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Maternal psychosocial well-being in pregnancy and breastfeeding duration.

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Short title: Stress in pregnancy and breastfeeding

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We declare that we have no conflict of interest.

Contributor's list

Dr Li had primary responsibility for conceptualising the paper, conducting the analysis and writing the paper.

Dr Oddy, Dr Kendall, and Dr Downie provided substantive comments on multiple drafts of the paper, regarding the background, analysis and interpretation of the results. Dr Oddy also contributed to the editorial improvement.

Dr Henderson provided a literature research and review and useful comments on the paper.

Ms Landsborough contributed to the analysis and provided important comments on the manuscript.

Abstract

Li J, Kendall GE, Henderson S, Downie J, Landsborough L, Oddy WH. Maternal psychosocial well-being in pregnancy and breastfeeding duration.

Aim: An increased duration of breastfeeding has many advantages for the child and mother. However, little research to date has investigated the influence of maternal psychosocial well-being during pregnancy on the duration of breastfeeding. This study aimed to examine if experience of life stress events, social contact/support in pregnancy and postpartum emotional disturbance had an effect on breastfeeding duration.

Methods: Using data from the Western Australian Pregnancy Cohort Study for 2,420 women followed from 18 weeks gestation, we analysed prevalent breastfeeding for four months or longer and its association with maternal psychosocial and socio-demographic factors in pregnancy, using multivariable logistic regressions.

Results: Experience of stressful life events during pregnancy increased the odds for the early cessation of prevalent breastfeeding (OR 1.34, $P < 0.05$, 95 % CI 1.04-1.71) independent of maternal socio-demographic characteristics and biomedical factors. Stress events associated with separation or divorce, financial problems and residential moves in pregnancy were important predictors for a shorter duration of prevalent breastfeeding.

Conclusion: Experience of stressful life events during pregnancy increased the odds for the early cessation of prevalent breastfeeding. Interventions that move beyond hospital-based antenatal care to address the causes of maternal stress in pregnancy and socioeconomic disparities between women is required to increase breastfeeding duration.

Key words: stressful life events in pregnancy, breastfeeding duration, postnatal emotional disturbances, social contact and support, socio-demographic factors.

Introduction

Because breastfeeding has many advantages for the child and mother (1-3), World Health Organization (WHO) (4, 5) and many governments and professional associations recommend exclusive breastfeeding for six months and continuing breastfeeding up to two years and beyond. Yet, despite these recommendations and the dissemination of the benefits of breastfeeding for six months, less than 50% of mothers breastfeed their infants for six months or longer. Between 1995 and 2001 breastfeeding rates in Australia have remained constant (6). Although 83% of Australian women initiated breastfeeding in hospital, many stopped within the first weeks following birth: by four months 48% of mothers were partially breastfeeding, at six months only 23% and at 12 months just one percent was breastfeeding (6).

A review of studies on breastfeeding in developed countries suggested a strong and consistent association between young maternal age, low maternal education, and maternal smoking in pregnancy and non-initiation and early cessation of breastfeeding. However, the association between marital and socioeconomic status (occupation and income), biomedical factors (parity, delivery mode and infant health), and the initiation and maintenance of breastfeeding is less consistent (7). Research has also shown that pacifier use is associated with early cessation of breastfeeding (8), and that mothers who are overweight or obese are less likely to initiate and maintain breastfeeding (9, 10).

Social support from partners and family members are an important factor associated with adequate breastfeeding (11, 12). This includes emotional, instrumental, and informational support (13-16). Qualitative research shows that many women had deep-rooted negative feelings about the adequacy and sufficiency of their breast milk and a profound lack of confidence in breastfeeding as an activity (17). These feelings are an important reason for progressing to formula feeding and underscore the importance of

both social and professional support for breastfeeding at both the familial and community levels.

No research to date has investigated the effect of maternal social contact and support and experience of stressful life events during pregnancy on breastfeeding duration. Only limited research on breastfeeding has considered postnatal psychological functioning (18). Using data from the Western Australian Pregnancy Cohort Study (The Raine Study), we examined the influence of these social and psychological factors on breastfeeding duration.

Patients and Methods

Study population The Raine Study is an ongoing pregnancy cohort study in which 2,979 women were enrolled between the 16th and 20th week of gestation from the public antenatal clinic at King Edward Memorial Hospital, the principal obstetric hospital in Perth, Western Australia, and nearby antenatal clinics between 1989 and 1992. Informed consent to participate in the study was obtained from the mother of each child at enrolment and a parent at each subsequent follow-up. All follow-ups of the study were approved by the Human Ethics Committee at King Edward Memorial Hospital and Princess Margaret Hospital for Children, Perth, Western Australia.

Data Collection The questionnaire on breastfeeding was administered by the research nurse at one, two, and three years of age and collected data from the primary caregiver (usually the child's mother) on the age in months when breastfeeding was stopped and age in months at which milk other than breast milk or solids were introduced. An interview with the research nurse followed the examination to identify any missing information. In addition a diary card was maintained throughout the first year of life where mothers recorded important events that occurred in their child's life including feeding. Comprehensive data on socio-demographic and psychosocial factors were obtained at enrolment and updated during the 34th week of pregnancy, at birth,

one, two, and three years. Our study examined the association of these factors with breastfeeding duration in 2420 mothers who had answered the questionnaire on breastfeeding.

Outcome variable The study focused on one binary outcome variable, whether or not the mother stopped **prevalent** breastfeeding before four months compared to whether or not she stopped breastfeeding later. **Mothers who did not initiate breastfeeding were coded as “0” (10.7%) in the outcome variable.** **Prevalent** breastfeeding was defined as breastfeeding without the introduction of any other milk, which did not rule out the introduction of solids or other fluids (e.g., juice). Because the cohort of women was recruited from 1989 to 1992 when the WHO and Australian recommendations were for all mothers to breastfeed their infants from four to six months, the outcome variable (cessation of prevalent breastfeeding before four months) was appropriate (4, 19).

Explanatory variables The explanatory variables included social contact and support (at 18 weeks of pregnancy), stress events in pregnancy (at 18 weeks and 34 weeks of pregnancy) and postnatal emotional disturbances (three days after birth while still in hospital), with adjustment for maternal socio-demographic and biomedical characteristics (at the recruitment). Social contact and support variables included contact with family and friends, number of people a mother could talk to with ease, and whether or not she could talk about her feelings with her partner.

Life stress events at 18 and 34 weeks of pregnancy included loss of a close relative, loss of a close friend, loss of partners' job, loss of own job, problems with older children, separation and divorce, marital and relationship problems, financial problems, residential move, pregnancy and other problems. We examined life stress events in pregnancy in three different ways: 1) whether or not a mother experienced any stressful life event at 18 weeks, at 34 weeks or at both 18 and 34 weeks; 2) the number

of stress events and three or more stress events at either 18 or 34 weeks of pregnancy; 3) specific stress events at either 18 or 34 weeks.

Postpartum emotional disturbance was measured with a “baby blues” index (ranging from 0 to 16) which is a summation of 22 postnatal feelings reported in a separate questionnaire by mothers on the third day after birth and while in hospital. These 22 items used in our study were similar to that developed by Kennerley and Gath (20).

Mothers were asked if they had experienced feelings of anxiety, worry, sadness or frustration, anger, over-sensitivity, lack of confidence, apprehension, confusion, vulnerability, tiredness, irritability, happiness, wonder, excitement/elation, pride, changeable mood and crying episodes, and eating or sleeping problems. These questions were asked on a four point Likert scale: 1=very much, 2= moderate, 3=a little and 4=not at all.

Statistical methods Univariate and multivariable unconditional logistic regression models were used to analyse the association between the explanatory variables and the cessation of prevalent breastfeeding before four months. Maternal socioeconomic and demographic factors were examined and they included age, ethnicity, marital status, education and smoking in pregnancy. Biomedical factors, such as the sex of the child, delivery mode and birth complications, and maternal body mass index before pregnancy ($BMI = wt(kg)/ht(m)^2$) were also included in the statistical model. In the multivariable analysis, married mothers and those cohabiting with a partner were combined after preliminary analysis showed no difference between these groups in breastfeeding duration. For the same reason, mothers with a trade certificate, college diploma or other type of degree were combined as one group and those with university degree and professional registration were grouped together. All analyses were conducted using SPSS (Version 13)(21). The alpha level was set at .05.

Results

Breastfeeding prevalence Prevalent breastfeeding was selected as the primary outcome variable because the proportion of mothers exclusively breastfeeding (no solids or other milk) at four months (around 20.0%) was much lower compared to the former (43.0%) (**Appendix 1 in Supplementary material Online**). Over 90% of the mothers in the study breastfed for one month or longer (any breastfeeding) but the rate dropped to about 62.0% by the fourth month. Mothers who introduced other milk at four months were more likely to introduce solids at four months than those who were still breastfeeding at this age (Pearson Chi-Square $p < 0.001$).

Characteristics of the cohort There was considerable variation in the socio-demographic characteristics of the 2420 pregnant women who answered the breastfeeding questionnaire (see Table 1). Preliminary analysis showed among 11 life stress events, pregnancy problems, monetary problems, residential mobility, marital problems, and separation/divorce were common stress events experienced by the study mothers in pregnancy. Indeed, between 11.7% and 36.6% experienced stress events associated with marital or relationship problems, residential move, financial and pregnancy problems.

Univariate results Contact with family members was positively associated with the likelihood of discontinuing breastfeeding before four months (Table 2). In further analysis this mainly reflected the difference between those who had no contact with family and those who had contacted their family more than once a week (Odds Ratio [OR] 1.45, 95% Confidence Interval [CI] 1.11 – 1.89, $P=0.006$) in stopping breastfeeding before four months. The number of people a mother was able to talk to with ease significantly decreased the likelihood that breastfeeding was discontinued before four months. Experience of the 'baby blues' and life stress events at both 18 weeks and 34 weeks of pregnancy were associated with discontinuing breastfeeding before four.

Multivariable results In the multivariable model which included all psychosocial variables and adjusted for maternal socio-demographic and biomedical characteristics (Table 2), the experience of stressful events at both 18 and 34 weeks of pregnancy remained significant (OR 1.34, 95% CI 1.04 – 1.71, $P=0.02$), but the indicators of social contact and support were no longer significant predictors of breastfeeding duration. Baby blues was just approaching significance following adjustment ($P = 0.10$). **Baby blues as a continuous variable was not significant in the multivariable analysis (not shown).**

We examined the total number of stress events and the experience of three or more stress events at 18 or 34 weeks of pregnancy, but they were not significantly associated with the cessation of breastfeeding before four months in the multivariate model (results not shown). We further enquired about the common life stress events that the mothers in the study experienced in pregnancy and whether or not these events were associated with breastfeeding cessation. The analysis showed that mothers who experienced separation or divorce (OR 1.70, 95% CI 1.17 – 2.47, $P = 0.005$), marital or relationship problems (OR 1.27, 95% CI 0.99 – 1.65, $P = 0.06$), financial problems (OR 1.38, 95% CI 1.16 – 1.64, $P < 0.001$) and residential moves (OR 1.35, 95% CI 1.12 – 1.63, $P = 0.002$) in pregnancy were more likely to stop breastfeeding before four months, compared to those who did not experience such problems. Because many of the maternal socio-demographic factors were so highly correlated with and thus a surrogate measure of the experience of these stress events, the adjustment of maternal socio-demographic characteristics would defeat the purpose of examining the effect of such stress events in pregnancy on breastfeeding cessation. About 47% of mothers who were separated or divorced at recruitment experienced stress associated with separation and divorce throughout pregnancy versus only about 2% of the mothers who were married at recruitment and experienced separation or divorce later in pregnancy (Chi Square $p < 0.001$). Young mothers ($< \text{age } 20$) were more than twice as likely to move residence in pregnancy,

compared to mothers aged 30-34 and 35 and above (42%, 20.0%, 17% respectively, Chi Square $p < 0.001$).

We examined the association between all predictors and cessation of any and exclusive breastfeeding before four months. Maternal socio-demographic factors were strongly associated with any and exclusive breastfeeding. However, none of the psychosocial factors in pregnancy were significantly associated with any and exclusive breastfeeding, other than that mothers who were able to talk to partner about feelings were less likely than those who were not able to do so to stop exclusive breastfeeding before four months (OR 0.52, 95% CI 0.24-0.91, $P = 0.02$).

Discussion

Our study demonstrated that women who experienced life stress events at both 18 and 34 weeks of pregnancy were more likely than those who did not experience any stress events in pregnancy to stop breastfeeding before the infant reached four months.

Stress associated with separation/divorce, marital problem, financial problems and residential move in pregnancy increased the likelihood that mothers stopped breastfeeding at four months. Future research is required to explore the mechanisms that may underpin the link between life stress in pregnancy and breastfeeding duration. It is plausible that mothers who experienced life stress at both 18 and 34 weeks of pregnancy continued to experience such life stress events at and after birth. This could in turn affect the lactation process and milk production.

The association of social contact/support and baby blues with the cessation of breastfeeding was largely attributed to maternal socio-demographic characteristics.

We tested for possible interactions between maternal age and education with social contact/support indicators and baby blues in a multivariate model and found none to be significant.

Consistent with previous research (7, 14), our results showed that maternal age, education and smoking in pregnancy were strong predictors of the cessation of breastfeeding before four months. Unlike most previous studies which only differentiate between teen and older mothers, we found strong age gradients in breastfeeding, suggesting that not only teenage mothers but also relatively young mothers under 30 years of age should be targeted for the promotion of adequate breastfeeding. The univariate positive association between frequent contact with the family and breastfeeding cessation before four months requires explanation. Frequent contact with family unlike contact with friends, may be indicative of problems and a need for but lack of social support. **This suggests that contact with family may not be an ideal indicator of social support.**

Our measure of postnatal emotional disturbance was informative but has some limitations. First, it did not capture mothers who left hospital before the questionnaire was administered. **Further analysis showed that these mothers were significantly more likely than mothers who did not have any baby blues to stop breastfeeding before four months (OR 1.50, 95% CI 1.15 – 1.96, P=0.003).** In many of these mothers breastfeeding might not have been established at the time of leaving hospital. Second, this measure may not adequately reflect postnatal emotional functioning beyond the hospital stay: the emotional disturbance may increase or decrease post hospital stay, depending on the level of support at home and the biomedical characteristics of the mother. **Our further analysis showed that young mothers and mothers with lower education were much more likely to be missing in the baby blues questionnaire (Pearson Chi-Square P =0.002), but there was no association between missing and social contact and support indicators or experience of life stress events in pregnancy. Consistently, the multivariate results with or without the missing cases for baby blues (a dummy indicator) included in the model did not differ significantly.**

Most of our data on breastfeeding were collected retrospectively when the infant was one year of age: 80% of the mothers were no longer breastfeeding at 12 months, only 17.1% were still breastfeeding at 24 months and less than 2.9% were still breastfeeding between 24 months and 36 months. Research has shown that maternal recall is a valid and reliable estimate of breastfeeding initiation and duration, especially when the recall is at three years or less (22). Hence our breastfeeding data are of adequate quality. Our analysis was based on a reduced number of women recruited for the Raine Study due to missing cases in both breastfeeding duration and some of the explanatory variables (eg, smoking in pregnancy, stressful events in pregnancy and baby blues). There was a large overlap of missing cases among these variables themselves. Hence we still had a sufficiently large number of valid cases for the multivariate analysis (N=1909) which excluded missing cases in all variables included.

The Raine Study over-represented socially disadvantaged women (e.g., mothers of younger ages and with low education (Appendix 2 in Supplementary Material Online). The same disadvantaged mothers were also over-represented in the missing cases. The omission of these missing cases from analysis attenuated this over representation and in turn made the data for the multivariate analysis more representative of the general Western Australia population.

Our data showed that a considerable proportion of women experienced stress related to financial problems (34%) and residential mobility (25%) in pregnancy. In Western Australian Child Health Survey, about 37% of mothers of children aged 4 to 16 reported financial problems as a main life-stress event in last 12 months but only 9% of mothers experienced life stress related to residential mobility (23).

Our study demonstrates that sustained life stress in pregnancy accelerates the cessation of breastfeeding before four months. Interventions must begin prior to birth and continue throughout the antenatal and postnatal period. We recommend interventions that target the distal social factors, such as income support, workplace and maternity leave, and the provision of housing for disadvantaged women and families during pregnancy, because these factors are primary causes of much life stress. **Such interventions are likely to have effects well beyond an increase in breastfeeding duration. Since teenage and young mothers (age <20 and ages 20-24) are at a much higher risk than others for discontinuing breastfeeding before four months as our study has shown, we recommend interventions aimed at reducing pregnancies in adolescents and young women and stronger support for young women with life stress in pregnancy.**

In addition, we suggest that midwife-led antenatal care be available as a domiciliary service to target women who do not attend antenatal clinics. General practitioners are well placed to direct their patients to this service. Regular contact with a domiciliary midwife would have numerous advantages, not just for the provision of obstetric care, but also as a support structure for women who are exposed to high levels of life stress in pregnancy and lack support from other sources.

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