Influence of naked body contact between mother and newborn on effective breastfeeding

Ruth Cantrill
Influence of naked body contact between mother and newborn on effective breastfeeding

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Synopsis

This thesis investigated the influence on breastfeeding of uninterrupted naked body contact between mothers and their newborn. The study explored breastfeeding initiation practices at the time of birth and examined relationships between duration of naked body contact and a range of breastfeeding and maternal outcomes.

There were four phases of this prospective, exploratory study. Phase 1 involved recruiting women (n = 100) who attended the public hospital antenatal clinic, were at least 36 weeks pregnant, intended to breastfeed, and had no aversion to holding their naked baby after birth. Participants provided demographic and antenatal information, a breastfeeding history and completed a standard questionnaire on breastfeeding confidence.

Phase 2 was an observation study of mothers from the recruited sample and their newborns (n = 78) for the first 60 minutes following birth. Events were recorded minute by minute on a prepared observation sheet and included placement of babies after birth, factors separating newborns from mothers, interruptions to naked body contact, newborn feeding behaviours, maternal action to assist babies in attaching to the breast, assistance received by mothers, and any routine medical or resuscitation interventions. Birth details were collected from medical records at this time.

Phase 3 involved postnatal observations of breastfeeding and structured interviews with recruited mothers (n = 96 out of 100) prior to discharge from hospital. A tool to observe maternal nurturing, positioning, attachment, breastfeeding, and maternal independence was developed and shown to be reliable. Mothers were interviewed to determine the extent of breastfeeding problems such as nipple pain and trauma, their experience of holding their naked baby at birth if this occurred, and perceptions of help and support to initiate breastfeeding.

The final phase (Phase 4) followed mothers at 2 weeks, 3 months and 6 months postpartum. The telephone interview asked about breastfeeding duration and problems. Questionnaires relating to maternal breastfeeding confidence and perceptions of milk adequacy were repeated at 2 weeks and 3 months.
Seventy-four percent (74%; 58 out of 78) of mother/baby dyads in the sample of observed births spent at least 30 minutes or longer together in naked body contact within the first hour after birth. While nearly all mothers experienced contact with their babies within the first minute after birth, less than half the mothers (42.6%; n = 26) who gave birth vaginally held their naked newborn on their bare chest immediately and remained together for 60 minutes. A further 46% (n = 28) held their babies in skin-to-skin contact for at least 30 minutes and seven did for less than 30 minutes or not at all. Four mothers (out of 17) who had a caesarean section held their newborn in naked body contact for at least 30 minutes of the first hour.

A quarter of the vaginally birthed newborns (n = 16) and all babies born by caesarean section (n = 17) were initially separated from their mothers. Skin-to-skin contact was interrupted for several mothers (n = 14). Seven mothers and babies did not experience naked body contact within the first hour following birth. Babies who did not begin skin-to-skin contact with their mothers immediately after birth were most commonly placed on the resuscitation cot. In many cases no resuscitation action was required and babies were returned to their mothers within a few minutes. Interventions such as administration of oxygen and/or suction were carried out for two thirds of babies born by caesarean section. Babies were then dried, wrapped and placed with their mothers or placed in the humidicrib for warmth and later placed in skin contact with their mothers. Some babies were kept wrapped or taken to the ward nursery for routine procedures and assessment.

Two thirds (n = 52) of infants in the present study commenced suckling within the first hour after birth. A quarter (n = 19) of babies initially separated began to suckle at the breast within the first 60 minutes after birth. Babies of multiparous women were significantly more likely to begin suckling within the hour ($\chi^2 (1) = 10.01, p < .01$). Twenty-seven percent (27%) of newborns were subjected to either oropharyngeal or nasopharyngeal suction soon after birth. Any form of suction administered had a negative effect on newborns achieving suckling during the first hour. A direct logistic regression model suggested that commencement of suckling within the hour was associated with four predictor variables: 1) duration of naked contact beyond 30 minutes; 2) baby’s chin nudging the underside of their mother’s breast; 3) ‘hands-on’ help that mothers received to position or attach their babies; and 4) no suction administered to babies ($F (7, n = 78) = 36.25, p < .001$).
A significantly higher proportion of babies achieved suckling (81.6% versus 52.5%) within the first hour in the birthing room if mothers received ‘hands-on’ help to position or attach their babies. A greater proportion of babies achieved suckling (56% versus 27%) within the hour if mothers received ‘hands-on’ help only to attach their babies to the breast. However, mothers who received ‘full assistance’, i.e. to position and attach their babies in the birthing room, reported significantly lower breastfeeding confidence at 2 weeks postpartum compared to mothers who did not receive assistance (t (65) = 2.16, p < .05).

Effective suckling observed in the postnatal period at around 48 hours was associated with the newborn infant’s body being stabilized against their mother’s body ($\chi^2 (1) = 9.087$, p < .01) and baby’s chin in firm contact with mother’s breast ($\chi^2 (1) = 7.05$, p < .01). A significant relationship was found between duration of skin contact greater than 55 minutes in the birthing room and no visible nipple trauma prior to discharge ($\chi^2 (1) = 4.12$, p < .05).

The wide variation in practices observed during the first hour after birth suggests inadequate attention is given to protect and support the first breastfeed. Duration of naked body contact between mother and newborn in the first hour after birth along with instinctive positioning of the baby at the breast contributes significantly to newborn suckling ability in the first hour after birth and during the later postnatal period. The present study extends current understanding of how positioning and attachment is taught to mothers by incorporating principles of instinctive positioning seen in the birthing room to subsequent breastfeeds and ongoing management. Birthing room intervention of naked body contact between mother and newborn and careful well-documented observation of newborn feeding behaviour would be of practical benefit to identify problems/difficulties early and provide support and guidance to mothers and their newborns.

Revisions for Baby Friendly Hospital Initiative (BFHI) best practice standards in ‘Steps 4 and 5’ to help mothers initiate breastfeeding and show mothers how to maintain breastfeeding are overdue and need to be addressed. The observation tools used in the present study inform best practice guidelines for timeframes to begin breastfeeding and assistance required. These tools would also be useful for auditing breastfeeding initiation practices in hospitals in relation to breastfeeding outcomes and sustained breastfeeding.
Acknowledgments

I would like to acknowledge the supervision and support provided by Professor Debra Creedy, Dr Marie Cooke, Dr Fiona Dykes and Associate Professor Janet Chaseling. Their enthusiasm and interest in this work was a great encouragement to me. The scholarly example of Debra, Marie and Fiona and their commitment to research in women’s health, nursing and midwifery education is truly inspirational.

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Thanks to Dr Hume Winzar who also provided guidance with statistical analysis.

To colleagues participating in, and who encouraged this work - thank you. Your challenging questions and moments of brief discussion over various issues, protocols, practices and observations all played a role in helping me to formulate ideas and questions and to give direction in various stages of the project. In particular Naomi Matenga assisted with important data entry.

Many thanks to the mothers who participated in the study and the fathers who agreed to share the precious first moments of the birth of their child with me, as research observer.

To many friends and family who took the time to listen and show interest in the progress of the work, I thank you. Your time and interest helped shape ideas and encouraged me to completion. In particular my immediate family have tolerated long hours of concentration that have gone into the research and writing. Brian, my husband has supported me throughout the process. Daughters Janelle and Nicole have assisted from time to time with data and managing the research literature database.

VC Graphics assisted with the final formatting of the document. Thank you Val and David for coming to the rescue.
Dedication

This research is dedicated to my brother Brian
Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the dissertation itself.

Ruth M Cantrill
# Table of Contents

**Synopsis** .......................................................................................................................................................... i

**Acknowledgments** ........................................................................................................................................ vii

**Dedication** ........................................................................................................................................................ ix

**Statement of Originality** ................................................................................................................................. xi

**Table of Contents** ........................................................................................................................................... I

**Appendices** ..................................................................................................................................................... IV

**List of Figures** .................................................................................................................................................. IV

**List of Tables** ................................................................................................................................................... V

**Glossary of Terms** .......................................................................................................................................... VI

  - Conference abstracts and presentations ........................................................................................................ IX
  - Posters .......................................................................................................................................................... IX

**Chapter 1** .......................................................................................................................................................... 1

  - Introduction ................................................................................................................................................ 1
    - BFHI, accreditation/ measurement and monitoring, and a critique of BFHI ............................................... 3
  - Problem statement ....................................................................................................................................... 4
    - Rationale and significance .......................................................................................................................... 7

**Chapter 2** .......................................................................................................................................................... 10

  - Naked body contact in the literature .......................................................................................................... 10
    - Skin-to-skin contact ................................................................................................................................... 12
      - Skin-to-skin contact for premature babies ............................................................................................... 12
      - Benefits of skin-to-skin contact for term babies ..................................................................................... 13
      - Skin-to-skin contact and breastfeeding duration ................................................................................... 14
      - Skin-to-skin contact and mother/infant interaction ............................................................................... 15
      - Skin-to-skin contact and newborn feeding ability ............................................................................... 17
      - BFHI best practice to enhance skin-to-skin contact .............................................................................. 21
    - Common breastfeeding problems .......................................................................................................... 22
      - Nipple pain .......................................................................................................................................... 23
      - Breast refusal ....................................................................................................................................... 25
      - Support and assistance .......................................................................................................................... 26
      - Maternal breastfeeding confidence ....................................................................................................... 27
      - Perception of milk adequacy .................................................................................................................. 29
  - Rationale, purpose and hypotheses .............................................................................................................. 31
  - Purpose ....................................................................................................................................................... 31
  - Hypotheses .................................................................................................................................................. 32
  - Summary .................................................................................................................................................... 32

**Chapter 3** .......................................................................................................................................................... 34

  - Method ..................................................................................................................................................... 34
    - Rationale for study design ....................................................................................................................... 34
      - Study aims .......................................................................................................................................... 36
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Postnatal observation of breastfeeding and follow-up</td>
</tr>
<tr>
<td></td>
<td>Birthing room observations</td>
</tr>
<tr>
<td></td>
<td>Breastfeeding history and intention</td>
</tr>
<tr>
<td></td>
<td>Reliability of instruments</td>
</tr>
<tr>
<td></td>
<td>Results: Duration of naked body contact and associated breastfeeding outcomes</td>
</tr>
<tr>
<td></td>
<td>Demographic characteristics</td>
</tr>
<tr>
<td></td>
<td>Reliability of instruments</td>
</tr>
<tr>
<td></td>
<td>Breastfeeding history and intention</td>
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<td></td>
<td>Birthing room observations</td>
</tr>
<tr>
<td></td>
<td>Postnatal observation of breastfeeding and follow-up</td>
</tr>
</tbody>
</table>

**Chapter 4**

**Research design**
- Validity of tools
- Staff education for BFHI accreditation

**Antenatal phase**
- Sample recruitment
- Procedure – antenatal phase
- Antenatal data collection
- Antenatal knowledge of skin-to-skin contact
- Breastfeeding intention and history
- Maternal confidence

**Birthing room observations**
- Birthing room observations tool
- Transposing of birthing room observation data
- Birthing events data

**Postnatal interviews and observations**
- Postnatal breastfeeding observation tool
- Postnatal interviews
- Extent of breastfeeding
- Nipple pain and trauma
- Positioning and attachment assistance
- Reported experience

**Postnatal and beyond: 2 weeks to 6 months**
- Procedure for postnatal follow-up interviews

**Ethical considerations**

**Data analysis**

**Summary**

**Results: Duration of naked body contact and associated breastfeeding outcomes**
- Response rate

**Demographic characteristics**
- Parity and health details

**Reliability of instruments**
- Skin contact knowledge
- Birthing room observations
- Postnatal breastfeeding observation tool
- Perception of assistance received tool

**Breastfeeding history and intention**
- Breastfeeding intention
- Antenatal breastfeeding preparation
- Prior breastfeeding
- Breastfeeding expectations

**Birthing room**
- Birthing room observations
- Baby feeding behaviours
- Mothers’ active involvement
- Assistance received by mothers

**Postnatal observation of breastfeeding and follow-up**
- Extent of breastfeeding at discharge
Preventing nipple trauma by naked body contact ................................................................. 182
Enhancing maternal breastfeeding confidence .................................................................. 183
Lactation and infant feeding outcomes ............................................................................. 184

Tools developed ..................................................................................................................... 184
Women’s knowledge of skin-to-skin contact ...................................................................... 185
Birth room observations ..................................................................................................... 185
Mothers’ perceptions of help received ................................................................................ 185
Postnatal observations ........................................................................................................ 186

Summary .................................................................................................................................. 186

References ................................................................................................................................. 189

Appendices

Appendix A Information sheets..................................................................................................221
Appendix B Consent obtained ..................................................................................................225
Appendix C Demographic and antenatal data ......................................................................227
Appendix D Queensland perinatal data collection ..................................................................234
Appendix E Pregnancy hand held record (PHHR) ..................................................................235
Appendix F Breastfeeding Self-efficacy Scale (BSES - Short Form) ....................................236
Appendix G Perception of Milk Adequacy (H&H scale) .........................................................237
Appendix H Birth Room Events ..............................................................................................238
Appendix I The birthing room observation grid sheet ..........................................................240
Appendix J Birth room checklist audit tool ..........................................................................249
Appendix K1 The postnatal breastfeeding observation tool (PBOT) ......................................251
Appendix K2 Follow-up prior to discharge .........................................................................252
Appendix K3 Follow-up at 2 weeks .....................................................................................258
Appendix K4 Follow-up at 3 months ...................................................................................263
Appendix K5 Follow-up at 6 months ...................................................................................268
Appendix L1 Perceptions of helpful and unhelpful midwifery practices .................................273
Appendix L2
Mother’s reported experience of holding naked newborn against their bare chest ..........275
Appendix L3 Words mothers used to describe the pain .........................................................276

List of Figures

Figure 1: Seth aged 50 minutes .............................................................................................. VIII
Figure 2: The BFHI ‘Ten Steps to Successful Breastfeeding’ .................................................2
Figure 3: Response rates, births observed and follow-up .....................................................63
Figure 4: Breastfeeding problems .........................................................................................77
Figure 5: Duration of naked body contact ...........................................................................84
Figure 6: Immediate skin contact & time suckled ...............................................................90
Figure 7: Separated initially & time suckled .......................................................................91
Figure 8: Mother supports baby’s whole body .................................................................94
Figure 9: Baby’s neck held by tong grip .............................................................................96
Figure 10: Back of baby’s head held .................................................................................96
Figure 11: Baby’s chin on mother’s breast .................................................................109
Figure 12: Stable positioning ..................................................................................113
List of Tables

Table 3:1 Intraclass Correlation Coefficient between observers .................................................................53
Table 4:1 Demographic characteristics of sample and sample of births observed compared with State or
National populations........................................................................................................................................65
Table 4:2 Rotated Component Matrix: Feeding behaviour.............................................................................70
Table 4:3 Rotated Component Matrix: Maternal action.................................................................................71
Table 4:4 Rotated Component Matrix Assistance received.............................................................................72
Table 4:5 Intraclass correlation coefficients PBOT ........................................................................................73
Table 4:6 Perception of help received (figures reported for all births).............................................................73
Table 4:7 Antenatal breastfeeding education.....................................................................................................74
Table 4:8 Breastfeeding and skin contact information....................................................................................75
Table 4:9 Knowledge of skin contact..............................................................................................................76
Table 4:10 Previous breastfeeding experience................................................................................................76
Table 4:11 Milk inadequacy............................................................................................................................78
Table 4:12 Previous breastfeeding experience................................................................................................78
Table 4:13 Type of birth....................................................................................................................................80
Table 4:14 Labor and adverse birth events.....................................................................................................81
Table 4:15 Analgesia /anaesthesia ..................................................................................................................82
Table 4:16 Episiotomy ......................................................................................................................................82
Table 4:17 Baby well being at birth ..............................................................................................................82
Table 4:18 Birth weight and sex .....................................................................................................................83
Table 4:19 Duration of skin-to-skin contact.....................................................................................................85
Table 4:20 Longest duration of skin-to-skin contact ....................................................................................86
Table 4:21 Resuscitation .................................................................................................................................88
Table 4:22 Events resulting in separation......................................................................................................88
Table 4:23 Time suckling commenced in relation to duration of skin contact .............................................90
Table 4:24 Suckling .........................................................................................................................................92
Table 4:25 Maternal action.............................................................................................................................94
Table 4:26 Assistance received ......................................................................................................................95
Table 4:27 Pearson’s product-moment correlation between breastfeeding scores .....................................97
Table 4:28 Exclusive breastfeeding at discharge .......................................................................................99
Table 4:29 Nipple pain ....................................................................................................................................101
Table 4:30 Nipple trauma...............................................................................................................................101
Table 4:31 Perception of assistance needed ..................................................................................................102
Table 4:32 Mean score differences between groups.....................................................................................105
Table 4:33 Classification Table (a) vaginal births; (n = 61).............................................................................108
Table 4:34 Equation variables vaginal births (n = 61)...................................................................................109
Table 4:35 Classification Table (a) all births (n = 78)...................................................................................111
Table 4:36 Equation variables all births (n = 78)...........................................................................................111
Table 4:37 Classification Table (a) all births (n = 72 out of 78).................................................................112
Table 4:38 Equation variables all births (n = 72)...........................................................................................113
Table 4:39 Breastfeeding at 2 weeks by birth type ......................................................................................115
Table 4:40 Breastfeeding at 2 weeks by birth type......................................................................................115
Table 4:41 Breastfeeding at 2 weeks by birth type......................................................................................115
Table 4:42 Problems reported at 2 weeks.....................................................................................................116
Table 4:43 H&H scale primiparae and multiparae comparisons .................................................................119
Table 4:44 BSES-SF and H&H scale mean scores .......................................................................................119
Table 4:45 Breastfeeding rates 2 weeks to 6 months ................................................................................122
Glossary of Terms

Artificial Baby Milk (ABM)

Cow milk based formula fed to infants ‘not breastfeeding’.

Baby Friendly Hospital Initiative (BFHI)

Baby Friendly Hospital Initiative aims to encourage health care practices that support breastfeeding.

Commencement of breastfeeding

When the baby grasps the nipple and begins suckling at the breast for the first time. Also termed ‘suckling achievement’ throughout the thesis (Glass & Wolf, 1994; Kroeger, 2003; Marmet & Shell, 1984; Medoff-Cooper & Ray, 1995; Medoff-Cooper & Gennaro, 1996; Righard & Alade, 1992; Webber, Woolridge & Baum, 1986; Wolf & Glass, 1992; Woolridge, 1986b).

Continuous skin-to-skin contact

Mothers and babies initially together in naked body contact within and beyond the first minute of birth; or baby kept with mother who looks at and examines their baby and then holds or picks up their naked baby (Widstrom & Thingstrom-Paulsson, 1993).

Continuous uninterrupted skin-to-skin contact

No event precedes the mother holding her naked newborn on her bare chest/abdomen within the first minute (or up to the first 5 minutes) of birth; baby and mother remain together in skin-to-skin contact without being separated for any reason for any length of time during the first 60 minutes after birth or until after the baby completes suckling at the breast for the first time.

Effective feeding

Sustained suckling with deep rhythmical suck-swallow-breathe-pause rhythms (Glover, 2005a; Newman & Pitman, 2000).
**Full assistance**

Hands-on assistance to position the baby and assistance to attach the baby by handling the mother’s breasts and/or by the back of the baby’s neck held in a tong grip to guide baby to the breast and help them begin to suckle.

**Hands-off assistance**

The midwife does not touch either the baby or the mother to assist with positioning the baby or to help the baby attach to breastfeed. Instead the mother is encouraged and supported, provided with information, questions are answered and most importantly newborn instinctive behaviours and responses of their baby is identified.

**Hands-on assistance**

The midwife or other helper handles the mother’s breasts or baby to assist with positioning and/or attachment to breastfeed.

**Interrupted skin contact**

Naked body contact commenced initially within 1 - 5 minutes after birth or at some point in time later but interrupted before the baby commenced breastfeeding or before completion of the first hour.

**Minimal assistance**

Hands-on assistance only to position.

**Moderate assistance**

Hands-on assistance to attach the baby by handling the mother’s breast/s, or by holding the back of babies necks in a tong grip to guide babies to the breast and help them begin to suckle.

**Multipara**

Woman who has been pregnant on at least one previous occasion and is pregnant again.
Pre-feeding behaviour

Newborns coordinate body and suckling action, orientate to new environment, home in, and attempt to attach to the breast and begin to suckle.

Previous breastfeeding experience

Woman who has previously experienced lactation and attempted to feed an infant at the breast.

Primipara

Woman who is pregnant for the first time.

Problem-free breastfeeding

Problem-free breastfeeding included: a pain score less than 2 during breastfeeding, no visible nipple trauma, baby feeds effectively (suck-swallow-breathe-pause patterns) with sustained attachment and mother manages breastfeeding independently.

Separated initially

Mother and baby are not together but are separated or moved apart for intervention, procedures or handling by others during the first minutes following birth.

Skin-to-skin contact

Naked baby placed prone on mother’s bare chest.

Figure 1: Seth aged 50 minutes
Conference abstracts and presentations


Posters

Cantrill, R., Knox, M., Cottle, T., Marsh, K., Crane, N., Solomon, S., et al. (2005) Keeping a breast @ Redland Hospital. Paper presented at the 5th Annual Health and Medical Research Conference, November, Brisbane, Queensland, Australia.
Chapter 1

Introduction

Breastfeeding is an important public health promotion initiative and cost effective intervention for maternal and child health and human longevity (Cunningham, 1995; National Health and Medical Research Council (NHMRC), 1996; Zeretzke, 1997). Health care costs are minimized as a result of increased breastfeeding rates in association with reduced infant and maternal morbidity and mortality (NHMRC, 2003; UNICEF, 2000; World Health Organization, 1996, 2003a). The World Health Organization (WHO) and government health authorities worldwide have set targets to increase both the initiation and duration of breastfeeding (Dykes, 1997; NHMRC, 2003; Nutbeam, Wise, Bauman & Harris, 1993; Queensland Health, 2003b; UNICEF, 2000).

Most women in Australia choose to breastfeed (Donath & Amir, 2000; Nutbeam et al., 1993) but report a range of common problems that interfere with their ability to sustain breastfeeding to three months (Nutbeam et al., 1993; Scott, Landers, Hughes & Binns, 2001). Indeed, most women do not sustain breastfeeding to six months or beyond (Donath & Amir, 2000; International Baby-Food Action Network (IBFAN), 2001). A range of common problems impacting on whether or not women sustain breastfeeding include: painful, sore or cracked nipples sometimes caused by poor attachment; perceptions of low milk supply, or mastitis leading to breast abscess (Minchin, 1998; World Health Organization. Department of Child and Adolescent Health and Development, 2000).

Problems experienced by women can undermine their confidence to feed and parent their child (Minchin, 1998; Righard & Alade, 1992). For example, if a baby remains sleepy and not interested in feeding for the first hours after birth, mothers may become disheartened and decide not to pursue breastfeeding. Similarly, if women experience difficulty attaching the baby or the baby seems unsatisfied after a feed, breastfeeding may be perceived as too difficult and change to alternative feeding methods. Many such problems can be prevented if appropriate support measures are in place when breastfeeding is initiated at the time of birth (Auerbach, 2000; Bernaix, 2000; International Lactation Consultant Association, 2005; Kroeger, 2004; Righard, 1996). Much attention has been given to improving breastfeeding rates (Blyth, Creedy, Dennis, Moyle, Pratt et al., 2002; Cox, 1998; Hughes & Cox, 1999; Scott et al., 2001; Vogel & Mitchell, 1998) but relatively little attention has been given to breastfeeding initiation.
Best practice standards for breastfeeding initiation in hospital are outlined by the ‘Ten Steps to Successful Breastfeeding’. These practice standards were developed by WHO/UNICEF in 1989 and launched in 1991 as the Baby Friendly Hospital Initiative (BFHI) with the aim to encourage health care practices that support breastfeeding (Moorhead & Pessl, 2000; Saadeh & Akre, 1996; UNICEF, 2000) (see Figure 2). The cumulative affect of all ‘Ten Steps’ for BFHI has been shown to increase breastfeeding initiation and duration in countries with low breastfeeding rates (World Health Organization, 1998).

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<th>Ten Steps to Successful Breastfeeding</th>
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<tr>
<td>Every facility providing maternity services and care for newborn infants should:</td>
</tr>
<tr>
<td>1. Have a written policy that is routinely communicated to all health care staff.</td>
</tr>
<tr>
<td>2. Train all health care staff in skills necessary to implement this policy.</td>
</tr>
<tr>
<td>3. Inform all pregnant women about the benefits and management of breastfeeding.</td>
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<tr>
<td>4. Help mothers initiate breastfeeding within a half hour of birth.</td>
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<tr>
<td>5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.</td>
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<tr>
<td>6. Give newborn infants no food or drink other than breastmilk, unless medically indicated.</td>
</tr>
<tr>
<td>7. Practice roaming-in – allow mothers and infants to remain together – 24 hours a day.</td>
</tr>
<tr>
<td>8. Encourage breastfeeding on demand.</td>
</tr>
<tr>
<td>9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.</td>
</tr>
<tr>
<td>10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.</td>
</tr>
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Figure 2: The BFHI ‘Ten Steps to Successful Breastfeeding’
(WHO.CHd, 1998)
Achieving BFHI accreditation includes ‘Ten Steps to Successful Breastfeeding’ beginning with a breastfeeding policy directive (Step 1), and education to improve breastfeeding knowledge (Step 2). The remaining eight steps are practices of health professionals to: inform mothers and their families about breastfeeding (Step 3); help mothers initiate breastfeeding (Step 4); show mothers how to maintain breastfeeding (Step 5); advise mothers who are breastfeeding to feed their babies only breastmilk (Step 6); allow mothers and babies to sleep in the same room (Step 7); advise mothers to feed their babies to need and not to a time schedule (Step 8); inform mothers how teats, dummies and other devices may interfere with effective breastfeeding (Step 9) and finally to refer mothers and families to peer and professional breastfeeding support in the community (Step 10).

**BFHI, accreditation/ measurement and monitoring, and a critique of BFHI**

The present study was conducted during the course of preparation for Baby Friendly Hospital Initiative (BFHI) accreditation at the Women and Birthing Services Redland Hospital. BFHI is a joint WHO/UNICEF global quality improvement and health promotion strategy embracing ‘Ten Steps to Successful Breastfeeding’ based on research known to engender an environment where breastfeeding is the norm. Eight of the ‘Ten Steps’ (Steps 3, 4, 5, 6, 7, 8, 9 and 10) are practices. ‘Step 1’ is a policy directive and ‘Step 2’ is an education intervention for health care staff. The main objective of BFHI is to improve breastfeeding outcomes for women, babies and families by increasing health professionals’ awareness of best practice. (WHO, CHD, 1998)

The accreditation process involves a pre-defined assessment of all 10 BFHI standards and comprises structured interviews with health care professionals, managers, receptionist staff, mothers and pregnant women; observations in the facility; and a review of the breastfeeding policy, breastfeeding information materials and staff education curricula (UNICEF UK Baby Friendly Initiative, 2001). In the past, hospitals in many countries have used the Self Assessment Tool provided by BFHI to identify areas of practice needing improvement (Cadwell, 1997; Dodgson, Allard-Hale, Brown & Duckett, 1999; Kovach, 2002). Data collection is guided by the global assessment criteria used by BFHI assessors related to breastfeeding policy; breastfeeding knowledge, skill and attitudes; breastfeeding education to women; documentation; practices; and changes in business dealings with baby food manufacturers (Cadwell, 1997; Saadeh, 2004).
Problem statement

Of particular interest to the current study is ‘Step 4’ of the global criteria in BFHI guidelines for accreditation. ‘Step 4’ criteria require newborns to be placed with their mothers immediately at birth or as soon as the mother is able to respond to her infant and to remain for at least 30 minutes. While ‘Step 4’ allows for individual preference of mothers and for variations in routine practice procedures, it is contrary to current research evidence on benefits of skin contact for breastfeeding initiation and research underpinning ‘Step 4’. Continuous uninterrupted skin-to-skin contact is the key element to facilitate newborn coordinated feeding behaviours to independently attach and suckle effectively (Righard & Alade, 1990; Righard & Alade, 1992; Widstrom, Ransjo-Arvidson, Christensson, Matthiesen, Winberg et al., 1987; Widstrom, Wahlberg, Matthiesen, Eneroth, Uvnas-Moberg et al., 1990). BFHI guidelines in the US have been reviewed to accommodate a full 60 minutes for women who have given birth vaginally, on the understanding that many babies may not be ready to begin breastfeeding until after the first hour (BFHI USA, 2004). Further more mothers may also not be ready to attend to breastfeeding immediately the baby is born. The wide discrepancies in policy recommendations and current research suggest a need for a major review of ‘Step 4’ of BFHI ‘Ten Steps’ as an important priority. ‘Step 4’ is the only step that has not undergone review (BFHI, 1999). It could be argued that ‘Step 4’ is in need of some change in wording to reflect current research evidence and accommodate individual mother’s needs.

Review is required for several reasons. Firstly, there is a lack of clarity for the term ‘skin-to-skin contact’ and at what stage mother/infant contact should begin. Secondly, there are differing opinions as to how long mothers and babies should remain in naked body contact for the first hour after birth. Thirdly, there is a contradiction between the best practice standard directive to initiate breastfeeding within 30 minutes and underpinning research for optimal time of readiness for newborn babies to begin suckling. Fourthly, discrepancies exist in the global assessment criteria as to how soon after birth maternity staff should be required to assist mothers and babies accomplish the first breastfeed. Finally, how help is offered or given to mothers in the first instance is not clearly defined.

Published tools proposed to measure the birthing room practices are inadequate to give any comprehensive understanding of practices and how such practices may relate to subsequent breastfeeding problems such as nipple pain, trauma and mothers’ lack of breastfeeding confidence. (WHO, 1999)
Despite BFHI recommended practices being known for over 10 years, recent studies show that the practical application of ‘Step 4’ (management of the first breastfeed) is most often neglected (Dasgupta, Battacharya, Das, Chowdhary & Saha, 1997; Rowe-Murray & Fisher, 2002). An important practice underpinning ‘Step 4’ is that newborns should not be separated from their mothers and that continuous skin-to-skin contact should be maintained at the time of birth (Righard & Alade, 1990). Skin-to-skin contact facilitates newborn adaptation, orientation to the breast, initiation of predictable feeding behaviour, coordination to attach correctly and breastfeed effectively (Widstrom et al., 1987). These points are explored in more detail in Chapter 2. Skin-to-skin contact also facilitates good attachment during breastfeeding in the first hour after birth (Righard & Alade, 1990; Widstrom et al., 1987; Widstrom et al., 1990). The establishment of effective skin-to-skin contact, however, is often impeded by common practices at the time of birth such as suctioning, separation, wrapping, injecting, and weighing (Auerbach, 2000; Righard & Alade, 1990; Righard & Alade, 1994).

One of the difficulties associated with the implementation of ‘Step 4’ relates to interpretation. Many authors and practitioners have focused on a ‘time limit’ as to when the baby should receive the first breastfeed (de Chateau & Wiberg, 1984; Edmond, Zandoh, Quigley, Amenga-Etego, Owusu-Agyei et al., 2006; Perez-Escamilla, Pollitt, Lonnerdal & Dewey, 1994; Thomson, Hartsock & Larson, 1979; World Health Organization, 1998; World Health Organization UNICEF, 1989). In line with this focus ‘Step 4’ was recently amended in the US to ‘maintain continuous skin-to-skin contact for at least the first hour after birth or until the mother indicates’ (BFHI, 2002; BFHI USA, 2004). It could be argued however, that skin-to-skin contact should be promoted as often as possible in the immediate postpartum period (Anderson, Moore, Hepworth & Bergman, 2003; International Lactation Consultant Association, 2005).

Currently in Australia the ambiguous expression of ‘Step 4’ remains in the criteria guide which is under review and the BFHI assessment guide for BFHI accreditation does not outline criteria to measure practices associated with the first breastfeed (ACMI/BFHI, 2004). The focus is on whether the mother and baby are in close proximity and not in skin-to-skin contact. Techniques recommended by BFHI to help mothers initiate breastfeeding are prescriptive and focus on correctness of technique. This technical approach, however, contradicts evidence-based research underpinning ‘Step 4’ and potentially interferes with the newborn’s innate ability to breastfeed and the mother’s ability to learn from her newborn baby. When such prescriptive techniques are misused by health professionals due to their poor understanding of human physiology, mothers
and babies are likely to receive conflicting and inappropriate advice, and consequently experience difficulties with breastfeeding (Glover, 2005a; Kroeger, 2004; Minchin, 1998; Noble & Bovey, 2002; Wolf & Glass, 1992).

There is also growing evidence of the effects of birthing room practices on breastfeeding initiation, but once again the global criteria suggested by BFHI are inadequate to measure breastfeeding initiation practices (WHO.UNICEF, 1992, 2004; World Health Organization, 1999). Knowledge of the benefits of skin-to-skin contact and birthing suite practices of health professionals may help or hinder breastfeeding initiation. One study identified that midwives’ knowledge of the innate abilities of neonates to orientate to the breast and begin suckling was generally poor (Cantrill, Creedy & Cooke, 2004). Some midwives reported using a ‘hands-on’ approach such as supporting the back of the baby’s head to prompt attachment even though this practice may hinder attachment and suckling. Several authors advocate that midwives use ‘hands-off techniques’ when helping women to initiate breastfeeding (Cox, 2000; Cox & Turnbull, 1998; Fletcher & Harris, 2000; Glover, 2003a; Wallace, Dunn, Alder, Inch, Hills et al., 2006). Furthermore, midwives do not consistently use strategies that empower mothers to gain confidence in breastfeeding (Auerbach, 2000; Chezem, Friesen & Boettcher, 2003). Indeed women consistently report conflicting advice and poor support for breastfeeding (Dykes, 2005a; Hailes & Wellard, 2000; Simmons, 2002).

In view of the ongoing ambiguity in the global BFHI assessment criteria more information is needed about the quality and duration of time that babies spend in skin-to-skin contact from birth to the first breastfeed and associated outcomes. Such research would inform assessments about positioning and suckling, and contribute to the prevention of attachment difficulties and other common breastfeeding problems experienced by mothers. The generation of evidence-based research for ‘Step 4’ may result in a higher rate of adoption of practices using skin-to-skin contact for breastfeeding initiation and a reduction in adverse maternal outcomes.
Aims of the study

The present thesis is concerned with the influence of uninterrupted skin-to-skin contact between mothers and their babies at the time of birth on breastfeeding initiation. The study aims to reveal breastfeeding initiation practices and explore relationships between duration of naked body contact between mother and newborn on a range of breastfeeding and maternal outcomes including breastfeeding success, duration, problems, and maternal breastfeeding confidence.

Rationale and significance

It is now well established that billions of dollars in health care costs would be saved if more mothers breastfeed (Drane, 1997; Kirk, 2002; Smith, 2001; Zeretzke, 1997). Global and national health targets aim to increase the number of infants being fed exclusively on human milk for the first 6 months of life and to continue breastfeeding into the second year of life (International Baby-Food Action Network (IBFAN), 1999, 2001; National Health & Medical Research Council, 2003; Queensland Health, 2003b; UNICEF, 2000).

Skin-to-skin contact for breastfeeding initiation is simple, natural and less involved than current methods used to ‘teach’ women how to breastfeed. Midwives are not always able to attend every breastfeed or explain every aspect of breastfeeding in the first 24 hours after birth nor would it be appropriate to do so (Cox, 2000; Glover, 2005a; Henderson & Scobbie, 2006; Henderson, Pincombe & Stamp, 2000; Smith, 2004). Research consistently shows uninterrupted skin-to-skin contact immediately after birth has important benefits that facilitate adaptation of mother and baby to coordinate breastfeeding initiation effectively and confidently. So if practice is in accordance with research evidence then babies are more likely to suckle effectively at the first breastfeed, and mothers are more likely to gain confidence in their ability to breastfeed, have a positive breastfeeding experience, and be less likely to experience trauma, frustration, anxiety, and dissatisfaction. Research underpinning ‘Step 4’ clearly shows that when babies are kept in continuous skin-to-skin contact to initiate breastfeeding they are more likely to orientate, coordinate, attach correctly and suckle effectively (Righard & Alade, 1990; Widstrom & Thingstrom-Paulsson, 1993).

Several important gaps have been identified in the literature. Despite consistent evidence on the benefits of continuous skin-to-skin contact no studies to date have made an in-depth exploration of the relationship between duration of naked body contact between mothers and their newborns during the first hour following birth and effective breastfeeding. No reported studies have
explored the help mothers receive to begin breastfeeding for the first time and subsequent breastfeeding outcomes such as maternal breastfeeding confidence and the incidence of common breastfeeding problems of nipple pain and trauma. No study to date has observed whether staff in attendance at birth facilitate breastfeeding initiation by encouraging continuous skin-to-skin contact. Instead the emphasis has been placed on staff ensuring the baby is breastfed within a stipulated timeframe. Finally, no measures are in place to examine how women are assisted or how they are taught positioning and attachment. There are wide variations in opinion between health workers in regards to these important practices for breastfeeding initiation.

**Structure of the thesis**

Chapter 1 has provided an overview of the importance of breastfeeding and BFHI. Of particular interest to the present study is the ‘Ten Steps to Successful Breastfeeding’ and successful implementation of ‘Step 4’. Despite considerable knowledge about the benefits of continuous skin-to-skin contact for breastfeeding initiation and best practice standards, there is very little research in the area. The present study aims to investigate breastfeeding initiation practices at the time of birth and explore relationships between duration of naked body contact between mother and newborn on a range of breastfeeding and maternal outcomes.

Chapter 2 critiques the literature on skin-to-skin contact and effective breastfeeding initiation. This includes a review of studies on skin-to-skin contact and breastfeeding initiation, positioning, attachment, and suckling. The techniques used by health professionals, particularly midwives, are examined. Studies exploring skin-to-skin contact and breastfeeding duration, problems, and maternal factors such as breastfeeding self-confidence and perception of milk adequacy are discussed. This chapter concludes by outlining the research questions of the study.

Chapter 3 presents the methodological considerations for the study. This prospective, longitudinal study includes four phases of data collection that occurred during the last trimester of pregnancy, at the time of birth, 24 - 72 hours after birth, and following discharge from hospital at 2 weeks, 3 months and 6 months. The approach to recruitment and a description of the participating site is provided. A description of the approach to data analysis is outlined and ethical considerations are discussed.
Chapter 4 presents the substantive results of the thesis. These include the sample characteristics, results of the labour room observation study of mothers and their newborns for the first 60 minutes following birth, as well as findings from the postnatal observations of breastfeeding and structured interviews with recruited mothers. Breastfeeding outcomes at 2 weeks, 3 months and 6 months postpartum are presented.

The discussion of results is presented in Chapter 5. Key findings relate to duration of naked body contact and associations with suckling achievement in the birthing room and effective suckling prior to leaving hospital at around 72 hours postpartum. Maternal confidence is discussed in relation to duration of naked body contact between mother and newborn and breastfeeding problems, and mothers’ experience such as nipple pain and trauma. Assistance that mothers receive from midwives in the birthing room to position and attach their infants to breastfeed and relationships to effective suckling are also discussed.

The thesis concludes by outlining the major implications of this study in regards to breastfeeding initiation. Recommendations for clinical practice such as revisions for BFHI best practice standards in ‘Step 4’ to help mothers initiate breastfeeding and ‘Step 5’ observation tools for auditing breastfeeding initiation practices in hospitals in relation to breastfeeding outcomes are presented. Finally, recommendations for further research such as the effects of implementing audits of birthing room practices on practice change are outlined.
Chapter 2

Naked body contact in the literature

This study explores associations between duration of skin-to-skin contact for mothers and newborns during the first hour following birth on newborn feeding ability and maternal outcomes. In this chapter the research literature on skin-to-skin contact at the time of birth in relation to effective breastfeeding will be reviewed. Research in regards to the physiological benefits of skin-to-skin contact, innate neonate feeding abilities, common breastfeeding problems, maternal confidence, and practices for successful breastfeeding will be critiqued.

A range of breastfeeding topics were accessed in the literature for the present study. A systematic search of MEDLINE, CINAHL, psychLIT and ERIC databases was conducted using several key search terms. Firstly, “skin-to-skin contact” or “kmc” or “kangaroo mother care”. Secondly “breastfeeding” or “breast feed/ing” and “initiation” and “duration”. Thirdly “suck” or “suckling” or “sucking” and “attachment” and “position/ing”. Other search terms used in combination with “breastfeeding” were “nipple pain” or “trauma” “confidence” “education” “rates” and “experience”. The Cochrane Library was also searched using the similar search terms. Search terms were combined in various sets to find the most relevant research literature. Additionally relevant journals such as Journal of Human Lactation and Breastfeeding review were hand searched. Reference lists of all specifically relevant papers were retrieved to examine key studies cited by policy documents such as those by BFHI, ILCA and government health policy.

A plethora of research has aimed to identify factors that influence breastfeeding outcomes for mothers (Fetherstone, 1995; Scott & Binns, 1999; Scott et al., 2001; Scott, Aikin, Binns & Aroni, 1999; Vogel, Hutchison & Mitchell, 1999). A wide range of non-modifiable demographic factors such as age, education, income, marital and immigration status and cultural and social background has been consistently identified with poor breastfeeding outcomes (Hughes & Cox, 1999). It has long been recognised that factors such as antenatal class attendance, maternal decision, satisfaction (Couto de Oliveira, Bastos Comacho & Tedstone, 2001; Scott et al., 1999), social and family support (Arora, McJunkin, Wehrer & Kuhn, 2000) and knowledge within cultures (Davies-Adetugbo, 1997), are also known to be associated with breastfeeding initiation and duration outcomes (Ceriani Cernadas, Noceda, Barrera, Martinez & Garad, 2003; Duckett, Henly & Gravis, 1993; Fetherstone, 1995; Renfrew, Woolridge & McGill, 2000b).
Much literature describes women’s experience of breastfeeding. As well as being a biological experience, the complexity of breastfeeding is relational, social and cultural (Baumslag & Michels, 1995; Blum, 1999; Esterik, 1995; Giles, 2003; Kitzinger, 2005; Palmer, 1993a; Stuart-Macadam & Dettwyler, 1995). Women’s breastfeeding experiences are diverse and complex as are their interactions with health professionals (McFadden, Renfrew, Dykes & Burt, 2006; Renfrew, McFadden, Dykes, Wallace, Abbott et al., 2006; Renfrew, 2005; Smale, Renfrew, Marshall & Spiby, 2006). The focus of the present research is on practices in the birthing room that support women’s intention to breastfeed.

Supportive practice interventions such as keeping mothers and babies together at the time of birth, and professional assistance in helping mothers to manage positioning and attachment of their babies to the breast have been shown to positively influence outcomes of confidence, success and satisfaction for breastfeeding mothers (Chezem et al., 2003; Couto de Oliveira et al., 2001; Cox, 1998; Cox & Turnbull, 1998; Fletcher & Harris, 2000; Papinczak & Turner, 2000). Research has shown that when babies are put to the breast within the first hour of birth, mothers breastfeed for longer (Edmond et al., 2006; Salariya, Easton & Cater, 1978). However, very little attention has been given specifically to the extent to which (1) the practice intervention of skin-to-skin contact in relation to effective breastfeeding and; (2) the help mothers receive at the time of birth are associated with successful breastfeeding.

In recent times much emphasis has been placed on promoting exclusive breastfeeding for around 6 months’ duration (International Baby-Food Action Network (IBFAN), 1999, 2001; World Health Organization, 2003a). However, the majority of mothers do not achieve exclusive breastfeeding for 6 months nor continue to breastfeed beyond that point. This trend is of concern for the health of the population and escalating healthcare costs (Weimer, 2001; World Health Organization, 2003b).

Much research has focused on promoting breastfeeding by educating mothers and providing follow-up postnatal support (Henderson, Stamp & Pincombe, 2001; Hill, 1987; Lindenberg, Artola & Jimenez, 1990; Schy, Maglaya, Mendelson, Race & Ludwig-Beymer, 1996). However, an over-emphasis on follow-up support without a proper understanding of how initiation practices may influence subsequent breastfeeding may contribute to breastfeeding problems and early cessation. Similarly, duration of breastfeeding is often reported without attention to common breastfeeding problems experienced in the early postnatal period that may contribute to breastfeeding cessation. Even though government and health authorities continue
to push for increased breastfeeding rates, management of breastfeeding initiation has not been adequately studied (Anderson, Moore, Hepworth & Bergman, 2002; National Health & Medical Research Council, 2003; World Health Organization, 2003a, 2003b). In order to effectively promote breastfeeding duration, health care professionals need to practice supportive initiation interventions that reliably influence immediate and long term outcomes.

**Skin-to-skin contact**

All studies that were found from the database search concerning breastfeeding initiation of term infants in the birthing room and naked body contact between mother and newborn were examined and critiqued to find the gaps in the literature for the present study. Researchers who are experts in the field of skin-to-skin contact were contacted and their websites accessed to further retrieve lists of studies conducted specifically on breastfeeding initiation in the birthing room and skin-to-skin contact.

There are many known benefits of naked body contact between mothers and newborns. Research has focused on the effects of skin-to-skin contact for physiological stability in premature and term babies, breastfeeding initiation and duration, neonate suckling ability, as well as maternal-neonate interaction. The research evidence underpinning ‘Step 4’ of the ‘Ten Steps to Successful Breastfeeding’ is also reviewed. ‘Step 4’ advocates naked body contact between mother and newborn for the first hour after birth to begin breastfeeding successfully.

The next section will discuss benefits of skin-to-skin contact for premature infants and full term infants. Discussion will focus on breastfeeding duration, mother-infant interaction, newborn feeding ability and best practice standards advocated by BFHI.

**Skin-to-skin contact for premature babies**

Kangaroo mother care or skin-to-skin contact is known to reduce morbidity and mortality in low birth weight infants (Conde-Agudelo, Diaz-Rossello & Belizan, 2001). Researchers have found hours of skin-to-skin contact care positively influence outcomes for premature infants (Anderson, 1991; Bergman, Linley & Fawcus, 2004; Feldman, Eidelman, Sirota & Weller, 2002; Ludington-Hoe, Hadeed & Anderson, 1991; Ludington, 1990). Skin-to-skin contact for premature babies is also known to impact on growth. In a randomized control trial, researchers found that preterm babies held in skin-to-skin contact had greater head growth than babies held in the traditional way (Rojas, Kaplan, Quevedo, Sherwonit, Foter et al., 2003). Studies have also
shown that milk volume can be increased in mothers who hold their preterm babies in skin-to-skin contact (Hurst, Valentine, Renfro, Burns & Ferlic, 1997).

**Benefits of skin-to-skin contact for term babies**

Term babies also benefit by naked body contact with their mothers. A Cochrane review of 17 studies involving 806 participants reported many positive effects of early skin-to-skin contact for healthy term babies (Anderson et al., 2003). Positive effects include successful breastfeeding at 1 to 3 months, and higher summary scores of maternal affectionate love/touch, maintenance of infant temperature and blood glucose, as well as decreased infant crying.

In a randomized control study, temperatures of newborn babies (n = 25) kept in skin-to-skin contact were significantly higher at 90 minutes of age than those babies nursed in the open cot (Christensson, Siles, Moreno, Belaustequi, De La Fuente et al., 1992). While separation was accurately defined as ‘any interruption in the body-to-body mother/infant contact during the first 1 – 2 hours’, and mothers held their babies momentarily at the start, all babies and mothers were then separated for routine hospital procedures. Babies were wrapped and put prone on their mother’s abdomen, umbilical cord cut 30 seconds after birth and arterial blood sample taken, baby removed and routine hospital procedures carried out at 4 – 12 minutes such as baby dried, physical examination, mouth pharynx suctioned, and baby weighed (Christensson, Cabrera, Christensson, Uvnas-Moberg & Winberg, 1995; Christensson et al., 1992). The study was therefore limited, in that immediately after birth, babies were subjected to routine procedures before being placed with their mothers. Furthermore, no information is available from this study as to breastfeeding initiation during the 90 minutes that babies spent in skin contact with their mothers.

Skin-to-skin contact between mothers and newborns can influence high levels of oxytocin promoting the milk ejection reflex and milk production and as such positively influence breastfeeding initiation (Matthiesen, Ransjo-Arvidson, Nissen & Uvnas-Moberg, 2001; Nissen, Lilja, Widstrom & Uvnas-Moberg, 1995b; Renfrew, Lang & Woolridge, 2001b). Furthermore, skin-to-skin contact is known to provide a calming effect for term and premature babies during times of painful interventions such as the common heel pick to collect blood for routine tests (Gray, Watt & Blass, 2000; Ludington-Hoe, Hosseini & Torowicz, 2005).
Skin-to-skin contact and breastfeeding duration

Several studies claim that early mother/infant contact either by commencing breastfeeding or experiencing some skin-to-skin contact influences duration of sustained breastfeeding (de Chateau & Wiberg, 1977b; Taylor, Maloni & Brown, 1986; Thomson et al., 1979). Salariya, Easton and Cater (1978) reported that early initiation of breastfeeding within 10 minutes of birth was related to longer duration of breastfeeding. They compared four groups of mothers, two of whom experienced early contact with their infant (n = 27 and n = 26) and the other two groups (n = 29 and n = 27) who had late contact. Within the early and late contact groups one subgroup breastfed second hourly while the other breastfed fourth hourly. A major limitation of this study was that early contact was not defined clearly other than infants were ‘put to the breast’ within 10 minutes of birth by a midwife. Babies likely to have suckling difficulties were excluded thus potentially biasing the results. While postnatal nipple pain and trauma were mentioned in the form of sore and cracked nipples, these were reported as minimal and treated promptly with chlorhexidine aerosol spray which has since been shown to be an inappropriate treatment. It is possible that longer duration of breastfeeding was influenced by more frequent feeding in the early days rather than early skin-to-skin contact.

Although feeding was supervised by a midwife, no information was given in regards to standardization of supervision and the knowledge base of attending midwives. Although the study reported that no babies experienced latch difficulties at the first breastfeed, some mention is given of cracked nipples, which is an indication of poor attachment (Woolridge, 1986a). The study states nipple problems were minimal and treated with chlorhexidine gluconate 0.2% ‘at first sign’ but these were not fully reported in the analysis. Another limitation of the study is that complementary feeds were freely available which suggests a number of babies were not being exclusively breastfed in hospital. Supplementation is known to impact on duration of later exclusive breastfeeding (Colin & Scott, 2002; DiGirolama, Grummer-Strawn & Fein, 2001). Furthermore, infants were not breastfed at night while in hospital, instead they were comforted or given water. This study focused only on early initiation and frequency of breastfeeding for sustained breastfeeding but the extent of breastfeeding outcomes were not reported so it is not known whether breastfeeding babies were being exclusively or partially breastfed during the follow-up.

A Cochrane review of randomized and quasi-randomized trials comparing early skin contact and breastfeeding with late skin contact and breastfeeding concluded no difference in duration of breastfeeding between those mothers who had early or late contact for breastfeeding initiation.
with their newborn infants (Renfrew, Lang & Woolridge, 2001c). Recommendations from the review suggested that medical interventions that delayed the time of the first breastfeed should be avoided and mothers should have contact with their babies as long as they wish (Renfrew et al., 2001c).

**Skin-to-skin contact and mother/infant interaction**

The work of Klaus and Klaus (1998) demonstrates that naked body contact between mother and newborn at birth can enhance bonding and attachment. Klaus (1998) suggests there is mounting evidence that interaction between mothers and their infants in the first moments after birth are biochemically modulated and may influence early emotional attachment between mothers and their newborns. Previous work of these authors also strongly suggests emotional ties are strengthened when mothers and their newborn babies are kept together from the moment of birth (Klaus, 1972; Klaus & Kennell, 1982; Klaus, Kennell & Klaus, 1995). Skin-to-skin contact between mother and baby at the time of birth has been found to positively influence mothers’ feelings of acceptance toward their babies (Robinson, 2000).

Studies have found that mothers behave more positively toward their infants after holding their babies in skin-to-skin contact during the first hour following birth. One study included 63 mother-infant pairs divided into three groups (de Chateau & Wiberg, 1977a; 1977b, 1984). The intervention group of 22 mother-infant pairs received 10 - 15 minutes of skin-to-skin and suckling contact within the first 25 - 30 minutes following birth. Two control groups received routine care where babies were shown to their mothers briefly and then taken to a different room for routine weighing, wrapping and bathing before being returned beside mother’s bed in a cot so mothers could watch their babies and touch their faces. Observations of 35 different predetermined and defined behavioural items were scored and noted on a check sheet at around 36 hours (32 - 34 hours). Mothers who received extra skin-to-skin contact and suckling immediately following birth behaved differently toward their infant than mothers who received no contact (de Chateau & Wiberg, 1977a). Mothers in the contact group were observed cuddling and touching their infants more at 36 hours after birth. At three months, these mothers were more likely to smile at their babies and kiss them significantly more (de Chateau & Wiberg, 1977b). Similarly, infants in the contact group smiled and laughed in response to their mothers significantly more than babies in the non-contact groups. Mothers in the contact group also reported breastfeeding their infants for around two and half months longer than routine care mothers at 12 month follow up (de Chateau & Wiberg, 1984).
This particular longitudinal study (published in three follow-up stages) however is limited in that skin-to-skin contact between mother and infant did not begin until about 10 minutes after the time of birth and interventions such as rinsing of mouth and upper airways, and emptying of the stomach were performed before infants were placed with their mothers. Actual contact was limited in that midwives helped infants attach to mothers’ breasts to suckle within five minutes of being placed in skin-to-skin contact and then babies were removed. Breastfeeding was not resumed until after four hours and mothers and babies were not kept together thereafter until after the third day postpartum. There is no information in the published paper as to how well babies suckled at the time of birth and no detail on what help mothers received. These early studies focused only on the time that contact was initiated but not the quality of early contact in terms of skin contact duration or effectiveness of suckling and implications for later breastfeeding.

The work of Widstrom, Wahlberg, Matthiesen et al. (1990) also suggests that mother-infant relationships are positively influenced as a result of skin contact time after birth. This study evaluated the effects of suckling within 30 minutes after birth when skin-to-skin body contact for mothers and infants was held constant in both cases (n = 32) and control groups (n = 25). Suckling ability was assessed by the assisting midwife as “suckled well”, “tried to suck but licked most of the time”, and “did not suck or lick”. Mother-infant interaction during breastfeeding, infants’ time spent in nursery, and different aspects of breastfeeding were evaluated. Only six (19%) of the 32 case infants suckled at this time, 59% tried but licked most of the time, and 22% of babies did neither. However further results showed that in the group where all infants had touched or licked the areola and nipple, mothers left the infants in the nursery for a significantly shorter time and more mothers talked to their infants during the short breastfeeding observation. An infant’s early touch of the mother’s areola and nipple positively influenced the mother-infant relationship during the first four days after birth. This study was limited as infants assigned to the suckling group were ‘put to the breast’ with assistance of staff. Mothers in the control group who first breastfed their infants at around 8 hours after birth assessed the effectiveness of suckling themselves. As such there was no consistency in observing effectiveness of suckling and this limitation may have contributed to data bias.
Skin-to-skin contact and newborn feeding ability

Newborn babies have an acute sense of smell that enables them to orientate to their new environment and find the breast while kept in naked body contact with their mothers (Porter & Winberg, 1999; Varendi, Porter & Winberg, 1994). Furthermore the protein substance in the liquor in utero matches the odour of the substance secreted around the areolar breast tissue for individual mothers and this helps to guide the infant when seeking the nipple (Porter & Winberg, 1999). Several studies have found that prolonged naked body contact between healthy newborn babies and their mothers immediately after birth contributes to newborns’ ability to coordinate innate suckling reflexes to initiate effective breastfeeding (Righard & Alade, 1990; Widstrom, Ransjo-Arvidsson & Christensson, 1996; Widstrom et al., 1987; Widstrom & Thingstrom-Paulsson, 1993).

Research evidence shows that newborn feeding behaviour can be disturbed by certain procedures and events after birth. For example, reports confirm that analgesia given during labour disturbs newborn feeding behaviour (Nissen, Lilja, Matthiesen, Ransjo-Arvidsson, Uvnas-Moberg et al., 1996; Nissen, Widstrom, Matthiesen, Uvnas-Mberg, Jacobsson et al., 1997; Ransjo-Arvidsson, Matthiesen, Lilja, Nisser, Widstrom et al., 2001). Separation from mothers has also been shown to increase infant anxiety and disturb newborn adaptation conducive to coordination for instinctive feeding ability (Christensson et al., 1995). One study reported that when babies are separated from their mothers in the first week of life the duration of breastfeeding is reduced (Elander & Lindberg, 1984).

One well designed study observing newborn feeding behaviour for breastfeeding (Widstrom, et al. 1987) evaluated the effects of gastric suction on newborn feeding behaviour of 21 healthy newborn term gestation infants in naked body contact with their mothers. Infants’ apgar scores were 8 or more at 1 and 5 minutes. Babies were dried and placed on their mothers’ chest immediately following birth. Routine suctioning of gastric contents was carried out on 11 randomly selected infants who were then replaced between their mothers’ breasts. Intensive observations (2 minute periods every 15 minutes) over 3 hours were carried out on all infants for intensity of spontaneous oral sucking activity and state of sleep and wakefulness using the Brazelton Neonatal Behaviour Assessment Scale (BNBAS). Continuous observations were also carried out over the next 3 hours to record the first moment in time infants put hand-to-mouth, found the nipple independently, and the first onset of suckling. Significant differences between groups were found in the maximal time of spontaneous suckling movements and in the distribution of lag time between the first hand-to-mouth movement and the onset of suckling.
There was a greater variation in time the first hand-to-mouth action occurred in infants subjected to gastric suction.

This research was the first to document organised feeding patterns developing in a predictable way in the first hours following birth. However the study is limited in that after 5 minutes of suckling, infants were disturbed in order to perform hospital protocols and so no quality or effectiveness of suckling was defined for the first breastfeed. There was no follow up to verify the value of uninterrupted skin-to-skin contact for protecting the instinctive suckling reflex for optimal attachment to the breast or if the disturbance of suckling ability had implications for breastfeeding problems commonly experienced by mothers. Sustained breastfeeding was not evaluated.

Widstrom and Thingstrom-Paulsson (1993) videotaped 11 mother/newborn pairs until a distinct rooting reflex was seen and they recorded the position of the tongue in the mouth cavity during rooting reflexes elicited before the first suckle. The videotapes of the rooting reflex were analysed and infants’ awake states were assessed according to the Brazelton Neonatal Behaviour Assessment Scale (BNBAS). Two important findings were observed from this research in relation to management of breastfeeding initiation. Firstly licking movements preceded and followed the rooting reflex in all but two infants (who were reported to be drowsy). Secondly, it was significantly more common than not for the tongue to be placed at the bottom of the mouth cavity during a rooting reflex and for maximal opening of the mouth to occur when the head was turned to the side (seen in 10 out of 11 infants). This research demonstrated that an alert newborn infant with distinct and undisturbed rooting reflexes, who is not crying, places the tongue low in the mouth to be able to attach to the nipple and suckle. When crying, healthy infants place the tongue on the palate and have difficulty attaching.

Widstrom and Thingstrom-Paulsson (1993) proposed that healthy newborns have the competency to grasp the nipple and should be left until they show hunger and optimal reflexes capable of attaching to the nipple by themselves. Furthermore, when infants are ‘helped’ to attach to the breast as is often the practice in hospitals, rooting reflexes are not optimally elicited and can even be disturbed. Even gently forcing a crying baby to the breast might cause the baby to instinctively place their tongue on their palate and at the next feed they may repeat the same reaction leading to preventable breastfeeding problems. Although numbers were small in this study and there were no comparison groups or follow-through of subsequent breastfeeding
episodes to verify findings, the insights for management of attachment using a ‘hands-off’ approach contribute enormously to clinical practice.

One of the most widely quoted studies on the effects of skin-to-skin contact in the birthing room for effective suckling at breastfeeding initiation is Righard and Alade’s (1990) observation of newborn feeding behaviour conducted in Sweden. They recorded two different ward routines of separation and contact, and observed the suckling technique of 72 infants of normal birth weight with apgar scores of 9 or 10, born to healthy mothers by uncomplicated vaginal birth, for the first 2 hours after birth. In the contact group, the naked infant was left to rest on the mother’s bare abdomen for at least 1 hour or until the first breastfeed was achieved. Infants in the separation group were removed after about 15 - 20 minutes of skin-to-skin contact with mothers for routine procedures such measuring, weighing, bathing and dressing which took around 20 minutes to do. Researchers observed babies display sequential feeding behaviours, first arm and leg arm movements at around 19 minutes followed by mouthing and sucking. It was reported that most babies in the study took the breast by their own efforts by around 49 minutes on average, and suckled for about 20 minutes. A significant difference was noted in success and failure of suckling between the two groups. Significant differences were also found between suckling ability of babies whose mothers were administered pethidine analgesia during labour and those who had not. It was concluded that routine ward practices of continuous uninterrupted skin-to-skin contact and administration of pethidine during labour were crucial determinants for effective suckling techniques for the first breastfeed following birth.

Limitations of this study included no randomization of participants, instead routine choice of care was decided between mother and midwife at the time of birth and mothers fell naturally into either a separation (n = 34) and a contact (n = 38) group. Correct suckling technique was defined as wide open mouth, tongue under areola and expressing milk with deep sucks; however, observation of effective suckling may be subjective according to individual view point and no descriptors of positioning of the infant for optimal attachment were given in the paper. No definitions of good positioning for effective suckling were described or reported being explained to mothers. Furthermore no follow up of participants was carried out to determine ongoing implications of achieving suckling in the birthing room or whether mothers continued to manage positioning their infant at the breast for effective attachment and suckling or in regard to breastfeeding outcomes of nipple pain and trauma commonly reported by mothers as problematic.
Recently, Carfoot, Williamson and Dickson (2005) conducted a randomized controlled trial in the north of England with 204 mother/infant pairs to investigate the effects of skin-to-skin contact on breastfeeding success in the birthing room. Mothers randomized to routine care (n = 102) were given their baby wrapped in a towel; then the baby was removed for routine procedures such as weighing, dressing, measuring or if maternal perineum suturing was required. Midwives offered assistance with breastfeeding when mothers and babies were ready. Mothers in the skin-to-skin contact group (n = 102) received their naked newborns on their bare chest as soon as possible after birth which was usually after the baby had been weighed. Midwives helped mothers attach their baby to the breast. The infant breastfeeding assessment tool (IBFAT) (Matthews, 1988) was adapted and used to assess breastfeeds both in the birthing room and postnatally. Midwives helped mothers put their babies to the breast when both were ready. Results identified that more mothers who received skin-to-skin contact tended to have successful breastfeeds and there was no evidence of any benefit of skin-to-skin contact for subsequent postnatal feeds. There was no evidence of any effect of sustained breastfeeding at 4 months.

Significantly more mothers were satisfied with their experience initiating breastfeeding if they received uninterrupted naked body contact with their baby for at least 30 minutes or beyond. Although numbers for this study were large compared to previous studies, several methodological weaknesses are noted. Mothers in this study received help from midwives to position and attach their babies but the help received was not defined or qualified. Only 45 minutes of skin-to-skin contact was prescribed for the contact group. This duration of skin contact may have been inadequate as available evidence suggests 60 minutes duration or longer. For example, Widstrom and Thingstrom-Paulsson (1993) videotaped and analysed the rooting reflex of 11 newborn babies while in skin-to-skin contact with their mothers from the outset of birth and none began suckling within 30 minutes of birth. Carfoot et al. (2005) also reported that skin-to-skin contact was interrupted for almost 20% of the contact cases. Some were moved in response to maternal request but in other cases the midwife decided to interrupt the contact before the end of the 45 minutes for almost half of these cases. Furthermore, there was no description or definition for pre-feeding behaviours which may constitute ‘readiness to feed’ for babies.

Most studies examining the effects of early contact between mothers and infants have focused on two themes, 1) skin-to-skin body contact; and 2) suckling attempt. But these two areas have not always been examined as separate entities with the exception of the study by Widstrom et al
(1990). Even in this study, however, it is not clear at what point babies and mothers were placed in skin contact as the article reports according to hospital routines but does not give times suffice to say within 30 minutes.

**BFHI best practice to enhance skin-to-skin contact**

Best practice standards recommended by the Baby Friendly Hospital Initiative (BFHI) include management of the first breastfeed which is ‘Step 4’ of the ‘10 Steps for Successful Breastfeeding’. As outlined above, research underpinning ‘Step 4’ clearly shows that when babies are kept in skin-to-skin contact to initiate breastfeeding they are more likely to orientate, coordinate, attach correctly and suckle effectively. Some researchers suggest that mothers are more likely to sustain breastfeeding when newborns breastfeed within the first hour following birth or if the time interval between the time of birth and breastfeeding initiation is less than 1 to 2 hours (BFHI, 2002; Cattaneo & Buzzetti, 2001; DiGirolama et al., 2001). Since the implementation of BFHI, several studies have shown that when ‘Step 4’ is implemented with the other steps there is an effect on duration of breastfeeding.

Dasgupta et al. (1997) compared two groups of postnatal mothers (n = 102) before and after the introduction of BFHI in the maternity setting. After introducing BFHI ‘Ten Steps’ there was a significant reduction in the time lapse between birth and the first breastfeed for all types of births. However, the extent to which continuous skin-to-skin was practised to initiate breastfeeding was not reported.

DiGirolama et al. (2001) surveyed women (n = 1085) in the USA to assess the impact of type and number of Baby Friendly practices on breastfeeding. Researchers found that a cumulative effect of practices was important for optimal breastfeeding outcomes. Of relevance to the present study was the finding that late breastfeeding initiation and supplementing breastfeeds with formula were statistically significant risk factors for early termination of breastfeeding by 6 weeks after controlling for other risk variables. However DiGirolama et al. (2001) did not differentiate between full and partial breastfeeding at discharge and results may have been more pronounced if only full breastfeeding criteria had been applied. Another limitation of this study was that naked skin contact at the time of birth was not observed and no documentation of duration of skin contact or chart audits was conducted to verify the extent of practice. Furthermore, data were not available for other relevant BFHI standards of practice and so were not included in the analysis.
Mikiel-Kosryna, Mazur and Boltruszko (2002) used a prospective cohort study with a group of 1250 Polish children and found that infants kept with their mothers for at least 20 minutes were exclusively breastfed longer and weaned later than those who had no skin-to-skin contact after birth. The practice of skin-to-skin contact after birth in this study co-existed with other hospital practices supportive of breastfeeding such as babies and mothers remaining in the same room together during their hospital stay and consistent breastfeeding education being given to mothers.

In summary, naked body contact between mother and baby has many benefits for breastfeeding initiation including coordination, adaptation, orientation and attachment to the breast. Opportunities for newborn babies to be in skin contact with their mothers to adapt, coordinate and orientate after birth may influence their ability to attach optimally to the breast and feed effectively. Conclusions as to the effect of a prolonged duration of early skin-to-skin contact for optimal breastfeeding outcomes have not been adequately investigated to provide consistent evidence for practice guidelines. There remains a need to further investigate the immediate and long-term influences of uninterrupted skin-to-skin contact duration within the first hours following birth.

**Common breastfeeding problems**

A range of problems commonly faced by mothers has been found to contribute to early cessation of breastfeeding (Fetherstone, 1995; Papinczak & Turner, 2000; Renfrew et al., 2000b; Scott et al., 2001). These issues include: nipple pain and trauma, perceived milk inadequacy, and lack of breastfeeding confidence (Blyth, Creedy, Dennis, Moyle, Pratt et al., 2003b; Chezem et al., 2003; Cooke, Cantrill & Creedy, 2003a; Dennis & Faux, 1999; Dykes, 2002; Dykes & Williams, 1999; Fallon & O'Brien, 2003; Hill & Humenick, 1996; McCormick & Renfrew, 2004). It has been well established that poor attachment to the breast is a major cause of common breastfeeding problems such as nipple pain and trauma (Braund & Amir, 2001; Renfrew, Lang, Martin & Woolridge, 2001a; Woolridge, 1986a, 1986b). Much work has been done to establish ‘good’ positioning and attachment techniques and to understand how to teach these to mothers (Blair, Cadwell, Turner-Maffei & Brimdyr, 2003; Cadwell, Turner-Maffei, O'Connor & Blair, 2002; Cox, 1998; Cox & Turnbull, 1998; Fisher, 1994; Fletcher & Harris, 2000; Glover, 2003a, 2005a, 2005b; Gunther, 1955; Woolridge, 1986a). However, very little observation has been carried out in the birthing room to understand how positioning and
attachment at the first breastfeed in relation to help received by mothers, carries over to the postnatal time of establishing breastfeeding.

Little is known about the factors that influence breastfeeding initiation in the birth suite and whether these may influence breastfeeding confidence for independent breastfeeding. Little is known about birth suite practices that may hinder opportunities for mothers and babies to be together and if separation factors in the birth suite influence subsequent breastfeeding episodes. The following section gives an overview of the literature associated with outcomes proposed in the present study to be associated with continuous uninterrupted skin contact for the first hour following birth.

Nipple pain

Nipple pain is one of the most common reasons why women cease breastfeeding prematurely (Amir, 2002; Blyth, Creedy, Dennis, Moyle, Pratt et al., 2003a; Forster, McLachlan, Lumley, Beanland, Waldenstrom et al., 2003). Much educational emphasis is placed on positioning and attachment to improve midwifery practices that aim to teach mothers to prevent nipple pain (Cox, 1996; Duffy, Percival & Kershaw, 1997; Fisher, 1994; Fletcher & Harris, 2000; Minchin, 1989; Weissinger, 1998). These midwifery practices have not always proved effective and have often been in isolation of consistent organization-wide BFHI practices. Global assessment guidelines emphasize attachment and positioning, and expect midwives to teach mothers to touch the baby’s lips with the nipple to get the baby to open his/her mouth wide and then ‘pull the baby quickly to the breast’ (ACMI/BFHI, 1996; Woolridge, 1986b; World Health Organization, 1998). This recommendation however does not give sufficient attention to newborn instinctive pre-feeding behaviour for coordination of innate reflex ability to attach well for effective breastfeeding. Neither are the numerous aspects of maternal experience and their needs for assistance taken into consideration.

In an Australian study of 87 postpartum mothers who were surveyed 3 days after the birth of their baby, the incidence of nipple pain was 71%. Around half of the mothers (54%) experienced difficulties in attaching their baby to the breast while 23% reported cracked nipples (Fetherstone, 1995). In a randomized control trial amongst 75 mothers, Duffy, Percival and Kershaw (1997) also found a high level of nipple pain (40%) and trauma (100%) in the early postnatal period amongst the 37 mothers in the control group who were taught positioning and attachment techniques. Nipple trauma was described by Duffy et al (1997) as redness, erythema
or ‘cracked nipples’ and 54% of the experimental group experienced these over the first 4 postnatal days.

Nipple pain has been reported as the second most common reason for mothers stopping breastfeeding (Tait, 2000). The incidence of nipple pain or trauma in the first week after birth has been reported as ranging from 34% to 96% (Page, Lockwood & Guest, 2003). Cox (1998) conducted a pre-post antenatal education intervention study in Tasmania and surveyed 123 of mothers at 3 months after birth. They found a 50% rate of reported nipple pain during the course of lactation in both the control group (n = 28) and the intervention group (n = 99). Cox (1998) did not report any differentiation between pain and trauma or define trauma so it is not possible to make clear comparisons. Furthermore, the experience of painful nipples was not specified to a particular point in time after the birth. According to Tait (2000) nipple pain is common in the first week, peaks by about day 3 to 6 after birth and then subsides. If nipple pain persists beyond the first week it is indicative that there is a problem needing further investigation.

Nipple pain and trauma have not been investigated in relation to naked contact holding. It has mostly been investigated in relation to antenatal and postnatal education on positioning and attachment without attention to what goes on in the birth suite regarding help received and timing of the first feed or whether optimal positioning using instinctive feeding behaviour of baby and action mother were facilitated for effective attachment and feeding.

Woolridge (1986b) declared it is the midwife’s responsibility to teach mothers how to breastfeed and achieve optimal positioning and attachment to help mothers avoid nipple pain. Some 20 years later, it has been proposed that it is the mother’s role to hold her baby in skin-to-skin contact so the baby can breastfeed without interference (Anderson et al., 2003; Bergman, 2001b). There appears to be a disjuncture between earlier knowledge and practice and more recent evidence of breastfeeding initiation. Indeed one recent review of content in popular midwifery textbooks identified a preponderance of out-of-date and inaccurate information (Cooke, Cantrill & Creedy, 2003). This means midwives may need to access recent research-based literature and learn more appropriate ways to support mothers other than what is depicted in popular midwifery texts. Palmer (1993b) voiced concern that midwives were expected to know how to assist and teach mothers but that education and support to midwives was inadequate. This concern seems to remain valid.
One study suggested that teaching attachment and positioning makes no difference to pain experienced by women who report that some techniques taught are confusing and difficult to master (Henderson et al., 2001). Other researchers have suggested likewise (Ingram, Johnson & Greenwood, 2002; Woods, Bramwell & Dykes, 2001). Similarly, another study found no difference in problems experienced by women being admitted to BFHI accredited hospitals compared with non-accredited hospitals (Dasgupta et al., 1997). However BFHI best practice recommendation for skin contact in the first hours after birth were not accounted for by Henderson et al. (2001) so it is not possible to know whether breastfeeding initiation practices included skin-to-skin contact and if the absence of this practice adversely affected the outcome for some mothers.

Several studies have recommended that a hands-off technique is more appropriate to assist mothers and improves outcomes including breastfeeding confidence (Chezem et al., 2003; Cox, 1998; Cox & Turnbull, 1998; Fletcher & Harris, 2000). Glover (2005a) has promoted this approach for over 20 years. However, the extent to which such practices are consistently performed in maternity settings is unclear. There is a need for observational studies to confirm reported practice and objectively assess subsequent breastfeeding outcomes.

**Breast refusal**

Breast refusal is another common phenomenon distressing mothers and may lead to early cessation of breastfeeding. Interventions by midwives particularly at the first breastfeed have been associated with unpleasant experiences for women and their newborn infant (Hailes & Wellard, 2000). Although much is known about infant reflex ability for suckling, much of what is taught regarding attachment to the breast actually counteracts what the baby needs to do to be able to breastfeed effectively without nipple pain to the mother (Noble & Bovey, 2002; Widstrom & Thingstrom-Paulsson, 1993). One case study report showed marked improvement for three full term babies experiencing breastfeeding difficulties in the postnatal ward when skin-to-skin contact interventions were used (Meyer & Anderson, 1999).

It is possible that some mothers experience baby breast refusal problems because of inappropriate interference during the initiation of breastfeeding. Diagrammatic representations of how to help a baby to attach to the breast commonly show the mother’s or helper’s hand on the back of the baby’s head with the baby’s head tilted forward as an attempt to grasp the nipple and breastfeed is made by the baby. This is so in some commonly used midwifery text books in Australia (Cooke, Cantrill et al., 2003) and also in popular breastfeeding books for mothers.
Contrary to this popular image, the baby’s neck needs to be supported by stabilising the shoulders, the baby’s chin needs to touch the breast first with the head slightly tilted backwards for the baby to be able to comfortably attach and breastfeed effectively (Glover, 2005a; Noble & Bovey, 2002; Wolf & Glass, 1992). If the baby’s head is thrust forward by the mother or midwife, they are less likely to attach and may be perceived by the mother to be ‘refusing’ the breast. The inability to attach successfully may contribute to neonate and maternal frustration and further hinder effective attachment and milk let-down.

**Support and assistance**

Professional support and assistance to begin breastfeeding are valued by mothers and contribute to duration of breastfeeding. Hands-off techniques used in the postnatal period to help mothers learn how to attach their babies have been found to boost maternal confidence and be more conducive to longer breastfeeding duration. No studies were found that specifically examined techniques used to help mothers in the birthing suite for the very first breastfeed.

Henderson, Pincombe and Stamp (2000) conducted focus group interviews with a convenience sample of Australian midwives (n = 18) who worked in postnatal areas to explore practices when assisting women establish breastfeeding. All group members had participated in a larger study related to lactation and nearly two thirds (61%) had at some prior stage of their continuing professional development, completed a lactation course. Five themes emerged from the data in relation to education, problem solving, support, views about breastfeeding and social influences on midwives’ practice. Midwives reported using research-based evidence when giving information to women and in the assessment strategies used to help women initiate breastfeeding.

The researchers noted, however, that the midwives made no mention of informing mothers about newborn innate reflexes and feeding behaviours when they discussed information given at the first breastfeed. Furthermore, there was no independent observation of the actual practice of participants. A range of opinions emerged from the discussion regarding continuous skin-to-skin contact and how to best assist mothers with the first breastfeed. While some midwives emphasized the first contact and breastfeeding as soon as possible after birth, others felt the first breastfeed required planning and concentration to ensure attachment issues were taught to the mother properly. Others believed action at the first breastfeed regarding timing should be based on individual assessment with care not to overwhelm mothers in the first instant. Conclusions reported by Henderson et al. (2000) are congruent with the findings of another Australian study.
that found midwives report a variety of options on how they would support mothers with the first breastfeed which are not based on best available evidence (Cantrill et al., 2004).

Despite the recognized role of midwives for the initiation of breastfeeding, there is little research on actual practice. No study to date has provided systematic data on observed midwifery practice particularly in the birth suite. While there is emerging research on midwives’ perceived role in breastfeeding initiation and promotion, the consistency and adequacy of such practice is relatively unknown. A recent national survey of practising midwives in Australia found their knowledge of neonate innate breastfeeding abilities was poor (Cantrill et al., 2003, 2004). It is highly likely therefore, that the abilities of neonates to attach to the nipple and suckle effectively are not promoted in practice and indeed may be hindered through the interference of routine practices in the birthing suite that separate mothers and babies.

**Maternal breastfeeding confidence**

There is a growing awareness of the relationship between duration of breastfeeding and maternal breastfeeding confidence (Blyth, Creedy, Dennis, Moyle, Pratt et al., 2004; Chezem et al., 2003; Dennis & Faux, 1999). Several authors suggest that practices employed by midwives to assist mothers in initiating breastfeeding can have a profound effect on maternal breastfeeding satisfaction (Chezem et al., 2003; Cooke, Sheehan & Schmied, 2003b; Garforth & Garcia, 1981; Palmer & Kemp, 1996; Royal College of Midwives, 2002). Evidence also suggests a causal effect of skin-to-skin contact between mother and baby on the interplay of hormones between mother and newborn to influence milk supply and confidence of a mother to provide sufficient milk to satisfy her baby (Matthiesen et al., 2001; Nissen et al., 1995b; Renfrew et al., 2001c; Uvnas-Moberg & Eriksson, 1996).

Several researchers suggest that health-care providers could intervene to increase mother’s self-efficacy before the birth of the baby (Blyth et al., 2003a; Dennis & Faux, 1999; Torres, Rene, Torres, Ana, Rodriguez et al., 2003; Wells, Thompson & Kloeblen-Tarvar, 2006). Wells et al. (2006) developed and tested a prenatal breastfeeding self-efficacy scale. In line with other studies, Wells et al. (2006) found that women scored more highly if they had previous breastfeeding experience. Wells et al. (2006) also found that women with no previous children had significantly lower mean self-efficacy scores than did women who reported having had breastfed previous children for longer than 1 month but less than 6 months. However breastfeeding confidence was measured prenatally with no follow up comparisons after birth. Furthermore the influence birth events and practices of breastfeeding management at the time of
birth may have on confidence were not explored in any of the previous studies reporting maternal breastfeeding confidence.

While it is known that high levels of maternal confidence improve outcomes and duration of exclusive breastfeeding, very little has been published on the education of midwives to boost maternal confidence except to say they do need to find practices that will not undermine maternal confidence (Blyth et al., 2004). There is evidence that midwives’ practice at the time of breastfeeding initiation can undermine mothers’ confidence (Auerbach, 2000; Henderson et al., 2001).

One study found that antenatal breastfeeding confidence predicted breastfeeding outcomes (Blyth et al., 2004). Similarly, in a prospective study of 198 women, a multivariate analysis of 11 psychosocial and demographic factors, identified antenatal confidence as one of the most significant predictors of breastfeeding duration (O'Campo et al., 1992). In the postpartum, a longitudinal study of 64 low-income mothers, Ertem, Votto and Leventhal (2002) found breastfeeding confidence rather than perceived problems to be associated with the early termination of breastfeeding. Specifically, pregnant mothers who lacked confidence in their ability to breastfeed were two times more likely to discontinue before 2 months postpartum.

Papinczak and Turner (2000) found mothers who were unable to establish lactation reported significantly lower levels of breastfeeding confidence in comparison to mothers who breastfed for more than 6 months. In a phenomenological study, deterioration in breastfeeding confidence during the early postnatal period was a major factor in the decision to cease breastfeeding (Dykes & Williams, 1999). Breastfeeding confidence has also been associated with maternal perceptions of insufficient milk supply, a leading cause of formula supplementation and decrease in breastfeeding level.

Base on Bandura’s (1977) self efficacy theory, breastfeeding confidence is suggested to be influenced by four domains: performance accomplishments (e.g. past breastfeeding experiences); vicarious experiences (e.g. watching other women breastfeed); verbal persuasion (e.g. encouragement from influential others such as friends, family, and lactation consultants); and physiological responses (e.g. fatigue, stress, anxiety) (Dennis & Faux, 1999). Studies investigating maternal breastfeeding confidence suggest that health care professionals can adjust these sources of information and experience to modify a mother’s breastfeeding confidence (Blyth et al., 2004; Chezem et al., 2003; Fallon & O'Brien, 2003; Dykes, 2002; Dykes, 2005a
b). To date, no study has recommended simple, practical interventions for midwives that boost maternal confidence and are compatible with their busy inpatient workloads.

The influence of birth events and practices of breastfeeding management at the time of birth in maternal breastfeeding confidence have not been explored in previous studies reporting maternal confidence. It is not known whether confidence levels of mothers who hold their naked baby against their bare chest may increase. It seems reasonable to consider that if mothers held their naked baby against their bare chest at the time of birth that their confidence to breastfeed may increase regardless of previous breastfeeding experience. This would be particularly so if the baby demonstrated a natural ability to attach well and breastfeed effectively with minimal or no assistance.

**Perception of milk adequacy**

Another common problem experienced by mothers is perception of low milk supply. Education sessions provided to mothers and midwives on this topic have not been effective, and perception of low milk supply is still a major reason why mothers stop breastfeeding (Dennis, 2006).

Mothers’ perception of insufficient milk to satisfy their baby remains the leading reason why mothers stop breastfeeding (Blyth et al., 2004; Cooke et al., 2003b; Dykes & Williams, 1999; Fallon & O'Brien, 2003). Using the H&H Lactation Scale to measure perceptions of insufficient milk supply, Hill and Humenick (1996) reported mothers who had lower scores on the maternal confidence/commitment subscale also had lower breastfeeding levels at 6 weeks postpartum.

None of the studies reported whether mothers were informed that holding their baby in skin-to-skin contact could improve their milk supply or help their baby learn to feed more effectively in the early postpartum days. Perhaps if mothers were informed and offered the option of trying skin-to-skin contact to improve milk adequacy, breastfeeding confidence may increase (Carfoot et al., 2005; Hill & Humenick, 1996; Price, 2002).

Along with mothers’ perception of milk adequacy, the physiology of milk transfer has been studied to try to understand the phenomena of maternal perception of milk adequacy. The physiology of infant suckling has been of ongoing interest since the 1800’s (Medoff-Cooper & Ray, 1995). Various aspects of newborn suckling and swallowing patterns in relation to feeding behaviour have been debated. The interest in sucking physiology and behaviours of neonates relates to the assessment of neurological development of babies (Marmet, Shell & Aldana, 2000; Neifert, 1996); the ability of premature babies to feed (Mandich, Ritchie & Mullett, 1996;
Medoff-Cooper & Ray, 1995); and understanding suckling patterns in breastfed babies (Lau & Schanler, 1996; Medoff-Cooper & Ray, 1995).

Webber, Woolridge and Baum (1986) confirmed these observations by ultrasound imaging and found that the mechanism of ‘sucking’ on an artificial teat for bottle feeding and ‘suckling’ to breastfeed were physiologically different. Woolridge (1986b) reported that the baby effectively milked the breast by peristaltic tongue action under the areola while the mother’s nipple was protected near the soft and hard palate junction. This was in contrast to previous observation studies that proposed that negative pressures in the baby’s mouth created mechanical suction to remove milk (Wolf & Glass, 1992). Woolridge (1986b) reported that the milk ejection reflex (MER) played an important role in milk transfer to the infant. MER created positive gradient pressure in the milk ducts to move milk into the milk sinuses behind the nipple.

As a result of this research, the use of artificial teats and pacifiers for breastfed babies became controversial. Artificial teats and pacifiers are now known to contribute to breastfeeding problems by reducing milk supply and poor suckling by babies resulting in sore nipples (Neifert, 1995; Victoria, Behague, Barros, Olinto & Weiderpass, 1997). Woolridge (1986b) findings also revolutionised the clinical management and prevention of sore nipples.

More recent ultrasound observation studies have verified the importance of the MER for milk transfer (Daly, Kent, Owens & Hartmann, 1996; Ramsay & Hartmann, 2005). Improved technology to clearly view breast function has identified that milk sinuses behind the nipple as depicted in anatomical drawings of the breast do not exist; instead the milk ducts continue on through the nipple and branches of ducts can be seen close in behind the nipple in some cases (Ramsay, Kent, Hartmann & Hartmann, 2005). Advanced technology using infra-red imaging to view attachment of babies to their mother’s breast and measure changes in the milk ducts as milk ejection occurred revealed wide variations in mother’s breast structure and function but no differences were noticed in babies’ breastfeeding characteristics (Hartmann, 2000).

Early studies illustrate the lack of knowledge of instinctive and normal behaviour of mothers and infants in a non-medicalized environment. Variations in time lapse and time duration of skin contact studies to date may illustrate progress from dependency on medicalized routines to a more conducive approach that enhances normal responses by infants and mothers in an environment where no interference is imposed on them.
Instruction about instinctive positioning for breastfeeding attachment in relation to naked body contact time is not clear in the guidelines. While instructional literature and videos in recent years do address this to some extent, these are specifically tailored to meet the needs of postpartum mothers (Cox, 2002; Glover, 2003b, 2005a; Mohrbacher & Kendall-Tackett, 2005; Smith, 2003). It is now apparent that these resources need to be promoted during the antenatal period so that decisions by the family can be made about optimal breastfeeding initiation.

Variables contributing to early breastfeeding problems and cessation identified in the literature include the time interval between birth and maternal contact, mother’s experience of attaching and positioning her baby at the breast, nipple pain, perceived milk insufficiency and knowledge to inform breastfeeding decisions. There is clearly a need to explore associations between duration of skin-contact at the time of birth and breastfeeding outcomes.

**Rationale, purpose and hypotheses**

In order to promote successful breastfeeding initiation and outcomes, further research is needed to establish the influence of continuous uninterrupted naked body contact between mothers and their babies, and babies’ effective suckling during the first hour of birth. Research is needed to understand baby-initiated feeding behaviour to suckle effectively in relation to mothers’ involvement to help their babies, and between assistance mothers receive from midwives to optimally position and attach their babies. Very few studies have specifically investigated relationships between duration of continuous uninterrupted skin contact during the first hour of birth and effective suckling. Very little attention has been given to newborn feeding behaviour for effective suckling, maternal involvement, and assistance received by mothers in the birthing room. Therefore it is unclear whether continuous uninterrupted skin contact during the first hour of birth is associated with subsequent effective breastfeeding or maternal breastfeeding confidence. It appears that no published studies have explored (1) the duration of continuous uninterrupted naked body contact between mothers and their babies in relation to newborn feeding behaviours and effective suckling, (2) active involvement of the mother to assist her newborn begin breastfeeding, and (3) the help that mothers receive from others to initiate breastfeeding.

**Purpose**

The first purpose of this study is to describe the nature of skin-to-skin contact and midwifery practices following childbirth. This data will inform a predictive model of the onset of suckling
during the first hour of birth in relation to assistance received and duration of continuous uninterrupted skin-to-skin contact. The second purpose is to determine predictors of effective suckling and maternal independence to manage problem-free breastfeeding before discharge from the postnatal ward. The third purpose of the present study is to determine whether babies’ effective suckling and maternal independence to manage breastfeeding at the time of discharge is associated with breastfeeding confidence and satisfaction at 2 weeks.

**Hypotheses**

In line with the outcomes of the review of the literature, predictors and associations between the duration of skin-to-skin contact during the first hour of birth and a range of events, routines and practices occurring to assist babies to breastfeed and mothers to be independent, confident and satisfied with their breastfeeding experience, will be explored. More specifically, it is hypothesized that:

1) Duration of continuous uninterrupted skin-to-skin contact between mothers and their babies during the first hour of birth will predict the onset of suckling.

2) Commencing suckling in the first hour of birth is associated with hands-off assistance received to position and attach baby in the birthing room.

3) Effective suckling will predict maternal independence at time of discharge.

4) Effective suckling at discharge is associated with reduced common breastfeeding problems such as nipple pain or trauma.

5) Independence managing breastfeeding at discharge will predict exclusive breastfeeding at 2 weeks postpartum.

6) Maternal confidence at 2 weeks postpartum is associated with effective suckling at discharge.

**Summary**

While breastfeeding initiation within the first hour of birth, is a primary focus in the research literature, actual birthing room practices carried out to assist mothers and babies achieve breastfeeding effectively at that time is under-researched. The main focus of breastfeeding
outcomes are most commonly measured by duration of breastfeeding. Very few studies have observed breastfeeding initiation within the first hour in the birthing room. Studies that have explored these areas have mainly focused on the timeframe in which babies take the first breastfeed, without attention to the assistance received or the influence of skin contact on suckling success at that time. No studies were found that observed initiation of breastfeeding in relation to duration of continuous uninterrupted naked body contact between mothers and their newborns, and assistance received by mothers to begin breastfeeding for the first time. No studies were found that have explored associations between duration of continuous uninterrupted naked body contact to initiate breastfeeding, assistance received by mothers to begin breastfeeding for the first time and maternal confidence to manage position and attachment of their infant to continue ongoing breastfeeding. This thesis argues that if babies are placed in skin-to-skin contact with their mothers for most of the first hour immediately following birth, they may attach and breastfeed effectively and mothers may gain confidence to continue managing breastfeeding.
Chapter 3

Method

This chapter outlines design considerations for the present study in light of gaps in the literature and methodological weaknesses found in previous studies concerning naked body contact between mother and newborn for effective breastfeeding initiation and assessment of maternal outcomes. The design components of this multiphase study are described. The context in which the study was conducted is outlined. Approach to recruitment and sampling procedures are described. The study used a range of data collection methods including structured interviews, standardised measures, and non-participant observation. Where tools were developed, processes to enhance reliability and validity are described. Ethical considerations and approach to data analysis will be discussed.

Rationale for study design

In the review of the literature, no previous studies were found that specifically explored relationships between duration of naked body contact between mothers and their babies in the first hour after birth and newborn feeding ability, actions mothers take to position and attach their babies, and assistance mothers receive for the first breastfeed following birth. No studies were found that established principles of positioning for comfortable and effective attachment for the first breastfeed in the birthing room and transfer of these principles to the success of subsequent breastfeeds in the postnatal ward. Six methodological weaknesses in related studies were evident.

Firstly the measurement of time mothers and babies spent in skin contact was inconsistent between studies. In one recent report 45 minutes was used instead of the best practice recommendation of 60 minutes (Carfoot et al., 2005). In many studies babies and mothers were not kept together in skin-to-skin contact for the first 15 to 30 minutes following birth. In some studies, skin-to-skin contact was interrupted, or babies were initially separated for routine procedures such as weighing (e.g. Carfoot et al., 2005; Ferber & Makhoul, 2004; Salariya et al., 1978; Taylor et al., 1986; Thomson et al., 1979). Therefore duration of skin-to-skin contact and the quality of this contact has not been adequately assessed.

Secondly, observational studies have demonstrated that newborns follow instinctive behaviours to find the nipple and begin suckling within a set time period when left in skin-to-skin contact
on their mother’s chest (Righard & Alade, 1990; Widstrom et al., 1990). Studies that examined the effects of skin contact on breastfeeding initiation at the time of birth were limited to measuring the time interval between birth and the first breastfeed (e.g. Renfrew et al., 2001c).

Relative duration of continuous uninterrupted skin-to-skin contact, newborn feeding ability and events which separate mothers and babies in the first hour were not reported.

Thirdly, there has been little follow-up of mothers to determine if effective breastfeeding continued following effective suckling in the birth suite. Similarly, there has been little research on the incidence of common problems when it has been assessed that the baby is suckling effectively.

Fourthly, duration of skin-to-skin contact was not reported in relation to helping mothers and subsequent breastfeeding effectiveness or maternal confidence. Inconsistencies in level of help received may have confounded interpretation of results regarding the effects of skin-to-skin contact for effective breastfeeding in the recent study by Carfoot (2005). It seems midwives handled babies or mothers’ breasts to provide positioning and attachment help while in skin contact with their newborns (Carfoot et al., 2005).

Fifthly, there were no standard tools available to record duration of skin-to-skin contact in relation to relevant birthing events and breastfeeding. Mainly video tape recordings are used in existing studies. Video tape recordings are expensive, may not necessarily capture the many facets of action needing to be observed and could eliminate some eligible study participants who would prefer not to be video taped. A tool that embraces best practice standards, and could be replicated in any setting is much needed if a proper understanding of the principles of breastfeeding initiation in the birthing room and implications for practice are to be understood and transferred to the later postnatal period. Such data collection could be easily transferred to the everyday working maternity setting to monitor outcomes of quality improvement initiatives such as BFHI (Merewood & Philipp, 2001; Philipp, Malone, Cimo & Merewood, 2003; Philipp, Merewood, Miller, Chawla, Murphy-Smith et al., 2001). Best practice such as naked body contact between mothers and their babies, and the assistance mothers receive and actions mothers take for the first breastfeed in the birthing room are not routinely documented. It is not known if relationships exist between duration of skin-to-skin contact and incidence of common breastfeeding problems that mothers encounter.
Finally, outcome measures used in previous studies were commonly concerned with duration of exclusive or any breastfeeding (Fairbank, O’Mears, Renfrew, Woolridge, Sowden et al., 2000; Renfrew et al., 2001c; Salariya et al., 1978; Thomson et al., 1979). Outcomes such as incidence of common breastfeeding problems in the early postnatal period and maternal breastfeeding confidence may have a more meaningful application to clinical practice for providing quality service in the maternity setting. Such measures may over time impact on goals for duration of breastfeeding.

**Study aims**

This present study aimed to explore associations between five main concepts in relation to duration of naked body contact for the first hour following birth: 1) newborn achievement to suckle and continuing effective suckling; 2) optimal positioning and attachment for comfortable breastfeeding; 3) incidence of nipple pain and trauma; 4) maternal breastfeeding confidence; and 5) exclusive breastfeeding at four time points to 6 months.

Eight principles were taken into consideration for the design of the present study to enhance methodological rigor when investigating associations between skin-to-skin contact for mothers and their newborns in the first hour of birth for breastfeeding initiation practices and maternal outcomes.

1) Observations of birthing room practices were recorded to accurately assess events that occur in relation to duration of skin-to-skin contact for breastfeeding initiation at the time of birth including the following:
   i. The length of time newborns that remain in uninterrupted skin-to-skin contact with their mothers.
   ii. The effectiveness of the first suckling attempt.
   iii. Reasons that babies are separated from their mothers at the time of birth, given it is thought that separation interferes with newborn feeding ability and may undermine maternal confidence.
   iv. Assistance and information mothers receive to offer their newborn the breast for the first time.
   v. Mothers’ actions to help their babies begin breastfeeding.

2) A longitudinal design over a specified time frame:
   i. Allowed for associations in suckling ability between birthing room and early postnatal (48 – 72 hours) to be tested.
ii. Facilitated insights into maternal outcomes in relation to breastfeeding initiation practices.

iii. Enabled the incidence of common breastfeeding problems and duration of breastfeeding to be compared across time periods.

3) Sampling procedures taken during recruitment endeavored to ensure an adequate and representative sample size to determine significance of results and robustness of conclusions.

4) Standardised tools were used in the study to ensure reliability and validity of data collected for measured outcomes.

5) New tools were based on research evidence, best practice recommendations and current clinical practice application to enhance validity of data collected. Reliability of tools was tested using statistically appropriate procedures.

6) To gain insights into duration of naked body contact in relation to breastfeeding, observation data incorporated measurement of the time lapse between time of birth and the time mothers hold their naked babies, separation of babies from mothers for routine interventions before being held skin-to-skin, and before beginning the first breastfeed.

7) To understand birthing room principles of positioning for attachment that may transfer to the success of subsequent breastfeeds in the postnatal ward, observation of breastfeeding prior to discharge measured the same positioning, attachment and suckling outcomes as observed in the birthing room.

8) Techniques for analysis were carefully planned with statistical advice, given the number of variables in the study and associations with maternal outcomes.

**Time of data collection**

All data for this study were collected between January 2004 and July 2005. At this time BFHI accreditation preparation was in progress and assessment scheduled for August 2004.

**Research design**

The present study used a correlational, longitudinal design to explore relationships by means of structured observations and interviews, and measured changes over time using standardised questionnaires (Roberts & Taylor, 2002). Both quantitative and qualitative data were collected over four main time periods. Firstly, during the antenatal period, pregnant women were approached to participate in the study and asked to complete an initial set of questionnaires.
Secondly during the first hour following birth, observations were recorded on a timeline grid record sheet of prepared variables for specific concepts. Structured observations can be used to record specific behaviour or events, accurately categorize recordings, and encode observations for sampling phenomena of interest. Observations of events and behaviour allow insights into newborn sequence of feeding behaviours, to record accurate times that events occurred and be able to record the level of assistance that mothers receive to help their babies breastfeed initially and again later on.

The third period of time for data collection was within 24 – 72 hours post-birth or immediately prior to discharge from hospital where structured observations of newborn breastfeeding and face-to-face interviews with mothers were conducted. Finally mothers were interviewed by telephone at 2 weeks, 3 months and 6 months postpartum. Telephone interviews can be a quick convenient method of collecting data when the researcher has had prior contact with participants (Polit & Beck, 2004).

Details of each time period will be outlined in the following sections. This will include participation details, procedures, data collection tools and data preparation processes used each time. The following section outlines processes to enhance tool validity.

**Validity of tools**

The present study used an array of tools to collect comprehensive data in all aspects of antenatal, birthing room and postnatal information to gain sufficient data for adequate description and analysis of the many known influences on breastfeeding outcomes. Validity refers to whether an instrument measures the attribute/s intended and is commonly assessed by content, criterion and construct validity (Polit & Beck, 2004; Roberts & Taylor, 2002). Several steps were taken to enhance validity. Content validity was obtained by application of the research literature to the issues under consideration, consulting experts in the area and by clinical judgment of the researcher and midwifery colleagues. Criterion validity was established by measuring correlations between main outcome variables and independent variables for both predictive validity and concurrent validity. Construct validity was tested by the ‘known groups analysis’ and by examining relationships based on theoretical prediction (Polit & Beck, 2004).

**Staff education for BFHI accreditation**

Education for staff at the hospital site was planned strategically, and based on Rogers’s (2003) theory of “diffusion of innovations.” The diffusion of innovations is a process whereby
information is gradually communicated from person to person through a process of social construction. Before introducing BFHI education to staff or implementing any changes, a chart audit was completed to ascertain BFHI practices and breastfeeding discharge rates. Staff breastfeeding knowledge pertaining to the BFHI ‘Ten Steps’ was assessed by administering the ‘BFHI breastfeeding knowledge questionnaire’ to all maternity staff before they commenced an on-line education program and six months after completion of the education. Monthly audits of practice in each area of maternity care were completed as per BFHI assessor guidelines. Thus in preparation for the impending assessment for accreditation changes to the existing workplace practices were monitored and monthly reports made available to staff.

All hospital staff involved in the care of mothers and infants including midwives, medical doctors, obstetricians, paediatricians, paediatric nursing staff, community health nurses and midwifery and nursing unit managers were required to complete education for BFHI. Between August 2003 and January 2004 42% of staff completed the on-line education package. Recruitment for data collection commenced in January 2004. During the month of February 2004, the remaining 58% of staff completed the education.

Education covered the required curriculum for all Ten BFHI Steps to successful breastfeeding and was delivered in nine interactive on-line modules (Fisher, 2004). The on-line method of delivery was considered to be cost effective, flexible, up-to-date standardized and conducive to self-directed adult learning. The standardized format meant that staff could complete the education in their own time or during down time in work hours and all would be accessing the same up to date evidence based information. No practical session demonstrating positioning and attachment were conducted at this time.

**Antenatal phase**

**Sample recruitment**

A convenience sample of pregnant women was accessed from Women and Birthing Services antenatal clinic at a metropolitan public hospital in Queensland, Australia. The recruitment site is a growing maternity unit with an average of 130 births per month at the time of recruitment. The population of Families who access hospital services are predominately white English speaking. The rates of normal vaginal birth were relatively high (70%) and intervention rates such as epidural anaesthesia (27%) and caesarean sections (20%), were lower than the State average at the time. Breastfeeding initiation rates in hospital were also over 90%.
**Inclusion**

Inclusion criteria required that participants were pregnant women at least 36 weeks gestation who expressed an intention to breastfeed, were over 18 years of age, could read and write English and had no major prenatal complications or underlying medical problems likely to impact on their ability to hold their naked baby immediately after or within 30 minutes of birth. Primipara and multipara women were included. Both planned vaginal and caesarean section births were included.

**Exclusion**

Women who expressed an aversion to holding their newborn in skin contact, did not agree for the researcher to be present to observe at the time of birth, would not be contactable by telephone after leaving hospital or planned to move house to an unknown address in the first 6 months of baby’s life, were not recruited in the study. Women were excluded if their medical or psychological state prohibited or rendered participation impractical or inappropriate or if their babies needed to be separated from them after birth for medical reasons for more than 2 hours.

Over 100 participants were recruited for the present study. Loss of up to 20% of participants was predicted based on figures reported in a previous study of similar nature (Carfoot et al., 2005). Using Cohen’s (1988. p. 103) sample size tables for the significance of Pearson’s product moment correlation between suckling success and duration of skin contact, for a moderate effect (.30) at 80% power and a significance of p < .05), sample of 68 (1 tailed test) or 85 (2 tailed) is required. Previous studies that compared the effects of a birthing room intervention on suckling (Righard & Alade, 1990; Carfoot et al., 2005) and breastfeeding success (Righard & Alade, 1992) ranged from 72 to 237. Due to the exploratory nature of the present study embracing many variables of interest, it was not possible or appropriate to calculate sample size based on a power calculation that included every variable for each facet of the study (Cohen, 1988). Furthermore financial and time constraints prohibited a long recruitment phase.

The nature of the present exploratory study required baseline data in order to make inferences that may need further investigation. Therefore around 100 participants were considered adequate to give reasonable statistical analysis for outcomes of interest (Cohen, 1988). In Queensland, antenatal care is increasingly offered by general practitioners on a ‘share care’ basis, but all pregnant women return to the hospital antenatal clinic at around 36 weeks
gestation and for subsequent visits until birth. Hence all eligible women had the same opportunity to join the study.

**Procedure – antenatal phase**

Eligible women were identified by midwives and clerical staff during antenatal clinics. The researcher then approached eligible women in the antenatal clinic waiting room and informed them of the study, confirmed eligibility and invited participation. The researcher informed women of the aims and rationale for the study and answered questions. No specific instructions were given by the researcher to the women.

An information sheet was provided and signed consent obtained (See Appendix A & B). A questionnaire with a return addressed envelope was left with each woman so it could be completed at home or given to clerical staff at the appointment desk on the way out. Those who wished to discuss the matter with their partner could also complete the questionnaire in the privacy of their home environment. The questionnaires took approximately 20 minutes to complete. The researcher emphasised that observations in the birthing room were unobtrusive but no care would be provided by the researcher. Participants would be guided by their own existing birth plans and their midwife providing care at the time of birth.

**Antenatal data collection**

In order to establish the representative nature of the sample, a range of background data was obtained. Participants provided contact details and information on age, length of relationship with partner and marital status, ethnicity, first language spoken, country of birth, completed educational level and occupational status, parity, due date of birth and wellness during pregnancy. Questions were asked about breastfeeding information that women had received at antenatal encounters with health professionals as well as knowledge and perceptions of holding their naked newborn in skin-to-skin contact. The demographic and antenatal data questionnaire is shown in Appendix C.

Age and length of relationship were recorded in number of years. Four categories of marital status: married, single, defacto and other were used. The ‘single’ category was used for those women who describe themselves as having no continuing relationship with the father of the baby. Five categories of ethnicity were used: Caucasian/European, Australian Aboriginal, Torres Strait Islander, Asian and other. Participants were asked to identify whether they spoke English as their first language and if not to name their first language and country of birth.
An open ended question asked participants to state their highest level of education and that of their partner.

Occupational status for women was asked by an open-ended question and later categorised according to the Australian Classification of Occupations (ASCO) into six categories of: 1) management and administration; 2) professional/associate professional; 3) trade persons; 4) clerical, sales and service; 5) production and transport; and 6) labourers (Australian Bureau of Statistics, 1997). Employment status included full time, part time, casual, unemployed, maternity leave, home duties and other.

One question asked about gross household annual income with three options and other.

Smoking during pregnancy is a growing health hazard for women and their offspring, and may affect milk production during lactation and the length of time mothers breastfeed (Agostoni, Marangoni, Grandi, Lammardo, Giovannini et al., 2003 ; Moshamme & Neuberger, 2006; Vio, Salazar & Infante, 1991). Women were asked whether or not they smoked cigarettes and if so the number per day or week. Four options of ‘less than 10 a week’, ‘less than 10 a day’, ‘less than 20 a day’ or ‘more than 20 a day’ were presented.

Information about significant antenatal history was gathered. Women were asked if they had been well during the pregnancy with answer choices of “no = 0” or “yes = 1”. A checklist of medical and obstetric conditions was presented and women were asked to answer “no” or “yes” to whether they had received any treatment during the current pregnancy for any of the listed conditions.

Questions for these items were considered valid as they were extracted from regular data collection forms such as the Queensland perinatal data collection sheet and the pregnancy hand held record (PHHR). These can be seen in Appendix D and E.

Best practice standards require health professionals to discuss the management of breastfeeding with all pregnant women at antenatal encounters and/or in birthing preparation classes (WHO. CHD Division of Child Health and Development, 1998; WHO.UNICEF, 2006c). Respondents were asked to recall whether information about skin-to-skin contact had been provided at any antenatal health care encounter. For BFHI accreditation purposes, it is expected that when asked, mothers will report that they were provided with breastfeeding information concerning skin-to-skin contact, and that practical skills of positioning and attachment for effective
breastfeeding were discussed at antenatal visits (ACMI/BFHI, 1996; WHO. CHD Division of Child Health and Development, 1998). Four questions addressed if women ever attended antenatal classes, if breastfeeding preparation information included skin-to-skin contact or if the benefits of skin contact were mentioned at antenatal visits. Choices of “no = 0”, “yes = 1” or “unsure = 2” were presented.

**Antenatal knowledge of skin-to-skin contact**

Questions in this section related to women’s knowledge of naked body contact for breastfeeding, and their feelings toward holding their naked baby on their bare chest immediately after giving birth. Participants were asked to rate on a scale of 1 to 5 whether they would like to hold their naked baby on their bare chest after birth: “1 = no”, “2 = not sure”, “3 = maybe I would”, “4 = I think so” and “5 = yes”.

A questionnaire was devised to assess pregnant women’s knowledge of skin-to-skin contact. Seven general knowledge questions were asked regarding the benefits of naked body contact rated on a five point likert scale of “1 = strongly disagree” to “5 = strongly agree” to produce a possible total score of 35. Questions concerned benefits of skin-to-skin contact for newborn physiological stability, adjustment to a new environment, learning to breastfeed, conservation of energy, bonding, less crying and increase in mother’s milk supply. Several of the questions had been previously tested with midwives on two occasions and shown to be valid (Cantrill et al., 2004; Cantrill, Creedy & Cooke, 2005a; Cantrill, Creedy, Cooke, Moon, Dykes et al., 2005e). All questions were devised from contemporary research literature and research used to inform rationales for ‘Step 4’ of the BFHI ‘10 Steps to Successful Breastfeeding’ (WHO.CHD Division of Child Health and Development, 1998). The skin-to-skin knowledge questionnaire can be seen in Appendix C. It was proposed that this tool would give valuable insights into mothers’ knowledge of skin contact in relation to their reports of being informed by health care staff at antenatal encounters and classes.

**Breastfeeding intention and history**

For accuracy in reporting breastfeeding outcomes, questions about breastfeeding intentions and expectations were asked. Mothers whose previous babies had breastfed were asked to complete a breastfeeding history section to establish an understanding of problems they may have experienced in the past. To enhance validity, questions were extracted from a published tool recommended for eliciting breastfeeding history information (Arbon & Byrne, 2001) (see Appendix C).
One question asked women how they planned to feed their newborn. Options of ‘breast’, ‘breast and formula’, ‘formula’, ‘no plan’ or ‘other’ were given. Even though mothers joined the study on the understanding they intended to breastfeed, more detailed answers other than affirmative or negative, as recorded in medical notes or elicited at recruitment, would be needed for accurate analysis.

Mothers were asked how long they intended to breastfeed and were provided with a range of options to 12 months. These questions were considered relevant because some mothers intend to offer breastmilk to their baby for only a short while and others feel uncertain as to whether they have the ability to produce sufficient milk for baby’s growth (Dykes, 2002; Dykes & Williams, 1999).

One of the many factors known to influence breastfeeding outcomes is the social support and encouragement of family and partner. Therefore participants reported on whether their partner, mother, mother-in-law or sister (if they had one) ‘encouraged breastfeeding = 1’, were ‘neutral towards it = 2’ or ‘discouraged it = 3’. This information was used in descriptive analysis to compare outcomes and experiences for individual cases.

Women’s experience of any previous history of breast surgery was asked as this can impact on milk supply and production (Hurst, 2003; Riordan, 2005). If participants had ever lost a baby over 16 weeks gestation they were asked if they had noticed any breastmilk production or leakage as this would give clues as to individual breastmilk adequacy and knowledge of breast growth between pregnancies (Hartmann, 1998; Lawrence, 2005).

Women were asked to rate how confident they felt about breastfeeding on a scale of “1 = not confident” to “5 = very confident”. Dichotomous questions were asked about exposure to women who breastfed, if they grew up seeing babies breastfeed or had ever held a newborn baby. Finally participants were asked to indicate the number of live children they had given birth to. This question captures the actual number of live births where women will have most likely experienced lactation that differs from the term ‘parity’ which refers to number of previous pregnancies.

Pregnant women with prior breastfeeding experience were invited to give details of any problems encountered, number of babies breastfed prior to the current pregnancy, breastfeeding
duration, and help or support sought at the time. This would assist when analysing relationships between duration of naked body contact at birth and breastfeeding confidence outcomes.

A checklist of commonly experienced problems which lead women to cease breastfeeding was presented with “yes”/“no” responses offered for each. The final question asked the main reason why they had stopped breastfeeding and offered a checklist of options. Questions to collect relevant data were considered valid as they had been used in previous research and addressed known reasons why mothers stopped breastfeeding before health authority recommendations (Binns & Scott, 2002; Fetherstone, 1995; National Health & Medical Research Council, 2003; Scott et al., 2001).

**Maternal confidence**

The final section of the antenatal questionnaire measured women’s confidence in their ability to breastfeed. Two standardized questionnaires that measure breastfeeding confidence and perception of milk adequacy, namely, 1) the Breastfeeding Self-Efficacy Scale-Short Form (BSES-Short Form) and 2) Perception of Milk Adequacy (H&H scale) were administered to women firstly at recruitment, and repeated at 2 weeks and 3 months. Appendix F and G display these questionnaires.

Maternal confidence or self efficacy is positively correlated to breastfeeding duration (Blyth et al., 2002; Chezem et al., 2003). Some writers have suggested that maternal confidence increases if mothers hold their baby from birth until the baby has initiated the first breastfeed (Klaus, 1998; Widstrom et al., 1990). It has been suggested that management of the first breastfeed and how well babies feed initially can affect maternal confidence (Palmer, 2002; Royal College of Midwives, 2002)

The Breastfeeding Self-Efficacy Scale (BSES) (Dennis & Faux, 1999) was recently revised into the short form, psychometrically tested and validated (Dennis, 2003). Cronbach alpha coefficient on a sample of 130 in-hospital participants was .96. The BSES-Short Form also has good reliability with a Cronbach alpha co-efficient of .97 for 481 participants at one week post partum. The longer version has been tested on an Australian sample (Blyth et al., 2002) and was found to be valid and reliable with a Cronbach alpha coefficient of .96 with 300 participants at 1 week postpartum. Responses on each item were added to produce a total score. Total scores for the BSES-Short Form ranged from 14 to 70. Higher scores indicate a higher
level of breastfeeding confidence. Cases of partially completed questionnaires were excluded from analysis.

A questionnaire to assess perception of milk adequacy (H&H lactation scale) (Hill & Humenick, 1996) has also been validated in an Australian study with a Cronbach alpha coefficient of .88 at 1 week postpartum (Creedy, Dennis, Blyth, Moyle, Pratt et al., 2003). More recently a study in Thailand recommended a short version of the H&H scale (Punthmatharith & Singh, 2005). The highest possible score for 14 items of the H&H lactation scale is 100. Scoring for six of the H&H lactation scale items were reversed. Responses on each item were added to produce a total score. Total scores for the H&H scale ranged from 20 to 100. Higher scores indicate a higher perception of milk adequacy. Cases of partially completed questionnaires were excluded from analysis.

Mixed between-subjects and within-subjects analysis of variance (ANOVA) were conducted to compare mean scores of multiparae with previous breastfeeding experience and those with no previous breastfeeding experience between three time periods antenatal, 2 weeks and 3 months postpartum. Comparisons of mean confidence scores between time periods were also calculated for mother baby dyads who remained in skin-to-skin contact for less than 30 minutes and 30 minutes or longer, for various levels of assistance mothers received to position and attach their baby to breastfeed in the first instance and extent of breastfeeding. The mixed between-within subjects ANOVA allows for comparisons between two or more groups and repeated measures (i.e. one group of subjects exposed to two or more conditions) to be conducted in the one analysis (Gravette & Wallnau, 2000; Pallant, 2002; Tabachnick & Fidell, 2001). Independent t tests were used to analyse differences between mean scores for mothers who experienced breastfeeding problems such as visible nipple trauma and those with no nipple trauma.

Validity of data collected was enhanced by use of existing tools and items derived from the research literature as well as local state and national demographic, obstetric and perinatal data collection (National Health & Medical Research Council, 2003; Queensland Department of Health, 2005; Queensland Health, 2001). Breastfeeding history questions were developed by Arbon and Byrne (2001). Two standardised and valid tools for measuring breastfeeding confidence were used antenatally and again at the two postpartum periods. A new tool for measuring skin contact knowledge was devised for this survey.
The next section reviews birthing events data, development of the birthing room observation tool and observed data.

**Birthing room observations**

To determine the adoption of, and duration of continuous uninterrupted skin-to-skin contact, optimal positioning and attachment for breastfeeding achievement, newborn feeding ability and type of breastfeeding help that mothers received during the first hour after birth, a group of recruited mothers and their newborns who were attended by midwives were observed. Observations were recorded in the birthing room for the first 60 minutes following birth. In keeping with protocols for unobtrusive observations, the researcher stood in the background in the birthing room to purposely avoid any conversation or involvement in procedures or care provision (Polit & Hungler, 1999; Roberts & Taylor, 2002).

As per the ethics protocol, the study was explained to midwives who might be involved as primary care providers of birthing women, and an information sheet was provided for their signed consent (See Appendix B). They agreed for the researcher to be present and record observations of participating mothers in their care. Midwives were requested to not make changes to their normal practice, and behave as if the researcher were not present. Any midwives unwilling to participate or disagreeing with the presence of the researcher in the room could be allocated to care for clients not participating in the study. Other professionals involved in the care of the mother (such as medical staff or midwives who were not the primary care provider) were also informed of the researcher’s intention to observe and collect data for each single case and their agreement was confirmed. Models of continuity of care were not practiced explicitly.

Several steps were taken to ensure births were not missed. Firstly, participating women were reminded to inform the midwife on duty that they were a research participant and ask the midwife to inform the researcher of their admission. Secondly, a bright yellow sticker was placed prominently on the outside cover of medical records belonging to participating mothers. Stickers were also placed on record pages to remind midwives at every possible point of contact with women in the research study of the need to notify the researcher of admission and impending birth. For example, the antenatal hand held record of every participant, the labour partagram and on the telephone assessment sheet used in the admission ward.
A third strategy to ensure births were not missed was a notice placed at the labour ward desk and at the ward admission desk briefly explaining the research, the researcher’s phone contact details and a list of names of participating mothers and their due dates. The list was kept up-to-date by the researcher. Finally, the researcher checked bookings for induction and caesarean section lists regularly, phoned the ward and birthing suite at times when a participant was near her due date, and also intermittently checked the admissions and patient diagnostic list whenever possible. This was allowable within ethical guidelines since the researcher was a hospital staff member.

It was agreed that once staff had informed the researcher of a participating woman’s admission to the ward it would be up to the researcher to keep in contact in regards to labour progress and together decide the best time to arrive at the birthing room. On arrival at the birthing room, consent of the participating woman and her partner were confirmed and confirmation to be an observer in the room was confirmed by the person managing the birth. The same consent procedure applied for both vaginal and caesarean section births.

Equipment for observations included an A3 sized observation record sheet, a stop-watch, a tape recorder and ear phones, and a pen. The researcher entered the room to observe only as birth was clearly imminent. At the moment of birth the researcher pressed the stop-watch, recorded the time of birth and pressed the play button on the tape recorder. A pre-recorded tape of a soft ‘beep’ every minute reminded the researcher of each next minute so events could be recorded within accurate time frames. The researcher recorded events minute by minute as they occurred.

All relevant events which occurred during the hour from the moment of birth were recorded by ticking the space next to the event in a particular time on the A3 time line grid record sheet. The time of birth, the time mothers first held their babies, the time they first held their babies in naked body contact and the time babies were removed from their mother’s arms were recorded. Times of any interventions and handling of babies by others in the room were documented. Commencement of newborn feeding behaviour, maternal responses to babies, mother’s request for and level of breastfeeding support received were also recorded on the prepared record sheet. In particular, the first time events occurred was noted. Events which occurred multiple times were recorded for a maximum of up to five times on the grid.

The researcher was able to get a good view of the baby exhibiting feeding behaviours by standing at the back of the head of the bed or to the side while coming in a little closer to view
actions such as mouthing, licking, latching and suckling. At the end of the hour, the researcher checked the baby’s temperature, congratulated and thanked the mother and partner, thanked staff and arranged a follow-up meeting with the mother within 48 hours to view a breastfeed. Mothers were requested to phone the researcher or inform staff to call should they decide to leave hospital earlier than anticipated.

**Birthing room observations tool**

The birthing room observation tool (shown in Appendix I) was designed to record the timing of a cluster of breastfeeding initiation events and practices. The tool was developed in collaboration with midwives working in the birthing suite. Activities known to occur at the time of birth were listed on an A3 sized record sheet in the form of a grid time line. To validate the observation variables chosen, an abbreviated form of the tool was prepared as a checklist for midwives to trial.

Midwives who frequently worked in the birthing suite, trialled the birthing room checklist as a self audit tool with mothers (n = 156) for BFHI accreditation preparations between 20 January to 28 February 2004 (Cantrill, Creedy, Cooke, Dykes & Chaseling, 2005d). They found the birthing room checklist to be a practical, user-friendly audit tool (See Appendix J). This process assisted with theoretical groupings of variables for analysis to make conclusions about relationships between newborn feeding behaviour, maternal actions and help that mothers received to position and attach their newborns for their first breastfeed.

The observation tool for the research study was presented on an A3 grid time line record sheet. It was devised to observe four overarchin g sets of variables and calculate the duration of continuous uninterrupted skin contact between mothers and their newborn babies. Observations related to four major categories of interest to this study as follows:

1. Where babies were placed, including interventions that may separate mothers and babies or interrupt skin-to-skin contact between mothers and their newborns:
   
   i. Events related directly to the birth (9 items)
   
   ii. Maternal response to the baby with a focus on naked body contact and recognition of feeding behaviours (16 items)
   
   iii. Who held the baby and how, whether naked on bare chest or other (18 items)
iv. Resuscitation measures (10 items)

v. Routine interventions and procedures (14 items)

2. Newborn feeding behaviours and ability (33 items)

3. Maternal action or involvement to initiate breastfeeding (22 items)

4. Assistance mothers received to position and attach their baby for feeding (20 items).

Observations of each variable were recorded each minute of the first hour following birth. Recording where the baby was placed, and at what time point within the hour, meant other information could be extrapolated. For example, events that 1) contribute to separation of mothers and babies, 2) prevent mothers holding their naked babies on their bare chest, and 3) interrupt skin-to-skin contact before baby initiates breastfeeding or before mothers are given a chance to understand how to respond to their babies’ innate reflex feeding cues.

**Transposing of birthing room observation data**

Birthing room observations were entered into individual Excel files for each case. The number ‘1’ was entered in the computer on the Excel grid where a square was ticked to indicate the event observed had been recorded. Blank spaces indicated no recorded event. Formulas in the form of ‘if’/‘then’ statements were set up and copied into the Excel file to transpose observations into the actual time in minutes that events occurred. These individual case files were then copied and transposed to include all cases on one Excel file with a separate Excel spreadsheet within the file for each set of variables.

This allowed data to be viewed in two ways, either presence or absence of, and time any event or action occurred. Variables were then imported into two SPSS files for if an event occurred and the time events occurred. Variables were coded so that “0 = no” for nil occurrence and “1 = yes” for the occurrence of an event. On the file for time events occurred, numbers ‘1 – 60’ represented the actual time events were recorded as occurred. Variables could then be used in analysis as categorical dichotomous variables or to calculate time between, before or after specific events. Thus continuous dependent variables for duration of continuous uninterrupted naked body contact between mother and newborn or time mothers and babies were separated was calculated in minutes.
**Birthing events data**

Birthing events including obstetric details for all study participants were collected from medical records around the time of birth. Questions for data collection were extracted directly from the Perinatal Data Statistics form (See Appendix D). Data collected included onset of labour induced, coded as “0 = no” and “1 = yes”, length of labour (coded in hours), adverse birth events such as prolonged second stage, failure to progress, foetal distress and meconium liquor coded as “0 = no” and “1 = yes” if each occurred. Five birth types were categorised as vaginal “spontaneous = 1”, “assisted forceps = 2”, “vacuum extraction = 3” and caesarean section “elective = 4” or “emergency = 5”.

Information about analgesia during labour including nitrous oxide administration, narcotic intramuscular or intravenous injection, and epidural or spinal anaesthesia were recorded. Each analgesia presented was coded as “0 = no” and “1 = yes” to represent if administered or not. Pethidine is known to have an adverse effect on newborn feeding behaviour if administered more than one hour before birth (Nissen et al., 1997; Ransjo-Arvidson et al., 2001). Administration of epidural anaesthesia and pethidine narcotic were categorised together for analysis as has been done in previous research (Ransjo-Arvidson et al., 2001).

Condition of the perineum after birth was recorded noting any tears or an intact perineum. Baby well-being at birth was noted by the Apgar scoring system. Details of birth weight and gestational age were recorded when available. Small for gestational age (SGA) babies were included provided they were confirmed well at birth (i.e., Apgar score over 8 at 5 minutes) and gestational age at least 36 weeks not requiring care in Special Care Baby Unit (SCBU) for longer than 4 hours.

Observation of events commenced from the moment of birth for both vaginal and caesarean section births. The researcher observed events in the operating theatre and then followed the mother with her baby to the recovery room to complete all observations during the hour after birth.

**Postnatal interviews and observations**

Postnatal observation of babies breastfeeding and face-to-face structured interviews with mothers took place 24 - 72 hours after birth. Full assessment of a breastfeed from which scores were derived, lasted approximately 20 minutes or longer, depending on the readiness of the
baby to feed and individual mother’s needs. The researcher asked the mother to ‘show’ what she did to offer her baby the breast. The researcher watched the baby being positioned, attach and breastfeed without giving the mother any instruction or advice. For accuracy of data collection the observations on the tick sheet were quickly attended to (within 5 minutes) and the rest of the time was spent gathering data by interview while continuing to observe sustained baby feeding. If babies were not ready to feed at the time, structured interview questions commenced first. If mothers were experiencing breastfeeding difficulties, the researcher provided help and guidance as requested only after recording observations. If breastfeeding difficulties were such that mothers needed more time than the hour allocated for observation and interview, referral to a lactation consultant on duty or midwife in the ward was made.

**Postnatal breastfeeding observation tool**

The postnatal breastfeeding observation tool (PBOT) was devised to measure newborn effective suckling and maternal independence in positioning babies for feeding (Cantrill, Creedy, Cooke, Dykes & Chaseling, 2005c) (see Appendix K1). The inventory comprises 32 items organized into five subscales: maternal nurturing (4 items), positioning (10 items), attachment (5 items), effective feeding (8 items), and assistance received (5 items).

For each behaviour observed or reported ‘1’ point is entered and ‘0’ points if the behaviour is not observed. Subscales and total inventory scores are derived by adding points. The PBOT is intended to identify any breastfeeding difficulties mothers may be experiencing prior to discharge together with any education needs requiring immediate attention or follow-up. Responses to most items may be gleaned from general visual assessment on immediate entry into a room where a mother is breastfeeding or about to breastfeed her baby. Several items required the observer to ask the mother’s opinion and observe the baby’s feeding patterns closely.

Content and face validity were established through several processes. The tool was underpinned by a model used for home observation of infants and children (Caldwell & Bradley, 2001). Items were developed from a critical review of the literature and best available evidence, and reviewed by an expert panel of clinical midwives and International Board Certified Lactation Consultants (IBCLC).

Reliability was established in a pilot study with three midwives who simultaneously observed seven mothers individually. The intraclass correlation assesses rating reliability by comparing
the variability of different ratings of the same subject to the total variation across all ratings and all subjects (Uebersax, 2003). Intraclass correlation coefficients (ICC) for overall scores were high 0.895 (p < 0.001) and ranged from 0.6 to 0.95 for the subscales when administered 24 – 72 hours post birth (see Table 3.1). Internal consistency for the PBOT was measured by Cronbach’s alpha.

Table 3.1 Intraclass Correlation Coefficient between observers

<table>
<thead>
<tr>
<th>Average measures</th>
<th>ICC</th>
<th>CI</th>
<th>Lower</th>
<th>Upper</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score</td>
<td>0.895</td>
<td>95%</td>
<td>.365</td>
<td>.943</td>
<td>9.655</td>
<td>6,12</td>
<td>0.001</td>
</tr>
<tr>
<td>Maternal nurturing</td>
<td>0.799</td>
<td>95%</td>
<td>.143</td>
<td>.892</td>
<td>5.690</td>
<td>6,12</td>
<td>0.005</td>
</tr>
<tr>
<td>Positioning</td>
<td>0.607</td>
<td>95%</td>
<td>-.041</td>
<td>.793</td>
<td>3.035</td>
<td>6,12</td>
<td>0.48</td>
</tr>
<tr>
<td>Attachment</td>
<td>0.956</td>
<td>95%</td>
<td>.841</td>
<td>.992</td>
<td>20.962</td>
<td>6,12</td>
<td>0.000</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>0.886</td>
<td>95%</td>
<td>.598</td>
<td>.979</td>
<td>8.612</td>
<td>6,12</td>
<td>0.001</td>
</tr>
<tr>
<td>Assistance</td>
<td>0.877</td>
<td>95%</td>
<td>.574</td>
<td>.977</td>
<td>8.387</td>
<td>6,12</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The tool was used to explore associations between duration of skin-to-skin contact and baby commencing suckling during the first hour after birth and effective suckling prior to discharge from hospital. Pearson’s product-moment correlation was used to explore relationships between mothers positioning their baby for attachment to the breast and effective breastfeeding, and between attachment scores and breastfeeding scores. Relationships between categorical variables were explored using a Chi-Square test for independence.

**Postnatal interviews**

To determine associations between antenatal baseline measures, birthing room outcomes and subsequent breastfeeding, mothers were interviewed before discharge from hospital or within 24 to 72 hours after birth (see Appendix K2). Participants were interviewed at the time breastfeeding was observed. For the few cases when babies were not ready to feed, the interviews were conducted first and the researcher returned at a more suitable time to observe feeding. The interviews could be completed in 10 minutes but most took around 20 minutes or longer depending on mothers’ needs to express their opinions and experiences.

Participants were asked a range of structured questions about extent and frequency of breastfeeding, any devices used to help baby feed, expressing breastmilk including perception
of milk adequacy, nipple pain and trauma, perception of help needed and received, their experience of holding their naked baby in the birth suite, and opinions about help received to initiate breastfeeding. Measures used for the postnatal interview were repeated for three time periods of 2 weeks, 3 months and 6 months (see Appendix K3-5).

**Extent of breastfeeding**

Criteria defined for exclusive breastfeeding by Labbock and Krasovec (1990) and WHO (1991) were used to measure extent of breastfeeding at each time period - discharge, 2 weeks, 3 months and 6 months (see Appendix K3-5). According to WHO (1991) infant feeding definitions, ‘fully breastfeeding’ is comprised of both exclusive breastfeeding and predominant breastfeeding. Exclusive breastmilk fed infants receive only breastmilk, while predominantly breastfed infants may receive breastmilk plus water based liquids. Infants who receive any breastmilk are classed as breastfed but may also be fed artificial baby milk (ABM) or other substances. Complementary feeding is when a child receives both breastmilk and solid (or semisolid) food while a bottle fed child receives liquid or semisolid food from a bottle with a teat.

Labbock and Krasovec (1990) combined the two categories of exclusive breastfeeding (EBF), defined as only breastmilk fed to the infant, i.e. no other oral substance whatsoever, and almost exclusive breastfeeding (AEBF) including occasional water and/or vitamins fed to the infant, and created three levels of ‘partial breastfeeding’. The three levels of partial breastfeeding are measured according to the number of breastfeeds over a 24 hour period: 1) partial high (PH) is more than 80% breastmilk feeds (i.e. 8 in 10); 2) partial medium (PM) is about 20% – 80% breastmilk feeds (i.e. 2 – 8 in 10); 3) partial low (PL) is less than 20% of feeds breastmilk (i.e. less than 2 in 10). A sixth category is recognised as token breastfeeding or 2 – 3 short breastfeeds of about 15 minutes in total over a 24 hour period. Lastly babies may be fed artificial baby milk (ABM) and not fed any breastmilk whatsoever.

Data were collected for breastmilk expression from interviews for the purpose of 1) ensuring those babies who received human milk provided by their mother were counted as breastfeeding (see definitions) even though they may not have been physically feeding from the breast at the time; and 2) to extend our understanding of mothers’ perception of milk adequacy in relation to problems experienced and duration of skin contact. It is known that duration of skin contact can increase milk supply. It is also known that breastfeeding problems experienced in the early adjustment phase may be associated with the need to express breastmilk.
Mothers were asked questions about frequency and duration of breastfeeding, and whether devices or pacifiers were used. Information was used in descriptive analysis to compare outcomes for those mothers who offered babies to breastfeed freely and those who were restrictive, in relation to skin-to-skin contact holding in the birthing room.

**Nipple pain and trauma**

Questions for nipple pain and trauma were derived from previous studies (Amir, 2002; Forster et al., 2003). Mothers were asked to answer “yes” or “no” as to whether they experienced any nipple pain at the beginning of the feed and during the breastfeed, and if nipple trauma was seen after the feed. They were asked to score the level of pain on a scale of 0 to 10, 10 being the worst pain imaginable and 0 being no pain at all. A smiley, sad and unhappy face were shown to mothers to help them decide on a pain score. Pain scores and data on nipple pain and trauma were repeated during the follow-up telephone interviews at 2 weeks, 3 months and 6 months.

**Positioning and attachment assistance**

To gauge mother’s satisfaction with assistance from staff for positioning and attachment for effective breastfeeding, questions in regards to perception of assistance needed and to assess mother’s perception of assistance received, were included with the main postnatal interview questionnaire.

*Perception of assistance needed*

Participants were asked how much help they felt they needed to position and attach their babies. Six options of ‘1 = full assistance put baby on, position and attach’, ‘2 = moderate assistance put baby on, attachment only’, ‘3 = minimal assistance positioning only’, ‘4 = no hands on assistance, verbal encouragement only’, ‘5 = reassurance about attachment’, ‘6 = no assistance’ and an option for ‘other’ assistance mothers may like to describe. These measures were used as categorical data in analysis to find differences between mothers’ perception of assistance needed and their perception of assistance received. The same items were used by midwives to provide feedback on the level of assistance they gave in the birthing room to help mothers with positioning and attachment.

*Perception of assistance received*

A tool with eight items to assess mothers’ perception of assistance received to breastfeed was developed to reflect the ways in which mothers disclosed the help they had received. The tool was developed in consultation with five mothers and piloted with 15 participants. Wording of
questions was slightly modified after the pilot phase to better suit mothers’ expressions of assistance received. Finally, eight items with responses rated on a five point Likert scale of “1 = strongly disagree” to “5 = strongly agree” were chosen to assess mothers’ perception of assistance received. Higher scores indicated a higher level of satisfaction reported by mothers with advice and assistance provided to manage positioning and attachment. Higher scores also indicated higher levels of recommended best practice as per standard global guidelines available at the time (ACMI/BFHI, 1996; WHO.UNICEF, 1992).

Reported experience

Finally four open-ended questions were asked of mothers for their opinion on 1) helpful actions by midwives offering health care; 2) unhelpful actions; 3) things they felt contributed to their confidence (or not) about breastfeeding; and 4) comments on their experience of holding their naked baby on their bare chest. Mothers were invited to offer any further comments they wished and ask any questions they wanted. At the end of the interview mothers were offered four information leaflets. The information leaflets were part of standard care given to mothers in the ward (ALCA, 2003; Cantrill, 2003; Glover, 2003b; QLCA, 2003). Mothers were thanked and reminded of the 2 week phone call.

Postnatal and beyond: 2 weeks to 6 months

Procedure for postnatal follow-up interviews

In order to build rapport with mothers a standard greeting was formulated to ask the mother if she and her baby were well. A checklist of common aspects of baby care and development was asked to give mothers an opportunity to express their experiences so far. The items were not used for data analysis but served as a lead into interview questions for data collection. This process allowed mothers to discuss matters they believed were relevant and was a useful strategy to avoid embarrassing mothers who may have stopped breastfeeding.

Questions discussed with mothers at this time on exclusive breastfeeding, and on nipple pain and trauma were the same as those used at discharge. Another question asked mothers if they ever held their naked baby on their bare chest. If yes, they were asked to choose one of five frequencies “1 = never”, “2 = rarely”, “3 = occasionally”, “4 = often”, “5 = daily”. These responses were used in descriptive analysis to further investigate individual cases who may have been having breastfeeding difficulties at 2 weeks postpartum, and explore associations between confidence scores and naked body contact holding at 2 weeks.
Items asked during the 3 and 6 month telephone interviews mirrored those administered at 2 weeks except for two questions. The question on naked body contact was not asked. Questions on exclusive breastfeeding were modified slightly using the same items as in the ABFAB study (Forster et al., 2003) to include complementary feeding or commencement of solids. This item was often brought up by mothers and recent concerns of how breastfeeding rates are collected and presented require this concept to be addressed (Commonwealth Department of Health and Ageing, 2002; National Health & Medical Research Council, 2003; World Health Organization, 2000).

**Ethical considerations**

Prior to administration of the survey form, participants were given information verbally and in writing outlining the purpose of the study, their right to refuse to participate and/or withdraw at any time without explanation, and not answer questions if they wished. Confidential storage of data and the complaints mechanism were explained. Opportunities were provided for participants to ask questions at any stage. Participants were required to sign a consent form which is shown in Appendix B.

The study did not propose to change or challenge participants in any way. The researcher who is a midwife and International Board Certified Lactation Consultant (IBCLC) conducted all the observations and interviews. The ethical code under which this research was conducted had the wellbeing of participants as the paramount consideration. When it was judged that participants were uncomfortable in any way concerning naked body contact with their baby, or unhappy in regards to continuing to breastfeed, they were encouraged to decide what was best for them. Mothers were referred to expert lactation help in the community and in the hospital if they needed extra support.

Every care was taken during follow-up phone calls to be mindful that not all healthy, well, term babies remain that way, and to be gentle and tentative in approach to mothers. The research was approved by both the University and the participating hospital ethics committees.

**Data analysis**

Several procedures were carried out to ensure accuracy of data entry. Firstly data entry was conducted by a research assistant and the researcher. The accuracy of data coding and computer entry was checked on a random sample (15%) of the database. The error rate was less than 5%.
Relevant variables of interval data such as scores for confidence were reviewed for normality, skewed or kurtotic distribution. Data was first entered in Excel for ease of management of large datasets with many variables and ability to screen and do filter checking.

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 13.0 (SPSS for Windows, 2006) for personal computers. Collected data were reviewed for completeness and consistency within a single data form and among data forms. The accuracy of data coding and computer entry was assured by comparing the computerised data with the original data, by checking that frequencies made sense and by using filters in Excel to ensure matching of number entries in some questions.

A variety of statistical methods were employed to review the data set. Psychometric properties of instruments were assessed using Cronbach’s alpha for reliability for the 14 item BSES – SF, the 20 item H&H lactation scale, new ‘skin contact knowledge’ questionnaire and the newly devised ‘perception of help received’ tools. Dependencies between categorical variables were examined using Chi-square analyses. Relationships between continuous variables were assessed using Pearson Product-Moment Correlation, and between categorical and continuous variables using either one-way Analysis of Variance (ANOVA) and/or t test.

Descriptive statistics were used to present some findings observed in this exploratory study. Factor analyses were conducted to check groupings of variables observed in the birthing room as the preliminary analysis of variables used in the inferential models. A logistic regression model was chosen to identify predictors of suckling achievement (dependent variable). The direct method where all predictors enter the equation simultaneously is the method of choice in this case as there were no specific hypotheses about the order or importance of predictor variables. Each predictor is evaluated as if it entered the equation last (Tabachnick & Fidell, 2001). Logistic regression analysis is helpful to predict a categorical variable from a set of predictor variables. Logistic regression analysis differs from ordinary leafed linear regression in that some or all of the independent variables and the dependent variable are dichotomous (Leech, Barrett & Morgan, 2005).

Direct logistic regression analysis was conducted to assess whether the four independent predictor variables: 1) any suction; 2) positioning of baby’s chin on the breast; 3) help received to attach; and 4) duration of skin contact for at least 60 minutes, significantly predicted effective suckling (dependent variable). Analysis was conducted firstly pertaining to effective suckling in
the birth suite during the first hour after birth and secondly for the postnatal period at around 72 hours after birth. Independent variables for the postnatal period were 1) positioning of baby’s chin on the breast and 2) duration of skin contact for at least 60 minutes. The dependent variable was ‘baby feeds with sustained attachment’.

An alpha level of .05 was used for all statistical tests.

Qualitative data from structured interviews were analysed using a thematic approach where the central purpose of analysis is to identify themes in the data in relation to the study aims. In addition to explicit themes, implicit meanings embedded in words spoken by participants that gave a unanimous meaning were also kept in mind for analysis of responses to interview questions (Taylor, Kermode & Roberts, 2007). Initially, line by line coding will be used to reduce the data into codes. The codes will be compared and contrasted within and between interviews to develop categories. The categories will then be grouped and the meaning formulated into significant statements or themes used to describe women’s experiences. (Strauss & Corbin 1988; Minichiello, Sullivan, Greenwood & Axford, 2004; Taylor, Kermode, & Roberts, 2006)

Summary

This chapter presented the study design and components of the four phases to explore the relationship between duration of naked body contact between mother and newborn and newborn feeding ability during the first hour after birth. Previous studies examining birthing room practices had not accurately measured the duration of skin-to-skin contact and there were inconsistencies between studies defining continuous uninterrupted naked body contact from the time of birth. Secondly, the present study aimed to further explore associations between suckling achievement in the birthing room and assistance mothers received to position and attach their infant at the breast. To date, instruction mothers receive regarding positioning and attachment is designed for postnatal ward care, several hours, days and in some cases weeks beyond birth. Finally, a third aim of the study was informed by gaps found in the research literature and aimed to explore associations between effective suckling in the birthing room and success of subsequent breastfeeds in the postnatal ward.

Characteristics of original tools used to accurately measure duration of naked body contact between mother and newborn, record maternal responses to infants, newborn feeding behaviours along with assistance received were outlined in this chapter. Reliability and validity
of a newly designed, postnatal breastfeeding observation tool with outcome measures mirroring key variables in birthing room observations and based on known principles of optimal positioning and attachment have been described. Plans to use standardised measures of breastfeeding confidence, and breastfeeding outcomes such as nipple trauma and exclusive breastfeeding were outlined.

Recruitment, sampling procedures, and data collection processes were explained. Finally ethical considerations were discussed and both descriptive and inferential data analysis methods presented. The next chapter presents the results of the present study.
Chapter 4

Results: Duration of naked body contact and associated breastfeeding outcomes.

This chapter presents the data results related to sample characteristics, breastfeeding history, breastfeeding confidence, birthing room observations and events, postnatal observations and interviews, and post hospital discharge follow-up. The validity and reliability of measures are also established. The response rate achieved in the study is reported. A descriptive comparison of the demographic characteristics of participants recruited in the antenatal phase with the State birthing population or National figures is outlined to demonstrate the representative nature of the sample. Inferential statistics are used to explore associations between birthing room events and postnatal outcomes, and between postnatal observations and post discharge follow-up outcomes reported by mothers. Qualitative data is presented to demonstrate mothers’ satisfaction with care to initiate breastfeeding. Logistic Regression analyses were performed to develop a predictive model of breastfeeding initiation and breastfeeding success.

Response rate

A total of 133 eligible pregnant women was approached to participate in the study. Of these, 30 declined participation. Two common reasons given by women for declining participation were that they did not want an observer in the room at a time they felt was private between themselves and their partner or that they felt rushed and stressed at this stage of pregnancy and were unable to commit their time. A 77.4% acceptance rate was achieved with a total of 103 women completing antenatal questionnaires relating to demographics, breastfeeding history, breastfeeding confidence and perception of milk adequacy.

Three women withdrew before birthing room observations took place, leaving a total of 100 study participants. One mother lost her baby by intrauterine death (IUFD) before the due date, two mothers withdrew from the study during labour, one no longer wished to breastfeed and the other had a long labour, difficult birth, and the baby was born with oral defects. Further losses occurred due to observations in the birthing room being missed for nearly a quarter of the cohort (22%, n = 22). Reasons for missed observations included the researcher not being notified of impending birth (n = 6), not called in time (n = 10), precipitate birth (n = 2), researcher not able to attend (n = 2), and simultaneous births (n = 2). However, mothers were offered the option of continued postnatal observations, interviews and further follow-up. Most mothers were keen to
continue participation in the study. Twenty (20) of the 22 women whose births were not observed were interviewed postnatally and the baby was observed breastfeeding.

Birthing room observations of mothers and newborns for the first hour after birth were obtained for 78% of the sample (n = 78), consisting of vaginal (78.2%; n = 61) and caesarean section births (21.8%; n = 17). Amongst the 78 observed births were primipara (46.2%, n = 36) and multipara (53.8%, n = 42) mothers. Birthing events information was collected from medical records. The main analysis of this present study is for the 78 observed births. Of this cohort, 56 vaginal and 16 caesarean section births were observed breastfeeding prior to discharge, making a total of 92 postnatal breastfeeding observations. Five of the mothers who went home early, were visited in their own home within 72 hours, for the postnatal interview and to be observed breastfeeding.

Reasons for missing postnatal interviews and breastfeeding observations, included early discharge without informing the researcher or an inability to be contacted. No data other than that recorded in the medical chart in regards to breastfeeding at discharge was available for these participants unless they responded at the 2 week phone call and were willing and able to give information retrospectively.

A flow diagram (Figure 2) depicts information from study recruitment, participation, observed births, skin-to-skin contact (ssc) at birth, postnatal observation and interview prior to hospital discharge and follow-up at 2 weeks, 3 months and 6 months.
Figure 3: Response rates, births observed and follow-up
Demographic characteristics

Demographic characteristics of the total sample are shown in Table 4.1. Local, state and national figures are shown for comparison (Australian Bureau of Statistics, 2000; Queensland Department of Health, 2005). The sample was similar to the birthing population of the participating site and Queensland birthing population for age, marital status and education.

The mean age for women in the sample was 28.9 years (range of 18 to 42 years, SD = 5.15 years), which is similar to the State-wide population of birthing women. The mean age for partners of women in the sample was 30.8 years (range of 19 to 46 years, SD = 5.28 years).

Three categories of marital status: married/defacto, single and separated/other (e.g. divorced) were used. The marital status of this sample was comparable with the Queensland Perinatal Statistics Data for 2003 with a slight decrease in the number of married/de facto women but half the number of single, separated or divorced women.

Two categories for ethnicity were reported as Aboriginal/Torres Strait Islander and neither Aboriginal nor Torres Strait Islander in line with Queensland perinatal data reports (Queensland Department of Health, 2005). Only one mother identified as Aboriginal/Torres Strait Islander whereas the State-wide population is 5.8%.

Country of birth for the majority (84.5%; n = 87) of the sample was Australia. Several mothers were born in Asian countries (2.9%; n = 3), New Zealand (2.9%; n = 3), Canada (1%; n = 1), United Kingdom (2%; n = 2) and countries of Oceania (2%; n = 2), Africa (2.9%; n = 3) and Europe (2%; n = 2). This is similar to Queensland birthing women (83.9%) (Queensland Department of Health, 2005).

Although the occupational status of participants reflects trends in the general population for women (Queensland Department of Health, 2005), the data for the present study reflects activities of childbearing women by including the categories of home duties, student and unemployed. The largest proportion of participants listed ‘home duties’ (24.27%; n = 25) as their occupation at the time of the survey, closely followed by ‘clerical/sales & service’ (21.36%; n = 22). The inclusion of the extra categories, particularly home duties, may account for discrepancies of numbers within the professional/associated professional category.
A quarter of the total sample group classed their employment status as home duties while around 20% reported maternity leave. Just under 20% were employed ‘full time’ during pregnancy and a few ‘casual’ or ‘part time’, with around 11% unemployed in comparison with State and National figures (Australian Bureau of Statistics (ABS), 2003a).

One third reported a family income greater than $55,500 (AUD), although almost 10% had a family income less than $22,500 (AUD). Compared to the average Australian family income of $44,720, the income of participants in the present study is comparable (Australian Bureau of Statistics (ABS), 2003a).

Half the sample (55.3%) achieved all or part of their secondary education as their highest level of education. A further 23% of women had some form of tertiary education and 17% had undertaken postgraduate studies. State figures for women’s educational achievement reflect similarly.

Table 4:1 Demographic characteristics of sample and sample of births observed compared with State or National populations

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Sample n (%)</th>
<th>Sample Births Observed n (%)</th>
<th>State or National population data (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Group women#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 20 years</td>
<td>3 (2.9)</td>
<td>3 (4)</td>
<td>6.1</td>
</tr>
<tr>
<td>20-24</td>
<td>15 (14.6)</td>
<td>10 (13.3)</td>
<td>17.7</td>
</tr>
<tr>
<td>25-29</td>
<td>38 (36.9)</td>
<td>26 (34.7)</td>
<td>28.4</td>
</tr>
<tr>
<td>30-34</td>
<td>34 (33)</td>
<td>26 (34.7)</td>
<td>31.4</td>
</tr>
<tr>
<td>35-39</td>
<td>10 (9.7)</td>
<td>7 (9.3)</td>
<td>13.6</td>
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<tr>
<td>40 years and over</td>
<td>3 (2.9)</td>
<td>3 (4)</td>
<td>2.8</td>
</tr>
<tr>
<td>Marital status#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Defacto</td>
<td>95 (92.23)</td>
<td>69 (92)</td>
<td>87.4</td>
</tr>
<tr>
<td>Single</td>
<td>5 (4.85)</td>
<td>4 (5.3)</td>
<td>11.1</td>
</tr>
<tr>
<td>Separated/divorced</td>
<td>1 (.97)</td>
<td>1 (1.3)</td>
<td>1.4</td>
</tr>
<tr>
<td>Non-response</td>
<td>2 (1.94)</td>
<td>1 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither Aboriginal nor Torres Strait Islander</td>
<td>98 (95.14)</td>
<td>70 (93.3)</td>
<td>94.2</td>
</tr>
<tr>
<td>Aboriginal/Torres Strait Islander</td>
<td>1 (0.01)</td>
<td>0 (0)</td>
<td>5.8</td>
</tr>
<tr>
<td>Non-response</td>
<td>4 (0.38)</td>
<td>1 (0.1)</td>
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</tr>
<tr>
<td>Occupational category*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home duties+</td>
<td>25 (24.27)</td>
<td>17 (22.7)</td>
<td>-</td>
</tr>
<tr>
<td>Clerical/sales &amp; service</td>
<td>22 (21.36)</td>
<td>16 (21.3)</td>
<td>37.2</td>
</tr>
<tr>
<td>Manager/administrator</td>
<td>15 (14.56)</td>
<td>12 (16)</td>
<td>4.1</td>
</tr>
</tbody>
</table>
### Demographic characteristics

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Sample n (%)</th>
<th>Sample Births Observed n (%)</th>
<th>State or National population data (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional/associate professional</td>
<td>14 (13.59)</td>
<td>10 (13.3)</td>
<td>30.6</td>
</tr>
<tr>
<td>Non-response</td>
<td>16 (2.5)</td>
<td>12 (16)</td>
<td></td>
</tr>
<tr>
<td>Trades person</td>
<td>8 (7.7)</td>
<td>5 (6.7)</td>
<td>2.9</td>
</tr>
<tr>
<td>Student+</td>
<td>2 (1.94)</td>
<td>2 (2.7)</td>
<td>-</td>
</tr>
<tr>
<td>Production and transport</td>
<td>1 (.97)</td>
<td>1 (1.3)</td>
<td>2.4</td>
</tr>
<tr>
<td>Employment*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home duties</td>
<td>29 (28.1)</td>
<td>21 (26.9)</td>
<td></td>
</tr>
<tr>
<td>Maternity leave</td>
<td>22 (21.4)</td>
<td>17 (21.8)</td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>19 (18.4)</td>
<td>14 (17.9)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>12 (11.7)</td>
<td>10 (12.8)</td>
<td></td>
</tr>
<tr>
<td>Casual</td>
<td>9 (8.7)</td>
<td>7 (9)</td>
<td></td>
</tr>
<tr>
<td>Part time</td>
<td>6 (5.8)</td>
<td>3 (3.8)</td>
<td></td>
</tr>
<tr>
<td>Non response</td>
<td>6 (5.8)</td>
<td>6 (7.6)</td>
<td></td>
</tr>
<tr>
<td>Income*</td>
<td></td>
<td></td>
<td>44,720</td>
</tr>
<tr>
<td>$22,500</td>
<td>8 (7.8)</td>
<td>6 (7.7)</td>
<td></td>
</tr>
<tr>
<td>$22,501 - 55,500</td>
<td>51 (49.5)</td>
<td>37 (47.4)</td>
<td></td>
</tr>
<tr>
<td>$55,501 or more</td>
<td>36 (35)</td>
<td>29 (37.2)</td>
<td></td>
</tr>
<tr>
<td>Non-response</td>
<td>8 (7.8)</td>
<td>6 (7.7)</td>
<td></td>
</tr>
<tr>
<td>Education*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary education</td>
<td>57 (55.3)</td>
<td>39 (52)</td>
<td></td>
</tr>
<tr>
<td>Tertiary study</td>
<td>24 (23.3)</td>
<td>18 (24)</td>
<td></td>
</tr>
<tr>
<td>Higher degree</td>
<td>17 (16.5)</td>
<td>15 (20)</td>
<td></td>
</tr>
<tr>
<td>Non-response</td>
<td>5 (4.9)</td>
<td>3 (4)</td>
<td></td>
</tr>
</tbody>
</table>

* Australian Bureau of Statistics (2003) Year Book, Australia
+ Category not included in ABS data (2000)

### Parity and health details

There was a slightly higher percentage of nulliparous women in the total sample than in the State birthing population (Queensland Department of Health, 2005). Distribution of births by age differed to the State population where the majority of first births are in the under 20 age group. In the study sample the majority of primipara (88.6%) and multipara births were amongst the 20 – 34 year age group. In the State population, the majority of second time mothers or more births are in the 35 years and over age group.

#### Previous experience holding a newborn

The majority of first time mothers in the study (90.5%) had previously held a newborn baby. Just over half the multipara (56%, n = 28) participating mothers reported having held a newborn baby.
baby in naked body contact at the time of their previous birth. But many (44%, n = 22) had not previously experienced naked body contact with their babies at birth.

**Pregnancy well being and risk**

All expectant participating mothers stated they were well during their pregnancy. A small number identified antenatal events of significance. These included high blood pressure (n = 6), gestational diabetes (n = 6), gestational insulin dependent diabetes (n = 1), vaginal bleeding (n = 9), decreased foetal movement (n = 4), asthma (n = 7), kidney problems (n = 1), thyroid (n = 2), liver (n = 2), depression (n = 5).

**Smoking**

Most of the women (87.4%; n = 90) in the sample were non-smokers. About half the smokers were primipara (n = 7) and half multipara (n = 6). All reported smoking less than 10 (n = 10) or 20 (n = 3) cigarettes per day.

**Reliability of instruments**

Two standardized tools and four new tools were used to explore relationships between mothers’ expectations, birthing room breastfeeding initiation practices and postnatal breastfeeding outcomes. The validity of the two standardised instruments and other tools used in this study were reported in Chapter 3. Reliability of the instruments in the present study will be reported here.

The reliability attribute of homogeneity for the Breastfeeding Self-Efficacy Scale - Short Form (BSES - SF) and Perception of Milk Adequacy measure (H&H scale), were tested using Cronbach’s alpha. A Cronbach coefficient alpha was also estimated for three new tools: Skin-contact Knowledge, Postnatal Breastfeeding Observation, and Perception of Assistance Received. The Birthing Room Observation Tool was tested using exploratory factor analysis.

The Cronbach’s alpha for breastfeeding confidence (as measured by the 14 item BSES - SF) was 0.93 (n = 99), antenatally 0.93 (n = 86) at 2 weeks postpartum, and 0.89 (n = 55) at 3 months postpartum. This is comparable to the Cronbach alpha of 0.94 reported by (Dennis, 2003).
The reliability coefficient calculated for Perception of Milk Adequacy at three time periods was 0.85 (n = 96) during the antenatal period, 0.95 (n = 86) at 2 weeks postpartum and 0.88 (n = 57) at 3 months. These measures indicate that the scale has reasonable internal consistency. Cronbach alpha reported by the original researchers was 0.84 at 1 week and 0.98 at 8 weeks postpartum (Hill & Humenick, 1996). Also reported in a previous study as 0.81 antenatally, 0.88 at 1 week and 0.86 at 4 months (Creedy et al., 2003).

**Skin contact knowledge**

A questionnaire devised to assess pregnant women’s knowledge of skin-to-skin contact antenatally produced a good Cronbach’s alpha of 0.76.

**Birthing room observations**

The primary outcome of this study is the time newborns begin to suckle in the birthing room in relation to duration of continuous uninterrupted naked body contact between mother and her infant. An observation tool on a time line grid was devised to observe four overarching variables and to calculate the duration of continuous uninterrupted skin contact between mothers and their newborn. Pearson’s correlations and exploratory factor analysis were carried out on items from three sections: 1) newborn feeding behaviours; 2) maternal actions to initiate breastfeeding; and 3) the assistance mothers received to position and attach their baby for feeding. Observations of these and a fourth variable, ‘separation of baby and procedures’ were recorded each minute of the first hour of birth.

**Feeding Behaviour**

Thirty-three (33) items were designed to observe newborn feeding behaviour and ability. Principal component analysis (PCA) with varimax rotation assessed the underlying structure of these. The Correlation determinant was greater than 0.001 and variables were highly correlated providing a reasonable basis for factor analysis. Kaiser-Meyer-Olkin (KMO) measure was 0.61 which is low but adequate to inform sufficient items predicted by each factor (Leech et al., 2005). Initially 12 factors with Eigen values greater than one accounted for 71% of variance. The scree plot suggested two factors with Eigen values greater than 11 accounting for 29% of variance.

Given that items were designed to observe pre-feeding behaviour and newborn ability to attach and suckle effectively, a two-factor solution of 26 variables with loadings above 3 was accepted for further analysis. After rotation, the first factor accounted for 15% of variance, and the
second factor accounted for 14%. Table 4.2 displays the items and factor loading for the two rotated factors. Further PCA with varimax rotation was conducted separately on each of these factored groups to further assess underlying structure. Coordination to attach and suckle were confirmed by this second factor analysis of feeding behaviour variables observed.

The initial investigation of factors observing newborn feeding, confirmed existing conclusions from the research literature and clinical practice in regards to 1) pre-feeding behaviour where newborns coordinate and orientate suckling and 2) attachment and suckling where babies attach to the breast, begin to suckle and settle into sustained suckling.
Table 4.2 Rotated Component Matrix: Feeding behaviour

<table>
<thead>
<tr>
<th>Feeding behaviour</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pokes tongue out</td>
<td>.680</td>
<td></td>
</tr>
<tr>
<td>Attempts to lift head</td>
<td>.670</td>
<td></td>
</tr>
<tr>
<td>Attempts to turn head</td>
<td>.630</td>
<td></td>
</tr>
<tr>
<td>Crawling movement</td>
<td>.611</td>
<td></td>
</tr>
<tr>
<td>Sucks fingers</td>
<td>.577</td>
<td></td>
</tr>
<tr>
<td>Pushes feet down</td>
<td>.524</td>
<td></td>
</tr>
<tr>
<td>Begins to gape</td>
<td>.511</td>
<td></td>
</tr>
<tr>
<td>Sucks fist</td>
<td>.495</td>
<td></td>
</tr>
<tr>
<td>Throaty groaning cries</td>
<td>.445</td>
<td></td>
</tr>
<tr>
<td>Moves toward breast</td>
<td>.443</td>
<td></td>
</tr>
<tr>
<td>Turns head</td>
<td>.419</td>
<td></td>
</tr>
<tr>
<td>Lip smacking</td>
<td>.416</td>
<td></td>
</tr>
<tr>
<td>Attempts to suck on skin</td>
<td>.354</td>
<td></td>
</tr>
<tr>
<td>Drooling saliva</td>
<td>.352</td>
<td></td>
</tr>
<tr>
<td>Grasping with hands</td>
<td>.348</td>
<td></td>
</tr>
<tr>
<td>Hand to mouth</td>
<td>.319</td>
<td></td>
</tr>
<tr>
<td>Grasps nipple</td>
<td>.878</td>
<td></td>
</tr>
<tr>
<td>Sustained deep rhythmical suckle</td>
<td>.795</td>
<td></td>
</tr>
<tr>
<td>Suckles at the breast</td>
<td>.790</td>
<td></td>
</tr>
<tr>
<td>Takes assymetrical latch</td>
<td>.674</td>
<td></td>
</tr>
<tr>
<td>Reattached</td>
<td>.602</td>
<td></td>
</tr>
<tr>
<td>Off breast</td>
<td>.560</td>
<td></td>
</tr>
<tr>
<td>Attempts to relatch</td>
<td>.444</td>
<td></td>
</tr>
<tr>
<td>Off and on latching</td>
<td>.374</td>
<td></td>
</tr>
<tr>
<td>Nudges breast with chin</td>
<td>.362</td>
<td></td>
</tr>
<tr>
<td>Attempts to grasp nipple</td>
<td>.336</td>
<td></td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 7 iterations.

Maternal actions initiating breastfeeding

Nine items were designed to record mothers’ actions initiating breastfeeding. Principal component analysis (PCA) with varimax rotation was conducted to assess the underlying structure. The correlation determinant was 0.173, Kaiser-Meyer-Olkin (KMO) measure was .68 which is approaching adequacy described by Leech et al. (2005) and is adequate according to others (Francis, 2004) to inform sufficient items predicted by each factor. Variables were highly correlated (p < 0.001) to provide a reasonable basis for factor analysis (Leech et al., 2005). Three factors with Eigen values greater than 1 accounted for 59% variance.
Three factors emerged: 1) positioning preparations (accounted for 29% of variance; 2) readiness to help babies attach (16% of variance) and enticing babies to attach to the breast; and 3) feed (14% of variance). Table 4.3 displays the items and loading for the rotated factors with items loading of less than 0.3 omitted. Results of this factor analysis gives confidence that variables observed are appropriately grouped to observe mothers’ actions to position and entice babies to attach to the breast for the first breastfeed and provides guidance for further analysis.

Table 4:3 Rotated Component Matrix: Maternal action

<table>
<thead>
<tr>
<th>Action</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supports baby's whole body</td>
<td>.770</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positions baby close</td>
<td>.703</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Positions herself</td>
<td>.684</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby's chin contacts breast</td>
<td>.569</td>
<td>.439</td>
<td></td>
</tr>
<tr>
<td>Does not hold back of baby's head</td>
<td></td>
<td>4.07</td>
<td></td>
</tr>
<tr>
<td>Expresses colostrum for baby</td>
<td>.843</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turns baby to face herself</td>
<td>.560</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expresses drop of colostrum into baby's mouth</td>
<td></td>
<td>.905</td>
<td></td>
</tr>
<tr>
<td>Holds nipple to baby's mouth</td>
<td></td>
<td>.460</td>
<td></td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

**Assistance received**

Twenty (20) items captured assistance that mothers received for the first breastfeed in the birthing room. Principal component analysis (PCA) with varimax rotation assessed the underlying structure of items. Five variables with communality values less than two were removed for analysis. The correlation determinant was $p < 0.01$, Kaiser-Meyer-Olkin (KMO) measure was 0.63 and variables were highly correlated $p < 0.001$ which suggests suitable collinearity between variables for a solution, sufficient items predicted by each factor being adequate, and a reasonable basis for factor analysis provided by correlations (Francis, 2004; Leech et al., 2005). Five factors emerged with Eigen values above 1 which accounted for 64% of variance.

A three factor solution was based on scree plot results and three main constructs of ‘hands-on help to position and attach’, ‘hands-off help by affirmation’ and ‘verbal encouragement and instruction’. The three factor solution accounted for 49% of variance. Table 4.4 displays the items and factor loading for the rotated factors with loading of less than 0.4 omitted to improve clarity.
### Table 4:4 Rotated Component Matrix Assistance received

<table>
<thead>
<tr>
<th>Assistance</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s breast shaped to help baby attach</td>
<td>.745</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby’s neck held by long grip</td>
<td>.731</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby held to breast for mother</td>
<td>.676</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father moved baby over to nipple</td>
<td>.516</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby positioned close to breast</td>
<td>.518</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding assistance offered</td>
<td>.516</td>
<td>.407</td>
<td></td>
</tr>
<tr>
<td>Baby’s ability to breastfeed affirmed</td>
<td>.702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby feeding behaviour noted</td>
<td>.681</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness to breastfeed discussed</td>
<td>.585</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisted to other position</td>
<td>.525</td>
<td>.472</td>
<td></td>
</tr>
<tr>
<td>Baby turned to face mother’s breast</td>
<td>.407</td>
<td>.458</td>
<td></td>
</tr>
<tr>
<td>Mother’s hands guided to support baby</td>
<td>.480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal encouragement given</td>
<td></td>
<td>.892</td>
<td></td>
</tr>
<tr>
<td>Colostrum expressed for mother</td>
<td></td>
<td>.654</td>
<td></td>
</tr>
<tr>
<td>Verbal instruction given</td>
<td></td>
<td></td>
<td>.570</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 6 iterations.

### Postnatal breastfeeding observation tool

The present study also explored whether duration of skin-to-skin contact in the birthing room and baby suckling in the first hour after birth is associated with effective suckling at time of discharge from hospital. The postnatal breastfeeding observation tool (PBOT) measures newborn effective suckling and maternal independence positioning babies for feeding prior to discharge from hospital. Internal consistency for the PBOT was 0.84 using Cronbach’s alpha.

Reliability was established in a pilot study with three midwives who simultaneously observed mothers (n = 7). Intraclass correlation coefficients (ICC) for overall scores were high 0.895 (p<.001) and ranged from 0.6 to 0.95 for the subscales when administered 24 – 72 hours post birth (see Table 4.5).
Table 4.5 Intraclass correlation coefficients PBOT

<table>
<thead>
<tr>
<th>Average measures</th>
<th>ICC</th>
<th>CI</th>
<th>Lower</th>
<th>Upper</th>
<th>F</th>
<th>Df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>0.895</td>
<td>95%</td>
<td>.365</td>
<td>943</td>
<td>9.655</td>
<td>6.12</td>
<td>0.001</td>
</tr>
<tr>
<td>Maternal nurturing</td>
<td>0.799</td>
<td>95%</td>
<td>.143</td>
<td>892</td>
<td>5.690</td>
<td>6.12</td>
<td>0.005</td>
</tr>
<tr>
<td>Positioning</td>
<td>0.607</td>
<td>95%</td>
<td>-0.041</td>
<td>0.793</td>
<td>3.035</td>
<td>6.12</td>
<td>0.048</td>
</tr>
<tr>
<td>Attachment</td>
<td>0.956</td>
<td>95%</td>
<td>.841</td>
<td>992</td>
<td>20.962</td>
<td>6.12</td>
<td>0.000</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>0.886</td>
<td>95%</td>
<td>.598</td>
<td>.979</td>
<td>8.612</td>
<td>6.12</td>
<td>0.001</td>
</tr>
<tr>
<td>Assistance received</td>
<td>0.877</td>
<td>95%</td>
<td>.574</td>
<td>.977</td>
<td>8.387</td>
<td>6.12</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Perception of assistance received tool

Sixty-two (62%) participants responded to eight questions measuring mothers’ perception of assistance to breastfeed. Cronbach’s alpha to measure the internal consistency of perception of assistance received was 0.64. Three items were removed and internal consistency improved to a Cronbach’s alpha of 0.75. The five items remaining specifically related to positioning and attachment (see Table 4.6 Perception of help received). Cronbach’s alpha reliability for the subset of five questions relating specifically to attachment help was 0.75 which is an acceptable reliability measure (Francis, 2004).

Table 4.6 Perception of help received (figures reported for all births)

<table>
<thead>
<tr>
<th>Breastfeeding help</th>
<th>SD</th>
<th>D</th>
<th>NS</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A range of helpful suggestions have been offered</td>
<td>7(8)</td>
<td>4(4.6)</td>
<td>8(9.2)</td>
<td>25(29.9)</td>
<td>42(48.3)</td>
</tr>
<tr>
<td>I have been offered breastfeeding information</td>
<td>11(13.4)</td>
<td>9(11)</td>
<td>5(6.1)</td>
<td>23(28)</td>
<td>34(41.5)</td>
</tr>
<tr>
<td>Staff in attendance have listened to my needs</td>
<td>6(6.9)</td>
<td>4(4.6)</td>
<td>5(5.7)</td>
<td>32(36.8)</td>
<td>40(46)</td>
</tr>
<tr>
<td>*I was told to manage attachment a certain way</td>
<td>32(36.8)</td>
<td>14(16.1)</td>
<td>9(10.3)</td>
<td>16(18.4)</td>
<td>16(18.4)</td>
</tr>
<tr>
<td>*Another person has held my breast to attach baby for me</td>
<td>18(20.7)</td>
<td>11(12.6)</td>
<td>9(10.3)</td>
<td>26(29.9)</td>
<td>23(26.4)</td>
</tr>
<tr>
<td>*My baby was held to my breast for me to get baby on</td>
<td>33(37.9)</td>
<td>11(12.6)</td>
<td>6(6.9)</td>
<td>18(20.7)</td>
<td>19(21.8)</td>
</tr>
<tr>
<td>*I feel inadequate after being given help to breastfeed</td>
<td>43(49.4)</td>
<td>15(17.2)</td>
<td>7(8)</td>
<td>11(12.68)</td>
<td>11(12.68)</td>
</tr>
<tr>
<td>*Advice received directly contradicted previous advice</td>
<td>38(43.7)</td>
<td>18(20.7)</td>
<td>8(9.2)</td>
<td>14(16.1)</td>
<td>9(10.3)</td>
</tr>
</tbody>
</table>

*Positioning and attachment help received Cronbach's alpha 0.75 (n = 62)
Breastfeeding history and intention

During the antenatal period information was sought about breastfeeding intention, attendance at antenatal classes for breastfeeding education, women's specific knowledge of skin contact information and previous breastfeeding experience. Questions were asked about intended duration of breastfeeding, and multiparae mothers were asked details about any previous breastfeeding problems and duration.

Breastfeeding intention

All mothers in the study intended to breastfeed. The length of time mothers planned to continue breastfeeding ranged from less than 2 weeks (n = 1) to more than 12 months (13.6%; n = 14). Variations within the group as to how long they planned to breastfeed included longer than 2 weeks to 3 months 3.9% (n = 3), longer than 3 to 6 months 21.4% (n = 22), greater than 6 to 9 months 21.4% (n = 22), beyond 9 to 12 months 23.3% (n = 24). A few were uncertain (10.7%; n = 11) or stated "as long as I can" (2.9%; n = 3).

Antenatal breastfeeding preparation

Most mothers (85.1%; n = 86) reported having attended antenatal classes at some stage. Three quarters of participants who attended antenatal classes for the current pregnancy were first time mothers (77.4%; n = 41 out of 53). See Table 4.7

<table>
<thead>
<tr>
<th>Table 4.7 Antenatal breastfeeding education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever attended n (%)</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Antenatal class attendance</td>
</tr>
<tr>
<td>Nullipara</td>
</tr>
<tr>
<td>Multipara</td>
</tr>
</tbody>
</table>

Breastfeeding and skin contact information

Best practice standards require health professionals to discuss the management of breastfeeding with all pregnant women at antenatal encounters and/or in birthing preparation classes. Eighty percent (80%; n = 41 out of 51) of those attending antenatal class in the current pregnancy agreed that breastfeeding preparation was covered in antenatal class. Three quarters of those (74.5%; n = 38 out of 51) recalled information on skin-to-skin contact being included in that preparation.
Respondents were asked to recall whether information about skin-to-skin contact had been provided at any antenatal health care encounter. The sample was divided in recall of skin-to-skin contact being mentioned at antenatal visits. Just under half (43.7%) could not recall skin-to-skin contact information being discussed (see Table 4:8). Ninety-three percent (93%; n = 38) of those who recalled information about skin-to-skin contact at an antenatal health care encounter said a midwife provided the information.

Fifty-three percent (53%; n = 49) reported learning about skin-to-skin contact for breastfeeding initiation from sources other than a health care provider. Other sources were mainly books, magazines and media (n = 26). Some had received information from friends and other mothers (n = 6), Australian Breastfeeding Association (n = 3), previous pregnancy (n = 3), introduction to the research project (n = 2), hospital tour (n = 1), non hospital birthing classes (n = 1).

Table 4:8 Breastfeeding and skin contact information

<table>
<thead>
<tr>
<th>Included in antenatal class or visit</th>
<th>Yes n (%)</th>
<th>No n (%)</th>
<th>Unsure n (%)</th>
<th>Missing n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding preparation</td>
<td>41 (77.4)</td>
<td>5 (9.4)</td>
<td>5 (9.4)</td>
<td>2 (3.80)</td>
</tr>
<tr>
<td>Skin contact information</td>
<td>38 (74.5)</td>
<td>4 (7.8)</td>
<td>9 (17.6)</td>
<td>2 (3.80)</td>
</tr>
<tr>
<td>Mentioned at antenatal visits</td>
<td>45 (46.4)</td>
<td>40 (41.2)</td>
<td>9 (17.6)</td>
<td>2 (3.80)</td>
</tr>
</tbody>
</table>

**Antenatal knowledge of skin-to-skin contact**

Seven general knowledge questions were asked regarding the benefits of naked body contact. The mean score was 28.58 out of 35 (SD 3.6; range 13 - 35). Most women understood about skin contact for bonding (98%), adjustment to the environment (91%), warmth (88%), and to help babies learn to breastfeed (83%). Pregnant women were less certain about skin contact to reduce crying (73%) and effects of skin-to-skin contact to increase milk supply (57%). Only one third believed that skin-to-skin contact could help babies conserve energy (32%). Table 4.9 presents ratings for knowledge of skin contact.

**Hold naked newborn**

Finally, participants were asked to rate on a scale of 1 to 5 whether they would like to hold their naked baby after birth. Most (83%) respondents rated their desire to hold their naked newborn against their bare chest highly ‘5’. Eleven percent (11%) rated this as ‘4’ but five women gave a less positive rating of ‘3’.
Table 4:9 Knowledge of skin contact

<table>
<thead>
<tr>
<th>Knowledge fact</th>
<th>SD</th>
<th>D</th>
<th>NS</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonding</td>
<td>1(1)</td>
<td>0(-)</td>
<td>1(1)</td>
<td>20</td>
<td>78(78)</td>
</tr>
<tr>
<td>Adjust to environment</td>
<td>(1)</td>
<td>0(-)</td>
<td>8(8)</td>
<td>40(40)</td>
<td>51(51)</td>
</tr>
<tr>
<td>Learn to breastfeed</td>
<td>1(1)</td>
<td>0(-)</td>
<td>16 (16)</td>
<td>41 (41)</td>
<td>42(42)</td>
</tr>
<tr>
<td>Warmth</td>
<td>1(1)</td>
<td>1(1)</td>
<td>10(10)</td>
<td>49(49)</td>
<td>39(39)</td>
</tr>
<tr>
<td>Less crying</td>
<td>1(1)</td>
<td>5(5)</td>
<td>21(21)</td>
<td>35(35)</td>
<td>38(38)</td>
</tr>
<tr>
<td>Increase milk supply</td>
<td>7(7)</td>
<td>0(-)</td>
<td>36(36)</td>
<td>35(35)</td>
<td>22(22)</td>
</tr>
<tr>
<td>Conserve energy</td>
<td>5(5)</td>
<td>12(12)</td>
<td>51(52)</td>
<td>22(22)</td>
<td>10(10)</td>
</tr>
</tbody>
</table>

Prior breastfeeding

In order to examine whether duration of naked body contact in the birthing room influences breastfeeding confidence and outcomes, pregnant women with prior breastfeeding experience were asked to give details of their previous experience including any problems encountered, and number of babies breastfed prior to the current pregnancy. All but three of the 59 multiparous mothers in the overall sample had breastfed previously. Two thirds (61%, n = 36) had one previously breastfed child. One quarter (25.4%; n = 15) had two breastfed children and 8.5% (n = 5) had three or more children who had breastfed.

Over half the experienced mothers had breastfed their previous babies for less than 6 months. One quarter of the group had breastfed for less than two months (27.6%) or from 3 to 6 months (25%). Only 20% of the multiparous mothers had continued breastfeeding for 12 months or longer (see Table 4:10).

Table 4:10 Previous breastfeeding experience

<table>
<thead>
<tr>
<th>Duration breastfeeding</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 7 days</td>
<td>6 (10.7)</td>
</tr>
<tr>
<td>3 – 8 weeks</td>
<td>9 (16.9)</td>
</tr>
<tr>
<td>3 to &lt; 6 months</td>
<td>13 (25)</td>
</tr>
<tr>
<td>6 months</td>
<td>4 (7.5)</td>
</tr>
<tr>
<td>&gt; 6 to &lt;12 months</td>
<td>10 (18.8)</td>
</tr>
<tr>
<td>12 months or longer</td>
<td>10 (18.8)</td>
</tr>
</tbody>
</table>

Breastfeeding problems

Interestingly, 89% (48 out of 54) of multiparous mothers in the main sample identified breastfeeding problems with their previous babies, usually the first. Only two out of 20 mothers reported problems with second or subsequent babies.
The four most common breastfeeding problems identified by these mothers were nipple pain (59.6%), insufficient milk (46.8%), attachment problems in regards to the baby (36.2%) or mastering attachment techniques (32%) and too much milk (27.6%). Most mothers (82%; n = 40 out of 49) who experienced previous breastfeeding problems did seek help from a health professional. Figure 4 presents an overview of breastfeeding problems reported by multipara mothers who had previous breastfeeding experience.

Figure 4: Breastfeeding problems

*Inadequate milk supply*

Mothers’ perception of insufficient milk is known to be a common breastfeeding problem experienced by mothers and a common reason for abandoning breastfeeding. Thirty-eight percent (38%; n = 21) of the multiparous mothers recruited in this study reported insufficient milk as a problem for their first baby. ‘Insufficient milk’ was determined by respondents as baby not gaining weight (55.6%), baby demanding extra feeds (50%), crying, irritable baby (44.4%), advice from family health nurse (44.4%); and breasts felt empty or smaller (44.4%) (see Table 4.11).
Table 4:11 Milk inadequacy

<table>
<thead>
<tr>
<th>Milk inadequacy determined by:</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby not gaining weight</td>
<td>10(55.6)</td>
</tr>
<tr>
<td>Demanding extra feeds</td>
<td>9(50)</td>
</tr>
<tr>
<td>Crying, irritable</td>
<td>8(44.4)</td>
</tr>
<tr>
<td>Advice from family health nurse</td>
<td>8(44.4)</td>
</tr>
<tr>
<td>Breasts empty, smaller</td>
<td>8(44.4)</td>
</tr>
<tr>
<td>Baby not sleeping well</td>
<td>6(33.3)</td>
</tr>
<tr>
<td>Advice from doctor</td>
<td>3(16.7)</td>
</tr>
<tr>
<td>Sick baby</td>
<td>1(5.9)</td>
</tr>
</tbody>
</table>

*Total not = 100% as participants ticked all applicable

Maternal breastfeeding satisfaction

Pregnant multiparous women were asked to rate on a 5 point likert scale of “1 = not at all” to “5 = yes very much” their commitment and satisfaction in breastfeeding a previous baby. Most reported being committed to breastfeeding (90.4%), but expressed less satisfaction and enjoyment. While 80% reported they enjoyed their previous breastfeeding experience, 30% had felt unsuccessful (see Table 4.12).

Table 4:12 Previous breastfeeding experience

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Not at all</th>
<th>Not much</th>
<th>Not sure</th>
<th>Reasonably</th>
<th>Yes very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committed to</td>
<td>1(1.9)</td>
<td>1(1.9)</td>
<td>3(5.8)</td>
<td>17(30.8)</td>
<td>31(59.6)</td>
</tr>
<tr>
<td>Enjoyed it</td>
<td>3(5.6)</td>
<td>3(5.6)</td>
<td>6(9.3)</td>
<td>23(42.6)</td>
<td>20(37)</td>
</tr>
<tr>
<td>Felt successful</td>
<td>8(14.5)</td>
<td>6(10.9)</td>
<td>2(3.6)</td>
<td>19(34.5)</td>
<td>20(36.4)</td>
</tr>
</tbody>
</table>

Breastfeeding expectations

It is well established in the research literature that women with higher levels of breastfeeding confidence expect to breastfeed for longer. Results of maternal breastfeeding confidence at antenatal recruitment are presented in this section

Breastfeeding confidence measures

Participants completed the Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF) (Dennis, 2003). During pregnancy, the BSES-SF mean for this sample was 51.3 out of 70 (SD 8.9, range 28 - 70). Previous research with the BSES-SF has shown that women with prior breastfeeding experience have higher breastfeeding self-efficacy than women with no previous experience.
As expected, the present study also revealed the mean BSES-SF during pregnancy for multiparae with previous breastfeeding experience (M = 53.43, SD = 1.21, n = 54) was higher than for primiparae (M = 48.49, SD = 1.28, n = 41). This was a significant difference (t(93) = 2.77, p < 0.05).

Perception of milk adequacy

The research literature consistently identifies that mothers’ perception of inadequate milk supply is the most common reason why mothers abandon breastfeeding. Measures of the perception of milk adequacy scale (such as the H&H scale) are also a standardized measure of breastfeeding confidence (Creedy et al., 2003). During pregnancy the mean for this sample was 69.75 out of 100 (SD 5.67, range 56 - 82). Other researchers have used the BSES-SF and the H&H lactation scale to compare maternal, breastfeeding confidence and perception of milk adequacy between the antenatal and postnatal periods (Creedy et al., 2003). Comparisons found during the postnatal period are presented later.

Results presented so far provide important background information about the sample of mothers recruited in terms of demographics, obstetric and health data, breastfeeding intention and history, specific knowledge, expectations and breastfeeding confidence. In the next section birthing events, birthing room observations and postnatal follow-up to 6 months are presented.

Birthing room

The main focus of the present study is on breastfeeding initiation practices in the birthing room for the first hour of birth. This section presents data about routine birthing room events and reports results of birthing room observations for breastfeeding initiation. The sample of births observed was 78 out of 100 study participants.

Birthing events including obstetric details for all study participants were collected from medical records around the time of birth. In this section, data for both the overall sample (n = 100) and the sample of births observed (n = 78) are compared with Queensland perinatal data. Rates of obstetric intervention such as instrumental birth were higher in the sample group (11% versus 7.8%) than for the State population (Queensland Department of Health, 2005). The overall caesarean section rate was lower for study participants compared with the Queensland population (23% versus 32%) (see Table 4.13)
### Table 4:13 Type of birth

<table>
<thead>
<tr>
<th>Type of birth</th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vaginal birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous vertex</td>
<td>66(66)</td>
<td>52(66.7)</td>
<td>60.2</td>
</tr>
<tr>
<td>Forceps/vacuum extraction</td>
<td>11(11)</td>
<td>9(11.5)</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Caesarean section</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective caesarean section</td>
<td>12(12)</td>
<td>10(12.8)</td>
<td>19</td>
</tr>
<tr>
<td>Emergency caesarean section</td>
<td>11(11)</td>
<td>7(9)</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>78</td>
<td></td>
</tr>
</tbody>
</table>

**Labour and adverse birthing events**

In line with State perinatal data, more than half the participants (55%) began labour spontaneously. Labour was induced for one third (33%); around 12% did not labour at all and had a planned caesarean section.

The average length of labour was 7 hours 36 minutes and ranged from 1 to 36 hours. Only 10 mothers laboured for more than 12 hours and two of those laboured for 24 hours or beyond. Less than 4 hours of labour is defined as a precipitate birth, as was the case for 17% of mothers in the study.

Adverse birth events such as prolonged second stage, failure to progress, foetal distress and meconium liquor were categorised together as prolonged second stage or failure to progress (12%) and foetal distress or meconium liquor (14%) (see Table 4:14).
**Table 4:14 Labor and adverse birth events**

<table>
<thead>
<tr>
<th>Onset of labour</th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>55(55)</td>
<td>43(55.1)</td>
<td>56</td>
</tr>
<tr>
<td>Induced</td>
<td>33(33)</td>
<td>25(32.1)</td>
<td>25</td>
</tr>
<tr>
<td>No labour (c/s)</td>
<td>12(12)</td>
<td>10(12.8)</td>
<td>19</td>
</tr>
<tr>
<td>Labour &lt;4 hours (precipitate birth)</td>
<td>17(17)</td>
<td>10(14.7)</td>
<td>24.4</td>
</tr>
<tr>
<td><strong>Adverse birth event</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged 2nd stage and/or failure to progress</td>
<td>12(12)</td>
<td>9(11.5)</td>
<td>12.5</td>
</tr>
<tr>
<td>Foetal distress and/or meconium liquor*</td>
<td>14(14)</td>
<td>12(15.4)</td>
<td>19.9</td>
</tr>
</tbody>
</table>

**Analgesia during labour**

Information about analgesia during labour was elicited from medical records. Seventy-one percent (71%) of all participants received at least one form of analgesia during labour. This is a slightly higher overall figure than State data (Queensland Department of Health, 2005). Two thirds received administration of nitrous oxide inhalation (63%), around one third narcotic intramuscular or intravenous injection (i.e. pethidine) (31%) or epidural anaesthesia (30%), 17% received spinal anaesthetics for the birth. Spinal anaesthesia for the birth of a baby is not classed as analgesia during labour by the perinatal database (Queensland Department of Health, 2005).

Most mothers who received spinal anaesthesia for the birth of the baby had an elective caesarean section (n = 12). One mother had a trial of forceps performed in theatre under spinal anaesthesia and did not progress to surgery, while three others had an emergency caesarean section. Percentage for spinal anaesthesia does not compare with State population data for caesarean section.

In all but three cases, pethidine was administered more than 1 hour before birth. Forty-five percent (45%) received either pethidine or epidural analgesia and 17 women out of 45 (37.8%) received both (see Table 4.15)
Table 4:15 Analgesia /anaesthesia

<table>
<thead>
<tr>
<th></th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least one method</td>
<td>71(71)</td>
<td>55(70.5)</td>
<td>63.6</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>63(63)</td>
<td>52(66.7)</td>
<td>62.9</td>
</tr>
<tr>
<td>Pethidine (narcotic IM/IV)</td>
<td>32(32)</td>
<td>22(28.2)</td>
<td>36.7</td>
</tr>
<tr>
<td>Epidural</td>
<td>30(30)</td>
<td>24(30.8)</td>
<td>34.1</td>
</tr>
<tr>
<td>Spinal anaesthesia</td>
<td>17(17)</td>
<td>11(14.1)</td>
<td>47.1</td>
</tr>
</tbody>
</table>

_Episiotomy_

The episiotomy rate of study participants (14%) was similar to the State average as were rates for sutured perineum (43%). Around two thirds of mothers (64%) in the study had an intact perineum after birth, a much higher percentage than the State average of 44% (see Table 4:16).

Table 4:16 Episiotomy

<table>
<thead>
<tr>
<th></th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact perineum (includes vaginal tear)</td>
<td>66(64.1)</td>
<td>25(32.9)</td>
<td>43.8</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>16(15.5)</td>
<td>11(14.1)</td>
<td>13.3</td>
</tr>
<tr>
<td>Other sutured perineum</td>
<td>45(43.7)</td>
<td>37(47.4)</td>
<td>42.9</td>
</tr>
</tbody>
</table>

_Baby well-being at birth_

The 1 and 5 minute apgar scores are a routine measure of baby’s well-being at birth. Weight for gestational age and sex of babies born are also presented. Eleven percent (11%) of babies were assigned apgar scores of less than 8 out of 10 in the first minute. All apgar scores were over 8 at 5 minutes of age (see Table 4:17).

Table 4:17 Baby well being at birth

<table>
<thead>
<tr>
<th>Apgar score</th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>@ 1 minute</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-7</td>
<td>11(11)</td>
<td>8(6.5)</td>
<td>15.8</td>
</tr>
<tr>
<td>8-10</td>
<td>89(89)</td>
<td>70(89.7)</td>
<td>82.3</td>
</tr>
<tr>
<td>@ 5 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-10</td>
<td>100(100)</td>
<td>78(100)</td>
<td>97.5</td>
</tr>
</tbody>
</table>
The average weight of babies born in the study was 3563.6 grams (SD 535g; range 2034g – 5150g). A small percent (4.8%) of babies born in Queensland at greater than 36 weeks gestation weigh between 2000 - 2249 grams.

Three babies of mothers participating in the study were at 36 week gestation and two were 37 weeks. Gestational age for remaining babies was assessed as 38 weeks and over. As expected half the babies born in the study were male and half female. Table 4.18 presents information comparable with Queensland perinatal data on weight for gestation and sex.

Table 4:18 Birth weight and sex

<table>
<thead>
<tr>
<th>Birth weight by gestation</th>
<th>Participants n (%)</th>
<th>Births observed n (%)</th>
<th>Qld perinatal data (2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2449 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 weeks gestation (32-36)</td>
<td>1 (1)</td>
<td>1 (1.3)</td>
<td>1.8</td>
</tr>
<tr>
<td>37 and over weeks gestation</td>
<td>5 (5)</td>
<td>4 (5.2)</td>
<td>1.4</td>
</tr>
<tr>
<td>2500g and over</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 weeks gestation (32-36)</td>
<td>2 (2)</td>
<td>0 (0)</td>
<td>2.9</td>
</tr>
<tr>
<td>37 and over weeks gestation</td>
<td>92 (92)</td>
<td>73 (93.5)</td>
<td>93.6</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>51 (51)</td>
<td>40 (51.3)</td>
<td>51.3</td>
</tr>
<tr>
<td>Female</td>
<td>49 (49)</td>
<td>38 (48.7)</td>
<td>48.7</td>
</tr>
</tbody>
</table>

Birthing room observations

Results reported in this section refer only to the births observed (n = 78).

Duration of naked body contact

The first purpose of this exploratory observation study was to calculate duration of continuous uninterrupted skin-to-skin contact and to identify events that initially separate mothers and babies, prevent naked body contact, or interrupt skin-to-skin contact.

Time that mothers and babies were observed together in skin-to-skin contact during the first hour after birth was calculated to determine 1) continuous uninterrupted skin-to-skin contact for at least 1 full hour, and 2) the maximum duration of any skin-to-skin contact during the first hour or before babies commenced suckling, for each mother-baby dyad.
**Initial skin-to-skin contact**

Most mothers who gave birth vaginally held their babies within the first minute of birth (82%; n = 50 out of 61). Almost three quarters (74%; n = 45 out of 61) held their naked baby on their bare chest within the first minute of birth (continuous skin-to-skin contact). However, naked body contact was interrupted for a portion of babies who were moved away from their mothers within minutes of them being together. Figure 5 represents the variations in practice of skin-to-skin contact (SSC).

Twenty-six (26) mothers continued to hold their babies for at least 1 hour after birth (continuous uninterrupted skin-to-skin contact). Nine (9) mothers and babies remained together without interruption for at least 30 minutes. Continuous skin-to-skin contact (CSSC) was interrupted briefly within the first 10 minutes for eight mother/baby dyads and resumed by at least 20 minutes. One mother resumed holding her baby lightly wrapped, at 17 minutes, after a brief interruption. One mother/baby dyad did not resume SSC after being interrupted.

![Diagram of skin-to-skin contact variations](image)

**Figure 5: Duration of naked body contact**

No caesarean section mothers and babies stayed together initially. See Table 4:19 for an overview of observed mothers and babies initially in continuous skin-to-skin contact and those interrupted.

**Separated initially**

Sixteen (16) mothers who gave birth vaginally were initially separated from their babies. All but one of these mother-baby dyads were placed together in naked body contact within 10 minutes after birth. Nine of the initially separated mother/baby dyads remained together in
skin contact for 30 minutes or longer and six did for less than 30 minutes. One mother declined to hold her naked newborn.

Only four caesarean section mother/baby dyads spent 30 minutes or longer in skin-to-skin contact during the first hour after birth. Six of the caesarean section born babies had no skin contact time with their mothers. Table 4.19 presents an overview of observed births where mothers and babies were initially separated, commenced skin contact later and in some cases interrupted.

### Table 4.19 Duration of skin-to-skin contact

<table>
<thead>
<tr>
<th>Skin-to-skin contact</th>
<th>Vaginal birth</th>
<th>Caesarean section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n (%)</td>
<td>&lt; 30 n (%)</td>
</tr>
<tr>
<td>#Continuous</td>
<td>45(73.8)</td>
<td>9(14.6)</td>
</tr>
<tr>
<td>^Interrupted</td>
<td>2(3.3)</td>
<td>8(13.1)</td>
</tr>
<tr>
<td>+Separated</td>
<td>16(26.2)</td>
<td>4(6.6)</td>
</tr>
<tr>
<td>^Interrupted</td>
<td>2(3.3)</td>
<td>2(3.3)</td>
</tr>
<tr>
<td>Zero skin contact</td>
<td>1(1.6)</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>61(100)</td>
<td>9(14.8)</td>
</tr>
</tbody>
</table>

# Naked body contact between mother and baby within and beyond the first minute
^ Skin contact interrupted after 1 minute elapsed or (recommenced after 1st separation)
+ Separated initially or removed from skin contact within the first minute (some recommenced later)

### Maximum naked body contact time

Almost three quarters (72%) of mother/baby dyads in this sample of observed births spent over 30 minutes together in naked body contact within the first hour after birth. Over one quarter (27%; n = 21) were either separated or interrupted for varying time periods. For consistency in analysis the maximum duration of any skin contact will be used for the main analysis of this study. Overall, one third of mothers and babies of observed births spent the entire first hour in continuous uninterrupted skin-to-skin contact, 41% were together in naked body contact for over 30 minutes, 17% for less than 30 minutes and around 10% had no time in naked body contact during the first hour. Table 4.20 presents categories for the maximum duration of skin-to-skin contact between mothers and newborns by birth type during the first hour after birth.
Table 4:20 Longest duration of skin-to-skin contact

<table>
<thead>
<tr>
<th>Naked body contact</th>
<th>Total n (%)</th>
<th>Vaginal n (%)</th>
<th>Caesar n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>7 (9.0)</td>
<td>1 (1.6)</td>
<td>6 (35.3)</td>
</tr>
<tr>
<td>1-9</td>
<td>1 (1.3)</td>
<td>1 (1.6)</td>
<td>3 (17.6)</td>
</tr>
<tr>
<td>10-19</td>
<td>6 (7.7)</td>
<td>3 (4.9)</td>
<td>-</td>
</tr>
<tr>
<td>20-29</td>
<td>6 (7.7)</td>
<td>2 (3.3)</td>
<td>4 (23.5)</td>
</tr>
<tr>
<td>30-39</td>
<td>7 (9.0)</td>
<td>3 (4.9)</td>
<td>4 (23.5)</td>
</tr>
<tr>
<td>40-49</td>
<td>4 (5.1)</td>
<td>4 (6.6)</td>
<td>-</td>
</tr>
<tr>
<td>50-59</td>
<td>21 (26.9)</td>
<td>21 (34.4)</td>
<td>-</td>
</tr>
<tr>
<td>60+</td>
<td>26 (33.3)</td>
<td>26 (42.6)</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>78 (100.0)</td>
<td>61 (100.0)</td>
<td>17 (100.0)</td>
</tr>
</tbody>
</table>

Separation and interruption factors

Events that separated mothers and babies after birth were documented. Mothers separated from their babies at birth often had a caesarean section or the baby required resuscitation. Mothers who gave birth vaginally were usually separated for no longer than 11 minutes and returned to their mother within less than 6 minutes. Occurrences which interrupted naked body contact between mothers and babies are presented below.

Separated

All mothers who experienced a caesarean section were separated from their baby and a quarter (26.2%; n = 15) of women who had vaginal births were initially separated. All babies born by caesarean section and half (50%; 8 out of 16) the vaginally born babies who were initially separated were placed on the resuscitation trolley within the first minute after birth.

Two thirds (65%; n = 11) of caesarean section babies were administered oxygen and/or suction, then dried and wrapped or placed in the humidicrib (n = 1). The remaining third were dried, rubbed down and generally assessed before being wrapped and handed to the mother or father to hold. Once mothers were in the recovery area, babies were placed (65%; n = 11) in skin contact with their mothers. Others were kept wrapped with their mothers or taken to the ward nursery for routine procedures and assessment.

Babies born vaginally who were separated from their mother and taken to the resuscitation trolley were administered suction (n = 2), oxygen (n = 2), both suction and oxygen (n = 3) or assessed (n = 1). Other reasons for separation at the start included oxygen or suction administered while near mother (n = 2), held by mother but not in skin contact (n = 3), held by
father (n = 2), placed in open cot under radiant heater (n = 1). Vaginal birthed babies who were initially separated began skin contact with their mothers within 2 to 28 minutes of birth. One had no skin contact and one had no further contact after a brief period of 1 minute.

Interrupted
Naked body contact was interrupted for eight mother/baby dyads during the first 10 minutes and resumed before the 20 minute mark. Three of these babies (37.5%) were removed to the resuscitation trolley around 3 minutes and administered facial oxygen and suction (n = 2) or just facial oxygen (n = 1). Three (37.5%) were held by the father within the first 11 minutes and two (25%) were placed under the radiant heater in the open cot within less than 10 minutes.

Four mothers who were initially separated from their babies and began skin contact later were also interrupted. Interruption was commonly due to baby being placed under a warmer in an open cot (50%), moved to the resuscitation trolley (25%) or held by father (25%). Resuscitation events are discussed in detail below. A general overview of events identified, that separate or interrupt naked body contact during the entire hour are shown on Table 4.22.

Resuscitation events
Resuscitation procedures commonly occurred before mothers held their babies or interrupted naked body contact between mothers and babies during the first hour after birth. Around 20% of babies received facial oxygen at the time of birth. A small number (n = 4) received oxygen by bag and mask, and one by intermittent positive pressure ventilation (IPPV). Twenty-seven percent (27%) of babies received some form of suction. This portion was lower than the State average (37.5%) in 2003. Two babies received a narcotic agonist to assist resuscitation. Table 4.21 presents resuscitation events for the sample of observed births and shows comparisons between babies born via a caesarean section or by a vaginal birth.

Suction and oxygen administration occurred most frequently during the first 1 - 2 minutes after birth and was usually completed within the first 10 minutes after birth. On one occasion oxygen was administered at 11 minutes and gastric suction at 22 minutes after birth. Findings reflect international guidelines for resuscitation which state that nearly 90% of babies are vigorous at birth and do not need to be separated from their mothers for initial resuscitation (Kattwinkel, 2006).
Table 4:21 Resuscitation

<table>
<thead>
<tr>
<th>Practices</th>
<th>Vaginal births (n = 61)</th>
<th>Caesar births (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen administered</td>
<td>12 (19.7)</td>
<td>3 (17.6)</td>
</tr>
<tr>
<td>Facial oxygen</td>
<td>12 (19.7)</td>
<td>3 (17.6)</td>
</tr>
<tr>
<td>Bag and mask</td>
<td>3 (4.9)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td>IPPV</td>
<td>1 (1.3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Any suction</td>
<td>10 (16.4)</td>
<td>11 (64.7)</td>
</tr>
<tr>
<td>Mouth</td>
<td>10 (16.4)</td>
<td>11 (64.7)</td>
</tr>
<tr>
<td>Nares</td>
<td>7 (11.5)</td>
<td>9 (52.9)</td>
</tr>
<tr>
<td>Meconium</td>
<td>6 (9.8)</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>Meconium via ETT</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Gastric</td>
<td>2 (3.3)</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>Narcotic antagonist injection</td>
<td>0 (0)</td>
<td>1 (5.9)</td>
</tr>
</tbody>
</table>

Other separating or interrupting events

Overall six categories of practices or events separated or interrupted naked body contact during the entire first hour. These categories of practices or events are presented in Table 4.22.

Table 4:22 Events resulting in separation

<table>
<thead>
<tr>
<th>Practices event/s</th>
<th>Vaginal births n (%)</th>
<th>TOTAL</th>
<th>Caesarean births n (%)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resuscitation</td>
<td>22 (36.1)</td>
<td>61 (100)</td>
<td>17 (100)</td>
<td>17 (100)</td>
</tr>
<tr>
<td>Baby held by other</td>
<td>22 (36.1)</td>
<td>16 (94.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warming</td>
<td>18 (29.5)</td>
<td>16 (94.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine practices</td>
<td>9 (14.8)</td>
<td>14 (82.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>8 (13.1)</td>
<td>15 (88.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother request</td>
<td>11 (18.0)</td>
<td>2 (11.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Baby feeding behaviours

The present study sought to investigate the association between newborn’s suckling in the birthing room within 1 hour of being born and duration of naked body contact with their mothers. Based on clinical knowledge, best practice recommendations, and factor analysis confirmation of correlations for observed feeding behaviours, the variable ‘attach and suckle’ was chosen as the dependent outcome variable to explore associations between key independent variables. Results are reported for those mothers who held their babies in skin contact and those initially separated from their babies.
Achieved suckling within the first hour

Two thirds (67%; n = 52) of babies in this sample of observed births suckled within the first hour after birth. The earliest time any baby began suckling was at the 10 minute mark and the latest at 60 minutes or beyond. The most frequent suckling times were between 35 and 46 minutes.

Initial skin contact

Two thirds of babies (62.3%; n = 34) who began suckling within the hour were held in skin contact initially. Two babies who were separated from their mother before the end of the hour had suckled early (at 20 minutes). No procedures or interventions occurred for babies of five mothers who delayed handling or picking up their baby for up to 3 minutes. Figure 6 presents case by case representation of duration of naked body contact in relation to time suckling was achieved for vaginal births where babies were initially placed with their mothers in skin-to-skin contact.

Initial separation

A quarter (24.4%; n = 19) of babies who were initially separated began to suckle at the breast within the first 60 minutes after birth. Time of separation before skin contact for most babies was minimal and ranged from 1 - 9 minutes for vaginal births and 24 - 44 minutes for caesarean sections. Figure 7 is a case by case representation of duration of naked body contact in relation to time suckling was achieved for vaginal births where mothers and babies were separated at first. One case had no skin-to-skin contact but commenced suckling within the hour.

No suckling within the first hour

One third of babies (n = 25) did not commence suckling within the first 60 minutes of birth. Eleven (44%) of these were in continuous uninterrupted skin contact with their mothers for varying time frames: at least 60 minutes (n = 9); 50 minutes (n = 1) and about 1 minute (n = 1). One baby was transferred to special care unit. The remainder of the babies who did not suckle within the hour (n = 14) were separated initially or not placed in naked body contact with their mothers. See Table 4:23 for times commenced suckling and did not suckle in relation to varying lengths of skin-to-skin contact initial separation. Figures in the table add down and show 1) began suckling and continuous or initial skin-to-skin contact; 2) began suckling but initially separated; and 3) did not suckle at all.
Table 4:23 Time suckling commenced in relation to duration of skin contact

<table>
<thead>
<tr>
<th>Time in minutes</th>
<th>Continuous skin contact</th>
<th>Interrupted skin contact</th>
<th>Began suckling</th>
<th>Separated initially</th>
<th>Began suckling</th>
<th>Did not suckle</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>60</td>
<td>16 (47.1)</td>
<td>3 (8.8)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9 (36)</td>
</tr>
<tr>
<td>50 - 59</td>
<td>5 (14.7)</td>
<td>**6 (17.64)</td>
<td>7 (20.6)</td>
<td>5 (26.3)</td>
<td>4 (21.1)</td>
<td>^3 (12)</td>
</tr>
<tr>
<td>40 - 49</td>
<td>3 (8.8)</td>
<td>1 (2.9)</td>
<td>6 (17.6)</td>
<td>1 (5.3)</td>
<td>6 (31.6)</td>
<td></td>
</tr>
<tr>
<td>30 - 39</td>
<td>1 (2.9)</td>
<td>5 (14.7)</td>
<td>4 (21.1)</td>
<td>4 (21.1)</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>20 - 29</td>
<td>1 (2.9)</td>
<td>9 (26.5)</td>
<td>5 (26.3)</td>
<td>4 (21.1)</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>10 - 19</td>
<td>*1 (2.9)</td>
<td>4 (11.8)</td>
<td>3 (15.8)</td>
<td>1 (5.3)</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>1 - 9</td>
<td>7 (20.6)</td>
<td>-</td>
<td>-</td>
<td>1 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>1 (5.3)</td>
<td>6 (24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>34 (100)</td>
<td>7 out of 34</td>
<td>34 (100)</td>
<td>19(100)</td>
<td>19(100)</td>
<td>25 (100)</td>
</tr>
</tbody>
</table>

*1 Outlier held briefly by father at 18 mins and returned to mother loosely wrapped suckled at 43 minutes
** Interrupted before suckled
# 5 interrupted after a first brief skin contact. Longest skin contact time is shown
^1 case in continuous uninterrupted skin contact
^^9 cases continuous uninterrupted skin contact

Figure 6: Immediate skin contact & time suckled
Effective suckling
Measures of effective suckling were derived from a large number of observed variables reduced to subsets of variables by factor analysis. Descriptors were chosen to define levels of suckling effectiveness on the basis of clinical observation, midwives’ documentation, and knowledge of contemporary research. These included: fed well, suckled (longer than 3 minutes); a few suckles (less than 3 minutes); repeated attempts but did not achieve sustained suckling beyond 3 minutes; licked and nuzzled only; and showed no interest in breastfeeding. The same definitions for effective suckling were used for postnatal follow-up observations.

Suckling and associated independent variables
A variety of factors or events may impact on whether or not babies achieve effective suckling. Independent variables from six categories were explored to find proportions and trends in relation to babies beginning to suckle in the birthing room. These were demographics, breastfeeding history and birthing events; duration of skin-to-skin contact; separation and interruption; newborn feeding behaviours; maternal action to position and help baby begin breastfeeding; and assistance mothers received. These associations are presented on Table 4.24.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Did not suckle n (%)</th>
<th>Did suckle n (%)</th>
<th>Proportion</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>24 (92.3)</td>
<td>45 (86.5)</td>
<td>0.65</td>
<td>.565</td>
<td>1</td>
<td>.366</td>
</tr>
<tr>
<td>Yes</td>
<td>2 (7.7)</td>
<td>7 (13.5)</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>16 (64)</td>
<td>20 (37.7)</td>
<td>0.55</td>
<td>4.715</td>
<td>1</td>
<td>.027</td>
</tr>
<tr>
<td>Multipara</td>
<td>9 (36)</td>
<td>33 (62.3)</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>16 (64)</td>
<td>23 (43.4)</td>
<td>0.59</td>
<td>2.885</td>
<td>1</td>
<td>.072</td>
</tr>
<tr>
<td>Yes</td>
<td>9 (35.8)</td>
<td>30 (46.2)</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarean section Vaginal</td>
<td>9 (34.6)</td>
<td>8 (15.4)</td>
<td>0.47</td>
<td>3.761</td>
<td>1</td>
<td>.052</td>
</tr>
<tr>
<td>Vaginal</td>
<td>17 (65.4)</td>
<td>44 (84.8)</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pethidine or epidural</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>13 (50)</td>
<td>33 (63.5)</td>
<td>0.72</td>
<td>1.298</td>
<td>1</td>
<td>.185</td>
</tr>
<tr>
<td>Yes</td>
<td>13 (50)</td>
<td>19 (36.5)</td>
<td>0.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral suction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>12 (48)</td>
<td>45 (84.9)</td>
<td>0.79</td>
<td>11.760</td>
<td>1</td>
<td>.001</td>
</tr>
<tr>
<td>Yes</td>
<td>13 (52)</td>
<td>8 (15.1)</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal action to help</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>11 (42.3)</td>
<td>12 (23.1)</td>
<td>0.52</td>
<td>3.083</td>
<td>1</td>
<td>.069</td>
</tr>
<tr>
<td>Yes</td>
<td>15 (57.7)</td>
<td>40 (76.9)</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chin positioned on breast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>17 (65.4)</td>
<td>17 (32.7)</td>
<td>0.50</td>
<td>7.534</td>
<td>1</td>
<td>.006</td>
</tr>
<tr>
<td>Yes</td>
<td>9 (34.6)</td>
<td>35 (67.35)</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistance hands on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>19 (73.1)</td>
<td>23 (44.2)</td>
<td>0.55</td>
<td>5.804</td>
<td>1</td>
<td>.014</td>
</tr>
<tr>
<td>Yes</td>
<td>7 (26.9)</td>
<td>29 (55.8)</td>
<td>0.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of skin contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No skin contact</td>
<td>6 (23.1)</td>
<td>1 (1.9)</td>
<td>0.14</td>
<td>13.63</td>
<td>3</td>
<td>.003</td>
</tr>
<tr>
<td>Any &lt; 30 mins</td>
<td>5 (19.2)</td>
<td>8 (15.4)</td>
<td>0.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any ≥ 30 mins &lt; 60 mins</td>
<td>5 (19.2)</td>
<td>27 (52.9)</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous 60 mins</td>
<td>10 (38.5)</td>
<td>16 (30.8)</td>
<td>0.62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Notably, babies who received oral suction at birth were less likely to achieve suckling within the hour ($\chi^2 (1) = 11.76$, $p < 0.01$). While 15% ($n = 8$) of babies who were suctioned achieved suckling, 52% ($n = 13$) of those who were administered suctioning did not suckle within the hour. Also babies of mothers who had a previous child were significantly more likely to begin suckling within the hour ($\chi^2 (1) = 4.715$, $p < 0.05$).

**Mothers’ active involvement**

Nine variables were used to explore mothers’ actions to help their baby begin breastfeeding. Guided by clinical practice, best practice recommendations and factor analysis for reliability of variable groupings, three independent variables were chosen to explore mothers’ active involvement in breastfeeding initiation. The independent variables chosen were ‘position self and baby’, ‘attach’ and ‘entice to attach’ to the breast and feed.

**Maternal action to initiate breastfeeding**

When the baby’s chin made contact with mother’s breast there was a significantly greater chance of the baby suckling (67.3%) than not (34.6%) ($\chi^2 (1) = 7.534$, $p < 0.05$). When mothers positioned themselves or their baby, by any of the three actions described, a significantly higher proportion of babies achieved suckling (82.7%) than babies of mothers who did not (61.5%) ($\chi^2 (1) = 4.210$, $p < 0.05$). The relationship between suckling outcome and mother’s positioning of self and baby without chin contact on the breast was not significant ($\chi^2 (1) = 3.083$, $p > 0.05$). More babies suckled when mothers enticed them by expressing drops of colostrum (53.8% versus 34.6%) however this association was not significant ($\chi^2 (1) = 2.571$, $p = 0.086$, 1 sided).

**Maternal action in relation to skin contact**

In relation to duration of naked body contact, a larger proportion of babies’ chins made contact with their mothers’ breasts if in continuous uninterrupted skin contact for the full hour (69.2%) than those who received over 30 minutes but less than an hour (56.3%), less than 30 minutes (53.8%) and no skin contact (14.3%). However differences in proportions were not significant ($\chi^2 (3) = 6.82$, $p > 0.05$).

Mothers who held their babies in continuous uninterrupted skin contact for at least 1 hour were significantly more likely to position themselves or their baby for the first breastfeed ($\chi^2 (3) = 13.67$, $p = 0.003$). Over 93% of mothers who held their babies in continuous uninterrupted skin contact for 1 hour actively positioned themselves or their baby whereas 69% did so for naked body contact lasting 30 minutes to less than 60 minutes, 54% for less than 30
minutes, and 29% for no skin-to-skin contact. Table 4.25 presents actions mothers took to position themselves and/or their baby in readiness for breastfeeding.

**Table 4:25 Maternal action**

<table>
<thead>
<tr>
<th>Positioning</th>
<th>Vaginal n (%)</th>
<th>Caesarean n (%)</th>
<th>Overall n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions herself</td>
<td>22 (36.1)</td>
<td>-</td>
<td>22 (28.2)</td>
</tr>
<tr>
<td>Supports baby’s whole body</td>
<td>43 (70.5)</td>
<td>5 (29.4)</td>
<td>48 (61.5)</td>
</tr>
<tr>
<td>Positions baby close</td>
<td>38 (62.3)</td>
<td>1 (5.9)</td>
<td>39 (50)</td>
</tr>
<tr>
<td>Turns baby to face herself</td>
<td>15 (24.6)</td>
<td>-</td>
<td>15 (19.2)</td>
</tr>
<tr>
<td>Allows baby’s chin to contact breast</td>
<td>40 (65.6)</td>
<td>4 (23.5)</td>
<td>44 (56.4)</td>
</tr>
</tbody>
</table>

**Figure 8: Mother supports baby’s whole body**

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**Assistance received by mothers**

Best practice recommendations suggest that mothers should be offered breastfeeding assistance within the first hour of birth and breastfeeding assistance to be ‘hands-off’. Three main constructs of ‘hands-on’ help to position and attach, ‘hands-off’ help to instruct, and verbal encouragement and support were identified in a factor analysis of variables used to observe the help mothers received in regards to the first breastfeed.

A significantly higher proportion of babies achieved suckling (81.6% versus 52.5%) within the hour if mothers received ‘hands-on’ help to attach or position
This difference was significant for caesarean born babies (77.8% versus 12.5%) ($\chi^2 (78, 1) = 7.415, p = 0.006$) and for vaginal births alone (82.8% versus 62.5%) ($\chi^2 (1) = 3.10, p = 0.05$).

More babies achieved suckling (56% versus 27%) within the hour if mothers received ‘hands-on’ help to attach by ‘baby held to breast for mother’, ‘baby’s neck held by tong grip’ or ‘mother’s breast shaped to help baby’ ($\chi^2 (1) = 5.814, p > 0.01$, one sided). Differences in proportions were significant for caesarean born babies (85.7% versus 22.2%) ($\chi^2 (1) = 7.244, p < 0.05$) but not for vaginal births (50% versus 29.4%) ($\chi^2 (1) = 2.10, p > 0.05$). See Table 4.26 for types of assistance mothers received to help position and attach baby for breastfeeding the first time.

Table 4.26 Assistance received

<table>
<thead>
<tr>
<th>Positioning and attachment</th>
<th>Vaginal n (%)</th>
<th>Caesarean n (%)</th>
<th>All n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands-on help to attach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers’ breast shaped to help baby attach</td>
<td>26 (42.6)</td>
<td>7 (41.2)</td>
<td>33 (42.3)</td>
</tr>
<tr>
<td>Baby’s neck held by tong grip</td>
<td>12 (19.7)</td>
<td>3 (17.6)</td>
<td>15 (19.2)</td>
</tr>
<tr>
<td>Baby held to breast for mother</td>
<td>7 (11.5)</td>
<td>8 (47.1)</td>
<td>15 (19.2)</td>
</tr>
<tr>
<td>Hands-on help positioning only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father moves baby over to nipple</td>
<td>2 (3.3)</td>
<td>1 (5.9)</td>
<td>3 (3.8)</td>
</tr>
<tr>
<td>Baby positioned close to breast</td>
<td>32 (52.5)</td>
<td>10 (58.8)</td>
<td>42 (53.8)</td>
</tr>
<tr>
<td>Breastfeeding assistance offered</td>
<td>45 (73.8)</td>
<td>11 (64.7)</td>
<td>56 (71.8)</td>
</tr>
<tr>
<td>Assisted to other position</td>
<td>29 (47.5)</td>
<td>1 (11.8)</td>
<td>30 (38.5)</td>
</tr>
<tr>
<td>Baby turned to face mother’s breast</td>
<td>22 (36.1)</td>
<td>8 (47.1)</td>
<td>30 (38.5)</td>
</tr>
<tr>
<td>Mother’s hands guided to support baby</td>
<td>14 (23)</td>
<td>-</td>
<td>14 (17.9)</td>
</tr>
<tr>
<td>Hands-off help</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby’s ability to breastfeed affirmed</td>
<td>17 (27.9)</td>
<td>2 (11.8)</td>
<td>19 (24.4)</td>
</tr>
<tr>
<td>Baby feeding behaviour noted</td>
<td>22 (36.1)</td>
<td>4 (23.5)</td>
<td>26 (33.3)</td>
</tr>
<tr>
<td>Readiness to breastfeed discussed</td>
<td>18 (29.5)</td>
<td>2 (11.8)</td>
<td>20 (25.6)</td>
</tr>
<tr>
<td>No assistance</td>
<td>6 (9.8)</td>
<td>5 (29.4)</td>
<td>11 (14.1)</td>
</tr>
<tr>
<td>Counter productive assistance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back of baby’s head held</td>
<td>14 (23)</td>
<td>3 (17.6)</td>
<td>17 (21.8)</td>
</tr>
</tbody>
</table>
Postnatal observation of breastfeeding and follow-up

Follow-up postnatal observations and structured interviews were conducted with 92 out of 100 of the total cohort. Phone interviews were conducted at 2 weeks, 3 months and 6 months to assess breastfeeding outcomes and determine lasting influences of naked body contact and breastfeeding achievement in the birthing room. The postnatal observation tool was devised to observe mothers feeding their babies around the time of discharge. Ninety-two (92) mothers and babies were observed breastfeeding prior to discharge. Data in this section is reported for observed births and for all participants.
Pearson’s product-moment correlation between scores confirmed associations between mothers’ positioning their baby for attachment to the breast and effective breastfeeding, and between attachment and breastfeeding. Associations were also found between scores for assistance given and positioning, attachment and breastfeeding scores (see Table 4.27).

### Table 4.27 Pearson’s product-moment correlation between breastfeeding scores

<table>
<thead>
<tr>
<th>Dimension</th>
<th>1 Nurturing</th>
<th>2 Positioning</th>
<th>3 Attachment</th>
<th>4 Breastfeed</th>
<th>5 Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Nurturing</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Positioning</td>
<td>-0.59</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Attachment</td>
<td>-1.42</td>
<td>0.624(**)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Breastfeed</td>
<td>-0.032</td>
<td>0.462(**)</td>
<td>0.438(**)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5 Assistance</td>
<td>-0.060</td>
<td>0.254(*)</td>
<td>0.224(*)</td>
<td>0.244(*)</td>
<td>1</td>
</tr>
</tbody>
</table>

Note **p< 0.01; * p < 0.05; N= 92 for each correlation

**Maternal nurturing**

Maternal nurturing comprised four items to determine whether mothers held their baby in skin contact again postnatally or the extent to which they attended to their babies’ needs. Nearly all mothers in this study kept their baby close and were attentive to the baby but very few mothers held the baby in skin contact again on the postnatal ward. Many held their baby on their chest but with clothes on.

**Positioning**

Elements of positioning were investigated by 10 items to determine optimal positioning of babies in readiness for effective attachment to breastfeed.

Babies were more likely to attach to the breast with an asymmetrical latch when mothers were observed: holding the baby’s body in firm contact ($\chi^2 (1) = 25.795, p< 0.001$); supporting their baby’s neck by stabilizing the shoulders ($\chi^2 (1) = 13.14, p< 0.001$); allowing baby to lift and extend their head ($\chi^2 (1) = 5.262, p< 0.05$); allowing baby’s head to remain angled slightly back ($\chi^2 (1) = 19.112, p< 0.001$); holding baby close with chin in firm contact with their breast ($\chi^2 (1) = 13.64, p< 0.001$); rolling her baby’s body to face her breast ($\chi^2 (1) = 6.904, p< 0.01$); and keeping their baby’s body including head in straight alignment from head to toe ($\chi^2 (1) = 5.951, p< 0.05$).
**Attachment**

Five items were formulated to observe effectiveness of attachment. The main outcome variable being, ‘baby takes a large asymmetrical latch’ and ‘mother reports no nipple pain’. Mothers were more likely to not report nipple pain during a breastfeed when babies were observed taking a large ‘asymmetrical latch’ ($\chi^2 (1) = 4.659$, p<0.05).

**Breastfeeding**

Eight items were designed to assess ‘effective suckling’ (the main outcome variable), which was measured by observed ‘deep rhythmical suck-swallow-breathe-pause-suck patterns’ and ‘sustained attachment’ while feeding.

Babies were more likely to feed with sustained attachment when optimal positioning was achieved by mothers. Optimal positioning occurs when babies’ shoulders were stabilized to support their necks ($\chi^2 (1) = 14.473$, p<0.001); head remained slightly angled back ($\chi^2 (1) = 9.950$, p<0.01); positioned so they could lift their heads freely ($\chi^2 (1) = 9.176$, p<0.01); mothers did not hold the back of babies’ heads by fingers or hand ($\chi^2 (1) = 4.725$, p<0.05); and mothers kept baby’s body including head in straight alignment from head to toe ($\chi^2 (1) = 4.905$, p<0.05).

Sustained attachment was also more likely when babies: took a large asymmetrical portion of breast and nipple into their mouth ($\chi^2 (1) = 7.985$, p<0.01); suckled with deep rhythmical suck-swallow-breathe patterns ($\chi^2 (1) = 28.141$, p<0.001); showed an interest in breastfeeding ($\chi^2 (1) = 7.690$, p<0.01) and did not actively push away from the breast ($\chi^2 (1) = 7.164$, p<0.01). When mothers were observed: waiting for baby to open their mouth and gape widely ($\chi^2 (1) = 12.429$, p<0.01); bringing baby in closer to herself ($\chi^2 (1) = 7.01$, p<0.01) and speaking positively about enough milk ($\chi^2 (1) = 22.241$, p<0.001), sustained attachment for effective breastfeeding was more likely.
**Assistance received**

Five items asked about assistance mothers received in the postnatal area to learn to breastfeed. Mothers’ ability to independently attach their baby to the breast before discharge was related to babies not being distressed when approaching the breast ($\chi^2 (1) = 5.251, p< 0.05$); mothers waiting for babies to gape ($\chi^2 (1) = 6.499, p< 0.05$); babies not actively pushing away from the breast ($\chi^2 (1) = 5.733, p< 0.05$); mothers bringing their baby in closer to herself and on to the breast ($\chi^2 (1) = 4.490, p< 0.05$) and babies showing an interest in breastfeeding ($\chi^2 (1) = 8.184, p< 0.01$).

**Extent of breastfeeding at discharge**

At time of discharge babies of all participants were breastfeeding or fed breastmilk. Ninety percent (90%) of babies were exclusively breastfeeding and 10% partially breastfeeding. These trends were similar to outcomes for the group of observed births where 91% were breastfeeding exclusively and 9% partially breastfeeding (see Table 4.28).

**Table 4:28 Exclusive breastfeeding at discharge**

<table>
<thead>
<tr>
<th>Breastfeeding extent</th>
<th>Observed births</th>
<th>All births</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>EBF</td>
<td>70 (90.9)</td>
<td>88 (88.9)</td>
</tr>
<tr>
<td>AEBF</td>
<td>1 (1.3)</td>
<td>1 (.01)</td>
</tr>
<tr>
<td>Partial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPBF</td>
<td>4 (5.2)</td>
<td>6 (6.1)</td>
</tr>
<tr>
<td>MPBF</td>
<td>1 (1.3)</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>LPBF</td>
<td>1 (1.3)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>ABM</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>77 (100)</td>
<td>100 (100)</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Participants were asked questions about expressing breastmilk for their babies. Around 20% (n = 15 out of 75) of mothers in the observed birth group expressed breastmilk in hospital and 12% (n = 9 out of 74) were feeding their babies expressed breastmilk (EBM). Of all the births, 24% (n = 23 out of 75) were expressing breastmilk and feeding their babies EBM 15% (n = 14).
Mothers used various techniques to express breastmilk. Two thirds expressed their own breasts by hand (68.2%; n = 15). Fifty percent of mothers reported that midwives expressed milk for them (50%; n = 11). A few expressed by hospital grade electric pump (n = 3; 13.6%).

Unlike previous research, an independent samples t test found no differences in antenatal mean scores for confidence (BSES-SF) (F (2, 86) = 2.03, p > 0.05) or perception of milk adequacy (H&H scale) (F (2, 87) = 1.42, p > 0.05) between mothers, exclusively or partially breastfeeding at discharge.

Breastfeeding problems

Nipple pain is a common breastfeeding problem experienced by mothers. Questions explored the relevance of nipple pain to the help mothers receive with attachment and positioning of their baby, maternal satisfaction, and breastfeeding outcomes.

Nipple pain

Over two thirds of mothers in the group of the observed births (65.3%) and 69% of all births experienced nipple pain at the beginning of a breastfeed. Slightly fewer mothers experienced nipple pain during a breastfeed in the group of the observed births (42.7%) and all births (46.9%).

Pain scores

Ongoing nipple pain particularly during a breastfeed, is indicative of poor attachment and needs investigation. The average pain score described by all participating mothers who experienced any nipple pain at the start of a breastfeed was 4.3 out of 10 (SD 1.9; range 1 - 9) and 3 during a breastfeed (SD 1.38; range 1 - 7). Around 93% of mothers who experienced nipple pain described their level of pain at the start of the breastfeed as about 2 or more out of 10. At least 84% described the level of nipple pain during the breastfeed observed before discharge as being as around 2 or more out of 10. A third of mothers (n = 25) reported they felt nipple pain at the start as well as during the breastfeed. To detect any differences between the overall sample and the cohort of births observed result for both groups the overall group of participants and the sample of mothers whose births were observed are presented (see Table 4.29).
Table 4:29 Nipple pain

<table>
<thead>
<tr>
<th>Nipple pain</th>
<th>Observed births</th>
<th></th>
<th>All births</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No n (%)</td>
<td>Yes n (%)</td>
<td>TOTAL</td>
<td>No n (%)</td>
</tr>
<tr>
<td>At start of feed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>26 (34.7)</td>
<td>49 (65.3)</td>
<td>75</td>
<td>30 (31.3)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During feed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>43 (57.3)</td>
<td>32 (42.7)</td>
<td>75</td>
<td>51 (53.1)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score out of 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;2 @ start</td>
<td>2 (6.3)</td>
<td>30 (93.8)</td>
<td>32</td>
<td>3 (6.7)</td>
</tr>
<tr>
<td>&gt;2 during</td>
<td>5 (15.6)</td>
<td>27 (84.4)</td>
<td>32</td>
<td>5 (11.2)</td>
</tr>
</tbody>
</table>

Nipple trauma

Forty-three percent (43%; n = 36) of mothers from the observed births group and 47% (n = 45) of all participants followed up before discharge reported visible nipple trauma which was verified by the researcher. Nipple trauma was described by mothers as blistered, bruised, grazed, cracked, bleeding or compressed/ridged. One third of mothers (31%) reported the trauma to their nipples was improving while the remaining said it was getting worse (25%) or much the same (44%).

Most mothers identified one (68.6%) or two (24.4%) types of trauma on their nipple. Less than 10% had three (6.7%) or four (2.2%) descriptions of nipple trauma at the time of inspection and interview. Table 4.30 presents nipple trauma observed and reported.

Table 4:30 Nipple trauma

<table>
<thead>
<tr>
<th>Nipple trauma</th>
<th>Observed births</th>
<th></th>
<th>All births</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No n (%)</td>
<td>Yes n (%)</td>
<td>TOTAL</td>
<td>No n (%)</td>
</tr>
<tr>
<td>Visible trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>43 (57.3)</td>
<td>32 (42.7)</td>
<td>75</td>
<td>51 (53.1)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blistered</td>
<td>18 (56.3)</td>
<td>14 (43.8)</td>
<td>32</td>
<td>25 (55.6)</td>
</tr>
<tr>
<td>Bruised</td>
<td>29 (90.6)</td>
<td>3 (9.4)</td>
<td>32</td>
<td>41 (91.1)</td>
</tr>
<tr>
<td>Grazed</td>
<td>21 (65.6)</td>
<td>11 (34.3)</td>
<td>32</td>
<td>30 (66.7)</td>
</tr>
<tr>
<td>Cracked</td>
<td>26 (81.3)</td>
<td>6 (18.8)</td>
<td>32</td>
<td>37 (82.2)</td>
</tr>
<tr>
<td>Bleeding</td>
<td>29 (90.6)</td>
<td>3 (9.4)</td>
<td>32</td>
<td>39 (86.7)</td>
</tr>
<tr>
<td>Compressed</td>
<td>26 (81.3)</td>
<td>6 (18.8)</td>
<td>32</td>
<td>34 (75.6)</td>
</tr>
</tbody>
</table>

Mothers who experienced nipple pain at the beginning of a breastfeed were significantly more likely to have visible nipple trauma (60%) than those who did not experience nipple pain at the start of a breastfeed (17%) ($\chi^2 (1) = 15.502, p < 0.001$).
The relationship between nipple pain during a breastfeed and visible nipple trauma was significant ($\chi^2 (1) = 21.14, p < 0.001$). A higher percentage of mothers who experienced nipple pain during a breastfeed also had visible nipple trauma (71% compared to 24%).

There was a statistically significant relationship between no nipple trauma at breastfeed observed prior to discharge, and duration of skin contact in the birthing room ($\chi^2 (1) = 8.135, p < 0.05$).

**Mothers’ perceptions of breastfeeding help**

Participating mothers were asked to report the level of breastfeeding assistance they felt they needed while in the postnatal area. Most participants (87%) answered the questions. About three quarters (74.9) of mothers felt they did not need help (37.2%) or they were happy with reassurance about attachment or verbal encouragement (36%; n = 31). A quarter (25.1%) indicated they needed help with positioning (11.6%; n = 10) or someone to ‘put baby on’ for them (attachment help) (8.1%; n = 7) or both positioning and attachment (7%; n = 6). See detailed results in Table 4.31.

### Table 4:31 Perception of assistance needed

<table>
<thead>
<tr>
<th>Assistance</th>
<th>Observed births n (%)</th>
<th>All births n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands-on help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full ‘put baby on’</td>
<td>5 (7.4)</td>
<td>6 (7)</td>
</tr>
<tr>
<td>Moderate baby held to attach</td>
<td>4 (5.9)</td>
<td>7 (8.1)</td>
</tr>
<tr>
<td>Minimal positioning help</td>
<td>8 (11.8)</td>
<td>10 (11.6)</td>
</tr>
<tr>
<td>Hands-off help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal instruction</td>
<td>6 (8.8)</td>
<td>8 (9.3)</td>
</tr>
<tr>
<td>Reassurance</td>
<td>19 (27.9)</td>
<td>23 (26.7)</td>
</tr>
<tr>
<td>No help needed</td>
<td>26 (38.2)</td>
<td>32 (37.2)</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>86</td>
</tr>
<tr>
<td>Missing data</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>
Perception of assistance received

The reported mean score for assistance received was 28.47 out of 40 (n = 62; SD 6.01; range 9 - 40). Descriptive results for all items are presented below.

Information support

Most mothers (81%) reported being offered a range of helpful suggestions and felt staff had listened to their requests for help (81%). About three quarters indicated they had been offered breastfeeding information (72%), but one quarter reported not being offered breastfeeding information.

Attachment and positioning help

Over half the mothers (57%) reported their breast had been held by another person to help attach their babies. About 42.5% reported their baby was held to their breast for them to help with attachment. Similarly around 36% felt they had been told to manage attachment in a particular way.

Associations between mothers’ perception of assistance needed and help actually received to position and attach baby for breastfeeding were determined. A significant difference was found between mothers’ perceived need of assistance and reports that babies had been held to their breasts for them ($\chi^2 (3) = 13.87, p = 0.003$). For example, ‘hands-on help’ was perceived by mothers to be contrary to their needs. There were differences in proportions of mothers (100%; 13 out of 13) whose breast was held to help baby attach and who felt they needed the help with attachment, to percentages of mothers who also had their breast held to help with attachment but felt they needed only minimal help with positioning (44.4%; 4 out of 9) or verbal instruction/reassurance (46.2%; 12 out of 26) or no help (50%; 16 out of 32).

Also a significant association between mothers’ perceived need of assistance and reports that baby had been held to their breast for them ($\chi^2 (3) = 13.87, p < 0.01$) was evident. Relationships between being told to manage attachment a certain way and actual help the mothers believed they needed was not significant ($\chi^2 (3) = 6.138, p = 0.105$).
Inadequate feelings
Around 20% of mothers participating in the study reported they felt inadequate after being given breastfeeding help.

Conflicting advice
One quarter (25%) of mothers reported they were given advice that directly contradicted advice given by a previous staff member. For example, one mother said, “I feel that some midwives want to teach me, others are not so helpful; it’s all a bit haphazard”. Another said, “Some midwives who seem to have been in the business for a fair while have an over-bearing attitude”.

A one-way between-groups analysis of variance (ANOVA) with post-hoc tests was conducted to explore differences between mothers’ perceived need for breastfeeding help and their reports of assistance actually received in the postnatal area. There was a significant difference between mean scores of received help reported by mothers and perceived needs for help (F (3, 54) = 3.78, p < 0.05). Mothers who stated they needed ‘hands-off’ help (i.e. just verbal encouragement or reassurance about attachment) scored significantly more highly for hands-on help received to attach their baby (M = 30.95, SD 5.09, n = 19) than mothers who felt they needed moderate or full hands-on assistance (M = 23, SD 8.46, n = 9). Table 4:32 presents mean score differences of received assistance between groups of mothers with differing perceived needs.
### Table 4: Mean score differences between groups

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Help needed</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>HSD</th>
<th>Mean difference between groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total help received score</td>
<td>None</td>
<td>23</td>
<td>28.52</td>
<td>5.47</td>
<td>1.14</td>
<td></td>
<td>-2.426</td>
</tr>
<tr>
<td></td>
<td>Hands-off Verbal reassurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimal hands-on position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate to full hands-on attach</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hands-off Verbal reassurance</td>
<td>19</td>
<td>30.95</td>
<td>5.09</td>
<td>1.16</td>
<td></td>
<td></td>
<td>2.426</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Minimal hands-on position</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Moderate to full hands-on attach</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Minimal hands-on position</td>
<td>7</td>
<td>28.43</td>
<td>4.89</td>
<td>1.85</td>
<td></td>
<td></td>
<td>-0.93</td>
</tr>
<tr>
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<td>None</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Hands-off Verbal reassurance</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Minimal hands-on position</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Moderate to full hands-on attach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate to full hands-on attach</td>
<td>9</td>
<td>23</td>
<td>8.4</td>
<td>2.82</td>
<td></td>
<td></td>
<td>-5.522</td>
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<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hands-off Verbal reassurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimal hands-on position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>28.45</td>
<td>6.25</td>
<td>.82</td>
<td></td>
<td></td>
<td>-5.429</td>
</tr>
</tbody>
</table>

95% CI for Mean
99% CI for Turkey HSD post-hoc test
*p < 0.05

**Helpful support**

Mothers were asked to identify three of the most important things they felt midwives did to help breastfeeding initiation. Several midwifery practices were commonly mentioned by mothers as helpful. These included help with attachment, showing how by doing, encouragement and support, offering help if needed and information giving. In contrast, a number of mothers said that midwives “did nothing for them at all”. See Appendix L1 for presentation of mothers’ reported perceptions of helpful and unhelpful midwifery practices.
Confidence factors identified by mothers

Second time mothers commonly reported the fact that they had breastfed before. New first time mothers mentioned that they asked for more help if they felt they needed more guidance.

Experience of holding naked newborn on bare chest

Appendix L2 shows mothers’ verbal comments on their experience of holding their naked baby on their bare chest. The majority (82%; n = 58 out of 71) mentioned the importance of bonding and closeness to their baby. Most mothers in this study expressed positive feelings of endearment (93%; n = 66 out of 71) toward their baby in relation to the skin-to-skin contact experience. However, a small number (7%; n = 5 out of 71) reported negative feelings about the experience.

The benefits of skin contact for synchronization of hormones between mother and baby are well documented in the research literature (Matthiesen et al, 2001). The hormone oxytocin heightens maternal feelings of acceptance and bonding toward their infant and may play a role in emotional well being. Words commonly used by mothers to express how they felt about their skin contact experience were “beautiful”, “lovely”, “special”, “good” “touching”, “relaxing”, “surreal”, “close”, “fantastic”, “wonderful”. As well as the bonding aspects, skin contact between mother and baby at the outset is also known to enhance coordination of the babies’ innate reflex ability to begin suckling (Righard & Alade, 1990). A small portion of mothers in the study noted the benefits to themselves and their babies in regards to improved breastfeeding outcome.

Not all mothers perceived skin-to-skin contact as beneficial. One mother felt stressed by the situation. Others admitted that the experience did not meet their expectations of feeling bonded to their baby. One mother lamented that skin-to-skin contact for breastfeeding did not help her bond with her baby. “I was freaking out because of the way she was crying,” she said. This mother also expected direct help with breastfeeding. “I know it is all very well to have them do it themself but I don’t think it was right with us,” she said. “I’d have preferred someone to help by putting my breast in her mouth.”
Best practice model

The main purpose of the present study was to find the best predictors of a newborn commencing suckling within the first hour after birth. This section presents predictive models for suckling within the first hour after birth, and factors influencing effective suckling in the postpartum. A binary logistic regression analysis approach was used. A logistic regression model enabled all predictors to be entered in the equation simultaneously as there were no specific hypotheses about the order or importance of predictor variables. Each predictor was evaluated as if entered into the equation last (Tabachnick & Fidell, 2001).

Predictors of suckling in the birthing room

Binary logistic regression assumes that the dependent or outcome variable is dichotomous and that the outcomes are independent and mutually exclusive and as such, differs from the ordinary leafed regression analysis where the dependent variable is continuous. Logistic regression requires large sample sizes with a minimum total of 60 cases to be accurate (Leech et al., 2005; Tabachnick & Fidell, 2001). Multicollinearity is a potential source of confusing or misleading results and needs to be assessed (Leech et al., 2005). Chi-square analyses and correlations were run on proposed variables to help minimise multicollinearity and choose the most appropriate independent variables. The selection of variables was informed by a critical review of the literature.

Independent variables that were not highly inter-correlated with each other but strongly related to the dependent (outcome) variable were selected. Only variables that had a statistically significant association with effective suckling were included in the logistic regression analysis. The ‘goodness of fit’ of the logistic regression model was assessed by the Omnibus Test of Model Coefficients and the Hosmer and Lemeshow Test.

The first direct logistic regression analysis was conducted to assess whether three predictor variables: 1) any suction; 2) positioning of baby’s chin on the breast; and 3) duration of skin contact predicted the outcome of suckling achievement within the first hour after birth for 61 vaginal births. The first two predictors are dichotomous. The third predictor was categorical data and the last category was chosen as the base for comparison of other categories. Odd ratios for the categorical variable represent comparisons with the reference group (OR = 1.00) after adjustment for other variables in the model.
There were 61 cases with no missing data. A test of the full model with all three predictors against a constant-only model was statistically significant ($\chi^2(7, n = 61) = 25.77$, $p < .0001$) indicating that the predictors as a set, reliably distinguished between newborns who did achieve suckling and those who did not. Hosmer and Lemeshow Test also supports the model as being worthwhile ($\chi^2 (4, n = 61) = 5.211$, $p = 0.26$) significance values greater than 0.05 indicate a ‘good fit’ (Pallant, 2002). The model had an overall prediction accuracy of 86.9%, after the predictor variables were entered, which is an improvement over 73.8% baseline predictions (see Classification Table 4.33). The model suggests 32.2% of the variability in suckling success is explained by this set of variables.

Table 4:33 Classification Table (a) vaginal births; (n = 61)

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Commence suckling</th>
<th>% correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n = No</td>
<td>n = Yes</td>
</tr>
<tr>
<td>Commence suckling</td>
<td>No</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.34 presents the maximum likelihood estimates. The odds of a baby achieving suckling was 25.9 times higher if naked body contact time between mother and newborn was continuous and uninterrupted for the entire 60 minutes after birth ($p < .05$). Babies were 15.7 times more likely to achieve suckling within the hour if they approached their mother’s breast chin first nudging the breast from underneath ($p < 0.5$). The odds were decreased by 2.6 times for babies to achieve suckling if they had been administered any suction (e.g. oropharyngeal suction) at the time of birth ($p < 0.5$).
Table 4.34 Equation variables vaginal births (n = 61)

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>OR</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction</td>
<td>-2.582</td>
<td>1.1094</td>
<td>5.56</td>
<td>1</td>
<td>.018</td>
<td>.076</td>
<td>.009 -.646</td>
</tr>
<tr>
<td>Position chin on</td>
<td>2.758</td>
<td>1.192</td>
<td>5.351</td>
<td>1</td>
<td>.021</td>
<td>15.768</td>
<td>1.524 -163.17</td>
</tr>
<tr>
<td>breast duration</td>
<td></td>
<td></td>
<td>6.51</td>
<td>3</td>
<td>.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30 mins</td>
<td>-22.297</td>
<td>40192.9</td>
<td>.000</td>
<td>1</td>
<td>1.00</td>
<td>.000</td>
<td>.000 .</td>
</tr>
<tr>
<td>&gt;30 - 59 mins</td>
<td>1.031</td>
<td>1.385</td>
<td>.554</td>
<td>1</td>
<td>.457</td>
<td>2.805</td>
<td>.186 42.375</td>
</tr>
<tr>
<td>CSSC 60 mins</td>
<td>3.1397</td>
<td>1.277</td>
<td>6.399</td>
<td>1</td>
<td>.011</td>
<td>25.927</td>
<td>2.122 316.746</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.663</td>
<td>1.209</td>
<td>1.893</td>
<td>1</td>
<td>1.69</td>
<td>.189</td>
<td></td>
</tr>
</tbody>
</table>

a Variable(s) entered on step 1: suction, chin on breast, duration skin contact.

OR = Odds Ratio

Figure 11: Baby’s chin on mother’s breast

© Ruth Cantrill 2004

The second direct logistic regression analysis was conducted to assess whether four predictor variables: 1) any suction; 2) positioning of baby’s chin on the breast; 3) assistance mothers received; and 4) duration of skin contact, predicted the outcome of suckling achievement within the first hour after birth for all births observed. Variables remain constant for the model with both vaginal and caesarean births (see Table 4.35). The model suggests that babies are more likely to commence suckling within the first hour of birth when three independent variables occur: 1) babies not suctioned at birth; 2) hands-on help received to attach baby by either or a combination of holding babies’ necks by ‘tong grip’, babies held to breast for the mothers, or mothers’ breast shaped to help babies; 3) babies’ chin positioned on the breast either by
newborn ability to nudge the breast with the chin or assisted with positioning; and 4) babies and mothers in skin contact for at least 30 minutes or longer during the first hour after birth.

There were 78 cases with no missing data. A test of the full model with all three predictors against a constant-only model was statistically significant ($\chi^2(6, n = 78) = 36.25, p < .001$) indicating that the predictors as a set, reliably distinguished between newborns who did achieve suckling and those who did not. Hosmer and Lemeshow Test also supported the model as being worthwhile ($\chi^2(7, n = 78) = 3.672, p = 0.817$). The model had an overall prediction accuracy of 84.6%, after the predictor variables were entered, which was an improvement over 67.9% baseline predictions (see Classification Table 4.33). The model suggested 37.2% of the variability in suckling success is explained by the set of variables (Cox & Snell R Square model).
Table 4:35 Classification Table (a) all births (n = 78)

<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Commence suckling</td>
<td>n = No</td>
</tr>
<tr>
<td>Commence suckling</td>
<td>No</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The cut value is .500*

The maximum likelihood estimates are presented in Table 4.36. When caesarean section births were pooled with vaginal births, the odds of a baby achieving suckling was 15.49 times higher if the longest naked body contact time between mother and newborn during the first hour after birth was at least 30 minutes or longer (p < 0.01). Babies were 6.8 times more likely to achieve suckling within the hour if they approached their mother’s breast chin first (p < 0.05), and 6.5 times more likely to achieve suckling within the hour if the mothers received assistance from the midwife to attach the baby (p < 0.01). The odds were decreased by 2.14 times for babies to achieve suckling if they had been administered any suction (e.g. oropharyngeal suction) at the time of birth (p < 0.05).

Table 4:36 Equation variables all births (n = 78)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>OR</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction</td>
<td>-2.146</td>
<td>.851</td>
<td>6.31</td>
<td>1</td>
<td>.012</td>
<td>.117</td>
<td>.022</td>
<td>.620</td>
</tr>
<tr>
<td>Position chin on breast</td>
<td>1.918</td>
<td>.835</td>
<td>5.275</td>
<td>1</td>
<td>.022</td>
<td>6.809</td>
<td>1.325</td>
<td>34.99</td>
</tr>
<tr>
<td>H on Assist</td>
<td>1.883</td>
<td>.728</td>
<td>6.696</td>
<td>1</td>
<td>.010</td>
<td>6.572</td>
<td>1.579</td>
<td>27.353</td>
</tr>
<tr>
<td>Duration category</td>
<td>9.916</td>
<td></td>
<td></td>
<td>1</td>
<td>.019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30 mins</td>
<td>-.288</td>
<td>1.403</td>
<td>.042</td>
<td>1</td>
<td>.837</td>
<td>.750</td>
<td>.048</td>
<td>11.719</td>
</tr>
<tr>
<td>&gt;30 - 59 mins</td>
<td>1.336</td>
<td>.938</td>
<td>2.028</td>
<td>1</td>
<td>.154</td>
<td>3.083</td>
<td>.605</td>
<td>23.906</td>
</tr>
<tr>
<td>CSSC 60 mins</td>
<td>2.741</td>
<td>.939</td>
<td>8.521</td>
<td>1</td>
<td>.004</td>
<td>15.496</td>
<td>2.460</td>
<td>97.59</td>
</tr>
<tr>
<td>Constant</td>
<td>-1905</td>
<td>.987</td>
<td>3.720</td>
<td>1</td>
<td>.054</td>
<td>.149</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*OR = Odds Ratio*

**Influences of birth events on postnatal outcomes**

The second aim of this study was to determine the influence of duration of skin-to-skin contact and predictors of baby suckling with effective attachment at the postnatal observation. Effective suckling was defined as ‘baby suckled with deep rhythmical suck-swallow-breathe-pause patterns and feeds with sustained attachment’. It is well-known that optimal positioning is
conducive to optimal attachment and if the baby is well attached there is more likelihood of effective suckling. Hence, positioning and attachment practices were chosen as the independent variables in the model, to find predictors of effective suckling (dependent variable).

A direct logistic regression analysis was conducted to assess whether three predictor variables: 1) mother observed supporting baby’s neck by stabilizing the shoulders; 2) mother holds baby close so chin is in firm contact with the breast; and 3) duration of skin contact, effective suckling observed prior to discharge. The outcome is dichotomous for the first two predictors. The third predictor was treated as categorical data and the last category was chosen as the base for comparison of other categories.

There were 72 cases, as six postnatal observations had missing data. A test of the full model with all three predictors against a constant-only model was statistically significant ($\chi^2 (5, n = 72) = 25.768, p < .001$) indicating that the predictors as a set, reliably distinguished between newborns who suckle effectively and those who did not. Hosmer and Lemeshow Test also supported a ‘good fit’ for the model ($\chi^2 (4, n = 61) = 2.596, p = 0.92$). The overall prediction accuracy of 75%, after the predictor variables were entered, was an improvement over 61.1% baseline predictions (see Classification Table 4.37). The model suggested 30.0% of the variability in effective suckling observed prior to discharge at postnatal observation is explained by this set of variables. Prediction success was correct for 67.9 not suckling effectively and 79.5% correctly predicted as suckling effectively (see Classification Table 4.37).

**Table 4:37 Classification Table (a) all births (n = 72 out of 78)**

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Effective suckling PN</th>
<th>% correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n = No</td>
<td>n = Yes</td>
</tr>
<tr>
<td>Commence suckling</td>
<td>No</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td>75.0</td>
<td></td>
</tr>
</tbody>
</table>

a The cut value is .500

The maximum likelihood estimates are presented in Table 4.38. Babies were 6.4 times more likely to suckle with deep rhythmical suck-swallow-breathe pause patterns if they were positioned so their chin was in firm contact with their mother’s breast ($p < 0.05$), and 3.5 times more likely to suckle effectively if they were positioned in such a way that their neck was supported by their shoulders being stabilised ($p < 0.05$). Although not statistically significant at
(p < 0.05), the odds of babies being observed suckling effectively prior to discharge if they had been in continuous uninterrupted naked body contact during the first hour after birth was 3.6 times more likely (p = 0.58).

Table 4:38 Equation variables all births (n = 72)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>OR</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby’s chin in firm contact with mother’s breast</td>
<td>1.866</td>
<td>.671</td>
<td>7.727</td>
<td>1</td>
<td>.005</td>
<td>6.465</td>
<td>1.734 - 24.103</td>
</tr>
<tr>
<td>Stable position baby’s neck supported</td>
<td>1.265</td>
<td>.618</td>
<td>4.193</td>
<td>1</td>
<td>.041</td>
<td>3.542</td>
<td>1.056 - 11.887</td>
</tr>
<tr>
<td>Duration category No skin contact</td>
<td>1.315</td>
<td>1.281</td>
<td>1.053</td>
<td>1</td>
<td>.305</td>
<td>3.725</td>
<td>.302 - 45.911</td>
</tr>
<tr>
<td>&lt;30 mins ssc</td>
<td>1.020</td>
<td>.855</td>
<td>1.424</td>
<td>1</td>
<td>.233</td>
<td>2.774</td>
<td>.519 - 14.816</td>
</tr>
<tr>
<td>&gt;30 - 59 mins ssc</td>
<td>1.281</td>
<td>.676</td>
<td>3.594</td>
<td>1</td>
<td>.058</td>
<td>3.600</td>
<td>.958 - 13.532</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.622</td>
<td>.587</td>
<td>7.623</td>
<td>1</td>
<td>.006</td>
<td>1.98</td>
<td></td>
</tr>
</tbody>
</table>

a Variable(s) entered on step 1: chin on breast, stable position, duration skin contact

Figure 12: Stable positioning
Telephone interviews at 2 weeks

Participants were interviewed by telephone to determine breastfeeding outcomes at 2 weeks postpartum. This section reports on breastfeeding characteristics, problems experienced, help accessed, confidence and perception of milk adequacy. At 2 weeks postpartum, 93 mothers were successfully contacted. Seventy-eight percent (78%; n = 73) of these were of the observed birth cohort. The average age of infants at the time of the telephone call was 17 days (SD 3.9).

Extent of breastfeeding at 2 weeks

Criteria defined by Labbock (1990) were used to collect breastfeeding information. Most mothers (82%) in the study planned to breastfeed for more than 3 months. Around 20% were either uncertain or planned their infant would breastfeed for less than 2 weeks (n = 1) or less than 3 months (n = 3).

Ninety percent (90%; n = 67) of the babies from the observed birth cohort were breastfeeding or being fed their mother’s expressed breastmilk (EBM). Three quarters of the babies (n =57) were fully breastfeeding or fed breastmilk exclusively, and 14% (n =10) of infants were partially breastfeeding. Around 10% of babies (n = 7) were being fed artificial baby milk (ABM) or no longer breastfeeding.

Breastfeeding rates in the overall sample, were similar for any breastfeeding 92% (n = 86), slightly higher for exclusive or fully breastfeeding 79.6 % (n = 74), a little less for partial breastfeeding 13% (n =12) and ABM (7.5%; n = 7). See Table 4.39 for subdivisions of breastfeeding extent by birth type comparing births observed and all births included in the study.

Results were comparable with national figures for infants under 3 months which reported 12% for partial breastfeeding (ABS, 2003b). However, fewer infants in the national population were exclusively breastfed (64% versus 79.6%); and twice as many in the National Survey were no longer breastfeeding (16%) compared to 7.5% in this sample.
Table 4:39 Breastfeeding at 2 weeks by birth type

<table>
<thead>
<tr>
<th>Breastfeeding extent</th>
<th>Observed births (n = 78)</th>
<th>All births (n = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vaginal n (%)</td>
<td>Caesar n (%)</td>
</tr>
<tr>
<td>Exclusive</td>
<td>44 (77.2)</td>
<td>10 (58.8)</td>
</tr>
<tr>
<td>AEBF</td>
<td>2 (3.5)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td>Partial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH</td>
<td>3 (5.3)</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>PM</td>
<td>3 (5.3)</td>
<td>0 (-)</td>
</tr>
<tr>
<td>PL</td>
<td>0 (-)</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>ABM</td>
<td>5 (8.8)</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>57 (100)</td>
<td>17 (100)</td>
</tr>
<tr>
<td>No follow-up</td>
<td>4 (6.6)</td>
<td></td>
</tr>
</tbody>
</table>

**Expressed breastmilk**

Just under half (46%) of the mothers who were breastfeeding at 2 weeks postpartum expressed breastmilk. Techniques used to express breastmilk were using a hand technique (32.3%) and using either manual (54.8%) or electric pump (25.8%). Almost a third (29.8%) of these mothers fed expressed breastmilk (EBM) to their babies (see Table 4.41). Bottle teats were used to feed expressed breastmilk in all cases. All mothers (n = 39) who were expressing breastmilk reported experiencing at least one common breastfeeding difficulty.

Table 4:41 Breast expression

<table>
<thead>
<tr>
<th></th>
<th>All births</th>
<th>TOTAL out of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express breastmilk</td>
<td>39 (45.9)</td>
<td>85</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Express method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self by hand</td>
<td>10 (32.3)</td>
<td>31</td>
</tr>
<tr>
<td>Manual pump</td>
<td>17 (54.8)</td>
<td>31</td>
</tr>
<tr>
<td>Electric pump</td>
<td>8 (25.8)</td>
<td>31</td>
</tr>
<tr>
<td>EBM fed to baby</td>
<td>25 (29.8)</td>
<td>84</td>
</tr>
</tbody>
</table>

**Breastfeeding problems**

Common breastfeeding problems are known to interfere with how long mothers may continue offering their breast or breastmilk to their babies. Ninety-two percent (92%; 79 out of 86) of
respondents reported at least one breastfeeding problem. Table 4.42 presents common breastfeeding problems identified for the observed birth group and participants overall. Problems of nipple pain, too much milk, baby not attaching properly, inadequate breastmilk supply, attachment difficulties for mother and nipple trauma were further analysed in relation to skin contact.

Table 4:42 Problems reported at 2 weeks

<table>
<thead>
<tr>
<th>Breastfeeding problems</th>
<th>Observed births n (%)</th>
<th>All births n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nipple pain</td>
<td>36 (60)</td>
<td>46 (61.3)</td>
</tr>
<tr>
<td>Too much milk/engorged breasts</td>
<td>30 (50)</td>
<td>38 (50.7)</td>
</tr>
<tr>
<td>Baby not attaching properly</td>
<td>17 (28.3)</td>
<td>21 (28)</td>
</tr>
<tr>
<td>Not enough milk</td>
<td>16 (26.7)</td>
<td>16 (21.3)</td>
</tr>
<tr>
<td>Not able to master attachment techniques</td>
<td>14 (23.3)</td>
<td>15 (20)</td>
</tr>
<tr>
<td>Baby colic – irritable/crying</td>
<td>12 (20)</td>
<td>16 (21.3)</td>
</tr>
<tr>
<td>Dislike breastfeeding</td>
<td>9 (15)</td>
<td>11 (14.7)</td>
</tr>
<tr>
<td>Nipple trauma</td>
<td>9 (13.6)</td>
<td>11 (13.3)</td>
</tr>
<tr>
<td>Embarrassed about breastfeeding</td>
<td>6 (10)</td>
<td>7 (9.3)</td>
</tr>
<tr>
<td>Mastitis /breast infection</td>
<td>3 (5)</td>
<td>5 (6.7)</td>
</tr>
</tbody>
</table>

**Nipple pain**

The most common difficulty experienced by mothers was painful nipples. At the 2 week telephone interview around two thirds (n = 57 out of 88) of mothers who responded reported experiencing nipple pain since leaving hospital. Nipple pain was reported at the start of breastfeeds by half the respondents (42 out of 84) with an average pain score of 3.43 out of 10 (range 1 – 9; SD 1.85). Fewer participants reported nipple pain as the breastfeed progressed (11.9%; 10 out of 84). Pain score during breastfeeds was described by mothers as 3.2 out of 10 on the average (range 1 – 7; SD 2.15).

Compared to the postnatal period, similar numbers of mothers reported pain scores greater then 2 at the start of a breastfeed (n = 35) and during breastfeeding (n = 7). Seven mothers continued to experience painful nipples during breastfeeding. A paired samples t test showed no significant difference (p < 0.05) between reported pain scores at the postnatal interview and at 2 weeks postpartum, at the start or during breastfeeding. Words mothers used to describe the pain they felt are listed in Appendix M.
Nipple trauma
Thirteen percent (12.6%; n = 11 out of 87) of respondents reported visible nipple trauma at 2 weeks. Six mothers reported the trauma on their nipples was improving, while three stated it was the same, and two felt the situation was worsening. Nipple trauma was described by mothers as blistered (n = 1), bruised (n = 2), grazed (n = 4), cracked (n = 5), bleeding (n = 2) or compressed/ridged (n = 1). Six mothers reporting nipple trauma also reported nipple pain scores greater than 2 during or at the start of breastfeeding.

Help accessed
Very few mothers reported seeking breastfeeding help since hospital discharge. Mothers with breastfeeding difficulties sought support from a range of avenues including friends and family. The most common source of support reported by mothers were the hospital midwife or the child health nurse.

Breastfeeding confidence at 2 weeks
This study aimed to explore associations between practices of naked body contact in the birthing room and breastfeeding outcomes. In particular, lack of breastfeeding confidence and perception of inadequate milk supply are common reasons for women to stop breastfeeding sooner than timeframes recommended by health authorities. Results of administration of two standard measures (BSES-SF and H&H scale) of breastfeeding confidence will be presented here in relation to the 2 week and 3 month post partum time period.

Confidence mean scores were somewhat higher at 2 weeks than reported by Dennis (2003) at 1 week. A one-way repeated measures ANOVA conducted to compare BSES-SF scores between three time periods (antenatal, 2 weeks and 3 months) revealed a significant change in BSES-SF over time (Wilks’Lambda = 0.39, F (2, 49) = 38.48, p < 0.001), multivariate partial eta squared = 0.61. Results suggest a medium effect size (Cohen, 1988).

A paired t-test demonstrated a significant change in breastfeeding confidence from the antenatal period to 2 weeks postpartum (t (82) = 7.714, p < 0.001). The mean score for breastfeeding confidence was considerably higher at 2 weeks postpartum (M = 59.76, SD = 10.11) than antenatally (M = 51.4, SD = 9.18). The increase in breastfeeding confidence was consistent amongst first time mothers (t (31) = 4.758, p < 0.001) and also amongst second time mothers (t (50) = 6.012, p < 0.001).
Unlike previous studies, differences between multipara with previous breastfeeding experience and primipara were not significant at 2 weeks postpartum or at 3 months. Between 2 weeks and 3 months postpartum breastfeeding confidence significantly increased ($t (52) = 2.411, p < 0.05$). However the increases found in mean scores amongst first time ($t (21) = 1.9$, NS) and second time mothers ($t (30) = 1.48$, NS) were not statistically significant from the 2 week to 3 month time period.

The mean H&H scale for this sample during the antenatal period was 69.75 out of 100 (SD 5.67, range 56 - 82). Unlike previous research, the present study showed no significant differences between primipara mothers or mothers with no previous breastfeeding experience and mothers who have had prior experience at the antenatal phase. However there was a trend toward increasing scores at 2 weeks (M 86.84, SD 5.7, range 56 - 82), and at 3 months (M 92.93, SD 5.7, range 56 - 82) for both primiparae and mothers who had prior breastfeeding experience.

A one-way repeated measures ANOVA compared H&H scores between three time periods: antenatal, 2 weeks and 3 months postpartum. The increase in mean scores over the three time periods was significant (Wilks’Lambda = 0.09, F (2, 53) = 258.9, p < 0.001), multivariate partial eta squared = 0.91. Results suggest a very large effect size (Cohen, 1988). Table 4.43 presents mean score comparisons and $t$ statistic.
Table 4.43 H&H scale primiparae and multiparae comparisons

<table>
<thead>
<tr>
<th></th>
<th>H&amp;H scale</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Antenatal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>42</td>
<td>69.21</td>
<td>5.46</td>
<td>T (94) = 0.82, p = 0.42</td>
</tr>
<tr>
<td>Multiparae</td>
<td>54</td>
<td>70.17</td>
<td>5.84</td>
<td></td>
</tr>
<tr>
<td>Postnatal 2 weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>38</td>
<td>84.47</td>
<td>17.031</td>
<td>T (86) = 1.35, p = 0.18</td>
</tr>
<tr>
<td>Multiparae</td>
<td>48</td>
<td>88.71</td>
<td>12.120</td>
<td></td>
</tr>
<tr>
<td>Postnatal 3 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>24</td>
<td>91.21</td>
<td>10.710</td>
<td>T (55) = 0.87, p = 0.39</td>
</tr>
<tr>
<td>Multiparae</td>
<td>33</td>
<td>93.24</td>
<td>6.906</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.44 presents participants’ mean scores for each measure (H&H scale and BSES-SF) at each phase of data collection. Mean scores reported in recent research are also presented for comparison.

Table 4.44 BSES-SF and H&H scale mean scores

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean scores</th>
<th>Previous studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primip</td>
<td>Multi</td>
</tr>
<tr>
<td>BSES-SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatally</td>
<td>48.97</td>
<td>52.84</td>
</tr>
<tr>
<td>2 weeks post partum</td>
<td>56.91</td>
<td>61.04</td>
</tr>
<tr>
<td>3 months post partum</td>
<td>63</td>
<td>64.97</td>
</tr>
<tr>
<td>H&amp;H scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatally</td>
<td>69.33</td>
<td>70.05</td>
</tr>
<tr>
<td>2 weeks post partum</td>
<td>83.60</td>
<td>89.06</td>
</tr>
<tr>
<td>3 months post partum</td>
<td>91.43</td>
<td>93.03</td>
</tr>
</tbody>
</table>

# (Dennis, 2003) at 1 week post partum
* Nil comparison

**Extent of breastfeeding**

Mean scores for either BSES-SF or H&H scale respectively did not differ significantly between antenatal and 2 weeks postnatal for mothers who were exclusively, partially breastfeeding or feeding their babies ABM.
**Influence of skin contact on breastfeeding confidence at 2 weeks**

It was hypothesised that mothers who held their babies in skin contact for a longer duration of time and continuously, during the first hour of birth may gain breastfeeding confidence. Although BSES-SF mean scores at 2 weeks differed between mothers who had held their babies in skin contact for less than 30 minutes or not at all and those who held their naked babies on their bare chest for over 30 minutes or continuously for the entire first hour or longer, differences were not statistically significant (F (2, 34) = 1.24, p > 0.05).

Using an independent \( t \) test, differences in breastfeeding confidence mean scores between two groups of 1) less than 30 minutes or no skin-to-skin contact and 2) greater than 30 minutes skin-to-skin contact were not significant (\( t (65) = 1.68, p > 0.05 \)). Equal variances were assumed (F = 5.26, p < 0.05). Likewise for women who had a vaginal birth, breastfeeding confidence at 2 weeks was not significantly greater for those mothers who held their babies in skin contact for 55 minutes or longer (\( t (49) = 1.51, p > 0.05 \)). Equal variances were assumed (F = 6.5, p < 0.05).

Although mean scores for perception of milk adequacy increased with longer duration of skin contact, they were not statistically significant (F (2, 34) = 0.92, p > 0.05). Mean H&H scale scores at 2 weeks for naked babies held on mothers’ bare chest less than 30 minutes or not at all, over 30 minutes or continuously for the entire first hour or longer.

Using an independent \( t \) test, differences in perception of milk adequacy mean scores between two groups of 1) less than 30 minutes or no skin-to-skin (M = 81, SD = 21.4, n = 17) and 2) greater than 30 minutes skin-to-skin (M = 87.5, SD = 13.2, n = 50) were not significant (\( t (65) = 1.5, p > 0.05 \)). For vaginal births alone the difference was also not significant for perception of milk adequacy at 2 weeks for those mothers who held their babies in skin contact for 50 minutes or longer (\( t (49) = 1.65, p > 0.05 \)).

**Telephone interviews at 3 months**

Participants were interviewed by telephone at 3 months about their breastfeeding status, breastfeeding problems, help accessed and breastfeeding confidence including perception of milk adequacy. At 3 months 79% of participants were contacted and 21% were not able to be contacted or had stopped breastfeeding by 2 weeks (n =7). Six participants whose babies were breastfeeding at 3 months declined completing the confidence questionnaire.
While 71% (n = 60 out of 90) of babies were breastfeeding at 3 months, 55.5% were fed breastmilk exclusively. Three mothers had commenced feeding their babies solids while breastfeeding, and 27.7% (n = 23) of babies were being fed artificial baby milk (ABM). Table 4.38 presents breastfeeding rates data for the sample with figures adjusted for babies not breastfeeding at the previous interview. Mothers were not telephoned if their baby had stopped breastfeeding.

Consistent with previous research investigating maternal confidence at 3 months, mothers in this present study who were exclusively breastfeeding had higher 2 week BSES-SF scores (M = 62.89, SD = 6.36, n = 44) than mothers whose babies were being fed any ABM or solids (M = 54.92, SD = 12.54, n = 36). The difference in mean scores between groups was statistically significant \( t (78) = 3.47, p < 0.001 \). The difference in means scores for the 2 week H&H scale was also significant for exclusive breastfeeding (M = 92.82, SD = 6.66, n = 44) compared with feeding any ABM or solids (M = 79.89, SD = 16.85, n = 36, \( t (78) = 4.34, p < 0.001 \)) at 3 months. The most common reason identified by respondents for stopping breastfeeding were “not enough milk” or “uncertainty whether baby had enough” (n = 7). Three mothers reported they felt tired and run down and that a health professional had advised them to stop breastfeeding.

By 3 months breastfeeding problems reported by mothers had diminished somewhat. However three mothers reported persistent nipple pain during breastfeeding with a score range of 2 to 7, and two mothers described visible nipple trauma. Around half the mothers responding had sought help for breastfeeding, mainly from family and friends (n = 12), family health nurse (n = 9), midwife (n = 5) or general practitioner (n = 8). A few contacted the Australian Breastfeeding Association (n = 4) and or a lactation consultant (n = 3).
Telephone interviews at 6 months

At 6 months postpartum interviews were conducted on the extent of breastfeeding, breastfeeding problems, and help accessed. At the 6 month interview 79% (35 out of 48) were breastfeeding exclusively. All but one mother commenced feeding their babies solids while breastfeeding (97%; n = 34 out of 35), and almost half (43.8%; n = 21 out of 48) of babies were being fed artificial baby milk (ABM) (see Table 4.45). Mothers who had stopped breastfeeding were not telephoned. The most common reason identified by respondents for stopping breastfeeding by 6 months was feelings of not enough milk or uncertainty whether baby had enough (n = 9 out of 13). The most important reason identified by individual mothers was that it was their own decision to stop.

By 6 months breastfeeding problems reported by mothers were minimal. Mothers were generally satisfied with their breastfeeding experience and those who had stopped were mostly satisfied with their achievement. A few mothers indicated disappointment at not being able to continue breastfeeding when they had wanted to breastfeed for longer.

Table 4.45 Breastfeeding rates 2 weeks to 6 months

<table>
<thead>
<tr>
<th></th>
<th>2 weeks n (%)</th>
<th>2 Adjusted n (%)</th>
<th>3 months n (%)</th>
<th>3 Adjusted n (%)</th>
<th>6 months n (%)</th>
<th>6 Adjusted n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF</td>
<td>74 (79.5)</td>
<td>N/A</td>
<td>46 (55.4)</td>
<td>46 (51.1)</td>
<td>35 (72.9)</td>
<td>35 (44.9)</td>
</tr>
<tr>
<td>PBF</td>
<td>12 (13.0)</td>
<td>11 (13.3)</td>
<td>11 (12.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF &amp; solids</td>
<td>3 (3.6)</td>
<td>3 (3.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABM</td>
<td>7 (7.5)</td>
<td>23 (27.7)</td>
<td>23 (25.6)</td>
<td>13 (27)</td>
<td>13 (16.6)</td>
<td>30 (38.5)</td>
</tr>
<tr>
<td>Adjust for ABM previous</td>
<td>7 (7.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>93 (100)</td>
<td>93 (100)</td>
<td>90 (100)</td>
<td>48 (100)</td>
<td>78 (100)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>7</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

Summary

Duration of naked body contact between mother and newborn beyond 30 minutes during the first hour after birth has important implications for infant suckling success. This study identified that newborn babies were more likely to achieve suckling within the hour if held by their mothers in naked body contact for a minimum of 30 minutes. Vaginally birthed babies were 26 times more likely to achieve suckling within the hour if kept in continuous uninterrupted skin-to-skin contact with their mothers for 60 minutes (p = .01) and 15.7 times more likely to achieve
sucking when their chin nudged the underside of their mother’s breast \( (p = .02) \) and 2.6 times less likely to suckle within the hour if suction was administered \( (p = .02) \). Similarly, when caesarean section and vaginal births were pooled, the odds of babies achieving suckling were 15.5 times higher if naked body contact between mother and newborn endured for at least 30 minutes \( (p = .02) \), 6.8 times more likely if they approached their mothers breast chin first \( (p = .02) \) and if mothers received midwifery assistance to attach the baby \( (p = .01) \). Babies were 2.14 times less likely to suckle within the hour if suction had been administered \( (p = .01) \).

Feeding behaviours observed in this present study identified two main behaviours of newborn coordination and orientation and attachment and suckling. The study defined three main categories of assistance received by mothers as ‘hands on’ assistance and ‘hands off’ assistance with affirmation and verbal instruction and encouragement. There was no association between maternal confidence in the antenatal period and newborn suckling success in the birthing room or during the postnatal period. Maternal breastfeeding confidence at two weeks post partum was not associated with breastfeeding duration for either primipara or multipara women. However, the present study found the proportion of infants who achieved suckling and born to multipara mothers was significantly greater than those of primipara mothers. Duration of naked body contact at the time of birth was not shown to influence breastfeeding outcomes of exclusive breastfeeding at any time period of the present study. Several mothers described negative experiences about holding their babies in naked body contact.

This present study demonstrated an association between duration of naked body contact between mothers and newborns in the birthing room and possible reduction of nipple trauma in the early postnatal period and may impact on maternal confidence to manage positioning and attachment independently. Clearly, help that mothers receive to position and attach their infant for breastfeeding may hinder or help some mothers and likewise may influence babies being able to manage effective suckling both in the birthing room and later during the postnatal period. The next chapter discusses results presented.
Chapter 5
Discussion

Several important findings are apparent from this prospective longitudinal study observing naked body contact between mothers and their newborns at birth and following up until 6 months postpartum. This chapter commences with a summary of strengths of the study. The chapter then provides an overview of the main findings of the study related to: 1) duration of skin-to-skin contact; 2) suckling achievement; 3) support and assistance; 4) maternal breastfeeding confidence; and 5) breastfeeding problems and outcomes. The findings are examined in relation to contemporary literature concerning newborn innate feeding behaviour, optimal positioning and attachment for effective pain-free breastfeeding and associations with maternal breastfeeding confidence. This chapter will also outline the limitations of the study and how these may hinder the generalizability of results.

Strengths of the study

The present study found the length of time mothers held their newborns in naked body contact, along with optimal positioning at the breast during the first hour following birth contributed to achievement of suckling both in the birth suite and during the postpartum period prior to discharge. Over 80% of mothers who gave birth vaginally spent at least 30 minutes of the first hour after birth holding their naked baby on their bare chest. This is in accordance with best practice standards outlined in BFHI global criteria (WHO.UNICEF, 1992). However, skin-to-skin contact did not commence initially for at least a third of mothers and babies or contact was interrupted before babies had a chance to attempt suckling or before the end of the hour. These issues will be discussed later in the chapter.

The study developed, tested and validated new tools that were found to be useful for measuring breastfeeding initiation in hospital. The tools assessed characteristics of effective breastfeeding initiation and contained elements that accurately predicted the likelihood of breastfeeding success. The items of the tools form a checklist for breastfeeding that will enable midwives to reinforce best practice guidelines, identify ineffective suckling in the birthing room, and address individual needs of mothers who may require follow-up for specific problems.

The methodological strengths of the present study built on previous research in the area of breastfeeding initiation and maternal infant contact around the time of birth. Firstly, the present
study included documented observations of newborn feeding behaviours along with duration of uninterrupted skin-to-skin contact between mother and infant to the onset of suckling. The present study explored attributes of effective breastfeeding in the birthing room such as optimal positioning, asymmetrical latch and sustained suckling. To date, effective suckling for the first breastfeed is poorly understood (Cantrill et al., 2004) and not reported adequately in previous studies (Carfoot, Williamson & Dickson, 2003). Maternal responses to their newborn infants’ behaviour, and actions taken by mothers to position their babies at the breast to latch were also documented. The time at which various events occurred during the first hour after birth were recorded to identify events and procedures that may cause separation of mothers from their babies or interruption of contact in the moments immediately following birth.

The exploratory nature of the study allowed for observation and analysis of the assistance that mothers received to help their babies attach to the breast. The study was inclusive of both multipara and primipara mothers who planned to breastfeed as well as vaginal and caesarean section birth modes to inform a comprehensive understanding of factors affecting breastfeeding. Finally, the present study followed up mothers in the postnatal period. Observations and interviews were completed at the time of discharge and telephone interviews conducted for up to 6 months postpartum to identify common, preventable breastfeeding problems that may be associated with breastfeeding initiation events during the first hour after birth.

**Duration of naked body contact at birth**

The first purpose of this exploratory observation study was to calculate duration of continuous uninterrupted skin contact and identify events that initially separate mothers and babies, or interrupt skin-to-skin contact. While nearly all mothers experienced contact with their babies within the first minute after birth, less than half the mothers who had a vaginal birth held their naked newborn on their bare chest immediately and remained together for 60 minutes. Around one quarter of mothers who had a caesarean section held their babies in naked body contact for at least 30 minutes of the first hour as recommended in ‘Step 4’ of the BFHI best practice standards current at the time this present study was conducted (ACMI/BFHI, 1996; WHO.CHD Division of Child Health and Development, 1998). Less than 10% of mothers in the present study had no skin-to-skin contact time with their babies within the first hour after birth.

The research literature identifies three different sub-groups of early skin-to-skin contact including skin-to-skin contact immediately at birth, very early skin-to-skin contact (within 30 –
40 minutes of birth) and early skin-to-skin contact (beginning any time within 24 hours of birth) (Anderson et al., 2003). Not all mothers and babies in the present study experienced skin-to-skin contact in the first hour of birth, although all experienced some immediate or very early mother/infant contact. In the present study four variations of mother/infant contact were identified.

1. Mothers initially holding their naked baby on their bare chest from within the first minute of birth until 60 minutes or beyond without any interruption (continuous uninterrupted skin-to-skin contact).

2. Mothers initially holding their babies or holding their naked babies on their bare chest briefly but interrupted before the first breastfeed or the end of the hour, for interventions or hospital routines. Then most babies were placed or replaced in naked body contact with mothers for a substantial length of time (continuous but interrupted skin-to-skin contact).

3. Mothers and babies separated initially, for interventions or routines or babies held by other persons and then mothers offered skin-to-skin contact and proceeded to hold their naked babies on their bare chest for anywhere between 10 – 55 minutes (naked body contact after initial separation).

4. Mothers who had contact with their babies but not naked baby in direct contact with mother’s bare chest or abdomen.

Variations observed in the present study as to whether mothers and babies commenced naked body contact or how long babies and mothers remained together may reflect the ambiguity of the BFHI best practice standards for ‘Step 4’ (BFHI, 1999). For example, some research literature underpinning ‘Step 4’ used the terms ‘suckling’ and ‘contact’ interchangeably (WHO.CHD Division of Child Health and Development, 1998). Hence the wording of ‘Step 4’ to ‘help mothers initiate breastfeeding within a half-hour of birth’ with assessment criteria requiring mothers who have given birth vaginally to ‘confirm that within a half-hour of birth they were given their babies to hold with skin contact, for at least 30 minutes’ (ACMI/BFHI, 1996; WHO.CHD Division of Child Health and Development, 1998; WHO.UNICEF, 1992) is ambiguous and may not be adequately substantiated by research evidence (BFHI, 1999; Perez-Escamilla et al., 1994; Renfrew et al., 2001c).
Ambiguity of ‘Step 4’ has been recognised for some time. For example, 10 years after the implementation of the BFHI best practice standards, a BFHI newsletter affirmed the validity and research application of all steps, but suggested revisions to ‘Step 4’ (BFHI, 1999). Experts in the area of mother/infant bonding suggest the values of ‘Step 4’ should not hinge on a mere 30 minute discrepancy but should emphasise the importance of mother and child being together and the actual taking of milk should be allowed to happen in its own time (Fairbank et al., 2000; Renfrew et al., 2001c). Observations from the present study help define optimal practices in the birthing room that are achievable and congruent with contemporary research evidence showing newborns take time to coordinate feeding behaviour for breastfeeding initiation (Nyqvist, Rubertson, Ewaksms & Sjoden, 1996; Radzyminski, 2005; Righard, 1996; Righard & Alade, 1990; Smith, 2003; Widstrom & Thingstrom-Paulsson, 1993; Widstrom et al., 1990). As such, results of the present study may contribute toward the rewriting of criteria for ‘Step 4’ of the BFHI global criteria which is presently being updated and is in draft form (WHO.UNICEF, 2006c).

Variations in practice in regards to continuous uninterrupted skin-to-skin contact during the first hour after birth may also reflect practice change trends in the birthing room of the maternity facility at the time the study was conducted (Cantrill, 2004). At the time of data collection, many midwives in the maternity unit had completed an essential breastfeeding education on-line program in preparation for BFHI accreditation. Although midwives participating in the present study were asked to provide usual practice and not change their behaviour while the researcher observed, some practice change may have been inevitable. A double Hawthorne effect could have resulted in altered behaviour of both mothers and midwives since both were aware of participation in the present research study (Polit & Beck, 2004; Roberts & Taylor, 2002). This effect is discussed further in the limitations section.

Studies investigating naked body contact between mother and newborn previously focused on bonding and mother infant relationships (Klaus & Kennell, 1982; Klaus et al., 1995; Tessier, Cristo, Velez, Giron, de Calume et al., 1998). Researchers have described early contact between mother and infant as naked babies on a blanket presented to mothers gowned in loose clothing within 10 – 30 minutes after birth and mothers deciding whether or not to offer their babies the breast (Taylor, Maloni, Taylor & Campbell, 1985a; Taylor, Taylor, Campbell, Maloni & Cannon, 1985b). A major criticism of studies investigating the effects of skin-to-skin contact on breastfeeding outcomes is the discrepancy in time lapse after birth before infants are placed with their mothers. The time lapse from birth to contact varied from 10 to 30 minutes and duration of
skin-to-skin contact varied from 15 to 90 minutes (Christensson et al., 1992; Thomson et al., 1979). Hence the understanding of ‘early contact’ is inconsistent in the research literature examining effects on breastfeeding outcomes.

One study defined early contact as ‘infants put to the breast within 10 minutes of birth by a midwife’ (Salariya et al., 1978, p. 1142). The extent or duration of naked body contact between mother and newborn at that time is unclear. Furthermore it appears newborn babies had no opportunity to demonstrate pre-feeding behaviours and results may be biased since babies likely to have suckling difficulties were excluded in the Salariya et al. (1978) study.

In two studies, mothers held their babies momentarily after birth, babies were wrapped and skin-to-skin contact commenced at around 15 minutes after birth once routine hospital procedures were carried out. Once in skin contact, mothers held their babies for 90 minutes without interruption (Christensson et al., 1992; Christensson et al., 1995).

In another study duration of skin contact was 15 to 20 minutes. Once again routine hospital procedures such as wrapping and care of babies plus birth of the placenta, episiotomy repair and transfer of mother to a stretcher bed took priority over mothers initially holding their naked newborns (Thomson et al., 1979). This meant a time lapse of up to 30 minutes before mothers and babies were together. It is not clear whether a time lapse between birth and when babies begin skin-contact with their mothers is of significance to effective management of the first breastfeed. In contrast to previous research, the present study explored the feasibility of the practice of continuous uninterrupted skin-to-skin contact being achievable and adds to the understanding of these matters to inform policy and practice.

In a recent randomized control trial studying the effects of skin-to-skin contact on breastfeeding, hospital staff insisted that weighing babies was a priority over placing naked babies on their mother’s bare chest (Carfoot et al., 2005). As a consequence, up to 15 minutes elapsed after the time of birth before babies and mothers in the contact group were together in skin-to-skin contact. Carfoot et al. (2005) reported contact time being ‘as soon as possible’ after birth and to allow for no interruptions once babies initiated feeding behaviour or until mothers requested other persons to take their babies. While newborns and mothers in the contact group remained in skin-to-skin contact for 45 minutes, skin-to-skin contact did not begin immediately and was interrupted for almost 20% of the contact cases.
While the control group of mothers had immediate contact with their babies initially, it was not skin-to-skin contact and was interrupted for routine interventions before babies were returned to mothers. Difficulties described by Carfoot et al. (2005) in soliciting cooperation from hospital staff to keep babies and mothers together in skin-to-skin contact continuously for the first hour are similar to results of this present exploration study.

The BFHI policy directive to commence breastfeeding within 30 minutes after birth may be misleading in view of the evidence that if newborns remain in skin-to-skin contact with their mothers, most will not begin breastfeeding spontaneously until after 50 minutes or longer (Gomez, Baiges Nogues, Batiste Fernandez, Marca Gutierrez, Nieto Jurado et al., 1998; Jansson, Mustaafa, Khan, Lindblad & Widstrom, 1995; Righard & Alade, 1990; Widstrom et al., 1990). The USA Baby Friendly policy guidelines and accreditation criteria were modified to 1 hour for breastfeeding initiation (UNICEF US Baby Friendly Initiative, 2006) based on research reporting many babies are not ready to begin breastfeeding until beyond 30 minutes into the first hour after birth (Righard & Alade, 1990; Widstrom et al., 1990). Likewise best practice guidelines to establish exclusive breastfeeding also suggest breastfeeding be initiated within the first hour with continuous skin-to-skin contact (International Lactation Consultant Association, 2005). However this may still be too prescriptive as a percentage of babies are not ready to begin suckling until the second hour or beyond (Righard & Alade, 1990; Widstrom et al., 1990). Furthermore, mothers’ preferences, experiences and well being at the time need consideration and these have not been well researched.

It has been suggested that transition and balanced regulation of motor activity occurs over a period of 6 hours after birth (Ferber & Makhoul, 2004). Therefore to focus on skin contact only for the first hour may be misguided or may contribute to high expectations from parents and midwives for newborns to suckle before a reasonable time has lapsed. The present study clarified optimal timeframes to commence skin-to-skin contact, continue skin-to-skin contact and defined optimal assistance for mothers to receive for breastfeeding initiation within the first hour of birth.

The revised draft BFHI assessment criteria guideline reads ‘place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour and encourage mothers to recognise when their babies are ready to breastfeed, offering help if needed’ (WHO.UNICEF, 2006c, p. 10). This is congruent with evidence-based research suggesting continuous uninterrupted skin-to-skin contact facilitates newborn coordination of instinctive feeding.
behaviour for optimal attachment and effective breastfeeding. However the contradictory wording ‘help mothers initiate breastfeeding within a half-hour of birth’ still stands as the leading statement in the draft version (WHO.UNICEF, 2006c).

A clear definition of ‘skin-to-skin contact’ is not apparent in the global criteria for BFHI. Clear direction as to optimal time to commence naked body contact between mother and newborn is also not evident. Indeed BFHI best practice standards do not require babies and mothers to commence skin-to-skin contact immediately after birth and this is contrary to research evidence. The BFHI global assessment criteria guidelines for accreditation lack specificity on the matter of time lapse after birth until infants are placed in skin-to-skin contact with their mothers. Clarification as to whether continuous uninterrupted skin contact for the first hour after birth or any period of time spent in skin contact during the first hour, is needed to reduce the existing ambiguity in the global criteria. Present research is inadequate to analyse the three identified subgroups of skin-to-skin contact around the time of birth. This present study gives further insights into practice variations of separation and interruption of skin-to-skin contact that occur immediately at birth and within 30 – 40 minutes of birth. Highlighting the variations of skin-to-skin contact provides a baseline for further research to establish optimal management of skin-to-skin contact at birth for effective breastfeeding.

**Factors that separate or interrupt mother and baby**

Factors observed to precede skin-to-skin contact included newborn resuscitation events, babies being passed from the mother to be held by another person, routines and procedures such as vitamin K injections, weighing and wrapping of babies or babies being placed under the overhead warmer. These observations are similar to those of previous studies (Carfoot et al., 2005; Christensson et al., 1995; de Chateau & Wiberg, 1977a; Ferber & Makhoul, 2004; Taylor et al., 1985b; Thomson et al., 1979). The present study identified a range of events occurring in the first hour after birth that cause separation between mothers and their newborns, and examined the practicalities and feasibility of continuous uninterrupted skin-to-skin contact in the birthing room for at least 1 hour.

One quarter of mothers who had a vaginal birth and their babies were separated or did not begin naked body contact until after the first minute. All but one mother/baby dyad commenced naked body contact within 10 minutes after birth and 11 out of 16 remained together for at least 30 minutes. A range of events that may occur in the first 10 minutes were examined further to prioritize care options in favour of continuous uninterrupted skin-to-skin contact.
In the present study babies who did not begin skin-to-skin contact with their mothers immediately after birth were most commonly placed on the resuscitation cot. This is despite current resuscitation guidelines recommending vigorous full term infants with no risk factors can be initially observed and assessed while naked on their mother’s bare chest (Kattwinkel, 2006). In many cases no resuscitation action was required for babies placed on the resuscitation cot and so babies were returned to their mothers within a few minutes.

It is possible that some midwives may not feel confident in their ability to assess the newborn infant in the close presence of the mother. Or perhaps some midwives are more anxious than others about the infant’s initial well-being after birth. A degree of anxiety to ensure babies are placed near resuscitation equipment after birth may be prominent in the mind of professionals attending births. It could be that the routine practices such as placing newborns on the resuscitation cot, wrapping and weighing is seen by some health professionals working in a medicalized hospital environment as a priority over skin-to-skin contact (Gorrin-Peralta & Parrilla-Rodriguez, 2000; Klaus & Kennell, 2001; Righard & Alade, 1994; West & Topping, 2000).

Meconium stained liquor during labour is one identifiable risk factor that may require suction and other resuscitation measures at the time of birth. One third of mothers in the present study whose babies were initially separated presented with meconium stained liquor during labour and classed as ‘at risk’ (American Heart Association American Academy of Pediatrics, 2006). Half of these babies were administered suction and none required further support with oxygen. Two thirds were returned to their mothers within the first 5 minutes and all were placed with their mothers in naked body contact by 10 minutes after birth and remained in naked body contact with their mothers for more than 30 minutes.

These results suggest that in circumstances where initial separation is warranted a time span of 5 minutes’ initial separation may be reasonable. A 5 minute initial separation is suggested as acceptable in the draft assessment criteria guidelines (BFHI.WHO, 2006). This would be manageable so far as documentation is concerned, since a second apgar score for babies is recorded at 5 minutes after birth. Longer time needed away from the mother could be classified as a medically justifiable reason (BFHI.WHO, 2006).

While anxiety around the infant’s welfare in the first minutes after birth may be valid, universal policy is clear that nearly 90% of babies are vigorous at birth and do not need to be separated
from their mothers after birth for initial resuscitation (Kattwinkel, 2006). Physiological adjustments immediately following birth and transition from intrauterine to extraterine life is known to be the single most dangerous event most humans will ever encounter (Gunn, 2006; Kattwinkel, 2006). However contemporary research suggests that environmental stimuli such as that available by naked body contact may have a greater effect on newborn self-regulation at the time of extraterine transition than cardiac and respiration adjustment (Ferber & Makhou, 2004). Several researchers have found that babies held in skin-to-skin contact stabilise breathing and heart rate (Acolet, Sleath & Whitelaw, 1989; Bystrova, Widstrom, Matthiesen, Ransjo-Arvidson, Welles-Nystrom et al., 2003; Christensson et al., 1992).

Previous research also demonstrated that temperature stabilisation can be provided by putting babies directly on the mother’s chest, drying and covering with a warm towel (Britton, 1980; Bystrova et al., 2003; Christensson et al., 1992; Jansson et al., 1995). Similar to previous results the present study found that all but one baby maintained temperatures above 36.5°C. Perhaps continuing education is needed to improve midwives’ knowledge and assessment skills of the newborn for initial resuscitation (Kattwinkel, 2006).

One baby in the present study was not covered adequately when held naked by the mother and became slightly hypothermic. The mother did not seem to know what to do with her baby; warm coverings for the baby and mother, and encouragement to hold her baby close were not forthcoming from the midwife in attendance. This observation highlights the fact that adequate midwifery support for mothers and their newborn infants is necessary to prevent hypothermia during naked body contact between mother and newborn immediately after birth (Gunn, 2006).

Previous research has identified the mode of birth by caesarean section as particularly problematic in meeting BFHI requirements for early skin contact and breastfeeding (Gorrin-Peralta & Parrilla-Rodriguez, 2000; Rowe-Murray & Fisher, 2001; Rowe-Murray & Fisher, 2002). As expected, all participants in the present study who experienced a caesarean section were initially separated from their babies. Interventions such as administration of oxygen and/or suction were carried out for two thirds of babies born by caesarean section. Babies were then dried and wrapped or placed in the humidicrib for warmth. The remaining third were dried, and generally assessed before being wrapped and handed to the mother or father to hold. Once mothers were in the recovery area, babies were generally placed in skin contact with their mothers. Others were kept wrapped with their mothers or taken to the ward nursery for routine procedures and assessment.
The draft policy guidelines for global accreditation criteria expect those mothers who have caesarean sections without general anaesthesia, to be treated the same as mothers who have vaginal births and hold their babies immediately or within 5 minutes of birth unless there are medically justifiable reasons not to (BFHI.WHO, 2006). Less than one quarter of mothers who had a caesarean section in the present study achieved naked body contact with their newborn for at least 30 minutes while in the recovery room but not in the operating room.

It is possible that events identified in the present study which preceded naked body contact for mothers having caesarean section could have been avoided. On the other hand, there may be safety issues in the operating theatre whereby sedated mothers require midwifery support while holding their babies on the operating table. Some mothers may not feel well immediately after surgery or arm movements may be restricted by intravenous lines and equipment for ongoing monitoring of blood pressure. Furthermore medical staff opinion may dominate operating theatre policy and prevent naked body contact in operating theatres. These matters may need further exploration in different countries to inform policy.

Another barrier to mothers and newborns being kept in naked body contact immediately at birth may reflect expectations placed on fathers to participate in birth events and bond with their newborn (Rodholm, 1981). In the present study fathers or significant others holding the newborn baby were among the three most common factors preceding or interrupting naked body contact between mother and baby during the first hour after birth. This observation highlights the importance of providing accurate unbiased information to couples about newborn adaptation and feeding ability. If parents are informed of these matters before birth they could discuss who will hold the baby and make informed decisions.

Another reason for separating mothers and their newborns at birth is that not all mothers choose to hold their naked baby against their bare chest at the time of birth. While only mothers who had no aversion to holding their naked baby on their bare chest were included in the present study, some women were unsure about participating in skin-to-skin contact with their naked baby. One mother decided at the time of birth that she did not want to hold her naked baby. Another held her naked baby on top of the linen covering her chest at first and decided to place her naked newborn baby on her bare chest after 10 – 15 minutes. This incident further illustrates the importance of mothers being given opportunities to hold their naked baby and be informed of the possible benefits of skin-to-skin contact.
The wide range of events that occurred before skin contact commenced suggest that routine care of the infant and mother immediately after birth is not well defined. It could be that not all staff understand best practice recommendations for the first hours after birth. This proposal is supported by the findings of a recent Australian survey of midwives on the topic of managing the first breastfeed (Cantrill et al., 2004) that found a lack of knowledge and inconsistent practice.

**Antenatal knowledge of skin-to-skin contact**

While over 80% of participants in the present study understood bonding, warmth and ability of newborns to adapt to their new environment while in naked body contact, other important factors about skin-to-skin contact were not well-known amongst women at the first antenatal interview. For example, a quarter of participants did not know that holding a newborn in skin-to-skin contact can reduce crying. Around half the women did not know that skin-to-skin contact could increase milk supply and two thirds did not realise babies conserve energy while being held naked against their mother’s bare chest.

There is a perception in western society that newborn babies cry a lot and new parents find babies’ crying disconcerting and difficult. Much has been written about how to manage babies’ crying to alleviate sleep deprivation for new parents (Pantley & Sears, 2002). Research has found that holding newborns in skin contact can reduce crying and assist mothers in managing care of their newborn (Christensson et al., 1992; Ludington-Hoe, Cong & Hashemi, 2002). The testimony of several mothers in the present study who expressed amazement at how quiet and contented their baby was so soon after birth concurs with research findings. Furthermore, researchers report that the crying baby is not able to grasp the areolar to attach to the breast effectively since the tongue is retracted when crying (Widstrom & Thingstrom-Paulsson, 1993). Therefore the settled, non-crying baby held in skin-to-skin contact has implications for effective breastfeeding initiation. The present study highlighted the importance of midwives passing on these simple facts to mothers and supporting naked body contact at the time of birth.

It is possible that some midwives may not provide comprehensive information to mothers about associations between breastmilk adequacy and naked body contact with their newborn (Cantrill et al., 2004). It is well-known that the most common reason for ceasing breastfeeding prematurely is mothers’ perception of inadequate milk supply (Colin & Scott, 2002; Dennis, 2003; Dykes, 2002, 2005b; McCarter-Spaulding & Kearney, 2001). Research has shown that skin-to-skin contact between mother and newborn can increase hormonal levels to improve
breastmilk supply (Matthiesen et al., 2001; Renfrew et al., 2001b; Uvnas-Moberg, Widstrom, Werner, Matthiesen & Winberg, 1990). Increased milk supply has also been demonstrated in mothers of premature babies who hold their babies in skin-to-skin contact (Hurst et al., 1997). Mothers who are informed of how skin-to-skin contact with their newborn can increase hormonal stimulation of breastmilk may be more likely to use the intervention of naked body contact with their newborn to initiate breastfeeding. The present study provided insights into associations between duration of skin-to-skin contact at the time of birth and maternal perceptions of milk adequacy which have not been reported in previous research.

Six mothers in the present study were diagnosed with gestational diabetes mellitus (GDM) during pregnancy. Only one of these reported knowing that skin-to-skin contact helps newborns conserve energy (Anderson et al., 2002; Ludington, 1990). It appears mothers are not being adequately educated on the benefits of skin-to-skin contact to enhance metabolic adaptation. A survey of Australian midwives reported a knowledge deficit about skin-to-skin contact associated with improved neonatal blood sugar stability (Cantrill et al., 2004). Other researchers report that the majority of neonatal hypoglycaemia cases are due to problems with the normal processes of metabolic adaptation after birth (Deshpande & Ward Platt, 2005).

Infants of mothers diagnosed with diabetes or gestational diabetes are at risk of hypoglycaemia (Williams, 2005). Hence babies of mothers with GDM are subjected to blood glucose monitoring by heel prick as per hospital protocol until blood glucose levels are maintained (Hawdon, 1999; World Health Organization, Division of Child Health and Development and Maternal and Newborn Health/Safe Motherhood, 1997). While some protocols define neonatal hypoglycaemia as 2.5mmol/l the definition of hypoglycaemia remains elusive (Deshpande & Ward Platt, 2005). Consequently some babies are unnecessarily subjected to excessive painful heel pricks which may be avoided if exposed to naked body contact.

While two thirds of mothers diagnosed with GDM in the present study held their naked baby on their bare chest for at least 55 minutes of the first hour, none held their baby in skin-to-skin contact once leaving the birthing room but two thirds held their lightly dressed babies in close contact. Coulson, de Rooy and Hawdon (2003) advocate that biological nurturing or babies held in close contact while lightly dressed can influence breastfeeding outcomes for vulnerable babies. Biological nurturing facilitates unrestricted breastfeeding in contrast to scheduled feeding and therefore reduces the chance of hypoglycemia in vulnerable infants. One mother diagnosed with GDM did not allow her baby unrestricted access to the breast during the
postnatal period. Results of the present study for a small number of mothers with GDM, raises further questions regarding the quality of health information provided by midwives to assist mothers’ needs.

The global BFHI accreditation criteria guidelines for breastfeeding initiation have not stipulated the importance of informing pregnant women about the importance of skin-to-skin contact until recently (ACMI/BFHI, 2004; BFHI.WHO, 2006). Information for pregnant women is focused on the benefits of breastfeeding and managing breastfeeding in the postnatal ward, with particular attention to positioning and attachment (ACMI/BFHI, 1996; WHO.UNICEF, 1992). The UK Baby Friendly Initiative (2001) is an exception and includes skin-to-skin contact information to pregnant women in the antenatal period. Such discrepancies between policy across countries is another example of the ambiguity in the BFHI global assessment criteria that needs to be reviewed for practical management of breastfeeding initiation in the birthing room.

**Experience of holding the naked newborn on bare chest**

Although most mothers in the present study expressed positive feelings of endearment toward their baby, a small number of mothers reported negative feelings about the naked body contact experience. Previous research has reported that early contact between mothers and infants usually provokes a positive interaction and relationship (de Chateau & Wiberg, 1977a; Salariya et al., 1978; Taylor et al., 1985b). Only one study concluded no difference in mother/infant relationships between those who experience early contact and those who do not (Curry, 1982).

In the present study several multiparous mothers related the experience of holding their naked baby on their bare chest to infant feeding ability and commented about differences between feeding ability of previous babies.

Some variation in practice for initiation of skin-to-skin contact and duration may be explained by mother’s reports about how they felt holding a naked newborn on their bare chest. Sensitivity to mothers’ individual needs is essential for quality care and these could be addressed and discussed with women during the antenatal period to help them to decide how they might like to best attempt the first breastfeeding session with their baby.

Not all cultures practise naked body contact between mothers and babies at the time of birth and this has not been shown to influence duration of breastfeeding in those countries or bonding relationships between mothers and their offspring (Lozoff, 1983). It seems other positive cultural influences towards breastfeeding may impact on breastfeeding and long-term
mother/infant relationship outcomes. However such studies did not account for, or measure, specific breastfeeding difficulties experienced by mothers in the early postnatal period in particular breastfeeding attachment difficulties manifested by nipple pain and trauma.

More recent studies demonstrate that the benefits of skin-to-skin contact between mother and baby have profound and far-reaching implications for mothers and infants, and for establishment of effective breastfeeding (Ferber & Makhoul, 2004; International Lactation Consultant Association, 2005; Kennell, 2001; Ludington-Hoe et al., 2002; Radzyninski, 2005). It is therefore important to gain further insights into the most optimal time for mothers and infants to begin skin-to-skin contact and whether it is achievable for them to remain together for a full hour. It is important also to convince midwives of the importance of skin-to-skin contact to facilitate effective breastfeeding.

This present study contributes in a unique way to unravel the inconsistencies and ambiguities of common birthing room practice that surround skin-to-skin contact. The optimal time immediately after birth for skin-to-skin contact to begin was clarified and the optimal duration of skin-to-skin contact time needed for newborn babies to coordinate instinctive feeding behaviours and begin breastfeeding spontaneously was confirmed. This present study provides direction for midwives to empower mothers to optimally assist their newborns at the first breastfeed without undermining their confidence, and in a manner that facilitates mothers to develop confidence and independence with a reduced chance of problems throughout the postnatal period.

**Suckling achievement in the first hour after birth**

The second purpose of the present study was to determine associations between duration of skin-to-skin contact and newborn sucking within the first hour after birth. The findings of this present study in the birthing room for suckling achievement are based on the commencement of ‘suckling’ as the key achievement outcome observed. Subtle differences between the terms ‘sucking’ and ‘suckling’ are not acknowledged in the literature describing infant feeding and the terms are often used interchangeably (Lau & Schanler, 1996). Indeed, ‘sucking’ on the nipple, instead of ‘suckling’ to breastfeed is a major cause of nipple pain and trauma (Braund & Amir, 2001; Webber et al., 1986; Woolridge, 1986b). Hence ‘suckling’ as correct terminology referring to the physiology of breastfeeding (Bergman, 2001c) is the term used throughout this present study to describe achievement of effective milk removal.
Evidence suggests that opportunities for newborn babies to be in skin contact enhances adaptation, coordination and orientation, and increases their ability to attach optimally to the breast and feed effectively (Kroeger, 2004; Righard & Alade, 1990; Righard & Alade, 1992; Smith, 2004; Widstrom & Thingstrom-Paulsson, 1993; Widstrom et al., 1990). In the present study, duration of skin contact greater than 30 minutes contributed significantly to suckling achievement within the hour. Two thirds of infants in the present study commenced suckling within the first hour after birth. The earliest time any baby began suckling was at the 10 minute mark and the latest at 60 minutes with the average time of 38 minutes to commence suckling.

While best practice guidelines advocate that newborn babies breastfeed within the first 30 minutes after birth (WHO.CHD Division of Child Health and Development, 1998; WHO.UNICEF, 1992; 2006c), previous observation studies have shown that if newborns are given time to follow instinctive feeding behaviour they are rarely ready to begin breastfeeding so soon after birth (Righard & Alade, 1990; Widstrom & Thingstrom-Paulsson, 1993). If babies are left alone to coordinate instinctive feeding behaviour, sequential pre-feeding behaviours of licking and mouthing precede rooting and ability to grasp the nipple and begin suckling. Widstrom and Thingstrom-Paulsson (1993) observed the coordination of feeding behaviour took from 48 to 148 minutes.

Similarly, Righard (1990) found two thirds of babies who were placed naked on their mother’s chest immediately after birth and had continuous uninterrupted skin-to-skin contact achieved suckling by about 49 minutes on average. In the separated group, naked body contact and pre-feeding behaviours were interrupted for routine procedures of weighing and bathing. A significant difference was observed in ability to achieve effective suckling within the first hour compared to the contact group.

In another study 19% of newborns assigned to suckle at birth achieved suckling at a first attempt within 30 minutes of birth and at the second attempt 3 – 22 hours later around half the babies suckled well (Widstrom et al., 1990). Of the group not assigned to suckle at birth 73% suckled well after 2 hours. However, in both groups babies were ‘put to the breast’ by hospital staff. Although naked babies and mothers did remain together for at least 45 minutes, the time lapse between birth and when skin-to-skin contact began is not clear. Results of this present study may suggest as does Righard (1990) that many newborn babies are not ready to begin sucking
soon after birth, interrupting their pre-feeding behaviour may disturb newborn suckling ability in the first hour.

In contrast to other studies investigating effectiveness of breastfeeding in the first hour after birth, a randomised control trial in the UK reported 91% of babies in a skin-to-skin contact group and 83% in a routine care group breastfed successfully for the first breastfeed within the hour (Carfoot et al., 2005). The average time from birth to breastfeed was 46 minutes. However all babies in this study were assisted to attach to the breast after being assessed by an attending midwife as meeting set criteria for ‘ready’ to begin breastfeeding. There seems to be a discrepancy between studies as to whether help to attach at the first breastfeed provided by midwives is needed or may be contraindicated. The present study explored variations in the help received by mothers and defined different levels of help.

In the present study, the average time from birth to breastfeed differed by about 10 minutes less than previous research (Carfoot et al., 2005; Righet & Alade, 1990; Widstrom & Thingstrom-Paulsson, 1993). Another difference was the proportion of infants who breastfed effectively within the hour. These may be explained by differing methods and inconsistencies used by midwives to assist mothers with attachment of their newborn to the breast.

Carfoot et al. (2005) found no significant difference between the two groups (skin-to-skin contact and routine care) for success of the first breastfeed or subsequent breastfeeds in the postnatal ward prior to discharge. This is not surprising since both groups of mothers had contact with their babies and as such, results may be confounded. Furthermore, in many cases the midwife decided to interrupt the contact and some babies were moved in response to maternal request (Carfoot et al., 2005). It may be ethically inappropriate to design a randomized study for groups with and without skin-to-skin contact. A study design measuring differences in breastfeeding outcomes between babies assisted to attach and those not assisted to attach by staff during the first hour while in continuous uninterrupted skin-to-skin contact or interrupted skin-to-skin contact may provide more meaningful results.

Recommendations from a Cochrane review comparing early or late contact for breastfeeding initiation were that interventions aimed at enhancing or delaying the time of the first breastfeed should be avoided (Renfrew et al., 2001c). However the expression used for ‘Step 4’ in both the current global criteria and in the draft document, ‘help mothers initiate breastfeeding within a half-hour of birth’ implies urgency for breastfeeding to commence within
half an hour of babies being born. (WHO.CHD Division of Child Health and Development, 1998; WHO.UNICEF, 1992, 2006c). Results of the present study inform definitions of continuous uninterrupted skin-to-skin contact between mother and newborn in the birthing room for best practice timeframes that are feasible and practical. The present study adds to our understanding of variables that may influence the success of the first breastfeed in relation to duration of skin-to-skin contact between mother and newborn.

Events observed in the present study highlight variations of maternal response to their infants at the time of birth which may naturally delay immediate naked body contact. For example, two thirds of babies (n = 33) who began suckling within the hour were held in skin contact initially but five mothers delayed handling or picking up their baby for up to 3 minutes. Since no procedures or interventions occurred before mothers held their babies they were classed as uninterrupted skin contact. As suggested for the current BFHI draft policy (ACMI/BFHI, 2004), unless there is a medical reason for extended separation, 5 minutes is a reasonable timeframe for defining uninterrupted skin-to-skin contact.

Variations in newborn suckling ability in relation to naked body contact during the first hour after birth noticed in this present study support previous research suggesting uninterrupted skin contact may play an important part in coordination of newborn feeding ability (Bystrova et al., 2003; Righard & Alade, 1990; Widstrom et al., 1996; Widstrom et al., 1990). For example, none of the babies in the present study who were separated and not placed in naked body contact with their mothers suckled within the hour. A number of babies who were in continuous uninterrupted skin contact with their mothers for at least 30 minutes also did not commence suckling within the first 60 minutes of birth. These observations have not been adequately compared with those babies who may have been separated at the outset for a short time but then remained for a long time in skin contact afterwards.

For example, in the present study, a quarter (n = 19) of babies initially separated began to suckle at the breast within the first 60 minutes after birth. Time of separation before skin contact for most babies was minimal and ranged from 1 - 9 minutes for vaginal births and 24 - 44 minutes for babies born by caesarean section. It is possible that separation for the first 10 - 20 minutes may be of little consequence to affect feeding ability. However Righard and Alade (1990) observed babies who were placed initially in skin-to-skin contact and remained with their mothers suckled more effectively than those whose feeding behaviours were interrupted.
In the present study some mothers and babies stayed together for a long period of time once settled after an initial short period of separation. Previous research examining metabolic adaptation and temperature stability in term newborns also separated mothers and babies for routine care over 10 minutes before observing babies with their mothers for 90 minutes (Christensson et al., 1992). In the present study observations ended after 60 minutes so it is not possible to accurately measure differences in the time suckling commenced between all participants.

Research with premature babies clearly suggests that coordinated newborn feeding behaviour is enhanced when skin-to-skin contact holding are practised over a long period of time (Cattaneo, Davanzo, Worku, Surjono & Echeverria, 1998; Furman & Kennell, 2000; Mandich et al., 1996; Simpson, Schanler & Lau, 2002). Researchers have also reported cases where there have been feeding difficulties and long periods of skin contact have effectively helped improve feeding coordination (Jaeger, Lawson & Filteau, 1997; Nyqvist & Ewald, 1997).

One mother/baby dyad observed in the present study experienced extreme feeding difficulties where the baby did not suckle effectively until the fifth day postpartum. This was despite a long duration of skin contact in the birthing room, postnatal ward and many episodes of help by midwives to position and attach the baby. Adverse birth events such as forceps delivery and longer than expected duration of labour can chronically disturb newborn feeding ability (Kroeger, 2004; Smith, 2004). Also health care workers’ efforts to provide full assistance to mothers by placing their hand on the back of the baby’s head to help attachment are counterproductive to newborn instinctive behaviour to breastfeed (Glover, 2005a; Noble & Bovey, 2002; Smillie, 2002; Smith, 2004). Hence mothers may need many hours of naked body contact beyond 1 hour after birth to enable the baby to become coordinated and neurologically adapted after the trauma of the birth process before being ready to suckle at the breast (Radzyminski, 2005). Further, midwives who use counterproductive methods of assistance may cause further delay to breastfeeding initiation for some mother/baby dyads (Noble & Bovey, 2002; Smillie, 2002; Smith, 2004).

A recent published report concluded that babies who do not commence breastfeeding in the first hour after birth have a higher risk of mortality (Edmond et al., 2006). However these data were in relation to a particular developing country and researchers did not report in relation to duration of skin contact or the help mothers may have received. No published work to date
sufficiently incorporates all facets of breastfeeding initiation to sufficiently inform practice. Such data could be used for quality improvement projects for practice and research.

Current tools used to describe effective suckling are inadequate as they do not embrace the factors described above. They focus on ‘correctness’ and imply that someone is at fault if it is not precisely as the subjective observer believes (Moran, Dinwoodie, Bramwell & Dykes, 2000). This approach is not helpful to maternal breastfeeding confidence. Several participants in the present study stated at interview that they felt their confidence was undermined when they were unable to attain the techniques prescribed by some midwives. There is clearly a need for improved tools to observe effective feeding in the birthing room.

**Suctioning**

Variables such as suctioning of the naso-oropharynx which can disturb newborn feeding behaviour and coordination of suckling (Widstrom et al., 1987) were not controlled for in previous research reporting timeframes newborns commence suckling after birth (Carfoot et al., 2005). Suctioning may be one variable that may account for discrepancies between research findings reported for expected suckling time after birth. For example, authors report that suctioning to remove secretions from the newborn’s mouth and nasal passages can damage the delicate mucus membranes of the oral pharynx and consequently cause oral aversion leading to feeding problems such as breast refusal (Glass & Wolf, 1994; Kroeger, 2004).

Results of the present study found any form of suction had a negative effect on newborns’ achieving suckling during the first hour. This finding is consistent with previous research (Widstrom et al., 1987). Twenty-seven percent (27%) of infants of mothers in the present study were subjected to either oropharyngeal or nasopharyngeal suction soon after birth. Considering most healthy newborns require no suction and can clear their own airways (Enkin, Keirse, Neilson, Crowther, Duley et al., 2000) the necessity of suctioning administered to some infants in the present study may be questionable.

While, routine suctioning to clear lung fluid from the nose and oropharynx of newborns at birth has been abandoned in most places for over a decade (Gunn, 2006) some midwifery and obstetric authors continue to promote it as acceptable routine practice (Farrell & Sittlington, 2003; Gilstrap & Oh, 2002; WHO UNFPA UNICEF World Bank, 2000). No clinical trials have assessed the practice of routine suctioning of the neonate who meets the criteria for vigorous within the first minute of birth and its value is uncertain (Enkin et al., 2000). Vigorous infants
with a heart rate greater than 100, who breathe spontaneously and have reasonable muscle tone would most likely score around 8 out of 10 for Apgar score according to the accepted definition (Kattwinkel, 2006).

Apgar scores at 1 minute in the present study were recorded as 6 – 7 out of 10 in 18.5% of the suctioned infants and over 8 out of 10 for the remaining 80%, suggesting that suction may have been administered hastily in some cases without attention to resuscitation assessment guidelines (Kattwinkel, 2006). Contemporary resuscitation guidelines recommend, that oropharyngeal or nasopharyngeal suctioning of the newborn is actioned only after other resuscitation actions have been unsuccessful (Kattwinkel, 2006). Findings of the present study may mean that midwives and others assisting at the birth rely on traditional hospital routines and practices without developing individual assessment and decision making skills to accurately judge the need for suction.

Intrapartum suctioning of infants born through meconium stained amniotic fluid (MSAF) has been widely practised and although controversial for some time has only recently been abandoned by the American Heart Association resuscitation guidelines (Kattwinkel, 2006; Vain, Szyld, Prudent, Wiswell, Aguilar et al., 2004; Wiswell, Gannon, Jacob, Goldsmith, Szyld et al., 2000). According to the most recent evidence, only infants who are not vigorous with meconium stained liquor should have endotracheal suctioning performed immediately after birth but otherwise do not require suctioning (American Heart Association American Academy of Pediatrics, 2006; Kattwinkel, 2006).

While no infants of mothers included in the present study required endotracheal suctioning, 10% were given naso-oropharyngeal suctioning during the birth process due to meconium stained amniotic fluid. Only 25% of these infants achieved suckling within the first hour despite 50% of them having naked body contact for at least 55 minutes and two thirds helped by midwives to position and attach to breastfeed. These results are in agreement with the evidence that interventions such as suction during and at birth can be harmful rather than helpful (Vain et al., 2004). Furthermore as Kroeger (2004) suggests, the harm associated with any suctioning negatively impacts on breastfeeding success (Kroeger, 2004).

Four infants in the present study were subjected to gastric suction which has been known to interfere with feeding behaviour (Widstrom et al., 1987). Two of these infants were born to mothers with meconium stained amniotic fluid, half the mothers had a caesarean section and
were in naked body contact with their infant for less than 30 minutes and two mothers had no skin contact with their newborn babies. While half the infants made an attempt to grasp the nipple none of them were able to attach and suckle during the first hour. The procedure of gastric suction can risk physical harm to newborns (Enkin et al., 2000; Kattwinkel, 2006). Gastric suction may be considered an assault on the newborn baby in view of disturbance to feeding behaviour when clinical indications are not clearly established (Enkin et al., 2000; Kroeger, 2004; Widstrom et al., 1987). In cases where interventions such as gastric suction are necessary for medical reasons, more attention is needed to ensure skin contact time between mother and newborn occur to facilitate coordination of feeding behaviour and neurological adaptation (Ferber & Makhoul, 2004; Nyqvist et al., 1996).

Observations from the present study of resuscitation being a factor for babies to be separated or removed suggests that the decision to use suction should be carefully and skilfully weighed up. In the present study, there may have been some cases where the baby could have stayed with the mother and not required suction. This observation highlights the need for a high level of assessment skill by midwives to enhance their accuracy and confidence in caring for the newborn. Previous research investigating effectiveness of suckling in relation to skin contact duration has not accounted for the variable of suction at birth. Results from the present study highlight variables that need to be taken into consideration for future research investigating effectiveness of suckling in association with skin contact duration.

**Analgesia during labour**

Administration of analgesia during labour may disturb newborn innate feeding behaviour and coordination of suckling reflexes (Crowell, Hill & Humenick, 1994; Radzyminski, 2005; Ransjo-Arvidson et al., 2001). Richard (1990) reported that ineffective suckling and not suckling within the hour was associated with administration of pethidine analgesia during labour. In the present study around one third of mothers received narcotic intramuscular pethidine up to 2 hours before the time of birth. Insufficient numbers and inadequate control for comparison were not able to detect the effect of pethidine upon suckling achievement in the present study. It was not possible to control for differences between epidural anaesthesia and pethidine in this present study. However several babies who experienced difficulties may have been affected by drugs administered to the mother intrapartum.
Support and assistance with breastfeeding

The third purpose of this study was to explore types of assistance mothers receive in the birth suite to initiate breastfeeding, and similarities or differences in type of assistance during the later postnatal period. An interesting finding of the present study was that hands-on help that mothers received in the birthing room to attach their babies to the breast contributed significantly to babies achieving suckling within the first hour after birth. While positioning and attachment techniques are promoted and taught in the postnatal period to improve effective feeding and alleviate common breastfeeding problems such as nipple pain and trauma, no standardised guidelines are readily available on how to help babies attach optimally to the breast in the birthing room (WHO.UNICEF, 2006b). Opinions differ as to whether to teach mothers precise principles of positioning and attachment or ‘put the baby on’ for the mother or allow babies to latch independently (Henderson et al., 2000).

Hands-on assistance

Some studies suggest that if babies commence breastfeeding within the first hour after birth, mothers tend to breastfeed for longer (Edmond et al., 2006; Salariya et al., 1978; Thomson et al., 1979). It is possible that emphasis on newborn’s feeding within the first hour after birth may influence midwives or birthing attendants to help mothers position and/or attach their babies to ensure breastfeeding begins soon after birth (WHO.CHD Division of Child Health and Development, 1998). In this present study almost half the babies were assisted to attach to the breast by hands-on assistance, i.e. being held to the breast by a midwife or grasped behind the neck while the mother’s breast was shaped by the midwife. Likewise in several previous studies assistance was given to help babies attach within the hour (Carfoot et al., 2005; de Chateau & Wiberg, 1977b). However no clear definition for level of help required was given in previous studies. In the present study some mothers reported that they expected midwives to put their babies to the breast for them, others commented that they felt midwives were interfering too soon without their permission.

In the present study a significantly higher proportion of babies achieved suckling (81.6% versus 52.5%) within the first hour in the birthing room if mothers received ‘hands-on’ help to position or attach their babies by any one of several specific actions. A hierarchy of actions to help was observed. For example, ‘hands-on’ help may have been given in the first instance by midwives touching babies to support them or to help position them close to mothers’ breasts. Secondly mothers were observed receiving assistance with attachment, by midwives holding or shaping
their breasts for them and holding babies close to their breasts. As a last resort if assistance received to position babies, attach them to the breast or to position and attach, did not result in babies achieving suckling, the back of the baby’s head was held to provide further assistance.

‘Hands-on’ help has been reported to be disempowering to mothers and some have been known to leave hospital unable to manage positioning and attachment of their babies to the breast (Cox & Turnbull, 1998; Fletcher & Harris, 2000; Inch, Law & Wallace, 2003; Wallace et al., 2006). A number of participants in the present study reported feeling disempowered when midwives ‘took over’ or acted in ways to ‘force’ babies onto the breast to feed. One mother reported, “I felt she wouldn't let me do it by myself… I felt she was doing it more for me than helping me. Then later I did it by myself.” Other mothers reported counter-productive actions that caused distress to themselves and their babies. For example, mothers described “forcing baby’s head onto the nipple”, “grabbing the baby's head” and “squeezing my nipples was excruciatingly painful”. Comments such as these from mothers suggest that perhaps some midwives do not adequately listen to mothers and first observe their ability to position the baby as well as the baby’s ability to suckle effectively before acting and touching in an unwelcome and unprofessional manner.

Holding the back of the baby’s head while attempting to feed is a major cause of breast refusal (Glass & Wolf, 1994; Kroeger, 2004; Noble & Bovey, 2002; Wolf & Glass, 1992). However inadequate attention has been given in the published literature to the forms of help mothers receive for the first breastfeed in relation to time spent holding their babies in naked body contact. The results of this study suggest that some forms of hands-on help can be counterproductive to newborn feeding ability. At least half of the infants observed in the present study whose head was held to assist with attachment refused to breastfeed at first attempt.

Previous research has not clarified levels of help that mothers receive. The present study is able to categorise hands-on help received by mothers as: 1) help to position babies at the breast for mothers; 2) help to attach babies to the breast; or 3) help to position and attach babies to mothers’ breasts for them. The present study is unique in providing definitions to inform best practice policy guidelines for various levels of help that mothers receive to begin breastfeeding at the time of birth. The definitions provided in this present study could inform future education for midwives and guide birthing room practices for managing the first breastfeed.
The present study found that a greater proportion of babies achieved suckling (56% versus 27%) within the hour if mothers received ‘hands-on’ help to attach their babies to the breast by “babies held to breast for mothers”, “babies’ necks held by tong grip” or “mothers’ breasts shaped to help babies”. This difference was significant for caesarean born babies but not for babies born vaginally. Observations of this present study suggest a certain level of hands-on help may be needed for some babies and mothers for the first breastfeed in the birthing room. On the other hand it is not possible to draw adequate conclusions from these results due to the hierarchical nature of help that mothers received which does not allow clear separation of the forms of hands-on help for analysis.

BFHI best practice standards recommend that mothers be helped to begin breastfeeding within the first hour of birth and again within 6 hours after birth (WHO.CHD Division of Child Health and Development, 1998). Although professional support and assistance to begin breastfeeding is valued by mothers and may contribute to breastfeeding duration (Hailes & Wellard, 2000; Humenick, Hill & Spiegelberg, 1998; Renfrew et al., 2000b; Scott et al., 2001; World Health Organization, 1998), some techniques used by midwives to help babies attach can be counter-productive to optimal positioning for babies to use their instinctive reflex ability to attach to the breast (Glover, 2003a, 2005a; Noble & Bovey, 2002; Smith, 2003; Wolf & Glass, 1992).

Unfortunately, diagrams and pictures designed to educate, commonly portray the mother or a helper holding the back of babies’ heads possibly with the idea that babies can be guided to the nipple if the head is held (Cadwell et al., 2002; Jolly, Phillips-Angeles & Chertok, 2005; Kitzinger, 1998; Lang, 2002; Mohrbacher & Kendall-Tackett, 2005). To the contrary, if the baby’s body is braced against the mother and the baby feels stable and comfortable, they will turn their head from side-to-side and seek their own position of optimal comfort to grasp the nipple. While individual mother/baby dyads achieve this their own way, the principles of optimal positioning for effective attachment are always the same (Glover, 2005a; WHO.UNICEF, 2006b).

**Hands-off assistance**

Half the babies in the present study who were held by their mothers in naked body contact for at least 55 minutes were given no hands-on assistance. Seventy-six percent (76%) of these dyads attached and commenced suckling within the hour which is a higher proportion than the overall study of two thirds but a lesser proportion than those who received some hands-on help to either position or attach.
Although ‘hands-off’ help is advocated for best practice (Bialoskurski, Cox & Hayes, 1999; Cox, 1998, 2000; Vogel et al., 1999), and research has demonstrated that newborn babies are capable of finding the nipple and attaching to the breast to feed effectively (Porter, 2004; Righard & Alade, 1990; Widstrom & Thingstrom-Paulsson, 1993), there is ambiguity as to how midwives should help mothers in the birthing room (WHO.CHD Division of Child Health and Development, 1998). Research investigating breastfeeding initiation is inconsistent in regards to help mothers receive to attach infants in early contact (Perez-Escamilla et al., 1994).

While some visual demonstrations show babies crawl to the breast and attach independently (Righard, 1990; Widstrom et al., 1996), such demonstrations do not inform midwives how to help mothers whose babies do not crawl to the breast and attach independently. The present study provides definitions for hands-off help that midwives can offer to mothers to encourage their newborn baby to begin breastfeeding. Instinctive positioning in the birthing room has not been emphasised as a method to help mothers in the first instance. While naked body contact is promoted for bonding between mother and newborn, optimal positioning and effective attachment for ease of breastfeeding have not been widely acknowledged amongst midwives who are with mothers at the time of birth. The present study is unique in its insights into descriptions of ‘hands-off’ help that mothers received in the birthing room during the first hour after birth.

Until the recent newly launched draft version of the policy guidelines for BFHI accreditation, assessment measures for the first breastfeed have not been clear (ACMI/BFHI, 2004; WHO.UNICEF, 2006c). Assessment relies on mothers’ reports of whether they breastfed their baby within 30 minutes to 1 hour of birth (ACMI/BFHI, 1996; WHO.UNICEF, 1992; World Health Organization, 1998, 1999). Observations from the present study offer policy descriptors to measure practices for accuracy of accreditation and these could be used by health facilities preparing for BFHI accreditation.

**Chin positioned on breast**

Another significant finding of the present study is that the position of the infant’s chin nudging under the mother’s breast contributed significantly to suckling achievement within the hour. When newborn babies are placed prone on their mother’s chest during the first hours after birth they approach the breast in the instinctive position with their chin making first contact. Infants are then able to open their mouth wide, turn their head from side-to-side, with their tongue
relaxed and down, and grasp the nipple with adequate breast tissue to suckle effectively (Widstrom & Thingstrom-Paulsson, 1993).

Instinctive positioning for optimal attachment can occur naturally without any force if the baby is prone on mother’s chest (Glover, 2005a; Gunther, 1955; Minchin, 1989). If optimal positioning as described is achieved in the birthing room for the first feed it may be that mothers will instinctively learn to work with their babies’ feeding behaviours and be less anxious about what to do. Interestingly not all babies in the present study were placed prone on their mothers’ abdomen or chest during the first hour. Indeed some midwives placed babies on their back and several on their side.

Babies placed in positions other than prone may have been disadvantaged regarding instinctive positioning for optimal attachment and some mothers may have been deprived of the opportunity to observe their newborn babies’ ability to find the breast and attach independently or with minimal assistance (Bergman, 2001a; Gunther, 1955; Minchin, 1989; Widstrom & Thingstrom-Paulsson, 1993). There may be some confusion in the minds of health professionals in regards to resuscitation guidelines where babies are placed on their back for assessment (Kattwinkel, 2006).

Some midwives may not know that when newborn babies are placed prone on mothers’ chest, they receive continual tactile stimulation which facilitates adaptation, the physiological mechanism for breathing, and to instinctively seek the breast (Radzyninski, 2005). The smell of amniotic fluid matching the odour of colostrum secretions from the breast enhances the ability of the infant to find the nipple and begin breastfeeding (Mizuno, Mizuno & Shinohara, 2004; Porter, 2004; Porter & Winberg, 1999; Varendi et al., 1994).

Observations recorded in this present study clearly demonstrate that when a baby’s chin approaches the breast first and makes firm contact, the baby is able to gape widely with tongue down, grasp the nipple and take in a mouthful of breast tissue with an asymmetrical latch. It is possible mothers may be less anxious and enabled to confidently manage subsequent breastfeeds if newborn instinctive feeding ability is pointed out in the birthing room. Reduced nipple pain and trauma may also be benefits of instinctive positioning for optimal attachment. Observations of the present study highlight reasons why some babies may not commence suckling soon after birth that may add to our understanding of breastfeeding difficulty for some mothers despite a long duration of naked body contact immediately after birth.
Effective attachment

Optimal positioning and attachment are important for adequate milk transfer to babies, effective milk removal from breasts and prevention of nipple pain and trauma (Glover, 2003a; Nursing Mothers’ Association of Australia (NMAA), 1996; Renfrew, Fisher & Arms, 2000a; Smillie, 2002). Effective attachment has been described by Newman and Pitman (2003) as an asymmetrical latch with deep rhythmical swallow-breathe-pause patterns. In the present study not all babies who appeared to suckle well in the birth room achieved an asymmetrical latch. Some babies gradually repositioned themselves to an asymmetrical latch as the feed progressed and their swallowing and suckling became rhythmical. Others did not.

Results of the present study demonstrated that the principles of positioning for effective attachment, if applied in the birthing room are instinctive for the baby and that some mothers may also behave instinctively to assist their baby in beginning breastfeeding. Findings of this present study suggest the reason for skin contact goes beyond the bonding hypothesis.

Maternal involvement

The present study found that babies of mothers who had a previous child were significantly more likely to begin suckling within the hour. This may be because mothers who have previously had children are familiar with holding the baby close against their body and this is an essential positioning factor for effective attachment. Simply learning to hold a baby close against the breast is a helpful action to allow babies to commence suckling (Glover, 2005a).

The fact that more than half the participants in the present study were second time mothers and nearly all had breastfeed previously may also have influenced maternal confidence in holding their naked newborn close. Since a large number of second time mothers in this present study had had previous breastfeeding problems, perhaps they were more open to trying different methods to assist their baby. Researchers have reported that mothers who have breastfed a baby previously are more confident about breastfeeding generally (Blyth et al., 2002; Dennis, 2003; Fallon & O’Brien, 2003; Wells et al., 2006; Xiaona & Dennis, 2003). A higher level of maternal confidence may therefore also impact on how mothers hold their babies and assist them to begin breastfeeding. This is in line with Bandura’s self efficacy theory (Bandura, 1977).

Another finding of the present study which is not featured in published research was the instinctive action of mothers while they held their babies in skin contact. Mothers who held their babies in continuous uninterrupted skin contact for at least 1 hour were significantly more likely
to position themselves or their baby for the first breastfeed. Over 93% of mothers who held their babies in continuous uninterrupted skin contact for 1 hour actively positioned themselves or their baby whereas 69% did so for naked body contact lasting 30 to less than 60 minutes, 54% for less than 30 minutes, and 29% for no skin-to-skin contact. This observation may indicate uninterrupted naked body contact from birth is important for, or could influence, maternal action. Although most of women in the present study who did not experience skin-to-skin contact with their infant had a caesarean section and therefore it may be assumed they could have difficulty positioning themselves, some attempted to position themselves for feeding in the recovery ward.

It is possible that naked contact between mother and newborn empowers some mothers to assist their newborn. This conclusion is supported by earlier studies showing mothers who have experienced even brief contact with their newborn at the time of birth tend to focus more on their babies (Taylor et al., 1985b; Thomson et al., 1979; Widstrom et al., 1990). Naked body contact between mother and newborn may give opportunities for babies to adapt and coordinate in a way that is different when they are clothed. Several mothers in the present study who had previous breastfeeding difficulties reiterated this theory during the postnatal interview.

Some mothers followed the lead of the midwife who was helping them and this may have influenced how they learnt to manage positioning and attachment for the first time. Some mothers in the present study were content to watch the actions of their newborn and take time to allow the baby to find his/her way. Others were anxious or displayed dependent behaviours expecting the midwife to attach their baby for them and made no attempt to assist their baby. For example, several mothers seemed to have unrealistic expectations of how babies may latch independently within minutes of birth and became anxious when they did not breastfeed immediately.

Maternal involvement for managing the first breastfeed after birth has not been adequately researched. Culture and socialised aspects, belief systems, the medicalization of childbirth all may have some effect on mother’s actions to assist her newborn around the time of birth (Baumslag & Michels, 1995; Blum, 1999; Esterik, 1995; Giles, 2003; Kitzinger, 2005; Palmer, 1993a; Stuart-Macadam & Dettwyler, 1995). A study which investigated practices of skin-to-skin contact between mothers and newborns at birth in 186 traditional societies found that only 14% of societies practised skin-to-skin contact between mother and newborn at birth but in nearly all societies mothers and babies stayed together after birth (Lozoff, 1983). The present
study identified some aspects of maternal involvement in breastfeeding initiation that have not been previously explored in relation to duration of naked body contact and assistance to initiate breastfeeding in the first hour of birth.

Postnatal observations

This present study endeavoured to find whether the instinctive positioning for effective attachment seen in the birthing room matched the principles of positioning and attachment for effective breastfeeding observed in the postnatal ward prior to discharge. Results of this present study demonstrated that effective suckling in the postnatal period at around 48 hours was associated with the newborn infant’s body being stabilized against their mother’s body. As the present study clearly demonstrated, if the baby is already up close and stabilised against the mother’s body with the chin firmly on the breast they are more likely to be able to attach and suckle effectively. These results concur with observations made by experts in clinical practice (Cadwell et al., 2002; Glover, 2005a; Gunther, 1955; Minchin, 1998; Mohrbacher & Kendall-Tackett, 2005; Renfrew et al., 2000a; Smith, 2004).

For over two decades, ‘correct’ positioning and attachment have been emphasised as the most important achievement for successful breastfeeding (Cox, 1996, 2002; Duffy et al., 1997; Fisher, 1994; Glover, 2003b, 2005a; Minchin, 1989; Woolridge, 1986a). Specific techniques are advocated for use in the postnatal period to help mothers learn how to attach their babies. Step-by-step instructions on how to ‘correctly’ attach their babies to the breast are provided for mothers in various books and audiovisuals (Cox, 1996, 2002; Day, 2004a; Glover, 2005a; Kitzinger, 1998; Minchin, 1985; Mohrbacher & Kendall-Tackett, 2005; Newman & Pitman, 2003; Renfrew et al., 2000a). Instructions arise from the BFHI education policy guidelines (WHO.UNICEF, 2006b; World Health Organization, 1993), and from clinical instruction to health workers who work with mothers and infants (Brodribb, 2004; Cadwell et al., 2002; Lawrence, 2005; Royal College of Midwives, 2002).

Standard instruction for positioning and attachment is for mothers to position their infant’s body against theirs to facilitate effective attachment (Fisher, 1994; Minchin, 1998; Renfrew et al., 2000a). However, wording used to describe ‘correct’ positioning and attachment in the BFHI global criteria and in instructional literature, do not emphasise holding babies close. The importance of the rooting reflex and the need for the infant to gape and then for the mother to bring the baby to the breast for proper attachment have been emphasised (Cox, 1996, 2002; Fisher, 1994; Glover, 2003b, 2005a; Minchin, 1989; Woolridge, 1986a).
Midwives commonly instruct mothers to touch their baby’s lips with their nipple to trigger the gape reflex while holding their babies at a distance and then to ‘quickly bring the baby in closer and onto the breast’ (Day, 2004b; WHO.UNICEF, 2006b, 2006c). Recent ‘fact sheets’ (Jolly et al., 2005) typically illustrate how to elicit the rooting reflex by touching a baby’s mouth with the mother’s nipple and then to ‘move baby quickly onto the breast, aiming the lower lip below the nipple’ (World Health Organization, 1993, p. 14). Such instructions are not compatible with instinctive positioning for effective attachment and may confuse some mothers or in some cases be associated with suckling delay.

Some mothers in the present study admitted having difficulty with the positioning and attachment techniques taught. Around three quarters of mothers in the present study reported a significant degree of nipple pain. When it was pointed out that attachment may be improved by holding their baby on their chest with baby’s chin resting on the breast, within easy reach of the nipple, as they did for the first breastfeed, mothers expressed a marked improvement in comfort and satisfaction in observing their baby’s feeding satiety.

This technique is not new however. Instinctive feeding behaviours and optimal positioning for effective feeding have been observed by researchers, midwives and lactation consultants for many years (Glover, 2005a; Gunther, 1955; Minchin, 1998; Widstrom & Thingstrom-Paulsson, 1993). Minchin asserts that ‘when health professionals do not understand exactly what babies do when they feed, facilitating breastfeeding is often reduced to an arbitrary set of rules and steps, of cute techniques, none of which will work for all mothers’ (1998, p. 85).

Midwives, mothers and lactation specialists have observed that common breastfeeding problems such as nipple pain, unsatisfied baby due to insufficient milk and breast engorgement could be prevented if newborns are positioned correctly at the breast and used correct suckling techniques (Fisher, 1994; Gunther, 1955; Minchin, 1989). Several mothers in the present study expressed immediate relief when shown simple measures of positioning baby close and reminded of how it was in the birth suite with baby in skin contact. Likewise at the 2 week phone interview follow-up mothers stated that the more simple technique reduced stress about getting baby on in a ‘correct’ fashion and made “all the difference” for them. However this was not true for all. Some mothers admitted they were used to bottle feeding techniques and stopped breastfeeding.
Nearly all mothers in the present study kept their baby within close vicinity to themselves and were attentive to the baby. Coulson, de Rooy and Hawdon (2003) refer to this as biological nurturing. While postnatal wards are usually very public space, at the research hospital site maternity clients are allocated single private rooms so mothers can ‘room in’ with their babies. However visitors do come and go throughout the day with only one, two hour break in the afternoons. Very few mothers held their baby in skin contact again on the postnatal ward. Many held their baby on their chest but with clothes on. It is possible that holding of the baby afterwards while wearing clothes may be as effective as skin contact. This has not been thoroughly investigated.

In the present study, a significant difference was found between mothers’ perceived need of assistance and reports that babies had been held to their breasts for them. Three quarters of mothers in the present study felt they did not need help to breastfeed or were happy with reassurance about attachment or verbal encouragement. Despite this perception, over half the mothers reported their breast had been held by another person to help attach their babies. Similarly, about 42.5% of all participants reported their baby was held to their breast to help with attachment.

Best practice standards require mothers to be helped (ACMI/BFHI, 2004; BFHI USA, 2004; BFHI.WHO, 2006; International Lactation Consultant Association, 2005; WHO.UNICEF, 2006c; World Health Organization, 1998), however descriptive assessment criteria for help may be inadequate. Techniques described by BFHI on how to help in the postnatal period are prescriptive and specific in structure. Mothers tend to perceive any help received as being supportive (Cooke et al., 2003b; Hauck, Langton & Coyle, 2002; Mozingo, Davis, Droppleman & Merideth, 2000; Raisler, 2000; Simmons, 2002).

While teaching helping techniques to midwives has proven effective in increasing breastfeeding rates (Dyson, McCormick & Renfrew, 2005; Renfrew et al., 2001a) studies have shown specifically that breastfeeding outcomes for mothers are improved when midwives are taught ‘hands-off’ helping techniques (Cox, 1998; Fletcher & Harris, 2000). No studies were found that explored relationships between helping techniques used in the birth suite and principles of positioning and attachment in the postnatal area. BFHI guidelines have, until recently, ignored this aspect.
Most mothers in the present study appreciated the help midwives gave and some reported that they expected help. For example, one mother said, “You expect them to show you some things”. Actions that mothers identified as being helpful were help with attachment, showing how by doing, encouragement and support, offering help if needed and information giving. Several mothers in the present study reported being grateful for ‘hands-on’ help in the postnatal area and felt it gave them the type of guidance they needed at the time. A quarter indicated they needed help with positioning or someone to ‘put the baby on’ for them (attachment help) or both positioning and attachment assistance.

Not all mothers felt positively about the help they received. Some mothers indicated they were “given no help at all” and midwives “did nothing to help them”. For example, one mother said, “I didn’t get help, it was not offered, all they did was say, "Oh, she looks like she’s latched on well”. To receive “no help” or a “hurried glance with a vague comment” can be perceived by mothers as unsupportive (Dykes, 2005a). Several mothers suggested that they felt the midwives were busy and so long as babies were fed during their shift “their job was done.” Some midwives may perceive that it is quicker and easier to ‘put the baby on’ for the mother than to spend time discussing aspects of positioning and attachment and observing baby suckling patterns and reassuring mothers.

Around 20% of mothers reported they felt inadequate after being given breastfeeding help. Others reported being given advice that directly contradicted advice given by a previous staff member. Comments from some mothers suggested poor and inconsistent midwifery practice and lack of communication skill, for example, one mother said, “I feel some midwives want to teach me but others are not so helpful and it’s all a bit haphazard”. Another said, “when I say it hurts they say, well she’s on now just keep her attached.” One mother who experienced a baby having difficulties latching and consequently received help from many different midwives stated, “they should have a routine checklist to go through rather than offer vague help.”

Having rarely or never seen a baby breastfeed could impact on a mother’s perceived need for ‘hands-on’ help. A lack of exposure to breastfeeding in society means children do not witness mothers breastfeeding as a normal part of daily living (Giles, 2003; Quandt, 1995). The age of women in Australia giving birth for the first time is increasing which means some women aged over 30 may have never held a newborn baby or seen a baby feed from the breast (Australian Bureau of Statistics (ABS), 2003b; Queensland Health, 2005). Maternal breastfeeding confidence can also be undermined by marketing of breastmilk substitutes (Baumslag &
Michels, 1995; Dykes, 2002) which may contribute to mothers feeling dependent on midwifery staff to guide them with breastfeeding. Furthermore, hospital policy and protocols, and antenatal information given to mothers promote the role of midwives in regards to breastfeeding assistance (Palmer & Kemp, 1996).

Interview data from the present study affirmed some practices but also raises some challenges for midwives to reflect on how they may improve practice for quality service delivery to mothers who plan to provide human milk for their offspring.

**Maternal breastfeeding confidence**

The fourth aim of this present study was to determine whether duration of skin-to-skin contact impacted on maternal breastfeeding confidence at 2 weeks post partum. Assistance received by mothers in the birthing room may impact on confidence so the study also aimed to report confidence mean scores in relation to ‘hands-on help’ received by mothers. The study also aimed to compare confidence and breastfeeding outcomes reported in previous studies.

**Confidence and skin-to-skin contact duration**

Although mothers who held their naked babies on their bare chest for 30 minutes or longer in the first hour after birth, had higher mean BSES-SF scores at 2 weeks, compared to those who held their naked babies on their bare chest for less than 30 minutes or not at all, differences were not significant. Likewise mean scores for perception of milk adequacy increased with longer duration of skin contact but differences between the two groups were not significant.

Some factors influencing this finding may relate to midwifery practices in the birthing room at the time. For example, confidence could be related to whether or not the midwife or health professional pointed out newborn feeding behaviour and abilities to the mother; the type of assistance provided; or the level of skill employed to help the baby attach to the breast. Although the present study explored events and occurrences around assistance received, duration of naked body contact, and infant feeding ability within the first hour, the small sample did not allow for adequate numbers to control for all possible variables in analysis.

Previous studies have not measured maternal breastfeeding confidence or perception of milk adequacy in relation to duration of skin-to-skin contact during the first hour of birth. It may be inappropriate to focus only on events of the first hour after birth when it is known that the
effects of naked body contact between mother and newborn are many and varied and may be utilized to 6 hours after birth and beyond (Nyqvist & Ewald, 1997; Nyqvist, 2004; Radzyminski, 2005). Associations between duration of skin-to-skin contact and maternal breastfeeding confidence need further investigation with larger samples and more stringent variability control.

**Confidence, positioning and attachment assistance**

The present study found that confidence scores of mothers who received ‘full assistance’ to position and attach their babies in the birthing room decreased compared to mothers who had not. This finding supports previous research that suggests maternal confidence may be undermined if they receive excessive ‘hands-on help’ to position and attach their infants for breastfeeding (Cox, 2000; Cox & Turnbull, 1998; Fletcher & Harris, 2000; Glover, 2005a; Smillie, 2002; Smith, 2004).

‘Full assistance’ is a term commonly used by midwives to document and describe the level of assistance needed to help babies attach to the breast and begin suckling. Levels of ‘hands-on’ help observed in the present study were defined as touching babies to position them, shaping or touching the mothers’ breasts to assist babies attach or holding babies to mothers’ breasts for them in several different ways to assist with attachment. ‘Full assistance’ is defined as ‘hands-on help’ to position and attach, meaning mothers are helped by midwives handling babies to position and attach them, and mothers’ breasts are handled to facilitate attachment. Around one quarter of participants in the present study received ‘full assistance’ to initiate breastfeeding in the birthing room. No research to date has defined and examined the various aspects of help mothers receive in the birthing room to begin breastfeeding their newborn babies.

As described earlier, while assistance received may have resulted in babies commencing suckling, particular aspects of ‘hands-on’ assistance may undermine maternal breastfeeding confidence and these effects may be lasting. It could be that low maternal confidence and common breastfeeding problems are perpetuated by poor midwifery practice. It could be argued that the effects of low confidence in regards to breastfeeding may be generalised by some women to other aspects of mothering or everyday life. Some mothers who perceive that they ‘failed’ at breastfeeding may experience difficulty overcoming adjustments associated with learning other new skills. This proposition is supported by Bandura’s (1977) theory of self efficacy which suggests that perceived failure can inhibits an individual’s ability to overcome other challenges.
Findings of the present study support a ‘hands-off’ approach when assisting mothers to learn how to breastfeed in line with the recommendations of other researchers (Cox, 2000; Cox & Turnbull, 1998; Fletcher & Harris, 2000; Glover, 2005a; Smillie, 2002; Smith, 2004). Results suggest that specific ‘hands-on help’ actions received by mothers affected breastfeeding confidence beyond the immediate postpartum. Several mothers reported their confidence was undermined by midwives ‘shoving’ the baby onto the breast and interfering without giving mothers the opportunity to ask questions or learn at a time they were most open to learning about their baby’s feeding ability. Adverse reports by mothers strengthens the argument that inappropriate, unskilled handling of newborn babies or mothers’ breasts by health workers is counterproductive to effective breastfeeding (Noble & Bovey, 2002; Smith, 2004). Results of the present study also suggest that naked body contact in the birthing room may impact on postnatal breastfeeding outcomes including nipple pain, trauma, ease of managing positioning and attachment, and maternal confidence.

**Previous breastfeeding experience**

The present study identified several differences between primipara and multipara women. Similar to the work of others using the BSES-SF (Dennis & Faux, 1999; Torres et al., 2003; Xiaona & Dennis, 2003), the present study found mean confidence scores of multipara mothers with previous breastfeeding experience were higher than primipara and mothers with no breastfeeding experience. However, differences between the two groups were not significant at 2 weeks or at 3 months. Previous researchers found differences between groups sustained to 4 months (Blyth et al., 2002; Creedy et al., 2003).

It could be that current successful experience over-rides the benefits of previous experience. For example, perhaps primipara who held their naked baby at the time of birth and observed newborn feeding abilities increased confidence quickly by 2 weeks thus reducing variability of mean confidence scores. On the other hand the non-significant difference at 2 weeks and beyond may be attributed to lower mean confidence scores of a number of mothers who previously experienced breastfeeding difficulties or who may have stopped breastfeeding sooner than 1 month postpartum previously.

Wells et al. (2006) reported lowest antenatal breastfeeding confidence scores amongst women who had previously breastfed for less than 1 month and mothers who had fed their babies artificial baby milk (ABM). Ertem, Votto, & Leventhal (2001) identified maternal confidence as a predictor of early breastfeeding cessation before 2 weeks. Their model showed only
confidence was related to the outcome of continued breastfeeding at 2 months and recommended that interventions should focus on increasing mother's confidence in breastfeeding as well as taking into account the role of the infant on the duration of breastfeeding (Ertem et al., 2001).

Very little information is available in the research literature for breastfeeding outcomes at 2 weeks post partum. Several mothers in the present study stated that follow-up by phone call at 2 weeks was good timing for them. The 2 week time period should perhaps be considered as an important period for future breastfeeding research.

**Birth type**

Unlike previous studies, experiencing either a vaginal birth or caesarean section did not significantly affect breastfeeding confidence or perception of milk adequacy at any time point. Previous studies have found mean score differences between mothers undergoing caesarean section birth and those giving birth vaginally (Blyth et al., 2002; Creedy et al., 2003; Dennis & Faux, 1999; Torres et al., 2003; Xiaona & Dennis, 2003).

**Extent of breastfeeding**

The present study differed from previous research by assessing the extent of breastfeeding at various time points. Whereas previous researchers found consistent mean score differences in confidence between three groups of mothers exclusively, partially or not breastfeeding at each time point, the present study did not. Differences could be explained by the study sample. For example, sample size of the present study was smaller than previous studies with over 100 (Dennis & Faux, 1999; Dennis, 2003; Torres et al., 2003; Wells et al., 2006; Xiaona & Dennis, 2003) and up to 300 participants in one study (Blyth et al., 2002; Creedy et al., 2003). Also the breastfeeding rates in the Australian population are higher than in the US and other countries where other studies were conducted (Saadeh, 2004; WHO, 2003). While all mothers in the present study were breastfeeding at discharge, around 10% were partially breastfeeding. Other studies examining postnatal outcomes measured breastfeeding extent at 1 week postpartum and all reported a number of mothers providing ABM for their babies and not breastfeeding (Blyth et al., 2002; Creedy et al., 2003; Dennis & Faux, 1999; Dennis, 2003; Torres et al., 2003).

Figures for breastfeeding extent at 2 weeks postpartum were higher in the present study than those reported at 1 week in an Australian study (Blyth et al., 2002; Creedy et al., 2003). This difference may bring into question the most suitable time to measure breastfeeding extent.
Although all mothers in present study sample intended to breastfeed and naked body contact practices were not reported by Blyth et al. (2002), contrasting extent of breastfeeding between Australian studies suggests that naked body contact between mother and newborn at birth positively influences duration of breastfeeding. A large Polish study reported that as little as 20 minutes of naked body contact during the first hour of birth increased breastfeeding duration (Mikiel-Kosryra et al., 2002). However breastfeeding rates figures reported are those of the study participants only, and general breastfeeding rates in the area are not reported for comparison.

Different data collection timeframes could also account for variations in extent of breastfeeding and self-efficacy. For example, in the present study the BSES-SF was administered during the antenatal period, at 2 weeks and 3 months. In comparison, Dennis (2003) administered the BSES-SF during the first week postpartum and again at 4 and 8 weeks, while the original BSES study (Dennis & Faux, 1999) and a replication study (Dennis & Faux, 1999; Torres et al., 2003), administered the BSES at 1 week postpartum week and again at 6 weeks postpartum. In an Australian study the BSES was administered during the antenatal period, at 1 week and 4 months postpartum (Blyth et al., 2004; Blyth et al., 2003b; Creedy et al., 2003). Clear comparisons may not be possible with such differing data collection times.

Some differences may be attributed to slight variations in the recent short form version of the tool. Or perhaps terminology used in the breastfeeding self-efficacy tool developed by Dennis (2003) such as "I can breastfeed my baby" tends to focus on maternal ability. While this may be in line with Banduras (1977) self-efficacy theory, an emphasis on how well mothers manage breastfeeding ignores newborn feeding ability. Mothers in the present study who took time to observe their baby’s feeding behaviour expressed amazement at how well their newborn baby could achieve suckling with very minimal or no interference. Mothers comments, such as “I didn’t know”, “I couldn’t believe”, “I’ve never seen”, “I never had that before”, “I was amazed at how clever he/she was”, “she did it all by herself” could mean that when given the chance to observe infant ability to physically achieve attachment and suckling, mothers’ perception of their own success is boosted. Perhaps authors could consider further revising the wording of some BSES-SF questions to emphasize confidence in newborn baby’s ability to breastfeed (Dennis, 2003). Likewise with the recent tool designed to measure breastfeeding confidence in the antenatal period, some questions could be reworded (Wells et al., 2006).
Suggestions have been made that the BSES could be used during the antenatal period to identify those mothers with less confidence and intervene (Blyth et al., 2003a; Blyth et al., 2004; Blyth et al., 2002; Creedy et al., 2003; Wells et al., 2006). To date no published reports have been found of this being done. It could be that antenatal care is loaded with information on many aspects of parenting and preparation for childbirth, that breastfeeding issues are not given priority (McFadden, Renfrew, Dykes & Burt, 2006; Renfrew, McFadden, Dykes, Wallace, Abbott et al., 2006; Renfrew, 2005; Smale, Renfrew, Marshall & Spiby, 2006). It is possible that midwives do not give breastfeeding sufficient attention proportionate to other care required.

Existing antenatal documentation on breastfeeding is poor, without adequate space or time allotted to document breastfeeding history adequately, or whether mothers have received specific breastfeeding information, and shown positioning and attachment principles (for example, Queensland Health PHHR). Interventions to improve breastfeeding outcomes are commonly introduced in the antenatal period or focus on managing breastfeeding problems in the postnatal period. In comparison few birthing room interventions for improved breastfeeding are implemented. While maternal breastfeeding confidence may be identified antenatally to identify problems and set up plans to follow mothers, currently the period of time in the birth suite for the first breastfeed is not being given adequate attention.

It is well established that women with higher levels of breastfeeding confidence expect to breastfeed for longer (Blyth et al., 2003a; Chezem et al., 2003; Dennis, 2003; Papinczak & Turner, 2000). Interventions to boost maternal breastfeeding confidence during the postnatal period have been shown to increase maternal confidence to breastfeed (Cox, 1998; Cox & Turnbull, 1998; Fletcher & Harris, 2000; Papinczak & Turner, 2000). Dennis (2003) suggested that the BSES-SF maybe a guide to devising interventions to facilitate breastfeeding success or encourage breastfeeding beyond 2 – 4 months.

Several researchers have recommended that breastfeeding confidence measures be used to assist healthcare administrators devise interventions or plan effective breastfeeding programs for mothers who may be at risk of stopping breastfeeding earlier than they wish (Blyth et al., 2003a; Blyth et al., 2004; Blyth et al., 2002; Creedy et al., 2003; Dennis, 2003; Wells et al., 2006). Research is needed to determine whether interventions that increase maternal breastfeeding self-efficacy can alter breastfeeding outcomes (Dennis, 2003). Results of the present research study provide evidence for interventions in the birthing room. With current short hospital stays it makes practical sense to focus on interventions that would most likely increase mothers’
breastfeeding confidence. This present study is unique in the exploration of skin-to-skin contact duration in the birthing room, and associations with help mothers receive for infant suckling success and maternal confidence outcomes.

**Inadequate milk supply**

Thirty-eight percent (38%) of multiparous mothers recruited in the present study reported insufficient milk as a problem when breastfeeding their first baby. Mothers determined ‘insufficient milk’ by baby not gaining weight, baby demanding extra feeds, crying irritable baby, advice from family health nurse, and breasts feeling empty or smaller. Similar perceptions have been reported by other researchers (Amir, 2002; Binns & Scott, 2002). Women commonly report the main reason for stopping breastfeeding before they planned is inadequate milk supply to meet their baby’s nutrition and satiety needs which leads to a lack of breastfeeding confidence (Akre, 1989; Fetherstone, 1995; Hill & Humenick, 1989; Papinczak & Turner, 2000).

Previous research using the H&H scale reported that mothers who sustained breastfeeding and did not perceive insufficient milk also reported high infant satiety (Hill & Humenick, 1996) and that maternal satisfaction with infant breastfeeding was negatively associated with breastfeeding status (Punthatharith & Singh, 2005). When milk transfer from breast to infant is adequate infants are more likely to be satiated (Mulder, 2006; Newman & Pitman, 2003; Shrago & Bocar, 1990). Research has demonstrated that hormones to increase milk supply are increased when mothers hold their naked newborn against their bare chest and breastfeed (Matthiesen et al., 2001; Nissen et al., 1995b; Uvnas-Moberg et al., 1990).

Results of this present study concur with previous research suggesting hours of naked body contact between mother and newborn can improve newborn ability to latch well and effectively remove milk from the breast (Ludington-Hoe & Swinth, 1996; Righard & Alade, 1990; Righard & Alade, 1992). Furthermore previous research suggests maternal breastfeeding satisfaction scores may predict maturity of mothers’ milk at 6 weeks which makes sense physiologically (Hill & Humenick, 1996).

Several mothers participating in the present study reported that they felt their milk supply was much improved compared to previous breastfeeding experience/s. Perception of insufficient milk is a common problem that could be mitigated by naked body contact between mother and newborn at birth. Previous research has shown that the majority of cases of low milk production
can be resolved by simple advice and support (Renfrew et al., 2000b). Indeed fewer than 2% of cases in a study of over 460 women referred to a breastfeeding clinic in Bristol, UK were attributed to pathophysiological failure of milk production (Woolridge, 1995). While it is currently not possible in practice to differentiate between physiological inability to produce milk and other manageable causes of lactation failure, with advancing technology, diagnosis of specific problems may be possible in the future (Daly et al., 1996; Kent, Mitoulas, Cregan, Ramsay, Doherty et al., 2006; Ramsay et al., 2005; Ramsay, Kent, Owens & Hartmann, 2004)

Government policy for promoting breastfeeding recommends targeting primipara mothers with the assumption that less effort should be required for second time mothers who are more experienced and knowledgeable (World Health Organization, 2003). Furthermore assertions are made that once a second time mother has decided not to breastfeed it is best to accept their choice and focus on the first time mother who requires a greater degree of assistance and support (Queensland Health, 2003b). This approach ignores the likelihood of successful subsequent breastfeeding experiences. Two multiparous mothers in the current study had no prior breastfeeding experience. Breastfeeding promotion and education strategies targeting primarily first time mothers do not make allowances for those mothers who may have chosen to not breastfeed but for a subsequent pregnancy may wish to attempt breastfeeding.

More than half the participants in this present study had previously breastfed an infant and a large number had experienced difficulties with their first attempt and stopped before they really wanted to. Many of these mothers expressed gratitude for participating in the present study where they were exposed to best practice and informed about instinctive positioning and attachment for effective suckling. Results of the present study confirm that many hospital practices do not meet best practice standards for care of lactating mothers and their infants. Mothers receive conflicting and poor breastfeeding advice, and some midwives have knowledge and practice deficits in lactation and infant feeding (Auerbach, 2000; Cantrill et al., 2004; Cantrill, Creedy, Cooke, Dykes & Chaseling, 2005b; DiGirolama et al., 2001; Henderson et al., 2000; Huffman, Zehner & Victora, 2001; Merewood & Philipp, 2001; Sinusas & Gagliardi, 2001).
Breastfeeding outcomes

The final purpose of this study was to explore associations between duration of skin contact, confidence levels and breastfeeding outcomes such as nipple trauma and pain, and extent of breastfeeding at 2 weeks after birth and beyond. At time of discharge, babies of all participants were breastfeeding or fed breastmilk. Ninety percent (90%) of babies were exclusively breastfeeding and 10% partially breastfeeding. The hospital discharge breastfeeding rate was similar to the population of mothers attending the hospital at the time and the population of mothers in Queensland (Queensland Health, 2003a, 2005).

One notable finding of the present study was a significant relationship between duration of skin contact in the birthing room and no visible nipple trauma at the breastfeed observed prior to discharge. Mothers in the present study who experienced nipple pain during the breastfeed were significantly more likely to have visible nipple trauma. Persistent nipple pain is associated with poor attachment and nipple trauma (Glover, 2005a; Hill, 1993; Minchin, 1998; Newman & Pitman, 2003; Tait, 2000; Woolridge, 1986a). In the group of births observed in the present study, two thirds of mothers reported nipple pain at the beginning of a breastfeed at around 48 to 72 hours postpartum. Slightly fewer mothers experienced nipple pain during a breastfeed and 43% reported visible nipple trauma which was verified by the researcher on interview and observation prior to discharge.

The understanding that poor attachment to the breast causes nipple pain and damage has been known for many years (Glover, 2005a; Hill, 1993; Minchin, 1998; Newman & Pitman, 2003; Tait, 2000; Woolridge, 1986a). Gunther (1955) observed and defined effective suckling as ‘when a baby takes the breast [s]he draws the nipple to the back of the mouth, and the gums, lips, and tongue hold and work on the yielding tissues underneath the areolar and behind the nipple (pp.575-6). Gunther (1955) proposed that babies who feed poorly need to have their position at the breast improved so that they can take in more of the underside of the breast for full oral stimulation. Webber, Woolridge and Baum (1986) confirmed these observations by ultrasound and more recently Ramsay and Hartmann (2005) used advanced ultrasound technology to view the suckling activity of babies at the breast for effective milk removal. Ramsay and Hartmann (2005) reported that some babies do different things with the mouth not always identifiable by the most experienced observant lactation consultant.
The notion of instinctive positioning for optimal attachment to protect the nipple from pain is not new (Cadwell et al., 2002; Cox, 1996; Fisher, 1994; Glover, 2005a; Minchin, 1989; Mohrbacher & Kendall-Tackett, 2005; Renfrew et al., 2000a). Fifty years ago, Gunther (1955) recognised the instinctive positioning of the baby at the breast to enable a full grasp all of the nipple and a large mouthful of breast tissue from underneath the breast. Lactation consultants now describe this as an asymmetrical latch (Cadwell et al., 2002; Cox, 1996, 2002, 2004; Glover, 2005a; Kroeger, 2003; Minchin, 1989; Mohrbacher & Kendall-Tackett, 2005; Newman & Pitman, 2003; Noble & Bovey, 2002; Smillie, 2002; Weissinger, 1998).

Gunther (1955) further noted that the vigorous response of the baby fades if full stimulation has not been experienced by the baby within 3 days postpartum. She advocated that the wakefulness of the baby after birth be utilised to offer the first breastfeed. Naked body contact between mother and newborn at birth (and beyond) to facilitate optimal positioning for effective attachment and positioning may be the key to improving breastfeeding. While the current emphasis on attachment and positioning has shown some improvement in successful breastfeeding rates there seems to remain an ongoing problem of sore or painful nipples and indeed nipple trauma. The present study found that a quarter of participants had both nipple pain and trauma. Visible trauma to the nipple has been described as blistered, bruised, grazed, cracked, bleeding or compressed/ridged (Riordan, 2005). When a baby’s attachment at the breast is improved or optimised by adjusting position of the baby at the breast, nipple pain can be reduced and trauma to the nipple healed unless there are other underlying pathological problems (Minchin, 1998; Page et al., 2003; Shrago, 1992; Weigert, 2005; Woolridge, 1986a).

The problem needing to be solved is, how is optimal attachment for effective feeding best achieved? Is it the baby? Is it the mother or perhaps the midwife who must ensure ‘correct’ attachment? Woolridge suggested the midwife is responsible to teach mothers as do BFHI guidelines (WHO.CHD Division of Child Health and Development, 1998; Woolridge, 1986a, 1986b). Bergman assures it is the baby and the mother is required to hold her baby in such a way to optimise breast into the baby’s mouth (Bergman, 2001a). Results of the present research prompt further review of breastfeeding initiation practices and ‘Step 4’ of the BFHI steps to embrace current research.

Both nipple pain at the start of the breastfeed and during the breastfeed were associated with nipple trauma. A higher percentage of mothers who experienced nipple pain during a breastfeed also had visible nipple trauma (71% compared to 24%). This observation suggests that if nipple
pain persists during the breastfeed, attachment is not optimal and the baby’s tongue position in the mouth is most likely causing some pinching of the nipple and subsequent trauma (Glover, 2005a).

As discussed earlier, the present research provides evidence to suggest a ‘hands-off’ approach to help mothers position and attach their babies to commence breastfeeding in conjunction with longer duration for skin-to-skin contact may boost maternal confidence at breastfeeding initiation. Potential outcomes could lead to reduced incidence of nipple pain and trauma in the postnatal period and improve mothers’ skill to manage lactation and infant feeding. Mothers’ improved breastfeeding skill and independence could prevent problems and ultimately reduce the workload of health care professionals who are currently required to address breastfeeding problems in the postnatal period.

**Extent of breastfeeding at 2 weeks**

During the follow-up telephone interview at 2 weeks postpartum, 86% of babies (of observed births) were breastfeeding or fed any breastmilk, 73% percent were being fed breastmilk exclusively or fully breastfeeding and 13% were partially breastfeeding. For the entire group of participants, overall percentages were slightly higher for any breastfeeding (93%) and exclusively breastfeeding (80%). Less than 10% of babies were being fed artificial baby milk (ABM) or no longer breastfeeding. Records for duration of skin contact for births not observed were not accurately recorded so it is not possible to make meaningful conclusions about duration of skin contact and extent of breastfeeding at 2 weeks.

In Australia, breastfeeding rates are mainly through a five yearly National Health Survey where mothers self report. Compared to the 2001 National Health Survey in Australia for infants under 3 months, a higher percent of babies in the study were exclusively breastfed (93% versus 64%) and half as many were no longer breastfeeding (8% versus 16%). Figures for partial breastfeeding of around 12% were comparable with the under 3 month reported in the National Survey report (ABS, 2003b). Comparisons may not be adequate and brings to light a need for improved methods and means to report accurate and timely breastfeeding rates and outcomes in Australia.

Most mothers (82%) in the study planned to breastfeed for more than 3 months. Results of the present study suggest that naked body contact between mother and newborn at birth may enable mothers to manage breastfeeding according to their intention. A Cochrane review of three
experimental studies found no differences between early and delayed contact in regard to breastfeeding duration (Renfrew et al., 2001c). However since that time, one study of a large cohort of women (n = 1020) in Poland has reported a significant difference in the magnitude of effect on both exclusive breastfeeding duration and any breastfeeding by duration of contact in the first hour (Mikiel-Kosryra et al., 2002). Furthermore breastfeeding duration for 53 mothers in the present study who maintained skin contact for over 30 minutes at the time of birth was more than 3 months longer than those who had no skin contact at all.

Although Australian breastfeeding rates are generally considered high in comparison to other developed western countries, accuracy in data collection for breastfeeding rates remains problematic (Saadeh, 2004). In Queensland, for example, the perinatal data collection sheet has one open ended question on breastfeeding which is not adequate to capture accurately the extent of exclusive and partial breastfeeding in hospital or on discharge. Hence Queensland Health yearly reports on breastfeeding do not inform quality improvement of hospital services or provide a useful baseline comparison of sustained breastfeeding for community services, other hospitals or for State comparisons. Clearly a review of data collection procedures for breastfeeding outcomes is needed at the hospital level within Queensland Australia (and perhaps for other States as well).

Accuracy of breastfeeding outcomes and extent of breastfeeding in relation to best practice standards of care are not generally reported. Reports focus on breastfeeding rates to the exclusion of other influencing practices (DiGirolama et al., 2001). Given the increasing interest in BFHI hospital accreditation and the number of hospitals in Australia recently accredited, a system could be in place whereby hospitals planning to be accredited and needing to sustain accreditation could monitor and report relevant long-term practices. However in Australia the tools purporting to provide this information are outdated and do not adequately measure practices for accurate reporting but are currently under review (ACMI/BFHI, 2004).

Tools prepared by WHO are insufficient in that duration of skin-to-skin contact is not measured, only the timing of the first breastfeed within the first hour of birth is requested (World Health Organization, 1999). These tools rely on interviews with mothers to elicit information. No allowance is made for documentation of staff observation. In the case of naked body contact at the time of birth, accuracy of information may not be specific as mothers generally do not accurately recall timeframes so soon after birth (Cantrill, 2004). The tools developed in the present study could overcome these problems and be used for BFHI accreditation and quality
improvement using the research process and this could make for more sustainable BFHI practices (Cadwell, 1997; NHMRC, 2003; Philipp et al., 2003; World Health Organization, 1999).

In the UK, BFHI assessment and sustaining tools were recently updated to embrace community services (UNICEF UK Baby Friendly Initiative, 2001) but the cost of purchasing these tools for the purpose of review for the present study was not possible. In the original UK version, the section measuring duration of skin contact was not useful. It asked for the time skin contact began and the time it ended in the birth suite. There was no record of practices in relation to naked body contact which may have occurred before and after, and the help mothers received. Furthermore midwives involved in this present study were non-compliant in documenting time of skin contact beginning and ending as they found it impractical and that other birth events mostly took priority (Cantrill, 2004). Data collection methods used in the present study could be adapted for improved documentation procedures of everyday practices which would provide meaningful useable data for quality and service improvement and for reporting breastfeeding outcomes in relation to other best practices.

Around 20% of participants in the present study were uncertain about how long they would breastfeed and commonly answered, “as long as I can”. One mother planned to breastfeed for less than 2 weeks and three mothers planned to breastfeed for less than 3 months. At 2 weeks just under half (46.2%) of the mothers who were breastfeeding reported expressing breastmilk and all of these reported experiencing at least one common breastfeeding difficulty. This finding may indicate the importance of offering mothers information on expressing breastmilk and offering to show them how to express breastmilk by hand. The finding may also suggests that some mothers express breastmilk as a result of breastfeeding difficulties.

Over 90% of mothers who expressed breastmilk used either a manual or electric breast pump. BFHI best practice guidelines require that mothers be educated on how to hand express breastmilk (WHO.CHD, 1998). Hand expressing can help stimulate the breast to improve milk supply (Marinet, 1998). A quarter of mothers expressing breastmilk fed the expressed breastmilk (EBM) to their babies using bottle teats. Bottle teats used to feed babies in the early postnatal period can interfere with effective suckling techniques and exacerbate existing suckling difficulties (Anderson, Guthrie, Alder, Forsyth, Howie et al., 2001; Neifert, 1995). None of these mothers reported continuing to have skin-to-skin contact during the postnatal period in hospital or once they left hospital. The lack of hand expression and skin contact
amongst mothers experiencing problems at 2 weeks suggests a lack of continuity of follow-up and inconsistency of information being provided to mothers in the postpartum.

**Breastfeeding observation tools**

Existing tools to measure birthing room breastfeeding practices and outcomes are inadequate. The present study developed and tested several tools to assess maternal knowledge of skin-to-skin contact, newborn feeding ability in the birthing room, mothers’ perception of help received to initiate breastfeeding, and maternal independence to manage breastfeeding in the postnatal period. While several tools have been useful for recording effectiveness of feeding they do not embrace baby feeding ability and pre-feeding behaviour to observe the whole picture of effective positioning, attachment and suckling (Jensen, 1994; Matthews, 1993; Medoff-Cooper & Gennaro, 1996; Nyqvist et al., 1996). As such, tools in existence do not adequately capture birthing room events for conclusions to be drawn about the effects of skin-to-skin contact duration on effectiveness of breastfeeding. Tools devised in this present study capture a comprehensive range of events applicable to both birthing room and subsequent feeding, and advance current existing tools that observe effective breastfeeding. Thus a more accurate picture of clinical practices employed to support breastfeeding initiation at birth and in the early postnatal period is captured.

**Women’s knowledge of skin-to-skin contact**

Although best practices recommend that pregnant women be informed about breastfeeding during the antenatal period, information about skin-to-skin contact has not been consistently promoted. Instead information given antenatally is focused on benefits of breastfeeding and management of positioning and attachment. The tool to specifically measure women’s knowledge of skin-to-skin contact is unique to this present study.

**Birthing room observations**

The birthing room observation tool developed in the present study aims to capture comprehensive observations of where babies are placed once born, any resuscitation or routine interventions, newborn feeding behaviour, actions mothers take to assist their newborn begin feeding, and help mothers receive with positioning and attachment. ‘Step 4’ of the ‘10 BFHI Steps’ to best practice remains problematic to achieve consistency of practice (BFHI, 1999; Cantrill, 2005; Merewood & Philipp, 2001). Data required by BFHI accreditation to measure this practice are inadequate and ask only for the time skin contact commenced and ended with
no supporting relevant information except to ask mothers in the postnatal period whether they held their newborn in skin contact and for how long (ACMI/BFHI, 1996, 2004). Mothers are generally not able to recall the events clearly therefore more meaningful information is needed (Cantrill, 2004). The tool devised for the present study provides useful detail for the purpose of overcoming current practice and knowledge barriers that hinder naked body contact between mother and newborn in the birthing room.

**Mothers’ perceptions of help received**

Best practice standards advocate that mothers be offered help to breastfeed (BFHI.WHO, 2006; World Health Organization, 1998). However, there is no mechanism to evaluate mothers’ perceptions of the help they receive. It is assumed all mothers require assistance to begin breastfeeding but the degree and type of assistance needed at the first breastfeed is not clearly defined. Assistance described in various education resources is inconsistent and tend to be overly technical (Cox, 1996, 2002; Glover, 2005a; WHO.UNICEF, 2006b; World Health Organization, 1993). The tool devised for the present study provides insights to inform best practice regarding assistance offered to mothers.

**Postnatal observations**

The postnatal breastfeeding observation tool (PBOT) developed and validated in the present study is a comprehensive measure of maternal independence to manage breastfeeding. While other tools have not been validated or may give only a partial view of the overall effectiveness of breastfeeding (Jensen, 1994; Matthews, 1988; Moran et al., 2000; Riordan, 1997; Tobin, 1996; Weissinger, 1998) the PBOT has been validated as reliable with a high inter-rater reliability between skilled, knowledgeable midwives (Cantrill et al., 2005c). Unlike previous breastfeeding observation tools the PBOT uses best practice principles based on physiology of breast function and newborn feeding behaviour as observation cues.

The tool captures the same principles of feeding behaviour seen in the birthing room rather than individual tasks. Furthermore the tool measures the continuance of naked body contact beyond birth and offers structured support without a midwife touching the woman’s breasts or baby. Having someone watch their baby breastfeed and confer with them as to how well the baby was feeding or what the mother may do to improve the situation was identified by mothers in this present study as supportive. At the postnatal interview and observation, one mother stated, “this is the best she’s ever fed … we were both fighting for the nipple before … this is a 100% improvement”. In the current observation study the researcher observed the breastfeed and
recorded all information on the PBOT before discussing or reviewing any aspect of the feed in progress with mothers. While other tools may encourage health professionals to view a breastfeeding at each shift, mothers can become dependent on assessment by a health professional, and confidence in their own judgment of effective baby feeding can be undermined. This is particularly so when health professional’s knowledge and experience is lacking (Dykes, 2006; Hill & Humenick, 1996; Humenick et al., 1998; Mary J. Renfrew 2006; Woods et al., 2001). The PBOT provides an avenue for comprehensive assessment of babies’ breastfeeding in hospital before discharge and as such potential problems can be identified and follow-up care offered.

In summary, the results of this present study provide evidence that duration of naked body contact between mother and newborn in the first hour after birth along with instinctive positioning of the baby at the breast contributes significantly to newborn suckling ability. The present study extends the findings of others (Righard & Alade, 1990; Widstrom & Thingstrom-Paulsson, 1993) in identifying the adverse impact of several modifiable practice variables on feeding behaviour and suckling coordination for effective breastfeeding. The observation tools used in the present study inform best practice guidelines for timetables to begin breastfeeding and assistance required. The exploratory nature of the present study also extends the current understanding of how positioning and attachment is taught to mothers by incorporating principles of instinctive positioning seen in the birthing room to subsequent breastfeeds and ongoing management (Cadwell et al., 2002; Cox, 1996, 1998; Glover, 2005a; Smillie, 2002).

**Limitations of the study**

The present study has several limitations. These are concerned with sample size, design, ‘Hawthorn effect’, adequacy of tools, multicollinearity and investigation of predictor variables.

The sample size was small in view of the number of variables to be investigated, leaving insufficient numbers for adequate analysis in some matters. However similar studies observing newborn behaviour at the time of birth have also used small numbers, some as few as 12 or 25 participants (Widstrom & Thingstrom-Paulsson, 1993; Widstrom et al., 1990). Although numbers recruited were considered adequate and allowed for losses, the sample diminished excessively due to a number of avoidable missed births. The Carfoot et al. (2005) study in North England experienced similar problems even with extra research assistants available on-call to observe births. Difficulties in the present study were attributed, in part, to the ongoing need for
clinical staff to call the researcher when a participant presented to the birth suite. This was
despite education, notification, explanation and staff agreeing to participate. Several losses
could have been avoided if the researcher had been notified as requested. It is understandable
that some staff may have been initially reluctant for the researcher to be present in the birthing
room. As the research project progressed and staff realised there was no threat to their practice
they were more comfortable with the study. Care of the mother is the primary concern and in
particular if events lead toward emergency care, calling a researcher would not be a priority.
Loss of participants was also expected due to unforeseen events such as precipitate labour or
two participants giving birth at the same time. Losses could have been minimized by
employing a research assistant. However, funding was not available to permit this.

Another limitation of the present study is that there was no comparison group either within or
external to the research study. Due to the exploratory nature of the observations this is
reasonable and it was anticipated that some groups for comparison would naturally form within
the study sample and allow for differences to be compared. However this did not occur
sufficiently, due to the unexpected wide variations in practice. Some comparisons could have
been made with general hospital populations especially since the BFHI accreditation project was
conducted around the same time as the research project. Better planning and collaboration with
hospital administration at the time could have provided an opportunity for comparison with
baseline hospital quality improvement data. Unfortunately the boundaries between research and
quality improvement are not well understood (NHMRC, 2003).

Overall, follow-up of participants was successful. It is possible some mothers who stopped
breastfeeding early may have avoided follow-up interviews by asking their partner to answer
and say they were not available or too busy at that moment for interview. It is also possible that
some multipara mothers who joined the study believing they would receive extra breastfeeding
support may have no longer felt such support was needed and as such did not make themselves
available for interview. The researcher made a maximum of five phone calls to contact
participants at each point of follow-up. Every effort was made to ensure correct and up-to-date
contact details were obtained at each phone call. Although inclusion criteria stated that
participants would need to be contactable after the birth, personal circumstances may have
unexpectedly changed causing contact difficulty in a few cases.

Some of the tools devised for the present study were tested for the first time and therefore could
have caused some response bias. For example, the skin contact knowledge questionnaire
administered to women antenatally had not been tested before. Several steps were taken to ensure validity and reliability of tools. A small group of relevant participants pilot tested the tools before administration to the research study group. Underpinning research literature was used to inform tools developed. Where possible standardised tools were used.

The item that asked about helping babies to conserve energy was worded for reverse scoring but may have confused women and confounded results. Although traditionally it has been recommended to reverse score some questions to reduce response bias this is not always necessary and can confuse and may contribute to response bias (Jackson, Wall, Martin & Davids, 1993). It is possible this question could work well if worded ‘skin contact helps babies to conserve energy’. This is an important knowledge question especially concerning mothers with gestational diabetes and how they care for their babies during the postnatal period. The reliability of the scale without this question was satisfactory (0.76) and showed this set of questions related well to give a valid score for women’s knowledge of skin-to-skin contact.

The Hawthorn effect (Polit & Beck, 2004) is a limitation of observation studies. It is possible the presence of the research observer in the birthing room influenced practices of some midwives. Midwives may have been more mindful to facilitate skin-to-skin contact since mothers were informed and the researcher was present. This was evident when midwives asked the researcher, “What do you want me to do?” To which the researcher replied, “Whatever you normally do”. However some midwives proceeded to clarify with their colleagues at the desk, “What should I do?” It is apparent therefore that in the present study the numbers of mothers who held their babies in naked body contact continuously from birth or for a substantial period of time may have been influenced by the practice changes underway in the hospital as well as the presence of the researcher.

An attempt was made to minimise this limitation by firstly emphasising that the study was primarily observing newborn feeding behaviour and mothers’ breastfeeding initiation; and secondly by asking midwives to provide normal practice and not make changes. Observations attempted to be unobtrusive in that the researcher did not interact with persons in the room (Polit & Beck, 2004; Roberts & Taylor, 2002).

The logistic regression analysis for predictors of suckling may have been limited by multicollinearity whereby some or all of the predictor variables are highly correlated and may confound the true measure of variance predicted. To overcome or eliminate problems of
multicollinearity correlations between predictor variables were checked and variables were combined or eliminated if there was too much overlap between predictors. Another method used to eliminate problems of multicollinearity was to conduct factor analysis on variables in the first instance and reduce the number of variables needed (Leech et al., 2005).

**Summary**

Naked body contact between mothers and their newborn babies immediately after birth is beneficial for both mothers and newborns to adapt, synchronise and begin breastfeeding for the first time. The present study found extended and uninterrupted skin-to-skin contact contributed to the onset of suckling in the birthing room and effective suckling around 48 hours after birth. Positioning of the baby at the breast with chin in contact with the breast in the birthing room and baby’s neck supported by stabilizing the shoulders at postnatal observation was consistently associated with breastfeeding initiation.

The help mothers received in the birthing room to attach their babies also contributed to the success of suckling onset, however this help did not necessarily equate to ongoing effective suckling or to trauma free nipples in the postnatal time before discharge. Help received in the postnatal ward did not make a statistically significant contribution to effective suckling. Mothers reported that the ‘hands-on’ help they received to position and attach their babies in the postnatal ward did not meet their perceived needs. While most mothers were satisfied with help received some mothers described the help as counterproductive. These practices may contribute to the ongoing breastfeeding difficulties some women experience and to undermining their confidence.

A high antenatal confidence score was not statistically associated with effective suckling or maternal independence to breastfeed prior to discharge from hospital. The absence of differences in mean confidence scores between first and second time mothers at 2 weeks and 3 months may indicate an influence of skin contact duration on maternal confidence of primipara mothers or it could mean second time mothers who have previously experienced problems need specific supportive measures to build confidence.

There was wide variation in practices observed during the first hour after birth. Some midwives fostered prolonged continuous uninterrupted skin-to-skin contact, while in other cases skin-to-skin contact was of short duration (less than 10 minutes). On some occasions skin-to-skin contact was interrupted more than once and in some cases no skin-to-skin contact occurred.
during the first hour. These variations in practice suggest much flexibility in routine care provided to mothers and infants during the first hour after birth and may indicate inadequate attention given to protect and support the first breastfeed. This is despite most of the staff involved having completed education specific to BFHI best practice recommendations.

Observations in the present study of newborn instinctive feeding behaviour support previous research reports. The present study adds to the body of knowledge on this topic by giving insights into and confirming that instinctive positioning of the baby at the breast is a major factor preceding optimal attachment for effective feeding. Results of the present study inform overdue revisions for BFHI best practice standards in ‘Steps 4 and 5’ to help mothers initiate breastfeeding and show mothers how to maintain breastfeeding. Tools developed in the present study would be useful for auditing breastfeeding initiation practices in hospital in relation to breastfeeding outcomes and sustained breastfeeding. The next chapter highlights major conclusions and provides some recommendations drawn from the present study.
Chapter 6
Recommendations and conclusions

There is a growing body of knowledge on the positive effects of skin-to-skin contact between mother and newborn at birth. Although skin-to-skin contact between mothers and their newborns is the global standard for best practice during the first hour after birth, associations between duration of naked body contact and commencement of breastfeeding in the first hour after birth have not been thoroughly explored. This chapter highlights the major conclusions of the study and outlines recommendations drawn from this work in regards to practice, policy and research.

Naked body contact in the birthing room

There is inconsistency of practice of naked body contact between mothers and newborns in the birthing suite for breastfeeding initiation. Findings of the present study concur with previous research that suggest newborn babies’ ability to adapt, coordinate, orientate and attach optimally to the breast and feed effectively are influenced by time and opportunity to be in naked body contact with their mothers after birth (Righard & Alade, 1990; Widstrom et al., 1987). The present study confirmed that the duration of skin-to-skin contact between mother and newborn contributes to the commencement of breastfeeding within the first hour after birth.

The study identified variability in newborn infants’ behaviour towards seeking the breast, with some requiring a longer time in skin-to-skin contact than others before the initiation of breastfeeding. The ambiguous wording for ‘Step 4’ of the BFHI policy therefore needs to be clarified and focus on duration of skin-to-skin contact rather than commencement of breastfeeding. Current BFHI policies under review should consider extending the minimum time for skin-to-skin contact to be at least 60 minutes with a suggested duration of 120 minutes. Further research could monitor effectiveness of birthing room practices in regards to outcomes of breastfeeding achievement after birth and effectiveness of feeding at postpartum discharge rather than commencement of breastfeeding. An optimal and minimal duration of naked body contact between mothers and their infants immediately after birth could be clarified by further research.
It is clear that routine obstetric birthing practices commonly separate or interrupt mothers and babies being together in the initial period of time after birth. Such routines should be postponed and skin-to-skin contact given priority. Naked body contact in the birthing room should be sustained as long as possible or as long as mothers wish (WHO.UNICEF, 2006c). Education is needed for health professional staff, parents and the community on the importance and benefits of naked body contact for a long period of time after birth. Although knowledge would be enhanced by future research with large numbers of participants using an experimental design to further investigate the influence of skin-to-skin contact duration on effective feeding, random allocation may not be feasible or desirable given the known positive effects of skin-to-skin contact for breastfeeding initiation and continuation. Factors such as obstetric procedures (for example, nasopharyngeal suction) need to be taken into account in future research.

The present study identified various events that occurred in the birthing room during the first hour and in particular, events that occurred in the first 10 minutes that are barriers to continuous uninterrupted skin contact. In particular removal of babies to the resuscitation cot and administering nasopharyngeal suctioning commonly prevented or interrupted initial contact between mothers and their babies in the present study. Some babies were unnecessarily administered suction; the detrimental effects of suctioning on coordination of newborn reflex suckling ability as observed in previous research (Widstrom et al., 1987) was demonstrated in the present study.

Routine practices and hospital protocols which are embedded in obstetric hospital environments, need to be changed to better accommodate the needs of mothers and their infants for best practices that are known to improve the likelihood of optimal breastfeeding outcomes (Righard & Alade, 1994). For example, meconium aspiration syndrome (MAS) of term-gestation infants born through meconium-stained amniotic fluid (MSAF) is not prevented by routine intrapartum naso-oropharyngeal suctioning (Vain et al., 2004). However until recently MSAF during labour was considered an identifiable risk factor to the newborn infant that required intra-partum suction (Kattwinkel, 2006).

Observations during this present study suggest routine practices of separating mothers and babies for suction and resuscitation are sometimes carried out unnecessarily; this may impact on maternal breastfeeding experience and ultimately infant feeding outcomes. More research using a control design and large numbers is needed to establish the effects of separation and suction of vigorous infants born through MSAF on breastfeeding.
The extent to which help was received by mothers to position and attach their babies needs to be taken into account in future research. The small sample in the present study did not allow detailed statistical analysis on the effects of ‘hands-on’ or ‘hands-off’ approaches to breastfeeding assistance by midwives. Future education of midwives and health education of mothers should place emphasis on observation skills for immediate assessment of newborn well-being after birth and reinforce the practice of continuous uninterrupted skin-to-skin contact between mothers and newborns for extrauterine adaptation. Some midwives need further education and reassurance from more experienced professionals (such as lactation consultants) to improve their assessment skills of neonate abilities and adaptation, and reduce unfounded anxiety that leads to unnecessary removal of babies from their mothers for suctioning intervention.

Future research perhaps should address the factor of optimal time to begin effective suckling by extending observation periods to the end of the second hour and to make periodic observations over several hours in the early postnatal period of time or even for the first 12 - 24 hours. A charting system for this could be developed much like a temperature graph.

There is a need to conduct a large study where mothers are randomised to an intervention of continuous uninterrupted naked contact for the full hour or longer with no hands-on help and only verbal encouragement, support and instruction. Mothers would need to be instructed beforehand that their baby may not take the breast immediately; they will need to hold their baby and give their baby opportunity without a third person interfering to ‘help’. Hands-on help to position could be given only after 6 hours if it was needed. The second and third groups could be assigned to at least 30 minutes skin contact at some point over the hour with the second group briefly interrupted after 10 minutes and then back again for 30 minutes with baby being assisted to feed using hands-on unless commenced feeding without help; and a third group separated at first for up to 10 – 20 minutes then together in skin contact and given hands-on help to feed.

**Naked body contact in the operating room**

In line with findings of previous research (Rowe-Murray & Fisher, 2001; Rowe-Murray & Fisher, 2002), the present study found caesarean section birth to be a major barrier to the practice of uninterrupted skin-to-skin contact between mothers and their newborns. The duration of naked body contact during the first hour after birth was reduced for babies born by caesarean section in comparison to vaginal births. This finding is of concern given the increasing rates of
caesarean section in both the public and private Australian health care systems. Further exploration is needed to determine the feasibility and outcomes of commencing skin-to-skin contact between mothers and their newborns in the operating theatre.

Education of operating theatre staff is needed so they understand the importance of naked body contact for newborns to coordinate feeding ability and for mothers to learn to hold their babies. Education and support for theatre staff is also imperative in view of the known effects of operative birth and associated trauma on women’s emotional health (Gamble & Creedy, 2006). The revised draft version of the BFHI policy guidelines suggesting mothers having a caesarean section birth with epidural anaesthesia be offered uninterrupted skin-to-skin contact in the same way as those who have a vaginal birth needs to be promoted and included in health care service breastfeeding policies. Indeed BFHI best practice guidelines should be implemented as general policy for practice throughout all maternity services (National Health & Medical Research Council, 2003; Queensland Health, 2003b).

Future research identifying barriers to the commencement of skin contact in the operating theatre could address safety measures that may be needed. Research could investigate whether long periods of naked body contact during the postnatal period may counteract difficulties attributed to lack of skin-to-skin contact during the first hour immediately after birth. Women’s receptiveness to naked body contact in the operating theatre after caesarean section also needs further research. Some women in this study did not fully appreciate naked body contact with their newborn. Differences in outcomes between mother/baby dyads who remain in immediate uninterrupted skin-to-skin contact after birth for 1 hour and those who commence skin contact after the first 30 minutes but remain together for up to 1 hour or beyond could also be addressed by future research.

Further experimental design research with control groups is needed to investigate the extent to which time lapse and events occurring before skin contact commences may interfere with newborn feeding ability to breastfeed well at the first breastfeed and to continue to do so. Future research studies would need to account for variations such as necessity of nasopharyngeal suctioning and clarify time boundaries for initial uninterrupted contact. Education is clearly required on guidelines for skin-to-skin contact in resuscitation workshops with emphasis on the skills of initial assessment at the bedside with mothers holding their babies is needed. Research on the extent to which education alters attitudes and practices of both health professional staff and mothers needs to be conducted.
Instinctive positioning for suckling achievement

The present study has confirmed that babies in naked body contact with their mothers are more likely to be positioned in the instinctive feeding position with their body well supported by their mother’s body, and their chin nudging the breast from underneath to achieve optimal attachment for suckling. This observation confirms the principles of optimal positioning and attachment taught by observant midwives and lactation specialists to mothers in the postnatal period (Cox, 2002; Glover, 2005a; Gunther, 1955; Minchin, 1998). Newborn sequential feeding behaviours observed in this present study concur with previous research (Jansson et al., 1995; Nissen, Lilja, Matthiesen, Ransjo-Arvidsson, Uvnas-Moberg et al., 1995a; Righard & Alade, 1990; Widstrom et al., 1987; Widstrom & Thingstrom-Paulsson, 1993).

Instructions provided in many breastfeeding books and leaflets instructing mothers on how to achieve optimal positioning and attachment for effective feeding need to be revised as proposed by Minchin (1998) almost a decade ago. Current emphasis on techniques to get ‘positioning and attachment right’ can be distressing for both mother and baby. Information should be rephrased to encourage skin-to-skin contact for newborns so they will be more likely to coordinate instinctive behaviours to achieve optimal attachment for feeding well (Bergman, 2001a). This concept applies to the postnatal period and not just for a short span of 1 hour after birth.

The principles of optimal positioning for effective attachment were clearly observed in the birthing room when naked body contact between mother and newborn occurred. It is known that the tactile stimulation babies receive by being in direct contact with their mother’s naked body plays an important part on neurological coordination and suckling ability (Ferber & Makhoul, 2004; Radzyminski, 2005; Uvnas-Moberg & Eriksson, 1996; Winberg & Kjelmer, 1994). Stable positioning of babies’ bodies braced against their mothers is achieved naturally without fuss when babies lie in prone position against their mothers’ bare chest (Widstrom et al., 1987).

Observations of the present study demonstrate that positioning of babies for optimal attachment and effective breastfeeding can be achieved by supporting mothers in working with their newborn’s instinctive ability to breastfeed. In this way mothers’ breastfeeding confidence is enhanced and they are less likely to be stressed or confused about complex breastfeeding techniques. It is therefore important that newborn instinctive reflex feeding behaviours are understood by health professionals who provide care for mothers and babies and that they pass accurate information on to mothers and families in the community.
Holding babies with clothes on in postnatal area is termed ‘biological nurturing’ and also known to benefit breastfeeding (Coulson et al., 2003). Research could examine whether biological nurturing is as effective as skin-to-skin contact for successful breastfeeding in the early postnatal period. Future research needs to address health professional knowledge of neonate feeding abilities, the quality and accuracy of breastfeeding resources available for health professionals and mothers, as well as the effects of knowledge on practice. Appropriate resources need to be developed and disseminated as widely as possible.

**Help received**

This present study is unique in its exploration of help mothers receive in the birthing room for breastfeeding initiation. Observations undertaken in the present study suggest that some mothers and infants may benefit from ‘hands-on help’ to position and attach their babies to the breast, or in some cases help to only position or only attach may be needed. However it was noticed in the present study that skilful midwives worked with babies’ instinctive reflex feeding behaviours and pointed these out to the mothers when providing help. The present study identified specific levels of help used by professional midwives to assist mothers and help infants attach for the first breastfeed.

Education for midwives on how to help mothers begin breastfeeding needs to be addressed in midwifery education texts and resources so consistent care can be provided (Cooke et al., 2003a). More research is needed to specifically identify appropriate techniques to help mothers to position and attach infants in the birthing suite for the very first breastfeed. Descriptors from the present study can be used to inform processes for further research on optimal methods for assisting breastfeeding in the birthing room. Breastfeeding policies need to give clear instruction to midwives on how to best assist mothers in observing their newborn baby’s feeding ability and assist without interrupting instinctive feeding behaviour. Furthermore, BFHI accreditation criteria for assisting mothers with breastfeeding needs to be more clearly defined.

For example, global criteria could define principles of instinctive positioning and optimal attachment, and clarify ‘hands-off’ techniques of support by verbal encouragement. If clinical staff are to be accredited as ‘helping’ mothers effectively, then effective helping procedures need to be observed. These need to be clearly stated in the global criteria as being adequate observation of mothers to assess individual situations and needs, and listening to mothers and encouraging them to boost their confidence and skill. Open statements with no clarity or definition of procedure, such as “maternity staff report they teach mothers how to position and
attach their babies for breastfeeding and are able to describe or demonstrate correct techniques for both” (WHO.UNICEF, 2006a pp. 30) are inadequate for assessment criteria measures.

Likewise education for staff on positioning and attachment needs to be updated with clear definitions so that the help offered is based on evidence-based principles of instinctive positioning and attachment as seen while mothers and their babies are in naked body contact in the birthing room. Observation findings of the present study support the need to review the teaching and assessment of positioning and attachment for BFHI accreditation. Findings indicate a need for future research to investigate difference in outcomes for mothers using specific helping techniques.

The present study investigated mothers’ perceptions of help received. Mothers reported receiving ‘hands-on help’ with attachment, but they preferred reassurance about attachment or verbal encouragement without hands-on assistance. Mothers also reported that some midwives did not adequately listen to them, nor observe their ability to position the baby and the baby’s ability to suckle effectively before acting and touching in an unwelcomed and unprofessional manner. These matters need to be addressed urgently in continuing education programs for midwives. Mothers need to be informed of their rights and supported when providing feedback about care received. The findings of the present study strengthened arguments made by researchers for ‘hands-off’ techniques to be used (Cox, 1998; Cox & Turnbull, 1998). Further investigation is needed to define ‘hands-off’ techniques and when they should be most appropriately employed.

There may be a certain level of hands-on help needed for some babies and mothers particularly for the first breastfeed in the birthing room. This needs further exploration with definitions of help clearly outlined. Skilful assessment is required to observe and correctly interpret and explain newborn feeding behaviour so that help facilitates the newborn’s instinctive abilities and perhaps those of the mother as well. The specific type of help identified by mothers could be used to inform future guidelines for midwives and other healthcare workers who support mothers with breastfeeding in the early postnatal period.

**Preventing nipple trauma by naked body contact**

The present study found an association between longer duration of skin-to-skin contact in the birthing room and no visible nipple trauma when a breastfeed was observed prior to discharge from hospital. While it may be important to begin breastfeeding soon after birth (Edmond et al.,
babies and mothers need the opportunity to remain together while naked without interruption or any interference to begin breastfeeding in a manner that is conducive to optimal positioning and attachment. There is a need for future research to investigate the concept of reduced incidence of nipple trauma in relation to naked body contact and how positioning and attachment for effective breastfeeding is managed for the first breastfeed immediately after birth.

Mothers’ experience of nipple pain during a breastfeed was associated with visible nipple trauma. Authors consistently equate painful breastfeeding with nipple trauma and faulty attachment of the baby to the breast (Cox, 1996; Fisher, 1985, 1994; Glover, 2005a; Minchin, 1998; Minchin, 1989; Mohrbacher & Kendall-Tackett, 2005; Ramsay & Hartmann, 2005; Ramsay et al., 2004; Renfrew et al., 2000a; Woolridge, 1986a). Best practice recommendations highlight the role of midwives in teaching mothers how to position their babies for correct attachment. One study reported that teaching positioning and attachment to mothers during the early postnatal period was ineffective in helping mothers manage positioning and attachment or reduce the incidence of nipple pain and trauma (Henderson et al., 2001). Ramsay and Hartmann (2005) reported that some babies have uncoordinated tongue action which can cause nipple pain and trauma while they feed but this may not always be identified even by an experienced lactation consultant. More research is needed to determine better ways to facilitate management of positioning and attachment for effective breastfeeding with particular attention to newborn instinctive feeding behaviours.

**Enhancing maternal breastfeeding confidence**

Although the present study found an association between maternal confidence and lack of breastfeeding problems, other interesting conclusions can be drawn. The present study did not find a statistical difference amongst first time and multiparous women in regards to breastfeeding. It could be that knowledge and observation of innate infant feeding abilities alter the focus from maternal confidence to the role of mother as facilitator of neonate abilities. This perspective has been rarely highlighted in the literature or practice. Future research could use a pre-post intervention design to measure and compare maternal breastfeeding confidence in the antenatal and postnatal periods between groups of mothers who hold their babies in uninterrupted skin-to-skin contact for at least 1 hour after birth and mothers who do not. Future research that attempts to assess associations between skin-to-skin contact and maternal breastfeeding confidence would need to ensure that adequate information about newborn feeding ability is provided during the antenatal period. Appropriate follow-up regarding
management of positioning and attachment and assistance mothers require would need to be addressed in future research.

Perhaps with new tools such as those devised by Wells et al. (2006), mothers in need of specific interventions to boost confidence could be identified during the antenatal period as some authors have suggested (Blyth et al., 2003a; Wells et al., 2006). Timely and helpful information could be provided to pregnant women if an expanded history was taken, a comprehensive assessment conducted, and accurate information and advice offered in the antenatal period.

This present study is unique in its endeavour to observe a full range of key variables for breastfeeding initiation in the birthing room and explore relationships between a wide range of postnatal outcomes such as positioning and attachment, nipple pain and trauma and maternal independence and confidence.

**Lactation and infant feeding outcomes**

Traditionally breastfeeding outcomes are described in terms of how long mothers breastfed their babies, whether they provided breastmilk exclusively or supplemented with artificial baby milk. Outcomes may be more meaningful if reported in the context of mothers’ breastfeeding experience and confidence. For example, degree of nipple pain and trauma, confidence to manage positioning of their babies at the breast and allow babies to latch and breastfeed effectively. The present study captures all of these and reports in relation to events occurring in the birthing room.

**Tools developed**

There are relatively few data collection tools available to monitor practices for the BFHI accreditation process (Merten, Dratva & Ackermann-Liebrich, 2005). Furthermore, reports on key breastfeeding outcomes are inadequately reported in perinatal data statistics (Queensland Health, 2005). The tools devised for the present study are useful for documenting and monitoring quality improvement, future comparative research, and for hospitals needing to provide evidence of recommended best practices for BFHI accreditation. Further research is required to establish the reliability and validity of the tools in other settings and other samples.
Women’s knowledge of skin-to-skin contact

There is a deficit in mothers’ knowledge of skin-to-skin contact. The skin-to-skin contact knowledge questionnaire used in the present study could measure baseline understanding of naked body contact in future studies. This brief questionnaire could also guide antenatal information-giving and save time by identifying mothers’ learning needs instead of providing information already known. Time could be directed to providing mothers with up-to-date practical information and answering specific questions.

Research is needed that compares interventions combining antenatal information and postnatal support with antenatal education alone that informs mothers of newborn instinctive feeding behaviour and the importance of it for newborn ability to breastfeed well. Comments from mothers can inform future research direction. Mothers’ preferences need to also be incorporated into future research on skin-to-skin contact for breastfeeding initiation and could be considered when wording revisions of policy guidelines. Conclusions from this study provide insights into mothers’ views and responses to holding their baby in skin-to-skin contact which have not been captured and reported in the literature.

Birthing room observations

This present study developed a tool to observe and record birthing room events, and a range of practices and times of occurrence not previously recorded in routine documentation by midwives. Events pertaining to items on the tool can be reduced to a few useable items for regular documentation of birthing room events. The tool is a useful teaching resource to inform midwives and mothers of expected sequential newborn feeding behaviour. The tool was found to be valid and could be used to investigate associations between newborn feeding behaviour, effective feeding, commencement and duration of naked body contact, and help received to position and attach their babies to begin breastfeeding. The birthing room observation tool (BROT) could form the basis for a comprehensive charting and documentation system.

Mothers’ perceptions of help received

This present study developed and validated a short easy-to-use tool to measure mothers’ perceptions of the help they received. This tool is unique to the present study and would be useful to build partnerships between mothers and their health care and providers with autonomy for mothers.
Postnatal observations

The PBOT was found to be useful for observing progress of breastfeeding and could be adopted to routine practice in hospital. The tool could guide midwifery practice and serve as an educational tool to help midwives understand how to observe breastfeeding and work in partnership with mothers to provide support. More research is needed with the PBOT to validate its use across various levels of health professional knowledge and expertise and compare results with other populations.

Despite limitations of the present study, no comprehensive observation of newborn feeding behaviour in relation to duration of naked body contact and help mothers receive to begin breastfeeding has been conducted to date. No tools have been devised to adequately capture the broad range of principles found in the literature to observe breastfeeding initiation practices in the birthing room with extensive and comprehensive follow-up observations for breastfeeding outcomes to 6 months postpartum.

As such, the present study was exploratory as no published studies were found that attempted to understand the influence of events that occur in the first hour following birth and impact of these events have on breastfeeding outcomes, especially maternal confidence and experience of common breastfeeding problems. The present study adds to the body of knowledge confirming innate newborn feeding ability. Insights into optimal management strategies to enhance mothers’ experience of breastfeeding initiation and to reduce common problems of nipple pain and trauma are suggested.

Summary

The present study found a positive association between infants commencing suckling within 60 minutes of birth and duration of naked body contact greater than 30 minutes between mothers and their newborn. A higher proportion of mothers and infants remained together in continuous skin-to-skin contact without interruption if the birth was normal. The implications for infants born by caesarean section and their mothers are not clear and need further investigation.

Naked body contact between mothers and newborns for breastfeeding initiation at the time of birth is not practiced consistently. A number of routine procedures interfere with mothers being enabled to hold their naked baby against their bare skin in a timely manner. These routine practices appear to adversely affect best practice. The findings of this study suggest a need to
review standard best practice requirements to focus on the first 60 minutes after birth for BFHI accreditation. The effectiveness of midwifery education including professional development education for practising midwives needs review.

The definition for three levels of ‘hands on’ assistance mothers receive, to position and attach their babies at the breast are unique to the present study and have not been previously reported in the research literature. While some mothers and infants do benefit from ‘hands-on help’ to position and attach their babies to the breast, this may be dependent on the manner and techniques used. The study provided insights into a ‘hands off’ approach by affirmation, verbal instruction and encouragement to assist mothers to learn about their infant’s innate feeding behaviour.

Results of the present study inform our understanding of how positioning and attachment are ‘taught’ to mothers initiating breastfeeding both in the birthing room and postnatal period. The findings have impact on the BFHI policy standards and assessment criteria that describe how mothers may be most skilfully assisted and how midwives and birthing attendants are best instructed on how to go about helping mothers with positioning and attachment. Results affirmed the recommendations put forward by experienced midwives (e.g. Glover, 2003b; 2005a; Cox, 1996) and recent research (e.g. Ramsay et al., 2006) advocating that babies to be positioned comfortably in the instinctive position, in close contact with their mother’s breast for effective attachment, feeding and adequate milk removal from the breast. However these principles are not generally applied to birthing room practices. The present study’s observations alerts health professionals who assist mothers initiate breastfeeding to use the principles of instinct positioning for effective attachment and breastfeeding at the time of birth and beyond.

This study is unique in its investigation of duration of skin-to-skin contact in the birthing room associated with breastfeeding problems such as visible nipple trauma. Results of this study suggest that sustained naked body contact with attention to newborn instinctive feeding behaviours may improve breastfeeding outcomes for women and boost their breastfeeding confidence at two weeks postpartum. This present study adds to the body of knowledge about positioning and attachment for effective breastfeeding. Traditional perceptions of ‘correctness’ in the way mothers are shown how to position and attach their baby and descriptions provided by BFHI best practice guidelines for what is considered ‘correct’ are not always helpful to reduce nipple pain or trauma. Policies such as BFHI are often implemented in a rigid way that
can be distressing for some women and their infants and therefore administration of these may need to be reconsidered.

Finally, the tools developed in the present study will assist audit practices for BFHI accreditation and enable measurement of key outcome indicators for maternity services. There is an urgent need for improvements in the documentation and reporting of infant feeding in hospital, at discharge from health services and beyond through perinatal data reporting. The skin-to-skin contact knowledge questionnaire could be used to guide information provided for parents during the antenatal period. The birthing room observation tool and the postnatal breastfeeding observation tool are also unique and capture a broad range of principles underpinning breastfeeding initiation practices and guide follow-up observations to assess breastfeeding outcomes.

The World Health Organisation continues to call for increased breastfeeding rates and duration of breastfeeding especially in developed countries. The present study aimed to enhance the likelihood of successful breastfeeding by investigating clinical practices at the time of birth that may interfere with breastfeeding initiation. The insights gained from this study add to the body of knowledge in regards to the best ways of providing mothers and infants with optimal maternity care for breastfeeding initiation and sustainability. The study was enriched by direct clinical observations of practice, as well as asking mothers about their breastfeeding knowledge and experiences. Importantly, the study identified the characteristics of the care provided and how it helped or hindered their confidence to be able to continue and enjoy their experience of feeding baby. Themes explored in the present study need to be carried forward on a larger scale in other settings to establish optimal practices to support breastfeeding mothers and their infants.
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Appendix A Information sheets

Griffith University,
Faculty of Nursing and Health,
Nathan Campus Kessels Road,
NATHAN QLD 4111
Telephone: D Creedy 07 55528788
Fiona Dykes 44 1772 893828
R Cantrill 07 38755224 0438987261
Email: r.cantrill@griffith.edu.au

Information Sheet
Invitation for midwives to participate

Project Title
An observation study of skin-to-skin contact and mothers’ breastfeeding.

I am a midwife at the Redland Hospital and a PhD student at Griffith University. As part of my doctoral degree I am studying skin-to-skin contact and common breastfeeding problems. This statement explains the study. The research degree is supervised by Professor Debra Creedy, and Ms Fiona Dykes (UK). Ethical approval from Bayside Health Service District and from Griffith University has been granted.

Background to the study
Currently Redland Hospital is seeking Baby Friendly Hospital Initiative (BFHI) accreditation and there is no reliable method of recording evidence of ‘Step 4’ and ‘Step 5’. The study complements the current accreditation BFHI program and will test a documentation process to improve our understanding of breastfeeding initiation for mothers.

Study aims
This study aims to investigate relationships between duration of skin-to-skin contact experienced by mothers and their newborns around the time of birth and common breastfeeding problems. Midwives’ practices influence mothers’ experience initiating breastfeeding. All midwives are invited to participate in the study.

What is required of you
Your involvement in the research is important to facilitate data collection and improved documentation methods. Women will consent to participate and their experience of breastfeeding initiation will be observed by a clinical midwife researcher. Women who participate in the study will be identified by a sticker on the front cover of the medical record. You will be asked to phone Ruth Cantrill to let her know of the impending birth.

In the first 24-48 hours after birth, Ruth will visit the women who have given their consent to participate in the study and observe a full breastfeed. Any women known to or found to experience unusual or extreme breastfeeding difficulties will be referred to you in the usual way through the existing system of care and be helped to find someone else who can work closely with them.

Possible Benefits
The outcomes of the study will promote breastfeeding, inform midwifery practice and reduce the incidence of common breastfeeding problems. There are no anticipated risks to midwives or to mothers from participating in the study.

The study in no way intends to dictate or coerce changed practice. The final management decision for breastfeeding initiation will be in accordance with safe practice and the mother’s wishes. Medical emergency will take priority of care as per regular hospital policy and protocols. We understand that not all women will want to hold their baby in skin contact and will not be expected to if they do not want to. No woman will be coerced to hold her baby in skin-to-skin contact at any time. No Midwife is to feel obliged to change their current practice.
Voluntary Participation
Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your educational or clinical experience neither your employment within the Women and Birthing unit BHSD or your relationship with Griffith University or Queensland Health.

Feedback
Results of this study will be presented in a Redland Hospital general meeting and as inservice sessions to midwives in Women and Birthing. If you give us your permission by signing the Consent Form, we plan to publish results. Any publication, information will be provided in such a way that you cannot be identified. All information will be strictly treated as confidential. These measures are to ensure that your privacy is protected.

Confidentiality
No information will be obtained in connection with this project that can identify you other than what is routinely documented in the client medical record. Code numbers will be used to identify client data collection. Information will only be disclosed with your permission, except as required by law.

Questions
You are free to ask questions any questions you have about the research.

Complaints mechanism
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may speak with an officer of the Griffith University or the BHSD who is not involved in the study.

The Ethics Officer, Office for Research, Bray Centre, Griffith University, Kessels Road Nathan Qld 4111 Telephone (07) 3875 6618

Or

The Pro Vice-Chancellor (Administration), Bray Centre, Griffith University, Kessels Road, Nathan, Qld 4111, telephone (07) 3875 7343).

Or

Jeff Hollywood, District Manager, Bayside Health Service District. Telephone: (07) 34883488

If you agree to participate in this study please sign the consent form. If you decide to withdraw from this project, please notify a member of the research team.

There will be no payment to participants of the study.

Yours sincerely

Ruth Cantrill
PhD Student Griffith University Nathan Campus, Nathan 4111 and BFHI Project officer Women and Birthing Unit Redland hospital

Debra Creedy Fiona Dykes Ruth Cantrill

Research Participants
Information Sheet
Invitation for birthing women to participate

Project Title
An observation study of skin-to-skin contact and mothers' breastfeeding.

You are invited to take part in this research project.

I am a midwife at the Redland Hospital and a PhD student at Griffith University. As part of my doctoral degree I am studying skin-to-skin contact between mothers and their babies after birth on improving mothers' breastfeeding confidence and reducing breastfeeding problems. The research degree is supervised by Professor Debra Creedy, and Ms Fiona Dykes (UK). Ethical approval from Bayside Health Service District and from Griffith University has been granted.

This statement explains procedures involved before you decide whether or not to take part.

Background to the study
It is thought that mothers who hold their babies in skin contact to learn how to breastfeed will gain confidence quickly and have less breastfeeding problems.

Study aims
The study looks at how skin-to-skin contact impacts on mothers' confidence to breastfeed and overcome problems, thoughts about having enough breastmilk before birth and again after birth and your satisfaction with breastfeeding.

What is required of you
Participation in this project will involve about 20 minutes of your time to answer some questions about how confident you feel about breastfeeding. Then events to do with starting the baby's first feed will be observed and recorded by Ruth for one hour at the time of birth. When you arrive at the hospital to give birth you may remind the midwife on duty that you are participating in the study. A midwife at the Redland Hospital will contact Ruth and inform her of your arrival at the hospital to give birth so she can be present.

In the first 24-48 hours Ruth will visit you to watch your baby feed and to ask about how the breastfeeding is going. At this time Ruth will be able to offer further support and answer any more questions you may have. If there are any unusual or extreme circumstances Ruth will speak with the other midwives in the team and help you find someone else who can work closely with you to help.

Around 2 weeks, 3 months and again at 6 months Ruth will phone you briefly to ask how the breastfeeding is going and whether baby is needing to be given any other foods or drinks and to offer support and answer questions you might have.

Possible Benefits
Possible benefits to you include the chance to speak directly with an experienced lactation consultant during six months of your breastfeeding experience. Your participation in the research will help other mothers, families and midwives in the future to understand how the first breastfeed is best managed to prevent avoidable problems.

There are no anticipated risks from participating in the study.
Voluntary Participation
Your participation is entirely voluntary and will not affect your midwifery or medical care or relationship with the hospital, the university or with any Queensland Health department. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

Feedback
If you give us your permission by signing the Consent Form, we plan to publish results to help others understand what is best for mothers and babies in learning to breastfeed.

Confidentiality
All collected information obtained in the project will be coded so that no data entered into the computer or published in reports can be traced to you. All information will be strictly treated as confidential. Names and contact details will be recorded on a separate information sheet. You will be given a code number for the study. The questionnaires and the personal details sheet will be kept separately under lock and key at the Griffith University.

Questions
You are free to ask any questions about the study. Contact Ruth on the number above. Other project officers may also be contacted on the phone numbers listed above.

Complaints mechanism
If you have any complaints about any aspect of the project or the way it is being conducted then you may speak with an officer of the University or the BHSD who is not involved in the study. If you agree to participate in this study please sign the consent form. If you decide to withdraw from this project please notify a member of the research team. There will be no payment to participants of the study. Some free breastfeeding information will be offered to all participating women and families.

Yours sincerely

Ruth Cantrill
PhD Student Griffith University Nathan Campus, Nathan 4111 and BFHI Project officer Women and Birthing Unit Redland hospital

Debra Creedy  Fiona Dykes  Ruth Cantrill

Research Participants

Appendix A
Appendix B Consent obtained

Griffith University,
Faculty of Nursing and Health,
Nathan Campus Kessels Road,
NATHAN QLD 4111

Telephone: D Creedy 07 55528788
Fiona Dykes  44 1772 893828
R Cantrill 07 3875224 0438987261
Email: r.cantrill@griffith.edu.au

Consent form
Invitation for midwives to participate

Project Title
An observation study of skin-to-skin contact and mothers’ breastfeeding.

I …………………………………………….., do hereby consent to be part of the above named study.
I acknowledge that the study has been explained to me and any questions have been answered to my satisfaction. I agree to phone Ruth Cantrill to be present around the time of birth of the recruited women in the study so mothers’ breastfeeding initiation in the first hour of birth can be observed and documented. I understand the observations are unobtrusive will only be with the mother’s and family’s permission, do not involve the researcher in clinical midwifery care and that I am not obliged to change my normal midwifery practices assisting women breastfeed.

I freely agree to participate in this project according to the conditions outlined in the attached information sheet.

I have a copy of the information sheet and the Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

Participant’s Name (printed) ……………………………………………………
Signature        Date

Witness Name (printed) ………………………………………………………
Signature        Date

Researcher’s Name (printed) ……………………………………………………
Signature        Date

Note: All parties signing the Consent Form must date their own signature.
Consent form Invitation for Birthing Women to participate

Project Title

An observation study of skin-to-skin contact and mothers’ breastfeeding.

I …………………………………………., do hereby consent to be part of the above named study. I acknowledge that the study has been explained to me and any questions have been answered to my satisfaction. I agree that Ruth Cantrill may be present at the time of the birth of my baby to observe and record breastfeeding events during the first hour. I understand the observations are unobtrusive and that the researcher will not be involved in my care at the time of observing. I realise I am not obliged to hold my baby in skin contact if I do not want to and I can hold my baby in skin contact for as long as I wish to.

I also understand that the researcher will return within 24 - 48 hours of birth to observe the baby breastfeeding and to ask questions about the breastfeeding experience. I understand there will be three further follow up phone calls over the next six months with interview questions about baby feeding and confidence. I have understood that my initial involvement in this project does not oblige me to continue breastfeeding if I do not want to. Also I am assured that observations are not intended to challenge the midwives or any health professional involved in my care.

I freely agree to participate in this project according to the conditions outlined in the attached information sheet.

I have a copy of the information sheet and the Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

Participant’s Name (printed) ……………………………………………………
Signature        Date

Witness Name (printed) ……………………………………………………
Signature        Date

Researcher’s Name (printed) ……………………………………………………
Signature        Date

Note: All parties signing the Consent Form must date their own signature.
Appendix C Demographic and antenatal data

Demographic and antenatal history

Thank you for participating in this important research for mothers and midwives.

Code Number: .................................................
Date: ..........................................................

Tick the box ☑ next to the answer which is most relevant to your situation
Or write your response in the blank space.

<table>
<thead>
<tr>
<th></th>
<th>Self</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Age</td>
<td>yrs</td>
</tr>
<tr>
<td>2</td>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Employment status</td>
<td>1 □ Full time employed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 □ Part time employed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 □ Casual employed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 □ Unemployed</td>
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<tr>
<td></td>
<td></td>
<td>5 □ Maternity leave</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 □ Home Duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Specify)</td>
</tr>
<tr>
<td>4</td>
<td>Highest education level achieved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self</td>
<td>Partner</td>
</tr>
<tr>
<td>5</td>
<td>What is your marital status?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 □ Married</td>
<td>2 □ Defacto</td>
</tr>
<tr>
<td>6</td>
<td>How long have you been in a relationship with your partner?</td>
<td>yrs</td>
</tr>
<tr>
<td>7</td>
<td>What is your gross household annual income?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 □ Up to $22,500</td>
<td>2 □ $22,501 - $55,500</td>
</tr>
<tr>
<td></td>
<td>3 □ More than $55,501</td>
<td>4 □ Other (specify)</td>
</tr>
<tr>
<td>8</td>
<td>What country were you born in?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 □ Australia</td>
<td>2 □ Other (specify)</td>
</tr>
<tr>
<td>9</td>
<td>Do you speak English?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 □ No</td>
<td>1 □ Yes</td>
</tr>
<tr>
<td>10</td>
<td>What is your first language?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 □ English</td>
<td>2 □ Other (specify)</td>
</tr>
<tr>
<td>11</td>
<td>Which ethnic origin do you identify with most?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 □ Aboriginal</td>
<td>2 □ TSI</td>
</tr>
<tr>
<td></td>
<td>4 □ Asian</td>
<td>5 □ Other (specify)</td>
</tr>
</tbody>
</table>
Tick the box ☑ next to the answer which is most relevant to your situation
Or write your response in the blank space.

12  Do you smoke cigarettes?

   0☐ No  Go to Question 14  1☐ Yes

13  If Yes how many cigarettes do you smoke?

   1☐ Less than 10 a week  2☐ Less than 10 a day
   3☐ Less than 20 a day  4☐ More than 20 a day

14  Have you been well during this pregnancy?

   0☐ No  1☐ Yes

15  Have you received treatment for any of the following conditions during this pregnancy?

   0☐ NO  1☐ Yes

16  High blood pressure

17  Gestational diabetes

18  Insulin dependent diabetes

19  Vaginal bleeding

20  Decreased fetal movement

21  Asthma /chest conditions

22  Kidney disease/UTI

23  Thyroid disorders

24  Heart disease

25  Liver problems

26  Epilepsy

27  Depression

28  Psychiatric illness

29  Blood disorders

30  Describe any other significant antenatal history.

31  How many previous pregnancies have you had?

32  Have you ever attended antenatal classes?

   0☐ No  Go to Question 35  1☐ Yes

33  Did you attend antenatal classes this pregnancy?

   0☐ No  1☐ Yes

34  Was breastfeeding preparation included in antenatal class?

   0☐ No  1☐ Yes  2☐ Unsure

35  Did antenatal breastfeeding preparation include information about newborns and skin-to-skin contact?

   0☐ No  1☐ Yes  2☐ Unsure
35 Was skin-to-skin contact between parent and newborn baby mentioned at your regular antenatal visits this pregnancy?
   0☐ No Go to question 37   1☐ Yes   2☐ Unsure

36 If Yes, by whom?
   1☐ Midwife   2☐ Doctor   3☐ Other (Specify)

37 Did you hear about skin-to-skin contact between parent and baby from other sources?
   0☐ No   1☐ Yes

38 If Yes, where did you hear about skin-to-skin contact ____________________________

39 Would you like to hold your bare newborn baby on your bare chest (skin-to-skin)?
   Tick the box ☐ that most reflects your feelings on a scale of 1 – 5
   No Not sure Maybe I would I think so Yes
   1☐ 2☐ 3☐ 4☐ 5☐

For the next seven questions, tick the box ☐ that most closely matches your opinion about skin-to-skin contact between mothers and babies.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>40</td>
<td>Skin-to-skin contact keeps baby warm</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>41</td>
<td>Skin-to-skin contact helps baby adjust to a new environment</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>42</td>
<td>Skin-to-skin contact helps baby learn to breastfeed</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>43</td>
<td>Skin-to-skin contact can increase mother’s milk supply</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>44</td>
<td>Babies do not conserve energy when held in skin-to-skin contact</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>45</td>
<td>Skin-to-skin contact is good for bonding</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
<tr>
<td>46</td>
<td>Babies held in skin-to-skin contact cry less</td>
<td>1☐</td>
<td>2☐</td>
<td>3☐</td>
<td>4☐</td>
<td>5☐</td>
</tr>
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</table>

Thank you for providing this helpful information.

The next section asks about your plans to breastfeed and about any previous experiences feeding baby.
Breastfeeding Intention and History

Tick the box ☑ next to the answer most relevant to you
Or write your response in the space provided.

47 Have you attended any formal breastfeeding preparation sessions?
   0☐ NO Go to Question 49  1☐ YES

48 If Yes please describe
   ______________________________________________________

49 How do you plan to feed this baby?
   1☐ Breast
   2☐ Breast & formula
   3☐ Formula
   4☐ No plan
   5☐ Other (Specify) _______________________________________

50 If you plan to breastfeed how long do you intend to feed in this way?
   1☐ Less than 2 weeks
   2☐ More than 2 weeks but Less than 3 months
   3☐ 3 - 6 months
   4☐ 6 - 9 months
   5☐ 9 - 12 months
   6☐ More than 12 months
   7☐ Not Sure
   8☐ Other (Specify) _______________________________________

51 Have you ever had any breast surgery?
   0☐ No Go to Question 53  1☐ Yes

52 If Yes, please describe
   .............................................................................

Do the following people encourage or discourage breastfeeding?

(Tick one box ☑ for each person if they are in your family, otherwise leave blank)

53 Your husband/partner?
   1☐ encourage
   2☐ neither encourage nor discourage
   3☐ discourage

54 Your mother?
   1☐ encourage
   2☐ neither encourage nor discourage
   3☐ discourage

55 Your mother-in-law?
   1☐ encourage
   2☐ neither encourage nor discourage
   3☐ discourage

56 Your sister?
   1☐ encourage
   2☐ neither encourage nor discourage
   3☐ discourage

57 Have you ever lost a baby over 16 weeks into the pregnancy?
   0☐ No go to Question 59  1☐ Yes

58 If you lost a baby over 16 weeks, did your breasts leak milk after birth?
   0☐ No
   1☐ Yes
59. How confident do you feel about breastfeeding?

<table>
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<tr>
<th></th>
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<th>Not sure</th>
<th>Reasonably</th>
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</table>

60. How many live children have you given birth to?

61. Have you ever breastfed a baby? 0 □ No 1 □ Yes

62. Have you been around women who breastfeed? 0 □ No 1 □ Yes

63. Did you grow up seeing mothers' breastfeeding? 0 □ No 1 □ Yes

64. Have you ever held a newborn baby? 0 □ No 1 □ Yes

65. How many of your children have you breastfed?

66. What age was each of your children when you stopped breastfeeding?

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</tbody>
</table>

67. Did you have any problems with breastfeeding these older children?

<table>
<thead>
<tr>
<th></th>
<th>No to Question</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes, what were problems breastfeeding for each child?

(Tick the box ✓ next to the number child you had that problem with.)

68. Sore nipples/pain

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
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<tr>
<td></td>
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</table>

69. Mastitis/breast infection

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
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</table>

70. Too much milk/engorged breasts

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
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<tr>
<td></td>
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</table>

71. Not enough milk

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

72. Embarrassed re breastfeeding

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

73. I disliked breastfeeding

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
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<tbody>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

74. Baby had colic/irritable crying

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
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<td></td>
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</tbody>
</table>

75. Baby had lactose intolerance

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

76. Baby wouldn’t attach properly

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

77. I couldn’t master attachment techniques taught in hospital

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

78. Other (Describe)

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Appendix C 231
For more than 5 children describe any breastfeeding problems for each below

If not enough milk was the problem how did you decide you did not have enough milk?
(Tick the box ✓ next to the number child to match how you decided.)

79 Baby not gaining enough weight
80 Baby demanding extra feeds
81 Baby crying/irritable
82 Baby not sleeping enough
83 Baby sick
84 Breasts felt empty/softer/smaller
85 Advice from doctor
86 Advice from Family Health nurse
87 Other (Describe)

For more than 5 children describe how you decided you did not have enough milk in each case below

88 Did you seek help for any of your breastfeeding problems at any time?
   0 □ No Go to Question 99   1 □ Yes

If you did seek help who was this from? (Tick ✓ all that apply.)

89 Family doctor
90 Community midwife
91 Australian Breastfeeding Association counsellor
92 Family and friends
93 Child Health 24 hour telephone advice
94 Hospital midwife
95 Lactation consultant
96 Family health nurse
97 Other (Specify)

98 Which health professional was most helpful with breastfeeding? (Choose ONE)
   1 □ Family doctor   2 □ Community midwife   3 □ Lactation consultant
   4 □ Hospital midwife   5 □ Family health nurse   6 □ Other (Specify)
What was the main reason why you stopped breastfeeding your previous child?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Not very</th>
<th>Not sure</th>
<th>Reasonably</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1□</td>
<td>2□</td>
<td>3□</td>
<td>4□</td>
<td>5□</td>
</tr>
</tbody>
</table>

Did you enjoy breastfeeding?

<table>
<thead>
<tr>
<th></th>
<th>1□</th>
<th>2□</th>
<th>3□</th>
<th>4□</th>
<th>5□</th>
</tr>
</thead>
</table>

Do you feel you were successful with breastfeeding?

<table>
<thead>
<tr>
<th></th>
<th>1□</th>
<th>2□</th>
<th>3□</th>
<th>4□</th>
<th>5□</th>
</tr>
</thead>
</table>

How committed to breastfeeding were you overall?

<table>
<thead>
<tr>
<th></th>
<th>1□</th>
<th>2□</th>
<th>3□</th>
<th>4□</th>
<th>5□</th>
</tr>
</thead>
</table>

How long is it since your last baby? yrs

Did you hold any of your previous babies in skin-to-skin contact at the time of birth?

<table>
<thead>
<tr>
<th></th>
<th>0□ No</th>
<th>2□ Yes</th>
<th>3□ Can't remember</th>
</tr>
</thead>
</table>

If Yes, state which number babies were held in skin-to-skin contact.

Please add any other comment/s you wish to make about your previous breastfeeding experience

Thank you for providing this helpful information.

The next 2 pages are surveys about breastfeeding confidence.
Appendix D Queensland perinatal data collection
### Appendix E Pregnancy hand held record (PHHR)

#### Personal History

<table>
<thead>
<tr>
<th>Date of last pap smear</th>
<th>Gynaecological disease</th>
<th>Gynaecological counselling</th>
<th>Fertility problems</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### Medical

<table>
<thead>
<tr>
<th>Heart disease</th>
<th>Diabetes (specific treatment)</th>
<th>Gastrointestinal/Eating disorders</th>
<th>High blood pressure</th>
<th>Kidney disease/UTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Surgical

<table>
<thead>
<tr>
<th>Previous anaesthetic</th>
<th>Blood transfusions</th>
<th>Medications (incl. over the counter)</th>
<th>Allergies</th>
<th>Alcohol</th>
<th>Smoking</th>
<th>Other drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### Family History

<table>
<thead>
<tr>
<th>Asthma</th>
<th>Diabetes</th>
<th>Heart disease</th>
<th>High blood pressure</th>
<th>Postnatal depression</th>
<th>Psychiatric illness</th>
<th>Genetic disorders</th>
<th>Hearing</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Other

- autoimmune
- DVT's
- DVT's
- Thrombosis
- Other
Appendix F Breastfeeding Self-efficacy Scale (BSES - Short Form)

Breastfeeding Confidence

<table>
<thead>
<tr>
<th>Code Number:</th>
<th>Date:</th>
</tr>
</thead>
</table>

For each of the following statements, choose the answer that best describes how confident you may feel about breastfeeding your new baby. Mark your answer by ticking the box that is closest to how think you will feel. There is no right or wrong answer (Please choose ONLY ONE ANSWER for each question)

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident</th>
<th>Not very confident</th>
<th>Sometimes confident</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can always determine that my baby is getting enough milk</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I can always successfully cope with breastfeeding like I have with other challenging tasks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I can always breastfeed my baby without using formula as a supplement</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I can always ensure that my baby is properly latched on for the whole feeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I can always manage the breastfeeding situation to my satisfaction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I can always manage to breastfeed even if my baby is crying</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I can always keep wanting to breastfeed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>I can always comfortably breastfeed with my family members present</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I can always be satisfied with my breastfeeding experience</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>I can always deal with the fact that breastfeeding can be time-consuming</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>I can always finish feeding my baby on one breast before switching to the other breast</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I can always continue to breastfeed my baby for every feeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>I can always manage to keep up with my baby's breastfeeding demands</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>I can always tell when my baby is finished breastfeeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

The remaining information will be completed by the researcher around the time you give birth, before you leave the hospital to go home and by follow-up phone calls. Follow-up phone calls will be around 2 weeks, 3 months and again at 6 months after you have given birth. The telephone survey, 'perception of milk adequacy' and 'breastfeeding confidence' surveys will be repeated at these follow up times. Thank you for participating in research for mothers and midwives
Appendix G Perception of Milk Adequacy (H&H scale)

**Perception of milk adequacy**

<table>
<thead>
<tr>
<th>Code Number:</th>
<th>Date:</th>
<th>Choose the answer that best describes how you imagine you may feel about breastfeeding your new baby</th>
<th>Mark your answer by ticking the box that is most relevant to how you imagine you will feel. There is no right or wrong answer (Choose ONLY ONE ANSWER for each question)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I feel that breastfeeding is providing my baby with an ideal food</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>2</td>
<td>I made the right decision when I decided to breastfeed my baby</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Even though I can breastfeed I would rather not be breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>4</td>
<td>Breastfeeding is a special way to console my baby</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>5</td>
<td>My baby would only get a bottle if I am not available for breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>6</td>
<td>I believe I can solve any breastfeeding problems that come along</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>7</td>
<td>I feel a sense of pride from watching my baby grow from my breastmilk</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>8</td>
<td>I am so upset about breastfeeding problems that I become upset at the thought of breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>9</td>
<td>I arrange my life so that breastmilk is almost the only thing my baby gets</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>10</td>
<td>Overall I would describe breastfeeding as a relaxing activity</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>11</td>
<td>My baby is satisfied with the amount of breastmilk received</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>12</td>
<td>My baby would be hungry if I did not use formula along with breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>13</td>
<td>I believe that following breastfeeding with a bottle is the best way to find out if baby got enough</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>14</td>
<td>I would describe my baby as fussy after breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>15</td>
<td>I feel I had to give formula after breastfeeding to satisfy my baby</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>16</td>
<td>In general I believe my baby was satisfied with breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>17</td>
<td>In general I am satisfied with breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>18</td>
<td>I became more relaxed as I sat and breastfed</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>19</td>
<td>My baby appears to enjoy breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>20</td>
<td>In general I feel successful at breastfeeding</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
</tbody>
</table>
# Appendix H Birth Room Events

## Birthing Events

**Code Number:**  
**Date:**  

The following are to be entered by the research observer at the time birth:

### A  Mother

1. **Weeks gestation**:  
2. **Birth Type (Choose ONE)**  
   - ☐ Spontaneous vaginal
   - ☐ Assisted forceps
   - ☐ Assisted vacuum extraction
   - ☐ Elective Caesarian section
   - ☐ Emergency Cesarean section

### Birth Events (Mark all that apply)

3. **Induction of labor**  
   - ☐ No
   - ☐ Yes

4. **Meconium liquor**  
   - ☐ No
   - ☐ Yes

5. **Fetal distress**  
   - ☐ No
   - ☐ Yes

6. **Failure to progress**  
   - ☐ No
   - ☐ Yes

7. **Prolonged 2nd stage > 2 hours**  
   - ☐ No
   - ☐ Yes

8. **Precipitate labour/birth**  
   - ☐ No
   - ☐ Yes

9. **Retained placenta**  
   - ☐ No
   - ☐ Yes

10. **PPH > 600 mls**  
    - ☐ No
    - ☐ Yes

11. **Monitoring (CTG)**  
    - ☐ No
    - ☐ Yes

12. **Other**

13. **Was Analgesia given during labor?**  
    - ☐ NO  
    - ☐ Yes
    
    If Yes, were any of the following given?

14. **Nitrous oxide gas**  
    - ☐ No
    - ☐ Yes

15. **Pethidine/narcotic**  
    - ☐ No
    - ☐ Yes

16. **Spinal**  
    - ☐ No
    - ☐ Yes

17. **Epidural**  
    - ☐ No
    - ☐ Yes

18. **Other**

19. **If Pethidine /narcotic given during labor, how long before birth was it last given?**  
    - _______ hours

---

238  

Appendix H
Appendix H

Perineum (Mark all that apply)

20  Intact  0□No  1□Yes Go to question 23
21  Episiotomy  0□No  1□Yes
22  Perineum sutured  0□No  1□Yes
23  Genital trauma  0□No  1□Yes
24  Were support person/s present for the birth?  0□No Go to Question 26  1□Yes
25  If Yes who was present at birth?  1□Partner
26  In what position did mother give birth?
   1□Standing  2□Sitting  3□Squatting  4□All fours  5□Flat on back  6□Semi-recumbent
27  How long did labor last?  ------------------ hrs  ------------------ mins
28  Were antibiotics given during labour?  0□No  1□Yes
29  If Yes give reason.  ________________________________________________________________

B  Baby

30  How many weeks gestation was baby at birth?
31  Was baby healthy when born?  0□No  1□Yes
32  If no describe
   1□Infection  2□Breathing problems  3□Jaundice  4□Other (Specify)  _______________________
33  Weight  _________ gms
34  Length  _________ cm  35  Head Circ  _________ cm
36  Baby 1 min apgar  _________  37  Baby 5 min apgar  _________
38  Baby apgar (other)  _________  39  Cord Ph  0□No  1□Yes  _________
40  Sex  1□Male  2□Female
41  Baby’s temperature before RTW  _________ °C  42  Time : hrs
43  Time of first breastfeed if not in the first hour of birth  : hrs
44  Include any further significant information/comments below
45  Busyness of the ward
46  Staffing levels at the time
47  Busyness of the Birthing
48  Describe nipple trauma if any

______________________________________________________________
| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| CODE               |
| DATE               |
| Record of actual time |
| Event observed     |
| 1 | Birth of baby     |
| 2 | Baby weak cry     |
| 3 | Baby vigorous cry |
| 4 | Baby head dried   |
| 5 | Baby body dried   |
| 6 | Warm blanket over m & b |
| 7 | Wraps changed warm dry |
| 8 | Cord Cut          |
| 9 | IM Syntocinon     |
| 10| Placenta birthed  |
| 11| Peri check        |
| 12| Peri repair       |
| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Baby               |   |   |   |   |   |   |   |   |   |   | P  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 1  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 2  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 3  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 4  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 5  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 6  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 7  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 8  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   | 9  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                     |   |   |   |   |   |   |   |   |   |   |10  |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

<p>| 1 | Placed on mother’s abdomen |
| 2 | Handed to mother           |
| 3 | Taken to resus cot         |
| 4 | Placed in open cot          |
| 5 | Placed in humidicrib        |
| 6 | Removed from mother’s arms |
| 7 | Returned to mother’s arms   |
| 8 | Handed to father            |
| 9 | Returned to father’s arms   |
|10 | Placed in Porta Cot         |</p>
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<td>Baby Held</td>
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<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>By father</td>
</tr>
<tr>
<td>3</td>
<td>By other 1</td>
</tr>
<tr>
<td>4</td>
<td>By other 2</td>
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<td>5</td>
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<td>With linen separating</td>
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<tr>
<td>7</td>
<td>Towel /blanket loosely over</td>
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<tr>
<td>8</td>
<td>Dressed</td>
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<td>9</td>
<td>Nappy on</td>
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<tr>
<td>10</td>
<td>Well wrapped - hands down</td>
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<tr>
<td>11</td>
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<td>Lying prone</td>
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<td>14</td>
<td>Lying on back</td>
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<td>-------------------------------</td>
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<tr>
<td>1 Pushes feet down</td>
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<td>2 Crawling movement</td>
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<td>3 Grasping with hands</td>
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<td>4 Hand to mouth</td>
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<tr>
<td>5 Sucks fingers</td>
<td></td>
</tr>
<tr>
<td>6 Sucks fist</td>
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<tr>
<td>7 Pokes tongue out</td>
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<tr>
<td>8 Licks</td>
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<td>9 Lip smacking</td>
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<td>10 Drooling saliva</td>
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<td>12 Turns head</td>
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<td>13 Attempt to lift head</td>
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<td>14 Lifts head up</td>
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<tr>
<td>15 Moves toward breast</td>
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<tr>
<td>16 Nudges breast with chin</td>
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<tr>
<td>17 Begins to gape</td>
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<tr>
<td>18 Wide gape</td>
<td></td>
</tr>
<tr>
<td>19 Attempts to suck on skin</td>
<td></td>
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**Appendix I**
<p>| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Baby feeding behaviour (cont) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Attempts to grasp nipple | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Grasps nipple | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Takes asymmetrical latch | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | Baby suckles at breast | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Sustained suckle (deep rhythmical) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Repeated suck attempts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Attempt to relatch | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Off and on latching | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Reattached | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Baby off breast finished feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Throaty groaning/cries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Mucousy baby | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Mouths nipple | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| <strong>Breastfeeding</strong>    |   |   |   |   |   |   |   |   |   |   | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 1 Mother positions herself |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2 Mother positions baby close |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 3 Baby’s chin contacts breast |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 4 Mother holds her nipple to baby’s mouth |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 5 Expresses drop of colostrum for baby |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 6 Expresses drops colostrum into baby’s mouth |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 7 Mother supports baby whole body |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 8 Mother holds back of baby’s head |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 9 Mother questions milk adequacy |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10 Mother reports nipple pain |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 11 Mother reports nipple pain subsides |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 12 Mother looks at nipple after feeding |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 13 Mother reports nipple trauma |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 14 Mother requests help to bf |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Breastfeeding (cont)|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 16                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 17                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 18                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 19                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 20                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 21                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |</p>
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<td>0 1 2 3 4 5 6 7 8 9</td>
<td>1 Baby held to breast for mother</td>
</tr>
<tr>
<td></td>
<td>2 Baby's neck held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>3 Baby positioned close to breast</td>
</tr>
<tr>
<td></td>
<td>4 Baby's head held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>5 Baby's hands guided to support baby</td>
</tr>
<tr>
<td></td>
<td>6 Baby feeding behaviour noted</td>
</tr>
<tr>
<td></td>
<td>7 Baby feeding behaviour noted</td>
</tr>
<tr>
<td></td>
<td>8 Baby's neck held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>9 Baby positioned close to breast</td>
</tr>
<tr>
<td>10 11 12 13 14 15 16 17 18 19</td>
<td>10 Verbal encouragement given</td>
</tr>
<tr>
<td>20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60</td>
<td>11 Verbal instruction given re expressing</td>
</tr>
<tr>
<td></td>
<td>12 Mother's breast shaped to help baby wound up</td>
</tr>
<tr>
<td></td>
<td>13 Baby's head held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>14 Mother's breast shaped to help baby wound up</td>
</tr>
<tr>
<td></td>
<td>15 Baby moved to face mother</td>
</tr>
<tr>
<td></td>
<td>16 Baby's hand shaped to help baby wind up</td>
</tr>
<tr>
<td></td>
<td>17 Baby's head held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>18 Baby's head held by 'tong'</td>
</tr>
<tr>
<td></td>
<td>19 Instructed re expressing</td>
</tr>
</tbody>
</table>

Appendix I
| Minutes of the hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| **Resuscitation**   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 Mouth suction     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 Nares suction     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 Meconium suction  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   
| 4 Suction Mec via ETT|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   
| 5 Gastric suction   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Oxygen**           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 Facial oxygen     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 Bag and mask      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 IPPV via ETT      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Other**            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 Narcotic antagonist|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 External Cardiac Massage |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 Transfer to SCBU  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Appendix J Birthing room checklist audit tool

Breastfeeding Initiation - Birthing Room Checklist

Thank you for helping with the Birthing Room chart audit for CQI.

Tick the relevant box or write in the space provided

Write in the actual time events occur (use the 24 hour clock eg 0830hrs)

1 What time was baby born? : hrs

2 Was the mother able to respond to her baby at the time of birth?
0 NO 1 YES

3 If no, what time was mother able to respond to her baby? : hrs

4 Did the mother hold her baby within the first minute of birth?
0 NO 1 YES

5 If no, at what time did mother first hold her baby? : hrs

Did any of the following events occur before the mother held her baby the first time?

6 0≤N 1≤Y Baby placed on resuscitation trolley
7 0≤N 1≤Y Active resuscitation
8 0≤N 1≤Y Oral suction
9 0≤N 1≤Y Baby transferred to SCBU
10 0≤N 1≤Y Baby Physical assessment
11 0≤N 1≤Y Baby suck assessment
12 0≤N 1≤Y Baby placed under radiant heater
13 0≤N 1≤Y Baby weight and measured

14 0≤N1≤Y Routine injection Vitamin K
15 0≤N1≤Y Routine injections Hepatitis B
16 0≤N1≤Y Baby wrapped
17 0≤N1≤Y Baby held by significant other
18 0≤N1≤Y Baby bathed
19 0≤N1≤Y Mother showered
20 0≤N1≤Y Mother requested not to hold baby in skin-to-skin contact
21 0≤N1≤Y Other(specify)

22 Did the mother hold her naked baby against her bare chest/abdomen (in skin-to-skin contact) the first time she held her baby?
0 NO 1 YES

23 If no, did mother hold her baby in skin-to-skin contact some time later?
0 NO Go to question 48 1 YES

24 If yes, what time did skin-to-skin contact holding begin? : hrs

25 If mother held her baby in skin-to-skin contact who decided when to end skin-to-skin contact holding?
1 ≤ Mother 2 ≤ Support person 3 ≤ Midwife 4 ≤ Other (specify)

26 What time was skin-to-skin contact holding ended? : hrs

Did any of the following events interrupt skin-to-skin contact holding between mother and baby within the first hour of birth?

27 0≤N 1≤Y Baby placed on resuscitation trolley
28 0≤N 1≤Y Active resuscitation
29 0≤N 1≤Y Oral suction
30 0≤N 1≤Y Baby transferred to SCBU
31 0≤N 1≤Y Baby Physical assessment
32 0≤N 1≤Y Baby suck assessment
33 0≤N 1≤Y Baby placed under radiant heater
34 0≤N 1≤Y Baby weight and measured

35 0≤N1≤Y Routine injection Vitamin K
36 0≤N1≤Y Routine injections Hepatitis B
37 0≤N1≤Y Baby wrapped
38 0≤N1≤Y Baby held by significant other
39 0≤N1≤Y Baby bathed
40 0≤N1≤Y Mother showered
41 0≤N1≤Y Mothers requested to stop holding baby
42 0≤N1≤Y Baby removed from mother’s arms by other person
43 0≤N1≤Y Mother unwell
44 0≤N1≤Y Other(specify)
Breastfeeding Initiation - Birthing Room Checklist

45 If yes to any of the above was skin-to-skin contact recommenced later? 0=No 1=Yes
46 If skin-to-skin contact recommenced later, what time? : hrs
47 Did baby attempt to breastfeed while in birth suit/recovery room? 0=No 1=Yes
48 If no, what was the reason (Tick the box ☑ for relevant reason then go to Question 57)
   1=Formula fed baby  2=Mother not ready to feed  3=Other (Specify) ____________
49 Describe the baby’s first breastfeed attempt
   1=fed well’ sustained deep rhythmical suck, swallow, breathe patterns
   2=A few sucks
   3=Repeated latch with a few sucks each time
   4=Licked/nuzzled only
   5=Not interested in feeding
   6=Unable to latch despite repeated attempts
   7=Other (Describe) ____________
50 If baby breastfed in birth suit, what time did the baby begin breastfeeding? :
   hrs
51 At what time did baby finish the first breast (ie baby pulled off the breast)? :
   hrs
52 Did baby take the second breast? 0=No 1=Yes
53 Was the mother given any assistance to breastfeed the first time?
   0=NO 1=YES
54 If Yes, what level of assistance was given?
   1=Full assistance “put baby on” position and attach
   2=Moderate assistance – “put baby on” attachment only
   3=Moderate assistance – shaping of mother’s breast for her
   4=Minimal assistance – positioning of baby near the breast
   5=Minimal assistance – mother’s hands guided to support baby
   6=No hands on assistance – verbal instruction/explanation only
   7=No assistance required - mother independent
   8=Other (Describe) ____________
55 Was there any visible nipple trauma after the breastfeed (Not present before the feed)
   0=NO 2=YES blistered 3=YES bruising
   4=YES ridged 5=YES grazed 6=Other (Describe) ____________
56 Did mother report any nipple pain during the first breastfeed
   0=NO 1=YES
57 Baby’s temperature before return to ward °C
58 Time temperature checked :
   hrs
59 Time mother transferred to ward :
   hrs
60 What type of birth did mother have?
   1=SVD
   2=Assisted forcep  3=Assisted Vacc  4=Elect LUSCS  5=Emerg LUSCS

Your contribution to Quality Improvement is important. Thank you
## Observation of a breastfeeding about 24-48 hours after birth

Write ‘1’ in the box along side actions/behaviour observed while interviewing mothers after birth. Write ‘0’ in the box if the action/behaviour did not occur.

For item 5 ‘Mother positions herself comfortably’, choose only one option by ticking the relevant box.

<table>
<thead>
<tr>
<th>I</th>
<th>Maternal nurturing of baby</th>
<th>SCORE</th>
<th>III</th>
<th>Attachment</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mother is observed to be, or reports holding baby in skin-to-skin contact since leaving the birthing room</td>
<td></td>
<td>20</td>
<td>Mother waits for wide open mouth (gape)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mother is observed to be or reports often holding lightly dressed baby in close contact with herself</td>
<td></td>
<td>21</td>
<td>Mother brings baby closer to herself and onto breast</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mother allows baby unrestricted access to breast</td>
<td></td>
<td>22</td>
<td>Mother allows baby to latch independently</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mother is attentive to and/or interacts with her baby</td>
<td></td>
<td>23</td>
<td>Baby takes large asymmetrical portion of breast and nipple into mouth</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>II Positioning</strong></td>
<td></td>
<td>24</td>
<td>Mother states no nipple pain during breastfeed</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mother positions herself comfortably</td>
<td></td>
<td>25</td>
<td>Mother expresses a drop of colostrum into baby’s mouth</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>III Attachment</strong></td>
<td></td>
<td>26</td>
<td>Mother speaks positively about enough breastmilk</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Sitting in bed</td>
<td></td>
<td>27</td>
<td>Baby suckled with deep rhythmicale swallow, breathe patterns</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sitting in chair</td>
<td></td>
<td>28</td>
<td>Parents/mother confirm seeing baby swallow milk</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lying on side</td>
<td></td>
<td>29</td>
<td>Baby feeds with sustained attachment (without coming off and on)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Semi-recumbent</td>
<td></td>
<td>30</td>
<td>Baby shows interest in breastfeeding</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Other position (state)</td>
<td></td>
<td>31</td>
<td>Baby does not actively push away from the breast</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mother holds baby’s body in firm contact with her body – no gaps</td>
<td></td>
<td>32</td>
<td>Mother agrees no visible nipple trauma after breastfeed</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mother supports baby’s neck by stabilizing baby’s shoulders between the shoulder blades.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Baby’s head remains angled slightly back</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mother allows baby to lift up and extend head</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Mother holds baby close so baby’s chin is in firm contact with her breast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Mother rolls baby’s body in to face her breast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Mother does not hold the back of the baby’s head (by either fingers or hand)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Baby does not become distressed when approaching breastfeeding position</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Mother keeps baby’s body including head in straight alignment from head to toe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CODE __________________**  

**DATE __________ TIME __________**  

**TOTALS**

---

**Appendix K1 The postnatal breastfeeding observation tool (PBOT)**
Appendix K2 Follow-up prior to discharge

**Ward Follow up prior to discharge**

<table>
<thead>
<tr>
<th>Code Number:</th>
<th>Date:</th>
<th>Time of visit hrs</th>
</tr>
</thead>
</table>

1. **What is baby's age?** ____________________ hours  
   - **Is baby breastfeeding?**  
     - 0□ No  
     - 1□ Yes

2. **Are any other foods/substances fed to the baby?**  
   - 0□ No  
   - 1□ Yes

3. **If YES, what else is fed to baby?**  
   - 1□ Water  
   - 2□ Formula  
   - 3□ Honey  
   - 4□ Vitamins  
   - 5□ Other (Specify)  
   - ________________________________

4. **To what extent is baby breastmilk feeding?**  
   - 1□ Exclusively breastfeeding (no other oral substance whatsoever)  
   - 2□ Breastfeeding but occasional water and/or vitamins given  
   - 3□ Partial High. More than 80% of feeds over 24 hours were breastfeeds (ie 8 in 10)  
   - 4□ Partial Medium. About 20% - 80% of feeds over 24 hours were breastfeeds (ie 2 - 8 in 10)  
   - 5□ Partial Low. Less than 20% of feeds over 24 hours were breastfeeds (ie less than 2 in 10)  
   - 6□ Token. Given 2 – 3 short breastfeeds in 24 hours or about 15 minutes total  
   - 7□ Not. Exclusively formula feeding.

5. **If baby is fed formula, what formula is used?**  
   - ____________________  
   - Go to question 10 if not breastfeeding

6. **How often each day does baby breastfeed?**  
   - ________________

7. **About how long does the average breastfeed last?**  
   - ________________

8. **At the most about how long between feeds?**  
   - ________________

9. **Are any feeding devices used?**  
   - 0□ No  
   - 1□ Yes

10. **If YES what is used to help feed baby?**  
    - 1□ Bottle teat  
    - 2□ Cup  
    - 3□ Finger feeding  
    - 4□ Nipple shield  
    - 5□ Other (Specify)  
    - ________________________________

11. **If bottle teat used, what brand/shape?**  
    - ________________________________

12. **If dummy/pacifier used?**  
    - 0□ No  
    - 1□ Yes

13. **If Yes, what brand/shape?**  
    - 1□ Nuk  
    - 2□ Cherry bulb  
    - 3□ Flat  
    - 4□ Other  
    - ________________________________

14. **Do you express breastmilk?**  
    - 0□ No  
    - 1□ Yes
If Yes, what method is used to express breastmilk?
1. Hand self
2. Hand midwife/other
4. Electric pump
5. Other (Specify)  

If a breast pump is used, state the brand  

Is baby fed expressed breast milk? 0. No 1. Yes  

Is there nipple pain at the start of the breastfeed? 0. No Go to question 1 1. Yes  

If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking the relevant box below
‘0’ being no pain at all and ‘10’ being the worst pain imaginable  

No pain just tugging feeling of baby moving my breast
Minor discomfort
Moderate pain
Severe pain
Very Severe pain

0 1 2 3 4 5 6 7 8 9 10  

Do you have nipple pain during the breastfeed? 0. No Go to question 1 1. Yes  

If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking the relevant box below
‘0’ being no pain at all and ‘10’ being the worst pain imaginable  

No pain just tugging feeling of baby moving my breast
Minor discomfort
Moderate pain
Severe pain
Very Severe pain

0 1 2 3 4 5 6 7 8 9 10  

What word/s would you use to describe the pain?  

Can any damage be seen on the nipple? 0. No Go to question 30 1. Yes  

If Yes, is the damage improving or getting worse? 1. Getting worse 2. About the same 3. Improving  

Which nipple/s is the damage on? 1. Left and Right 2. Left only 3. Right only  

Appendix K2
How would you describe the damage to the nipple/s?
(Tick choices below or write your description.)

1. Blistered  
2. Bruised  
3. Grazed  
4. Cracked  
5. Bleeding  
6. Compressed/ridged  
7. Other

Use the diagram below to describe where on the nipple the damage is. Eg

![Diagram of Nipples]

28 Right Nipple  
1. Stripe in middle  
2. Stripe medial aspect  
3. Stripe lateral aspect  
4. Describe 

29 Left Nipple  
1. Stripe in middle  
2. Stripe medial aspect  
3. Stripe lateral aspect  
4. Describe 

30 How much help do you feel you need with breastfeeding?

1. Full assistance “put baby on” position and attach  
2. Moderate assistance – “put baby on” attachment only  
3. Minimal assistance – positioning only  
4. No hands on assistance – verbal encouragement only  
5. Reassurance about attachment  
6. None  
7. Other (Describe)

The following questions refer to the breastfeeding help you received after birth. (Tick box that best reflects your experience.)

31 I feel inadequate after being given help to breastfeed.  
32 Another person has held my breast to attach baby for me.  
33 My baby has been held to my breast for me to get baby on.  
34 I have been “told” to manage attachment a certain way.  
35 Advice I received directly contradicted previous advice.  
36 A range of helpful “suggestions” have been offered.  
37 I have been offered breastfeeding information.  
38 Staff in attendance have listened to my needs  
39 Other
Has your milk “come in”?  
0 ☐ No  
1 ☐ Yes  
1 ☐ Not sure  

Comment  
__________________________________________________________________________

How do your breasts feel?  
1 ☐ Soft  
2 ☐ Firming  
3 ☐ Firm  
4 ☐ Heavy  
5 ☐ Rock hard  
6 ☐ Lumpy  
7 ☐ I don’t know  
8 ☐ Other  

Comment  
__________________________________________________________________________

What are the 3 most important/helpful things midwives did/can do to help you get started with breastfeeding this baby?  

1 

2 

3 

__________________________________________________________________________

What if any, are unhelpful things midwives did in your experience of learning to breastfeed this baby.  

1 

2 

3 

__________________________________________________________________________

Identify the 3 things you feel gave you confidence to breastfeed.  

1 

2 

3 

__________________________________________________________________________

Appendix K2
Do you have any comments you would like to make about your experience holding your baby in skin-to-skin contact?

________________________________________________________________________________________________________________________________________________________________________

Do you have any other comments you would like to make about your experience feeding baby?

________________________________________________________________________________________________________________________________________________________________________

Are there any other questions you have or comments you’d like to make?

Comment/s:

________________________________________________________________________________________________________________________________________________________________________

<table>
<thead>
<tr>
<th>Questions Asked by participant</th>
<th>Response/explanation offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Literature given

1 □ Breasts Work
2 □ Key to Success
3 □ Breast or Bottle
4 □ LC’sQld
5 □ Other

Problem/s identified

Referal to

Time visit ended: __________________________ Discharge Date: / /2004
Discharge Time: __________________________ hrs

Thank you for participating in this research. Your contribution is highly valued.
Points reviewed by researcher after observation of a full breastfeed?

1. Position - nipple under nose
2. Position - baby’s chin in firm contact with breast
3. Position - hold baby’s chest on breast firm contact - no gaps
4. Attach - wait for baby to gape wide open
5. Attach - allow baby freedom to adjust own head position for comfort
6. Attach - firm support of baby’s shoulders
7. Attach large asymmetrical latch pointed out
8. Revise/explain breast function patterns
9. Clarify ‘milk in’ and milk production levels
10. Switch feeding increases supply. Stay on one breast for drainage and hind milk.

Other matters discussed

Other comments by researcher
Appendix K3 Follow-up at 2 weeks

Telephone follow-up at 2 weeks

Code Number: __________________________
Date: __________________________
Time: __________________________

I am phoning to follow-up on the skin-to-skin contact research.

1. How are you?
   Comment: __________________________
   __________________________

2. Are you well?
   Comment: __________________________
   __________________________

3. How is baby?
   Comment: __________________________
   __________________________

4. Tell me about the last two weeks being home with baby.
   1. baby weight
   2. baby growth
   3. baby feeding
   4. baby behaviour
   5. milk supply
   6. routine post visits
   7. present extra help
   8. coping
   9. managing
   10. other comment/s

5. What is baby’s age today? ____________ days

6. Is baby breastfeeding? 0 □ No 1 □ Yes

7. Are any other foods/substances fed to the baby?
   0 □ No 1 □ Yes

8. If YES, what else is fed to baby?
   1. Water
   2. Formula
   3. Honey
   4. Vitamins
   5. Other (Specify) __________________________

258 Appendix K3
9 To what extent is baby breastmilk feeding?
   1. Exclusively breastfeeding (no other oral substance whatsoever)
   2. Breastfeeding but occasional water and/or vitamins given
   3. Partial High. More than 80% of feeds over 24 hours were breastfeeds (ie 8 in 10)
   4. Partial Medium. About 20% - 80% of feeds over 24 hours were breastfeeds (ie 2 - 8 in 10)
   5. Partial Low. Less than 20% of feeds over 24 hours were breastfeeds (ie less than 2 in 10)
   6. Token. Given 2 – 3 short breastfeeds in 24 hours or about 15 minutes total

10 If baby is fed formula, what formula is used? Go to question 14 if not breastfeeding

11 How often each day does baby breastfeed? 1. no set pattern

12 About how long does the average breastfeed last? 1. varies from feed to feed

13 At the most about how long between feeds? ____________________________

14 Are any feeding devices used? 0. No 1. Yes

15 If YES what is used to help feed baby?
   1. Bottle teat
   2. Cup
   3. Finger feeding
   4. Nipple shield
   5. Other (Specify) ____________________________

16 If bottle teat used, what brand/shape?

17 Is a dummy/pacifier used? 0. No 1. Yes

18 If Yes, what brand/shape?
   1. Nuk
   2. Cherry bulb
   3. Flat
   4. Other

19 Do you express breastmilk? 0. No 1. Yes

20 If Yes, what method is used to express breastmilk?
   1. Hand self
   2. Hand midwife/other
   4. Electric pump
   5. Other (Specify) ____________________________

21 Is a breast pump used? 0. No 1. Yes

22 How often do you hold your bare baby next to your bare chest (skin-to-skin)?
   0. No 1. Yes

If Yes, Never Rarely Occasionally Often Daily

Appendix K3
Have you experienced any of the following since leaving hospital?
(Tick ☑ the relevant boxes.)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Sore nipples/pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Mastitis/breast infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Too much milk/engorged breasts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Not enough milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Embarrassed about breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>I dislike breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Baby has colic/irritable crying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Baby has lactose intolerance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Baby is not attaching properly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>I'm not able to master attachment techniques taught in hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Other (Describe)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If not enough milk is a problem how do you decide you do not have enough milk?
(Tick ☑ the most relevant box)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>0</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Baby not gaining enough weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Baby demanding extra feeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Baby crying/irritable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Baby not sleeping enough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Baby sick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Breasts felt empty/softer/smaller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Advice from doctor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Advice from Family Health nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Other (Describe)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments

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44  Is there nipple pain at the start of the breastfeed?

0  No  Go to question  1  Yes

45  If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking the relevant box below. ‘0’ being no pain at all and ‘10’ being the worst pain imaginable

<table>
<thead>
<tr>
<th>No pain just tugging feeling of baby moving my breast</th>
<th>Minor discomfort</th>
<th>Moderate pain</th>
<th>Severe pain</th>
<th>Very Severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑</td>
<td>☑  ☑  ☑  ☑</td>
<td>☑  ☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

46  Do you have nipple pain during the breastfeed?

0  NO  Go to question  1  YES

47  If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking the relevant box below. ‘0’ being no pain at all and ‘10’ being the worst pain imaginable

<table>
<thead>
<tr>
<th>No pain just tugging feeling of baby moving my breast</th>
<th>Minor discomfort</th>
<th>Moderate pain</th>
<th>Severe pain</th>
<th>Very Severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☑</td>
<td>☑  ☑  ☑  ☑</td>
<td>☑  ☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

48  What word/s would you use to describe the pain

49  Can any damage be seen on the nipple/?

0  No

1  Yes

50  If Yes, Is the damage improving or getting worse?

1  Getting worse

2  About the same

3  Improving

51  Which nipple/s is the damage on?

1  Left and Right

2  Left only

3  Right only

52  How would you describe the damage to the nipple/s? (mark choices below or write your description)

1  Blistered

2  Bruised

3  Grazed

4  Cracked

5  Bleeding

6  Compressed/ridged

7  Other
Use the diagram below to describe where on the nipple the damage is. Eg ☑

<table>
<thead>
<tr>
<th>o’clock position</th>
<th>R</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Nipple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Stripe in middle</td>
<td></td>
<td>2 Stripe medial aspect</td>
</tr>
<tr>
<td>3 Stripe lateral aspect</td>
<td></td>
<td>4 Describe</td>
</tr>
<tr>
<td>Left Nipple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Stripe in middle</td>
<td></td>
<td>2 Stripe medial aspect</td>
</tr>
<tr>
<td>3 Stripe lateral aspect</td>
<td></td>
<td>4 Describe</td>
</tr>
</tbody>
</table>

53 Are you doing study or paid work that takes you away from your baby at the present time

0 No 1 Yes full time 2 Yes part time

54 If Yes, did returning to study or paid work cause you to stop breastfeeding before you had planned

0 No 1 Yes

55 Did you seek help for breastfeeding since leaving hospital?

0 No 1 Yes

56 If you did seek help/advice who was this from? Tick ☑ all that apply.

1 Family doctor 2 Community midwife
3 Australian Breastfeeding Association counselor 4 Family and friends
5 Child Health 24 hour telephone advice 6 Hospital midwife
7 Lactation consultant 8 Family health nurse
9 Other (Specify)

57 Which health professional was most helpful with breastfeeding? (Choose ONE)

1 Family doctor 2 Community midwife 3 Lactation consultant
4 Hospital midwife 5 Family health nurse 6 Other

58 Do you have any other questions or comments you’d like to make?

61 Questions/comments by participant

Response offered by researcher

1

2

Time call ended ................................

Thank you for participating in this research.
Appendix K4 Follow-up at 3 months

Telephone follow-up at 3 months

Code Number: .................................
Date: .................................
Time .................................

I am phoning to follow-up on the skin-to skin contact research.

1 How are you? Are you well?
   Comment: ...........................................

2 Is baby well?
   Comment: ...........................................

3 What is baby’s age today? [ ] months [ ] weeks [ ] days
   How are you feeding baby at present?
   1 ☐ Breastfeeding 0 ☐ N 1 ☐ Y
   2 ☐ Expressed breastmilk (EBM) 0 ☐ N 1 ☐ Y
   3 ☐ Formula feeding 0 ☐ N 1 ☐ Y
   4 ☐ Solids 0 ☐ N 1 ☐ Y
   5 ☐ Other (Specify) ______________________

9 If breastfeeding, are any other foods/substances fed to the baby?
   0 ☐ No 1 ☐ Yes

10 If YES, what else is fed to baby?
   1 ☐ Water 2 ☐ Formula 3 ☐ Honey
   4 ☐ Vitamins 5 ☐ Other (Specify) ______________________

11 To what extent is baby breastmilk feeding?
   1 ☐ Exclusively breastfeeding (no other oral substance whatsoever)
   2 ☐ Breastfeeding but occasional water and/or vitamins given
   3 ☐ Partial High. More than 80% of feeds over 24 hours were breastfeeds (ie 8 in 10)
   4 ☐ Partial Medium. About 20% - 80% of feeds over 24 hours were breastfeeds (ie 2 - 8 in 10)
   5 ☐ Partial Low. Less than 20% of feeds over 24 hours were breastfeeds (ie less than 2 in 10)
   6 ☐ Token. Given 2 – 3 short breastfeeds in 24 hours or about 15 minutes total
   7 ☐ Not. Exclusively formula feeding.

12 If baby is fed formula, what formula is used? .................................
   Go to question 14 if not breastfeeding

Appendix K4 263
13. If baby is fully breastfeeding (no solids), how many breastfeeds does she/he have each day? (in a 24 hour period) Go to Question 18

1. [ ] 1-2 feeds per day 2. [ ] no regular pattern/demand feeding/feeds on and off all day

14. If baby is fully feeding only on milk (ie formula +/- breastfeeding but “no solids”), how many feeds does she/he have each day? (in a 24 hour period) Go to Question 18

1. [ ] 1-2 feeds per day 2. [ ] no regular pattern/demand feeding/feeds on and off all day

15. If baby is having breastmilk and solids, how many feeds with breastmilk does he/she have each day? (in a 24 hour period). Go to Question 17

1. [ ] 1-2 feeds per day 2. [ ] no regular pattern/demand feeding/feeds on and off all day 3. [ ] Other (Please comment)

16. If baby is having formula and solids (or formula and breastmilk & solids), how many feeds with formula does he/she have each day? (in a 24 hour period).

1. [ ] 1-2 feeds per day 2. [ ] no regular pattern/demand feeding/feeds on and off all day 3. [ ] Other (Please comment)

17. If baby is having solids? At what age did he/she commence solids?

1. [ ] 1-2 months 2. [ ] not sure/ can’t remember

18. Are any feeding devices used?

0. [ ] No 1. [ ] Yes

19. If YES what is used to help feed baby?

1. [ ] Bottle teat 2. [ ] Cup 3. [ ] Finger feeding 4. [ ] Nipple shield 5. [ ] Other (Specify)

20. If bottle teat used, what brand/shape?

---------------------------------------------------------------------

21. Is a dummy/pacifier used?

0. [ ] No 1. [ ] Yes

22. If Yes, what brand/shape?

1. [ ] Nuk 2. [ ] Cherry bulb 3. [ ] Flat 4. [ ] Other

23. Do you express breastmilk?

0. [ ] No 1. [ ] Yes

24. If Yes, what method is used to express breastmilk?


25. If a breast pump is used, state the brand

---------------------------------------------------------------------

26. Is baby fed expressed breast milk?

0. [ ] No 1. [ ] Yes

27. If baby is having solids, how many feeds of solid food does she/he have each day?

1. [ ] 1-2 feeds per day 2. [ ] Other (please comment)
If baby is having solids, what type of solids is your baby having? (tick all that apply)

28. Baby cereal
29. Fruit
30. Vegetables
31. Yoghurt
32. Custard
33. Meat
34. Other (Describe) __________________________

Have you experienced any of the following since the last time we spoke? (Tick ☑ the relevant boxes.)

35. Sore nipples/pain
36. Mastitis /breast infection
37. Too much milk/engorged breasts
38. Not enough milk
39. Embarrassed about breastfeeding
40. I dislike breastfeeding
41. Baby has colic/irritable crying
42. Baby has lactose intolerance
43. Baby is not attaching properly
44. I’m not able to master attachment techniques
45. Other (Describe) __________________________

If not enough milk is a problem how do you decide you do not have enough milk? (Tick ☑ the most relevant box)

46. Baby not gaining enough weight
47. Baby demanding extra feeds
48. Baby crying/irritable
49. Baby not sleeping enough
50. Baby sick
51. Breasts felt empty/softer/smaller
52. Advice from doctor
53. Advice from Family Health nurse
54. Other (Describe) __________________________
55 Is there nipple pain at the start of the breastfeed?
   0□ No Go to question 1□ Yes

56 If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking □ the relevant box below. '0' being no pain at all and '10' being the worst pain imaginable
   0□ 1□ 2□ 3□ 4□ 5□ 6□ 7□ 8□ 9□ 10□

57 Do you have nipple pain during the breastfeed?
   0□ NO Go to question 1□ YES

58 If Yes, describe your level of nipple pain on a scale of 0 – 10 by ticking □ the relevant box below '0' being no pain at all and '10' being the worst pain imaginable
   0□ 1□ 2□ 3□ 4□ 5□ 6□ 7□ 8□ 9□ 10□

59 Can any damage be seen on the nipple/?
   0□ No 1□ Yes

60 If Yes, Is the damage improving or getting worse?
   1□ Getting worse 2□ About the same 3□ Improving

61 Which nipple/s is the damage on?
   1□ Left and Right 2□ Left only 3□ Right only

62 How would you describe the damage to the nipple/s? (mark choices below or write your description)
   1□ Blistered 2□ Bruised 3□ Grazed
   4□ Cracked 5□ Bleeding 6□ Compressed/ridged
   7□ Other

63 Are you doing study or paid work that takes you away from your baby at the present time
   0□ No 1□ Yes full time 2□ Yes part time

64 If Yes, did returning to study or paid work cause you to stop breastfeeding before you had planned
   0□ No 1□ Yes

65 Did you seek help for breastfeeding since last we spoke?
   0□ No 1□ Yes

66 If you did seek help/advice who was this from? Tick □ all that apply.
   1□ Family doctor 2□ Community midwife
   3□ Australian Breastfeeding Association counselor 4□ Family and friends
   5□ Child Health 24 hour telephone advice 6□ Hospital midwife
   7□ Lactation consultant 8□ Family health nurse
   9□ Other (Specify)
Which health professional was most helpful with breastfeeding? (Choose ONE)

1. Family doctor
2. Community midwife
3. Lactation consultant
4. Hospital midwife
5. Family health nurse
6. Other

If not breastfeeding, can you tell me the reason/s you decided to stop or give up breastmilk?

68. No  Yes  Did not want to breastfeed/ did not want to breastfeed any longer
69. No  Yes  Sore nipples/pain
70. No  Yes  Sore nipples/trauma
71. No  Yes  Mastitis/breast infection
72. No  Yes  Recurrent mastitis
73. No  Yes  Felt there was Not enough milk/ did not know baby had enough milk?
74. No  Yes  Baby very premature
75. No  Yes  Lack of help/supervision with breastfeeding
76. No  Yes  Baby had poor weight gain
77. No  Yes  Baby is not attaching/sucking properly
78. No  Yes  Unable to get baby to attach/suck/ difficulties attaching baby to the breast
79. No  Yes  Advice from professional (State which one)__________________
80. No  Yes  Employment reasons
81. No  Yes  Baby lost interest/ always looking around/starting feed
82. No  Yes  Advice form partner/family/friends
83. No  Yes  Maternal exhaustion/ feeling run down
84. No  Yes  So that other people could help with feeding/caring for baby
85. Other (Describe)
86. Other (Describe)
87. Of the above answers, which would be the most important reason for deciding to stop breastfeeding (write code from above question)

88. Do you have any other questions or comments you’d like to make?

89. Questions/comments by participant  
1

Response offered by researcher  
1

2

Time call ended  

Thank you for participating in this research
### Appendix K5 Follow-up at 6 months

**Telephone follow-up at 6 months**

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<td>Time:</td>
</tr>
</tbody>
</table>

I am phoning to follow-up on the skin-to-skin contact research.

1. How are you? Are you well?

   Comment:

2. Is baby well?

   Comment:

3. What is baby’s age today?  [ ] months  [ ] weeks  [ ] days

   **How are you feeding baby at present?**

   4. [ ] Breastfeeding  0 [ ] N  1 [ ] Y

   5. [ ] Expressed breastmilk (EBM)  0 [ ] N  1 [ ] Y

   6. [ ] Formula feeding  0 [ ] N  1 [ ] Y

   7. [ ] Solids  0 [ ] N  1 [ ] Y

   8. [ ] Other (Specify) ________________________

   9. If breastfeeding, are any other foods/substances fed to the baby?

      0 [ ] No  1 [ ] Yes

   10. If YES, what else is fed to baby?

       1. [ ] Water
       2. [ ] Formula
       3. [ ] Honey
       4. [ ] Vitamins
       5. [ ] Other (Specify) ________________________

   11. To what extent is baby breastmilk feeding?

      1. [ ] Exclusively breastfeeding (no other oral substance whatsoever)
      2. [ ] Breastfeeding but occasional water and/or vitamins given
      3. [ ] Partial High. More than 80% of feeds over 24 hours were breastfeeds (ie 8 in 10)
      4. [ ] Partial Medium. About 20% - 80% of feeds over 24 hours were breastfeeds (ie 2 - 8 in 10)
      5. [ ] Partial Low. Less than 20% of feeds over 24 hours were breastfeeds (ie less than 2 in 10)
      6. [ ] Token. Given 2 – 3 short breastfeeds in 24 hours or about 15 minutes total
      7. [ ] Not. Exclusively formula feeding.

   12. If baby is fed formula, what formula is used?  [ ] Go to question 14 if not breastfeeding

    ______________
If baby is fully breastfeeding (no solids), how many breastfeeds does she/he have each day? (in a 24 hour period). Go to Question 18

1. [ ] feeds per day
2. [ ] no regular pattern/demand feeding/feeds on and off all day

If baby is fully feeding on milk (i.e. formula +/- breastfeeding but "no solids”), how many feeds does she/he have each day? (in a 24 hour period). Go to Question 18

1. [ ] feeds per day
2. [ ] no regular pattern/demand feeding/feeds on and off all day

If baby is having breastmilk and solids, how many feeds with breastmilk does he/she have each day? (in a 24 hour period). Go to Question 17

1. [ ] feeds per day
2. [ ] no regular pattern/demand feeding/feeds on and off all day
3. [ ] Other (Please comment)

If baby is having formula and solids (or formula and breastmilk & solids), how many feeds with formula does he/she have each day? (in a 24 hour period). Go to Question 17

1. [ ] feeds per day
2. [ ] no regular pattern/demand feeding/feeds on and off all day
3. [ ] Other (Please comment)

If baby is having solids? At what age did he/she commence solids?

1. [ ] months/weeks
2. [ ] not sure/ can't remember

Are any feeding devices used?

0. [ ] No
1. [ ] Yes

If YES what is used to help feed baby?

1. [ ] Bottle teat
2. [ ] Cup
3. [ ] Finger feeding
4. [ ] Nipple shield
5. [ ] Other (Specify)

If bottle teat used, what brand/shape?

------------------------------------------

Is a dummy/pacifier used?

0. [ ] No
1. [ ] Yes

If Yes, what brand/shape?

1. [ ] Nuk
2. [ ] Cherry bulb
3. [ ] Flat
4. [ ] Other

Do you express breastmilk?

0. [ ] No
1. [ ] Yes

If Yes, what method is used to express breastmilk?

1. [ ] Hand self
2. [ ] Hand midwife/other
3. [ ] Manual Pump
4. [ ] Electric pump
5. [ ] Other (Specify)

If a breast pump is used, state the brand

------------------------------------------

Is baby fed expressed breast milk?

0. [ ] No
1. [ ] Yes

If baby is having solids, how many feeds of solid food does she/he have each day?

1. [ ] feeds per day
2. [ ] Other (please comment)
If baby is having solids, what type of solids is your baby having? (tick all that apply)

<p>| | | |</p>
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<th></th>
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<td>33</td>
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<td>Yes</td>
</tr>
<tr>
<td>34</td>
<td>No</td>
<td>Yes</td>
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</tbody>
</table>

Have you experienced any of the following since the last time we spoke?  
(Tick ☑ the relevant boxes.)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>35</td>
<td>Sore nipples/pain</td>
<td>No</td>
</tr>
<tr>
<td>36</td>
<td>Mastitis/breast infection</td>
<td>No</td>
</tr>
<tr>
<td>37</td>
<td>Too much milk/engorged breasts</td>
<td>No</td>
</tr>
<tr>
<td>38</td>
<td>Not enough milk</td>
<td>No</td>
</tr>
<tr>
<td>39</td>
<td>Embarrassed about breastfeeding</td>
<td>No</td>
</tr>
<tr>
<td>40</td>
<td>I dislike breastfeeding</td>
<td>No</td>
</tr>
<tr>
<td>41</td>
<td>Baby has colic/irritable crying</td>
<td>No</td>
</tr>
<tr>
<td>42</td>
<td>Baby has lactose intolerance</td>
<td>No</td>
</tr>
<tr>
<td>43</td>
<td>Baby is not attaching properly</td>
<td>No</td>
</tr>
<tr>
<td>44</td>
<td>I’m not able to master attachment techniques</td>
<td>No</td>
</tr>
<tr>
<td>45</td>
<td>Other (Describe)</td>
<td></td>
</tr>
</tbody>
</table>

If not enough milk is a problem how do you decide you do not have enough milk?  
(Tick ☑ the most relevant box)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Baby not gaining enough weight</td>
<td>No</td>
</tr>
<tr>
<td>47</td>
<td>Baby demanding extra feeds</td>
<td>No</td>
</tr>
<tr>
<td>48</td>
<td>Baby crying/irritable</td>
<td>No</td>
</tr>
<tr>
<td>49</td>
<td>Baby not sleeping enough</td>
<td>No</td>
</tr>
<tr>
<td>50</td>
<td>Baby sick</td>
<td>No</td>
</tr>
<tr>
<td>51</td>
<td>Breasts felt empty/softer/smaller</td>
<td>No</td>
</tr>
<tr>
<td>52</td>
<td>Advice from doctor</td>
<td>No</td>
</tr>
<tr>
<td>53</td>
<td>Advice from Family Health nurse</td>
<td>No</td>
</tr>
<tr>
<td>54</td>
<td>Other (Describe)</td>
<td></td>
</tr>
</tbody>
</table>
Many new mothers experience some degree of nipple pain. Since the birth of your baby how would you describe your worst experience (on a scale from 0 to 10) during a feed, after the initial milk let down? (0 means “no pain at all” and 10 means “the worst pain possible”)

0 1 2 3 4 5 6 7 8 9 10

Can you estimate how old the baby was when you no longer experienced any nipple pain whilst feeding?

1 2 3 4

Always had nipple pain while still breastfeeding

Can any damage be seen on the nipple?

0 No
1 Yes

If Yes, Is the damage improving or getting worse?

1 Getting worse
2 About the same
3 Improving

Which nipple/s is the damage on?

1 Left and Right
2 Left only
3 Right only

How would you describe the damage to the nipple/s? (mark choices below or write your description)

1 Blistered
2 Bruised
3 Grazed
4 Cracked
5 Bleeding
6 Compressed/ridged
7 Other

Are you doing study or paid work that takes you away from your baby at the present time

0 No
1 Yes full time
2 Yes part time

If Yes, did returning to study or paid work cause you to stop breastfeeding before you had planned

0 No
1 Yes

Did you seek help for breastfeeding since last we spoke?

0 No
1 Yes

If you did seek help/advice who was this from? Tick ☑ all that apply.

1 Family doctor
2 Community midwife
3 Australian Breastfeeding Association counselor
4 Family and friends
5 Child Health 24 hour telephone advice
6 Hospital midwife
7 Lactation consultant
8 Family health nurse
9 Other (Specify)

Which health professional was most helpful with breastfeeding? (Choose ONE)

1 Family doctor
2 Community midwife
3 Lactation consultant
4 Hospital midwife
5 Family health nurse
6 Other
If not breastfeeding, can you tell me the reason/s you decided to stop or give up breastmilk?

<table>
<thead>
<tr>
<th>Code</th>
<th>Yes/No</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>Yes</td>
<td>Did not want to breastfeed/ did not want to breastfeed any longer</td>
</tr>
<tr>
<td>67</td>
<td>Yes</td>
<td>Sore nipples/pain</td>
</tr>
<tr>
<td>68</td>
<td>Yes</td>
<td>Sore nipples/trauma</td>
</tr>
<tr>
<td>69</td>
<td>Yes</td>
<td>Mastitis /breast infection</td>
</tr>
<tr>
<td>70</td>
<td>Yes</td>
<td>Recurrent mastitis</td>
</tr>
<tr>
<td>71</td>
<td>Yes</td>
<td>Felt there was Not enough milk/ did not know baby had enough milk?</td>
</tr>
<tr>
<td>72</td>
<td>Yes</td>
<td>Baby very premature</td>
</tr>
<tr>
<td>73</td>
<td>Yes</td>
<td>Lack of help/ support/supervision with breastfeeding</td>
</tr>
<tr>
<td>74</td>
<td>Yes</td>
<td>Baby had poor weight gain</td>
</tr>
<tr>
<td>75</td>
<td>Yes</td>
<td>Baby is not attaching/ sucking properly</td>
</tr>
<tr>
<td>76</td>
<td>Yes</td>
<td>Unable to get baby to attach /suck/ difficulties attaching baby to the breast</td>
</tr>
<tr>
<td>77</td>
<td>Yes</td>
<td>Advice from professional (State which one)____________________</td>
</tr>
<tr>
<td>78</td>
<td>Yes</td>
<td>Employment reasons</td>
</tr>
<tr>
<td>79</td>
<td>Yes</td>
<td>Baby lost interest/ always looking around/stopping and starting feed</td>
</tr>
<tr>
<td>80</td>
<td>Yes</td>
<td>Advice form partner/family/friends</td>
</tr>
<tr>
<td>81</td>
<td>Yes</td>
<td>Maternal exhaustion/ feeling run down</td>
</tr>
<tr>
<td>82</td>
<td>Yes</td>
<td>So that other people could help with feeding/caring for baby</td>
</tr>
<tr>
<td>83</td>
<td>Other (Describe)</td>
<td>__________________________________________________________</td>
</tr>
<tr>
<td>84</td>
<td>Other (Describe)</td>
<td>__________________________________________________________</td>
</tr>
<tr>
<td>85</td>
<td>Of the above answers, which would be the most important reason for deciding to stop breastfeeding (write code from above question)</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>Do you have any other questions or comments you’d like to make?</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>Questions/comments by participant</td>
<td>Response offered by researcher</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time call ended: [hrs]

Thank you for participating in this research
Appendix L1 Perceptions of helpful and unhelpful midwifery practices

Helpful with attachment

- Attached him to the breast
- Helped with feeding attachment position
- Put him on straight away
- Putting baby on me (skin-to-skin contact)
- Teaching me attachment
- Shown me what to do
- They did show us how to latch. You expect them to show you some things
- Initial help with right attachment, signs to look for
- Put her there
- Skin-to-skin contact thing
- Having her on my chest in birth suite made it more comfortable - the thought of breastfeeding
- Initial help with right attachment, signs to look for
- Tucking baby’s bottom in under my arm

Helpful showing how

- Helped me do it
- Showed me how to do it
- Showed me how to hold baby between the shoulders
- Showed positioning to not hurt me
- Shown how to shape the breast
- Coaxed baby on and tried to get him interested
- Shown me what to do
- Nipple to top lip not teasing baby’s mouth all around at a distance away
- Showing me different positions
- Coaxed baby on and tried to get him interested
- Helped me to express because I was in pain
- Expressed milk

Helpful encouragement and support

- Encouraged to keep going
- Encouraging skin-to-skin contact at birth and feeding at that time
- Encouragement but not forcing me
- Moral support
- Encouragement. They always offer help and I don’t feel like I’m improving
- Encouraged me to focus
- Made me feel OK about getting her on when I don’t know what I’m doing which was never given to me with my first one
- Following up on the same shift by the same midwife
- Reassurance that we can still feed him
Offering help

- All offered assistance if needed
- Offer help regardless of breastfeeding history
- Offered help early on
- Offering suggestions and alternatives even to a mother who has breastfed before
- Offer to watch a whole feed
- Midwife did what need to be done and left us alone for a while - no rush - very helpful
- Assisted with breastfeed attempts and acknowledged that if baby not interested its OK

Information

- Explained what can happen re engorgement and breast function and what to do
- Given me information
- Explaining the best effect of breastfeeding for baby
- Informed me about baby nuzzling and giving baby time to do it
- Answered my questions on if to wake baby up
- Breastfeeding video and a Lactation consultant to talk to
- Discussing options
- Told me about position to lie down
- Range of different things to do
- I thought I’d run out when finished and didn’t know there’d be more if I did it again in an hour and switched between breasts
- Nipple to top lip, not teasing baby’s mouth all around at a distance away
- Pointed out normality

No help/Unhelpful

- Didn’t get help it was not offered all they did was say “oh she looks like she’s latched on well”
- They should have a routine check list to go through rather than offer vague help
- They should at least go round and give us some advice
- I need someone to spend time with me and don’t rush off (45 mins to 1 hour)
- Didn’t see a midwife unless coming round to check temp or something
- No help given or offered except to tell me to leave bras on and take Panadol
- I felt she wouldn’t let me do it by myself. I had one yesterday and I felt she was doing it more for me than helping me. Then later I did it by myself. Then they also showed how to sit up and do it. She did it for me as well.
- I needed more attention
- Upsetting to baby and myself

Counter productive to attachment

- Forcing of baby head onto the nipple
- Grabbing of baby’s head
- Interfering
- Pushing too much
- Squeezing my nipples is excruciatingly painful
Appendix L2 Mother’s reported experience of holding naked newborn against their bare chest

**Mother’s experience of holding their naked newborn - bonding**

“Oh beautiful. It was lovely, gorgeous. A different feel, him being naked on me.”
“Different cause this is my second baby and didn’t do it with the first. It was good, rather than with clothes all the time. Makes me more bonded with baby straight away.”
“Find that the bond between us is good like he knows me and that he relaxes more”
“I feel it is very good to give me the feeling of belonging to me and she can feel my heart beat and my voice and familiarity which she knows already.”
“I felt comfortable; it was lovely. It made a big difference. I felt euphoric, on top of the moon.”
“I loved it, no doubt about it. I’ve been sleeping with him right next to me at night. Before I was very unsure about sleeping in bed with a baby but he and I are together.”
“I thought it was nice because I didn’t have that with ‘S’. ”
“I wished I’d have done it earlier but I was too stunned. It helped me to come to realise the birth had happened and to focus. The warmth and solidness of him made it real.”
“It was just wonderful. Just the fact it helped with bonding. I think it was just beautiful. It helps forget about all the pain I’d just gone through.”
“It’s a bit funny. It’s hard to grasp. Hard to explain. Glad baby was not so tired. It was definitely a bonus - made it seem like he was mine, what I went through was worth it.”
“Oh I loved it. Especially straight after birth it was an absolutely beautiful experience. I think it should be done with everyone - compulsory. Just the difference in attitude toward the baby in comparison to the other baby, the positive feelings straight up.”

**Mother’s experience of holding their naked newborn - breastfeeding**

“He came straight on me about half an hour after I had him; it was like a need after finished stitching. Skin contact with this one definitely the way to go; he didn’t show signs to going on straight away, just contented to be there for an hour then we went to the wards and fed him.”
“I’ve found the key.”
“I just found it amazing that she moved herself to the breast. I loved it and thought it was great.”
“I really think now that’s why he feeds. My last baby didn’t and I wonder if that’s why. She took so long to get the gist of it.”

**Less positive feelings expressed**

“I don’t really remember a lot of it because I was a bit crook. I knew he was with me and that helped me. They kept telling me where he was all the time.”
“It’s probably a good thing to do - natural, primitive. It should be pretty much standard practice. I didn’t feel any big surges of bonding or anything like that. Maybe from the baby’s point of view it is better for them.”
“No more of a comfort - I needed to be held myself. Very awkward - strange feeling.”
Appendix L3 Words mothers used to describe the pain

<table>
<thead>
<tr>
<th>annoying</th>
<th>bite</th>
<th>burning</th>
</tr>
</thead>
<tbody>
<tr>
<td>close my eyes for a minute</td>
<td>f word</td>
<td>gnawing</td>
</tr>
<tr>
<td>horrible</td>
<td>injection sting and gone</td>
<td>like a …#*!!#’</td>
</tr>
<tr>
<td>niggling</td>
<td>no</td>
<td>not worse than in hospital</td>
</tr>
<tr>
<td>ouch</td>
<td>ooh</td>
<td>pinching</td>
</tr>
<tr>
<td>pins and needles</td>
<td>relief</td>
<td>sensitive when he comes off</td>
</tr>
<tr>
<td>sharp</td>
<td>sharp pain then none</td>
<td>sharp pinch</td>
</tr>
<tr>
<td>sharp uncomfortable</td>
<td>shush</td>
<td>slight discomfort, pins and needles feeling</td>
</tr>
<tr>
<td>slight discomfort</td>
<td>sort of sharp tingling</td>
<td>stabbing pain</td>
</tr>
<tr>
<td>surprise oohh</td>
<td></td>
<td></td>
</tr>
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</table>