‘Understanding the physical activity patterns of Aboriginal and Torres Strait Islander mothers, including the factors that influence participation’

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Abstract
This thesis explores the physical activity experiences of Aboriginal and Torres Strait Islander mothers from a health promotion viewpoint, in which the determinants of physical activity can be understood. Although regarded as highly inactive subgroup of the population, little is known about the influence the determinants of health have on Aboriginal and Torres Strait Islander mothers’ physical activity participation. Therefore it is difficult to understand how future interventions could be developed to improve physical activity levels and probably explains why so few exist. The central argument of this thesis was that standardised, ‘one size fits all’ approaches, targeted at the majority are ineffective if they did not address the needs of specific groups and populations.

Physical inactivity is a serious public health issue for all Australians, in particular the Aboriginal and Torres Strait Islander population, who suffer the greatest burden of disease. Hence, efforts to close the gap are needed by promoting physical activity, which is noted as the second most modifiable risk factor to chronic disease. In order to do this a comprehensive understanding of the factors that influence participation is needed. Whilst limited information that documented the physical activity determinants of Aboriginal and Torres Strait Islander mothers was available, the influences of the broader determinants were examined. The World Health Organization’s social determinants of health were used as framework to understand the various influences that impacted Aboriginal and Torres Strait Islander women’s lives. The purpose of this initial investigation was to contextualise physical activity behaviour. At this point however, it was discovered that the evidence base of the broader Australian maternal population was also relatively small. Therefore, pilot work was conducted to strengthen the knowledge and approach that would be taken in the main study.

The main study used a case study approach to understand the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women. This included a cohort of Aboriginal and Torres Strait Islander women and a non-Indigenous cohort. The Theory of Planned Behaviour (TPB) was used as a theoretical framework in which inter- and intra-case analysis could be conducted to understand the cognitions of women that influence their intentions to be physically active. Case study analysis demonstrated the strong
influence the culture of motherhood has on all women regardless of the socioeconomic or cultural characteristics. Factors that opposed this culture reduced women’s confidence to be active. However a number of subtle differences were detected between Aboriginal and Torres Strait Islander and non-Indigenous women that will be useful for health promotion practice to assist in targeting and motivating postnatal women to be active.

This study supports the principles of health promotion theory and suggests that more work is needed that promotes the physical activity of all Australian postnatal women, as a sub-group of the broader female population. However, the postnatal population is heterogeneous therefore the needs of specific groups such as the Aboriginal and Torres Strait Islander population should be considered. This would include modification to the broader postnatal physical activity messages to ensure Aboriginal and Torres Strait Islander women are appropriately targeted and engaged to be physically active.
Statement of Original Authorship

“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 thesis itself.”

Signed: ______________________

Date: ______________________
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory of Planned Behaviour</td>
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<tr>
<td>TRA</td>
<td>Theory of Reasoned Action</td>
</tr>
<tr>
<td>CCHC</td>
<td>Community Child Health Clinics</td>
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<tr>
<td>PNG</td>
<td>postnatal groups</td>
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<tr>
<td>GCCC</td>
<td>Gold Coast City Council</td>
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<tr>
<td>PAR</td>
<td>Physical Activity Recall</td>
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<tr>
<td>QAIHC</td>
<td>Queensland Aboriginal and Islander Health Council</td>
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<tr>
<td>MET</td>
<td>Metabolic Equivalent</td>
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<tr>
<td>ACOG</td>
<td>American College of Obstetricians and Gynaecologist</td>
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### Definitions

**Physical activity:** will be defined in this study as any movements of the body produced by the skeletal muscles that results in energy expenditure (Capern and Christenson 1985). It may include terms such as exercise, fitness, incidental activity, active living and active sport and recreation. The recommended amount of minimum physical activity that should be undertaken by an individual is 30 minutes of accumulated moderate intensity physical activity (for example brisk walking). This should be carried out on five or more days of the week (Us Department of Health and Human Services 1996; Armstrong, Bauman et al. 2000). Moderate physical activity is defined as 3-5 metabolic equivalents (MET) (Dempsey, Butler et al. 2005).

<table>
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<th><strong>Non-Indigenous women:</strong></th>
<th>will be defined in this study as those women who have not self-identified as being of Aboriginal and/or Torres Strait Islander descent</th>
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**Postnatal period:** will be defined as the first year immediately after a woman has given birth.

**Maternal population:** will be defined as all mothers and includes women whom are in the postnatal period.
Acknowledgements

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CHAPTER 1: Introduction

This thesis seeks to demonstrate that health promotion programs aimed at the Aboriginal and Torres Strait Islander postnatal women must seek to understand the multitude of factors that influence this population if they are to be successful. Health promotion attempts to move individuals from education to the ways in which they can undertake behaviour change (World Health Organization 1986; World Health Organization 1986). A key component of the principle of health promotion is that in order to enhance success, skills and strategies should be developed so that populations are realistically able to achieve them in conjunction with changing or managing their environments (Health Promotion International 1986). This research is designed to understand how this translates in the Aboriginal and Torres Strait Islander context by understanding the physical activity experiences of women, examined within a determinant of health approach.

Understanding physical activity behaviour at a population level is challenging. Much research has been conducted over the years to understand this including exploratory studies, interventions studies and case studies amongst many others. Although this has occurred, physical inactivity is still a major problem in Australia. Women with children have been identified as a highly inactive subgroup of the population. Through the course of this research (including both the literature review and pilot studies), decisions were made to change the focus from the maternal population to the postnatal population, however it is important to note that the 1) postnatal population is a maternal population and 2) the postnatal period, which extends one year after a woman has given birth, has been reported as a vital time for behaviour change to occur (Mottola 2002).

Physical activity participation by postnatal women is particularly low (Armstrong, Bauman et al. 2000; Brown and Bauman 2000; Brown, Brown et al. 2001; Lewis and Ridge 2005). This time represents an extremely challenging period for women, especially if they are first time mothers and/or feel inadequately prepared to optimally care for their babies or themselves (Mottola 2002). Although the evidence implies a problem exists, limited published research currently describes the physical activity participation of Aboriginal and Torres Strait Islander postnatal women. This thesis seeks to address this gap in the evidence with the intention to inform future health promotion interventions targeted at this group.
The promotion of physical activity to Aboriginal and Torres Strait Islander women with children is an important public health issue. This is evident as they have been earmarked as a priority group in relation to physical activity promotion. It is well understood that physical inactivity is a major risk factor to chronic disease (Australian Institute of Health & Welfare 2005; Australian Bureau of Statistics 2007). Therefore the physiological benefits and potential health outcomes of physical activity are significant. In addition, the evidence suggests that the psychological benefits are also apparent (Lewis and Ridge 2005; Daley, MacArthur et al. 2007). The significance however of promoting physical activity to this sub-group of the population is two-fold, as not only can the primary population (postnatal women) be impacted but also a secondary population (children), as parents are important role models to their children (Larson-Meyer 2002; Medina and Magnuson 2009).

Whilst some work has been conducted in the postnatal physical activity area, more needs to be done to understand the factors that impact Aboriginal and Torres Strait Islander postnatal women. This is important as they suffer the greatest burden of disease, are the most inactive and are more likely to give birth (Australian Institute of Health & Welfare 2005; Australian Institute of Health & Welfare 2006); (Australian Bureau of Statistics 2007). Previous physical activity research has focused on the needs of advantaged mothers (middle class, white, married) (Yeager, Macera et al. 1993; Vertinsky 1998; Lewis and Ridge 2005). Therefore more directed work needs to be undertaken with Aboriginal and Torres Strait Islander women (Lewis and Ridge 2005). This is also palpable with past public health intervention research aimed at Aboriginal and Torres Strait Islander populations that seek to modify behavioural risk factors such as physical activity. The ineffectiveness of these programs has been attributed to overlooking the wider social meanings attached to chronic disease risk factors, as well as not acknowledging the social and cultural differences of the Aboriginal and Torres Strait Islander population. This requires a more in-depth understanding of these factors in addition to ensuring the cultural appropriateness of mainstream programs and services (Thompson, Gifford et al. 2000; Brough, Bond et al. 2004).

The limited evidence that exists suggests that physical activity participation amongst the Aboriginal and Torres Strait Islander community must seek to strengthen social and cultural connections (Brough, Bond et al. 2004). However the way in which these findings translate to the postnatal population is unknown. Such an understanding is important as it aligns with the
principles of health promotion that has demonstrated that a ‘one size fits all’ approach is ineffective, and that a thorough understanding of the community is needed. Therefore the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women are needed to inform health promotion approaches.

In order to address this gap, the principles of a problem analysis will be used. According to Kettner, Moroney & Martin (2008) a problem analysis seeks to understand a particular issue in depth before the generation of solutions is undertaken. Such an approach seeks to revoke common practice which involves the identification of problems in tandem with possible solutions. For this research, the problem of physical inactivity is explored in two ways. Firstly, the social determinants of health are used to contextualise physical activity behaviour into the lives of Aboriginal and Torres Strait Islander postnatal women. This allows for the issues that may directly or indirectly influence women to be identified and explored. Two pilot studies were conducted as part of this problem analysis to understand the issues that influence Australian postnatal women which could be used to inform the development of the main study.

Pilot work

Pilot Study 1: An exploratory study to understand the physical activity experiences of disadvantaged postnatal women. The aim of this pilot study was to assess the physical activity experiences of women who attended community child health clinics (CCHC). The research questions included:

- Are mothers meeting the National Physical Activity recommendations of at least 150 minutes of moderate physical activity per week?

- What information and advice are mothers recalling that is consistent with the National Physical Activity recommendations of 150 minutes of moderate physical activity per week?

- What factors are positively or negatively influencing mothers to achieve the National Physical Activity recommendations of 150 minutes of moderate physical activity per week?
Key findings of this pilot study: Whilst this pilot study was conducted with the intention to recruit disadvantaged women, the findings indicated that recruited women were middle class and well educated. The Active Australia survey was used during this study, however it was not considered an ideal instrument to collected physical activity measurement of mothers (see Chapter 3). The results showed that women were relatively active when compared to the National Physical Activity Guidelines; however they reported a number of barriers to participation. A consideration of this pilot was the need to consider different sub-groups of the maternal population as recruited women were in the early postnatal period (first year after childbirth).

Pilot Study 2: A facilitated group discussion with young disadvantaged mothers to understand the factors that influence their physical activity participation. The research questions included:

- How do mothers prioritize physical activity in their everyday lives?
- What factors do mothers report that positively or negatively influence their physical activity prioritization?
- What factors do mothers report that positively or negatively influence their motivation to undertake physical activity?
- What types of physical activities mothers participate in?

Key Findings of this pilot study: This second pilot study was undertaken to redress the issues identified in the first pilot study and was conducted in a youth health service with mothers that were identified as being disadvantaged (see Chapter 3). Women recognised the importance of physical activity however they also reported a number of barriers to participation. A key finding of this study was the need for women to interact and engage with other women in which they identified. This had particular implications for group-based physical activity programs that were promoted to the broader population. This findings from this pilot study suggested that the uptake of these programs would be appealing to women if they felt women similar to themselves attended these programs.

A number of methodological considerations were given at the conclusion of the pilot work. This was undertaken with the intention to inform the development of the main study. The key considerations given were in relation to nature of the target group (hard to reach groups), the
method (face-to-face versus group based date collection), a physical activity measurement tool and the stage of the motherhood a woman was in (maternal categories). These considerations are discussed in depth in Chapter 3.

**Main study**

The central argument of this work is that the needs and experiences of Aboriginal and Torres Strait Islander postnatal women are different to that of other groups hence targeted health promotion approaches must reflect these differences. The Theory of Planned Behaviour (TPB) underpinned the main study as it allowed for the physical activity cognitions of women to be examined. This information would help understand the factors that motivate women to be active as well as describing their physical activity intentions. The theory possesses three constructs which allow an understanding of how women perceive their physical activity (behavioural beliefs), the degree to which their significant others influence their behaviour (subjective norms) and how confident they are to undertake physical activity (controlled beliefs). Whilst the TPB has been used in postnatal physical activity research previously, it appears to have limited application in the Aboriginal and Torres Strait Islander population.

A follow up case study approach was the methodology used for this study. Two cohorts of women, similarly placed in the postnatal period were recruited. Each cohort was stratified by age, education, martial status, employment situation and parity. As this was a qualitative inquiry, data was analysed and coded in regard to the theoretical constructs of the TPB. Behavioural beliefs were considered in regard to the way in which women reported the costs and benefits of physical activity participation. Subjective norms were considered in regard to the degree in which women reported the need to conform to their significant others perceived physical activity. Controlled beliefs were reported in relation to the internal confidence that women had to be physically active. The theory informed the interview schedules at baseline and follow-up for both cohorts.

The aim of the *Mums the Word* study:

1) To understand the physical activity needs and experiences of Aboriginal and Torres Strait Islander postnatal women in Australia.
The research questions that this work sought to answer were:

1. What are the key salient behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) that influence their physical activity experience at baseline and 6 month follow up?
   
a. How do the behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) change among women of differing Indigenous descent, age, marital status, education, employment situation and parity?

2. What are the key behavioural beliefs, subjective norms and controlled beliefs of Aboriginal and Torres Strait Islander postnatal women that should be considered for the development of health promotion interventions that aim to increase physical activity levels?

Key findings of this study: The social and cultural influences of motherhood strongly influenced the behavioural beliefs, subjective norms and controlled beliefs of the postnatal women (both Aboriginal and Torres Strait Islander and non-Indigenous) recruited into this study. The key difference between the Aboriginal and Torres Strait Islander and non-Indigenous postnatal women was identified in their physical activity behavioural beliefs. Stratification of each of the cohorts by age, marital status, parity, education and income type also indicated some variance in the findings. This study reinforced the principles of health promotion theory that outlined the consideration of specific populations’ determinants and needs to inform approaches that will empower individuals to take control of their lives and their health. This study suggests that in some instances targeted maternal strategies may be relevant to both the Aboriginal and Torres Strait Islander and non-Indigenous postnatal women if they address cultural determinants related to motherhood. However, the findings also show that the reasons for physical activity participation by each cohort of women are different; hence the promotion of motivational factors will need to vary between each group. As a result a number of considerations for future research with this group have been identified. This includes the implications of maternal health promotion practice, Aboriginal and Torres Strait Islander physical activity health promotion and
the considerations needed when researching the postnatal population. In addition a number of research and health service recommendations are presented (see Chapter 6).

**The Researcher’s journey**

The researcher is a non-Indigenous woman, with no children and who has been an elite sportswoman for much of the duration of this thesis. Hence she feels that it is important for her to acknowledge this at the beginning, as well as acknowledge that she has little right to speak for or represent the views of Aboriginal and Torres Strait Islander physically inactive mothers. Although this may be true, her inexperience in each of these domains has motivated her to seek further into her inquiry to understand the factors that influence mothers’ physical inactivity. The researcher was also very conscious of her own attributes and the lens that she might apply to this research. In order to overcome these potential biases the researcher undertook two pilot studies to gain experience with the target group before undertaking the main study. These studies also provided her with the opportunity to reflect on her own experience and undertake discussions with her supervisors, colleagues and peers to ensure that her bias was limited.

The researcher also has gained confidence in the support she has received from the Queensland Aboriginal and Islander Health Council (QAIHC). QAIHC are the peak body for the Aboriginal and Torres Strait Islander Community Controlled health sector in Queensland. They are affiliates to the National Aboriginal Community Controlled Health Organisation (NACCHO). The researcher was supported to undertake her Doctor of Philosophy by the former research unit of QAIHC known as the Centre for Clinical Research Excellence for Circulatory and Associated Conditions in Urban Aboriginal and Torres Strait Islander Communities (funded by the National Health and Medical Research Council). This research was endorsed and supported by the QAIHC Board of Representatives and former Research Advisory Group (RAG) which included a number of Aboriginal and Torres Strait Islander researchers (Professor Cindy Shannon, Dr Noel Hayman, Dr Bronwyn Fredericks and Dr Mark Wenitong). The researcher was required to present progress and updates to RAG biannually.

The model adopted by the QAIHC CCRE was unique in which all funded researchers were provided with office space within the organisation. The key aim of the CCRE was to ensure that research findings translated into practice. The rationale for this was to enhance the research
culture within the organisation but also ensure that the researchers work addressed and accounted for the issues faced by the community on a daily basis (location at QAIHC). Whilst this provided many benefits to the organisation, it was equally rewarding for the researcher. Firstly this model ensured that the cultural considerations and understanding were the central theme to the researchers work by her location and by the integration into the organisation through staff meetings and presentations. Secondly, this model provided the researcher with greater access to the community and Aboriginal and Torres Strait Islander medical services (both health staff and clients). It also assisted in the development of rapport for the researcher as she represented a recognised organisation within the Aboriginal and Torres Strait Islander community.

This research journey begun before the Doctor of Philosophy was undertaken. Prior to this, the researcher had worked on a number of chronic disease projects that examined the health service utilisation of Aboriginal and Torres Strait Islander patients. On many occasions the researcher talked with health service clients about their chronic disease experience, very often after major surgery. Whilst these stories and lessons were significant to the researcher on both a personal and professional level, it resulted in more questions about what could be done to prevent such occurrences in the future to modify chronic disease risk factors such as physical activity.

As an elite sportswoman who was competing at both a national and international level participation in physical activity and exercise were imbedded into the researcher’s life. Therefore it was difficult for her to understand how physical activity could be excluded from individuals lives, given the many benefits of participation and due to the fact it is noted as the second most modifiable risk factor behind tobacco (Australian Institute of Health & Welfare 2002). Hence, the researcher was keen to promote the physical activity needs of the Aboriginal and Torres Strait Islander population. Therefore, an investigation in to the literature began, with a particular focus on the types of physical activity interventions that could be developed that would assist with this promotion. At this time, it was discovered that only one peer reviewed intervention existed in the literature that focussed on the promotion of physical activity within the Aboriginal and Torres Strait Islander community (Shilton and Brown 2004). Initially this provided many challenges for the researcher who had been intent on undertaking intervention research in which she hoped to build on her experience as a chronic disease research officer. The key question posed at this time was ‘how could she develop a health promotion intervention to promote
physical activity to Aboriginal and Torres Strait Islanders when limited evidence existed?" This proved to be the turning point in her inquiry and forced her to delve deeper into what she actually wanted to understand. Was the aim of the proposed intervention research to provide the community with an opportunity to be active? Or would the intervention research test the feasibility and acceptability of her approaches (which would be based on the evidence base and her experiences)? Had she planned to target the whole Aboriginal and Torres Strait Islander population or was there a specific section of the population?

Through analysis and consideration it was decided that the focus of the proposed research would be on Aboriginal and Torres Strait Islander mothers, as they represented a under-researched, vulnerable and physically inactive sub-group of the population (Australian Bureau of Statistics 2007; Liamputtong 2007). However a scan of the Aboriginal and Torres Strait Islander maternal population literature also revealed limited work existed that described their physical activity patterns and experiences. The researcher again considered the implications of her proposed intervention development via reference to health promotion theory.

**Outline of the Thesis**

Chapter two presents a review of the literature. The first section will review the history of health promotion theory to demonstrate how approaches designed to suit the needs of the majority neglect social and cultural differences of minority groups. The World Health Organization’s (WHO) social determinants of health will be used as a framework. The second section will contextualise the issues identified in the previous section and review the factors required when planning health promotion interventions for Aboriginal and Torres Strait Islander postnatal women.

Section 1 of Chapter 3 outlines pilot study one which was conducted in CCHC to explore the physical activity experiences of women who attended the clinics. This study aimed to identify current physical activity participation rates, the types of physical activity information received by women, barriers and facilitators to participation and to assess the awareness of local physical activity programs. A major limitation of this study was the inability to reach disadvantaged women from these clinics. Although the results represented the views of advantaged women, it
did, however, provide important methodological findings which were used to inform the major study reported in Chapter five.

Pilot study two involved a facilitated discussion with women identified as ‘at risk’ who attended a youth health service (see Chapter 3). This pilot study built on the findings from pilot study one. This study examined physical activity priority and barriers and facilitators to participation. Mothers were also asked to describe the types of activities they currently enjoyed as well as any activities they were intending to undertake. The findings from this study provided an interesting insight into the group’s perceptions about physical activity programs offered by the local council.

Section two of chapter three outlines the methodology employed for the major study titled the ‘Mums the Word’ project. A collective case study was used to understand the physical activity experiences of non-Indigenous and Aboriginal and Torres Strait Islander postnatal women. Women were recruited within the first eight weeks after giving birth and then followed up again six months later. Qualitative methods were employed using face-to-face interviews with women at these two time points. This approach was selected as a result of the pilot study findings, but also because it allowed for in-depth data to be obtained. Physical activity data was obtained at follow up only. A complete review of the methodological approach for this study can be found in this chapter.

Chapter four outlines the qualitative results of the ‘Mums the Word’ project. The Theory of Planned Behaviour was used to structure the themes identified in the data. This chapter will outline the physical activity perceptions of non-Indigenous and Aboriginal and Torres Strait Islander postnatal women in particularly, their behavioural beliefs, subjective norms and controlled beliefs. This information will provide an understanding of women’s intention to be active at baseline and then help to describe how this influences their behaviour at follow up.

The results will then allow for an in-depth discussion in Chapter five on the salient behavioural beliefs, subjective norms and controlled beliefs of non-Indigenous and Aboriginal and Torres Strait Islander postnatal women. This discussion will be based on the results of the ‘Mums the Word’ project. At this time, the strengths and weaknesses of the studies will also be outlined. Chapter six completes the thesis by detailing the implications of this thesis within the literature.
and wider community. Recommendations for future research as well as development of physical activity programs will also be outlined.
CHAPTER 2: Literature Review

Introduction

The following literature review seeks to contextualise the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women by understanding the various factors that influence their lives and their health. The importance of this understanding is positioned within health promotion theory that highlights the need to consider the social, cultural, economic, political and environmental determinants that influence health. Historically evidence suggests that approaches that do not consider the social and cultural determinants that influence individuals are unlikely to be appropriate (World Health Organization 1986; O'Connor and Parker 1995). Despite this understanding, little is known about the effectiveness of current health promotion practices that target Aboriginal and Torres Strait Islander postnatal women to increase their physical activity levels.

Health promotion has evolved over a number of phases from its beginning to what is considered common practice today (O'Connor and Parker 1995). The increased prevalence and incidence of chronic disease has resulted in a paradigm shift from an acute medical approach to a preventative focus. Strategies to prevent chronic disease risk factors have heavily focussed on the promotion of ideal health behaviours such as sufficient physical activity, good nutrition and tobacco cessation. Contemporary health promotion practices outline that the promotion of health behaviour are considerate of the determinants that influence individuals’ behaviours. This is a result of the progression of the discipline over time (World Health Organization 1986; O'Connor and Parker 1995) which is important to understand as it highlights the how it has evolved to current practice.

Initially health promotion begun using a scientific-medical approach during the early 1900s and was based on a western medical definition of health (O'Connor and Parker 1995; Baum 2008). It assumed the provision of advice and direction from health professionals would result in the individuals conforming to prescribed health behaviours. This approach was centered on the prevention of physiological attributes to health such as immunisation or screening for diseases. It was based on western and scientific knowledge and it did not consider the diversity of people’s values, cultures and attitudes (O'Connor and Parker 1995). Not surprisingly the scientific-
medical approach was not successful as it did not address the determinants nor provide individuals with strategies to make the desired changes.

During the 1970’s, health promotion shifted to a behavioural approach which acknowledged individuals behaviours. This included acknowledgement of various factors that influence these behaviours. The approach provided a response to the increased prevalence and incidence of chronic disease and changed the way the determinants to health were viewed (Lalonde 1974; O’Connor and Parker 1995). In addition to preventing disease, the importance of physical and emotional well-being was adopted. Although this approach advanced the understanding of the factors that influenced individual’s health outcomes, it did not take into account the socio-cultural determinants of health (World Health Organization 1986; O’Connor and Parker 1995). However, it did acknowledge that education on its own was not adequate to facilitate behaviour change. Recognition was given to the need for health promotion to be appropriate and relevant to the social, cultural, economic, political and environmental contexts in which people lived (World Health Organization 1986).

Current health promotion practice and theory recognises the significance of the socio-environmental approaches. This includes the socio-environmental examination of health and illness (O'Connor and Parker 1995). It acknowledges that those members of society who were more socially or economically advantaged are more likely to adopt healthier lifestyles compared to less advantaged members (O'Connor and Parker 1995). The mid 1980’s witnessed the development of the Mandala of Health that acknowledged the bio-psycho-socio-environmental attributes that influence health (Hancock and Perkins 1985; O’Connor and Parker 1995). This model sought to describe the plethora of factors that influences individual’s lives and those that need consideration when examining a population’s health status which is commonly referred to as the determinants of health. The principles of health promotion now centre on the notion that approaches acknowledge the determinants of health so that individuals can be empowered to take control of their health (World Health Organization 1986; World Health Organization 1986).

This literature review will focus on understanding the determinants that influence the physical activity behaviours of Aboriginal and Torres Strait Islander postnatal women. The review will use the World Health Organization’s social determinants of health as a framework to explore the multitude of factors that influence women’s lives. An understanding of these factors is important
as they will provide insight into what should be considered when physical activity initiatives are developed in the future so that women are empowered to undertake physical activity. The review will then consider the work that has been conducted regarding postnatal physical activity, which includes the factors that influence behaviour. This will be followed by exploring the TPB to examine the efficacy and appropriateness of its use with Aboriginal and Torres Strait Islander postnatal women.

At the end of this literature review it will be clear that there are multiple factors that influence Aboriginal and Torres Strait Islander postnatal women. The consideration of these factors is important as they will assist to contextualise the experiences of women. They also demonstrate why ‘umbrella’ approaches that are not considerate of the specific needs of certain populations will be ineffective and are unlikely to succeed.

**Section 1: The Determinants of Health**

The development of health promotion theory identifies the need for targeted approaches that are applicable to the intended recipients (World Health Organization 1986). Comprehensive health promotion seeks to change the behaviours of people and populations by ensuring that its approaches are contextualised into the socio-cultural norms of these groups (Baum 2008; Keleher and MacDougall 2009). It is acknowledged that such approaches may be viewed as idealistic, especially if resources or capacity is limited. However, the evidence suggests that efforts should be directed to undertaking such methods as they provide the greatest opportunities for success. This involves the provision of strategies and the development of skills that can assist individuals to engage in these behaviours which extend from the provision of education to a more complex intervention. A lack of adherence to these principles raises the likelihood of the application of generic approaches that fail to consider relevant factors and influences (World Health Organization 1986; Achhra 2009). These historical lessons of health promotion are important to consider for the Aboriginal and Torres Strait Islander population whose cultural traits and values are very different from western views.

The Aboriginal and Torres Strait Islander population represents a diverse community in Australia. The population represents 2.4% of the Australian population and is highly heterogeneous (Australian Bureau of Statistics 2004; Australian Bureau of Statistics 2008). As two distinct Indigenous populations of Australia, there are over 500 clan and tribal groups across
the country. However colonisation and past government policies has created fractures within these populations such as removal from traditional lands, loss of customs and cultural practices and a loss of cultural identity. As a result of this disruption many argue that this has affected the health status of these two populations both directly and indirectly (Carson, Dunbar et al. 2007).

Overall, the Aboriginal and Torres Strait Islander population suffers a far greater burden of disease compared to the broader Australian population (Australian Institute of Health & Welfare 2005; Australian Institute of Health & Welfare 2006). For this reason, the population has been identified as a priority group in Australia. However, given the significant chronic disease burden that this population bears, little is known about the physical activity approaches that are targeted at the postnatal population. This includes obtaining a comprehensive understanding of how physical activity is perceived in the population, including the determinants that influence this behaviour. Such information is vital to inform the development of future health promotion strategies.

Given the limited information that exists it is difficult to comprehend how past and present approaches have been developed. Many are mainstream approaches that have been ‘indigenised’ and delivered to the Aboriginal and Torres Strait Islander population (Brough, Bond et al. 2004). However, these are merely token approaches that have largely failed to deliver positive health outcomes to the population. This is not surprising, especially when the history of health promotion is revisited and the lessons clearly demonstrate the need for approaches that are relevant and appropriate to the intended population. The Aboriginal and Torres Strait Islander population possesses many qualities that require unique approaches that are starkly different to other sub-groups of the Australian population. Such approaches however, must avoid the use of ‘stereotypical cultural traits’ and should seek to recognise those innate needs as outlined by the community (Brough, Bond et al. 2004). This may be a challenge but it is important to gather and consider the limited evidence that exists, so that informed decisions can be made. This reinforces the need to understand the underlying issues that influence the Aboriginal and Torres Strait Islander population, which should also assist to deconstruct such stereotypes. Health promotion approaches targeted at Aboriginal and Torres Strait Islander populations require specific investigation to understand the bio-psycho-socio-environmental factors that influence their health outcomes.
Identifying the determinants of health

Problem analysis is an effective method of ensuring that a holistic and comprehensive view of factors that influence populations are considered (Kettner, Moroney et al. 2008). This analysis provides depth and insight and is useful to explore the factors that contribute to a problem. It contributes to the fundamental principles of health promotion which requires the exploration of the factors that influence health behaviour. This includes identifying and understanding those social, economic, cultural and political factors that may prevent or encourage behaviours (O’Connor and Parker 1995). Through understanding such factors, a comprehensive understanding of health behaviours can be obtained which allows the exploration of opportunities for change or maintenance. In addition to this, an in-depth understanding of how the target population views the health behaviour must be comprehended. Together, this will contribute to a greater knowledge of how health behaviour is perceived by individuals in a particular population, and what factors may influence this behaviour either directly or indirectly (Allen 2010).

Such a task is often complex, as the way in which these factors influence both individuals and populations vary. Nevertheless, this view is endorsed by the World Health Organization European Regional Office who suggest that health promotion should: 1) focus on populations in relation to the contexts in which they live and not target individuals who are predisposed to disease; 2) be targeted at overcoming the determinants of health; 3) be multi-strategic in its approach; 4) encourage full participation by all segments of the community; and 5) ensure that health professionals are aware of the important role they have in facilitating health promotion (World Health Organisation Europe 1986; O’Connor and Parker 1995). From these principles emerged the Ottawa Charter for Health Promotion (1986) which suggests that in order to promote health comprehensively it must cover five broad areas including: building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and reorientating health services (World Health Organization 1986). The Ottawa Charter demonstrates that health promotion is a multi-factorial approach which requires the investment of various organisations, institutions and communities on a number of levels. It is imperative that health promotion approaches are specific and relevant to the target population and this can be achieved effectively by undertaking a problem analysis. Once this has occurred,
frameworks such as the Ottawa Charter can be utilised effectively and strategies that are specifically relevant to the target population can be developed. Undertaking such an approach should prevent the generation of solutions without this careful consideration and avoid the ‘one size fits all approach’ (Kettner, Moroney et al. 2008). This is especially important for Aboriginal and Torres Strait Islander postnatal women where limited evidence exists that identify their physical activity experiences.

**Aboriginal and Torres Strait Islander determinants of health**

The determinants of health represent a body of evidence identified as influencing the health outcomes of individuals and populations. These determinants relate to factors or characteristics that influence health either positively or negatively and are usually beyond the control of individuals. The determinants of health that influence the broader Aboriginal and Torres Strait Islander population have been thoroughly investigated (Carson, Dunbar et al. 2007). However, there is limited evidence that details the specific determinants that influence Aboriginal and Torres Strait Islander postnatal women and their physical activity behaviour and experiences. These determinants must be fully understood in order to inform future health promotion strategies and interventions targeted as this population.

The determinants of health are categorised as either proximal or distal (Keleher and MacDougall 2009). Proximal determinants includes those factors that are directly associated with impacting health status such as nutrition and physical activity. Distal determinants are those factors that indirectly influence health status such as housing and employment. Determinants affect people and populations differently which contribute to the complexity of describing their influence and developing ways in which they can be overcome.

The World Health Organization has outlined ten social determinants which significantly influences the health outcomes and behaviours of both individuals and populations. Extensive research has been undertaken to compile this list of determinants which are non-discriminatory and can influence the living circumstances and quality of life of any population in the world (World Health Organization 2003). These determinants are influenced by the distribution of money, power and resources at many levels (World Health Organisation 2011). They include:
• Social gradient
• Work
• Unemployment
• Stress
• Social Support
• Social exclusion
• Early Life
• Transport
• Addiction
• Food

*Food security and addiction*

Food security and addiction to substances are important social determinants of health but they will not be a focus of this research. These determinants may present themselves in the target group, as they both are more likely to occur in disadvantaged minority groups (World Health Organization 2003). It is anticipated that the availability of food may occur in discussions related to weight loss of postnatal women, as diet and exercise are closely associated to achieving this. The research will be mindful of potential affects, however direct efforts to understand these determinants are beyond the scope of this research.

*World Health Organization’s Social Determinants*

The World Health Organization’s social determinants will be applied as a framework to explore Aboriginal and Torres Strait Islander postnatal women’s health outcomes in this review. In many cases the literature that relates to the broader Aboriginal and Torres Strait Islander population, postnatal population, disadvantaged postnatal population or disadvantaged female population will be reported due to limited Aboriginal and Torres Strait Islander postnatal
evidence. It is important to acknowledge however, that the influence of these determinants is multi-factorial, and one factor alone will not contribute to participation or inactivity. However, the purpose of this section is to demonstrate the determinants that influence this population that must be considered in health promotion planning. This should also demonstrate why a ‘one size fits all’ approach to health promotion is highly inappropriate and would be ineffective without such considerations.

**Social gradient**

The social gradient determinant refers to the position in which individuals or populations are located on the social ladder. Those individuals who are lowly positioned on the social gradient are more likely to experience poorer health as this position influences their education attainment, employment security, housing access and stress levels (World Health Organization 2003; Furler and Young 2005). The research indicates that the Aboriginal and Torres Strait Islander population fairs poorly in many of these categories. Education attainment shows that overall, Aboriginal and Torres Strait Islanders have lower literacy and numeracy skills, low attendance to schooling and hence, lower retention rates (Urquhart 2009). The literature suggests that these education outcomes are a result of contributing factors such as the school and family environment and student-related factors (Mellor and Corrigan 2004; Minniecon and Kong 2005; de Plevicz 2007; Urquhart 2009). Education is an important influencer of health as it impacts other determinants such as employment and work opportunities, as those who have limited education attainment are more likely to be unemployed or in low paying jobs.

In addition to education attainment, the impact of health literacy should also be considered. Health literacy refers to an individual’s capacity to understand and action information that may be useful to adopt health behaviour change (Rootman and Ronson 2002). The extent to which individuals and populations are health literate is important to understand when considering the determinants that influence their health outcomes. For example health promotion strategies that encompass self directed techniques will be difficult for individuals if they are unable to process and apply this information. Literacy has been suggested as a better predictor to health outcomes than education, socio-economic status, employment, race and gender (Keleher and MacDougall 2009). It is also seen to have a casual relationship with poorer health outcomes, although the nature of this relationship is unspecified (Keleher and Hagger 2007). Health literacy
must be considered in health promotion planning and has been noted as a determinant of health (Keleher and MacDougall 2009). Health literacy, in addition to education attainment is therefore an important concept that should not be ignored. Work of this nature will be complex and perhaps overwhelming; however the philosophy of health promotion requires such consideration.

**Work**

Work is listed as a World Health Organization’s social determinants of health (World Health Organization 2003). Those who have a job have better health outcomes than those that do not and, unemployment is related to increased mortality and morbidity (World Health Organization 2003). For Aboriginal and Torres Strait Islanders, these factors are important to consider given that a large proportion of the population are either unemployed or not in the labour force (Urquhart 2009). Of those that are employed, 60% work in low skill level occupations and 24% are labourers (Australian Bureau of Statistics 2008; Urquhart 2009). Therefore, not only are Aboriginal and Torres Strait Islanders more likely not to be working, they are also more likely to be working in low income jobs. Such information is important to understand from a postnatal perspective, as this will have varying influences on women’s lives. Although it is expected that that most women will be on maternity leave of some time during the early postnatal period, work and employment situation will be explored in the proposed study. This information will provide insight into how employment situation and income methods impact women’s lives, especially for those women who need to return to work. Women who return to work will face a number of additional challenges such as child care and time constraints. From a physical activity perspective such factors have been reported as barriers to participation in the literature (Larson-Meyer 2002; Lewis and Ridge 2005).

**Unemployment**

Conversely, women who do not return to work or who are unemployed are also faced with additional challenges such as financial burden. This is a complex indicator for social disadvantage as it is difficult to determine its exact relationship with health outcomes. Some argue that income inequality in the population is important to consider while others argue that only absolute level of income should be examined (Australian Institute of Health & Welfare 2006). Despite this indecision, there is no argument that income is related to health outcomes of the population. In 2006, the weekly income of non-Indigenous Australians was $740 compared
to $460 for Aboriginal and Torres Strait Islanders (Australian Bureau of Statistics 2002; Australian Bureau of Statistics 2008). According to the Australian Bureau of Statistics, the poorest households in Australia have an average net worth of $23,000 per household (Australian Bureau of Statistics 2005). Therefore, overall the Aboriginal and Torres Strait Islander population represent a disadvantaged group when financial burden is considered.

Final burden is often compounded by the number of dependants an individual is responsible for. The most common household situation for the Aboriginal and Torres Strait Islander population is a couple with dependent children (28%) followed closely by lone-parents with dependent children (23%) (Australian Bureau of Statistics 2008; Urquhart 2009). Further, the evidence shows that on average, lone-parent households receive the lowest equivalised\(^1\) disposable household income ($329 per week) (Australian Bureau of Statistics 2004); tend to have a strong dependence on government pensions and allowances, with 53% of households claiming these as their principal source of income (Australian Bureau of Statistics 2004) and; in 2001 accounted for 22% of total families (Australian Institute of Health & Welfare 2006). The impact of financial burden is important to consider for the Aboriginal and Torres Strait Islander postnatal population in addition to their number of dependants, living situation and marital status. In a study to investigate the cardiovascular disease risk of single mothers, findings indicated that these women were more likely to smoke, be overweight or obese and be more physically inactive compared to mothers with partners (Young, Cunningham et al. 2005). Therefore marital status and family situation needs to be considered in addition to income indicators, as they assist to describe the social context in which postnatal women live. These factors are distal determinants which generally, are out of the individual’s control. Understanding the factors that impact individuals is vital in health promotion practice. It allows for the health behaviours such as physical activity to be contextualised into the daily lives of individuals. For example, some women may view physical activity positively however it may rank lower on the list of priorities when compared to managing a household on limited financial resources. Therefore strategies that seek to promote physical activity to Aboriginal and Torres Strait Islander postnatal women must be mindful of such issues as there is a strongly likelihood they will be impacted by such factors

\(^1\) Equivalised disposable household income is a standardised income measure, adjusted for the different income needs of household of different size and composition.
to a degree. The existence and degree to which these factors influence women’s lives and hence health behaviours, will be explored in the proposed study.

Financial burden is also reported to influence the health outcomes of children in single-parent families (Mathers 1995). Single-parent families are more likely to have lower average incomes and higher rates of unemployment (National Health Strategy 1992; Mathers 1995). In 2003, 20% of the Australian population comprised of children aged between 0-14 years, equating to approximately 3.9 million children. Of this number, it is estimated that 20% of them lived in lone parent families with the majority (88%) lone mothers (Australian Institute of Health & Welfare 2005). Although the primary target group of the proposed research are Aboriginal and Torres Strait Islander postnatal women, offspring of these women will represent a secondary target group. Based on these figures, this represents a significant component of the Australian population. Therefore understanding the physical needs of these women will not only be important in terms of the benefits they may receive, it will also be important in regards to the potential benefits obtained by their children.

**Physical activity participation**

The proposed research seeks to understand the physical activity needs of Aboriginal and Torres Strait Islander postnatal women. In Australia, socially-economically disadvantaged groups, including the Aboriginal and Torres Strait Islander population, suffer significantly higher rates of morbidity and mortality in most of the chronic diseases compared to other groups (Kaplan and Lynch 1997; Australian Institute of Health & Welfare 2001; Australian Institute of Health & Welfare 2002; Turrell and Mathers 2003; Thrift, Dewey et al. 2006). This is not surprising given that disadvantaged groups are also more likely to report chronic disease risk factors such as smoking, alcohol consumption, physical inactivity and overweight and obesity (Sobel and Stunkard 1989; World Health Organisation 2003; Glover, Hertzel et al. 2004). Despite this burden of disease, disadvantaged groups are also less likely to access health services, (Turrell and Mathers 2003) suffer a lack of control and independence of life decisions, are subject to discrimination and intolerance and suffer inequality (Liamputtong 2007). The impact of these factors has been reported as influencers to physical activity participation within the literature and include factors such as education, income, wealth, occupation, marital and family status, labour force participation, housing, ethnic origin and characteristics of the area of residence (Australian
Institute of Health & Welfare 2006). These factors also influence the physical activity participation of women with children, as these women are less likely to be active (Shaw 1994; United States Department of Health and Human Services 1996; Jones, Ainsworth et al. 1998; Fahrenwald and Sharma 2002; Urizar, Hurtz et al. 2005) and more likely to report limited resources and greater barriers to physical activity (Wilkinson, Huang et al. 2004). Therefore socio-economic factors and positioning of individuals on the social gradient strongly influence physical activity participation.

Despite this, little is understood about how the Aboriginal and Torres Strait Islander population perceive risk factors such as physical activity (Sobel and Stunkard 1989; World Health Organisation 2003; Glover, Hertz et al. 2004; Australian Institute of Health & Welfare 2006). Findings suggest that Aboriginal and Torres Strait Islanders who are physically inactive are unemployed or not in the labour workforce, have limited access to a motor vehicle or have difficulty getting to places needed (Standing Committee on Recreation and Sport Research Group by the National Centre for Culture and Recreation Statistics- Australian Bureau of Statistics 2004). Therefore more work is required that understands the physical activity needs of this population including the postnatal population.

To date, much of the qualitative work regarding the physical activity levels of postnatal women has predominantly represented the views of women from advantaged backgrounds (Yeager, Macera et al. 1993; Vertinsky 1998). Hence, more work needs to be conducted that focuses on understanding the physical activity participation of minority groups such as Aboriginal and Torres Strait Islander women (Gennaro and Fehder 2000; Olson, Strawderman et al. 2003; Poudevigne and O’Connnor 2006). In Australia, little is known about the physical activity experiences of disadvantaged postnatal women. Brown, Brown et al (2001) suggest that a greater understanding of the factors that influence physical activity participation of disadvantaged Australian mothers is required as they may experience greater obstacles (Brown, Brown et al. 2001). This is essential given the research that indicates that those most disadvantaged (such as poor education attainment, insecure employment, poor housing or raising a family in difficult circumstances) suffer an increased burden of disease (World Health Organisation 2003). In addition, limited understanding exists that describes the socio-economic factors that influence physical activity within ethnic minority groups (Verhoef and Love 1992; Verhoef and Love
The degree to which these factors impact Aboriginal and Torres Strait Islander women will be important, particularly when understood within the cultural environment in which these women live. The influence of culture and ethnicity is discussed in more details in another section of this review.

Many of the socio-economic factors are interrelated and the degree to which they affect physical activity may be dependent on the relationships between these variables. For example, in a study that examined the effects of health status during and after pregnancy, women who reported insufficient money for food or housing after giving birth, were more likely to report poor or fair health, poor physical function and depressive symptoms compared to women who did not experience financial burden during this time (Haas, Jackson et al. 2004). Therefore understanding the degree to which these factors influence the lives of Aboriginal and Torres Strait Islander postnatal women will be important as it will help to contextualise and prioritise health behaviours. Understanding these factors will also assist in developing targeted strategies to improve physical activity levels amongst this group. Strategies and interventions that fail to consider the influence of social gradient, work and employment determinants will fail to address the challenges that occur as a result, and will therefore be irrelevant to the population.

**Stress**

Stress is listed as one of the WHO Social Determinants of Health. The evidence suggests that those that experience stress are more likely to suffer adverse health outcomes, including death (World Health Organization 2003). Stress is a subjective experience and will be reported differently by women. Therefore the degree to which these factors impact their lives will differ. However possessing such information will allow for physical activity participation to be described and understood. Although the post-impact of stress to individuals can be quantified to some degree, the way in which it affects individuals differs; therefore the pre-assessment can be difficult. Given the broad spectrum of factors that may result in stress for individuals, including much of the evidence that was reported in the previous section, three areas of literature will be discussed in the following section. These areas include motherhood stressors, gender and ethnicity. These have been selected due to their specific relevance to the target population of postnatal women.
Gender and Motherhood

In order to understand motherhood, gender must first be understood. Gender refers to societal roles, norms, behaviours and expectations that may be differentiated by age, class, education, sexuality, religion and culture (Keleher and Murphy 2004). Gender in itself can be classed as a determinant of health. Gender is considered a relational determinant as it is described to influence the way in which individuals consider other determinants such as education, employment and access to health (Keleher and Murphy 2004). In the instance of motherhood, gendered roles such as care-giving and selflessness reflect cultural and societal expectations. Such expectations have shown to influence physical activity participation by women and have also been reported as causing conflict and stress to women (Lewis and Ridge 2005). The ideology of motherhood has been reported in the literature as a cause of conflict and stress to Australian women when considering physical activity. In this study, women questioned whether they should allocate time for themselves to exercise given they generally assumed the primary care giver role for their children. Cultural norms and expectations characterize a ‘good’ mother as being selfless and dedicated to her children and domestic duties, which leaves little time for physical activity (Lewis and Ridge 2005). Individual physical activity participation, which requires women to set aside time for themselves, may contradict the ideology of this role (Lewis and Ridge 2005). Similar finding were reported in a study that explored the perceived barriers to physical activity by mothers. Women in this study stated that time committed to family and home duties were more important than dedicated time for physical activity (Brown, Brown et al. 2001). Such expectations are an example of the influence of gender.

The conflicts that arise from the tension between meeting societal and cultural obligations of motherhood versus performing behaviours that may appear to oppose such obligations have been reported in the literature (Brown, Brown et al. 2001; Lewis and Ridge 2005). In a study conducted by Brown, Brown et al (2001), almost 60% of mothers were insufficiently active, although a large proportion had high intentions to participate in physical activity. Factors that inhibited physical activity behaviour included structural barriers (such as lack of time, money, and energy), cultural expectations of the role of motherhood (commitment to others) and access to levels of available support to be active (Eyler, Brownson et al. 1997; Brown, Brown et al. 2001). Other factors that have been listed as influencing the physical activity participation of
mothers include family commitments, poor physical activity attitudes, poor body image, neglect for self-care, depressive symptoms, fatigue, tiredness, feeling pressured, safety, cost, pain, poor quality breast milk, bad weather, lack of private transport and distance from physical activity facilities (Cody and Lee 1999; Tortolero, Masse et al. 1999; Juarbe, Turok et al. 2002; Larson-Meyer 2002; Fahrenwald and Noble Walker 2003; Gonzales and Keller 2004; Rich, Currie et al. 2004; George, Milani et al. 2005; Lewis and Ridge 2005; Nilsson-Wikmar, Holm et al. 2005; Smith, Cheung et al. 2005; Keller, Allan et al. 2006; Rudra, Williams et al. 2006; Rowley, Dixon et al. 2007; Albright, Maddock et al. 2009). Again, this emphasises the role and responsibilities associated with motherhood, which may inhibit women’s’ ability to be physically active.

The impact of motherhood stressors has been investigated, with findings concluding that women who report higher levels of maternal stressors are more likely to be inactive (Urizar, Hurtz et al. 2005). Like other life-stages, motherhood is influenced by numerous factors, many of which are inter-related. Given this, the ideology of motherhood including the roles and responsibilities should be explored to unpack the associated stress experienced by women. To date, limited information exists that outlines the influences of gender on motherhood in the Aboriginal and Torres Strait Islander context and how maternal stressors influence health behaviours such as physical activity.

**Aboriginal and Torres Strait Islander women**

Aboriginal and Torres Strait Islander women possess many unique stressors in addition to those they experience as mothers. Stress associated with historical events such as colonisation, past legislations (such as the stolen generation), loss of traditional lands, culture and the unresolved grief associated with these events are still present (Carson, Dunbar et al. 2007). In addition to this, Aboriginal and Torres Strait Islander women experience motherhood at a younger age than non-Indigenous women, with the average age for first time mothers being 24.8 years (Australian Institute of Health & Welfare 2006). In 2001-03, 78% of Aboriginal and Torres Strait Islander women had given birth before the age of 30 years compared to 49% of non-Indigenous women (Australian Institute of Health & Welfare 2005; Australian Institute of Health & Welfare 2006). Aboriginal and Torres Strait Islander women are also more likely to be classified as ‘young mothers’ (give birth aged 20 years or less) (23%) compared to the non-Indigenous Australian maternal population [4.6%] (Australian Institute of Health & Welfare 2006), and birth rates in
the 15-19 year age bracket are four times higher than the non-Indigenous population (Sullivan and Lancaster 1999; Australian Institute of Health & Welfare 2005). Although the overall number of young mothers is small in Australia, there is evidence to suggest that women who give birth earlier than average, suffer substantial social, educational and behavioural disadvantage (Lee and Gramotnev 2006). As discussed by Lee and Gramotnev (2006), evidence from developed countries, including Australia are likely to report that younger mothers have low education levels, are single parents, smokers, have higher rates of substance misuse (alcohol and illicit drugs) and be more likely to have a history of abuse or neglect (Dickson, Fullerton et al. 1997; Miller 2000; Van der Klis, Westenbergy et al. 2002; Phung, Bauman et al. 2003; Lee and Gramotnev 2006). However, early motherhood itself is not the single cause of social disadvantage, as some authors suggest that the factors that create social disadvantage predispose women to becoming mothers at a younger age (Lawlor and Shaw 2002; Geronimus 2004; Lee and Gramotnev 2006). Nevertheless, maternal age is a factor to consider, especially for the Aboriginal and Torres Strait Islander population.

The number of dependent children has also been reported as a contributor to maternal stress. However, the evidence is conflicting and poorly reported (Urizar, Hurtz et al. 2005), as is difficult to predict how the transition to motherhood is further compounded by the number of children women have. Nevertheless, the evidence suggests that the overall transition to motherhood creates stress for women and needs to be explored. If it is not, physical activity promotion targeted at these women will be irrelevant especially as stress is likely to be an outcome of other competing priorities. Conversely, information about stress levels and the factors that contribute to it will be important to understand, as the reduction of stress levels have been described as a benefit of physical activity (Urizar, Hurtz et al. 2005; Daniel, Brown et al. 2006). This needs further consideration in the Aboriginal and Torres Strait Islander context, as women are likely to have more than one child (Australian Bureau of Statistics 2007). From a physical activity perspective the presence of children has shown to influence participation, as evidence shows that women with children report more barriers to physical activity than women without children, and married women with children exercise less than married women without children (Verhoef and Love 1992; Verhoef, Love et al. 1992; Keller, Allan et al. 2006). Therefore the culture of motherhood and the assumed roles and responsibilities of mothers is likely to provide conflict and stress to women, especially if they have intentions to be active.
Understanding how they manage motherhood with their desire to engage in physical activity is therefore important.

The life-stage of motherhood presents a unique phase of a woman’s life in which she may experience stress. The evidence suggests that some of this stress is influenced by societal and cultural expectations of mothers which create tensions when individual behaviours such as physical activity is promoted (Brown, Brown et al. 2001; Lewis and Ridge 2005). This conflict can also be witnessed in the literature where many of the barriers to physical activity participation relate to a woman’s roles and responsibilities she must perform as a mother. Understanding these factors is useful when exploring motherhood in the Aboriginal and Torres Strait Islander context. This should occur in addition to those factors that are specifically related to the population including the influence of position on the social gradient, work related factors, unemployment, historical events, maternal age and number of dependent children. Understanding motherhood in this way allows for behaviours such as physical activity to be thoroughly explored and understood. It also allows for the forward planning of interventions and strategies to consider those factors that might normally provide obstacles for women to be physically active. Understanding this in the Aboriginal and Torres Strait Islander context is important.

Information and knowledge that describes these experiences are important to obtain to inform health promotion initiatives. This including understanding the factors that may inhibit physical activity participation despite women’s intentions to be active and the construction of motherhood in the Aboriginal and Torres Strait Islander context. This information will be extremely useful to health promoters as it will assist to tailor programs to the needs of the population.

Therefore, more work is needed to understand how physical activity is impacted by the experiences felt by women during motherhood. This is particularly evident for Aboriginal and Torres Strait Islander women who may also experience stress as a result of their position on the social gradient, work related factors or unemployment. These determinants, together with perceived motherhood ideals further compound stress and hence influence physical activity participation. As a result, physical activity health promoters must seek to understand these contributors of stress and conflict to women when planning programs, as failure to do so will result in inappropriate and irrelevant programs.
Social support

Social support involves strong support structures and networks to individuals, as good social relations contribute positively to health, both emotionally and practically (World Health Organisation 2003). Social support may occur directly or indirectly. Indirect social support for a postnatal woman may include talking about exercising or encouraging her to exercise (Sallis, Grossman et al. 1987). Direct social support for a postnatal woman may include exercising with her, assisting in child-care or doing chores for her while she is exercising (Sallis and Owen 1999). Social support is identified as a WHO social determinant of health and has been reported consistently in the postnatal physical activity research as influencing participation.

Social support has been identified in the literature as increasing a woman’s confidence to care for her offspring, especially in the first six weeks of the postnatal period (Leahy 2005; Warren 2005). Family, friends and other significant others have been listed as the key providers of this support. In regard to physical activity participation during this time, similar findings have been witnessed. In a study conducted to examine the physical activity patterns and well being of postpartum women, indirect social support was reported as an important influencer to participation (Blum, Beaudoin et al. 2004). These findings outlined the importance of women’s supportive partners, family and friends in relation to physical activity uptake. The importance of social support was further highlighted in a study that reported the lack of support from partners, friends and family as a major obstacle to postnatal physical activity (Lewis and Ridge 2005). Therefore, social support is a key determinant of postnatal physical activity.

The influence of the frequency and type of social support on pregnant and postpartum women has been assessed (Thornton, Kieffer et al. 2006). Results indicated that informational and emotional support from women’s partners was the most significant influence of physical activity participation. Support from female family and friends were also an important influence. In addition to these results, lack of direct social support, in particular child care, has been consistently reported in the literature as a major barrier to postnatal physical activity (Cody and Lee 1999; Brown, Brown et al. 2001; Fahrenwald and Noble Walker 2003; Leahy 2005; Lewis and Ridge 2005; Smith, Cheung et al. 2005; Thornton, Kieffer et al. 2006; Pereira, Rifas-Shiman et al. 2007). Again this emphasises the strong impact social support has on postnatal physical activity participation.
Despite the strong evidence that outlines the influence of social support on the postnatal population, little is known about its influence on the Aboriginal and Torres Strait Islander population. Although limited work exists that specifically relates to this sub-group of the Aboriginal and Torres Strait Islander population, some evidence exists. A study conducted by Thompson et al (2000) described three meanings of physical activity reported by an urban Aboriginal community. These included exercise, everyday activities and sporting activities. These meanings of physical activity were viewed positively if they had strong social and family connections. Physical activity was viewed as negative if it was undertaken for individual benefits, as this was viewed as shameful and disconnected individuals from family and social ties (Thompson, Gifford et al. 2000). Another study found similar results and reported that perceptions of physical activity were centred on the importance of family connections (Marshall and Miller 2004). Therefore whilst the research does not directly report the influence of social support to postnatal physical activity participation in the Aboriginal and Torres Strait Islander population, it does suggest that it would bear some influence.

**Ethnicity**

The connection to family and cultural ties when engaging in physical activity has been reported by other ethnic communities, similarly as what has been reported in the Aboriginal and Torres Strait Islander population (Keefe, Padilla et al. 1979; Vega 1990; Thornton, Kieffer et al. 2006; Guinn, Vincent et al. 2007). Ethnicity refers to factors that individuals share and identify with a particular culture. It may include language, customs, values and norms, all of which make them distinctive compare to other cultural groups (Eriksen 2002; Skrbis 2007). The influence of ethnicity on health behaviour is important to consider as this provides the context in which individuals live. In addition, ethnic identity moves beyond individuals acknowledging membership to a particular group, and can have significant impact on the way in which individuals conduct their lives including their health outcomes (Skrbis 2007). Therefore understanding ethnic identity in relation to the context in which individuals live is essential, especially when examining the factors that influence behaviour.

Ethnicity is important to consider when thinking about Aboriginal and Torres Strait Islander postnatal women’s physical activity experience, as limited work currently exists. The role ethnicity plays in this sub-group of the postnatal population may help to provide a cultural
context for participation. As Thorton & Kieff (2006) et al discussed, the influence of ethnicity on health has been reported in many studies (Hovell, Sallis et al. 1991; Sanders-Phillips 1994; Balcazar, Krull et al. 2001; Evenson, Sarmiento et al. 2002; Sanderson, Littleton et al. 2002; Collins, Lee et al. 2004; Kieffer, Willis et al. 2004). Although limited work exists in Australia, internationally the way in which ethnicity influences postnatal physical activity has been described. In a study conducted with multiethnic postnatal women in Hawaii, an intervention was delivered to improve physical activity levels (Albright, Maddock et al. 2009). The results indicated that barriers to participation included self-consciousness related to appearance, caregiving duties, limited time, tiredness, lack of energy, weather and lack of social support. Conversely, in a study conducted with Latino women to investigate dietary and physical activity beliefs and practices during pregnancy and the postpartum, the influence of culture was discussed at length (Thornton, Kieffer et al. 2006). The findings of the study showed that postnatal women reported absence of mothers, other female relatives and friends to assist with childcare and offer companionship for physical activity as major barriers. The role of the extended family was stressed as an important component of the Latino culture (Keefe, Padilla et al. 1979; Vega 1990). In particular, the way in which the extended family provides support to members throughout life. This assistance is sometimes different to that expected and provided in western society. These findings again highlight the strong impact social support has on these groups, including their physical activity participation.

Understanding how ethnicity underpins behaviour is important to consider when examining levels of support to postnatal women. For example in a study conducted with a Latino population, the family unit was identified as the central component of the Mexican culture (Thornton, Kieffer et al, 2006). In this instance, males of the household were identified as the primary decision makers, whilst females were identified as the primary homemaker and care provider. These cultural constructs and expectations provide important learnings for health promoters to consider the social support determinant. For example, health promotion strategies that might seek to increase the social support levels (in the form of childcare) of the women’s partners or spouses might be deemed culturally inappropriate if this is not their assumed role. Therefore interventions designed to improve physical activities amongst ethnic women, should undertake these cultural considerations.
These international learning’s of how ethnicity influences social support are significant when considering Aboriginal and Torres Strait Islander postnatal population. An understanding of the ways in which this influences Aboriginal and Torres Strait Islander postnatal women is needed to ensure future strategies and program aimed at promoting activity amongst this group are culturally appropriate. For this reason, family and culture must be considered when investigating health behaviours such as physical activity to identify the influence of the social support determinant.

**Social exclusion**

Social exclusion refers to those individuals or populations that become isolated due factors such as racism, discrimination, stigmatization, hostility or employment (World Health Organization 2003). For disadvantaged groups there is evidence to suggest that they are more likely to suffer lack of control and independence of life decisions and become subject to discrimination and intolerance (Liamputtong 2007). For this reason, social exclusion is identified by World Health Organization’s as a key determinant of health.

Historical events of Australia have predisposed the Aboriginal and Torres Strait Islander population to social exclusion. Factors such as the loss of traditional land, culture and force legislation have resulted in a lack of control and independence. Understanding the degree to which social exclusion has influenced the population and continues to influence the population provides perspective in which health behaviours such as physical activity can be analysed.

Aboriginal and Torres Strait Islander postnatal women are potentially doubly disadvantaged as women, have been described as a vulnerable population. Other vulnerable populations include children, the elderly, ethnic communities, immigrants, sex workers, the homeless, gay men and lesbians (Liamputtong 2007). In addition to this, women with children who are from ethnic or minority groups have been described as ‘doubly vulnerable persons’ as their disadvantage is compounded (Moore and Miller 1999) in (Liamputtong 2007). These are important considerations that need to be given, as Aboriginal and Torres Strait Islander postnatal women account for each of these measures of vulnerability.
Physical Activity participation rates

When examining physical activity participation rates, the influence of social exclusion and vulnerability can be used. Whilst being female predisposes women to being vulnerable, it is also a predictor of inactivity. Australian women report lower levels of physical activity compared to men across most age groups (Armstrong, Bauman et al. 2000) and this statistic has resulted in women, including postnatal women targeted by campaigns to increase physical activity levels (Stephenson, Bauman et al. 2000; http://www.ausport.gov.au/fulltext/2002/nphp/chapter1.1.asp 2002). Those at the greatest risk of physical inactivity include young women and disadvantaged women (Ball 2006). These decreased levels have been attributed to women reporting household and childcare duties as a barrier to physical activity, as women who do not work and have major child care responsibilities appear to be the least active (Commonwealth Of Australia 1998).

Women with children who have been described as ‘doubly vulnerable’ populations also appear to be physically inactive. Approximately 60% of Australian postnatal women are not undertaking physical activities to achieve health benefits in line with national recommendations of at least 150 minutes per week of accumulated moderate-intensity physical activity (Armstrong, Bauman et al. 2000; Brown and Bauman 2000; Brown, Brown et al. 2001; Lewis and Ridge 2005). Women with children are more likely to be sedentary or insufficiently active compared to women without children (Verhoef and Love 1992; Verhoef, Love et al. 1992; Marcus, Pinto et al. 1994; Scharff, Homan et al. 1999; Fahrenwald and Sharma 2002; Lewis and Ridge 2005). Data from the Australian Longitudinal Study of Women’s Health indicated that only 46% of women with young children engaged in adequate physical activity compared with 56% of women without children (Brown, Lee et al. 2000). In another study of Australian mothers, only 34% of the cohort were undertaking sufficient activity levels (Smith, Cheung et al. 2005). Internationally, this trend of insufficient activity levels amongst postnatal women is also apparent (Fahrenwald and Noble Walker 2003; Krummel, Semmens et al. 2004; Symons Downs and Hausenblas 2004). However limited data exists that outline participation rates of minority groups within the total postnatal population including the Aboriginal and Torres Strait Islander population.

On a population level, Aboriginal and Torres Strait Islanders are more inactive compared to the general Australian population. They also report higher rates of low physical activity participation
and sedentary behaviours (Standing Committee on Recreation and Sport Research Group by the National Centre for Culture and Recreation Statistics- Australian Bureau of Statistics 2004). In 2002, less than half (46%) of the Indigenous population had participated in sport or physical recreation compared to two thirds (63%) of the non-Indigenous population (Standing Committee on Recreation and Sport Research Group by the National Centre for Culture and Recreation Statistics- Australian Bureau of Statistics 2004). Aboriginal and Torres Strait Islander women reported higher rates of low exercise and sedentary behaviours compared to men (Standing Committee on Recreation and Sport Research Group by the National Centre for Culture and Recreation Statistics- Australian Bureau of Statistics 2004; Australian Institute of Health & Welfare 2005). In addition, Indigenous women (18 years and above) were less active than non-Indigenous women (Australian Institute of Health & Welfare 2005). Therefore, more work is needed to understand these levels of inactivity.

As Shilton & Brown (2004) have discussed, there is only a small amount of published evidence that outlines the challenges and success of Indigenous physical activity programs (Shilton and Brown 2004). The limited evidence base that exists is surprising given the Aboriginal and Torres Strait Islander population suffers a higher burden of chronic disease related to poor lifestyle behaviours such as physical inactivity in Australia (Australian Institute of Health & Welfare 2005; Australian Institute of Health & Welfare 2006). Therefore more work is need that seeks to understand the physical activity levels within this population and more importantly, the impact of behavioural risk factors that modify participation in physical activity. Such research and approaches will only be effective however, if they seek to understand the wider social meanings attached to chronic disease risk factors (Thompson, Gifford et al. 2000). This includes obtaining an in-depth understanding of the elements of social exclusion and vulnerability as well as the social and cultural differences of the population, in addition to ensuring the cultural appropriateness of mainstream programs and services (Brough, Bond et al. 2004). As a ‘doubly vulnerable’ population, understanding the needs of the Aboriginal and Torres Strait Islander postnatal population is essential. From health promotion perspective this understanding is also necessary as it will inform Aboriginal and Torres Strait Islander specific strategies.
**Early life**

The early life determinant relates to improving health outcomes of mothers and children and suggests that the foundation for health begins during the early stages of an individual's life (World Health Organisation 2003). Contributing factors to this include biological, social, family, community and economic influences (Australian Institute of Health & Welfare 2005). Harmful effects during pregnancies may lead to poor foetal development and include poor nutrition, maternal stress, substance misuse (alcohol, drug and tobacco) and physical inactivity (World Health Organisation 2003). As well as resulting in poor health outcomes for the infant, these factors may also predispose the child to cardiovascular, respiratory, pancreatic and kidney disease later in life (World Health Organisation 2003). Therefore strategies that seek to minimize and/or overcome these factors are essential for both mother and child.

From a physical activity perspective, the early life determinant is important for two reasons. Firstly, promotion of physical activity to pregnant women can assist in improving birth outcomes and health outcomes more generally over time. Secondly, physically active mothers are able to model behaviours to their children which will increase their likelihood of undertaking physical activity and other health related behaviours later in life. Therefore the promotion of physical activity to the maternal population is important, especially during the postnatal period.

The postnatal period itself extends from the time when a woman gives birth to one year post-delivery and is an important time for healthy lifestyle practices to occur (Mottola 2002). However, this period can also represent an extremely challenging time for mothers as they may become overwhelmed, particularly if they feel inadequately prepared to optimally care for their babies and themselves (Hirst 2005). It is strongly acknowledged that postnatal physical activity is not directly related to the physiological health outcomes of the child. However the early life determinant is relevant to this target group given the potential secondary influences such as positive role modelling.

The promotion of positive role modelling to postnatal women can occur by highlighting the various benefits of physical activity, both mentally and physically (Lewis and Ridge 2005). A number of physical benefits have been reported in the postnatal physical activity literature. In a review undertaken by Larson-Meyer (2002), the existing evidence outlining the benefits of
postpartum physical activity included the ‘prevention of overweight and obesity, improved aerobic fitness and strength, improved bone health and improved mood and self-esteem’ (p.841) (Larson-Meyer 2002). In addition to these benefits, the reduction of pain has also been identified. This was demonstrated in a study conducted with Swedish postnatal women suffering from pelvic girdle pre- and post- pregnancy (Nilsson-Wikmar, Holm et al. 2005). Physical activity participation reportedly decreased pain levels as well as increased women’s ability to be physically active.

The reduction of the affects of overweight and obesity has also been reported as a physical benefit of postnatal physical activity. Much of the existing evidence has described weight loss as a primary outcome for increased physical activity participation (Ohlin and Rossner 1994; Boardley, Sargent et al. 1995; Walker 1996; Devine, Rove et al. 2000; Larson-Meyer 2002; Linné, Barkeling et al. 2002; O' Toole, Sawicki et al. 2003; Blum, Beaudoin et al. 2004; Krummel, Semmens et al. 2004). Indeed, weight loss is a beneficial outcome for postpartum women, however physical activity participation is important in its own right due to its preventative health benefits. Preventative health benefits associated with physical activity participation have been widely reported. They include the reduction of premature death from cardiovascular disease, diabetes, some cancers, injury control, mental health, diabetes mellitus and asthma (Mathers, Vos et al. 1999). For the postnatal population a relevant preventative health benefit during this time is the occurrence of gestational diabetes. In a study conducted with Australian postnatal women recently diagnosed with gestational diabetes, increased physical activity was identified as an important strategy to assist in the management of the condition and the prevention of diabetes mellitus in the future (Smith, Cheung et al. 2005). Therefore physical activity should be encouraged as an important health behaviour that should be undertaken regardless of its associated weight loss benefits.

Psychological benefits have been reported as a result of postnatal physical activity. Factors include the prevention of negative body image perceptions and postnatal depression symptoms (Ohlin and Rossner 1994; Goodwin 1997; Devine, Rove et al. 2000; Lewis and Ridge 2005; Lindseth and Vari 2005; Daley, MacArthur et al. 2007). An Australian study demonstrated physical activity positively influenced postnatal depression symptomatology (Armstrong and Edwards 2003; Armstrong and Edwards 2004). Whilst these results were closely linked to social
support, it did demonstrate that physical activity is an important tool that could assist in the reduction and severity of such symptoms. In addition to this, other important psychological factors that could be attributed to physical activity participation include a sense of accomplishment, improved coping mechanisms, improved mood and increased energy levels (Larson-Meyer 2002; Fahrenwald and Noble Walker 2003; Armstrong and Edwards 2004). Finally, the literature has described the social benefits associated with postnatal physical activity. These benefits have been reported where group-based activities have been undertaken. Two Australian studies and one British study described how pram-walking not only increased activity levels amongst mothers, but also facilitated social support (Armstrong and Edwards 2004; Watson, Milat et al. 2005; Rowley, Dixon et al. 2007). Whilst there are many physical, preventative health, psychological and social benefits associated with postnatal physical activity participation, it is unclear what Aboriginal and Torres Strait Islander postnatal women report, given the limited existing evidence. Consequently, more work is needed that clearly articulates how these women perceive physical activity and what benefits they obtain from participation. This would provide useful information for the development of physical activity promotion strategies and programs as it may assist to explain and/or provide motivation for future participation of these groups.

For women who have recently given birth, the early stages of the postnatal period has been viewed as a critical time in which health messages can be promoted and received (McKellar, Pincombe et al. 2006). It is a dynamic time where new behaviours occur and old behaviours are affected and influenced by their baby’s sleeping and feeding pattern, which increase time restraints (Mottola 2002; Cramp and Brawley 2006). Women also undergo a number of physical changes during this time (Mottola 2002; Cramp and Brawley 2006). Whilst there may be challenges in regard to the promotion of physical activity, it can also be an opportunity to engage with women during this significant life event (Lewis and Ridge 2005). Given the many factors that can negatively influence women’s physical activity participation, it is argued that health professionals need to have a better understanding of the ways in which they can support mothers to undertake activity during the early postnatal period (Lewis and Ridge 2005).

Little is known about how the Aboriginal and Torres Strait Islander population describe the benefits of postnatal physical activity. This information is important to understand from an
overall health promotion perspective as it allows such factors to be used to encourage the population. From an early life perspective, these factors are also important to identify as they may be used to promote physical activity in this group so that mothers can model this behaviour to their children.

**Transport**

The social determinant of transport refers to participation in walking and cycling which increases physical activity, reduces fatalities, increases social contact and reduces pollution (World Health Organization 2003). The benefits of physical activity in the general Australian population have been readily reported (United States Department of Health and Human Services 1996; Bauman, Ford et al. 2001; Bauman, Armstrong et al. 2003). There is evidence in specific populations about the health benefits of physical activity to heart attack patients (Bauman, Wright et al. 2001), breast cancer survivors (Turner, Hayes et al. 2004), diabetes patients (Australian Institute of Health & Welfare 2002) and the elderly (McClure, Turner et al. 2008). Healthy and active transport is therefore a relevant determinant to the Aboriginal and Torres Strait Islander postnatal population which is important to understand and promote.

Available evidence suggests that disadvantage mothers lack private transport which influences their ability to be active (Lewis and Ridge 2005). This is also the case for Aboriginal and Torres Strait Islanders who report limited access to motor vehicles or report difficulty getting to places needed (Standing Committee on Recreation and Sport Research Group by the National Centre for Culture and Recreation Statistics- Australian Bureau of Statistics 2004). From a physical activity perspective, such findings may be viewed positively as it promotes the possibility of healthy transport options. On the contrary, these findings could prevent Aboriginal and Torres Islander postnatal women from accessing physical activity services or programs. In addition, perceptions of walking and public transport will also be important to understand. Walking has been reported as a popular physical activity amongst many cultural groups (Bird, Radermacher et al. 2009) however little is known about how this translates in the Aboriginal and Torres Strait Islander community. Therefore it will be important to understand how transport (including walking) is undertaken and perceived by the Aboriginal and Torres Strait Islander population. This information will be important to inform future strategies as well as identify current opportunities related to transport and physical activity.
Section 2: Understanding the population
This section seeks to explore the key considerations when planning health promotion interventions targeted at Aboriginal and Torres Strait Islander postnatal women. The integration of the determinants of health into health promotion intervention planning is often complex, especially if they are distal determinants. However such understanding is important for health promotion professionals to ascertain in order to effectively enable, mediate and advocate for this population.

An investigation of the theoretical implications for behaviour change will be undertaken in this section. This includes exploring the appropriateness and relevance of behaviour change theories in the Aboriginal and Torres Strait Islander context. The TPB will be further explored to identify its potentially useful application within this population. At the conclusion of this section, it should be clear what the key issues are for consideration in health promotion intervention planning.

Factors that influence behaviours
To date few studies have clearly articulated the degree to which socio-economic and psychological factors (maternal age, martial status, education, employment and income indicators, parity and ethnicity) influence the postnatal physical activity experiences of Aboriginal and Torres Strait Islander mothers (Verhoef, Love et al. 1992; Verhoef and Love 1994; Miller, Trost et al. 2002; Urizar, Hurtz et al. 2005). Therefore research that seeks to understand the factors that assist to motivate mothers to become more physically active is essential. This includes identifying the timing of interventions within the postnatal period as well as understanding the needs of this identified ‘vulnerable’ group (Urizar, Hurtz et al. 2005; Wiggins, Oakley et al. 2005). Health promotion interventions to improve physical activity levels of mothers during the postnatal period are timely, as the early postnatal period has been viewed as a critical time in which health messages can be promoted and received by women (McKellar, Pincombe et al. 2006). Whilst there may be challenges in regard to the promotion of physical activity, it can also be an opportunity to engage with women during this significant life event (Lewis and Ridge 2005). Given the multiple factors that may influence physical activity participation, it is argued that health professionals need to have a better understanding of the ways in which they can support mothers to undertake activity during the early postnatal period.
(Lewis and Ridge 2005). This includes understanding the context of the postnatal period and the factors that influence women during this time. In addition, an understanding the degree in which socio-economic and psychological factors influences physical activity behaviour is required. This information is important and can inform the development of health promotion programs targeted at these women to ensure they are appropriate and address postnatal needs.

Effective models of health promotion targeted at Aboriginal and Torres Strait Islander postnatal women must be culturally appropriate, community controlled, self-determining and built on the foundation of the communities needs (Commonwealth of Australia 2002; Durie 2004; McLennan and Khavarpour 2004; Mikhailovich, Morrison et al. 2007). These components require an in-depth exploration in order to ensure that they are representative of the groups in which they are intended. Currently, limited information explicitly describes the way in which Aboriginal and Torres Strait Islander postnatal women view physical activity. As discussed previously, a problem analysis is an effective way of obtaining a holistic view of the factors that influence populations (Kettner, Moroney et al. 2008). This includes understanding how the community express their needs in relation to particular situations or circumstances such as physical activity (Kettner, Moroney et al. 2008). Until such information is obtained it is unclear how any health promotion interventions targeted at the community would be effective. Therefore there is an urgent need to acquire such knowledge given the high rates of physical inactivity within the postnatal population.

The postnatal period will present unique situations and circumstances in regard to the delivery of health promotion interventions. Although it is a challenging time for women, this period provides a window of opportunity in which health practices can be promoted (McKellar, Pincombe et al. 2006). It represents a new phase for women who are experiencing many changes, so the promotion of health behaviours may be effective. An added complexity during this time is the appropriate timing of interventions to promote health behaviours such as physical activity. This is important as interventions should be offered at targeted times during the postnatal period or else they could become irrelevant to women. For example, the promotion of physical activity to women within the first six weeks post-delivery would be highly inappropriate to them as would not be physically, mentally and emotionally able to participate. As Wiggins (2005) outline, interventions need to ensure that they are not only timely but also culturally sensitive.
(Wiggins, Oakley et al. 2005). This is particularly relevant for Aboriginal and Torres Strait Islander postnatal women and should be considered when delivering interventions.

An important component of health promotion intervention design is the use of behavioural theories. Theories are useful in predicting and explaining why relationships exist (McLeroy, Steckler et al. 1992; Cottrell and McKenzie 2005). When examining the relationship between adoption and adherence of physical activity, theoretical frameworks that have been used within the literature including the Transtheoretical Model (or Stages of Change) (Marcus and Simkin 1994), Social Learning Theory (or Social Cognitive Theory) (Bandura 1977) and the Social Ecological Model (McLeroy, Bibeau et al. 1988).

In a review undertaken by Bellows-Riecken & Rhodes (2007), eight interventions underpinned by theoretical behaviour change models to improve physical activity of parents were critiqued (Marcus, Pinto et al. 1994; Cody and Lee 1999; Scharff, Homan et al. 1999; Fahrenwald and Noble Walker 2003; Farhrenwald, Atwood et al. 2004; Cramp and Brawley 2006; Farhrenwald and Shangreaux 2006). The findings from this review also highlighted two additional studies that possessed similar attributes to behavioural theories however no theoretical approach was stated (Myers, Weigel et al. 1989; Urizar, Hurtz et al. 2005). The authors concluded that the use of the stages of change model and the social cognitive theory have achieved some success in physical activity interventions.

Whilst the application of theoretical frameworks can assist to understand and predict behaviour, they often tend to assist those whom they are not directed towards, that is, the socially and economically advantaged groups in society (Erben, Franzkowiak et al. 1999; Brough, Bond et al. 2004). Another flaw of the theoretical based approach is the tendency for interventions to be individually focussed. Behaviour change that is individually focussed assumes that individuals are able to undertake decision making and rational choices (Baum 2008). Such assumptions prove risky when individuals are not equipped to undertake this decision making given their social and economic environments and due to the choices they have available to them. Such findings further support the determinants of health approach.

For the Aboriginal and Torres Strait Islander population little is known about the development of such approaches that seek to contextualise their behaviours via a determinants approach.
Brough, Bond and Hunt (2004) argue that behavioural interventions and their associated messages can isolate the community by inferring that those individuals who are able to adopt the ideal health behaviours are superior due to their ability to be self-disciplined. As noted earlier, this may not always be true, especially if individuals do not have the capacity or resources to undertake such changes. This reinforces the notion that the problem must be understood in the initial stages of health promotion planning to inform the development of solutions. Currently limited work exists that outlines the application of theoretical models in the Aboriginal and Torres Strait Islander postnatal population. Bellows-Riecken & Rhodes (2007) conclude that more work is needed that seeks to understand the use of theoretical behavioural change models such as the TPB (Ajzen 1985), the Social Cognitive Theory (Bandura 1986) and the Social Ecological Model (McLeroy, Bibeau et al. 1988).

Interventions informed by theoretical behavioural change models and targeted at Aboriginal and Torres Strait Islander postnatal women need careful consideration. Only one peer reviewed intervention that specifically focussed on the physical activity promotion of an Aboriginal community was identified (Shilton and Brown 2004). However, whilst the peer-reviewed evidence base is limited, there are a variety of health promotion activities occurring at the grass roots level, often funded with limited resources and support (Brough, Bond et al. 2004). Given the lack of empirical evidence outlining the physical activity experiences of the population, it is challenging to determine where to begin. Reflection of the broader Aboriginal and Torres Strait Islander literature indicates that prior to intervention development; a thorough understanding of the populations physical activity experiences is needed. This includes understanding whether women like physical activity and whether they feel supported and confident to be physically active.

**Theory of Planned Behaviour**

Theoretical frameworks allow for behaviours to be examined within boundaries. These boundaries exist in the form of constructs. A theories construct outlines an anticipated behavioural trait given an individual situation or circumstance. They are also useful for strategy development and intervention design, as the construct allows for theoretical predictions and expectations to be made (Ajzen 1998; Baum 2008; Ajzen 2009; Allen 2010). In addition, a
theoretical construct can be used to interpret an individual’s behaviour. Therefore theories allow for behaviours to be understood and interpreted within scope.

The TPB seeks to understand the cognitive progresses individuals will move through before engaging in behaviours (Ajzen 1985; Ajzen 2009). If physical activity behaviour is considered, the theory allows for the examination of individuals’ cognitions before deciding whether to undertake physical activity. It is an individual behavioural model which examines the factors that influences an individual’s intention to undertake a desired behaviour (see Figure 1).

![Figure 1: Theory of Planned Behaviour](http://people.umass.edu/aizen/tpb.diag.html) (Permission is granted for use of this diagram for non-commercial purposes only).

The TPB is an extension of the Theory of Reasoned Action (TRA) (Ajzen 1985; Ajzen 2009). The original TRA centres on the notion that behaviour can be understood by understanding attitudes. The key principle of this theory is that intention is influenced by attitudes and subjective norms. For example physical activity participation is influenced by an individual attitude towards the behaviour. If the attitude is positive, they will be more likely to be physically active and if their attitudes are negative they will be more likely to physically inactive. Similarly, if individuals perceive that their significant others, such as their spouse, parents, children or friends view physical activity positively, they will be more likely to be active and less likely if
they sense negative perceptions. The TPB includes behavioural beliefs and subjective norms however it extends the TRA with the inclusion of the controlled beliefs construct. This construct examines an individual’s internal confidence to undertake a particular behaviour. This internal confidence examines an individual’s desires and motivations. These constructs are described in more detail below.

Understanding individual’s cognitions is important for health promotion intervention planning. An intervention that seeks to promote physical activity will be redundant if the individuals in which they are targeted perceive physical activity negatively, are influenced by significant others that perceive physical activity negatively or have limited confidence to be active. Therefore the application of the TPB allows for strategies and interventions to be constructed so that can reflect the needs of the individuals in which they are directed. This is important and adheres to the fundamental principles of health promotion theory.

**Behavioural beliefs**

Behavioural beliefs relate to an individual’s evaluation of a potential behaviour and the degree in which individuals desire these behaviours positively. This construct can be used to understand the overall evaluation of physical activity by Aboriginal and Torres Strait Islander postnatal women. These beliefs translate to positive or negative attitudes that individuals have towards a behaviour (Ajzen 1985; Ajzen 2001). In this construct, individuals undertake a cost benefit analysis when considering the desired behaviour (Allen 2010). For example mothers might identify that the benefit of physical activity is the increased ability to lose weight. However they may also identify that the cost for undertaking such behaviour is using spare time to exercise instead of sleeping or performing household tasks. This information is important to consider for mothers as their beliefs will be influenced by the cost benefit analysis they undertake for themselves and their children.

This evaluation might also be different to the feelings mothers have about exercise. Whilst mothers may view physical activity positively and understand the benefits of undertaking exercise, they may not be able to undertake it due to a range of factors (Allen 2010). This is reinforced by Azjen & Fishbein (2005) who suggest that individual beliefs are influenced by a range of factors including the determinants of health that have already been discussed (Ajzen
2005). For the Aboriginal and Torres Strait Islander postnatal population this understanding is significant and is limited in the current evidence. Insight into the cost-benefit analysis that women undertake to be physically active will be important learning’s that inform future physical activity health promotion activities. This will be strengthened if these learning’s are contextualised into the lives of these women by acknowledging the broader determinants that influence their attitudes and behaviour.

In addition, an understanding of how the cost benefit analysis is influenced by motherhood will also contribute to significant learning’s. The ideology of motherhood is strongly influenced by societal and cultural roles and responsibilities. Hence, whilst the outcomes of physical activity may be viewed positively by women, their ability to be physically active (either real or perceived) may be restricted. This may also be compounded by other socio-cultural and economic factors in which physical activity behaviour are strongly influenced. This information is fundamental, especially given the strong impact attitudes have on behavioural intentions.

Limited evidence exists that explicitly outlines the physical activity attitudes of Aboriginal and Torres Strait Islander postnatal women. Without such knowledge and insight into how positively women view physical activity and its associated cost to them, it is difficult to ascertain how health promotion efforts to improve activity levels could be delivered. Hence, the examination of Aboriginal and Torres Strait Islanders postnatal women’s view about physical activity and the identification of the factors that may assist or prevent participation will be a major component of this study.

**Subjective Norms**

Subjective norms allows for the influence of others to be explored. This includes understanding the perceptions individuals have that important others think that they should engage in a desired behaviour (Ajzen 1985; Chatzisarantis, Hagger et al. 2004; Symons Downs, Graham et al. 2006). They also relate to the degree in which individuals feel that they must conform to particular health practices based on what others think or what others do (Allen 2010). In regards to postnatal physical activity participation, this construct can be explored within a determinants model, within motherhood and within the Aboriginal and Torres Strait Islander culture.
The previous sections have described the potential influence that these factors have on the target population of Aboriginal and Torres Strait Islander postnatal women. At a theoretical level, it also important to understand to what degree the determinants may influence behaviour and in this instance the subjective norms of individuals. The social and economic environments in which individual’s live will no doubt influence their perceptions of others. Therefore, this should be considered when exploring subjective norms.

In addition, subjective norms must also be considered within the context of motherhood. The postnatal period is an extremely challenging time hence the way in which cultural expectations of motherhood influences postnatal physical activity will be explored to understand the complexities of this construct. Maternal roles and responsibilities have been outlined to describe how these influence behaviour. The ideology of motherhood has also shown its influence on women’s perceptions of themselves as mothers and how this influences individual behaviours such as physical activity. Therefore, subjective norms can be used to further explore how women report their significant others perceptions relating to physical activity. Firstly, to understand the degree in which mothers feel pressured to undertake physical activity by their significant others and secondly, to understand the degree to which mothers feel pressure to be physical inactive. Both will provide insight into how subjective norms influence the intentions of mothers to be physically active. Finally, subjective norms can be used to understand Aboriginal and Torres Strait Islander postnatal women’s experiences. The current evidence outlines that physical activity will be undertaken to strengthen social connectedness within this population. Therefore the subjective norm construct must be considered within this context to understand whether these findings translate to the postnatal population.

The subjective norm construct can be used to explore many factors related to postnatal physical activity of Aboriginal and Torres Strait Islander women. Although there is some evidence that suggests and predicts its potential influence, more work is needed to fully describe this as women face many challenges at this time. The more this can be understood to inform health promotion strategies, the greater chance of success these strategies will have.
Controlled Beliefs

Controlled beliefs relate to the degree in which individuals feel confident to execute desired behaviours (Ajzen 1985; Ajzen 1998). They also relate to the degree in which individuals think that they can control their beliefs by willpower (Ajzen 2009). From a physical activity perspective, the level of confidence a woman has to be physically active is important to understand.

Controlled beliefs have been related to the construct of self-efficacy from the Social Learning Theory, as they are similar in nature. However, at assessment level, the ways in which these constructs are interpreted differ. For example, self efficacy relates to a mothers confidence to undertake desired behaviours where inhibiting factors may be present (Bandura 1977; Ajzen 1985; Ajzen 1998; Bandura 2000). Conversely, controlled beliefs relate to a mother’s confidence in herself to undertake physical activity and the level of control she feels she has to undertake this (Bandura 1977; Ajzen 2009).

Confidence to undertake physical activity has consistently been reported in the literature as a moderator of participation (Bandura 1986; Sallis, Haskell et al. 1986; McAuley 1992; Oman and King 1998). A lack of confidence has also been reported as a barrier to postnatal physical activity (Bandura 1977; Bandura 1986; Sallis, Haskell et al. 1986; McAuley 1992; Oman and King 1998). Smith, Cheung et al (2005) conducted a study which investigated the physical activity behaviours and associated psychosocial factors of postpartum women who had recently been diagnosed with gestational diabetes (Smith, Cheung et al. 2005). The results indicated that self efficacy was reduced when women were time poor or tired. Cramp & Brawley (2006) also highlighted the importance of self efficacy in a study undertaken to compare adherence to postnatal physical activity (Cramp and Brawley 2006). Therefore, self efficacy needs to be considered in relation to postnatal physical activity, as lack of self efficacy can act as a barrier to participation.

However, much of the existing evidence does not articulate the internal confidence Aboriginal and Torres Strait Islander postnatal women have to be physically active. Therefore more work is needed that outlines the level of confidence women feel they have to be active and how much control they have to execute this behaviour. Similarly to the other constructs of the TPB
discussed, controlled beliefs will need to be discussed within the context of the determinants and the life-stage of motherhood. This understanding will allow for more depth in the exploration of these factors.

Application of TPB

The TPB has been applied to many health behaviours including physical activity (Hagger, Chatzisarantis et al. 2002; Jackson, Smith et al. 2003; Blue 2007; Guinn, Vincent et al. 2007). It has also been used in pregnancy and postpartum physical activity research. In a prospective study of pregnant women, the theory was used to examine exercise intention and behaviour, and identify group differences between body mass index and birth outcomes of those women who were and were not exercising (Symons Downs and Hausenblas 2007). The results indicated intention predicted exercise behaviour and those women who exercised in their third trimester had a significantly lower body mass index compared to women who did not exercise. In another study conducted with both pregnant and postpartum women, behavioural, normative and controlled beliefs about exercising were examined to identify their most salient beliefs (Symons Downs and Hausenblas 2004). The finding suggested that overall, women were more likely to exercise before they were pregnant compared to during pregnancy and postpartum. The most common belief about exercising for postpartum women was that it assisted with weight control. Husbands and partners were most likely to offer support in relation to physical activity behaviour. In other work, individuals who reported high self efficacy and positive attitudes towards physical activity were more likely to have the intention and/or be physically active (Hagger, Chatzisarantis et al. 2001; Blue 2007; Boudreau and Godin 2007).

The TPB presents a useful framework to assist to understand the physical activity needs of Aboriginal and Torres Strait Islander postnatal women. It allows for the description of women’s physical activity behavioural beliefs, subjective norms and controlled beliefs to be explored within a determinants approach. Understanding the degree to which social class a, stress, social support, social exclusion, early life, transport, food security and addiction of substance influences physical activity participation of this group could be examined. Whilst the theory examines at the individual level, it identifies those factors that contribute an individuals intention to undertake a desired behaviour (Ajzen 1985; Ajzen 2001; Ajzen 2009), in this case, Aboriginal and Torres Strait Islander postnatal women’s intention to be physically active.
This theory has had limited application in the Aboriginal and Torres Strait Islander postnatal population and therefore its relevance and appropriateness to this population is relatively unknown. For this reason the theory could be applied qualitatively as a heuristic framework to allow for women’s experiences to be explored in more depth. Whilst the exploration of how Aboriginal and Torres Strait Islander postnatal women view physical activity behaviour is necessary, so too is the exploration of the determinants that influence this behaviour. This investigation aims to show that a standardised approach that does not consider such factors is an ineffective way to engage with the Aboriginal and Torres Strait Islander postnatal population and does not adhere to the guiding principles of health promotion.

**Conclusion**

The purpose of this literature review has been to explore the degree in which the determinants influence Aboriginal and Torres Strait Islander women to understand the context of their lives. This has been undertaken to further demonstrate why ‘one size fits all’ approaches will be ineffective if they do not consider or account for these influences. This understanding draws on the principles of health promotion theory which outlines the necessity for these considerations so that interventions can be developed to empower individuals to overcome them.

This review has demonstrated there are multiple determinants that influence Aboriginal and Torres Strait Islander postnatal women’s ability to engage in regular physical activity. These determinants are interrelated and the degree to which they influence and impact upon women vary. As outlined in this review, a woman’s circumstance predisposes her to particular determinants, for example her position on the social gradient, the level of social support she has or her employment situation. From a population perspective in which health promotion interventions are targeted a good understanding of these issues are needed for the greatest chance of success.

Overall, the literature suggests that the population is physically inactive, however only some of the reasons for this inactivity are understood. A major gap in the current evidence base is the missing voice of Aboriginal and Torres Strait Islander mothers and the way in which they articulate their physical activity needs. Understanding the stories of Aboriginal and Torre Strait Islander women within a determinants approach will provide useful insight to their physical
activity experiences. This should include an identification of their attitudes and perceptions to activity, available support and their internal confidence to be active. If this information is obtained and used to inform future physical activity interventions and strategies, it will provide a greater opportunity for success in increasing physical activity levels within this group.

The current evidence base that describes the response to physical inactivity of Aboriginal and Torres Strait Islander postnatal women is almost non-existent. In fact, the response to overall inactivity within the broader Aboriginal and Torres Islander population is limited. With this in mind it is important that preliminary work undertaken in this area should contribute to the evidence base and allow proceeding work to follow. Whilst an obvious start might be the development and trial of a physical activity intervention, this cannot happen without greater insight from women themselves. This understanding together with a consideration of the determinants would provide a good platform for intervention design.

An exploration of the literature has identified the TPB as a useful model to help understand the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women. This theory allows a description of the cognitive processes women move through before engaging in a behaviour (Ajzen 2009). This includes understanding how women perceive physical activity, whether they feel pressure to conform to physical activity beliefs of their significant others and how confident they are to participate in physical activity. Information and knowledge such as this is not readily reported in the physical activity literature. Without this understanding it is difficult to understand how future physical activity interventions could be developed and targeted at Aboriginal and Torres Strait Islander mothers.
CHAPTER 3: Methods

Introduction

The following chapter will outline the methodological considerations given to understanding the physical activity experiences of Aboriginal and Torres Strait Islander mothers. As outlined in the previous chapter, obtaining this understanding presents both a challenging and complex task, especially in consideration of the multiple determinants that influence women. Hence, it is was important to ensure that the methodology and approaches employed were socially, culturally and practically relevant and appropriate for this population. The final decisions were strongly influenced by the literature and the pilot studies that were conducted prior to the main study.

The purpose of the main study titled ‘Mums the Word’ was to contribute the gap in the current evidence base that revealed the missing voice of Aboriginal and Torres Strait Islander mothers and the way in which they describe physical activity participation. The methodological considerations were centred on how best to obtain these stories and experiences from women in the most appropriate and efficient way. In the initial stages of this research, the principles of a problem analysis were applied. A problem analysis seeks to understand an issue in depth before strategies to improve or rectify the issue are developed (Kettner, Moroney & Martin, 2008). The process of this analysis allows for the identification of key factors that should be considered during sample selection, method selection and data collection procedures (Kettner, Moroney et al. 2008). Using an analytical approach, the ‘problem’ of physical inactivity was examined using the current evidence base and the TPB. In addition to this, two pilot studies were conducted to inform the development of the main study.

The rationale for undertaking each pilot study was to test recruitment strategies and alternative methods given the limited evidence that exists in this area. It also provided the researcher with experience in working with this population. The pilot studies were particularly useful as they allowed consideration to be given to working with ‘hard to reach’ populations, methods selection and physical activity measurement. They were also responsible for identifying the different time points within the maternal population that may be important to consider when exploring physical activity experiences with women. In respect to this research, it influenced the change of focus from the broader maternal population to the postnatal population (a sub-group of the maternal
population), which extends the first year after childbirth. The postnatal period has been described as both a challenging and opportunistic time for women. Hence the issues that influenced women’s experiences during this time should be examined so that they can also inform the most appropriate timing of interventions for the future. The design, methodology and outcomes of these pilot studies are presented in the first section of this chapter.

The second section of this chapter describes the methodological considerations of the ‘Mums the Word’ study. A qualitative, multiple case study methodology was used to understand the physical needs and experiences of Aboriginal and Torres Strait Islander postnatal women. Informed by the findings of the pilot work, a number of decisions were made in relation to the target group, method selection and measurement used. The most significant decision was the addition of a non-Indigenous cohort of cases to the main study. Given that little is known about the broader Australian postnatal population, this cohort was included to further develop the understanding and highlight the issues identified by Aboriginal and Torres Strait Islander women. In addition to the inclusion of this cohort, each cohort was stratified by age, marital status, parity, income indicators and education to ensure that they were similar. This was undertaken in attempt to account for the determinants of health that have been reported in the literature to influence women’s lives.

The TPB was selected as the theoretical framework to understand the process in which Aboriginal and Torres Strait Islander mothers consider physical activity. This theory allowed for the exploration of women’s cognitions and needs, which ultimately inform their intentions to be active. At the individual level, the TPB was used to explore the cognitive processes postnatal move through before engaging in physical activity. This allowed for the understanding of women’s attitudes, beliefs and support to be physically active. In addition, the factors that influence a woman’s motivation to execute physical activity can also be understood. The TPB was used as a heuristic framework to explore the key physical activity behavioural beliefs, subjective norms and controlled beliefs of postnatal women. This allows for further clarification, confirmation and exploration of the narratives provided by women to be examined. In addition, the follow-up component of this study allowed for the physical activity accounts of women to be further developed.
As this was a qualitative study, it allowed each of the theory’s constructs to be explored at depth. The TPB underpinned both the baseline and follow up interview schedules in which the behavioural beliefs, subjective norms and controlled beliefs can be explored. The purpose of the follow up design was to identify if women’s physical activity intentions had changed over the first 8 months of the postnatal period. It also allowed for a range of experiences to be examined. This chapter will outline how mothers were recruited into this study as well as the data collection methods that were used.

Also included in this chapter is an outline of how the data was managed and analysed. This includes a description of how the NVivo 8 software was utilized to help manage, shape and analysis the data. This software is specifically designed for qualitative data management. However, it is important to note that the software alone will not analysis the data, an analysis strategy must be employed. The use of this software in accordance with the application of a thematic analysis strategy will be described including how this was done using the constructs of the TPB. This will also describe the decisions that were made at various time points of the analysis.

At the conclusion at this chapter, it will be clear that the methodological and analytical strategies selected for the main study are an important element of this research. These methods have assisted to ensure that Aboriginal and Torres Strait Islander postnatal women have an opportunity to describe their physical activity beliefs and perceptions. They have also allowed for the exploration of other factors to be considered so that a thorough understanding of these experiences can be obtained.

Section 1: Pilot work
It is well documented that physical activity participation is influenced by socioeconomic factors (Australian Institute of Health & Welfare 2006). When examining the disadvantaged maternal population (who are low income earners, unemployed, young, have a number of dependants or are single parents) the evidence indicated that they are less likely to be physically active (Shaw 1994; United States Department of Health and Human Services 1996; Jones, Ainsworth et al. 1998; Fahrenwald and Sharma 2002; Urizar, Hurtz et al. 2005). They also report limited resources and greater barriers to physical activity (Wilkinson, Huang et al. 2004).
However a comprehensive understanding of the physical activity experiences of the broader maternal population in Australia is relatively unknown. Although the population are described as an inactive sub-group, few studies have sort to quantify physical activity patterns using well validated measures (Poudevigne and O'Connnor 2006). Historically, physical activity questionnaires have not measured household or childcare activities which are central to the duties and tasks performed by mothers (Ainsworth, Richardson et al. 1993; Ainsworth 2000). Therefore a greater understanding is needed that describes the physical activity participation of this group.

Much of the qualitative work that explores the physical activity experiences of Australian mothers has predominantly represented the views of women from advantaged backgrounds (Yeager, Macera et al. 1993; Vertinsky 1998). Hence, more work is needed that focuses on understanding the physical activity participation of the disadvantaged maternal population (Gennaro and Fehder 2000; Olson, Strawderman et al. 2003; Poudevigne and O'Connnor 2006). Brown, Brown et al (2001) suggest that a greater understanding of the factors that influence physical activity participation of disadvantaged Australian mothers is required as they may experience greater obstacles (Brown, Brown et al. 2001), hence more work is required.

Pilot studies are useful as they allow a trial to be undertaken before the main study (Machin and Campbell 2007). Hence, the purpose of the two pilot studies conducted as part of this research was to obtain an understanding of the physical activity experiences of disadvantaged Australian postnatal women. Given the limited understanding of the broader Australian postnatal population, disadvantaged women were selected as the target group for this initial work as these women are predisposed to similar determinants of health as the Aboriginal and Torres Strait Islander population. The decision to focus on disadvantaged women was undertaken as it allowed for the researcher’s understanding of physical inactivity in this group to be developed. This included the trial of methodological approaches that could be used to inform the main study. Disadvantaged women were defined for these two pilot studies as young (under 20 years of age), single (absence of partner), low income (<$30 000 per annum) and low education (less than Year 12 attainment).
The following section will outline the formative evaluation that was conducted as part of this work. The purpose of this section is to provide the basis in which the 'Mums the Word' study can be understood. Pilot study 1 and 2 will be described to provide an understanding of the work that was completed. This will be followed by a discussion of the methodological considerations that were given and used to inform the main study.

**Pilot Study 1: An exploratory study to understand the physical activity experiences of disadvantaged postnatal women**

The aim of this pilot study was to explore the physical activity experiences of women who attended community child health clinics (CCHC). CCHC were identified as sites to recruit mothers as this service is specifically targeted to meet their needs and the needs of their babies. Services offered included open clinics, which allow mothers the flexibility to access the healthcare system in accordance with their baby’s routine. If data collection occurred within this setting, issues such as travel, childcare and time constraints can be overcome. The clinics also provided a non-threatening, child-friendly environment where mothers could interact with each other.

**Research Questions**

The researcher questions for this pilot study included:

1. Are mothers meeting the National Physical Activity recommendations of at least 150 minutes of moderate physical activity per week?

2. What information and advice are mothers recalling that are consistent with the National Physical Activity recommendations of 150 minutes of moderate physical activity per week?

3. What factors are positively or negatively influencing mothers to achieve the National Physical Activity recommendations of 150 minutes of moderate physical activity per week?
Measurement

Interview schedules included questions that explored women’s current physical activity participation, knowledge of the physical activity guidelines and barriers and facilitators to physical activity participation. Physical activity was collected and calculated using the methods and procedures as outlined by the Active Australia Survey (Australian Institute of Health & Welfare 2003). Demographic information was also obtained. All questions were derived from a variety of validated tools where possible including the National Health Survey (Australian Institute of Health & Welfare 2003).

Ethical approval

Ethical approval was obtained from the Gold Coast Health Service District Human Ethics Department and Griffith University Human Research Ethics Department.

Analysis

As this was a pilot study, sample size was not calculated. Attendance at these open clinics varied as there were no scheduled appointments. The open clinics were highly unstructured so times spent in the clinics by mothers varied from 5 to 20 minutes in duration.

For the data collected in this pilot study, results are presented as percentages of the total numbers. Where group data is presented, data is reported as percentages of the group total as well as percentages of the total number recruited. Qualitative data is grouped and reported in common themes.

Women who attended the clinic were categorised into postnatal groups (PNG) (see Table 1). These groups were formed based on a woman’s current position in the postnatal period at the time of interviews. This was undertaken so that physical activity participation of pilot mothers could be further examined and contextualized. For example, mothers generally reported receiving advice about resuming physical activity six weeks post delivery, therefore it would be expected that they would not be physically active. However, if data were collated without such consideration, it may bias the results and overall physical inactivity, especially if they were over represented in the sample.
Table 1: Postnatal groups

<table>
<thead>
<tr>
<th>PNG#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2mths PNG</td>
<td>Mothers will have given birth less than 2 months from the time of interview</td>
</tr>
<tr>
<td>2-4mths PNG</td>
<td>Mothers will have given birth between 2 and 4 months from the time of interview</td>
</tr>
<tr>
<td>5-6mths PNG</td>
<td>Mothers will have given birth between 5 and 6 months from the time of interview</td>
</tr>
<tr>
<td>&gt;6mths PNG</td>
<td>Mothers will have given birth more than 6 months from the time of interview</td>
</tr>
</tbody>
</table>

#PNG: postnatal groups

Recruitment strategies

Eligible mothers were approached in the clinic by the CCHC nurse. Eligible women included those that had given birth in the past 12 months, were aged 18 years or above, could speak English and could provide informed consent. Those women that met this criterion were invited to participate in this pilot study.

Results

Patient Characteristics

More than half of the mothers recruited (63%) were aged between 30-39 years old (Table 2). Sixty-three per cent of mothers had completed post qualifications since school, while 17% had not completed Grade 12. A large proportion of mothers had a household income of between $50 001 to $100 000 (39%). Fifteen per cent of mothers reported a household income of less than $30 000. The majority of mothers were married (68%), with a further 26% in a de facto relationship. Slightly less than 80% of women were first time mothers, with 65% of them having given birth less than 6 months before the interview was conducted.
Table 2: Mothers’ characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>n=46</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% (n)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>20-29 years</td>
<td>36 (16)</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>63 (29)</td>
</tr>
<tr>
<td></td>
<td>40+</td>
<td>2 (1)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Less than Grade 12 or equivalent</td>
<td>17 (8)</td>
</tr>
<tr>
<td></td>
<td>Grade 12 or equivalent</td>
<td>20 (9)</td>
</tr>
<tr>
<td></td>
<td>Post Qualifications</td>
<td>63 (29)</td>
</tr>
<tr>
<td><strong>Income Levels</strong></td>
<td>&lt;$30 000</td>
<td>15 (7)</td>
</tr>
<tr>
<td></td>
<td>$30 001 - $50 000</td>
<td>26 (12)</td>
</tr>
<tr>
<td></td>
<td>$50 001 - $100 000</td>
<td>39 (18)</td>
</tr>
<tr>
<td></td>
<td>&gt;$100 000</td>
<td>17 (8)</td>
</tr>
<tr>
<td></td>
<td>Refuse to answer</td>
<td>2 (1)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td>Never married</td>
<td>4 (2)</td>
</tr>
<tr>
<td></td>
<td>De facto</td>
<td>26 (12)</td>
</tr>
<tr>
<td></td>
<td>Separated</td>
<td>2 (1)</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>68 (31)</td>
</tr>
</tbody>
</table>
Physical activity participation rates

Overall, almost 60% of mothers were participating in sufficient amounts of physical activity when compared to the National Physical Activity Guidelines (Australian Institute of Health & Welfare 2003) of at least 150 minutes of total activity per week. Conversely, 40% of mothers were either sedentary or not undertaking amounts to achieve desired health benefits.

When results are examined at a group level they indicated that approximately 50% of mothers in the <6mth PNG were undertaking sufficient levels of activity. Overall, those mothers in the >6mth PNG had higher levels of activity compared to the other groups.

Table 3: Physical activity participation of mothers by their in the postnatal period

<table>
<thead>
<tr>
<th>Physical Activity Amounts</th>
<th>n=2 &lt;2mths PNG*</th>
<th>n=20 2-4mths PNG*</th>
<th>N=12 5-6mths PNG*</th>
<th>n=12 &gt;6mths PNG*</th>
<th>n=46 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary women</td>
<td>0 % (n)</td>
<td>10 (2)</td>
<td>17 (2)</td>
<td>0 % (n)</td>
<td>9 (4)</td>
</tr>
<tr>
<td>Insufficiently active</td>
<td>0 % (n)</td>
<td>45 (9)</td>
<td>25 (3)</td>
<td>25 (3)</td>
<td>32 (15)</td>
</tr>
<tr>
<td>Sufficiently active</td>
<td>100 (2)</td>
<td>45 (9)</td>
<td>58 (7)</td>
<td>75 (9)</td>
<td>59 (27)</td>
</tr>
</tbody>
</table>

* PNG = Post-natal group

Demographic and physical activity participation rates were examined to determine whether there were any difference in characteristics between those who were sedentary or insufficiently active and those who were sufficiently active. Results indicated that there were no marked differences between these two groups.

Barriers to physical activity and facilitators

Seventy-eight percent (n=36) of mothers indicated at least one factor that inhibited their ability to undertake physical activity in their daily lives. Barriers reported included lack of social support, lack of time, limited resources and coordinating physical activity around the baby’s routine. Seventy-four per cent of mothers reported at least one factor that assisted their ability to
undertake physical activity. Facilitators included social support, self motivation and absence of tiredness and/or fatigue.

Discussion

Whilst disadvantaged groups are the most in need of health care, they are also often the most hard to reach groups (Turrell and Mathers 2003; Statham 2004). The recruitment of women for this study also highlighted the difficulties involved in accessing women who were categorized as disadvantaged. Data from this study showed that two-thirds of mothers had completed post qualifications since leaving school, whilst 17% had not completed year 12. Recruited mothers were aged between 30-39 years, hence representative of the total maternal population, but not the desired target group for this study (under 20 years old). Women were from middle to high income households, with approximately 70% of them married and a further 26% in de facto relationship.

The limited number of disadvantaged women recruited into this study was contrary to the information received from health service providers. However a reason for this may be that disadvantaged women are treated through the Family Care Program. The Family Care Program targets mothers who are identified as ‘at risk’ women to domestic violence and other elements of disadvantage. Whilst these women do receive treatment and care via the CCHC, they do not necessarily attend the open clinics, as community child health nurses conduct home visiting consultations with them. The consultation data during this time also reinforced this as records indicated that between July and August 2006, the program conducted home-visits to 170 families. Of this number, all families had experienced or were experiencing domestic violence, maternal mood disorders and were financially stressed.

Physical activity rates indicated that recruited women were slightly more active than the general female population. Approximately 60% of recruited women reported sufficient physical activity levels compared to the national average of 54% (Bauman, Ford et al. 2001). These results are also higher than participation rates of activity recorded in two separate Australian studies of postnatal women where sufficient activity levels were 46% and 36% respectively (Smith, Cheung et al. 2005; Lee and Gramotnev 2006). Higher physical activity rates in this group may be attributed to the socioeconomic characteristics of these women which indicate that they are
highly educated, have higher incomes, married and older. This is consistent with other studies that have highlighted the relationship between physical inactivity and low education and income levels (Crespo, Ainsworth et al. 1999; Martinez-Gonzales, Varo et al. 2001; Najman, Toloo et al. 2006).

Overall, recruited mothers were reasonably active and their socio-demographic characteristics indicated limited disadvantage, almost 80% of them identified at least one factor that negatively influenced their physical activity levels. The factors identified are similar to those reported in the literature which include lack of time, lack of energy, lack of childcare and other social support, cold weather and other competing demands such as housework (Fahrenwald and Noble Walker 2003; Lewis and Ridge 2005; Smith, Cheung et al. 2005).

A number of studies have tried to limit factors that inhibit physical activity by developing strategies to overcome these. For example two Australian studies aimed to increase women’s social support levels by establishing stroller pram walking groups. Both studies reported some success in increasing physical activity and social support levels of these mothers (Currie and Develin 2000; Armstrong and Edwards 2004).

Women recruited into this study reported social support, self motivation and absence of tiredness and/or fatigue as factors that facilitated physical activity behaviour. A study conducted in the United States with postnatal women, reported factors that positively influenced physical activity participation. These included a sense of accomplishment, increased strength, decreased stress levels and getting back into ‘shape’ after pregnancy (Fahrenwald and Noble Walker 2003).

In an Australian study, physical activity undertaken with significant others was viewed as a positive influence. Mothers perceived this as a way of strengthening relationships, providing an active role model for children and engaging in shared family time (Lewis and Ridge 2005). Results from this study correlate with these findings, as recruited mothers reported undertaking physical activities by themselves or with family and friends rather than in an organized group or program. Overall, recruited women in this group seemed to have high motivation and self efficacy levels. Self-efficacy which relates to the confidence an individual has to perform certain behaviours, has a strong and consistent relationship with exercise adherence (Bandura 1977; Bandura 1986; Sallis, Haskell et al. 1986; McAuley 1992; Oman and King 1998).
Summary

Although limited numbers of disadvantaged women were recruited into this pilot study, the results did highlight the difficulties mothers face in regard to physical activity after birth. This was particularly evident when almost 80% of this ‘advantaged’ group reported barriers to physical activity uptake. The suggestion that overall these women were highly motivated and confident to undertake physical activity supports why women in this group were relatively active. However, whilst this information has proved valuable, it also highlights the need for a more concerted effort to reach disadvantaged mothers who may face similar obstacles to physical activity, in more difficult circumstances. This information is essential in order to lay the foundations for health promotion programs that aim to increase the physical activity levels of socioeconomically disadvantaged women.

Pilot Study 2: A facilitated group discussion with young disadvantaged mothers to understand the factors that influence their physical activity participation.

The purpose of this study was to explore the physical activity experiences of young disadvantaged mothers. Given the limited success in accessing the target group in pilot study 1, this pilot study was conducted in a youth health service. This service was a non-government organisation that provided support to youth aged between 12-25 years who were identified as ‘at risk’. The research questions for this study were:

- How do youth health service mothers prioritize physical activity in their everyday lives?
- What factors do youth health service mothers report that positively or negatively influence their physical activity prioritization?
- What factors do youth health service mothers report that positively or negatively influence their motivation to undertake physical activity?
- What types of physical activities do youth health service mothers participate in?

Methods

A facilitated group discussion was used to obtain information from mothers who attended an organized playgroup meeting at the youth service. The Service Coordinator specifically selected these women for the group discussion. This occurred for a number of reasons; firstly this was an
established group that met weekly and the Coordinator felt that mothers were comfortable with each other and could provide support to each other, if needed, during the discussion. Secondly, as these mothers had children who ranged from 6 to 18 months, the Coordinator felt that they would be confident to discuss the issues they had faced since giving birth.

Four open-ended questions were administered to the group. Although a focus group discussion was the intended method for data collection, a number of conditions resulted in this methodology not being applied. The Coordinator of youth health service felt that the mothers had been over-researched and were hesitant to participate in research activities as they felt information was always retrieved and not received. Therefore a condition to the discussion was that a short presentation about the benefits of physical activity be given to the mothers. This presentation outlined the National Physical Activity guidelines as well as information about physical activity programs offered on the Gold Coast.

Secondly, the Coordinator asked that the discussion not be tape-recorded as she felt this may intimidate the group. Data was collected on butcher’s paper and all members of the group had an opportunity to view this. At the completion of each question, information recorded was read back to the group to allow for clarification and final input.

Finally, although demographic information pertaining to mothers levels of disadvantage was important, so too was the need to build rapport. The research team was asked not to administer the demographic survey to mothers until the follow up visit as the Coordinator felt that this may intimidate mothers.

At the completion of the group discussion, data was collated for each question. The principles of thematic analysis were applied so that common trends and themes from this discussion could be identified.

**Results**

The following outline the key themes that were identified as part of this facilitated discussion. They key themes included priority, childcare, lack of financial resources and time, type of activity, perceptions of organised physical activities, motivation and types of activities enjoyed. A description of each theme is outlined below.
**Priority**

Only one of the eight mothers reported physical activity as being a high priority in her life. The majority of mothers had general agreement that whilst physical activity should be a priority, realistically it was not. One mother noted that her daily routine resulted in her undertaking physical activity for transport. A number of reasons for mothers’ inabilitys to undertake physical activity were mentioned. The main themes identified included childcare, lack of financial resources and time, type of activity and perceptions of organized activities.

**Childcare**

Limited availability of services was only one component of the childcare issues reported by mothers. Issues also related to when the child was scheduled to attend. For example, one mother discussed how she enjoyed playing netball but she could not participate as the fixture day did not coincide with the day that her child was booked into a childcare facility. Another mother explained that whilst her local swimming pool provided child minding facilities, her son did not like attending, therefore this proved difficult.

**Lack of financial resources and time**

Lacks of financial resources were identified by one mother who indicated that whilst she would like to join a gym, she could not afford to pay the membership fees. In relation to time, one mother indicated time was limited and she found it difficult to set aside 30 minutes of exercise a day. This was reinforced by a mother who added that she did not set aside time to exercise like she needed to.

**Type of activity**

There was general agreement that walking was the most common exercise that could be undertaken ‘easily’ by this group. However factors that make it difficult to walk with a pram included the children climbing out of the pram while walking or the inability for older children to ‘keep up’ if long distances were walked.
Perceptions of organized physical activities

There was much discussion around organized physical activity programs in the community such as those conducted by the Gold Coast City Council (GCCC). The general perception by the group was that GCCC programs were attended by mothers from high class backgrounds or ‘yuppies’ as they termed it. These perceptions resulted in women from this group not attending GCCC programs. Comments included:

‘They (women who attend the GCCC programs) stare at me’

‘They think that just because you’re young your kids are naughty’

‘They think that we had kids for the money’.

Positive past physical activity experience was the major reason identified by a mother who reported physical activity as a high priority in her life. She explained how her ability to remain physically active now was linked to her constant participation in physical activity and sport when she was younger.

Motivation

Mothers were asked to indicate what motivated them to participate in physical activity and exercise everyday. One mother responded that she enjoyed strenuous exercise which made her ‘legs burn.’ She also stated that her motivation was driven by her desire to appear physically fit and intimidating:

‘I want bigger muscles so that I can cross my arms and girls will be nice to me’.

Mothers were asked to identify factors that assisted their motivation to undertake physical activity. Common themes identified included incidental activity such as transport and housework, stress relief and satisfaction. One mother described that her participation in incidental activity was through necessity and not planned, she commented:

‘When you don’t have a car you’ve got no choice but to walk everywhere’

Factors identified as inhibiting activity include issues with childcare and participation with mothers who they did not identify as being similar to themselves. For example one mother stated
that she did not like participating in physical activities with ‘old, posh or yuppie’ mothers. There was agreement in the group by other mothers who shared similar feelings.

**Types of physical activity enjoyed**

Mothers were asked to report the types of activities they enjoyed participating in. There were varied responses across both individual and group based activities. Individual activities included weight and strength training, swimming, walking and riding a bike. Group based activities included participation in aerobics, yoga classes, water running and netball.

Mothers were asked whether they enjoyed undertaking these physical activities by themselves or with others. Some mothers responded that they preferred to exercise by themselves. Obviously, group based activities resulted in mothers exercising with others (such as yoga classes or netball), however this question was related to whether mothers would undertake these activities with others that they knew or whether they were confident to participate by themselves in these group situations. One mother responded that she would not be able to participate in a large class as she would feel intimidated going by herself. General agreement in the group centred on the mothers’ willingness to participate in group based activities if they felt comfortable and confident in the environment that these classes were conducted. A common theme that again appeared was the apprehension by these mothers to undertake these activities with older women or women whom they felt were from higher class backgrounds. This was reinforced by a comment by one mother who stated:

*I prefer to do physical activity with mums who are similar to me*

Mothers were asked to consider whether their neighbourhoods allowed them to be physically active. Safety concerns were the most common theme identified. These issues related to concerns of their children being kidnapped and high traffic areas. One mother described that these concerns were evident in the community as it was now uncommon to see children playing games in the front yard of their home or in the street. Another mother discussed how she did not feel confident to ride her bike with her baby on the back as the roads around her home had heavy traffic.
An additional theme identified by women related to physical activity infrastructure, in particular footpaths. One mother commented that there were not any footpaths in her suburb whilst another stated that the footpaths in her suburb were not wide enough for her pram.

**Discussion**

Priority of physical activity indicated that whilst pilot mothers regarded it as a high, in reality it was difficult to achieve. Factors identified that have inhibited physical activity by mothers are similar to those reported in the literature which include lack of time, lack of energy, lack of childcare and other social support, cold weather and other competing demands such as housework (Fahrenwald and Noble Walker 2003; Lewis and Ridge 2005; Smith, Cheung et al. 2005). In a study conducted by Lewis and Ridge (2005) with Australian mothers, findings were similar as one mother reported (Lewis and Ridge 2005):

‘Thirty minutes on most days of the week? Nice to think it would happen but boy.... What a daydream. I think it should be done, but the reality is quite different’ (p.2298)

This information is useful to know from a health promotion perspective. Interventions that aim to increase physical activity levels in mothers need to be mindful of their ability to undertake these recommended amounts even if they prioritize physical activity highly. Research has indicated that factors such as time, resources, social support and beliefs about motherhood and their entitlement to free time to exercise hugely influence whether a women will be physically active (Wimbush 1989; Wearing 1990; Bialeschki and Michener 1994; Kay 1998; Brown, Brown et al. 2001; Lewis and Ridge 2005).

Environmental barriers have been reported as barriers to physical activity by low income mothers, similar to those reported by the recruited pilot mothers. Socio-economic status and neighbourhood environments are correlated with levels of physical activity. Research has indicated that those who are economically advantaged live in environments that make it easier to be physically active (Sallis, Johnson et al. 1997; Crawford 2006), while people from low socio-economic groups are less likely to be active (Commonwealth Department of Health and Family Services 1998). A reason provided for this fact includes safety concerns about being physically active in the local neighbourhood (Ball 2006). Given that those who live in disadvantaged communities are low-income earners, the influence socio-economic status and neighbourhood
environments have are important to understand when thinking about physical activity participation. It is essential to understand that physical environments can influence physical activity participation both positively and negatively (King, Jefferey et al. 1995; Sallis and Owen 1997). Positive influences include the provision of maintained walking paths, parks and exercise resources (Sallis, Johnson et al. 1997). Negative aspects include heavy traffic, unsuitable weather, untamed dogs and threat to personal safety due to high crime unattended dogs and pollution from cars and factories (Sallis, Johnson et al. 1997; Wilkinson, Huang et al. 2004).

A study conducted to asses the influences of neighbourhood environments on physical activity found that walking in the neighbourhood was influenced by the availability of sidewalks, limited traffic and local shops (Corti, Donovan et al. 1997). It also found that participation was less likely to occur if respondents feared crime or dogs within the neighbourhood (Corti, Donovan et al. 1997). In contrast, pilot study mothers indicted that walking with their babies in prams was restricted due to the unavailability of footpaths and heavy traffic.

Another study looked at the physical activity facilities located within a neighbourhood. It revealed that those who participated in physical activity had a higher density of pay facilities (for examples gyms where money is exchanged for the use of facilities) around their homes than sedentary adults even after age, education, and income were adjusted for (Sallis, Johnson et al. 1997).

Mothers recruited for the facilitated discussion reported negative perceptions about participating in physical activities with women who they viewed as different from themselves. This was particularly relevant when participation in the Council’s Healthy and Active Program was discussed. Mothers reported feeling stigmatized by older, more affluent mothers to attend these programs. These feelings relate to the social exclusion determinant of health outlined by the World Health Organization. Social exclusion occurs when individuals have been subjected to racism, discrimination, stigmatization, hostility and unemployment (World Health Organisation 2003). These feelings of stigmatization resulted in pilot mothers avoiding attending these physical activity programs. Interestingly, those mothers who reported feeling stigmatized had not experienced this before. This may be a result of experiencing similar encounters in different situations in the past, or a case of their perceptions only.
Limitations

A number of factors should be considered when interpreting the results from this facilitated discussion. The way in which data was collected should be viewed with caution as bias may exist in the way in which the researchers interpreted the information reported by mothers. As previously mentioned, a focus group technique was the methodology of choice for this consultation. However strict conditions placed by the health service coordinator prevented this from occurring. Strategies to minimize the impact of researcher bias were developed. For example, all information reported to the research team was read back to the group for clarification. Another factor that influenced data collection was the facilitation of the discussion during an organized playgroup session. This resulted in times when mothers would leave the group discussion to attend to their children playing near by. Although this may have prevented input into the conversations at times, this could be also viewed as strength, as mothers felt comfortable to move in and out of the discussions. Nevertheless, the researchers did undertake every effort to ensure that all mothers were included at all times.

Caution must also be given to the small sample size of this group. Although the number was adequate for this qualitative approach, it should be acknowledged that the results from this consultation should not be generalized as they relate to the attitudes and beliefs of this group of mothers at a point in time. In order to get an overall view of the influences and experiences of similar mothers, more discussions are needed.

Summary

Although considerations should be given when interpreting the results, this facilitated discussion was viewed as successful. This is largely due to the limited information and data that existed in relation to the physical activity experiences of ‘at risk’ mothers. The data produced from this discussion provides preliminary results in the understudied area of young disadvantaged mothers and their physical activity behaviours. The results from this discussion suggest that whilst mothers acknowledge the importance of undertaking physical activity, there are a series of factors that prevent this form occurring on a day-to-day basis. Childcare, lack of financial resources, lack of time, activity type and perceptions of organized physical activity programs were identified as factors that inhibit physical activity by this group. Environmental factors, in
particular, physical activity infrastructure were also identified as barriers by mothers. A strong theme identified by this group is the stigma they reported feeling for being a young mother by older and more financially advantaged mothers. Whilst no direct experiences were reported by mothers in relation to why they felt this way, these perceptions may provide insight into future physical activity program design. Specifically, this would ensure that they are acknowledged, so that strategies can be undertaken to overcome this from the onset.

**Key considerations of pilot studies**

**Hard to reach populations**

Considerations were given to the nature of this particular target group. According to Liamputtong (2007) research conducted with vulnerable populations such as the Aboriginal and Torres Strait Islander postnatal population should acknowledge that these individuals may suffer a lack of control and independence of life decisions, be subject to discrimination and intolerance and suffer inequality (Liamputtong 2007). In addition to their vulnerability as a result of their potential levels of disadvantage, Aboriginal and Torres Strait Islander postnatal women are considered ‘doubly vulnerable person’ due to their gender, role as caregiver and membership to an ethnic minority group (Moore and Miller 1999; Liamputtong 2007). Liamputtong and Ezzy (2005) discuss this further and suggest that such consideration is necessary as well as the acknowledgment that undertaking research with this group will present numerous challenges such as access issues, method selection and trust and rapport (Liamputtong and Ezzy 2005). Such challenges were experienced during the pilot work of this research. Pilot study was undertaken to understand the physical activity experiences of disadvantaged mothers who access CCHC. This study demonstrated the difficulty in accessing disadvantaged mothers. Although anecdotally nursing staff reported access to their community child health clinics by the target group, the research was unsuccessful in its ability to reach these women. Pilot study two involved a targeted approach to access disadvantage mothers via a playgroup conducted at a youth health service designed to support ‘at risk’ youth. This method proved successful however a number of variations to the methods were undertaken to the study. Requests by the co-ordinator of the health service included that the facilitated discussion be conducted with women and that this should not be tape-recorded as she felt the group would be intimidated. The second request was that demographic information not be obtained from women during the discussion as she felt
women would be embarrassed to disclose such information. These issues are not uncommon when seeking to conduct research with hard to reach populations (Liamputtong and Ezzy 2005). Trust and rapport are important components that must be established which can influence the success of research (Liamputtong and Ezzy 2005). Although the researchers had not developed such relationships, the coordinator of this service did have these established connections with these women. Hence, it was important to conduct the research under the advice of the coordinator. These lessons were important and were used to inform the development of the main study.

**Method selection**

Findings from the pilot studies also provided learning’s which informed this understanding. During pilot study one, face-to face interviews were used to deliver a semi-structured questionnaire. This allowed for women’s experiences and meanings to be shared (Seidman 1998; Rice and Ezzy 1999; Cottrell and McKenzie 2005) and for rapport to be developed between the researcher and the woman (Seidman 1998; Cottrell and McKenzie 2005; Hansen 2006). However, a disadvantage of this method was the high workload it placed on the researcher in respect to time (Hansen 2006). Conversely, in pilot study two, a group discussion was conducted. Group discussions are useful as they create a safe environment for participants to share their knowledge and experiences, and discuss ideas or issues amongst their peers (Morgan 1997; Baker and Hinton 1999; Hansen 2006). A disadvantage of such an approach is the potential for individual members to dominate or intimidate other members (Hansen 2006). Upon reflection the researchers’ experiences during data collection and field notes from the pilot work, it was concluded that the individual face-to-face interviews were better in terms of participant management and depth of information that could be gathered from each participant. The individual interviews meant that the researcher could investigate the experiences of women and the method allowed for the opportunity for meanings to be explored when required. From a practical perspective, as childcare was an issue, women were encouraged to bring their children to the interviews. One-on-one data collection meant that the researcher could concentrate on controlling the conversation of one mother and one baby at one time, compared to seven mothers and seven babies which occurred during the facilitated discussion.
Physical activity measurement

Results from pilot study one demonstrated that identifying how recently a woman had given birth was needed when examining an individual’s behaviour relating to physical activity. For example, physical activity participation of women who were four weeks postpartum was significantly different to those women who were twelve weeks postpartum due the effects of birthing. Therefore, such considerations were given for the main study, in addition to comprehending such information when formulating recommendations for health promotion interventions that target postnatal physical activity. The Active Australia questionnaire is a standardised, reliable and validated tool that has been used extensively in physical activity research, including one study with Australian postnatal women (Armstrong, Bauman et al. 2000; Bauman, Ford et al. 2001; Smith, Cheung et al. 2005). Whilst this data allows for comparisons to be made with the general Australian population in regard to physical activity participation, the instrument did not seem sensitive enough to document the varied time and activities associated with motherhood during the postnatal period. Therefore, whilst physical activity measurement seemed an important component of future work, the way in which this would be collected needed more consideration.

Maternal categories

The position of a woman in the postnatal period was an important finding that was discovered as part of the pilot studies. The postnatal period extends during the first year after childbirth (Mottola 2002). Results from pilot study one demonstrated how physical activity behaviour was significantly influenced by how recently they had given birth. For example, physical activity participation of women who were six weeks postpartum was significantly different from women who were twelve weeks postpartum. Therefore, this would need to be considered for the main study. This information was also important to consider in regard to formulating recommendations for health promotion interventions that target the postnatal population.
Section 2: Main Study
A comprehensive understanding and exploration of the physical activity needs and experiences of Aboriginal and Torres Strait Islander postnatal women was the purpose of the main study, titled, 'Mums the Word'. This study was positioned within the principles of problem analysis. Kettner, Moroney and Martin (2008) describe a problem analysis as a method to understand a particular issue at depth before the generation of solutions. Commonly, regular practice involves the identification of problems in tandem with possible solutions. In many instances these solutions that are offered relate to an increase to services, staff or other related program features. When considering the physical activity needs of Aboriginal and Torres Strait Islander postnatal women, this may translate to the provision of more physical activity related services or programs. This is described as the business as usual approach in which existing services are continued to meet the needs of the population of interest. However, this may not necessarily be the most effective approach. Health of people and populations, including the factors that influence them are dynamic. Therefore, changes that occur in society should be reflected in the programs that are offered. These programs should be responsive to the needs of the target population which should result in a number of different programs and interventions. This reinforces the notion that a standardised approach to program development and implementation is inappropriate for the delivery of health promotion programs. As the authors conclude, an analytical approach is required to understand the problem. Such understanding must occur at the onset of program planning, be free of assumptions and avoid the suggestion of possible solutions (Kettner, Moroney et al. 2008). As discussed, the analytical approach requires a problem to be examined using the current evidence base and theories (Kettner, Moroney et al. 2008). For this research the World Health Organization’s Social Determinants of Health has been used contextualise physical inactivity. The proposed research seeks to provide Aboriginal and Torres Strait Islander women with a voice in which they can express their physical activity experiences and identify their own physical activity needs. Only once this has occurred can the generation of solutions that seek improve physical inactivity amongst this group be developed.

Target group
The target group for this study are Aboriginal and Torres Strait Islander postnatal women. The postnatal period which includes the first year after childbirth, has been suggested as a ideal time
in which health practices can be promoted (Mottola 2002). This period was selected so that the findings of this study could be used to inform future health promotion interventions and strategies targeted at these women during this time period. A key learning from the pilot work was the need to specify a women’s stage within the postnatal period as it would influence the relevance and likely uptake of physical activity. For example, women who are in the early postnatal phase (within the first six weeks), are not recommended to resume physical activity until after this time, therefore promotion of activity during this time would be redundant. Hence, such considerations were given for the main study so that the formulation of recommendations could occur for future health promotion physical activity interventions targeted at women during this time. This further highlighted the inappropriateness of a standardised approach to physical activity for postnatal women as the type of advice they might receive was dependent on their position within the postnatal period.

Aim

The aim of the ‘Mums the Word’ study was:

1. To understand the physical activity needs and experiences of Aboriginal and Torres Strait Islander postnatal women in Australia.

Research Questions

The research questions that this work sought to answer were:

1. What are the key salient behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) that influence their physical activity experience at baseline and 6 month follow up?

   a. How do the behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) differ among women of differing Indigenous descent, age, marital status, education, employment situation and parity?

2. What are the key behavioural beliefs, subjective norms and controlled beliefs of Aboriginal and Torres Strait Islander postnatal women that should be considered for
the development of health promotion interventions that aim to increase physical activity levels?

**Study Design**

A collective, follow-up case study approach was chosen as the methodology for the main study, titled the 'Mums the Word' project. Case studies are helpful in assessing change in naturally occurring events (Mottola 2002; Keen 2008) and are useful when a holistic understanding and in-depth knowledge of an issue is required (Cottrell and McKenzie 2005; Keen 2008). A qualitative enquiry was chosen to obtain a detailed understanding of women’s experiences in their natural settings (Crewsell 1998; Green and Thorogood 2004). Qualitative methods are adaptable and can be used to understand meanings, interpretations and subjective experiences of the target group (Wiebel 1990; Lee 1993; Miller 1997; Renetti 1997; Dunne 2000; Dunne, Prendergast et al. 2002; Hutchinson, Marsiglio et al. 2002; Melrose 2002; Liamputtong and Ezzy 2005; Liamputtong 2007). Given the nature of the target group, face-to-face, in-depth interviews were reported as the preferred method for data collection (Liamputtong and Ezzy 2005). This methodology is also strongly associated with feminist research (Edwards, 1993) and symbolises a ‘female style of knowing’ (Graham, 1983, p.136) and ‘standpoint of women’ (Smith, 1987, p.105) (Liamputtong and Ezzy 2005). As limited evidence existed that outlines the experiences of Aboriginal and Torres Strait Islander postnatal women, it became apparent that the main study would be qualitative in nature in order to obtain a detailed view of the topic in these women’s natural settings (Rice and Ezzy 1999). The study design was undertaken prospectively, consistent with a case study approach (Keen 2008).

The preference was to select multiple cases in order to obtain extensive insight into the lives of Aboriginal and Torres Strait Islander postnatal women. Given that limited information exists that describes such experiences of the broader Australian postnatal population, it was decided that a non-Indigenous cohort of postnatal women, who possessed similar characteristics would also be recruited. This was done in order to help decipher whether the factors reported represented general needs of postnatal women; or whether they represented the socio-economic characteristics of postnatal women; or whether they were specific factors that represented the social and cultural needs of Aboriginal and Torres Strait Islander postnatal women. This collective approach allowed for inter-case analysis as well as intra-case analysis (Crewsell...
1998; Cottrell and McKenzie 2005), so that associations could be made between each cohort to identify where findings are similar or different. This would also be helpful to support the central argument of this research, that a standardised approach to health promotion, that is not considerate of social and cultural determinants, is not appropriate and is less likely to succeed in addressing the needs of minority or disadvantaged groups such as Aboriginal and Torres Strait Islander postnatal women. A follow-up component was also incorporated into the study design. Follow up studies are useful when the examination of particular variables over time is needed (Beaglehole, Bonita et al. 1997). This allowed for measurement on two occasions to examine whether changes had occurred over time.

Women were recruited within the first eight weeks of the postnatal period and were followed up six months post baseline interview. Data was collected from numerous sources at these two separate time points, which is consistent with case study methodology (Crewswell 1998). The project was interested in identifying the reasons that influenced women’s ability to be physically active. This line of investigation aligns with the principles of case study methodology where behaviour should be understood in the context of the case and where questions that seek to understand ‘why or how’ behaviour occurs, is needed (Keen 2008). In-depth face-to-face interviews were conducted at both time points. This method was selected as it allows for dynamic engagement of a topic and allows for the discovery of new meanings, attitudes and beliefs to be uncovered (Rice and Ezzy 1999; Cottrell and McKenzie 2005). Two time points were considered appropriate as the researchers were mindful not to over burden the participants. The six month time frame was selected as it has been reported that individuals who are intending to seriously change will do so in this time (Prochaska and Norcross 2001) [See Figure 2].
Application of the Theory of Planned Behaviour

In the examination of cases, the TPB was chosen to underpin this work. This theory was selected as it would allow an in-depth knowledge of the physical activity behaviour of women to be obtained through each of its constructs to understand what Aboriginal and Torres Strait Islander postnatal women thought about physical activity. This included understanding how women viewed physical activity during the postnatal period; whether they felt pressure to conform to be physically active and the level of control they reported that enabled them to undertake physical activity. The accumulation of this information would assist to understand the factors that motivated women to be physically active, which could also describe their intentions. The TPB informed the interview schedules used for both baseline and six months follow up for both cohorts.
**Measurement tools**

**Participant questionnaire**

A participant questionnaire was administered at baseline to all postnatal women in order to describe their social and economic characteristics. This was important as the study aimed to determine if women’s experiences were influenced by their situation, culture or the experience of motherhood. Questions included age, gender, marital status, education, employment, living situation; parity, height and weight (see Appendix 1). These questions were derived from the National Health Survey (Australian Bureau of Statistics 2001). In addition, participants were also asked to provide their contact details so that they could be followed up again in six months time. Height, weight and employment status was collected at follow-up to assist with exploring changes since baseline. This was undertaken to identify if those women who were employed had returned to work from maternity leave. Understanding if women had returned to employment would assist to inform the context of their physical activity experiences. The repeated measure of weight was collected to examine whether any changes had occurred over time. Weight loss is widely reported in the literature as a benefit to physical activity by mothers. Therefore this was collected at follow up to identify whether major weight loss has occurred for any women.

**Interview schedules**

The baseline and follow-up interview schedules were formulated on the evidence from the literature and pilot studies. A modified set of questions based on the constructs of the TPB, which had been previously developed for pregnant and postnatal women was used to extract the salient beliefs of recruited women (Symons Downs and Hausenblas 2003; Symons Downs and Hausenblas 2004; Symons Downs and Hausenblas 2007). The questions were open-ended in nature so that women could fully express their physical activity experiences (Hansen 2006). A series of probes were used to assist with the elaboration of responses and to help focus women on the areas of interest for the project (Hansen 2006). The six month follow-up interview schedule was designed to ascertain whether changes had occurred since baseline in regards to women’s physical activity experience. In addition, in order to determine current physical activity levels of postnatal women, physical activity measurement was also conducted at this time. The use of this measurement was designed to assist in describing the activities undertaken by postnatal women to determine whether women were meeting current physical activity
recommendations. A summary of the baseline and follow-up questions are outlined below and a copy of the interview schedule can be found in Appendix 2.

**Behavioural beliefs**

**Baseline**

A question was included that sought to understand how physical activity was viewed by postnatal women. This question was designed to understand the degree in which women viewed physical activity positively or negatively. It was also anticipated that this question would provide insight into the cost-benefit analysis that women undertook before engaging in physical activity. It was adapted from a similar question used by Symons Downs & Hausenblas (2004). Another question that sought to understand how women categorised physical activity was included as some evidence suggested that individuals generally identify physical activity in relatively vigorous forms (Wigg 2000). This question was asked to examine whether postnatal women identified similarly or whether they identified other forms of activity such as incidental activity. In addition, postnatal women were asked to identify the advantages of physical activity participation and it was based on a similar question used previously (Symons Downs and Hausenblas 2004). A question on past physical activity experience was also used to understand whether this influenced how postnatal women perceived physical activity. Although, the current evidence base is divided about whether historical factors influence postnatal physical activity this question was used to explore the views of women in this study (Pereira, Rifas-Shiman et al. 2007).

**Follow up**

At follow-up women were asked to describe how motherhood had changed their life in order to provide a context for their physical activity experiences. For some women, this was their first experience of motherhood, for others this was not the case. Hence, this question was designed to understand the impact that motherhood had on women to inform whether there had been any changes to the way in which they viewed physical activity since baseline. In order to investigate this question line more, women were also asked to describe the importance of physical activity at this point of their life. Women were also asked to discuss the factors that they had identified as
benefits to physical activity to explore if they had obtained those benefits. They were also asked to describe any other benefits they had enjoyed as a result of physical activity.

**Subjective norms**

**Baseline**

A series of questions were asked to understand the degree in which postnatal women thought that their significant others influenced their physical activity participation (Ajzen 1985; Chatzisarantis, Hagger et al. 2004; Symons Downs, Graham et al. 2006). These included questions related to the physical activity participation of family members, peers and older female relatives. These questions were designed to describe the degree in which women felt pressure to conform to the physical activity expectations of those significant people in their lives. What was also of interest was to understand whether women felt pressure to conform to inactivity by their significant others. The addition of the older female relative question was included to explore if women reported active role models. This question was derived as a result of the debate in the literature that seeks to understand whether parental physical activity is a predictor to future physical activity participation for offspring (Moore, Lombardi et al. 1991; Fogelholm, Nuutinen et al. 1999; Larson-Meyer 2002). These questions were designed as prompts to explore this topic with each participant.

**Follow-up**

In order to understand the influence of significant others, women were asked to report the support they received from others to be physically active. This included identifying the sources of this support as well as the type received. For those women who reported that they did not receive support, women were asked to describe the types that they would like to receive. This question was informed from the baseline results where women reported that their expectations to be physically active occurred in the form of support received from their significant others.

**Controlled beliefs**

**Baseline**

Controlled beliefs were measured by asking women to report the factors they felt inhibited them from being active. This question sought to explore women’s confidence to be active by asking
her to report the factors that might impinge on her motivation and will power to undertake activity and was based on a similar question used in previous work (Symons Downs and Hausenblas 2004). An existing question of intention to be physically active was also included to understand whether postnatal women were planning to be active in the upcoming six months (Symons Downs and Hausenblas 2003). This timeframe was selected as evidence suggests that those who are seriously intending to change will do so within this period (Prochaska and Norcross 2001). Women who reported intentions to be active were asked to describe the types of activity, frequency of participation per week and who they planned to be active with (if relevant).

**Follow-up**

Women were asked to report how successful they had been at achieving the activities reported at baseline. Where necessary, women were reminded of the factors they had reported and then asked to report on these. At this time, they were asked to describe the reasons that contributed to their success or inability to participation. Women were also asked to report additional factors that influenced their ability and confidence to be active.

**Seven Day Physical Activity Recall**

The Seven Day Physical Activity Recall (PAR) was administered to women at six month follow up by the researcher. The PAR seeks to obtain the total energy expended in a week by assessing the frequency, intensity and duration of physical activity and has been used extensively in physical activity research (Sallis, Haskell et al. 1997; Sarkin, Nicholos et al. 2000; Richardson, Ainsworth et al. 2001; Johnson-Kozlow, Sallis et al. 2006; Trost, Marshall et al. 2007), including the postnatal population (Bellows-Riecken and Rhodes 2007). It has also been administered to the Aboriginal and Torres Strait Islander community (Trost, Marshall et al. 2007). In accordance with instructions outlined by Sallis et al (1985), information was derived from recruited women (Sallis, Haskell et al. 1997). Activities such as occupational and sleep was recorded separately. Women were asked to recall the activities that they had undertaken starting from the previous day and work backwards. Each day was divined into three sections morning, afternoon and evening. Participants were asked to classify activities as moderate, hard or very hard and these were recorded if they lasted at least 10 minutes or more in duration.
Participants

Criterion sampling was undertaken for the main study and was applied across both cohorts. Criterion sampling involves the selection of participants based on criteria set by the researcher (Hansen 2006). These provided scope for the work to be undertaken (Cottrell and McKenzie 2005) and included:

- **Postnatal women aged 18 years and above.** Age restrictions were placed on study participants as it was deemed that younger women (those aged 18 years or below) may share different experiences to women aged 18 years or above. Based on national statistics, it was expected that Aboriginal and Torres Strait Islander women would be younger on average compared to non-Indigenous women overall (AIHW; Leeds et al. 2007). Therefore the age limit was decided so that both cohorts could include women from a similar range.

- **Postnatal women recruited within the first 8-10 weeks postpartum.** Women were recruited at baseline if they were within the first 8-10 weeks of the postnatal period. This time point was decided as a result of the pilot work, where generally women were advised to undertake light physical activities in the first six weeks. Recruitment of women at this stage allowed the researcher to record the experiences of women early in the postpartum period, which would be compared to data collected at 6 month follow up. It also allowed the researcher to record the experiences of women in similar time points in relation to the postnatal period to highlight similarities and differences.

- **Postnatal women who have not experienced major medical complications** eg. *Hypertension, eclampsia or clotting disorders.* As childbirth was in general viewed as a life changing event, women were excluded from the study if they had experienced a major medical complication as a result of their recent delivery. This decision was made on the basis that these women may confound the experiences of women who had not suffered similarly.

- **Postnatal women were excluded if they had an intellectual disability and were unable to speak English.** Women with these characteristics were excluded because of the potential to confound the results.
In order to ensure that each cohort had women of similar characteristics, stratified purposive sampling was also applied (see Figure 3). This sampling methods allows for particular sub-groups to be identified (Liamputtong and Ezzy 2005). These sub-groups were identified from the literature that outlines the socio-economic determinants that influence the health of postnatal populations. Each cohort was therefore stratified by age (20-24years; 25-30years; 31-35years; 36-40years; 40years and over), marital status (married; defacto; single), income indicators (employed; unemployed; home duties; receipt of government concessions), education (less than year 12 attainment; year 12 attainment) and parity (first child; second child; third child or more) where possible. This was undertaken to further assist in indentifying where similarities and differences occurred between cohorts. Women were recruited using a snowballing approach which is an appropriate methodology that can be applied to hard to reach populations (Liamputtong and Ezzy 2005).

**Figure 3: Sampling strategy**
Recruitment sites

Aboriginal and Torres Strait Islander postnatal women

Aboriginal and Torres Strait Islander women were recruited via the Brisbane Aboriginal and Torres Strait Islander Community Health Service. As the research project was conducted via the Centre for Clinical Research Excellence located within the Queensland Aboriginal and Islander Health Council (QAIHC), access to these health services, in which QAIHC is the peak body, could occur. Before the project’s commencement, approval was obtained from the QAIHC Board of Directors as well as the Chief Executive Officer of the health services. This approval process included the researcher meeting with representatives from the health service and presenting the project overview to staff.

The researcher’s approach was determined through consultation with Aboriginal and Torres Strait Islander health service staff, in particular the services’ midwife. The midwife identified eligible women and instigated initial contact about the project to ascertain whether women wanted to receive more information about the project. Those women that agreed were given an information pack which included an information sheet and consent form (Appendix 3). The researcher then contacted the potential participant formally and provided a full brief about the project. At this time, consent was obtained by those women who agreed to participate.

Non-Indigenous women

Non-Indigenous women were recruited via playgroups. Liaison with the Playgroup Queensland Coordinator resulted in the project being advertised on the organization’s website. The recruitment approach for non-Indigenous women was slightly different. Women from playgroups that reported interest in the project were briefed and provided with an information sheet. Consent was then obtained from those who agreed to participate.

Ethical approval

Ethical clearance for the study was obtained by the Griffith University’s Human Research Committee (PBH/04/08/HREC). This included adhering to the National Health and Medical Research Council’s principles for research conducted with Aboriginal and Torres Strait Islander peoples.
Assumptions

Assumptions of the ‘Mum’s the Word’ project were considered. These refer to those circumstances that are understood without discussion or consultation (Neutens and Rubinson 2002). An assumption of this study was the importance placed on the participation of physical activity by the researcher. A further assumption was that the recruited participants would have an opinion regarding physical activity participation, either positive or negative, and would be able to articulate this to the researcher.

Data Management

Most interviews were recorded on a digital voice recorder at baseline and follow-up. One participant requested that she was not recorded during her baseline interview. At follow up, two women were interviewed over the telephone as this was the most convenient method for these participants. All recorded interviews were transcribed verbatim including cues such as sighs, laughing, crying, silence and repetitive language such as ‘ers’ and ‘ums’, in order to provide an accurate record (Kermode 2004). All transcription was undertaken by the researcher. Comprehensive notes were taken during the non-recorded and telephone interviews during and immediately after the interviews were completed. All interviews were transcribed in Microsoft Word which allowed for importation into the analysis package NVivo 8. NVivo 8 is research software which is specifically designed to manage, shape and examine qualitative information (QSR International 2010). Each transcript was formatted in Microsoft Word in a standardized manner which allowed data to be auto-coded in NVivo 8. This function in NVivo 8 automatically grouped data for each question together and was used as an organizational tool, in which more specific coding could be undertaken.

Once transcripts were imported, ‘cases’ were created which allowed relevant information for each participant to be collated. Such information are called ‘attributes’ which can be assigned to each individual case such as age and gender (QSR International 2008). These are useful as it allows for the comparison of cases using the demographic characteristics that have been assigned to each case (QSR International 2008). Attributes assigned to cases in this study included Indigenous decent, age range, marital status, educational attainment and income indicators. This information was used to examine the degree in which the sample was stratified. Parity was collected as a continuous variable however was categorised for the purposes of attribute
allocation in NVivo 8 (see Table 4). The development of cases and the assignment of attributes meant that once data had been coded, questions could then be asked of the data for example ‘what do Indigenous women, aged 21-30 years, with more than one child like about physical activity?’ Memos were also created in NVivo 8 and attached to each case. This allowed for additional information about each woman to be added such as notes taken during and after each interview.

Table 4: Demographic attributes assigned to cases in NVivo 8

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Category assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous decent</td>
<td>Aboriginal and/or Torres Strait Islander</td>
</tr>
<tr>
<td></td>
<td>Non-Indigenous</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married or de facto</td>
</tr>
<tr>
<td></td>
<td>Single</td>
</tr>
<tr>
<td>Education</td>
<td>Year 12 attainment</td>
</tr>
<tr>
<td></td>
<td>No Year 12 attainment</td>
</tr>
<tr>
<td>Income indicator 1</td>
<td>Employed full time, taking maternity leave</td>
</tr>
<tr>
<td></td>
<td>Employed part-time, taking maternity leave</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
</tr>
<tr>
<td></td>
<td>Home duties (i.e. not looking for employment)</td>
</tr>
<tr>
<td>Income indicator 2</td>
<td>Receipt of government benefits</td>
</tr>
<tr>
<td></td>
<td>Non-receipt of government benefits</td>
</tr>
<tr>
<td>Parity</td>
<td>1\textsuperscript{st} child</td>
</tr>
<tr>
<td></td>
<td>2\textsuperscript{nd} child</td>
</tr>
<tr>
<td></td>
<td>3 or more children</td>
</tr>
</tbody>
</table>

Data Analysis

Data was analysed in accordance with the principals of a problem analysis. This included the in-depth examination of the data, using the current evidence base and the TPB, of each of the cohorts (Kettner, Moroney et al. 2008). This was undertaken using thematic analysis. This method involves the identification and examination of trends that existed in the data (Braun and
Clarke 2006). In particular, theoretical thematic analysis, which was driven by the researcher’s theoretical and analytic interests and involved coding for specific research questions was used (Braun and Clarke 2006). This theoretical analysis was based on identifying themes associated with the constructs of the TPB. In this initial phase this approach resulted in predictable themes in which the data was organized (Pope, Ziebland et al. 2007). The process of thematic analysis was undertaken based on the steps outlined by Braun and Clarke (2006) described below (Braun and Clarke 2006). Data was analysed using similar methods and procedures for both the baseline and follow up data. The baseline data is presented below to help describe the processes that were undertaken.

Step 1

After the completion of auto-coding, targeted coding commenced. Data was summarized, categorized and coded to help identify important themes that could be further considered. This process is called ‘open coding’ where phenomena are grouped (Rice and Ezzy 1999). In NVivo 8, nodes were used to collate concepts that were similar in line with the project’s research questions (QSR International 2008). This resulted in data being organized into five main categories, which was in line with the baseline interview questions. They included categories of physical activity, physical activity experiences, behavioural beliefs, subjective norms and controlled beliefs. In the ‘categories of physical activities’ theme, nodes included incidental activities, walking, planned activities, vigorous activities and unplanned activities. In the ‘physical activity experiences’ theme, nodes included pre-pregnancy activities, pregnancy activities, current activities, future activities and mother specific categories. The behavioural beliefs include mental, physical, no advantaged, social, for the children and health reasons. Subjective norms nodes included indirect support, direct support, expectations, active significant others, role models and other mothers. Controlled beliefs included breastfeeding, childcare, work, weather, environment, physical inability, self motivation, time, dislike activity, money and support. A number of free nodes, which is data that does not logically link to any of the existing tree nodes, were developed during this time. Figure 4 outlines how the data was categorized at this stage.
The free nodes were then examined to identify if they could be incorporated into any of the five key themes. There were ten free nodes which included baby, exercise with others, fun, gardening, motivation, preferences, pre-pregnancy, strategies, weight and diet. At this stage nine of the ten free nodes were incorporated into the existing themes.

**Step 2**

Within each of these five categories, the data was subjected to more in-depth coding. Each node within each theme was re-examined and re-organised to reflect the data that it represented. Example 1 outlines the types of decisions that were made, in this case for the ‘Types of PA’ theme. This theme was renamed to ‘categories of PA’ to better reflect the data. At this time, the nodes listed as ‘incidental’, ‘planned’ and ‘unplanned’ were renamed and reorganised. Nodes now included ‘housework & gardening’, ‘childminding duties’, ‘sport’, ‘fitness activities’, ‘walking’ and ‘definitions’ to provide a better description of the data. Similar decision were made and undertaken for the remaining four themes including ‘physical activity experiences’, ‘behavioural beliefs’, ‘subjective norms’ and ‘controlled beliefs’ (see Figure 5).

*This diagram has been imported directly from NVivo 8; ‘parent’ refers to a relationship term within this software.*
Baseline data: child node analysis

Tree Node: Types of PA

Tree Node name changed to ‘Categories of PA’

Incidental
- Looking after your baby
- Walking
- **Reading**
- Housework
- Anything over 10 minutes that gets your heart rate up
- Swimming
- Riding bike
- Playing with kids
- Gardening
- **Sex**
- Getting outdoors
- Actually ‘doing’ activity
- Jogging
- ‘Sweat it up’
- ‘Being really active’

Planned
- Weights – curves, gym
- Any sport
- Wii Fit – yoga, strength, flexibility, aerobics & balancing
- Only feel like I’ve done something if I’ve planned it, then I can say hey I did something
- Running & sit-ups
- Tennis
- Cardio
- RPM cycle class
- Classes
- Don’t like anything planned
- Thai-bo

All the child nodes were renamed within the tree node:

**Categories of PA**
- Housework & gardening
- Child minding duties
- Sport
- Fitness activities
- Walking
- Definitions

All responses previously coded to the previous child nodes were recoded into the newly developed child nodes.

Unplanned
- Committing from one day to another is hard
- Swimming

*This highlight represents responses which were not able to be coded to the renamed child nodes. These responses were coded separately as a free node ‘unusual categories of PA’
Step 3

Step 3 involved the generation of conceptual maps in NVivo 8 to visually examine the incorporated changes. This allowed the investigator to explore where similarities of categories might exist. For example, if categories possessed similar names, the researcher was able to go back to the data to reflect if they represented similar data and if the data could be grouped together. Conversely, when category names were similar, however represented different data, this process allowed the researcher to reconfirm these decisions on why this was the case (Figures 6-10).

*This diagram has been imported directly from NVivo 8, ‘parent’ refers to a relationship term within this software.*

Figure 6: Conceptual map – ‘categories of physical activity’
Figure 7: Conceptual map – ‘history of physical activity’

Figure 8: Conceptual map – ‘behavioural beliefs’

*This diagram has been imported directly from NVivo 8, ‘parent’ refers to a relationship term within this software.
Figure 9: Conceptual map – ‘subjective norm’s’

Figure 10: Conceptual map – ‘controlled beliefs’
Step 4

Once coding and changes had been made, it allowed for the themes to be examined and understood. This process is called ‘axial coding’ where the researcher must start to identify the relationships between phenomena (Rice and Ezzy 1999). The constructs of the TPB was referred to upon examination of the data at this time to review women’s physical activity experiences. The data was analysed to understand how women viewed physical activity, whether they felt they needed to conform to physical activity and whether they felt confident to undertake physical activity.

Behavioural beliefs were examined to understand how women viewed physical activity and whether this occurred positively or negatively. Upon reflection of the data at this time, it was decided that ‘categories of physical activity’ and ‘history of physical activity’ would be incorporated into the ‘behavioural beliefs’ category. This was decided as the data revealed that the way in which women categorized physical activity as well as past experiences helped described how they viewed physical activity. Further review and examination of the data resulted in five key nodes associated with the behavioural beliefs key theme.

The data was further examined to understand the subjective norm construct to see if women felt expectations or pressure to conform to be physically active. Some changes were made to the final nodes that were created in step 3. This included moving the ‘exercising with others’ node from the ‘history of physical activity’ theme to the subjective norms theme. At this time the ‘childcare’ node was moved to the ‘controlled beliefs’ theme as the data seemed better suited there. The final ‘subjective norms’ theme included five nodes, ‘perceived expectations to be active’, ‘identification of active significant others’, ‘physically active significant others’, ‘physically active mothers’ and ‘support to be physically active’ (see Figure 11).
Finally, the data was analysed to identify the most common salient controlled beliefs. This referred to information provided by postnatal women that influenced their confidence to be active. The data was analysed to identify where women reported instances that might influence their confidence and hence ability to control physical activity by their will power. The data needed further examination and synthesis after the numerous nodes that were revealed in the previous step. After re-examination and re-organisation the controlled beliefs theme presented seven nodes. They included ‘motivation’, ‘childcare’, ‘environmental factors’, ‘time constraints’, ‘financial constraints’, ‘pain and fatigue’ and ‘breast-feeding’ (see Figure 12).
Step 5

After thematic analysis occurred for both baseline and follow up data, the next step involved using the ‘query’ and ‘attributes’ function in NVivo 8. These functions allowed questions to be asked of the coded data based on the attributes that were assigned to each case (see Table 4), for example ‘what did Aboriginal and Torres Strait Islander postnatal women respond in relation to behavioural beliefs about physical activity?’ or ‘what did non-Indigenous women, with low education attainment and were in a de facto relationship respond in relation to confidence to be physically active?’ Such questions would be very useful in outlining to what degree the similarities and differences reflected motherhoods, Indigenous descent or psycho-social-economic characteristics.

Step 6

The final step included continued analysis, to refine the specifics of each theme detailing the results of the analysis that was undertaken for each cohort, which included generating clear statements and names for each theme. This process is called ‘selective coding’ where the data
must be incorporated to identify the ‘core code’ which is used to theoretically explain the central phenomenon under examination (Rice and Ezzy 1999; Kermode 2004).

**Seven Day Physical Activity Record**

The seven day physical activity record was analysed by using the following steps. Women were asked to recall the number of hours spent sleeping and engaged in light, moderate, hard or very hard activity. For the purposes of scoring, the following metabolic equivalents (MET) levels were assigned to each class of activities, sleep = 1 MET, Light = 1.5 METs, such as activities listed as ‘recreation’ or ‘housework’ or ‘child-minding activities’ such as playtime, moderate = 4 METs such as walking or very hard = 10 METs such as walking or running. Activities that fell between moderate and very hard were classified as ‘hard = 6 MET. Time spent in each activity was totaled and multiplied by its respective MET value. An estimate of total kilocalories of energy expenditure per day was calculated (Richardson, Ainsworth et al. 2001). This measure was selected as it allowed freedom for postnatal women’s physical activity to be explored. It also allowed for women to describe their activity levels

**Rigour**

Rigour is an important component of qualitative research to ensure credibility and to avoid overgeneralization by carefully articulating processes that have been undertaken (Rice and Ezzy 1999). Rice & Ezzy suggest that rigorous qualitative research should clearly articulate the procedures undertaken to achieve results (Burgess 1984, Silverman, 1990, Sillms, 1990, Ratner, 1996, Atkinson, 1991 in (Rice and Ezzy 1999). This should include an outline of the recruitment of individuals and organizations, how participants were approached, how trust and rapport were developed with participants, how unexpected factors were dealt with, how data were collected, recorded, coded and analysed and how refusals were managed [Altheide & Johnson (1994, p493)]. These steps have been comprehensively outlined in the sections above.

A number of strategies were employed in order to ensure interpretative rigour. According to Atkinson (1991), data is accepted when those studied, their peers or other appropriate groups agree with results and conclusions (Ezzy and Rice). The first step undertaken to ensure the main study was subject to interpretative rigour was to send completed transcripts to each participant to verify the contents and give them an opportunity to add or delete any of the conversation. A
follow up telephone call was then made to each participant to obtain their input about their interview transcripts. The additional step used to add rigour to the findings was the obtainment of two mothers, not involved in the study to identify their interpretations of small sections of the findings. This allowed the researcher to reflect on her own interpretations. This process included presenting these women with the overall themes and asking them to discuss how they would define such themes. This process was extremely valuable and allowed for some adjustment to theme names and definitions.

**Triangulation**

Triangulation refers to the use of different methods to combat bias and to strengthen a study’s validity (Greene, Caracelli et al. 1989). Triangulation also allows the topic to be explored in depth in order to provide a comprehensive account which might not occur if only one method had been employed (Flick, 1992; Lucchini, 1996 in Ezzy & Rice).

Triangulation has been categorised in four ways, 1) data source triangulation, which includes the collection of multiple data sources, 2) methods triangulation, which relates to the use of multiple research methods, 3) researcher triangulation, in which a number of researchers are involved and 4) theory triangulation, where a number of theoretical perspectives are used to provide a number of perspectives.

The *Mum's the Word* project used both method and theory triangulation processes in an effort to reduce bias and strengthen validity. Method triangulation included in-depth interviews, participate surveys and a physical activity record. This allowed the researcher to understand what women were reporting in relation to physical activity participation during this time, what their psycho-socio-economic characteristics were which might predispose them to certain behaviour (based on the current evidence-base), as well as conduct physical activity measurement to understand the types of activities women were currently involved in. Theory triangulation included the use the Theory of Planned Behaviour. The use of this theory allowed the researcher to understand the most salient beliefs Aboriginal and Torres Strait Islander postnatal women had about physical activity and to what degree this influenced their behaviour. This information would be very useful for future health promotion program planning as it would allow programs...
to address the factors that may intrinsically influence women. This could avoid the potential to offer women generalised strategies or solutions which do not address their specific needs.

**Conclusion**

The purpose of this chapter has been to describe the methods used to understand the physical activity experiences of Aboriginal and Torres Strait Islander mothers. A range of methodological considerations were given to this research so that the voices of women recruited into the main study could be heard. This included conducting pilot studies to inform the development of the main study as well as adding a non-Indigenous cohort of women to further validate the stories of Aboriginal and Torres Strait Islander women.

Providing this opportunity so that the voices of Aboriginal and Torres Strait Islander postnatal women could be heard influenced the selection of the study design, theoretical framework and data collection method. A case study design was selected as they are useful to obtain a holistic and comprehensive understanding of behaviour. Given that a limited understanding exists that outlines the physical activity needs of Aboriginal and Torres Strait Islander postnatal women, this methodology was selected. This approach together with the qualitative nature of this study has allowed for the theoretical investigation of women’s physical activity cognitions to be explored. This includes understanding the degree to which women describe the benefits of physical activity in relation to the costs of participation, the degree to which women report they should conform to others perceptions and their internal confidence to be active.

In addition to design and theoretical strategies, consideration was also given to how the social determinants of health would be accounted. In addition to complying with health promotion practice, it allow for the physical activity experiences described by postnatal women to be contextualised and hence contributes to this understanding. The stratification of each cohort was the strategy used to account for the influence of the socio-economic determinants, with assistance from NVivo 8 software. For example, the narratives provided by women of similar age (across both cohorts) could be collated and examined for common themes. This allows for the consideration of women’s stories to be examined beyond the influence of their ethnicity. This assists with contextualising women’s accounts, as those who are similarly aged might report experiences which reflect the influence of this factor.
The analysis strategy outlined in this chapter has allowed for the examination of the complex relationships and understanding of this data to be undertaken. This includes exploring the inter-case and intra-case analysis of women’s behavioural beliefs, subjective norms and controlled beliefs. The examination of these theoretical constructs has occurred over time so that a deeper understanding of their experiences could be obtained. On one hand, the data has been analysed to explore the salient behavioural beliefs, subjective norms and controlled beliefs of all women at baseline and follow-up to understand how women collectively view physical activity. On the next level, the data has been analysed to describe the way in which Aboriginal and Torres Strait Islander cases and non-Indigenous cases describe their postnatal physical activity experiences. At the final level, the data has been further analysed to explore the way in which age, education levels, employment situation, martial status and parity influence these experiences. NVivo 8 has been critical to assisting with the management and shaping of this data so that each of these considerations can be given. The software also has a number of features, such as the assignment of cases, that has assisted with the organisation of this data in the first instance. This feature allows for each of the women’s socio-demographic characteristics to be assigned so that the data can then be analysed based on these.

The methodological considerations and strategies outlined in this study are an important component of this research as they will assist to describe the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women. The findings generated by the analytical strategies outlined in this chapter will respond to the current gap in the literature that has not explored the physical activity needs of Aboriginal and Torres Strait Islander mothers. It will also inform the development of future health promotion programs that aim to increase physical activity levels of Aboriginal and Torres Strait Islander postnatal women who have been identified as a highly inactive sub-group of the population. It will also seek to deconstruct current practice that seeks to provide standardised approaches to physical activity that are ineffective and oppose the fundamental principles of health promotion theory. The findings of this research are reported in the following chapter.
CHAPTER 4: Results

Introduction

The aim of this chapter is to present the findings from the 'Mums the Word' project. This chapter will be structured in accordance with the themes of the TPB. This theory will help identify how non-Indigenous and Aboriginal and Torres Strait Islander postnatal women view physical activity in respect to their behavioural beliefs, subjective norms and controlled beliefs. This information will provide an understanding of women’s intention to be active at baseline and then help to describe how this influences their behaviour at follow up. The findings will also allow the exploration of both cohorts to identify where similarities and differences exist. The results will then allow for an in-depth discussion in Chapter 8 on the salient behavioural beliefs, subjective norms and controlled beliefs of non-Indigenous and Aboriginal and Torres Strait Islander postnatal women.

The following chapter will begin by outlining a description of the women recruited into this study. The qualitative data at both baseline and follow up will be presented to describe the key themes identified by all women at both time points (with the first 10 weeks of postnatal period and then 6 months post baseline). This will be followed by a presentation of a case study of each cohort to highlight the similarities and differences that exist between Aboriginal and Torres Strait Islander and non-Indigenous postnatal women. Following this, the demographic characteristics of each cohort will be examined to identify if the stratification that was administered to each group presented any differences. The presentation of data is this way will assist to address the research questions that were posed s part of this study.

The purpose of this chapter is to explore the physical activity experiences of postnatal women recruited into the 'Mums the Word' study using the constructs of the TPB. The TPB seeks to understand the processes in which women move through before engaging in physical activity (Ajzen 1985; Ajzen 2005; Ajzen 2009). This theory explores three components, the way in which women desire to be physically active (behavioural beliefs), the way in which women feel obligated to conform to their significant others perceptions to be physically active (subjective norms) and the way in which women feel internally confident to be physically active. Whilst the
theory is an individual behavioural model, it will be used to identify the common themes of the narratives provided by women.

This chapter will begin by providing an overview of the socio-demographic characteristics of all women recruited into this study. This information is useful and will assist to describe the physical activity experiences of women later in this chapter. This will be followed by the presentation of qualitative data by outlining the baseline findings. This information was obtained from women who were within the first eight weeks of the postnatal period, as this is the time in which they are usually recommended not to engage in physically activity by their doctor or midwife. Collection of data at this time allowed women to reflect on their physical activity experiences both retrospectively and prospectively. The data is presented by identifying the common themes identified through analysis in association with the theoretical constructs of the TPB.

Presentation of data collected at six month follow-up is presented next. The purpose of data collection at this time point was to build on the experiences described by women at baseline. This included understanding if changes had occurred and/or had been anticipated since baseline. This data is also presented through identification of women’s common themes in respect to their behavioural beliefs, subjective norms and controlled beliefs. The data of both cohorts has been combined and presented in the first instance to address the research question one of this study:

What are the key salient behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) that influence their physical activity experience at baseline and 6 month follow up?

The baseline and follow-up findings present an overview of the factors that influence the physical activity experiences of all of the ‘Mums the Word’ study women over the postnatal period. The next step is to examine the Aboriginal and Torres Strait Islander case study and the non-Indigenous case study. In this instance the cohorts are analysed separately to describe their most salient behavioural beliefs, subjective norms and controlled beliefs. This is followed by an investigation into the demographic similarities and differences of women across both cohorts. Together this analysis and presentation of the data addresses the second component of the first research question, which is:
How do the behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) differ among women of differing Indigenous descent, age, marital status, education, employment situation and parity?

At the conclusion of this chapter it will be clear that women of the ‘Mums the Word’ study have provided rich and detailed narratives of their physical activity experiences. Through investigation of these accounts using the constructs of the TPB, the data will show the multiple assessments women undertake before engaging in physical activity. This information will be useful for future health promotion practice as it will provide understanding about the experiences of Aboriginal and Torres Strait Islander postnatal women which will assist to highlight the ineffectiveness of standardised approaches that are inconsiderate of a population’s specific needs.

Description of recruited women

A total of twenty-seven women were recruited into this study. Of this number, 10 women identified as Aboriginal and/or Torres Strait Islander and 17 women identified as non-Indigenous. The Indigenous cohort’s mean age was slightly younger when compared to non-Indigenous women (29 years versus 32 years). Non-Indigenous women were more likely to be married and to have completed senior secondary education. Indigenous women were more likely to receive some form of government assistance. These socio-demographic characteristics are outlined in Table 5.

Two Indigenous women were lost to follow up; one could not be reached whilst the other woman did not wish to continue participation. Three non-Indigenous women only completed some of the follow up measurement due to time constraints and this data was used. Therefore there is complete data for 22 women (n=8 Indigenous women and n=14 non-Indigenous women).
### Table 5: Socio-demographic characteristics of the ‘Mum’s the Word’ sample

<table>
<thead>
<tr>
<th>Characteristics at baseline</th>
<th>Indigenous (N=10)</th>
<th>Non-Indigenous (N=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
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</tr>
<tr>
<td>Minimum</td>
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<td>24</td>
</tr>
<tr>
<td>Maximum</td>
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<tr>
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**Baseline results**
The next section outlines the salient behavioural beliefs, subjective norms and controlled beliefs postnatal women have about their physical activity participation at baseline. These are all constructs of the TPB which is the underpinning framework used in this study. The theory aimed to understand how postnatal women view physical activity (positively or negatively), the degree in which they feel pressured to conform to being physically active and the degree of control they felt they have to be physically active. The themes have been identified in relation to understanding these constructs.

Women were also asked to report their intentions to be physically active in the upcoming six months. This included identifying the activities they were planning to undertake, the frequency each week and whether they were planning to undertake these activities alone or with others. All women (n=27) reported the intention to be physically active in the next six months.
Behavioural beliefs

The first construct of the TPB that will be discussed in relation to the findings is behavioural beliefs. Behavioural beliefs refer to the degree in which women view physical activity positively, which then translate to their attitudes (Ajzen 1985; Ajzen 2001). The data was examined to identify the types of considerations women gave to physical activity both in relation to the cost and benefit of participation. It also included the costs and benefits of her most recent birth, if she had other children, her partner or husband and other important aspects of her life. The data revealed that most salient behavioural beliefs included planned activity, health consequences, body image, pre-birth activity and current and future physical activity. Planned and organised physical activity and body image were the strongest baseline behavioural beliefs compared to health consequences, pre-birth activity and current and future physical activity (see Figure 13).

Planned and organized physical activity

Planned or organized physical activity was a key theme of postnatal physical activity behavioural beliefs. Women reported physical activity positively if it was planned or organised. This was evident in the way in which women categorized physical activity. Activities reported included sport, fitness activities or walking for exercise. Fitness activities included attending the gym, running or swimming. Although women did report housework, child minding and gardening as types of physical activity, they did not view these activities as adequate physical activity in which they could achieve any benefits (health, weight or strength). These were also the most common roles undertaken by women.

‘The only time that you think that you have done something is if you have planned it and gone for a walk and then you feel hey, I have achieved something today’. (NI005)

‘I have got a big house, so I suppose mopping the floors and that (could count as physical activity), but I don’t class that as physical. I don’t class that as my exercise’ (NI008)

Walking was only considered as physical activity if women had planned to undertake it for exercise. This was usually reported by women as a conscious effort in which they tried to incorporate it into their daily and weekly routine. No amount of time or distance was reported by women in regards to the amount of walking achieved or undertaken for exercise. Women did not
class walking for transport or incidental walking as physical activity. Activities such as this were viewed as part of daily life and therefore did not constitute physical activity participation. For example, they quite often reported walking to the shops but they did not report this as a physical activity achievement.

‘I was there for quite a while yesterday walking around (at the shops). And I wouldn’t class it as exercise, but it was borderline as I had been walking for about 45 minutes or so’ (NI008)

‘Well I do a lot of walking; I try and make a conscious effort to walk 3 or 4 time week. And that’s pushing him up and down these hills’ (I009)

Participation in organised physical activity seemed to correlate with the benefits reported by women. Women expressed improved well-being from participation and they reported a high sense of accomplishment from successfully undertaking physical activity they had planned to do. This was related to 1) being able to schedule the activity and 2) successfully completing the activity.

‘I have always felt better when I have done exercise’ (NI008)

‘Well it’s definitely going to help and I think you feel better when you exercise too’ (NI015)

‘You feel good about yourself afterwards and you keep doing it’ (I007)

One woman also stated that feeling good about herself also benefited her baby and her significant others.

‘When I feel good and am happy then my baby’s happy and everyone around me is happy. Happy mum, happy baby’ (NI008)

Organized sport participation was also positively reported by women. Again the nature of sporting activities meant that they were planned events in which women attended. The additional benefit to sport participation for women was social interaction. Women described playing sport with friends or family as a further bonus.

‘That’s why I think it’s good doing team sports and that, because it’s more of a social thing…..’
(NI002) 
Women were asked to describe whether they had any previous physical activity experience. This information was deemed useful as it could provide a context for women’s current and future participation. Most women recalled some form of physical activity participation. Again, the majority of activities recalled included sporting activities such as volleyball, netball, gymnastics, touch football, softball, swimming and basketball.

‘I was doing netball, a few years ago now. It was good’. (I002)

‘Yeah, very athletic... Just mainly school sports and stuff like that. Running and touch football...’ (I007)

Health consequences

Improved health consequence was also a behavioural belief identified by postnatal women. Women viewed physical activity positively due to its protective factors to disease and illness. Key themes that emerged from the data included, improved well being, the prevention of chronic disease and the potential impact of poor health outcomes on offspring. Firstly, women who had a family history of chronic disease reported physical activity participation as a way to prevent acquiring chronic disease. Women with these experiences were very conscious about the affects that physical inactivity, poor nutrition, alcohol misuse and tobacco consumption had on health outcomes.

‘I am genetically predisposed to quite a lot of diseases that I would like to prevent.... Diabetes, heart conditions and stuff like that’ (NI007)

Similarly, women reported physical activity participation as a way to avoid poor health outcomes which could ultimately affect their children. They described having a child as a life changing event that had given them a new perspective on living a healthy lifestyle. They expressed a desire to increase their life expectancy for their children rather than for their own purposes.

‘Your know, my dad was 44 (years old) when he died and I’d hate to be young and leave her (baby), that’s horrible’ (I008)
Another benefit of physical activity participation as described by women was increased quality time with children. Being able to participate in activities that increased this time included play time and sports practice. Women reported that they wanted to be healthy mothers and good role models for their children. They also saw this as a long term commitment as they suggested that their children’s physical demands would only increase over time.

‘To lead an active life as a family, to be good role models’ (NI001)

‘They’re only going to get more physically demanding...’ (NI005)

Body image

Body image was also reported as a key behavioural belief by postnatal women. They viewed physical activity positively as a tool in weight reduction and improved physique. In this instance, women reported the benefit of a positive body image was due to the (cost) of participating in physical activity. Poor body image perceptions was reported by most women as they commonly reported post pregnancy weight retention, with most women wanting to return to their pre-pregnancy weight. In addition to weight retention, women negatively described changes to their body as a result of their pregnancy. These poor body image perceptions were motivators for undertaking physical activity and reinforced the benefits of this behaviour. They described feeling healthy, retaining fitness levels and having more energy as associated benefits of weight reduction from physical activity. Women also described that feeling healthy stimulated them to undertake other health behaviours.

‘...cause I’m feeling fat, just around my stomach...’ (I007)

‘...you kind of want your body like you did before...’ (I011)

‘I mean, I don’t feel bad about my body, but everyone wants to lose it’ (NI005)

The association of body image and physical activity was further heightened in women’s descriptions of other women’s body image. Some women reported that other mothers they knew did not need to be active as they did not have any weight issues. These women suggested that the lack of activity by these other women was a result of no weight retention after their pregnancy.
‘.. but yeah, my girlfriends, a lot of them are extremely lucky, that they don’t have to, like weight wise or burning calories or what have you, they don’t have to try to, you know, to lose any weight, so they just don’t bother. They don’t bother exercising, because they don’t have to’ (NI015)

Physical activity before giving birth

Behavioural beliefs were also identified by the way in which women reported physical activity participation. Whilst in general they viewed participation positively; their beliefs and ultimately attitudes towards physical activity were influenced by their pregnancy. This was evident by their description of antenatal physical activity participation. They reported making many changes to the type of physical activity they undertook, generally as they were physically affected by their pregnancy. In many cases women reported walking as one of the few activities they could undertake despite the physical affects of their pregnancy. These affects included swollen ankles, pregnancy related sickness or illness and tiredness and fatigue. Other activities such as sport or attending the gym were usually ceased by women as they reported not feeling comfortable to continue participation.

‘I didn’t do any exercise while I was pregnant…..especially in the first few months, I was quite ill, so that put me off any type of exercise’ (NI008)

‘Don’t play netball anymore; I stopped when I was pregnant. ….’ (I008)

Those women who continued physical activity participation reported an absence of pregnancy related sickness or illness. They reported being able to undertake most daily activities and were only affected by this as they became physically bigger due to their pregnancy. Some women changed the impact of activities they participated in to low impact activities such as swimming or yoga. Other women reported pregnancy as their catalyst to resume or begin physical activity participation.

‘It (pregnancy) affected me in a better way, because when I fell pregnant, I thought, I want to be fit. So I was doing more activity I think when I was pregnant. I was doing antenatal swimming classes and aqua aerobics and stuff’ (NI006)
Current and future participation

Women responded optimistically about physical activity participation in the next six months. Walking was the only type of physical activity undertaken at this stage of the postnatal period (first eight weeks). Examples of planned and organized activities that women reported wanting to undertake included netball, boxing, going to the gym, yoga, swimming, riding a bike, cardio sessions, sport and using a Wii fit. Some women also reported urgency to commence some form of physical activity.

‘So I was just waiting to get back to sort of feeling as normal as yep, and then I wanted to get straight back into it. Because I don’t want to leave a gap and start to get all, a bit nervous about going back or anything like that’ (NI008)

‘I am look at the place where we are doing mummy and baby yoga….because I’m fairly out of shape from being pregnant, I was looking at maybe going to that facility, because they have later hours at night…I could leave her with her dad, express some milk, feel confident enough to go over and do something on my own…’ (I008)

Subjective norms

The next construct of the TPB that will be discussed in relation to the findings is subjective norms (Ajzen 1985; Ajzen 2001). Subjective norms relate to the degree in which individuals think that they should conform to particular health behaviours due to what others think or do (Allen 2010). When examining the data, considerations were given to the way in which postnatal women reported a necessity to conform to physical activity based on the influence of significant others. The data revealed that most salient subjective norms included perceived expectations to be active, physical activity of significant others, types of support, support from mothers and childcare. A perceived expectation to be active was the strongest subjective norm theme identified by postnatal women (see Figure 14).

Perceived expectations to be active

Perceived expectations to be active were the strongest subjective norm identified by women. However, women reported differences in these expectations to be physically active. Some women reported that they felt no degree of expectation to be active from their significant others
such as their partners/husbands, family or friends. They stated that expectations such as these were not generally discussed or they described themselves as being physically active which did not warrant such expectations from important others. Some women also reported defiance by suggesting that they would not feel any pressure to comply with such expectations anyway. One woman stated:

‘Even if they (significant others) did, I would tell them to get stuffed’ (I004)

On the other hand, some women did report a perceived expectation to be active by significant others. For some women they perceived pressure by their significant others to do more, for other women it was to do less. Husbands/partners and women’s mothers were identified as the sources of such pressure. For women who perceived that there were expectations to do more physical activity, this usually centred on increasing other activities in addition to household activities, as one woman described:
'They think I should be more physically active (laughs). I probably think that they do. Cause some days when your home all day.... I don't leave the house externally, but I’m running around doing the washing, cleaning, looking after baby. I’m doing a lot, but to them, it look like I’m doing nothing’ (I008)

For some other women they reported perceptions by their significant others to do less physical activity. Again this was centred on the amount of activities such as housework that women undertook. As one woman reported:

‘Mum still gets up me for doing stuff. ‘Are you alright to do that’ still. And then my husband’s parents who are a bit older again are very protective about what I shouldn’t be doing... I shouldn’t be going walking and I shouldn’t be hanging washing’ (NI002)

Identification of active significant others

To understand the subjective norm construct further, women were asked to report those significant others they classed as physically active. This was done to explore the influence important others had on postnatal women’s physical activity participation. Women identified a range of significant others whom they classed as being active. This included their partners, parents, siblings and older children. The types of activities ranged from sport related activities to work related activities.

‘My brother is. He’s active, cause he walks everywhere’ (I006)

‘My father is. He’s really active. He still likes to have a run or a swim and keeps himself fit’ (I011)

Physically active significant female others

In order to further explore the influence of significant others on postnatal women, women were asked to describe the activity levels of significant female others when they were younger. This question was asked to examine if women had any active role models which might help to explain if women felt compelled to conform to physical activity. Recall suggested that significant others primarily undertook limited planned physical activity. Significant others were primarily involved
in unplanned activities such as housework or child minding. Women described their significant others as being busy women who were dedicated to their family and households, in which their role and responsibility were centered.

‘They were very active, but all in the unplanned stuff. They would never go for a run or anything like that, that I could remember? They were all ‘ants in their pants’ people, they couldn’t keep still for a minute. They would always find something to do’ (NI002)

However of those significant others that were physically active, most reportedly participated in organized group based activities. These activities included softball, netball, aerobics, squash and water skiing. Women recalled that their significant others participated in these activities with established networks including family and friends for social benefits.

‘I do remember my mother going off twice a week to do aerobics; Aerobics to you know the video..... But it was more to do around social, socialization – rather than actually doing physical activity’ (NI009)

**Physically active mothers**

In order to further explore the influence of others on postnatal physical activity, women were asked to describe the physical activity participation of other mothers they knew. They mostly reported that other mothers they knew undertook similar amounts of activity to themselves. This included activities centred on household child minding tasks. Activity levels amongst other mothers seemed dependant on the age of their children. Women suggested that other mothers they knew were able to undertake more structured and planned activity if they had older children.

‘Um, most of my friends are on to their second (child), so they’ve had to be active because of their little ones running around. So, they take them swimming um and go outside and throw the ball around but they’re at that age where they can do that kind of stuff, so it’s a little bit different’. (I009)

‘My sister-in-law has got a treadmill at home as well. She goes on that a little bit now. Her youngest is 18months now, so she’s able to do a little bit more, with the kids being a little bit older, so that helps. When they were younger she found it very hard to do that’ (NI015)
Interestingly, for one woman undertaking healthy behaviours was described as an effort. She described another mother she knew that was health conscious and described the perceived effort involved with this. She suggested that these attempts at healthy behaviour were too much to expect of a mother with children as it required valuable energy that could be directed elsewhere.

‘.... she’s one of those people who is very particular about how she eats and what she eats and that sort of stuff. I don’t know.... there’s just a point that when you’ve got kids you don’t overdo yourself, because then you’ve go no energy to do with them what you’ve got to do with them’.

(I004)

A key theme that was identified in this discussion of other mothers was participation in mother-based activities. Women responded differently about their physical activity experiences in mother-specific groups. Women who reported positively about these types of groups did so because they were able to undertake activities with their children.

‘I think that that’s really clever, its nice to do stuff with your kids, not just have to shove them off to day care, so that you can jump on the treadmill for half an hour at the gym, at least if you could do something with them. I think that that’s cool.’ (NI005)

Women who reported negatively about mother-specific groups did so for two main reasons; firstly women reported that this type of interaction was centered on their babies and not always the physical activity component. They preferred to undertake activities with friends or family members, regardless of whether they had children as this strengthened social ties. Secondly, women described interactions with individuals whom they did not know nor have any social connectedness with as a false and an awkward association. These women also reported a strong support network that they could access, which could explain their reluctance to access these types of groups or services.

‘I find when you get together with the other mums all you end up doing is talking about the babies and as much I say that I don’t want to, it’s a bit hard because that’s the one thing that you have in common. When you get there talking about its ok, but I would just prefer that if I was going to I would do something that I totally come away from that.’ (NI001)
'Some mums annoy me. Well, I am not too keen at the moment to going to mum’s groups because some mums are so full on with their baby and like I am pretty crazy and relaxed with her and not every second like oh, oh, she’s choking. That would frustrate the hell out of me, if I was trying to do some exercise and a person is talking about her baby the whole time’ (NI002)

Support to be physically active

Types of support were examined in relation to subjective norms as it helped demonstrate the influence of significant others on women’s physical activity participation in the type and amount of support they received. Women reported receiving support from partners/husbands, their mothers or their friends to undertake physical activity. They reported receiving both direct and indirect support by their significant others. Direct support was generally received from women’s partners and usually occurred in two ways; partners/husbands provided support by participating in activities with them or by minding the children while they undertook activity. Women also received indirect support from either their partners/husband or their mothers. This usually occurred in the form of verbal encouragement to undertake activity.

‘I spoke before with my mum about exercise in the house and pilates and stuff like that’ (I001)

Controlled beliefs

The final construct of the TPB that will be discussed in relation to the findings is controlled beliefs. Controlled beliefs relate to the degree in which individuals feel confident to perform a behaviour by their willpower, in this case physical activity (Ajzen 1985; Ajzen 1998(Ajzen 2009). When examining the data, consideration was given to the way in which postnatal women reported and described their confidence levels and associated willpower. The data revealed that most salient controlled beliefs included motivators, childcare, environmental factors, time constraints, financial constraints, pain and fatigue and breastfeeding (see Figure 15). Childcare was the strongest baseline controlled belief identified by postnatal women compared to the other themes.

Motivation

In order to understand the controlled beliefs construct, women were asked to report factors that reduced their confidence to be physically active. A major theme that was reported was self
motivation. This motivation was generally described by women as having the desire and means to undertake physical activity. It also involved having the aspiration to overcome any factors that may prevent women from undertaking physical activity.

‘..if you really wanted to do it, you’d do it’. (I008)

‘No, nothing will stop me.’ (I010)

‘It’s the matter of having motivation to do it. My only motivation at the moment is to get back to my pre-baby weight (laugh)’ (NI015)

On many occasions women described strategies that they had developed to assist with these desires and aspirations. This included a goal to wear pre-pregnancy clothes, purchase clothes that they liked rather than that fit them or scheduling an activity in which they felt committed to undertake.

‘..to get back into some of your clothes. All my jeans and that fit again, but by the end of the day they are uncomfee (uncomfortable). So it would be good just to put them on and not have to go and buy anything, just for that intermediate stage’. (NI004)

‘...if you have got an activity planned, it more motivates you to get on top of things, so you think OK, I am going to go for a walk at 10’oclock, so I will get up and have a shower and do some house cleaning and then go out .... Sort of a motivational thing if you’ve got something planned each day’. (NI016)

Another strategy that women described as facilitating their own motivation was the use of external motivators. External motivation included attending personal training sessions with a qualified instructor or attending organized group sessions such as an aerobics class or cycle class.

‘I really love someone who motivates me (laugh). I’m not so good at motivating me, but if someone else does it for me and I pay them, it’s a lot better’ (NI009)

Conversely, women reported a lack of self motivation as a barrier to participation. Competing demands with higher priority were generally reported as the most common reason for physical
inactivity. Matters of higher importance included attending to their baby, household tasks or issues and other family commitments. Some mothers did however identify themselves as the major barrier to motivation.

‘If something else becomes more important.’ (NI003)

‘I think, like I could do it now, but I am just really lazy’ (NI014)

‘Except for yourself I suppose, if your lazy or you can’t be bothered or something’. (I001)

**Figure 15: Baseline controlled beliefs**

**Childcare**

Childcare was the strongest theme identified by women as influencing their confidence to be physically active. Although access and affordability was an issue, of more importance was the availability of a trusted source of childcare. Women often reported the lack of trusted and experienced childcare which prevented them from being physically active.
‘If there were something like that where you knew that it was good childcare and that they weren’t just going to go into a room and a 20 year old was going to watch them that had no experience in child care, that I would find a bit weird’ (NI005)

‘Yeah, someone I knew, I wouldn’t leave him with someone….. I don’t know about child care’ (NI002)

In many cases trusted childcare was described in the form of family or friends. However, in some cases women reported established childcare facilities where other family members had attended and had good experiences. Trusted and experienced childcare strengthened women’s confidence to leave their children. On some occasions, women reported that they did not feel confident to leave their babies with their husbands or partners.

‘Like I can’t really, because, well he (partner) can’t really look after her (baby); he’s not very good at it’ (NI014)

Women also expressed a sense of obligation and responsibility to their children which prevented them from wanting to leave them in childcare. They outlined that as their children’s primary care giver, they felt compelled to look after them at times, especially when they were so young. In addition to this, women discussed that they had the most intimate knowledge of their baby and what they required and did not think it appropriate to then leave their child with someone who did not possess this similar knowledge. For some women, this extended to their husbands and partners as well, but for others it was more related to significant others and/or childcare workers.

‘I would prefer to do things where I don’t have to leave my children. I know that sounds dumb, but if they are with me I know that I am in control. ...If I go off to play (sport) I would be worried all the time... I feel like my husband is doing me a favour. Although I shouldn’t feel like that’

(NI001)

This commitment of women to their children and their uneasiness to leave them in childcare reinforced why many women reported wanting to undertake physical activity that included their children. Although expense and availability of childcare services were mentioned, women seemed to possess stronger feelings towards activities based around their children that did not involve them having to leave them with anyone. Conversely, women who did not report having
any issues with childcare suggested that having set times of childcare availability made it difficult to undertake and attend some activities if they could not coordinate their baby’s routine around this. One woman described her confidence issues in relation to childcare and physical activity participation.

‘It’s quite you know, hard with kids. You have got to build up the confidence to drop them at the crèche, be fine to leave them. Then you have got to build up the confidence to appear in the gym’. (NI009)

Environmental factors

Women reported that environmental factors reduced their confidence to be physically active. Weather was commonly reported as a barrier that would prevent women from undertaking physical activity. Women discussed how all types of conditions could prevent them from undertaking physical activity and hence influenced their willpower to be active. This was related to activity undertaken outside, mainly walking, but was also related to other types such as swimming and riding a bike. Women also discussed this barrier in regard to their children and how these conditions also affected them. For example women discussed that they could not undertake pram walking in the rain. Also linked to weather was the seasonal change that occurred during the study. Women were interviewed during the winter and described being deterred by the cold to undertaken physical activity. Also related to this was the issue such as darkness in the early morning and early afternoon which further prevented women from undertaking physical activity

‘Especially because now, it’s really cold in the morning and I just can’t be bothered’ (NI014)

‘We’ve been trying to get out, but it’s been too cold lately to go for walks and that. And dark’ (I001)

Another environment barrier reported by women was issues surrounding safety. Two main concerns were raised by women, firstly safety related to the lack of quality infrastructure and secondly, safety related to crime. Women reported the lack of walking paths in high traffic areas as a major barrier for them to undertake pram walking. They described not wanting to undertake such activity in these dangerous circumstances.
'The footpaths are on either side of the other... they might stop when you hit a bus stop, because they don’t think that anyone is going to walk past a bus stop, then you’re on the road, I mean, you can’t trust the drivers around. They’re flying around corners and stuff, so you don’t really want bubby on the road. And then if you’re not on the road, then you’re on this terrain that’s bumpy and all over the place, nah....’ (I008)

In addition to this was the safety issues surrounding crime. Women cited recent sexual assaults reported in Brisbane as a major deterrent to undertaking physical activity either alone or in recreation spaces such as parks and walking tracks. Women also reported that their significant others were wary about them undertaking physical activity by themselves due to similar concerns.

‘I am happy to go do it by myself, but my husband is really funny about me walking by myself’

(NI004)

‘Yeah, I am not going to walk on the path as a girl got raped on the paths just up the road’

(NI007)

**Time constraints**

Women reported limited time as another deterrent to physical activity that reduced their confidence. This was particularly related to the lack time to be able to commit to physical activity due to other priorities. These priorities included tasks related to housework, child minding and returning to employment after maternity leave. Although women expressed a desire to be active, they acknowledged that time would play a major role in being able to actually undertake it.

‘Well I suppose there are going to be times when things get in the road. Housework has got to be done, dinner’s got to be cooked, stuff like that so...’ (NI011)

Women further discussed this in relation to organized activities in which they were eager to participate in such as sport. Although they expressed enjoyment in participating in these types of activities they recognized the difficulties in committing time to such activities now that they had a baby.
‘...committing to something that's a team sport is a little bit...... just because you don’t know from one day to the next. Or even sometimes one hour until the next, until she gets a bit older, you know’ (NI001)

Financial constraints

Financial constraints were identified by some women as factor that reduced their confidence to be physically active. This was related to paying for services in which they could be physically active or that could assist them to be active. Expense associated with childcare was noted by one woman who said:

‘I think childcares these days are pretty expensive, so they've gone up. But they do give you a childcare benefit these days, but it’s still not enough’ (I007)

Expense related to facilities in particular gym membership was also highlighted by some women as a barrier to physical activity. These women suggested that the money outlaid for these types of services could be used for other more important things.

‘I don’t know about childcare in gyms to pay as well. ... I could see the money going elsewhere and keeping me at home a bit longer’ (NI004)

‘But also when you're down to one salary you like, ok, you've got to start cutting things out (reference to gym membership)’ (NI013)

Pain and Fatigue

Women reported pain, soreness and fatigue as a result of their pregnancy and birthing experience influenced their confidence to be physically active. Women who had delivered via caesarean seemed to report the most pain and soreness and also reported frustration at not being able to resume daily activities. In addition to this one woman reported fatigue from lack of quality sleep as another barrier to physical activity.

‘If you are waking up 3 or 4 times a night, the last thing that you want to do is go for a walk, even though you know it will make you feel better’ (NI010)
Breastfeeding

Women who breastfed reported that this that reduced their confidence to be physically active and expressed a degree of discomfort and awkwardness. Increased breast size as a result of milk production affected their back and posture which sometimes resulted in headaches.

‘they are bigger, which can hurt your back and give you a headache...... so maybe breastfeeding plays a part in not wanting to do anything (physical activity).’ (NI001)

They also expressed concerns about undertaking activity and leakage. Other issues associated with breastfeeding and physical activity as described by women included the need to feed babies more if they are breastfeeding and being able to express milk if they were to leave their children in the care of a significant other. In relation to breast fed babies needing to feed more, one woman discussed how her friend would have to stop to feed her child on her daily walks in the park. This women indicated that the choice was not whether to feed or not in this environment, which she outlined would be a major barrier for her to undertake physical activity. Some women suggested that expressing a bottle might be a way to overcome the barrier to physical activity and breastfeeding, however not all agreed.

‘I have to work around the breast and what not until I can get a breast pump and express bottles.... but with my first baby I couldn’t express bottles’ (NI007)

Follow-up results

The next section outlines the follow up results derived from women about their physical activity participation since they were interviewed at baseline. Twenty-five of twenty-seven women were successfully followed up and these experiences have been examined in relation to the most salient behavioural beliefs, subjective norms and controlled believes. Once these constructs have been reported, the key similarities and differences between the Aboriginal and Torres Strait Islander and the non-Indigenous cohort will be discussed. At this time the physical activity scores for both cohorts will also be presented to identify the current activity rates.

Behavioural beliefs

Behavioural beliefs were again examined at follow up to identify if women had changed their views and hence attitudes on physical activity either positively or negatively (Ajzen 1985; Ajzen
Given that women were more than half way through the postnatal period, the data were examined to identify if the cost and benefit analyses that they undertook had influenced participation. This cost benefit analysis women was also examined in relation to her most recent birth, other children, her partner or husband and other important aspects of her life. Women were asked to describe to what degree they prioritised physical activity at this stage of their life. The key themes reported included health consequences, benefit for offspring, body image and no priority (see Figure 16). Benefits to offspring and body image were the strongest follow-up behavioural beliefs identified by postnatal women.

**Figure 16: Follow-up behavioural beliefs**

Health consequences

Beneficial health outcomes were reported by women as a reason for participation in physical activity during the postnatal period. Women reported feeling better about themselves as a result...
of physical activity participation. They also described the importance of undertaking physical activity and maintaining a healthy lifestyle now as it would be more difficult to resume if they delayed it. As one woman described:

‘It’s important even at this point, just to maintain the same level of physical activity. Basically so you don’t become unhealthy, so you don’t have, you know, more to undo than do.’ (NI001)

**Benefit for offspring**

A key behavioural belief identified by women at follow-up was the benefit of physical activity to their offspring. They expressed the desire to be positive role models for their children and set good examples for them to follow now and in the future. Women also wanted to be able to participate in physical activity with their children as they grew older. They noted that physical activity levels of their children would only increase over time, which further emphasized the importance for them to become active, as described by one woman:

‘This time in my life, I reckon it’s important. Because you know, the kids.... You can’t sit around and be lazy, because they’re gonna think, oh well we can be lazy when we get older or just sit around and do nothing. And I don’t want my kids to be like that, I want them to think healthy.....’ (I004)

In addition, women reported that their physical activity participation was beneficial for their children as it provided them with an opportunity to meet other children at childcare. They discussed that this provided further incentive to exercise as not only did they benefit but their children did as well.

‘We go to the gym for an hour each day and that’s the child minding there, that’s her time to play with her buddies and my time just to do my thing in the day’ (NI002)

**Body image**

Body image, in particularly the reduction of weight, was also identified as a key behavioural belief by women at follow-up. Women stated that they were keen to return to their pre-pregnancy weight and body shape. Achievement of reduced weight was in many times, motivated by their ability to begin wearing pre-pregnancy clothes.
'I wanted to still try and get fit, well, not fit, but lose some weight’ (NI006)

'I feel so much better and I’m starting to fit clothes that I used to pre-pregnancy, and it’s like 'yes!’ Huge milestone!’ (I008)

This notion was reinforced by one woman who suggested that she did not need to exercise or undertake physical activity because she already wearing her pre-pregnancy clothes. She stated:

‘I’m not too stressed about it (physical activity), as long as I can fit into my clothes, that was all that matters really.’ (NI004)

No priority

Some women were less positive about physical activity during the postnatal period and did not report it as a priority. These women outlined lack of time due to competing interests such as housework and cooking as a reason for this. One woman who had returned to work outlined that whilst she did have time when she got home, she was exhausted as she had been on her feet all day. Another woman suggested that whilst exercise was not a priority, it was also not any activity that she enjoyed undertaking.

‘Bottom of the list. I just, I find that there’s probably other things that are more important than me going out and doing some like exercise and something like that. And I don’t, I’m not a real big fan of it’ (NI014)

Subjective Norm

Data was examined to identify the most salient subjective norms, a construct of the TPB. Subjective norms were examined to identify to what the degree women thought that they should conform to physical activity due to what others thought or did (Allen 2010). Given that women were more than half way through the postnatal period, the data was examined to identify what women reported into relation to significant others expectations. The key themes reported included role and responsibility, perceived expectations and levels of support (see Figure 17). Role and responsibility together with perceived expectation were the strongest subjective norms identified at follow-up.
Role and responsibility

When examining the subjective norm construct, women’s perceived role and responsibility of motherhood was a common theme. These expectations were reported in relation to what women perceived was their duty as a mother. Women reported feeling obligated to undertake all household and child minding activities within their home environment at the expense of physical activity. They reported a sense of guilt and expectation to undertake these tasks especially if their husbands or partners were the main income earners in the family.

‘Hired a treadmill, but when there’s so much to do, it comes last. I can’t not do things because I’ve been on the treadmill when he’s been out earning money.’ (I008)

Women reported not undertaking physical activity even if their husbands or partners had offered encouragement or support. They generally viewed these tasks as central to their role as a mother and wife (or partner).

‘Because my husband works long hours so I just felt like it’s an, you know... obligated to cooking dinner’ (I011)
One woman however described how her husband had come to realize that she needed exercise and was insistent that she participate in some activity for her own benefit.

‘I felt that I had to be home because I wasn’t working, I had to make sure the house was perfect, dinner was ready, everything was right with her, because my husband was at work. So I didn’t think that I could ever be going to the gym. But now my husband says no, you’re going crazy, go and get your gym membership and do what you want to do.’ (NI002)

**Perceived expectations**

Perceived expectations of motherhood were also a commonly reported theme by women. This was reported in relation to the level of experience a woman felt she possessed and was generally related to how many children she had. Not surprisingly, experiences reported between first time and mothers of more than one child were different, although all mothers reported a sense of enjoyment from their recent birth. Those women who had more than one child, described being more relaxed and confident after their most recent birth. These feeling were related to the experience they had obtained from birthing their previous child. As one woman reported:

‘You’re a lot calmer the second time round, you’re not as wound up with looking after them, wrapping them in cotton wool, so you’re a little bit more, freer...’ (NI001)

First time mothers reported some anxiety around the roles and tasks related to mothering due to their inexperience. These concerns were centred on women’s perceptions of how they judged their mothering skills or if they felt others might judge them. For example, one woman discussed attending an exercise class for her and her baby and reported feeling incompetent as her son was the only baby in the class who was not asleep while their mothers exercised. She did however report connecting with other people in the class whom she viewed as having similar experiences which offered her solace.

‘So he screamed throughout most of those, so I didn’t get a lot of exercise done (laugh). Apart from sitting up jiggling him, which was a little bit demoralizing cause most of the session a whole heap of them had babies which were just lying down and they’re there doing their Pilates stuff and I’m sitting there going, I’m doing this somewhere else rather than at home. Um, but as part of that, met a number of other women who have babies, similar age, around the area. All of
whom, were also having difficulties with the class cause their babies had colic or reflux or were the cranky babies in the class. The non-sleeping babies in the class... It wasn’t that they (other mums) weren’t supportive. It was just that, probably that you were feeling really envious of them that they had babies that just conked out. ...I don’t know? So it wasn’t that they weren’t supportive but it was useful being around some mums who were having some more difficult experiences’. (NI010)

Support

Types of support were examined at the subjective norm level to understand if this influenced women’s perceived expectations to be active. Women reported receiving indirect support from their partners/husbands, children or their mothers. This included verbally encouraging them to exercise. In some cases women suggested that whilst they were encouraged to exercise, this was not a realistic achievement given the other tasks that needed to be undertaken. Therefore, encouragement and support was at times redundant.

‘But he does say if you want to hop on, hop on (treadmill). But then I look at everything else that needs to be done, but I can’t, there’s washing to be put on or I need to cook dinner, I don’t cook dinner now, we won’t eat by 5 o’clock..... It’s not the fact that he’s not supportive, just go ahead and do it, but I just physically can’t.’ (NI015)

One woman described that whilst her husband encouraged her to be active, the times that she could undertake activity were not suitable. She reported that her husband liked going to the gym during the times that she was available. She concluded that because he was the main income earner, going to the gym for him was his down time which took precedence over her own needs.

Women reported receiving direct support as much more beneficial to them in regard to physical activity. This included receiving assistance from significant others with child minding and household activities which enabled them to exercise.

‘Mum can look after the kids. I can try and do exercise with my husband leaving when he does. I can try and get some exercise done in the morning, he’s quite willing to wake up and do a bottle in the morning.’ (NI007)
Controlled beliefs

Follow-up data was examined to identify the most salient controlled beliefs of women. Controlled beliefs describe the level of confidence women have in regard to undertaking physical activity, including how confident they feel they can engage in activity as a result of their will power (Ajzen 1985; Ajzen 1998; Ajzen 2009). The follow-up data revealed that most salient controlled beliefs included changes during motherhood, demands of the baby, significant social interactions, childcare, mothers groups, increased time pressures, lack of sleep and financial constraints (see Figure 18).

Figure 18: Follow-up controlled beliefs

Changes during motherhood

Women were asked to describe the changes that had occurred since giving birth to their child and if any of these changes influenced her confidence to be physically active. Women were very descriptive in their outline of how life had changed since giving birth approximately 8 months
ago. The majority of women reported numerous changes to their lives, including obtaining a new perspective on life. This was related directly to the arrival of their new baby (and other children if relevant). Changes were generally centered on the time and effort required to care for their offspring, which they described as majorly influencing their previous behaviours.

‘Whole life has turned upside down since she’s come’ (I005)

‘I’ve grown a lot, the biggest thing I think I’ve learnt is to be selfless’ (I008)

‘How it’s changed my life? It’s just turned around’ (NI001)

‘Everything has changed – it tips your whole world upside down, everything’s changed’ (NI014)

Women also described a number of subtle changes that had occurred during their life. This included the organization and planning required undertaking and participating in daily activities, with the addition of a new child. Women outlined that now simple tasks like going to the shops or undertaking spontaneous activities have changed.

‘I suppose like simple things like jumping in the car and driving down the road without thinking of someone else is just like, ah, isn’t too bad, but just bit of planning now, I think?’ (NI002)

‘Just eh, way family life is (has changed). How we run the household. Being on the clock with routine and everything’ (NI007)

Physical activity was described by some women as a part of life as it was incorporated in many of their daily tasks. This was particularly relevant to housework and child minding where women described being of the move for many of these activities.

‘Well, I was actually just thinking about it, I haven’t done any like organized physical activity…. Just running around and getting things done. Like going to the shopping centre and having only one hour to do something makes you go that little bit faster.’ (NI005)

**Demands of baby**

When examining factors that influenced women’ decision, motivations and will to be active, many women outlined how all tasks and activities were primarily centered on their baby’s routine. The majority of women discussed how their baby’s schedule such as feed times, sleep
time and other related tasks (such as bath time) generally occurred at specific times of the day. Therefore any other activities that might clash or compete for time with these needs would always be moved or missed. In addition to this, some women described that at times, their babies might demand their attention, more than usual, which would also result in a delay to other things. For example, women who were still breastfeeding at the time of follow up, explained how this contributed further to their baby’s requirements.

‘I thought it would be easier. But then you set up your routines and if you break it you just ruin your day, I find. It’s a happy household if she sleeps when she is supposed to sleep.’ (NI004)

‘I’ve had my friend ring me, can you play netball tonight? The old me would be ‘yes’ and even though I’d love to (now), umm its getting a little easier now, because my husband is getting, umm finding it easier with her to deal with at night and sort of thing so I possibly could at times. But if you’ve had a bad day or if you think that things aren’t going to be a good night, then it’s just not worth it.’ (NI008)

‘Um having to plan around like his sleeps. So, because he doesn’t sleep well, I’ve not ever been willing to interrupt any of his sleeps. Or go out at any time when he is likely to sleep, particularly when he was 5 months. He slept in the sling when I was bouncing on the ball. So I had to be home, bouncing on the ball…. (laughs) it wasn’t ideal. You do what you do to survive, but it wasn’t ideal (laughs)’. (NI010)

**Significant social interactions**

Significant social interactions were identified as an important controlled belief related to physical activity participation. These interactions included both those that had been previously established or that had recently been developed. Women outlined that in many cases these interactions provided the motivation for physical activity participation rather than the overall benefits of exercise.

‘It’s that connection with other people involved’ (I006)

‘It’s nice to see familiar faces, especially when you’ve been home.’ (NI008)

In addition to this, participation of physical activity with other women identified as being similar to them was also important. For example, one described wanting to undertake activity with other
mothers; a young mother expressed the desire to exercise with mothers of similar age and; an Aboriginal women expressed feeling isolated because she was the only Indigenous woman in her class. Therefore, for group based physical activities, a sense of belonging seemed to increase women’s motivation to exercise due to the social interactions that resulted from this.

**Child care**

A particularly strong theme identified to influence women’s confidence to be physically active was childcare. Surprisingly, issues around access and availability of individuals or services did not report highly, compared to women’s confidence to leave their baby or children with others, including family members in some cases. Some women reported high confidence to use child care facilities; however these women were current users of such services.

‘They’re really good at our gym. They’re really nice people and she loves going there. So I think that it’s finding the right place, if you’re going to a sporting complex where there’s a 16 year old kids but then you’d be doubting it…. But it’s about finding the right place.’ (NI002)

One woman did outline her reluctance to place her son in childcare at her local gym although she could not identify any immediate factors to why this was the case. The idea of having someone else care for her son seemed to be the biggest barrier for her, as well as not knowing how her son would cope under these conditions. She suggested that her only resolution would be to place her son in childcare at the same time when her friend put her baby in, however as she explained:

‘I might put him in one day when her baby is in there. I don’t know why that makes it better? It doesn’t make it even better or worse?’ (NI010)

**Mothers groups**

Although significant social interactions were identified as an important influencer of controlled beliefs for women, there was mixed reviews about mother specific exercise classes. Whilst overall, most women enjoyed being able to connect and exercise with other mothers, they did report some challenges which influenced their confidence to participate in such classes. The first challenge was a practical issue and related to class times. Some women reported that scheduled times make it difficult for them to attend if they could not coordinate their baby’s routine around this. Women also reported that whilst the inclusion of their baby’s in these classes overcame the
child care issue, this also made it difficult at times to exercise. This was mainly due to tending to their baby during this class which then prevented them from being able to undertake exercise.

‘You didn’t get much yoga done because of feeding and changing nappies or just tending to them.’ (NI008)

One woman outlined that whilst she enjoyed the exercise component, her son was not content to sit in his pram for the hour long class. She also noted that the ability to attend to your babies during the class also provided distractions to the class either by trying to exercise with your baby or having other women tend to their babies similarly.

‘The exercise class was great for me, I really enjoyed it but you had to park all of the babies prams around the edge of the room. Um, yeah, but the baby just wasn’t happy in the pram for an hour.. But when your baby would whine, you’re allowed to bring them into the exercise class but then you can’t do the exercises very well. Yeah, it just didn’t work for me and other kids are probably used to it or they were happy to sit in the pram, (but) for small times most mums were interrupted at some point.’ (NI006)

**Increased time pressure**

Lack of time was a major barrier to physical activity participation and influenced women’s confidence and motivation to exercise. Women reported that increased daily tasks had reduced the amount of time they could dedicate to themselves.

‘Even though I’m up so early with her, I just find, I don’t know where the day goes. I mean its 3 o’clock already and I just don’t know where the day goes. I’ve done nothing but washing all day.’ (NI004)

Limited time was further compounded if women had returned to work or had other commitments which placed further restrictions of their time. Women discussed that when they arrived home from work they still had household chores to undertake as well as spend time with their babies which all took precedence over physical activity participation.

‘I have not actually, to be honest; I have not found ‘me’ time (since returning to work)’ (NI003)
Furthermore, women discussed the difficulties in scheduling physical activities when all tasks were centred on their baby. Therefore, whilst they might have strong intentions to be active, this would always be compromised if their baby required attention.

‘I don’t know where I’m going to fit it in? It’s important to me and I want to do it, um but yeah. I don’t know where I’m going to….unless I forgo more sleep’ (NI015)

Lack of sleep

Lack of sleep was reported as a barrier to physical activity participation. Women described that their confidence, motivation and will to be physically active was severely reduced as a result of sleep deprivation. Not only was the lack of total amount of sleep discussed, but also the amount of times during the night sleep was affected by having to attend to baby.

‘Probably sleep has been a huge issue. Cause he’s not, he’s not been one of these kids that have slept through, ever. So it makes it a bit less motivating, to sometimes do some things, when all you really want is sleep.’ (NI010)

‘I honestly, I just wake up in the morning and I feel like I haven’t even slept. Like I just feel so tired so I can’t be bothered. I can’t even sometimes get up off the lounge to put a load of washing on’ (NI014)

Financial constraints

Financial constraints were only identified by some women as a factor that influenced their confidence and will be active. Mostly this was related to the cost of gym memberships. Whilst these women expressed a strong desire to join a gym, the cost of joining inhibited their ability to undertake this. This was especially relevant to women who were not currently employed and whose partner or husband was the main income earner.

‘Gym was expensive and I would rather see the money on something that we need, instead of me doing exercise.’ (NI004)
Physical activity participation

To understand actual physical activity rates of the women recruited into the main study, a physical activity measurement was conducted. The seven day physical activity record was used to measure the physical activity rates of recruited women. At baseline all women were asked to report their intention to be active in the next six months. All women reported having intentions to be active. At follow-up, approximately two-thirds of women (n=14/22) reported that they were unsuccessful in adhering to these intentions and undertaking the activities they reported at baseline. They discussed a series of factors all of which has been discussed in the previous section. In order to obtain further insight into women’s ability to be physically active, the seven day physical activity record was used. This was a useful tool to describe the types and amounts of household and child minding activities undertaken, as well as identify where opportunities of physical activity could occur. The results of the seven day physical activity record indicated that none of the women were sufficiently active in accordance with the national recommendations. Overall, Indigenous women were more inactive compared to non-Indigenous women (Table 6).

Table 6: Mean scores of seven day physical activity

<table>
<thead>
<tr>
<th></th>
<th>Aboriginal &amp; Torres Strait Islander (n=8)</th>
<th>Non-Indigenous (N=17)</th>
<th>National Physical Activity recommendations*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean PAR scores</td>
<td>89.093 MET</td>
<td>104.076 MET</td>
<td>600 MET</td>
</tr>
</tbody>
</table>

*National recommendations calculated as 150minutes/weeks x 4 MET
Case studies
The following section will examine Aboriginal and Torres Strait Islander postnatal women as a case study. This will be followed by the case study analysis of non-Indigenous postnatal women. The TPB will be used as the framework for both case studies to demonstrate the salient behavioural beliefs, subjective norms and controlled beliefs that women have identified as influencing their intention to be physically active.

A case study: Aboriginal and Torres Strait Islander postnatal women
Aboriginal and Torres Strait Islander women identified the importance of family and community as their behavioural beliefs. This finding suggested that at a theoretical level, women were more likely to view physical activity positively if the benefit of the participation was related to those they are participating with. This was further reinforced by Aboriginal and Torres Strait Islander women who reported a higher preference to undertake group based activity with existing networks such as family or friends. Conversely, non-Indigenous postnatal women described participating in group based activity without the need for such existing networks. The rationale provided by Aboriginal and Torres Strait Islander women was related to the sense of belonging and deep connectedness to both the activity and those participating in it to be achieved.

Belonging and connectedness to physical activity was also linked to women’s preference to participate in planned or organised activity. These types of activities were important as women could commit and allocate time for participation. The nature of these activities also allowed for family and community participation, unlike unplanned or spontaneous activity. Hence, women’s behavioural beliefs indicated that social and family interactions were key components of physical activity participation. This suggests that if women are unable to engage with organised activity with their significant others, they are less likely be physically active.

Another key behavioural belief identified by Aboriginal and Torres Strait postnatal women was the importance of positive role modelling. In this case, women reported physical activity participation in relation to the benefit their children would receive from their participation. Aboriginal and Torres Strait Islander women discussed the need to be physically active for their children so that they could be good role models in which their children could aspire to. Women noted the need to be active role models with their children both now and in the future. This was the first of many findings which suggested women’s physical activity participation was
influenced by the expectations women felt during motherhood. In this instance, women described their need to demonstrate healthy behaviours to their children in which they could model. It also highlighted the motherhood cognitions and behaviours of women where the health and wellbeing of their children were prioritised ahead of their own health needs.

The influence of motherhood was further reinforced when the subjective norms of Aboriginal and Torres Strait Islander women were described. This construct examined women’s perceptions of their significant others, for example, women were asked to report how they felt their significant others (family & friends) perceived their physical activity participation. The findings of this construct identified that role and responsibility of motherhood was identified as a key theme. Women described their motherhood role and responsibility and described their expectations in relation to their duty as mothers. These duties involved being the primary carer of their children and their obligation to undertake all tasks related to their household. At this time, women described their need to fulfil their role and undertake their motherhood tasks which left little time for physical activity.

This was further compounded for women who were not currently working. These women described their need to undertake household and cooking duties in addition to caring for their children. At times, this extended to their husbands and/or partners return from work each day, in which women indicated the importance of their husbands and/or partners physical activity participations as a release from their employment duties. This again highlighted women’s insistence to put the needs of others before the needs of their own. From a physical activity perspective, women are not willing to engage in activity unless they feel the needs of others have been addressed.

Aboriginal and Torres Strait Islander postnatal women reported controlled beliefs that related to available, trusted child care. Women were very particular with the individuals they chose to care for their child in their absence. They usually applied strict criteria to their choices including whether their carer had previous experience with children (or their child), whether the carer shared similar philosophies to child care such as their child’s routine, discipline of children and food choices. In many cases women reported that not even their husband or partner met this criteria to care for their child. This was interrelated to finding that described motherhood role and responsibilities. Women described the need for trusted child care to compensate their perceived
selfish behaviour of physical activity participation. As primary care givers, mothers outlined the necessity to find suitable replacements in their absence to care for their child. This presented a number of challenges to women if such child care was not available or if care was available but did not meet women’s criteria. Hence, women are not confident to be physically active without the provision of appropriate child care (see Figure 19).

**Figure 19:** Cognitive processes Aboriginal and Torres Strait Islander mothers move through before engaging in physical activity

A case study: non-Indigenous postnatal women

Non-Indigenous women reported body image as their key behavioural belief. The benefits of physical activity participation were associated with weight benefits and improved body image. Some women also described how body image could determine whether physical activity was required or not. For example, if they or other women they knew had a perceived ‘ideal’ body image, then physical activity was not necessary. They reported that those women who they deemed to adhere to social norms of acceptable body image did not need to undertake physical activity compared to those women whom they deemed as being overweight. In this instance, physical activity was viewed as a tool for weight loss, with little regard given to the associated health benefits of physical activity participation. Theoretically this suggested that unless women perceived weight loss, they are not inclined to be physically active.
Similar to Aboriginal and Torres Strait Islander postnatal women, non-Indigenous women were strongly influenced by their perceived expectations of motherhood. These expectations related to the level of experience women reported they had or should have and their perceived ability to meet the demands and undertake tasks related to motherhood. Non-Indigenous women identified themselves as the primary carers of their children and the key person responsible for the uptake of their household. These role and responsibilities influenced their ability and intentions to be physically active as these tasks were given higher priority to physical activity participation. Therefore women who did not feel that they could manage their motherhood role and responsibilities were less likely to be active.

Non-Indigenous women reported their subjective norms in relation to their perceived mothering ability. Those women who were first time mothers sometimes reported feeling under prepared and judged when they in the company of others, in particularly other mothers. From a physical activity perspective this was described in mothers’ group situations, where women were encouraged to exercise with their baby. Whilst these groups are designed to provide social support, non-Indigenous women of the main study reported feeling inferior if their child did not conform to the behaviours of other babies. For women this reflected their mothering skills, hence this influenced their confidence to be active. This finding is interrelated to that discussed as part of the subjective norm construct and highlights the influence of the societal and cultural expectations of mothers. Hence, women who perceived limited or reduced confidence in their mothering skills were less likely to be physically active (see Figure 20).
Demographic similarities and differences

Each of the cohorts recruited for the main study were stratified by employment situation, age, marital status, parity and education. This was undertaken in order to account for the influence of these determinants that have also been reported in the literature (described in Chapter 2). The following section outlines the findings that were interpreted based on these key characteristics.

Employment situation

Women were asked to report their employment situation at baseline and follow-up. Most often, women were not working or on maternity leave at baseline. During follow-up, women indicated how their employment situation influenced their perceived ability to be physically active. Unemployed women or women who had not returned to work were more likely to report a higher expectation of what their household duties should be. These women were more likely to report feeling obligated to care for their children as they regarded this as their primary role. They also described perceived expectations of having to undertake all the household duties because they did not work. This also extended to the feeling of guilt for some women, who were at times reluctant to leave their baby in the care of his/her father for any period of time including for physical activity participation. These expectations extended to the apprehension of these women.
to not undertake physical activity because their partners had not been at home all day and should not be burdened by housework or childcare. Therefore non-working women expressed difficulty to undertake physical activity due to their childcare and household duties.

**Age**

Age was included to identify whether this influenced women’s physical activity experience. Young women were defined as those aged less than 20 years. Young mothers represent a hard to reach group and this was demonstrated in this study as the youngest women were aged 24 years (one Indigenous woman and one non-Indigenous woman). Both women reported similar differences when compared to older women in this study. They reported a lack of support from peers as a barrier to physical activity participation, given that most of their friends did not have children. This resulted in a feeling of isolation especially when consideration to undertake physical activity was given. The key issues women reported related to an inability to fully commitment to activities due to their baby’s needs and how this influenced the scheduling of events with their friends. At times women reported feeling frustrated as they discussed how many of their friends did not understand the logistics of coordinating their baby in line with physical activities; especially those participated in at night time.

**Martial status and parity**

Martial status and parity were examined to indentify their influence on physical activity. Martial status did not seem to influence women’s accounts of physical activity participation. Parity influenced women positively as they reported feeling more prepared and experienced to deal with the birth of their most recent baby. However, they did acknowledge an increase in the amount of tasks that needed to be undertaken.

**Education**

Education levels were closely related to women’s issues with childcare services. Both cohorts flagged this as a major barrier to physical activity as they reported requiring trusted childcare to be available before they would leave their children. Education levels influenced the type of activity undertaken by women if they felt they did not have adequate childcare support. Women who were moderately to highly educated were more likely to attend mothers groups or mother and baby physical activity groups. Those women who were classed as less educated were more
likely to undertake their own activities such as pram walking. Financial constraints may have also influenced these decisions on activities, however it was not a strong theme reported by women at any time during the study.

Conclusion

This chapter has presented the qualitative findings of the main study titled the ‘Mums the Word’ project. These findings are a detailed examination and exploration of the physical activity participation and experiences of postnatal women. The TPB underpinned this study and the results are a culmination of the rich narratives that were described by Aboriginal and Torres Strait Islander and non-Indigenous postnatal women at baseline and follow-up. These findings have been structured as to address the two components of research question one, which include:

How do the behavioural beliefs, subjective norms and controlled beliefs of postpartum women (during the first 8 months of the postnatal period) differ among women of differing Indigenous descent, age, marital status, education, employment situation and parity?

The findings have revealed the strong influence of the ideology of motherhood that has consistently appeared throughout each of the theoretical constructs of the TPB for all women (both Aboriginal and Torres Strait Islander and non-Indigenous). This ideology is based on the way in which women perceive their role and responsibility as mothers, which influences all aspects of their lives. In many cases women reported motherhood as impacting their physical activity experiences, as other activities such as household tasks or care giving duties are given priority. This information is useful from a health promotion perspective as it highlights that overall women view physical activity positively, despite their numerous challenges to be active. Hence, future approaches need to be considerate of the demands of motherhood when promoting physical activity.

When considering the second component of research question one, Aboriginal and Torres Strait Islander and non-Indigenous postnatal women have reported different benefits to physical activity participation. Aboriginal and Torres Strait Islander postnatal women have reported the benefits of organised physical activity with their family and friends and an opportunity to be active role models to their children as key reasons for participation. Non-Indigenous postnatal women on the other hand have identified body image and the benefits of weight loss as their
major reason for physical activity participation. Hence the behavioural beliefs of each cohort have been identified differently. In addition, an investigation into the influence of socio-economic characteristics of women has revealed that women of similar age, education and employment situation have reported comparable physical activity experiences. Together, these findings allow for considerations to be given to the health promotion interventions and to assist with addressing the second research question of this study:

*What are the key behavioural beliefs, subjective norms and controlled beliefs of Aboriginal and Torres Strait Islander postnatal women that should be considered for the development of health promotion interventions that aim to increase physical activity levels?*

The following chapter will discuss the results of the 'Mum's the Word' study that have been reported here. This will include considering the key experiences reported by women and the implications of these finding to future health promotion practice. This understanding is necessary to inform the development and implementation of physical activity interventions that are designed to promote maternal physical, in particularly to Aboriginal and Torres Strait Islander mothers. It will also ensure these approaches are relevant and specific to the needs of motherhood by drawing on the experiences reported by mothers in this study.
CHAPTER 5: Discussion
Introduction

The following chapter will discuss why standardised approaches to health promotion are not always suitable because they fail to address a given population’s determinants of health. This discussion will draw on the findings of the main study to show the range of considerations that should be given when dealing with the postnatal population. In addition, this discussion will highlight the need to consider the physical activity requirements of minority groups within the broader postnatal population by examining the Aboriginal and Torres Strait Islander cohort and the non-Indigenous cohort of this study.

The Theory of Planned Behaviour (TPB) has been useful to understand the factors that influence the physical activity of both the Aboriginal and Torres Strait Islander and non-Indigenous postnatal cohort. The theory highlights the maternal cognitions of women that influence their intention to execute physical activity. This study suggests that there is a universal ideology of motherhood that cuts across the cultural and socio-economic characteristics of both cohorts of women. The construction of motherhood is the strongest influencer to maternal beliefs, perceptions and confidence of intentions to be physically active. Motherhood ideals are shown to be interwoven into the physical activity experiences of women in this study. The ability to understand this and to identify ways in which health promotion interventions might address it has been challenging. For example consideration has been given to the practical, social and cultural factors that impact upon women on a daily life. This chapter will examine the findings based on the theoretical constructs of this study, including the behavioural beliefs, subjective norms and controlled beliefs, to show the interrelated nature of women’s physical activity to their motherhood ideals which centre on the best outcomes for their children. The necessity to ensure postnatal physical activity approaches are different to those that target the broader female population (whom are non-mothers) will be discussed.

This will be followed by the close examination of the behavioural beliefs reported by Aboriginal and Torres Strait Islander and non-Indigenous women to show the differences reported by each cohort. Aboriginal and Torres Strait Islander postnatal women reported the need for social
interactions as part of their physical activity participation. They also wanted the opportunity to model this behaviour to their children. Non-Indigenous postnatal women outlined the need to participate in physical activity mainly if they perceived negative body images. These contrasting belief systems will be discussed to emphasise the heterogeneous nature of the postnatal population and the need to consider particular groups differently.

This chapter will begin by discussing motherhood as the key cultural determinant. Motherhood will be discussed initially so that an understanding of the roles and responsibilities reported by the women can be comprehended. This will provide the basis for discussion of the TPB including how the ideology of motherhood influences the beliefs of Aboriginal and Torres Strait Islander women, their desire to conform to their mothering role and responsibilities and the impact of this on their internal confidence levels. Following this an examination of Aboriginal and Torres Strait Islander and non-Indigenous postnatal women’s behavioural beliefs will be discussed. Previous postnatal and maternal research will then be revisited to examine how the application of the TPB has occurred and the degree to which the ‘Mum's the Word’ study aligns with it. Secondly, the demographic characteristics used for stratification of the two cohorts (Aboriginal and Torres Strait Islander and non-Indigenous) will be investigated to draw attention to the cultural influences of motherhood.

The limitations of this study will also be discussed at the end of this chapter. However, it is important to reinforce that this was a qualitative study. Hence the results that will be discussed represent the views of women recruited into the ‘Mums the Word’ project. It is also important to note that sampling bias may have occurred given women were recruited from two specific settings (playgroups and Aboriginal and Torres Strait Islander medical services). Hence the findings from this study may reflect the views and characteristics of women that attend these groups and services and not the broader postnatal population. Therefore, some caution must be given in the interpretation and discussion of these results. Finally, the implications for future physical activity initiatives and research will be discussed.
Culture of motherhood

‘As far as I’m concerned the mother goes to the back seat and everyone else comes in first... I think when you’ve had them you tend to grow up more and you prioritise more... you learn that you’re not so important..... It’s all part of it isn’t it? (Jemma (three children, full time mother, no regular activity). (Lewis and Ridge 2005) – pg. 2300

The culture of motherhood was identified as the most significant determinant that influenced the physical activity participation of Aboriginal and Torres Strait Islander and non-Indigenous postnatal women. Many definitions have been proposed that suggest motherhood is based on a number of socially constructed activities and expectations that are centred on the rearing of children and the maintenance and upkeep of the family’s household (Forcey 1994; Arendell 2000; Tardy 2000; Douglas and Michaels 2004; Medina and Magnuson 2009). These definitions have evolved over time and can often place restrictions and pressures on women, especially if they are unable to meet these motherhood requirements. This can lead to women questioning their mothering ability which may result in a feeling of failure or guilt (Tardy 2000) or subject women to restrictive gendered expectations and stereotypes of what it takes to be a good mother (Lewis and Ridge 2005). Women from this study described their physical activity experiences in relation to their role and responsibility as mothers. This description generally relates to their care-giving role, their focussed attention to their baby and their resistance to undertake activities for personal gain. These narratives highlighted that women’s goal of mothering was related to their desired outcome of healthy, happy children and less related the process of achieving this (a ‘what ever gets you through’ approach) (Medina and Magnuson 2009). This study showed that women’s care-giving role was central to their daily tasks and were not compromised for other activities, especially those that were categorised as self-care. This philosophy may present challenges, as it may result in the redundancy of healthy messages and behaviours that are promoted to women, as they may not be in a position to receive them, if the health of the children constantly remains central. The following sections discuss the findings identified using the constructs of the TPB. In many cases, attention will be drawn to the significance of the culture of motherhood and why it will be important for future physical activity interventions
aimed at Aboriginal and Torres Strait Islander mothers to take this determinant into consideration.

**Behavioural beliefs**

The exploration of the behavioural belief construct allowed for the physical activity desires of Aboriginal and Torres Strait Islander women to be understood (Ajzen 2005). This construct examined the evaluation women undertook when considering whether the cost of participating in physical activity was worth the benefit of participation. In this case, Aboriginal and Torres Strait Islander women described their desire to undertake physical activity in relation to benefits incurred by their children and the social benefits of organised activity. The non-Indigenous women described the benefits to body image as the influencer to participation. This suggests the need to understand the way in which women interpret the benefits of physical activity as this ultimately influences their intentions to be physically active.

**Positive role modelling**

*‘To lead an active life as a family, to be good role models’ (NI001)*

*‘This time in my life, I reckon it’s important. Because you know, the kids…. You can’t sit around and be lazy, because they’re gonna think, oh well we can be lazy when we get older or just sit around and do nothing. And I don’t want my kids to be like that, I want them to think healthy…..’ (I004)*

Positive role modelling was identified as a behavioural belief by Aboriginal and Torres Strait Islander postnatal women due to the acquired benefits and opportunities children could receive if they were to model similar behaviours in the future. Therefore women indicated that their desire to be physically active was built on the anticipated benefits to their children as opposed to the potential benefits to themselves. This is despite the well known health benefits of physical activity, particularly during the postnatal period (Ohlin and Rossner 1994; Goodwin 1997; Devine, Rove et al. 2000; Australian Institute of Health & Welfare 2002; Lewis and Ridge 2005; Australian Institute of Health & Welfare 2006; Australian Bureau of Statistics 2007). This further highlights the power of the construction of motherhood in which women place family as
central to their lives. It also shows how women prioritise the needs and benefits to their children ahead of their own needs and benefits.

Although the literature is not conclusive as to the actual effects of positive role modelling of physical activity by mothers, it has identified that mothers can assist to act as role models for their children as they are active agents for facilitating change (Larson-Meyer 2002; Medina and Magnuson 2009). Given the similar benefits of regular physical activity participation to children (Australian Institute of Health & Welfare 2005; Australian Institute of Health & Welfare 2006) and the potential for this behaviour to be carried through life course trajectories (Sallis, Simons-Morton et al. 1992), positive role modelling seems important (Larson-Meyer 2002).

Physical activity promoted to benefit a mother’s child or children may offer solutions to the tension created from participation. Physical activity promoted within family units can been seen as a way of confirming relationships by undertaking activities together (Lewis and Ridge 2005). However whilst this could create a short term solution to maternal physical activity participation, it does raise the question as to whether this compounds these social and cultural expectation of mothers. Given the high number of stressors (Urizar, Hurtz et al. 2005) and structural constraints (Brown, Brown et al. 2001; Wen, Thomas et al. 2002) reported by mothers, this type of physical activity promotion may indeed be restrictive and inhibiting. However, as women (themselves) have identified the preference to undertake activity for the benefit of their children then promotion of this sort in the short term may be reasonable.

Subjective norms

‘Hired a treadmill, but when there’s so much to do, it comes last. I can’t not do things because I’ve been on the treadmill when he’s been out earning money.’ (I008)

The subjective norm construct allowed for the influence of women’s significant others to be explored. This includes understanding how women perceived their significant others desire for them to be active, as well as the degree in which they feel they should conform to these desires (Ajzen 1985; Ajzen 2005). The findings of this construct emphasised the ideological expectations of motherhood that women perceived others held of them. These expectations relate to the social and cultural standards that place women under pressure to conform to as mothers.
(Medina and Magnuson 2009). Women in this study demonstrated the degree to which they felt they should conform to the social and cultural expectations of motherhood rather than the expectations to be physically active. Whilst women reported overall support by their significant others to be active, they also outlined their shared assumption with their significant others regarding their role and responsibility of motherhood.

Maternal role and responsibilities were assumed by women and their significant others which influenced their ability to be physically active. This is usually due to the multiple responsibilities women face as mothers each day. For these women, participation in activity meant they had to complete and approve their mothering and domestic tasks. Hence this creates many dilemmas for women as they were often restricted and inhibited in their ability to be active (Lewis and Ridge 2005; Medina and Magnuson 2009). Women in this study described encouragement from their significant others to be physically active; however participation was often overridden by caring and domestic duties. This study suggests that women place higher significance on conforming to their significant others’ perceptions of their role and responsibilities as mothers rather than their perceptions to be physically active. This again points to the powerful construction of motherhood and the way in which women’s behaviours are influenced.

‘But he does say if you want to hop on, hop on (treadmill). But then I look at everything else that needs to be done, but I can’t, there’s washing to be put on or I need to cook dinner, If I don’t cook dinner now, we won’t eat by 5 o’clock….. It’s not the fact that he’s not supportive, just go ahead and do it, but I just physically can’t.’ (NI015)

Controlled beliefs

The culture of motherhood was again highlighted in the exploration of the controlled belief construct, which examined women’s internal confidence to be physically active. Women reported reduced confidence and a sense of guilt in the pursuit of activities for individual purposes. For women, participation in physical activity contested their ideology of motherhood as they become central to the direct benefits of participation in place of their children. This opposed the social and cultural principles of motherhood in which children are, and always remain, central to mothering (Brown, Brown et al. 2001; Lewis and Ridge 2005; Bellows-Riecken and Rhodes 2007; Price 2007; Medina and Magnuson 2009).
Similar to the feelings identified in the behavioural belief and subjective norm constructs, the expectations of motherhood were explicitly linked to the confidence of women to undertake physical activity. They described a number of trade-offs and considerations that occurred in their quest to be physically active, in particularly the utilisation of childcare. Childcare was viewed as a voluntary relinquishment of care-giving responsibilities by mothers. As the primary care giver to their children, women outlined their sense of guilt and unworthiness to undertake physical activity if it meant placing their children in care. These tensions are not uncommon for women and reinforce the ideology of motherhood that suggest ‘a good mother would never simply put her child aside for her own convenience’ (Hays 1996; Tardy 2000). This again highlights the social and cultural expectations placed on mothers in contemporary times that result in increased pressures and unrealistic goals (Douglas and Michaels 2004; Medina and Magnuson 2009).

For those women who considered childcare options, confidence to access these services (provided by unknown or known sources) was dependent on trust of the care giver. Women outlined the strict criteria they applied to individuals whom they considered appropriate to care for their children. The application of these guidelines even meant that sometimes the fathers of these children did not meet a mother’s approval.

‘Like I can’t really (leave baby with partner), because, well he (partner) can’t really look after her (baby); he’s not very good at it’ (NI014)

This undertaking again highlights women’s need to control the care of their children and ensure that it is not compromised in their absence. The selection processes undertaken by women to find appropriate care givers for their children increased their confidence to be physically active.

**Comparison of behavioural beliefs: the importance of perceived benefits**

One of the research questions of the main study was to explore the differences in salient beliefs between Aboriginal and Torres Strait Islander and non-Indigenous postnatal women. Whilst not commonly used in qualitative research, it was appropriate to use the TPB as a heuristic framework to understand the population’s most significant physical activity beliefs (Ajzen 2009). The behavioural beliefs construct identified the major difference between the way in which Aboriginal and Torres Strait Islander and non-Indigenous postnatal women perceived the
benefits of physical activity. Whilst positive role modelling was a key behavioural belief for Aboriginal and Torres Strait Islander mothers that linked to the culture of motherhood (and was discussed above), so too was the preference to undertake organised activity with significant others. Conversely, non-Indigenous women reported the benefits of weight loss as a result of participation.

**Participation in organised activity with significant others—Aboriginal and Torres Strait Islander postnatal women**

‘It’s that connection with other people involved’ (I006)

Participation with significant others highlights the collective societal nature of Aboriginal and Torres Strait Islander communities. Women reported the benefits of participating in physical activity were due to the social connections that are derived from participation with others. In addition, women described the need and preference to participate in organised activities as they could plan and jointly attend activities with their significant others. This finding indicates the cultural preferences of Aboriginal and Torres Islander peoples as opposed the cultural preferences of mothers.

These findings are consistent with those reported in other Aboriginal and Torres Strait Islander physical activity research where activity is viewed positively if it has strong social and family connections (Thompson, Gifford et al. 2000). In addition to this, is has been reported that activity undertaken for individual benefit is viewed as shameful as it is seen as disconnecting individuals from their family and social ties (Thompson, Gifford et al. 2000). Another study had indicated similar results and reported that perceptions of physical activity were centred on the importance of family connections (Marshall and Miller 2004). Hence, these finding suggest that Aboriginal and Torres Strait Islander mothers share similar philosophies to that of the broader population as the cost of undertaking physical activity is measured against the social benefits of participation. It also supports their preference to undertake physical activity due to the benefits of being active role models to their children. Not only will children benefit from modelling this behaviour (both in the short and long term), they will also acquire the social benefits if physical activity is undertaken with their significant others.
Not surprisingly, these behavioural beliefs are interrelated with those subjective norms and controlled beliefs reported by Aboriginal and Torres Strait Islander women. Communal and group based activity assumes a mutual agreement by all those involved. Hence, the nature of this participation suggests that significant others will influence a mother’s intention to be active, as well as be influenced to undertake physical activity. This in itself presents an interesting analysis in the relationship of physical activity participation of Aboriginal and Torres Strait Islander postnatal women. On one hand, women are influenced by the expectations of their role in society as mothers and on the other hand they are influenced by the expectations of their cultural heritage. From a physical activity perspective the behavioural beliefs of Aboriginal and Torres Strait Islander postnatal women suggest that women will undertake physical activity if they are able to fulfil their maternal role and responsibility, participate in activity with their significant others and model this behaviour to their children. Not surprisingly, the absence of these factors reduced the confidence of women to undertake physical activity.

**Body image—Non-Indigenous postnatal women**

‘I’m not too stressed about it really (physical activity), as long as I can fit into my clothes, that was all that matters really’ (NI004)

‘I will try and get fit, well, not fit, but lose some weight’ (NI006)

The key behavioural belief reported by non-Indigenous women was the benefit of physical activity due to its usefulness as a weight loss tool. Whilst labelled ‘body image’, this finding is fundamentally linked to women’s perceptions that physical activity is only necessary if weight loss is required. Non-Indigenous women expressed their desires to be physically active if they perceived a negative body image. Conversely, those women who perceived positive body image often reported participation as needless. Whilst these findings do not suggest that Aboriginal and Torres Strait Islander postnatal women did not have similar body image views, this theme was far stronger within the non-Indigenous cohort.

A strong correlation between postpartum weight retention and physical activity participation has been reported consistently in the literature (Ohlin and Rossner 1994; Boardley, Sargent et al. 1995; Walker 1996; Devine, Rove et al. 2000; Larson-Meyer 2002; Linné, Barkeling et al. 2002;
O’Toole, Sawicki et al. 2003; Blum, Beaudoin et al. 2004; Krummel, Semmens et al. 2004). Non-Indigenous women reported a desire to lose weight and usually measured this in terms of returning to pre-pregnancy weight or clothing. Similar findings have been reported in other studies where women have used similar measurements and strategies to determine successful post-pregnancy weight loss (Chang, Nitzke et al. 2008). From a health promotion perspective this information is important to understand when considering current physical activity recommendations. These recommendations of thirty minutes per day are designed to improve the general health and wellbeing of individuals. These guidelines may not be totally beneficial to achieve major weight loss if women want to reduce weight after pregnancy. Therefore, the advice provided to postnatal women must be clear, especially when the physical activity guidelines are promoted. As a result of these findings it also seems necessary that the associated health benefits of regular physical activity, regardless of weight issues, are promoted to women given that physical inactivity is a major risk factor to most chronic diseases (Australian Bureau of Statistics 2007).

Using the TPB: Theoretical implications of this research

The exploration of the constructs of the TPB have been useful in providing Aboriginal and Torres Strait Islander postnatal women with a voice and a framework in which their stories could be understood and interpreted. A discussion of the finding so far has indicated that women’s intention to be physically active is influenced strongly by the culture of motherhood (See figure 21). Whilst the influence of this determinant has been reported in the literature, there is limited information that describes the impact of this on Aboriginal and Torres Strait Islander mothers. Hence, this study emphasises the universal definition and responsibilities of mothers that cut across age, education, employment, marital status and parity. The TPB has been used in previous physical activity research including the postnatal population. These studies have outlined the influence of behavioural beliefs and subjective norms; however have done so to varying levels of influence. They do however suggest that controlled beliefs are the greatest predictor of physical activity intentions of individuals (Courneya, Friedenreich et al. 1999; Marttila and Nupponen 2000; Hardeman, Johnston et al. 2002; Symons Downs and Hausenblas 2004; Blanchard, Kupperman et al. 2007; Guinn, Vincent et al. 2007). As acknowledgement of the strong
influence confidence has on behaviour, Ajzen (2001) has also highlighted that confidence is both a dependent and independent influencer of behavioural intentions (Ajzen 1985; Ajzen 1989; Ajzen 1991; Marttila and Nupponen 2000). Hence, confidence is a significant contributor to physical activity intentional behaviour and will be discussed further below.

A systematic review has been conducted to understand how the TPB is used in behavioural modification interventions (Hardeman, Johnston et al. 2002). This review has indicated that the theory is commonly used to predict intentions and behaviours and less commonly to develop interventions. Hardeman, Johnson et al (2002) argue that interventions could benefit from being underpinned by the TPB as it could inform the recruitment and motivation of individuals. In the case of this research, the development of strategies would need to ensure that they were aligned to the ideology of motherhood by limiting the conflict and tension caused to maternal role and responsibilities and by ensuring that confidence was not reduced. For example, physical activity strategies targeted at mothers may incorporate a woman’s child so that the childcare issue was resolved. Such a strategy may maintain a woman’s confidence by not having to place her child in care and by confirming her primary role as care giver. For Aboriginal and Torres Strait Islander mothers this strategy may also serve a double purpose as women would be able to model their physical activity behaviour to their children.

**Figure 21:** The influence of motherhood on the constructs of the TPB

- **Behavioural Beliefs**
  - Positive Role Modeling
  - Participation of organised activity with significant others

- **Subjective Norms**
  - Conform to the ideology of motherhood rather than PA

- **Controlled Beliefs**
  - Factors that oppose or challenge ideology of motherhood with reduce confidence

- **Intention to be physically active**

* PA – physical activity
Participation in activities that involve children may be a better choice for all postnatal women (and mothers) in particularly, as physical activity groups such as these provide a viable option to those women who are not willing to access childcare services. In these instances, women are able to exercise in the company of their children. These groups also provide opportunities for increased social support in which women can interact and obtain advice from other mothers. Social support and group based activities have been identified as a positive outcome of postnatal physical activity. Two Australian studies examined the effects of pram/stroller walking as a way to increase physical activity. One study reported that walking together with other mothers in a group-based environment improved their depressive symptomology (Armstrong and Edwards 2004). Another study reported the improved physical and mental benefits of pram walking in a group (Currie and Develin 2000).

The positive effects relating to social support was also demonstrated in a randomized controlled trial which compared standard physical activity classes to a group mediated cognitive behaviour intervention. The results indicated that whilst both groups increased physical activity levels, the group based intervention had greater physical activity success (Cramp and Brawley 2006). Therefore group-based activities which increase social support networks have shown positive benefits of physical activity for postnatal women. In addition, these types of programs also eradicate the childcare issue, as women are able to exercise in the presence of their children.

Not surprisingly, the lack of significant social interactions were identified as a controlled belief by Aboriginal and Torres Strait Islander women, as they reported this as reducing their confidence and motivation to be active. Again, this emphasises the importance of promoting physical activity that strengthen these social ties. Hence, this understanding provides implications for the promotion of physical activity to the Aboriginal and Torres Strait Islander maternal population (which includes postnatal women) in regard to how the messages are currently promoted. The current national physical activity guidelines recommend individuals perform at least thirty minutes of moderate physical activity on most days of the week (Australian Institute of Health & Welfare 2003). Whilst the guidelines are relevant to this population, the way in which these messages are promoted to the population are important. Physical activity campaigns targeted at the Aboriginal and Torres Strait Islander maternal
population should acknowledge and incorporate these family and social connections in order to be effective. For example, mothers should be encouraged to accumulate the recommended physical activity levels with their children, partners and other family and friends.

The promotion of the current guidelines may also present a challenge for Aboriginal and Torres Strait Islander postnatal women. Whilst the guidelines provide recommendations to the type and intensity of activity required, they also provide suggestions of how individuals should look for opportunities to incorporate physical activity into their daily lives. Such activities are referred to as incidental activities, in which individuals are active through the daily tasks that they perform. Whilst it is not suggested that such messages are irrelevant, more consideration should be given to the potential uptake of these messages when the population has reported the preference to participate in organised activities. Therefore more work should be undertaken to identify how such messages are promoted.

Health promoters will also need to be aware of the barriers to the utilisation of childcare by mothers and can not assume that the provision of a service alone will influence women’s decisions to be physically active. They will need to understand the dilemma’s created for women by placing their children in care and how this undermines their role as mothers. In particular, childcare was identified as the key factor that reduced the confidence of Aboriginal and Torres Strait Islander and non-Indigenous women to be active. Given that confidence has been reported as the key predictor to physical activity intentions, the provision of appropriate, trusted childcare is particularly significant as this alone could determine whether women do or do not undertake physical activity.

The TPB can also be used to understand the way in which groups perceive the benefits of physical activity and therefore can assist to recruit them into physical activity interventions and motivate them to be physically active (Hardeman, Johnston et al. 2002). The approach also aligns with the principles of health promotion that calls for the need to consider populations differently. Whilst motherhood is a unique yet universal stage of women’s lives, it is important to understand that there will be groups within the maternal and postnatal population that will require specific needs. The different behavioural beliefs reported in this study show how such differences can exist.
Therefore from a health promotion perspective, these findings suggest that overall that a physical activity intervention can be targeted at the broader maternal population and where possible, should align to the ideology of motherhood by acknowledging a woman’s role and responsibility. This acknowledgement should include strategies that do not conflict or contradict this philosophy. However, in regards to targeting, motivating and structuring physical activity interventions, strategies should differ, dependent on the target group. The findings from this study suggest that for Aboriginal and Torres Strait Islander postnatal women, programs should encourage participation with family and friends and should provide women with the opportunity to be active role models to their children. The findings also suggest that for non-Indigenous postnatal women, programs should acknowledge women’s potential desire to lose weight, ensure that women understand that the national physical activity guidelines are not designed to promote weight loss and should also promote the health benefits of undertaking physical activity if weight loss is not the primary goal.

**Figure 22: Using the TPB to understand how to develop maternal physical activity interventions**

<table>
<thead>
<tr>
<th>Physical activity postnatal program</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Align with motherhood ideology &amp; ensure childcare options are available</td>
</tr>
</tbody>
</table>

PA promoted differently to each population to recruit them into program and motivate them to be active

<table>
<thead>
<tr>
<th>Aboriginal &amp; Torres Strait Islander women</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Promote active role modeling &amp; encourage participation with family &amp; friends</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Indigenous women</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acknowledge the importance of body image but should also promote health benefits of regular activity</td>
</tr>
</tbody>
</table>

Intention to be physically active
loss is not their goal (Figure 22).

**Understanding the determinants to inform health promotion interventions**

This study suggests that the consideration of the key determinants identified may be important to help contextualise and inform future health promotion interventions and strategies. This understanding is built on the social and political processes involved to establish health promotion action that includes changing social, environmental and economic conditions to improve the health of individuals and populations. The following section will discuss the influence of employment, age and education levels of women (World Health Organization 1986; World Health Organization 2011). The purpose of this understanding is to ensure that women are able to increase control over these determinants and their health by ensuring that future health promotion interventions account for these influencers (World Health Organization 1986).

**Employment situation**

‘Mothers of all socio-economic status, find themselves in an ambiguous, guilt-ridden position in a modern society that prizes paid work, yet culturally has not fully relinquished a commitment to the exclusivity of motherhood’ (Duncan and Edwards 1999; Price 2007) p:24

The necessity to conform to the social and cultural expectations of motherhood was witnessed when women described their employment situations. Obligation and a sense of duty to domestic and caring activities were often reported by non-working women who considered physical activity participation. Similar to above, women highlighted their need to fulfil their domestic and care giving responsibilities so that their partners were not burdened with such tasks. Whilst this finding was consistent with the overall findings, women emphasised this issue more if they had been at home all day.

‘Because my husband works long hours so I just felt like it’s an, you know... obligated to cooking dinner’ (I011)

Similarly, working mothers outlined the need to conform to the social and cultural expectations of motherhood as they had not been at home all day. They outlined the limited priority physical activity was given due to the many other tasks that needed to be undertaken.
The influence of employment situation provided an interesting layer to the understanding of maternal physical activity. Whilst working mothers reported participation as low priority as they had been away from their household and children, non-working mothers reported similarly due to their domestic and caring duties.

‘Bottom of the list. I just, I find that there’s probably other things that are more important than me going out and doing some like exercise and something like that. And I don’t, I’m not a real big fan of it’ (NI014)

This further highlights the tensions and complexity associated with motherhood and the context in which physical activity should be considered. The findings of the subjective norm construct and employment situation of women emphasised the power of the culture of motherhood. Therefore this understanding must be applied to health promotion strategies and interventions that aim to promote physical activity participation to mothers.

Age

The influence of maternal age has been discussed in the literature. Some authors report that early motherhood predisposes women to unhealthy lifestyles, stress, educational and socio-economic disadvantage (Loxton 2005; Lee and Gramotnev 2006) whilst others report that delayed motherhood may influence a woman’s ability to conceive and the number of children she may ultimately birth (Greenspan 1994; Lee and Gramotnev 2006). Early motherhood is particularly relevant to Aboriginal and Torres Strait Islander women as they are more likely to give birth earlier and be single (Westenberg, van der Klis et al. 2002). Despite this, research indicates that young Australian women cope well with the pressures of motherhood (Lee and Gramotnev 2006).

Maternal age influenced the physical activity experiences of women recruited into this study. Young mothers of this study reflected the WHO social exclusion determinant of isolation and segregation from their existing networks (World Health Organization 2003; World Health Organization 2011). They expressed frustration and disappointment from their peers (who did not have children) about the lack of support and consideration they gave them in regard to their maternal roles and responsibilities. This was generally related to a lack of planning of events or
meetings in which mothers could not attend as they had not been given sufficient time to make arrange their child.

‘A lot of my friends are young, so you know, they’re always going out you know, and they ring me and go 'do you want to go out' and it’s too, you either got to find a babysitter or you rely on your parents too much, and my partner, he doesn’t really care, like, he still does everything that he wants to do, but I’m the one that has to stay home with the baby, which I don’t mind, but sometimes it would be nice to just go out once and a while........I wouldn’t take it back, but for those younger people that want to have babies when they’re young, I think maybe they should just wait a little bit, have a bit of life first, you know what I mean. (NI014)

These findings from the main study also correspond with the findings from the second pilot study that explored the physical activity experiences of young mothers who attended a youth health service. Collectively these results suggest more consideration is needed for young mothers who may not feel supported during the postnatal period and beyond. These women may be responsive to group-based activities that could offer practical and social support by their peers (Logsdon, McBride et al. 1994; Davis, Logsdon et al. 1996; Ostbye, Krause et al. 2009). However as outlined by women of this study, such programs may only be effective if they are able to attract women of similar demographics.

Education

Low education levels of women predisposes them to social and economic disadvantaged (Lee and Gramotnev 2006). The findings from this study suggest that education may influence the physical activity choices of women and their decisions to access childcare. Moderately to highly educated women reported attendance to formalised mother and baby groups. Lowly educated women reported attendance to informal activities such as pram walking. However it was difficult to ascertain the degree to which financial constraints also influenced these decisions on activities and care. Given that low education is also linked to socio-economic disadvantage, affordability of physical activity options and childcare services may also influence these decisions in addition to education levels. Social class is known to shape behaviour of individuals (Zadoroznyj 1999) therefore health promoters need to be mindful. This may be relevant for both intervention development but also for physical activity promotion as an understanding of the broader
determinants, including women’s position on the social gradient will influence relevance and uptake of messages.

**Future implications**

This research has highlighted the importance for cultural determinant of motherhood to be considered when promoting physical activity to the postnatal population. On one level the findings have shown how the cultural determinants of motherhood strongly influence the way in which women view physical activity behaviour. On another level, the findings have shown how Aboriginal and Torres Strait Islander culture influences how women would like to undertake physical activity. In both instances, these levels reflect the principles of health promotion practice that require that the determinants of health are identified so that they can inform strategies and interventions that seek to promote physical activity. In this way, women feel empowered to take control of their activity levels. These findings also provide further consideration for health promotion practice in regard to the way in which physical activity is promoted and/or offered to mothers. For example the provision of child care services alone will not always increase the likelihood of women attending physical activity programs. Women expressed a lack of confidence and willingness to leave their child in care to undertake individual pursuits given their assumed role as primary care givers of their children. Aboriginal and Torres Strait Islander women on the other hand, seek to undertake physical activity with their family and friends in organised and structured activity. Hence, the current physical activity messages that encourage incidental and unstructured activity may not be well received. Therefore, many considerations are needed to promote the physical activity messages to all postnatal women, including the Aboriginal and Torres Strait Islander population.

**Maternal considerations**

Health promotion interventions targeted at mothers need to consider the ideological and practical factors that will influence women’s physical activity participation. Failure to account for such considerations may limit women’s opportunities to be active as maternal tasks will always precede other activities. Whilst the postnatal period can be a challenging time for women (Wiggins, Oakley et al. 2005; McKellar, Pincombe et al. 2006) and hence the promotion of physical activity, it is also viewed as an opportunity to engage with women during this period.
significant life event (Lewis and Ridge 2005). Issues such as timing and flexibility of interventions offer both practical and ideological strategies for maternal physical activity programs.

For example the promotion of physical activity during the early postnatal period will not be useful to women given they are advised to undertake light activities during the first six weeks. Therefore promotion should occur after this time. In addition, intervention delivery must be flexible to accommodate the multiple roles and responsibilities undertaken by women in which children are central to their life. If they do not, they will reduce their accessibility to women whose daily routines are dictated by the needs of their children. Hence, the flexible delivery of interventions that do not compete with these needs are required, as if they are not, physical activity will always receive limited priority. In addition, more work is needed to promote the correct physical activity messages to the postnatal population.

Currently, much of the evidence and recommendations instruct postnatal women about the types of activities that they should avoid after child birth (Pillitteri 1995; Reeder, Martin et al. 1997; Sampselle, Seng et al. 1999). As Sampselle & Seng et al (1999) argue, even the recommendations by the American College of Obstetricians and Gynaecologists (1994) are limited in their advice to postnatal women about the resumption of exercise. Mostly, postnatal women are instructed that they should gradually resume activities similar to those undertaken before and during pregnancy (American College of Obstetricians and Gynaecologists 1994). These guidelines are not helpful to those women wanting to undertake an exercise program in a time when there are so many physical and psychological changes occurring after the birth of a child (Sampselle, Seng et al. 1999; Devine, Rove et al. 2000). This in itself could provide a barrier to those women wanting to resume or undertake physical activity during the postnatal period. Many women may not recognise the importance of physical activity during the postnatal period, or know when and how to resume and increase activity over time (Wilkinson, Huang et al. 2004). Health professionals need to better understand the ways in which they can support mothers to undertake physical activity during the postnatal period (Lewis and Ridge 2005). Therefore more work should be done that seeks to develop guideline development and advice that can support both health professionals and mothers themselves.
Aboriginal and Torres Strait Islander postnatal women

The results of this research provide new insights into the physical activity experiences of Aboriginal and Torres Strait Islander postnatal women. Despite low levels of physical activity levels within the population, the findings support the evidence that suggests that women are interested in programs that aim to improve lifestyles, including increasing activity (Urizar, Hurtz et al. 2005). However challenges do exist that relate to overcoming factors that hinder this adoption. Whilst there are a number of common motherhood ideals that influence Aboriginal and Torres Strait Islander women, there are also a number of differences that are related to their ethnicity. These differences need to be recognised to ensure that models of health promotion targeted at the Aboriginal and Torres Strait Islander population are culturally appropriate, community controlled, self determining and based on the aspirations of the community (Commonwealth of Australia 2002; Durie 2004; McLennan and Khavarpour 2004; Mikhailovich, Morrison et al. 2007). In addition, these models must ensure that they recognise the strengths and capacity of communities rather than the deficits, to maximise their effectiveness (Brough, Bond et al. 2004; Mikhailovich, Morrison et al. 2007). Aboriginal and Torres Strait Islander specific approaches concur with the principles of health promotion theory that require the determinants of health to be understood and used to inform strategy development to increase the potential for success. This also reinforces why caution should be given to the application of standardised approaches that fail to undertake such considerations and fail to empower individuals.

Aboriginal and Torres Strait Islander postnatal women identified the need for family and kinship in their physical activity experiences. These experiences reflect the Aboriginal definition of health that requires the physical, social, emotional and cultural well-being of individuals and the community (National Aboriginal Community Controlled Health Organisation 1989). This need is built on the customs of traditional society in which immediate and extended family are responsible for each other and obliged to support each other in all dimensions (such as socially, emotionally and economically) (Australian Government 2011). This includes the assumed responsibility of children by all family and community members (Australian Government 2011). This is very different to the western interpretation of the nuclear family unit (Australian
Government 2011). This further strengthens the physical activity experiences and desires reported by Aboriginal and Torres Strait Islander postnatal women who report the need for family and friends to undertake physical activity.

Hence, future physical activity programs should incorporate the cultural customs of Aboriginal and Torres Strait Islander society. Such interventions could be underpinned by the TPB and informed by those factors that will motivate and predict participation to empower women take control over their physical activity (Ajzen 1985; World Health Organization 1986; Ajzen 1991). Findings from this study suggest that physical activity messages and programs could be promoted holistically to the community, which should outline the importance of physical activity for all members and encourage participation together. Cultural responsibility and obligation may also be promoted accordingly to acknowledge the importance of social and community bonds. In addition, these messages should emphasise the opportunity (and responsibility) for all individuals to be active role models to children. At the theoretical level these strategies will address the behavioural beliefs identified by women and accommodate the ideological perceptions of mothers in which women are obligated to conform to. Therefore, participation by the broader community may reduce the cultural tensions of motherhood by promoting physical activity in accordance with Aboriginal and Torres Strait Islander culture. Whilst the power of motherhood ideals should not be underestimated, the findings from this study suggest that health promotion interventions should look to draw on the strengths of the Aboriginal and Torre Strait Islander culture and incorporate them into strategies (Brough, Bond et al. 2004). This will also help to alleviate the confidence issues experienced by women looking to participate in physical activity if it is accepted practice undertaken by all community members, especially if children are involved in activity.

Whilst the current national physical activity guidelines are relevant to the Aboriginal and Torres Strait Islander population, the cultural and social influences of participation are equally important. More work is needed that looks to extend to the development and implementation of physical activity interventions that aim to increase the activity levels of women. The next step may be to undertake intervention research to understand the physical activity patterns of Aboriginal and Torres Strait Islander mothers. This is supported by the National Health and
Medical Research Council who have recently released ‘Road Map II’ – a strategic framework for improving the health of Aboriginal and Torres Strait Islander people through research (National Health and Medical Research Council 2010). This document outlines seven action areas in which Aboriginal and Torres Strait Islander research should target. A key action area is the need for more intervention research to outline the lessons and success when working with Aboriginal and Torres Strait Islander peoples and communities. The purpose of this action area is to build the evidence base in under-researched areas. The research as part of this thesis has highlighted the gaps in the knowledge related to Aboriginal and Torres Strait Islander physical activity research, despite physical inactivity being a major risk factor to chronic disease, in which this population suffers greatest burden in Australia (Australian Institute of Health & Welfare 2005; Australian Bureau of Statistics 2007). Hence immediate action that contributes to this evidence base is required.

**Physical activity participation**

Physical activity measurement was undertaken with each of the cohorts of this study to understand their physical active levels. The results indicated that overall both cohorts did not meet the national physical activity recommendations and were indicative of postnatal physical activity participation rates more generally (Armstrong, Bauman et al. 2000). Women mostly reported incidental and unstructured types of physical activity participation such as walking for transport and household chores. Limited structured activity was undertaken, although this did not necessarily comply with women’s intentions to participate in such activities.

Aboriginal and Torres Strait Islander postnatal women were less active compared to the non-Indigenous cohort. This is not surprising given that Aboriginal and Torres Strait Islanders are more inactive compared to the broader Australian population (Australian Bureau of Statistics 2007). However in consideration of the types of activities reported, it is also not surprising that Aboriginal and Torres Strait Islander women were inactive given they rarely reported participation in activities in which they reportedly desired to undertake (organised, structured activity with family and friends). Therefore it is not clear whether the challenges of motherhood compounded women’s ability and opportunity to be active given the practical constraints of such participation. Or on the other hand, given that the broader Aboriginal and Torres Strait Islander
population are inactive it could be theorised that there are currently limited opportunities within the community that provide physical activity options in which family and social networks can participate together in. Although the sample size was small and results should be viewed with caution, the findings do suggest that there is a need to promote physical activity to the whole Aboriginal and Torres Strait Islander community if activity levels are to be improved. However paramount to this must be the acknowledgement and encouragement of communal participation given the cultural significance.

Implications for future research

The findings from this research (pilot work and main study) highlight the methodological challenges when researching the postnatal population. A key consideration needed is the application of future data collection procedures, that is, individual versus group-based data collection methods such as focus groups. The advantages of group-based data collection are similar to those outlined in previous research (Liamputtong and Ezzy 2005; Neuman 2006; Liamputtong 2007). For this population, this method also provides practical advantages in which mothers can attend with their children, and their children can interact with each other. Whilst the findings of Pilot Study 2 and its methodological implications have been discussed previously, another consideration has surfaced after the conclusion of the main study. This relates specifically to the culture of motherhood and the perceived role and responsibilities. This research suggests that women take their roles as mothers very seriously and measure themselves against societal expectations and their peers. Hence, group-based inquiry may provide an opportunity in which women may validate their experiences and performance as mothers, however it may also result in women questioning their mothering duties. This was discussed in both pilot study 2 and the main study in which women described their perceived mothering inadequacy in group-based situations such as focus groups. Therefore consideration must be given to this method. The advantages and disadvantages of individual data collection methods have already been discussed in Chapter 3.
Limitations of the study

It is important to note that caution must be given to the results identified in this research given the small sample size of the studies (pilot work and main study). The limitations of the pilot studies have been discussed in previous sections. However, a number of limitations must be considered when interpreting the results from the main study. Given the qualitative nature of this inquiry the results should be viewed with caution given the limited number of participants and represent the views and experiences of women during this research. Additionally, this was an urban sample, all women recruited into this study (Aboriginal and Torres Strait Islander and non-Indigenous women) were located in the greater Brisbane area. Whilst in-depth data could be obtained from each of the case participants, the results cannot be generalised. In addition, the sampling techniques employed for this study may also create bias as women were recruited from Aboriginal Medical Services and play groups of Play Group Queensland. However the findings from this research have provided new knowledge into the physical activity experiences of both Aboriginal and Torres Strait Islander and non-Indigenous postnatal women. Whilst the findings have been consistent with similar work reported in the current evidence base, they have also provided greater direction in to which physical activity messages and programs should be tailored to suit particular population groups. They also support the central research aim which is to demonstrate the need to consider specific population groups differently by identifying and addressing their specific determinants of health.

Recommendations

A number of recommendations have been made to address the issues that have emerged from this research. These recommendations are proposed to address some of the immediate gaps that exist in the evidence. They are described below in relation to the research-based and health service based recommendations.

Health-based recommendations

After childbirth, women are often regarded as members of general population. Hence, physical activity promotion fails to acknowledge the needs of this sub-group in the physical activity advice and promotional activities that are offered to women. A strong need exists to ensure that
women are receiving adequate and consistent physical activity advice. Additionally, more intervention research is needed to build the limited evidence base. Therefore the following health-service based recommendations are made:

- The development of Australian postnatal physical activity guidelines that provide direct advice on the types of activities women can undertake during this period and beyond. Central to this is the acknowledgement of the determinants of this population including the unique needs of specific groups within this population.

- Development of a physical activity intervention targeted at Aboriginal and Torres Strait Islander postnatal women based on the TPB that is considerate of the social determinants of health.

**Research-based recommendations**

The postnatal population is a unique sub-group of the female population. More work is needed that articulates the specific needs of the population, including the needs of specific subgroups such as the Aboriginal and Torres Strait Islander group. In order for this to occur, the methodological implications of working with this population must be explored. Therefore the following research-based recommendations are made:

- Studies should employ both individual and group based data collection techniques to develop a greater understanding of the most appropriate methods in these vulnerable and hard to reach populations.

- Data collection procedures must understand the cultural influences of motherhood and degree to which it influences women’s health and behaviours such as physical activity. This information is important and will assist to ensure accurate, reliable and valid data is collected that will assist to inform strategies that seek to promote activity levels amongst this population.
CHAPTER 6: Conclusion

Physical activity has been identified as a ‘best buy’ for improving the health outcomes of the Australian population (Morris 1994; Hunt, Marshall et al. 2008) due to the well-established benefits of regular moderate physical activity (Australian Institute of Health & Welfare 2001; Australian Institute of Health & Welfare 2002; Australian Institute of Health & Welfare 2006). However more work is required to get the population moving as there is still a large proportion of Australians that are inactive or sedentary (Stephenson, Bauman et al. 2000; Bauman, Ford et al. 2001). This includes Aboriginal and Torres Strait Islander mothers who are more likely to be physical inactive and suffer significantly higher rates of chronic disease morbidity and mortality (Sobel and Stunkard 1989; Kaplan and Lynch 1997; Australian Institute of Health & Welfare 2001; Australian Institute of Health & Welfare 2002; Turrell and Mathers 2003; World Health Organisation 2003; Glover, Hertzel et al. 2004; Australian Institute of Health & Welfare 2006; Thrift, Dewey et al. 2006). In addition, Aboriginal and Torres Strait Islander women have higher fertility rates and are more likely to be become mothers at an earlier age compared to non-Indigenous mothers (Australian Bureau of Statistics 2007). Hence, efforts that seek to increase physical activity participation within this population are needed.

As Shilton & Brown have discussed, only a limited amount of published evidence exists that outlines the challenges and success of Aboriginal and Torres Strait Islander physical activity programs (Shilton and Brown 2004). Therefore it is difficult to understand how future programs and interventions can be developed. It may also explain why targeted risk factor modification programs have been ineffective as they have not addressed the wider social meanings of health and chronic disease risk factors such as physical inactivity (Thompson, Gifford et al. 2000). Hence, a greater understanding of the social and cultural factors that influence Aboriginal and Torres Strait Islander mothers is needed so that future health promotion approaches are both relevant and appropriate for uptake so that women feel empowered to achieve physical activity (World Health Organization 1986; World Health Organization 1986).

The philosophy of health promotion requires that targeted strategies and approaches that seek to facilitate behaviour change are contextualised into the broader environments in which individuals live (World Health Organization 1986). Historical lessons have demonstrated that a
‘one size fits all’ approach is not appropriate to engage with health behaviour change. The investigation undertaken as part of this thesis has centered on this philosophy of health promotion which has allowed for a broader perspective of health to be examined in which physical activity and/or inactivity has been contextualised into women’s lives.

This Doctorate of Philosophy has allowed the factors that influence Aboriginal and Torres Strait Islander postnatal women’s physical activity experiences to be understood. The findings have demonstrated that women will undertake physical activity if they are able to fulfil their motherhood duties, are able to participate in physical activity with their family and friends and are able to model this behaviour to their children. These findings have provided a greater understanding to the factors that influence women’s experiences and intentions to be physically active. It also calls for greater consideration to be given to future physical activity programs and the promotion of the national physical activity guidelines. This information is significant as it suggests new approaches to physical activity promotion amongst this population, which is missing from the current evidence base.

In addition, these findings are important in relation to the broader Aboriginal and Torres Strait Islander health agenda. Currently efforts that seek to ‘Close the Gap’ in health inequalities between Aboriginal and Torres Strait Islander and non-Indigenous Australians are a major focus of government policy and funding. This has been identified as a national responsibility which requires commitment by all segments of government and the community (Commonwealth of Australia 2011). Included in this policy direction are five targets which include to: close the gap in life expectancy between Indigenous and non-Indigenous Australians by 2031; halve the gap in mortality rates for Indigenous children under five by 2018; ensure access to early childhood education for all Indigenous four year olds in remote communities by 2013; halve the gap in reading, writing and numeracy achievement for Indigenous children by 2018; halve the gap in Year 12 or equivalent attainment rates for Indigenous young people by 2020 and; halve the gap in employment outcomes between Indigenous and non-Indigenous Australians by 2018.

Improvements in health outcomes are clearly identified within these targets. This includes increasing the life expectancy of Aboriginal and Torres Strait Islander peoples and halving infant
mortality rates (Commonwealth of Australia 2011). However as has commonly been discussed, health is influenced by a number of determinants such as education, employment, a healthy start to life and an individual’s position on the social gradient. These factors have also been recognised in the ‘Close the Gap’ agenda and are included in the national targets. This acknowledgement confirms the philosophy of health promotion which recognises the influence of social determinants of health.

Physical inactivity has been listed as one of the key risk factors to chronic disease that account for approximately 70 per cent of the gap in health outcomes of Aboriginal and Torres Strait Islander peoples (Commonwealth of Australia 2011). This has been identified by the Australian Government and they have called for acknowledgement to be given to the complex relationship between to the key chronic disease risk factor behaviours and the determinants of health (Commonwealth of Australia 2011). This understanding will allow greater attention to be given to the prevention and management of chronic disease within the Aboriginal and Torres Strait Islander population (Commonwealth of Australia 2011). This Doctorate of Philosophy has contributed to this understanding by examining physical activity behaviour of Aboriginal and Torres Strait Islander mothers within a social determinants approach. The findings from this research have identified the key considerations that should be given to the development of physical activity interventions that intend to target this population. The next step now is to develop, implement and evaluate these interventions in an effort to increase participation of the population, which will contribute to the national targets outlined in the ‘Close the Gap’ campaign and add to the currently limited evidence base on this topic.

This Doctorate of Philosophy has provided insight into the physical activity experiences of Australian mothers, with a particular focus on the needs of Aboriginal and Torres Strait Islander mothers. The results of this research have clarified the research question and aims posed at the beginning of the thesis. Currently, this study is one of the first Australian studies that explore the physical activity needs of Aboriginal and Torres Strait Islander mothers. Future research addressing the measurement and methodological issues raised in this project is warranted, as is the development of health promotion interventions that seek to promote physical activity to this population in consideration their unique needs.

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Appendix 1: Participant questionnaire

Mum’s the word SURVEY

The following questions are designed to provide us with an overview of your circumstances. Please answer all questions to the best of your ability. There is no right or wrong answers.

Section A - About your family

A1. What is your baby’s date of birth?

<table>
<thead>
<tr>
<th>Date of birth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em><strong><strong><strong>/</strong></strong></strong></em>/________</td>
</tr>
</tbody>
</table>

A2. What type of delivery did you have?

<table>
<thead>
<tr>
<th>Natural birth</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caesar</td>
<td>☐</td>
</tr>
<tr>
<td>Other</td>
<td>☐</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>☐</td>
</tr>
</tbody>
</table>

A3. Do you have other children that you care for?

<table>
<thead>
<tr>
<th>Yes</th>
<th>☐ 1 → Go to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>☐ 2 → Go to A6</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>☐ 3</td>
</tr>
</tbody>
</table>

A4. How many children do you care for?

<table>
<thead>
<tr>
<th>Number:</th>
<th></th>
</tr>
</thead>
</table>

Page 182 of 212
A5. How old is each child?

Ages:

A6. How many people aged 18 years and over, including yourself, live in your household?

Section B - About you

B1. What is your date of birth?

Date of birth

B2. What was your country of birth?

<table>
<thead>
<tr>
<th>Country</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1</td>
</tr>
<tr>
<td>England</td>
<td>2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3</td>
</tr>
<tr>
<td>Italy</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam</td>
<td>5</td>
</tr>
<tr>
<td>Country</td>
<td>Code</td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
</tr>
<tr>
<td>Scotland</td>
<td>6</td>
</tr>
<tr>
<td>Greece</td>
<td>7</td>
</tr>
<tr>
<td>Germany</td>
<td>8</td>
</tr>
<tr>
<td>Philippines</td>
<td>9</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>11</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>12</td>
</tr>
</tbody>
</table>

**B3. What is your marital status?**

<table>
<thead>
<tr>
<th>Status</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>1</td>
</tr>
<tr>
<td>De Facto</td>
<td>2</td>
</tr>
<tr>
<td>Separated</td>
<td>3</td>
</tr>
<tr>
<td>Divorced</td>
<td>4</td>
</tr>
<tr>
<td>Widowed</td>
<td>5</td>
</tr>
<tr>
<td>Single/never married</td>
<td>6</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>7</td>
</tr>
</tbody>
</table>

**B4. Do you own or have access to a car?**

<table>
<thead>
<tr>
<th>Status</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>
**B5. How often do you have to rely on public transport to get to and from places?**

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the time</td>
<td>☐ 1</td>
</tr>
<tr>
<td>A little of the time</td>
<td>☐ 2</td>
</tr>
<tr>
<td>Some of the time</td>
<td>☐ 3</td>
</tr>
<tr>
<td>Most of the time</td>
<td>☐ 4</td>
</tr>
<tr>
<td>All of the time</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

**B7. How much do you weigh?**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilograms</td>
<td></td>
</tr>
<tr>
<td>Stones/pounds</td>
<td></td>
</tr>
<tr>
<td>Pounds</td>
<td></td>
</tr>
</tbody>
</table>

**B8. How tall are you?**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centimetres</td>
<td></td>
</tr>
<tr>
<td>Feet/inches</td>
<td></td>
</tr>
</tbody>
</table>

**Section C - Education**

**C1. What is the highest year of primary or secondary school that you have completed?**

<table>
<thead>
<tr>
<th>Year</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 12 or equivalent</td>
<td>☐ 1</td>
</tr>
<tr>
<td>Year 11 or equivalent</td>
<td>☐ 2</td>
</tr>
<tr>
<td>Year 10 or equivalent</td>
<td>☐ 3</td>
</tr>
<tr>
<td>Year 9 or equivalent</td>
<td>☐ 4</td>
</tr>
<tr>
<td>Year 8 or below</td>
<td>☐ 5</td>
</tr>
<tr>
<td>Never attended to school</td>
<td>☐ 6</td>
</tr>
</tbody>
</table>
C2. Have you completed a trade certificate, diploma, degree or any other educational qualification?

<table>
<thead>
<tr>
<th>Yes</th>
<th>□ 1 → go to C3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>□ 2 → go to C4</td>
</tr>
</tbody>
</table>

C3. What was the level of the highest qualification that you have completed?

<table>
<thead>
<tr>
<th>Qualification level</th>
<th>□ 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 12 certificate or equivalent</td>
<td>□ 2</td>
</tr>
<tr>
<td>Statement of attainment</td>
<td>□ 3</td>
</tr>
</tbody>
</table>

C4. Are you currently taking any course of study for a trade certificate, diploma, degree or any other educational qualification?

<table>
<thead>
<tr>
<th>Yes</th>
<th>□ 1 → go C5</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>□ 2 → go D1</td>
</tr>
</tbody>
</table>

C5. At what type of educational institution are you currently enrolled?

<table>
<thead>
<tr>
<th>Institution</th>
<th>□ 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary school</td>
<td>□ 1</td>
</tr>
<tr>
<td>University/other higher education</td>
<td>□ 2</td>
</tr>
<tr>
<td>TAFE/technical college</td>
<td>□ 3</td>
</tr>
<tr>
<td>Business college</td>
<td>□ 4</td>
</tr>
<tr>
<td>Industry skills centre</td>
<td>□ 5</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>□ 4</td>
</tr>
</tbody>
</table>
C6. Are you studying full-time or part-time?

| Full-time | □ 1 |
| Part-time | □ 2 |

Section D - Employment Situation

D1. Which one best describes you below?

| Employed full time | □ 1 | Currently taking maternity leave | □ 11 |
| Employed part time | □ 2 | Currently taking maternity leave | □ 12 |
| Home duties | □ 3 |
| Unemployed | □ 4 |
| Full time student | □ 5 |
| Part time student | □ 6 |
| Retired | □ 7 |
| Permanently ill/unable to work | □ 8 |
| Other (please specify) | □ 9 |
| Do not wish to answer | □ 10 |
Section E – Pensions, allowances and other forms of assistance

E1. Do you have any of the following concession cards?

<table>
<thead>
<tr>
<th>Concession Card</th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care Card</td>
<td>□1</td>
</tr>
<tr>
<td>Pensioner Concession Card</td>
<td>□2</td>
</tr>
<tr>
<td>Pensioner Concession Card – Veterans Affairs</td>
<td>□3</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>□4</td>
</tr>
</tbody>
</table>

E2. Do you currently receive any of these?

<table>
<thead>
<tr>
<th>Allowance</th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian age pension</td>
<td>□1</td>
</tr>
<tr>
<td>Newstart allowance</td>
<td>□2</td>
</tr>
<tr>
<td>Mature age allowance</td>
<td>□3</td>
</tr>
<tr>
<td>Service pension (DVA)</td>
<td>□4</td>
</tr>
<tr>
<td>Disability support pension (Centrelink)</td>
<td>□5</td>
</tr>
<tr>
<td>Wife pension</td>
<td>□6</td>
</tr>
<tr>
<td>Carer pension</td>
<td>□7</td>
</tr>
<tr>
<td>Sickness allowance/benefit</td>
<td>□8</td>
</tr>
<tr>
<td>Widow B pension</td>
<td>□9</td>
</tr>
<tr>
<td>Special benefit</td>
<td>□10</td>
</tr>
<tr>
<td>Partner allowance</td>
<td>□11</td>
</tr>
<tr>
<td>Family tax benefit</td>
<td>□12</td>
</tr>
<tr>
<td>Parenting payment</td>
<td>□13</td>
</tr>
<tr>
<td>War widow pension</td>
<td>□14</td>
</tr>
<tr>
<td>Disability pension</td>
<td>□15</td>
</tr>
<tr>
<td>Carer allowance</td>
<td>□16</td>
</tr>
<tr>
<td>Child disability allowance</td>
<td>□17</td>
</tr>
<tr>
<td>Benefit</td>
<td>Code</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Youth allowance</td>
<td>18</td>
</tr>
<tr>
<td>Austudy</td>
<td>19</td>
</tr>
<tr>
<td>Abstudy</td>
<td>20</td>
</tr>
<tr>
<td>Overseas pensions/benefits</td>
<td>21</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>22</td>
</tr>
<tr>
<td>Do not wish to answer</td>
<td>23</td>
</tr>
</tbody>
</table>
Appendix 2: Baseline and follow-up interview schedules

Baseline Interview questions

Thank you very much for agreeing to talk to me today; I really appreciate you giving me some of your time. Today I would firstly like to ask you about your experiences with physical activity before you gave birth. I would then like to chat about what you think might happen in the next 6 months.

Physical activities include things such as:

- Walking either for transport, exercise or leisure
- Housework eg. Vacuuming, mopping or washing clothes.
- Moderate Activities such as gardening, medium swimming or cycling and mowing
- Vigorous activities such as playing tennis, netball, aerobics, weights training or jogging.

These activities may be planned or unplanned. For example, planned activity may include going for a walk with a friend every second afternoon. Unplanned activities may include walking from the car park to the shopping centre.

The following questions are designed to get an idea of the way that you think and feel about physical activity. There is no right or wrong answers; I am interested in what you have to say, good or bad.

Question 1: What types of activities would class as types of physical activities?

Question 2: Do you like to participate in physical activities?

   a. If no, can you tell me why?
   b. If yes, what types of activities do you like?
      i. Has giving birth to a child affected this?

Question 3: How much physical activity did you do before you became pregnant?

   a. How do you think this will change now that you have given birth?
Question 4: How physically active are the important people in your life?

a. Do you think the important people in your life, think you should be doing physical activity?
b. Who is active in your family?
c. Who are the active women with children that you know?
d. When you were young how active were women who had children?

Question 5: In the next 6 months do you think you will participate in any physical activities?

a. What types of activity?
b. How often?
c. With whom?

Question 6: Are there any advantages in participating in physical activity in the next 6 months?

a. What are they?

Question 7: What are the main things that prevent you from participating in physical activity in the next 6 month?

a. What will help you exercise?
**Mum's the Word**

Six month follow-up interview questionnaire

**PA Questions**

1. If you remember the last time we spoke, I asked you about the physical activities you were planning to undertake in the next 6 months. It’s now been approximately 6 months, so I was wondering if you were able to tell me how you went with the following activities:

List activities that they reported back 6 months ago:

<table>
<thead>
<tr>
<th>Activity</th>
<th>With whom</th>
<th>How often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td></td>
<td></td>
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<tr>
<td>2)</td>
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<td>3)</td>
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<tr>
<td>4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Did you undertake any other type of activity?
   i) If yes, what types?
   ii) How often?
   iii) With whom?

2. The last time we spoke you identified the following things advantages for participating in physical activity?

<table>
<thead>
<tr>
<th>Advantages</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>
b) Did they provide the advantages you anticipated?
   • If yes, how did they?
   • If these factors didn’t, why didn’t they?

3. The last time we spoke you identified the following things that might prevent you from being able to undertake these activities:

<table>
<thead>
<tr>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

   a) Did they prevent you like you anticipated?
      • If yes, how did they?
      • If these factors didn’t, why didn’t they?

4. How important is it to you now that you undertake physical activity at this time of your life?
   • Why/why not?

5. Do you feel that you receive the support you need from people who are important to you?

   Yes □ → Go to 6a
   No □ → Go to 6b

   a) What types of support do people your family & friends offer?
   b) What type of support would you like to receive from your family & friends?

6. How has motherhood changed your life?

   a) What things have changed the most?
   b) What things have not changed as much?
   c) Do you feel confident to undertake daily activities given these changes?
Appendix 3: Information and consent form

Printed on Griffith University letter head

Mum’s the word PROJECT

Who is conducting the research?

<table>
<thead>
<tr>
<th>Senior Investigator</th>
<th>Student Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name(s)</strong></td>
<td><strong>Name(s)</strong></td>
</tr>
<tr>
<td>Professor Donald Stewart</td>
<td>Ms Simone Nalatu</td>
</tr>
<tr>
<td>School(s) / Centre(s)</td>
<td>School(s) / Centre(s)</td>
</tr>
<tr>
<td>Griffith University</td>
<td>Queensland Aboriginal &amp; Islander Health Council</td>
</tr>
<tr>
<td>Logan Campus</td>
<td>PO Box 698</td>
</tr>
<tr>
<td>School of Public Health</td>
<td>FORTITUDE VALLEY Q 4006</td>
</tr>
<tr>
<td>University Drive</td>
<td></td>
</tr>
<tr>
<td>MEADOWBROOKE Q 4131</td>
<td></td>
</tr>
<tr>
<td>Contact Phone</td>
<td>Contact Phone</td>
</tr>
<tr>
<td>(07) 3382 1487</td>
<td>(07) 3360 8444</td>
</tr>
<tr>
<td>Contact Email</td>
<td>Contact Email</td>
</tr>
<tr>
<td><a href="mailto:Donald.Stewart@griffith.edu.au">Donald.Stewart@griffith.edu.au</a></td>
<td><a href="mailto:simonenalatu@qaihc.com.au">simonenalatu@qaihc.com.au</a></td>
</tr>
</tbody>
</table>

Why is the research being conducted?

Despite the well-known health benefits of physical activity, a comprehensive understanding of activity levels of postnatal women remains relatively unknown, as few studies have sought to quantify physical activity patterns. The research also suggests that postnatal women require more promotion about the importance of physical activity participation. Improved promotion and participation is required for Indigenous postnatal women who have higher rates of low exercise and sedentary behaviours and are less active compared to women without children. This project is being conducted as part of Ms Nalatu’s postdoctoral studies.

What you will be asked to do?

If you agree to participate in the project you will be required to participate in two interviews. The first interview will take place now and the second interview will be conducted in 6 months time. If you agree, both interviews will be tape-recorded.
Why have you been selected?

The project is interested in obtaining the physical activity experiences of postnatal women who have recently given birth to a baby in the last two months.

The expected benefits of the research

This project will help provide an understanding of the factors that influence physical activity participation by postnatal women. It is expected that the results from this research will inform the development of future physical activity programs targeted at postnatal women.

Risks to you

We do not anticipate that there will be any risks to you during the course of the project. However if you do become uncomfortable, please advise us and we will make every attempt to help you.

Your confidentiality

All information that you provide will be kept completely confidential and will not be disclosed to a third party. Only the research officer will know the information that you provide. During the analysis and follow up period, the information will be key coded so that we can ensure that we collect all your required information. At the completion of follow up analysis, this key code will be destroyed.

Your participation is voluntary

Your participation in this study is entirely voluntary. If you do not wish to participate in this project, it will not affect your relationship or the treatment or care you receive from this health service. You will not be disadvantaged at all if you do not wish to participate. You are free to withdraw from the interview/s and/or study at any time without comment or penalty.

Questions / further information

If you have any questions or require further information at any time during the life of this project, please do not hesitate to contact Donald Stewart or Simone Nalatu via their contact details listed above.

The ethical conduct of this research

The project is conducted through Griffith University in accordance with the National Statement on Ethical Conduct in Research Involving Humans. If you have an concerns or complaints about the ethical conduct of this research please contact the Manager, Research Ethics on 3735 5585 or research-ethics@griffith.edu.au.
Feedback to you

At the end of both interviews, our discussion will be developed into a report. You will then be contacted to go through this report to ensure that the information is accurate and complete. At the completion of this project all participants will be sent a final report that will outline the overall results.

Privacy Statement

The conduct of this research involves the collection, access and / or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for other research purposes. However, your anonymity will at all times be safeguarded. For further information consult the University’s Privacy Plan at www.griffith.edu.au/ua/aa/vc/pp or telephone (07) 3735 5585.
**Mum’s the word PROJECT**

**Research Team**

<table>
<thead>
<tr>
<th>Senior Investigator</th>
<th>Student Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name(s)</strong></td>
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<td><a href="mailto:simonenalatu@qaihc.com.au">simonenalatu@qaihc.com.au</a></td>
</tr>
</tbody>
</table>

By signing below, I confirm that I have read and understood the information package and in particular have noted that:

- I understand that my involvement in this research will include two interviews, one now and one in 6 months time.
- I agree for interviews to be tape recorded
- I have had any questions answered to my satisfaction;
- I understand the risks involved;
- I understand that there will be no direct benefit to me from my participation in this research;
- I understand that my participation in this research is voluntary;
- I understand that if I have any additional questions I can contact the research team;
- I understand that I am free to withdraw at any time, without comment or penalty;
- I understand that I can contact the Manager, Research Ethics, at Griffith University Human Research Ethics Committee on 3735 5585 (or research-ethics@griffith.edu.au) if I have any concerns about the ethical conduct of the project; and
- I agree to participate in the project.

**Name**

**Signature**

**Date**
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