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**THE RELATIONSHIP BETWEEN VULNERABILITY FACTORS
AND BREASTFEEDING OUTCOME**

By

Sandra Dunn

Thesis submitted to the School of Graduate Studies and Research
in partial fulfilment of the requirements for the
Degree of Master of Science in Nursing

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Abstract

Objectives: To determine whether vulnerability factors (confidence with breastfeeding, postpartum depression, supplementation and perceived adequacy of support) explain breastfeeding outcome at six weeks postpartum after controlling for age and education. To describe the use of breastfeeding resources by women with vulnerability factors.

Design: Cross-sectional telephone survey at six weeks postpartum.

Setting: Ottawa-Carleton, Ontario, Canada.

Participants: A proportionate, consecutive sample of breastfeeding women from each of four hospitals in the region was conducted (n=526/554, 95% response rate).

Methods: Secondary analyses of data, using stratified bivariate analyses to examine the relationship between each factor and breastfeeding outcome. Multivariate logistic regression analyses examined relationships between all factors and breastfeeding outcome. Missing data was 7.0%.

Results: For breastfeeding mothers (n = 526), while confidence, postpartum depression and supplementation were significantly related to breastfeeding in the bivariate analyses, only confidence with breastfeeding (OR: 1.85, 95% CI: 1.50, 2.27, $p < 0.001$) and postpartum depression (OR: 0.28, 95% CI: 0.11, 0.71, $p = 0.007$) were independently related to breastfeeding in the logistic regression analyses. Approximately half of the women (n = 262, 49.8%) did not access any community resources.

Conclusions: Assessment of maternal confidence with breastfeeding and postpartum depression need to be conducted. Intervention strategies to address these vulnerability factors need to be evaluated. Supplementation policies of infants in hospital need review. A cost-effectiveness analysis of the use of community resources is recommended.

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CHAPTER ONE

Introduction

In this chapter, the problem of early weaning from breastfeeding as a health care concern is introduced. The factors associated with early weaning are presented and the concept of vulnerability is introduced. The purpose and rationale for the study are presented.

Breastfeeding is considered by many to be the “gold standard” for infant feeding for the first year of life. Current national and international infant feeding guidelines recommend exclusive breastfeeding for at least six months (INFACT Canada, 2001; World Health Organization, 2001). In Canada, data from both the National Population Health Survey (NPHS) (Statistics Canada, 1994) and the National Longitudinal Survey on Children and Youth (NLSCY) (Statistics Canada and Human Resources Development Canada, 1995) indicated national breastfeeding initiation rates of 73%, with lower rates in the Atlantic Provinces (53%) than in British Columbia (87%). In a survey of breastfeeding women in Ottawa in 1999, 88% of women initiated breastfeeding at birth, 60% of women were still breastfeeding at three months, and less than 40% of women continued to breastfeed to six months (Ottawa-Carleton Health Department, 1999). However, seven to ten percent of women stop breastfeeding within the first two weeks postpartum (Ottawa-Carleton Health Department, 2000). The goal of the Ontario Ministry of Health is to increase the breastfeeding rate at six months to 50% by 2010.

Early weaning is a health care issue because of the many important benefits breastfeeding provides to infants, women, families and society. Human milk provides all the fluids and nutrients required for optimal growth of infants (Heinig, Nommsen, Pearson, & et.al., 1993). A recent meta-analysis of the effects of breastfeeding found that

infants who were exclusively breastfed for six months experienced less morbidity from gastrointestinal infection than those who were breastfed for three or four months. No deficits were demonstrated in growth among infants from either developing or developed countries who were exclusively breastfed for six months or longer (Kramer & Kakuma, 2002).

Breastfeeding also protects infants against middle ear, urinary tract and upper respiratory infections (Aniansson et al., 1994) and this protective effect increases with the duration and exclusivity of breastfeeding (Beaudry, Dufour, & Marcoux, 1995; Canadian Pediatric Society, Dieticians of Canada, & Health Canada, 1998; Wilson et al., 1998). Breastfeeding may also protect against Sudden Infant Death Syndrome (Canadian Pediatric Society et al., 1998) and exclusive breastfeeding for at least four months has been reported to have a protective effect against developing allergies for infants in families with a history of allergy (Canadian Pediatric Society et al., 1998; Chandra, 1997; Saarinen & Kajosaari, 1995).

The benefits of breastfeeding for women include increased uterine contractions and decreased maternal blood loss (Chua, Arulkumaran, Lim, Selamat, & Ratham, 1994), decreased probability of ovarian and pre-menopausal breast cancer (Newcomb et al., 1994), delayed postpartum ovulation and birth spacing (Kennedy & Visness, 1992; Labbok & Colie, 1992), a lower incidence of osteoporosis and hip fracture after menopause (Cumming & Klineberg, 1993; Melton et al., 1993), and reduced incidence of pregnancy-induced long-term obesity (Heinig & Dewey, 1997). As well, women who breastfeed may experience increased feelings of relaxation, increased attachment to their

infant (Carter & Altemus, 1997), and feel empowered by the experience (Milligan, Pugh, Bronner, Spatz, & Brown, 2000).

Breastfeeding also impacts on families and societies. Infants who are breastfed have less illness, and require fewer visits to doctors and hospitals (Ball & Wright, 1999). Breastfeeding saves money for families and society, being considerably less expensive than formula feeding (Ball et al., 1999; Montgomery & Splett, 1997). It also results in less environmental waste. Thus, reducing the rate of early weaning in the population has the potential to impact on the health and well being of infants, women, families and society.

Early Weaning

Early weaning is defined as cessation of breastfeeding prior to the recommended six months (Health Canada, 1999). Early weaning has been investigated in terms of the characteristics and the social environment of women and a number of factors have been found to be associated with early weaning of newborns. The following examples describe selected findings reported in the literature.

Data from the NLSCY (1995), and the NPHS (1994) indicated the following demographic factors are associated with breastfeeding duration. An infant was more likely to have been weaned if the mother was less than 25 years of age, lived in a lone-parent family, had low or lower middle family income or had a high school education or less (Statistics Canada and Human Resources Development Canada, 1995). Women living in eastern Canada (Ontario, Quebec and Atlantic Provinces) weaned earlier than women living further west. NPHS data suggested that women who weaned early were more likely to be immigrants (Health Canada, 1999). The demographic factor most

consistently related to early weaning, in the United States and Canada, is an education level of high school or less (Buxton et al., 1991; Health Canada, 1999).

Other factors, reported in the literature, to be associated with early weaning are lack of support (Gill, 2001; Sikorski, Renfrew, Pindoria, & Wade, 2002) inconsistency of information (Ellis & Hewat, 1984; Vogel & Mitchell, 1998), lack of confidence (Blyth et al., 2002), inaccurate expectations around breastfeeding, decreased mother-infant contact, incorrect position and latch, and lack of continuity of care (Enkin et al., 2000; Logsdon, 2000; Riordan & Auerbach, 1999). As well, hospital practices such as analgesia, separation, soothers and routine feeding schedules (Enkin et al., 2000; Riordan et al., 1999) and use of supplemental formula feeding in the early postpartum period (Health Canada, 1999; Schwartz et al., 2002; Sheehan et al., 1999) have been reported to be predictive of early cessation of breastfeeding. Forty-one percent of women, who weaned early, described insufficient milk supply as the primary reason for weaning before five weeks postpartum (NLSCY data) (Health Canada, 1999). Smoking and smoking relapse in the postpartum period have also been associated with early weaning (Amir & Donath, 2002; Horta, Kramer, & Platt, 2001; Ratner, Johnson, & Bottorff, 1999). In addition, maternal history of abuse and postpartum depression have been associated with shorter breastfeeding duration (Acheson, 1995; Health Canada, 1999). In one study, women who weaned prematurely reported living in a situation of high chronic stress, had low to very low self-esteem and a low sense of mastery, and had experienced a recent major life event resulting in high mental health distress (Cooper, Murray, & Stein, 1993).

Statement of the Problem

As described in the previous section, a number of factors have been reported to impact on a woman's breastfeeding experience and duration. What makes a woman susceptible to these factors and vulnerable to early weaning? Why do some women, despite facing many challenges (i.e. separation, supplementation, infant illness) succeed in establishing breastfeeding, while other women wean within the first week or two postpartum after only a brief attempt to establish breastfeeding? How can factors that are not modifiable, such as young age or a low education level, be overcome? Do women with non-modifiable factors access the available support systems?

The theoretical framework of vulnerability will be used to explore the issues around breastfeeding duration. Although this model has not been studied in the context of breastfeeding situations before, the concept of vulnerability has been studied with a number of different populations including perinatal clients (Lessick, Woodring, Naber, & Halstead, 1992; MacMullen, Dulski, & Pappalardo, 1992; Phillips, 1992; Rogers, 1997). This model was chosen because it provided an opportunity to explore early weaning from a multi-dimensional perspective and to view each woman as an individual with her own set of personal resources and environmental supports. Although the vulnerability model was not originally developed to study breastfeeding issues, it does provide a framework for critical appraisal of the literature around breastfeeding duration, and a way to explore how women cope with different life situations. This study is not testing the validity of the vulnerability model, but rather using it as a framework to explore breastfeeding issues and research findings.

According to Phillips (1992), to be vulnerable means to be susceptible to health problems, harm or neglect. A person's degree of vulnerability is dependent on the interplay between their personal resources and environmental supports (Phillips, 1992). Lessick et al. (1992) suggest that each person has a threshold of vulnerability unique to them and that if the level of vulnerability remains below the threshold level, the person is able to adapt. However, when the threshold of vulnerability is exceeded, the person is less likely able to adapt (Lessick et al., 1992).

In the context of a breastfeeding situation, supplementation, separation of mother and baby, infrequent feeding, and lack of confidence or support are factors that have been reported to affect breastfeeding duration. A woman's degree of vulnerability or susceptibility to these factors would be determined by the interplay between her personal resources (i.e. previous experience, knowledge and confidence with breastfeeding) and environmental supports (i.e. family and professional support and adequate education, income).

Some women and infants establish breastfeeding with little difficulty, while for others the breastfeeding experience is a challenge. Each mother and infant's experience is unique (Riordan et al., 1999). The decision to stop breastfeeding is often a struggle and is made while dealing with frustration, fatigue, physical problems in mother or infant, fear that the infant is not getting enough to eat, and repeated attempts to find solutions to the problems being experienced (Mozingo, Davis, Droppleman, & Merideth, 2000). Sometimes, the mother may discontinue breastfeeding without ever having been seen by anyone who might have provided the support she needs.

Purpose and Research Question

The purpose of this study is to focus on four selected modifiable vulnerability factors for breastfeeding women (confidence with breastfeeding, postpartum depression, supplementation, and perceived adequacy of support) and determine their relationships to breastfeeding outcome. These factors were selected because research evidence supports a link to breastfeeding outcome and examining the relationships between these modifiable factors could identify segments of the population that would benefit from development of specific interventions. As well, (population-based) data from the Family Centered Maternity Care (FCMC) Study provided information about these variables and was available for secondary analysis.

The review of the literature about these modifiable variables identified a number of studies where a significant relationship between these factors and breastfeeding outcome exists. The combined effect of these variables on level of vulnerability and breastfeeding outcome has not been tested. Therefore, the purpose of this study is to explore the relationships between these factors and breastfeeding outcome and determine predictors of early weaning. The research questions are:

1. After controlling for education and age, do vulnerability factors (maternal confidence with breastfeeding, perceived adequacy of family and professional support, supplementation, and postpartum depression) explain breastfeeding outcome at six weeks postpartum?
2. What percent of women with the selected vulnerability factors access available resources in the community?

In summary, despite national and international recommendations for exclusive breastfeeding to six months, well established benefits to infants, women, families and society (Kramer et al., 2002; Statistics Canada and Human Resources Development Canada, 1995; UNICEF, 1998; UNICEF, 1998) and high initiation rates, over half of all women who initiate breastfeeding wean before six months. Breastfeeding duration is influenced by many factors, some modifiable and some not. Due to the complexity of the problem, clinical practice guidelines, which summarize the evidence and provide recommendations for best practice, have been developed by many organizations (International Lactation Consultant Association, 1999; Janke, Creehan, Ellerbee, Johnson, & Snelgrove-Clarke, 2000; World Health Organization, 1998). Clinical practice guidelines aim to increase the knowledge and skills of the health care providers who support women, in order to assist the provider and client in applying evidence-based care.

Within the communities in Southeastern Ontario, certain populations of women may be more likely to discontinue breastfeeding early. However, knowledge about the vulnerability of breastfeeding women is lacking. The information obtained from this research will specifically aid health care providers in planning interventions and setting priorities for care, and provide decision-makers with information that will help establish health care services for this population.

The next chapter will focus on the conceptual framework of vulnerability as it has been reported in the literature. Following that, the findings from the literature review on postpartum depression, maternal confidence with breastfeeding, supplementation, and perceived adequacy of support, will be presented. Only the variables directly related to the thesis analyses have been included in the literature review. These variables were

selected for review because they have been reported by others to be related to breastfeeding outcome, they are modifiable, they represent both sides of the vulnerability model (personal resources and environmental supports) and data is available from the FCMC Study. Other variables that have reported to be related to breastfeeding outcome (i.e. smoking, or abuse) are beyond the scope of this thesis and have not been included in the literature review.

CHAPTER TWO

Conceptual Framework and Literature Review

This chapter includes the conceptual framework of vulnerability and the literature review of the four vulnerability factors under study. The empirical findings of the vulnerability factors that contribute to early weaning are discussed.

Introduction

The literature review has been organized into five sections: conceptual framework of vulnerability, maternal confidence with breastfeeding, postpartum depression, supplementation, and perceived adequacy of support. Each section includes a description of the elements involved, a review of the literature within the context of the breastfeeding situation and a summary of the state of knowledge. The conceptual framework, vulnerability, will be discussed first.

Conceptual Framework: Vulnerability

The Vulnerability Model proposed by Rogers (1997) (Appendix A – Figure 1A) was selected as the theoretical framework for this study. An adaptation of this model (Figure 1) was developed to illustrate factors in the context of the breastfeeding situation. The rationale for this choice is listed below.

1. The model is multi-dimensional and includes environmental and personal elements that have been found to impact on breastfeeding.
2. The model is congruent with a stress-coping-adaptation model understood by nurses and by lay people.
3. The model has been used in other fields to examine complex problems, generate strategies for client support, and evaluate cost of health care programs (Browne et al., 2001; Rogers, 1997).

Therefore, this model provides a logical and comprehensive framework around which to build the research design, examine and organize the literature of previous work around breastfeeding duration, and answer the questions in this study.

The vulnerability model has not been studied in the context of breastfeeding situations before. Vulnerable populations that have been studied are the poor, homeless, disabled, chronically ill, adolescents, frail elderly, immigrants, refugees and the mentally ill (Aday, 1993; Gitterman, 1991; Lessick et al., 1992; Saunders & Valente, 1992). A number of authors have explored the concept of vulnerability within the perinatal context with pregnant adolescents (Rich, 1992), antepartum clients (MacMullen et al., 1992; Phillips, 1992) and perinatal and neonatal nursing (Lessick et al., 1992). This model is really a stress/coping model with a focus on vulnerability. Although the model does describe aspects of the individual and the environment, and illustrates the interaction between both concepts, it does not quantify the concepts. It was chosen because it provided an opportunity to explore early weaning from a multi-dimensional perspective and to view each woman as an individual.

Roger's vulnerability model and definitions of terms for the model can be found in Appendix A (Figure A1 and Table A2). A description of the basic concepts of the model is provided next. The Model of Vulnerability (Appendix A – Figure A1) is depicted as an equilateral triangle with each side representing one of the main concepts in the model: *personal resources*, *environmental supports* and *vulnerability*. The triangle demonstrates the interaction of the three variables. The degree of vulnerability is the net result of an *interaction* between *personal resources* and *environmental supports* (Browne et al., 2001). The base of the triangle is the *continuum of vulnerability* while each side of

the triangle represents the other two inter-related variables. Theoretically it should be possible to calculate an individual's degree of vulnerability along the vulnerability continuum (base of the triangle) by using the concepts in the model as follows: 1) locate a person's level of environmental supports on the left side of the triangle and draw a straight line to the opposite apex, and 2) locate a person's personal resources on the right side of the triangle and draw a straight line to the opposite apex. A line would be dropped from the point where these two lines intersect to the base of the triangle to intersect with the vulnerability continuum. This represents an outcome of the interaction of personal resources and environmental supports (Rogers, 1997). However, this is not a mathematical model and as a result vulnerability cannot be quantified.

This model represents the interplay of factors that have been found to influence the health and well being of individuals. According to Rogers, examples of *personal resources* are inborn characteristics (temperament, age, gender, race), acquired characteristics (previous life experiences and learned abilities), and individual coping abilities. The *environmental supports* are factors such as those in the immediate environment (physical features of the home), the broader environment (employment, income, education, access to services), and the level of social supports (emotional, instrumental, informational and appraisal). The numbers of stressors/strengths in a person's life therefore determines the level of *vulnerability* the person experiences and is represented as a continuum (base of the triangle).

An adaptation of the vulnerability model, using the factors (for breastfeeding women) being examined in this study, is found in Figure 1. The breastfeeding mother's *personal resources* are factors such as age, absence of postpartum depression, and

confidence with breastfeeding. Her *environmental supports* are factors such as education, access to services, her level of social support, and non-supplementation with formula in hospital. Thus, the model proposes that the breastfeeding mother facing challenging life situations, who has the fewest personal resources and environmental supports is living in a very stressful situation and is highly vulnerable for early weaning. As she develops more personal resources, or moves into a more supportive environment, her degree of vulnerability would decrease, as would the likelihood of early cessation of breastfeeding.

A number of factors are recognized to be determinants of vulnerability. These are age, gender, and race and ethnic origins. Infants, children and adolescents are vulnerable because they are usually totally dependent on others for their care, and are often unable to speak up for their own needs (Gitterman & Shulman, 1994; Rogers, 1997). Inadequacy of social support is one of the most potent indicators of vulnerability (Gitterman, 1991). Level of education and income also affect vulnerability. People who have less education are less likely to access the health care system or practice preventive health (Gitterman, 1991). Women with a lower level of education are less likely to obtain prenatal care and, therefore, are more vulnerable to ill health for themselves and their infants (Rogers, 1997; Smyke, 1993). Having a combination of factors (e.g. single mother, no job, and low education) will increase the level of vulnerability experienced by an individual (Rogers, 1997).

A number of factors that determine vulnerability, such as age, gender and ethnic status, are not modifiable. However, the potent indicators for vulnerability, such as poverty, low level of formal education and level of social support, are potentially

modifiable over time. Altering the modifiable factors could improve health by decreasing an individual's level of vulnerability (Rogers, 1997).

Figure 1: Adapted Model of Vulnerability Applied to Breastfeeding

* Note: This adaptation of Roger's Vulnerability Model includes variables under study in this secondary analysis as applied to a breastfeeding situation.

Individuals have their own *threshold of vulnerability*' (Lessick et al., 1992). A woman is able to adapt if her level of vulnerability or susceptibility remains below her threshold level. However, when the threshold of vulnerability is reached she will not be able to cope and may become ill. This can be translated into the breastfeeding context by saying that, if the mother's threshold of vulnerability is not breached she will be able to cope with her situation and breastfeeding will continue beyond six weeks. However, when the threshold of vulnerability is exceeded, the mother is likely to wean her infant early.

Individuals who are undergoing major changes, transitions or stresses in their lives are also more vulnerable for ill health (Phillips, 1992; Rogers, 1997) such as during adolescence and pregnancy and birth (Rich, 1992; Rose & Killien, 1983). When determining level of vulnerability, it becomes obvious that both personal and environmental factors need to be assessed (Rogers, 1997). The nurse may be able to identify strengths and available resources to assist in coping, thereby reducing a client's level of vulnerability. A balance between the needs of the person, personal resources and environmental supports is important (Gitterman et al., 1994; Rose et al., 1983). Nurses can help develop strategies to promote 'fit' by altering characteristics of the individual and/or of the environment (Rogers, 1997).

Vulnerability is the net result of the interaction between personal resources and environmental supports. Personal resources and environmental supports are both determinants of health (Browne et al., 2001), and therefore may influence an individual's need to access health services (Browne et al., 2001). Even if an individual's personal resources remain constant, when the situation changes (e.g. breastfeeding a newborn),

variations in their environmental supports can alter their degree of vulnerability and therefore their need for or use of services (Browne et al., 2001). How does vulnerability impact on health and well-being? "The psychological effects of vulnerability include feelings of: helplessness, desperation, anger, uncertainty, weakness, loss of control, embarrassment, powerlessness, isolation, anxiety/worry, changed effect, lowered self-esteem, loss of self-worth, inability to express feelings, challenge to transcend, inability to concentrate, emotionally labile" (Rogers, 1997, pg.69). To be highly vulnerable is similar to being highly stressed. Stress has a direct physiological effect that can impact on milk production and therefore can impact on the initiation and successful establishment of breastfeeding in the early postpartum period. Since a new mother who is trying to establish adequate milk production and breastfeeding is coping with new stressors in her life, it is understandable that these factors can impact on her situation. The study of the relationship between vulnerability and breastfeeding outcome is important to help to understand the multidimensional nature of breastfeeding duration.

Literature Review of Vulnerability Factors Under Study

A review of the literature was completed for information about breastfeeding duration and the selected vulnerability factors under study (maternal confidence with breastfeeding, postpartum depression, supplementation, perceived adequacy of family and professional support). The following computerized databases were searched: CINAHL; Cochrane Database of Systematic Reviews; Dissertation Abstracts; Medline; PsychINFO. Articles from indexed journals reporting research results relevant to the four study variables and published after 1990 (except for classic findings published earlier) were selected for review.

Articles were also searched for in personal files, through consultation with experts in this area, and from citations in existing literature. The search terms used were breastfeeding duration, age, education, confidence, postpartum depression, Edinburgh Postpartum Depression Scale, supplementation, family support and professional support, and perceived adequacy of support. Main findings from the research literature are presented here. A summary of the key findings is presented first followed by a more detailed description of the research.

Maternal Confidence with Breastfeeding

Lack of maternal confidence with breastfeeding is a commonly cited factor associated with discontinuation of breastfeeding within the first six weeks (Blyth et al., 2002; Buxton et al., 1991; Dennis, 1999; Hill & Humenick, 1996; O'Campo, Faden, Gielen, & Wang, 1992; Papinzak & Turner, 2000). Lack of confidence with breastfeeding has been associated with a delay in the onset of milk production, and women with low level of confidence with breastfeeding are more likely to perceive their milk supply to be inadequate (Hill et al., 1996; Segura-Millan, Dewey, & Perez-Escamilla, 1994). Attitude, confidence and feelings of control may contribute to a woman's intention to breastfeed (Kessler, Gielen, Diener-West, & Paige, 1995; Wambach, 1997) and women who intend to breastfeed are more likely to do so (Caulfield et al., 1998; Kessler et al., 1995). A literature search for research about maternal confidence with breastfeeding and weaning revealed one randomised controlled trial, seven longitudinal studies and one cross-sectional survey.

Caulfield et al. (1998) randomly assigned 242 women in Maryland, prenatally to a no intervention (control) or one of three interventions designed to support breastfeeding

(video, peer counselling, video plus peer counselling). Women were followed for seven to ten days. Women intending to breastfeed at enrolment as well as at 34 weeks gestation were significantly more likely to continue breastfeeding to seven to ten days postpartum (OR: 12.57, 95% CI: 5.43, 29.14) than other women. Among women initiating breastfeeding, those who reported their first breastfeeding experience in a negative fashion or who expressed a negative reaction to breastfeeding were significantly less likely to be breastfeeding at seven to ten days. The treatment effects on breastfeeding duration were evident, but weak, and gone by seven to ten days postpartum. The limitations to this study were related to the fact that only one clinic per intervention was used and there were high rates of loss to follow-up (88 eligible women refused to participate beyond the first contact) resulting in a loss of power to detect differences in breastfeeding practices across clinics.

Five studies used specific measurement tools to quantify 'confidence with breastfeeding'. A prospective, longitudinal survey was conducted with 300 Australian women in the last trimester of pregnancy (90.6% response rate). Telephone interviews were also conducted at one week and four months postpartum. The Breastfeeding Self-Efficacy Scale was used to measure mother's confidence with breastfeeding. Mothers with high breastfeeding self-efficacy were significantly more likely to be breastfeeding exclusively at one week ($p < 0.001$) and four months postpartum ($p < 0.001$) (Blyth et al., 2002).

Maternal confidence and commitment to breastfeeding has also been measured using a 10-item subscale (Maternal Confidence/Commitment Breastfeeding - internal consistency - alphas 0.75 and 0.98), which is a part of the Hill and Humenick Lactation

Scale (Hill et al., 1996). A convenience sample of 230 women (110 mothers of low birth weight infants and 120 mothers of infants of healthy term infants) in Illinois and Iowa who planned to breastfeed and were actively breastfeeding or pumping to maintain a milk supply completed a questionnaire at one-week postpartum and sequential surveys either by telephone interview or during a home visit up to 20 weeks postpartum. Lower levels of confidence were significantly correlated with decreased breastfeeding at six weeks postpartum ($r = 0.66$).

Dennis and Faux (1999) developed and tested an instrument to measure breastfeeding self-efficacy. They interviewed a convenience sample of 130-breastfeeding women in-hospital and by phone at six weeks postpartum. Reported maternal confidence with breastfeeding, as measured with the Breastfeeding Self-Efficacy Scale, was significantly related to breastfeeding behaviour at six weeks postpartum ($p \leq 0.001$) (Dennis & Faux, 1999).

In a longitudinal study, a representative, random sample, of 491 pregnant women participated in a telephone survey prenatally and at six to eight months postpartum (O'Campo et al., 1992). The follow-up rate at the second interview was 82% ($n = 401$). Maternal confidence with breastfeeding was measured using the Maternal Confidence Survey and was significantly associated with breastfeeding duration. Women who reported low confidence were three times more likely to discontinue breastfeeding than women who were very confident with breastfeeding (Relative Risk (RR): 3.1, 95% CI: 1.39, 6.76). There was no information about the psychometric properties of the measures of confidence reported by the authors.

In contrast, a prospective, descriptive study was completed with 74 of 83 eligible first time mothers (participation rate 89%) who intended to breastfeed. Telephone interviews were completed prenatally, at six weeks, three months and six months postpartum. Breastfeeding knowledge was positively correlated with breastfeeding confidence ($r = 0.262$; $p = 0.025$). Maternal confidence with breastfeeding was measured using the Maternal Confidence Survey (O'Campo et al., 1992). The reliability coefficient (K-R 20) for this tool was 0.73 and the researchers reported a trend towards longer duration of breastfeeding in those women who had higher breastfeeding confidence scores ($r = 0.218$; $p = 0.063$). The authors suggested that the lack of statistical significance might be related to the choice of the instrument used to measure maternal confidence with breastfeeding. Limitations of this study included timing of the assessment of confidence, which occurred during the prenatal interview, and the small sample size (Chezem, Friesen, & Boettcher, 2003).

In Mexico 165 women (98% response rate) were interviewed at one week, two months and four months postpartum to identify factors associated with perceived insufficient milk intake. The overall attrition rate was 10% at the end of the study. Women with lower maternal confidence scores were less likely to be breastfeeding at six weeks postpartum ($p < 0.05$) (Segura-Millan et al., 1994). The psychometric properties of the measures of confidence were not described.

In a study in Australia, 159 women were recruited from a group of 210 possible participants (response rate 75.5%). The women were interviewed using three questionnaires (prior to hospital discharge, three months postpartum, and six months postpartum). Longer breastfeeding duration was significantly associated with higher

levels of breastfeeding self-confidence ($p = 0.003$), lower levels of anxiety ($p = 0.017$), lower depression score ($p = 0.039$), increased self-esteem ($p < 0.001$), increased coping capacity ($p = 0.039$), and stronger social health score ($p = 0.025$). Again, the psychometric properties of the measures of confidence were not described (Papinzak et al., 2000).

Buxton et al. (1991) interviewed 187 women in Baltimore City to examine the combined ability of selected prenatal and postpartum variables to predict failure to breastfeed for more than seven days among women who had intended to breastfeed. Logistic regression analysis was used and they found that 27% of women with low confidence during pregnancy discontinued breastfeeding in the first postpartum week compared to only 5% of women who reported being very confident ($p < 0.001$). The limitations of this study included the fact that determination of 'failure to breastfeed' was set at one week, the sample included small numbers of women with high school education and small numbers of women who breastfed for less than one week. As well, there was no discussion of the psychometric properties of the measures of confidence (Buxton et al., 1991).

In summary, studies to date consistently suggest that confidence plays a role in breastfeeding duration, confidence and feelings of control may contribute to a woman's intention to breastfeed and that women who intend to breastfeed are more likely to do so. Only one randomised controlled trial was found. All studies related to the role of confidence on breastfeeding duration have used completion of surveys and questionnaires for data collection. Three studies provided little or no data on the psychometric measures of confidence. Most of the studies used convenience sampling and phone contact with

participants and therefore limit the generalizability of the findings to women with phones. Therefore, confidence with breastfeeding is an important factor to include in studies about breastfeeding duration.

Postpartum Depression

Depression occurs frequently during the postpartum period and includes a spectrum of mood disorders including the “baby blues”, postpartum depression, and postpartum psychosis (ACOG, 2002). The “baby blues” are the most common mood disorder experienced by 75% to 85% of women (ACOG, 2002), while postpartum psychosis affects less than 1% of women (Dennis & Kavanagh, 2002b; Evins & Theofrastous, 1997). In national surveys in Canada, women with depression were more likely to wean before 3 months than women who were not depressed (Health Canada, 1999; Statistics Canada and Human Resources Development Canada, 1995).

A meta-analysis of 58 studies reported the incidence of postpartum depression to be approximately 13% (O'Hara & Swain, 1996) ranging from 8% to 15% of all women (Gabbe, Niebyl, & Simpson, 1996; Hendrick, 2000). The relationship between postpartum depression and breastfeeding outcome was not assessed. Postpartum depression most commonly occurs within the first three months postpartum (Cox, Murray, & Chapman, 1993) and may occur any time after delivery, but most frequently begins 2-3 weeks postpartum (Morris-Rush & Bernstein, 2002). The prevalence of depression in postnatal women has been found to be similar to that in the general population of women. However, there is an increased risk of depression after delivery suggesting childbirth and the psychosocial sequelae may be important causal factors (Cox et al., 1993).

The Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987) is known to be a valid and reliable screening tool for postnatal depression by health care professionals. The cut-off score, indicating risk of major postpartum depression is 12 and above (Cox et al., 1993; Cox et al., 1987; Holden, 1991).

In a recent national survey of women's childbearing experiences in the United States (Declerq, Sakala, Corry, Applebaum, & Risher, 2002), 136 women were interviewed by phone and 1,447 women completed an online version of the survey. Almost 20% of mothers experienced some degree of depression in the week preceding the survey, on the basis of the EPDS. Women who had given birth up to 24 months before taking the survey were almost as likely to score as "probably having been depressed" (20%) as those who had given birth within six months of taking the survey (23%). This may indicate that postpartum depression is as common in the early postpartum period as later, and women may go undetected, undiagnosed, and untreated. Or, this may indicate that depression at 24 months postpartum is a separate entity than postpartum depression.

A review of the research on postpartum depression and breastfeeding outcome revealed three longitudinal studies. A summary of the major findings is presented first followed by a more detailed description of each study.

Longer breastfeeding duration has been associated with lower levels of anxiety and depressed mood (Papinzak et al., 2000) and with a decrease in negative mood (Mezzacappa & Katkin, 2002). The best predictors of a score of greater than or equal to 12 on the EPDS included: lack of confidant support, (social relationships in which participants can share thoughts, experiences, and ideas) and a self-identified unmet need

for care for an emotional/mental health problem (Watt, Sword, Krueger, & Sheehan, 2000).

Papinzak and Turner (2000) surveyed 159 women (75.5% response rate) in Australia prior to discharge, at 3 months and 6 months postpartum to determine the degree to which personal and social factors were associated with the length of breastfeeding experience. A control group ($n = 30$) was randomly selected and interviewed at six months to measure the effect of interview bias on breastfeeding outcomes. Breastfeeding outcomes for the control group did not differ from the study group and therefore bias due to being interviewed was assumed to be minimal. Longer breastfeeding duration was significantly associated with lower levels of anxiety ($p = 0.017$), lower depression scores ($p = 0.039$), and higher self-esteem scores ($p < 0.001$). The direction of a causal association between breastfeeding, depression, anxiety and self-esteem could not be determined. In other words, it is not clear whether measures of high anxiety, depression and low self-esteem were reflective of a mother's breastfeeding experience or were the cause of weaning. The sample size is a limitation to this study.

A longitudinal study of 1250 women from five Ontario sites (Watt et al., 2000) was completed to explore early identification of postpartum depression. Data were collected prior to discharge from hospital and then again by telephone four to six weeks postpartum. Postpartum depression (defined as EPDS score ≥ 12) was found in 10% (score range, 4.3-15.2) of women at four weeks postpartum. Initiation or continuation of breastfeeding although identified in the literature as one of the predictive factors for an EPDS score ≥ 12 , was not associated with EPDS scores. The predictors of an EPDS

score of ≥ 12 were (in order of importance): mother's rating of infant's health as fair or poor, self-identified unmet need for care for an emotional/mental health problem, mother's rating of her own health as fair or poor, household income of $< \$20,000$, lack of confidant support (social relationships in which participants can share thoughts, experiences, and ideas), lack of affective support (social relationships in which individuals provide positive emotional support for each other), wanting to stay in hospital longer, and identification of six or more learning needs while in hospital.

In contrast, Mezzacappa and Katkin (2002) examined the effects of breastfeeding on maternal stress and mood in two studies. In the first study, perceived stress in the past month was compared between 28 breastfeeding and 27 bottle feeding women. After controlling for demographic confounders, breastfeeding was associated with less perceived stress. In the second study, mood ratings (as measured by the Positive and Negative Affect Scale – PANAS) were assessed in the same 24 women both before and after one breastfeeding and one bottle-feeding session. Breastfeeding was associated with a decrease in negative mood and bottle-feeding was associated with a decrease in positive mood from pre to post feeding. They concluded that breastfeeding in fact buffers negative mood and that these effects appeared to be attributable to the effects of breastfeeding itself and not just to individual differences. The findings may be explained in light of the fact that prolactin release in breastfeeding women has been associated with relaxation and a sense of well-being (Carter et al., 1997; Lawrence & Lawrence, 1999). The sample size in these studies was small.

It is not clear whether early weaning occurs because of perceived or real contraindication with psychopharmacological treatment of depression, or because of a

woman's feeling of not being able to cope with the challenges of breastfeeding at the same time as she struggles with the depression. Wisner et al. (1996) reviewed the literature about the use of antidepressants during lactation and provided a list of drugs that can be safely used by a breastfeeding woman who requires treatment with antidepressants (e.g. Sertraline) (Wisner, Perel, & Findling, 1996).

A Cochrane systematic review is currently underway to evaluate the effect of psychosocial interventions on postpartum depression (Dennis et al., 2002b). The primary objective of the review is to assess the effects on women and their families of preventive psychosocial interventions compared with usual antepartum, intrapartum or postpartum care to reduce the probability of postpartum depression. Two of the outcome measures will be breastfeeding duration to one, three and six months postpartum and breastfeeding level (exclusive, almost exclusive, high, partial, token and bottle feeding).

In summary, studies to date suggest that postpartum depression plays a role in breastfeeding duration. Studies related to the role of depression on breastfeeding duration have been limited to use of surveys and questionnaires for data collection. It is not clear whether early weaning occurs because of the perceived or real contraindication with psychopharmacological treatment of depression, or because of the woman's feelings of not being able to cope with the challenges of breastfeeding at the same time as she struggles with the depression. It is also not clear whether measures of high anxiety, depression and low self-esteem were reflective of the type of breastfeeding experience a woman had or the cause of the breastfeeding outcome (weaning). In other words which comes first, the anxiety and depression or the difficulty with breastfeeding. Further

research is needed to explore the relationship between postpartum depression and early weaning.

Supplementation

Supplementation with formula, in the early postpartum period when breastfeeding is being established, can prevent the establishment of maternal milk supply and have adverse effects on breastfeeding, alter infant bowel flora, sensitize the infant to allergens and interfere with maternal-infant bonding (Blomquist, Jonsbo, Serenium, & Persson, 1994). In a recent national survey of women's childbearing experiences in the United States (2002), 47% of breastfed infants were given water or formula supplements (Declercq et al., 2002).

The use of supplemental formula feeding prior to discharge from hospital and in the first month postpartum when milk supply is being established has been associated with breastfeeding failure and early weaning (Hill, Humenick, Brennan, & Wolley, 1997; Martin-Calama et al., 1997). As a result, guidelines for the appropriate use of formula supplementation have been developed (Academy of Breastfeeding Medicine Protocol Committee, 2000; Powers & Slusser, 1997; UNICEF, 1992; Powers et al., 1997). According to the Academy of Breastfeeding Medicine (2000), *acceptable medical indications for supplementation* include: hypoglycemia unresponsive to appropriate feeding, separation of mother and infant, severely ill mother (e.g. psychosis, pregnancy induced hypertension or shock), inborn errors of metabolism (e.g. galactosemia, phenylketonuria, maple syrup urine disease), infant unable to feed at breast (i.e. congenital malformations, illness), women taking contraindicated medication when breastfeeding. In addition, some other *possible indications for which supplementation in*

term healthy infants may be considered include: hypoglycemia documented by laboratory blood glucose measurement, clinical evidence of significant dehydration, weight loss of eight to ten percent accompanied by delayed lactogenesis (five or more days), insufficient intake despite adequate milk supply, hyperbilirubinemia, breastfeeding jaundice where intake is poor despite appropriate intervention, breast milk jaundice when levels are greater than 342 in an otherwise thriving infant and where a diagnostic interruption of breastfeeding may be helpful, low birth weight, intolerable pain during feedings unrelieved by interventions, primary glandular insufficiency, delayed lactogenesis (e.g. retained placenta, postpartum hemorrhage). The benefits versus the potential negative consequences of supplementation must be weighed. One randomised controlled trial and six longitudinal studies were found addressing issues related to supplementation and the effect on breastfeeding duration. A summary of the major findings is presented first followed by more details of each study.

Milk arrival is later when bottles are introduced in the first week postpartum (Perez-Escamilla, Segura-Millan, Pollitt, & Dewey, 1993) and early milk arrival has been consistently associated with full breastfeeding and breastfeeding up to two months (Perez-Escamilla et al., 1993). 'Not enough milk' is the most common reason given for termination of breastfeeding in the first four weeks postpartum (Perez-Escamilla et al., 1993; Schwartz et al., 2002). The early introduction of supplementary formula increases the likelihood of early termination of breastfeeding (Banderali, Agostoni, Silano, Radailli, & Giovannini, 1999; Barber, Abernathy, Steinmetz, & Charlebois, 1997; Chezem, Friesen, Montgomery, Fortman, & Clark, 1998; Chezem et al., 2003; Hill et al., 1997; Perez-Escamilla et al., 1993; Sheehan et al., 1999; Barber et al., 1997; Chezem et

al., 1998; Hill et al., 1997; Perez-Escamilla et al., 1993; Sheehan et al., 1999). Infants receiving glucose water in hospital are less likely to continue breastfeeding at 16 weeks and are more likely to be formula fed at four weeks postpartum (Martin-Calama et al., 1997). The likelihood of not breastfeeding is almost four times greater if formula supplements are used in hospital than if supplements are not used (Blomquist et al., 1994). The greatest rate of decline occurs during the first month (Barber et al., 1997). Women who used a bottle for some feedings during week four to 12 were less likely to discontinue breastfeeding than women, who did not use a bottle (Schwartz et al., 2002). After three weeks, bottles and manual expression are not associated with weaning and may improve the likelihood of continuing breastfeeding until 12 weeks (Schwartz et al., 2002). Details of these studies are presented in the following section beginning with the randomised controlled trial.

Martin-Calama et al. (1997) carried out a randomised controlled trial to study the effects of feeding glucose water on breastfeeding infants. Infants ($n = 180$) were randomly assigned to a 'glucose water' group (allowed to receive glucose water from a bottle after breastfeeding during the first three days postpartum) or a 'non-glucose water' group (exclusively breastfed). They compared the intervention group of infants receiving only breast milk during the first three days of life ($n = 87$) with a control group who received glucose water ad libitum by bottle during the same period ($n = 83$). Women were interviewed by telephone at five months postpartum. Women lost to follow up did not differ from women followed up. As compared to infants randomised to receive no glucose water supplements, infants randomised to receive glucose water supplements were twice as likely to have received formula feedings during the first month

(18% versus 34%; $p < 0.05$), and less likely to still be breastfeeding (57% versus 41%; $p < 0.01$). Most major possible confounders were controlled, except maternal education. They did not quantify how much glucose water infants in the glucose water group consumed.

A multivariate analysis on retrospective data from the 1991/1992 Epidemiology and Family Health Survey from Honduras, which included 714 women with children zero to six months old was carried out to explore the effect of supplementation on breastfeeding outcome (Perez-Escamilla et al., 1993). The use of milk-base prelacteal feeds was negatively associated with exclusive breastfeeding (Odds Ratio (OR): 0.19, 95% Confidence Interval (CI): 0.08, 0.43) and any breastfeeding (OR: 0.21, 95% CI: 0.09, 0.48). Water-based prelacteal feeds were associated with delayed initiation (>24 hr) of breastfeeding ($p = 0.003$). They reported that milk arrival was later when a bottle was introduced in the first week (3.3 ± 1.3 versus 2.9 ± 1.1 days; $p \leq 0.05$). Early milk arrival was consistently associated with full breastfeeding and breastfeeding up to two months. The early introduction of supplementary bottles increased the likelihood of early termination of breastfeeding. Women who were fully breastfeeding at one week postpartum were four times more likely to continue breastfeeding to four months postpartum than women who were partially breastfeeding and supplementing during the first week postpartum (OR: 4.1, 95% CI: 1.7, 10.0).

In a prospective study of the feeding routines of 521 newborns in a maternity unit in Sweden, 69% of newborns had breastfed exclusively and 31% had received at least one bottle of breast milk or formula (Blomquist et al., 1994). At three months, 80% were still breastfeeding fully or partially. When formula supplements were used in hospital,

infants were four times more likely to not be breastfed at three months postpartum (OR: 3.9, 95% CI: 2.1, 7.2). Breastfeeding cessation at three months was nearly seven times greater when infants experienced both supplementation and weight loss of 10% or more of birth weight than when neither factor occurred. Among infants given supplementation for specific medical indications the duration of breastfeeding was similar to that in the non-supplemented group. The authors suggest that supplementing a newborn for medical indications may not interfere with mother-infant interaction and maternal confidence and therefore not impact on breastfeeding as much as it does when supplements are given because of perceived insufficient milk.

Barber et al (1997) surveyed a random sample of women (obtained from birth records in Toronto, Ontario) with 4-month-old infants to determine the initiation and duration rates of breastfeeding. Three hundred and fifty women completed the questionnaire by telephone and five during a home visit. This represented an 81% response rate of the 434 women who were originally contacted. Women were interviewed in English, Cantonese, Portuguese, Vietnamese, Spanish, Mandarin, Filipino, Hindi, and Italian. They found a breastfeeding initiation rate of 83%. The greatest rate of decline in breastfeeding occurred during the first month postpartum. They reported that 22% of infants were supplemented with formula by 4 months postpartum and shorter breastfeeding duration was related to use of formula supplements (Barber et al., 1997).

Hill, Humenick, Brennan and Wolley (1997) in a secondary analysis of data from two different samples examined the effect of early supplementation with manufactured milk on breastfeeding status at 20 weeks postpartum. A prospective, time series design with two convenience samples of 120 and 223 women was used for this study. Infant

feeding status was assessed at multiple time points (1, 2, 4, 8, 12, 16 and 20 weeks) postpartum. Parents or hospital staff introduced artificial milks as desired to the infants. Breastfeeding rates at 20 weeks were significantly greater for women who reported breastfeeding exclusively the second week after delivery compared with women who breastfed and simultaneously supplemented with manufactured milk.

In the first data set, 12.3% of the exclusively breastfed infants versus 37.5% of the supplemented infants ($\chi^2 = 8.8$; $p < 0.01$) had weaned at eight weeks postpartum. By 20 weeks postpartum 37.0% of the exclusively breastfed infants versus 71.9% of the supplemented infants ($\chi^2 = 10.9$; $p < 0.001$) had weaned.

In the second data set, 11.9% of the exclusively breastfed infants versus 39.4% of the supplemented infants ($\chi^2 = 15.4$; $p < 0.001$) had weaned at eight weeks postpartum. By 20 weeks postpartum 40.3% of the exclusively breastfed infants versus 75.8% of the supplemented infants ($\chi^2 = 10.9$; $p < 0.001$) had weaned. The researchers concluded that early introduction of supplemental bottles of artificial milk is associated with a decrease in the amount of human milk the infant receives, and with early weaning. Degrees of freedom were not reported and no information is provided about analysis of supplementation in combination with other factors.

A longitudinal survey of 227 Canadian women (Sheehan et al., 1999) using a pre-discharge, self-administered questionnaire, medical record review and follow-up telephone interview at six weeks postpartum also found that infants who did not receive supplementation in hospital were over twice as likely (OR: 2.49, 95% CI: 1.25, 4.98; $p = 0.005$) to still be breastfeeding at six weeks postpartum as were infants who had been supplemented with formula.

Similar results were found in a study of over 2,000 women in Italy who were interviewed to evaluate factors associated with initiation and duration of breastfeeding. Formula supplementation in the hospital was associated with shorter duration of exclusive breastfeeding ($p < 0.03$) (Banderali et al., 1999).

Schwartz, D'Arcy, Gillespie, Bobo, Longway & Foxman (2002) completed a prospective cohort study with 946 women. They reported that mastitis, breast or nipple pain, bottle use, and milk expression in the first three weeks were all associated with early termination of breastfeeding. Women who used a bottle for some feedings during weeks four to twelve were 98% less likely to discontinue breastfeeding than women who did not use a bottle. "Not enough milk" was the most common reason given for termination of breastfeeding in weeks one to three (37%) and weeks four to six (35%). They concluded that exclusive breastfeeding for the first three weeks should be encouraged. After the first three weeks, bottles and manual expression are not associated with early weaning and may improve the likelihood of continuing breastfeeding until at least 12 weeks (Schwartz et al., 2002).

A prospective longitudinal study was carried out to examine the influences of in-hospital administration of breast milk replacements on lactation duration (Chezem et al., 1998). Sixty-nine breastfeeding mothers entered the study and 53 completed all scheduled telephone interviews conducted prenatally, at six weeks, three months and six months postpartum. During hospitalization, 19% of infants received formula supplementation and the duration of breastfeeding was significantly shorter in these infants compared to infants who were not fed formula ($p = 0.004$).

Another recent prospective, descriptive study was completed with 74 of 83 eligible first time mothers (participation rate 89%) who intended to breastfeed. Telephone interviews were completed prenatally, at six weeks, three months and six months postpartum. Women planning to exclusively breastfeed were almost twice (OR: 1.86, 95% CI: 1.12, 3.09) as likely to achieve their feeding goals as were those planning to feed a combination of breastmilk and formula. Women planning to supplement their infants started supplementing earlier than women who planned to exclusively breastfeed ($p = 0.001$). A strong negative correlation was observed between the number of weeks an infant received daily formula feedings and the actual duration for both women planning to exclusively breastfeed ($r = -.785$, $p = 0.001$) and those planning to combination feed ($r = -.542$, $p = 0.025$). A limitation of this study was the small sample size (Chezem et al., 2003).

A Cochrane systematic review is currently underway to evaluate the effect of giving additional food and fluids to breastfed infants on the duration of breastfeeding (Martin, Renfrew, & Woolridge, 2002).

In summary, studies of the effect of in-hospital supplementation of infants, using large sample sizes, and multi-ethnic groups consistently suggest that supplementation with formula and water during the first three weeks postpartum, when milk supply is being established, plays a role in breastfeeding duration. Most studies have relied on use of surveys, self-administered questionnaires and phone interviews for data collection. More studies are needed to determine whether early weaning occurs because use of supplements affects the establishment of adequate milk supply, is a cause or symptom of

breastfeeding problems, or because supplementation affects the mother's confidence and perception of the adequacy of her milk to meet her infants needs.

Support

Support has been defined as: 1) material support (practical help, performing household tasks, financial support); 2) emotional support (encouragement, affection, approval and feelings of togetherness); 3) informational support (being told things one needs to know, assistance in problem solving by sharing information or tracking down information), and 4) comparison support (encouragement, advice, or information from someone in the same or a similar position) (Cronenwett, 1985; House, 1981). Support can be provided by an informal network of family, friends and co-workers, as well as, by a more formal network of health care professionals (Heaney & Isreal, 1997).

Support for breastfeeding women has been well recognized as a factor that affects breastfeeding success (Sikorski et al., 2002). Women who successfully breastfed for a long time received help from family, friends and health care providers (Bryant, 1982; Buchner & Matsubara, 1993; Houston, 1984; McNatt & Freston, 1992).

An overview of the literature review on support and breastfeeding is presented here. This section of the review is organized into four categories – family support (six studies), professional support (two systematic reviews), peer support (five randomised controlled trials), and perceived adequacy of support (five studies). All of these studies included support of the breastfeeding mother and breastfeeding outcome in the study results. A summary of the general findings of the group of studies is presented at the beginning of each section. A more detailed outline of each of the studies follows.

Family Support

The mother's partner, family and friends are powerful influences on her during breastfeeding. Their influence can potentially be either positive or negative, thus influencing her ability to successfully breastfeed. Women who weaned early reported receiving less breastfeeding support from social and professional resources; believed breastfeeding was difficult and saw more advantages of formula feeding and fewer advantages to breastfeeding (Janke, 1991). Support from husbands, relatives and friends have been reported to increase breastfeeding duration by contributing to mother's confidence (Buchner et al., 1993). Women are more likely to call or visit family or friends with concerns about breastfeeding than to seek other professional sources of support (Kuan et al., 1999); however, some women receive little breastfeeding support from family or friends in the immediate postpartum period (Hawthorne, 1994). Support from family and friends have also been found to influence decisions about breastfeeding in a negative way (Ineichen, Pierce, & Lawrenson, 1997). The most significant predictor of breastfeeding duration was the mother having a breastfeeding friend or relative (Kum-Nji, Mangrem, Wells, White, & Herrod, 1999).

Kuan et al. (1999) carried out a prospective eight-week cohort study to identify and characterize health care system factors that contribute to successful breastfeeding in the early postpartum period. Participants (n = 522) were women from five hospitals who had a vaginal delivery of a healthy full-term single infant, and intended to breastfeed. Mothers and infants had unrestricted access to each other for breastfeeding during the hospital stay. Data were obtained through chart review, survey, person-to-person interview, telephone interview and the mother's journal describing telephone calls, clinic

visits, and home visits. Success was determined based on each mother's initial estimate of the planned duration of breastfeeding. Seventy-six percent of women successfully breastfed for at least as long as they had intended to. Seventeen percent of women stopped breastfeeding by four weeks postpartum and 29% by eight weeks postpartum. The majority of women (98%) expected to have help with household chores. Women were more likely to call or visit family and friends (34.7%) with concerns about breastfeeding than to seek other sources of support such as the lactation consultant (16.5%), pediatrician (8.8%), obstetrician or midwife (8.2%), breastfeeding support group (5.9 %), and birth hospital (2.5%). The researchers concluded that health care system support of breastfeeding women during their hospital stay and early post discharge period was a key issue in determining a successful breastfeeding experience, however, this is questionable since only small numbers of women reported accessing support from health care providers. Also, the researchers did not report on whether accessing professional support was associated with better breastfeeding outcome.

Kum-Nji, et al. (1999) interviewed 420 women in a low-income rural Mississippi community to determine the incidence, predictors, attitudes, and practices of breastfeeding initiation. They reported that for both Black and White low-income women in Mississippi, the most significant predictor of breastfeeding duration was having a breastfeeding friend ($p < 0.0001$) or relative ($p < 0.0005$).

Buckner and Matsubara (1993) surveyed 126 women in Alabama postnatally using the Utilization of Support Network Questionnaire (USNQ) and Norbeck Social Support Questionnaire (NSSQ) to determine how the breastfeeding mother uses her support network for successful breastfeeding. Sixty questionnaires were completed

resulting in a 48% response rate. They found that partners, relatives, or friends were helpful for a mother making the decision to breastfeed, and for providing encouragement during difficult times. Support for a mother's confidence and self-esteem during breastfeeding came most often from the husband. Friends, family and lactation consultants also contributed to the mother's level of confidence. The total support score for breastfeeding women, as measured by the USNQ, was significantly higher than for non-breastfeeding women (148 versus 85; $p < 0.05$), which suggests that support contributes to breastfeeding.

Hawthorne (1994) surveyed 80 primipara, breastfeeding women in England, to compare the intent to breastfeed with breastfeeding rates at 8 weeks postpartum. Mothers reported receiving little breastfeeding support from family or friends in the immediate postnatal period. This is an important issue and speaks to the need for adequate assessment of breastfeeding mother's support needs prior to discharge.

Ineichen, Pierce & Lawrenson (1997) interviewed 55 expectant teenagers to determine when the decisions about breastfeeding are made and who influences those decisions. They found that decisions about breastfeeding for these teenagers were made late in the pregnancy. Thirty-eight percent of the teenagers initiated breastfeeding ($n = 21/55$) and almost half ($n = 10/21$) had weaned by the end of the first week. Only half of the teenagers had discussed breastfeeding with a health care worker. The teenagers reported that their partners and their own mothers often influenced their decisions about breastfeeding, sometimes in a negative way.

Whelan & Lupton (1998) also explored factors, which promote or discourage successful breastfeeding in low-income women in England. The sample consisted of 15

women who delivered at a District General Hospital in the South West of England, were receiving income support or were 16-17 years of age, and were unemployed. In a qualitative study, women were surveyed using semi-structured interviews around 21-28 days post delivery. The researchers concluded that a woman's individual and social environment impacts on whether she continues to breastfeed. Specific factors associated with increased duration of breastfeeding were: positive attitudes, realistic expectations, greater self-esteem, supportive mother or friend, partner not against breastfeeding, ability to cope with temporary perceived social isolation, infant not given supplementary feeds, mother received good advice especially with respect to positioning the infant at the breast and greater continuity of care and sufficient quality time with a midwife (Whelan & Lupton, 1998).

In summary, studies to date suggest that support from family and friends play a role in breastfeeding duration. Studies related to family support and breastfeeding duration have been limited to surveys and questionnaires. It is not clear exactly how this support contributes to breastfeeding duration. More research is needed to clarify whether support from family and friends impacts breastfeeding duration because of the effect on maternal confidence and her perception of the adequacy of her milk to meet her infants needs, or because it helps to alleviate stress which can impact on milk production.

Professional Support

There is clear evidence in the research literature for the effectiveness of professional support for breastfeeding women on breastfeeding duration (Sikorski et al., 2002). The assistance that professionals provide has been described as surrogate support, extending the support available in the client's network and replacing what is not available

(Norbeck & Tilden, 1988). Many researchers have used survey methodology to explore professional support and breastfeeding duration. Two systematic reviews of randomised controlled trials were found addressing the impact of professional support on breastfeeding duration.

A systematic review of studies that measured the effect of correcting breastfeeding technique (position and latch) on breastfeeding duration and incidence of problems was completed (Renfrew & Lang, 1999). Only one study (Righard & Alade, 1992) of 54 women was retained in the review. Women whose breastfeeding technique was corrected were less likely to have milk insufficiency (OR: 0.22, 95% CI: 0.07, 0.66), have breast problems (OR: 0.17, 95% CI: 0.06, 0.53), or stop breastfeeding at 4 months (OR: 0.23, 95% CI: 0.08, 0.68). Correction of breastfeeding technique appears to reduce problems of lack of milk and breast problems.

Sikorski and Renfrew (2002) completed a meta-analysis of 20 studies from 10 countries that examined the effectiveness of breastfeeding support services on breastfeeding duration rates with 23,712 mother-infant pairs. The designs of the studies included in the meta-analysis were randomised or quasi-randomised controlled trials with or without blinding comparing extra support for breastfeeding women with usual care. Support was defined as, “contact with an individual or individuals (either professional or volunteer) offering support which is supplementary to standard care (in the form of, for example, appropriate guidance and encouragement) with the purpose of facilitating continued breastfeeding” (Sikorski et al., 2002, p.3). In the studies that were analysed, breastfeeding support was provided either in both the antenatal and postpartum period or exclusively in the postpartum period. Supportive interventions were classified into two

categories: whether the intervention did or did not contain an antenatal component; whether the intended intervention was predominantly face-to-face, by telephone, or equally balanced.

There was a beneficial effect on the duration of any breastfeeding with all forms of extra support. The relative risk (RR) of discontinuing breastfeeding before six months is 0.88 (95% CI: 0.81, 0.95) (15 trials, 21,910 women). The effect was greater for exclusive breastfeeding (RR: 0.78, 95% CI: 0.69, 0.89) (11 trials, 20,788 women). Extra professional support appeared beneficial for any breastfeeding (RR: 0.78, 95% CI: 0.81, 0.97) (10 trials, 19,696 women). Lay support was effective in reducing the cessation of exclusive breastfeeding (RR: 0.66, 95% CI: 0.49, 0.89) (five trials, 2530 women), but did not reach statistical significance for any breastfeeding (RR: 0.84, 95% CI: 0.69, 1.02) (five trials, 2224 women). There is clear evidence for the effectiveness of professional support on the duration of any breastfeeding although the strength of its effect on the rate of exclusive breastfeeding is uncertain. Lay support is effective in promoting exclusive breastfeeding while the strength of its effect on duration of any breastfeeding is also uncertain (Sikorski et al., 2002).

Peer Support

Five randomised controlled trials were found examining the effect of peer support on breastfeeding duration (Caulfield et al., 1998; Dennis, Hodnett, Gallop, & Chalmers, 2002a; Haider, Ashworth, Kabir, & Huttly, 2000; Mongeon & Allard, 1995; Morrow et al., 1999)

In these studies, peer support is provided during the prenatal and/or postnatal period, using a variety of methods (telephone, face-to-face contact, in clinic or the home

settings). Peer support counsellors were volunteers, with previous breastfeeding experience, who received some form of training prior to the study. Three randomized controlled trials demonstrated a statistically significant effect on breastfeeding duration with use of peer support interventions (Dennis et al., 2002a; Haider et al., 2000; Morrow et al., 1999). However, the frequency of difficulties encountered by breastfeeding women was not found to be any different with the use of peer support (Mongeon et al., 1995). The effectiveness of telephone support alone has also been studied (Dennis et al., 2002a), with one study (Mongeon et al., 1995) finding a significant impact on breastfeeding duration (Dennis et al., 2002a).

In summary, studies to date provide evidence that professional support plays an important role in breastfeeding duration. The type and availability of support is an important factor in determining the rates, duration and success of breastfeeding. Support can be effectively provided in a variety of settings: hospital, home, or at a breastfeeding drop-in clinic, but strategies that include face-to-face contact and an antenatal and postnatal component may be more effective in increasing breastfeeding duration (Sikorski et al., 2002). Peer support has been also been found to be effective in increasing breastfeeding duration when trained lay volunteers are used (Dennis et al., 2002a; Haider et al., 2000; Morrow et al., 1999). Extra professional support results in increased numbers of mother's breastfeeding for longer (Sikorski et al., 2002).

It is not clear whether support from professionals impacts breastfeeding duration because of the effect on a mother's confidence and her perception of the adequacy of her milk to meet her infant's needs, or because it provides the mother with informational and emotional support to help alleviate stress which can impact of milk production. It is also

not clear whether the impact of professional support on mother's confidence to breastfeed has its effect on breastfeeding duration because it increases her vulnerability threshold making it more likely for her to persevere through difficult times.

Perceived Adequacy of Support

Accurate advice and support that is tailored to meet a mother's needs are important in helping women, who wish to breastfeed, achieve their objectives. If the advice given is incorrect, it is unlikely to be helpful (Enkin et al., 2000). For support to be effective, the mother must perceive the support that is offered to be necessary and adequate, that an adequate number of people are available to help, and that they have the time to help (Gill, 2001; Sarason, Levine, Basham, & Sarason, 1983). Research has not shown a significant correlation between a mother's *perception* of the adequacy of support she receives and breastfeeding duration (Boettcher, Chezem, Roepke, & Whitaker, 1999; McNatt et al., 1992). Perhaps perceived adequacy of support is a difficult concept to measure without a social desirability bias.

Support is not always perceived to be positive or benign. It can be a source of stress for some women. It can foster dependency (Norwood, 1996) and women may not be able to identify when their support needs are not being met (Porter & MacIntyre, 1984). Accessing health care resources is difficult for some women during the early postpartum period. Women are often stressed, fatigued, with limited resources to cope during the first few weeks. This may impact on their ability to participate in existing programs, affecting the adequacy of the support for breastfeeding they receive. As well, literacy levels and access to transportation, and child-care resources can affect

participation and influence support received. Details of five survey studies exploring the concept of perceived adequacy of support or care are described in the following section.

In a classic study from Aberdeen, Scotland (Porter et al., 1984), that evaluated innovations in antenatal care, 232 women were interviewed when they were 36 weeks pregnant. One important finding from this study, as reported by the researchers, was that the women's overall level of satisfaction with care was high. Pregnant women appeared to assume that whatever care they had experienced was the best care possible and this was labelled as the "What is must be best" phenomenon. This has implications for care planning and research, in that, if women tend to say they like whatever care they receive, then uncontrolled studies which assess preferences for a particular pattern of care may not be indicating 'real' levels of satisfaction with the current mode of care under study. Women also tended to be negative about alternative modes of care until they had experienced them (Porter et al., 1984).

A descriptive correlation study, with a convenience sample of 45 primiparae women, was carried out in Connecticut (McNatt et al., 1992). Perceived social support was measured using the Hughes Breastfeeding Support Scale (HBSS). Perceived social support, lactation outcomes (satisfaction or dissatisfaction with breastfeeding) and the size and structure of the women's support networks were evaluated. The type of breastfeeding (exclusive, partial, minimal) was not measured. A significant correlation between the numbers of health care provider supports, informational support and a mother's perception of successful lactation ($p < 0.01$) was reported. The study revealed no statistical differences between perceived support and lactation outcome. The authors suggest two reasons for this. First, there may have been no differences in their sample.

A larger more heterogeneous, randomly selected sample might have demonstrated differences between perceived support and lactation outcome. They also suggest that the Hughes Breastfeeding Support Scale may not have been an ideal tool to measure these differences. The limitations of this study included a small convenience sample, limited validity and reliability of the HBSS to measure factors associated with breastfeeding satisfaction, and failure to measure the type or amount of breastfeeding.

Norwood (1996) developed a Social Support Apgar (SSA), a tool for screening client perceptions of adequacy of social support and tested the tool using a convenience sample of 220 postpartum women, 52 Caucasian low-income maternity patients and 54 women participating in a maternity support program (home visits). The data revealed that women do not always perceive support to be benign. It can demand reciprocity and can be a source of stress and it can also foster dependency. The researchers concluded that the SSA has value as a valid, efficient and effective screening tool for assessing perceived adequacy of social support in perinatal clients. Psychometric analyses from three separate studies involving the SSA revealed Cronbach's alphas of 0.88 to 0.93.

Boettcher et al. (1999) surveyed experienced and inexperienced breastfeeding women to study the potential factors associated with lactation duration. Perceived social support was not significantly correlated with breastfeeding duration and the researchers concluded that it might be important to assess actual social support available to a breastfeeding mother rather than simply rely on her perception of the adequacy of the support.

Gill (2001) completed an ethnographic study in Florida to describe how maternal-child staff nurses support breastfeeding women during the postpartum hospital stay and

how these women perceive the support received from the nurses. Unstructured interviews were carried out with seven maternal-child nurses caring for breastfeeding women and eight breastfeeding women. Twelve nurses' interactions with breastfeeding women and newborns were observed. The breastfeeding women were interviewed using a semi-structured guide in hospital before discharge and at two and six weeks postpartum. In the category of informational support, nurses believed that providing written material was helpful while the majority of women felt that written material was not useful. Nurses and women agreed that providing verbal information and demonstrations was helpful. Women also needed nurses to stay with them during feeding sessions to provide interpersonal support. Nurses often found it difficult to spend the time with each client due to their other work-related responsibilities and clients. Nurses did not identify encouragement as form of lactation support, whereas women reported encouragement to be an important form of support for them. The researchers concluded that women and nurses differ in their perceptions of adequate, appropriate breastfeeding support and that health care providers can help breastfeeding women, but the support offered must be the kind women want.

In summary, the few studies done to date, suggest that the mother's perception of the adequacy of breastfeeding support is not related to breastfeeding duration. In fact, research by Porter et al. (1984) suggests that a mother might not be able to critique whether the support she is receiving is adequate, if she has never breastfed before and therefore does not know what is missing. More research is needed to explore the relationships between perceived adequacy of support for breastfeeding mothers and early weaning.

Literature Review Summary

Research to date provides evidence that mother's confidence with breastfeeding, postpartum depression, supplementation with formula and water during the first three weeks postpartum, and adequate support all play a role in breastfeeding duration. Studies also provide evidence that the mother's perception of the adequacy of breastfeeding support is not related to breastfeeding duration and, in fact, it may not be possible for the mother to know whether the support she is receiving is adequate if she has not breastfed before.

It is not clear whether early weaning occurs because of the need to use pharmacological measures to treat the postpartum depression, or because of a woman's feelings of not being able to cope with the challenges of breastfeeding at the same time as she struggles with the depression. It is also not clear whether early weaning occurs because supplementation affects the establishment of adequate milk supply or because of the impact supplementation has on a mother's confidence and her perception of the adequacy of her milk to meet her infant's needs. As well, further research is needed to determine whether support from family and friends, or professionals impacts breastfeeding duration because of the effect on a mother's confidence and her perception of the adequacy of her milk to meet her infants needs, because it provides the mother with different forms of support (tangible, informational, emotional) to help alleviate stress which can impact on milk production or because it increases her vulnerability threshold making it more likely for her to persevere through difficult times.

The factors described in this literature review are clearly related to breastfeeding duration. What makes some women vulnerable for early weaning? No studies to date,

have explored these factors as determinants of vulnerability threshold and their relationship with breastfeeding duration. Research is needed to determine the extent to which factors for early weaning impact on a women's vulnerability threshold and thus her ability to persevere through any challenges she faces while breastfeeding is becoming established.

Thus, the primary purpose of this study is to explore the relationships between these selected vulnerability factors (supplementation, confidence with breastfeeding, postpartum depression and perceived adequacy of support) and breastfeeding outcome at six weeks postpartum to learn more about how these concepts relate. These variables were selected for review because they have been reported by others to be related to breastfeeding outcome, they are modifiable, they represent both sides of the vulnerability model (personal resources and environmental supports) and data is available from the Family-Centered Maternity Care Study.

The second purpose of the study is to explore use of selected community resources (Parent Child Info Line, Breastfeeding Support Drop-In, Well-Baby Drop-In, Lactation Consultants) by women with the above vulnerability factors. These resources were selected because they all require parents to seek help. The results of this study will provide health care providers with information to develop more accurate and comprehensive tools to assess women for factors related to early weaning and provide information to help design interventions to increase a women's vulnerability threshold. Discussion of the methods used for secondary analysis of data to explore these questions is described in the next chapter.

CHAPTER THREE

Methods

In this chapter, information about both the primary Family Centered Maternity Care (FCMC) study and the secondary analysis will be presented. The research design, the setting, the sampling procedure, and the instruments for data collection for the primary study will be presented first. Following this, the research design, sampling procedure, study variables, data management and data analysis for the secondary analysis will be presented. Ethical considerations will also be discussed.

Primary Study

Research Design and Study Setting

Data for the primary study were collected from a sample of new mothers who delivered in the city of Ottawa and who consented to participate in the original Family Centered Maternity Care (FCMC) Study. Women were eligible to participate if they lived in Ottawa-Carleton, gave birth in an Ottawa hospital between October 1st, 2000 and March, 2001 spoke English or French well enough to respond to the survey, were competent to give consent to participate, and were discharged home with their infant (Ottawa-Carleton Health Department, 2000). The primary study was a prospective longitudinal design with data collected by telephone interview at two time points (one week and six weeks post-delivery). The purpose of the study was: to gain a better understanding of the care received by women in Ottawa-Carleton during their pregnancy and in the postpartum period within hospital and community settings; to determine women's perinatal behaviors; to collect socio-demographic data on women who give birth in Ottawa-Carleton; and to determine the prevalence of postpartum depression.

Sampling Procedure

As a normal part of the regional early postpartum assessment and support program, hospital staff provides the Health Department with a completed information sheet (Parkyn Screen, Appendix E – Figure E8) (Ministry of Health and Long Term Care, 2003) for all women who give birth in hospital and who consent to being contacted by the Health Department. Within two days of discharge, a public health nurse at the Health Department phones each new mother, completes an initial postpartum assessment, and makes arrangements for a home visit. During the study recruitment period, screening for eligibility and consent to participate in the survey was completed during this initial phone call. If the woman agreed, her name and phone number were passed along to a trained telephone interviewer who called to explain the study and conduct the interviews. A research assistant was responsible for coordinating local sample recruitment, ensuring consent (Appendix B – Figure B2) and proper completion and collection of interview questionnaires. Phone interviewers used a script to ensure the consistency of the process that was used to collect the data (Appendix B – Figure B1 and B3). Interviewers were trained to create a comfortable environment during the interview and ensure respondent anonymity. If necessary, the interviewer made six attempts, at various times during the day and evening, to reach the women (participants) at home.

The planned sample size of the primary study was 600 participants. In order to reach this sample size, the researchers planned to contact 750 women allowing for a 20% refusal rate. The researchers sequentially contacted women who met the eligibility criteria until they met a pre-designated proportionate hospital quota. Each hospital's

quota was determined based on the birth rate at the institution. Women were sequentially recruited as the information sheet was faxed to the Health Department.

As depicted in the participant flow chart (Figure 2), 627 women participated in the FCMC survey at one week postpartum. A total of 52 women declined to participate in the first survey yielding a participation rate of 92.3%. Twenty-seven women did not participate in the second survey leaving a total of 599 participants (4.5% attrition rate).

Figure 2: Participant Flow Chart – Primary Study

Measures for Data Collection

Data for the primary study were collected using the Family Centered Maternity and Newborn Care Surveys: Week One Questionnaire and Week Six Questionnaire. Each questionnaire was completed by a phone interview and each interview took approximately 30 minutes. A complete copy of each of these questionnaires can be found in Appendix C1 and C2.

The first phase of the study involved completion of a phone interview one week following discharge. This first questionnaire included questions related to: birth experience, labour support, postpartum care following the birth, preparation for discharge, care providers, maternal decision-making, Neonatal Intensive Care Unit or Special Care Nursery experience, and agreement to participate in the second phase of the study.

The second phase of data collection consisted of a phone interview at six weeks postpartum. The Week Six Questionnaire was completed with eligible women who agreed to be interviewed at this second time point. This questionnaire included questions related to demographic data, prenatal support and education, health care provider, problems during pregnancy, infant feeding, breastfeeding experience and support received in hospital, preparation for discharge, feeding experience since discharge, maternal expectations and problems with breastfeeding, support received, infant problems, emergency visits, hospital readmission, and postpartum depression

An expert in the field, (Louise Hanvey – a consultant in women's and children's health and social policy), who has conducted provincial and national surveys on maternity care practices using similar questions (Levitt, Hanvey, Avard, Chance, &

Kaczorowski, 1995; Post, 1981; Post & Hanvey, 1986; Levitt et al., 1995) developed the questionnaires based on these questions. The survey questions were developed to match the objectives of the study in an effort to assess the implementation of Family-Centered Maternity Care practices in Ottawa. To enhance the content validity, experts in the field, including professors from the Faculties of Nursing at the University of Ottawa and Queen's University, managers with a public health background in mother-infant care, consultants from the Perinatal Partnership Program of Eastern and Southeastern Ontario, and a Neonatologist also reviewed questions. Advice about relevant items was also obtained from Public Health Nurses and other managers from the Parent Child Health Sector. The survey questions were revised following feedback received.

The Edinburgh Postpartum Depression Scale (EPDS) (Cox et al., 1987), which was included in the FCMC Study, is known to be a valid and reliable screening tool for postnatal depression. This is a 10-item self-report scale with four available responses for each question. The symptoms of depression included in the scale are inability to laugh, inability to look forward to things with enjoyment, blaming oneself unnecessarily, feeling anxious or worried, feeling scared or panicky, feeling that 'things have been getting on top of me', difficulty sleeping because of unhappiness, feeling sad or miserable, crying, and thoughts of harming oneself. Each response is given a possible score from zero to three ('no, not at all' to 'yes, most of the time'). Seven of the 10 items are reverse scored. The possible total score ranges from zero to 30. Higher scores indicate higher severity of depression. Responses to items are summed to provide a total score.

The reliability and validity of the EPDS has been reported in the literature. Cox et al. (1987) reported the alpha reliability of the 10-item EPDS at 0.87 and a sensitivity of

86%, specificity of 78% (measured against Research Diagnostic Criteria – RDC for depression), and positive predictive value of 73% with the EPDS. More recently, Beck (2001) reported a sensitivity of 78%, a specificity of 99% (measured against DSM – IV diagnostic interview), a positive predictive value of 93% and a negative predictive value of 96% for the EPDS for ‘major’ postpartum depression (score ≥ 12). The cutoff score, indicating ‘major’ postpartum depression, is 12 and above (Cox et al., 1993; Cox et al., 1987; Holden, 1991).

Data was coded into a data set in SPSS 10.0 by a data entry clerk at the Ottawa Health Department under the supervision of a data analyst.

Thesis Analyses

Research Design and Study Setting

The current study is secondary analyses of selected data obtained from the FCMC Study, and is a cross-sectional design. Based on the theoretical model described in chapter two, there are many potential influences on the vulnerability threshold of breastfeeding women. For the thesis analyses, factors in the theoretical model were selected for testing on the basis of availability of data, sufficient variability in the responses and adequate numbers for analysis.

Study Variables

For the secondary analyses, a data subset was constructed from the original FCMC data set from the Week Six Questionnaire (Q19, 22, 23, 32, 36, 43.1, 46, 47, 48, 51, 55-64, 65-74) (Appendix E – Table E1). The items used for the secondary analyses were maternal confidence with breastfeeding, perceived adequacy of support, postpartum depression, supplementation, age, education, and use of community breastfeeding

resources (Parent Child Info Line, Breastfeeding Support Drop-In, Well Baby Drop-In and Lactation Consultants).

Sampling Procedure and Sample Size

The sample for this research project is from the original FCMC data set and includes only women who were either (1) solely breastfeeding or (2) breastfeeding in combination with bottle-feeding at 48 hours postpartum ($n = 526$). Of these women, 367 (69.8%) reported that they were breastfeeding at 48 hours postpartum, 159 (30.2%) reported that they were both breastfeeding and bottle-feeding. Seventy-three (12.1%) women from the original sample reported that they were bottle-feeding only and were excluded from the data set.

It was determined that this sample size was sufficient to test relationships between the variables selected for these analyses. The adequacy of the sample size was judged using the conservative assumption that, with alpha at 0.05 and statistical power of 80%, 10 cases are required for each variable, level of variable, or interaction term (Darlington, 1990).

A list of variables, type of variable, and numbers of levels within each variable, is provided in Appendix E – Table E2. There are five nominal level variables, three categorical level variables, each with two levels, and three ordinal variables that were coded to create four dummy variables each. In addition, two interaction terms were tested. Thus, the required sample size was $250 (10 \times [5 + (3 \times 2) + (3 \times 4) + 2]) = 10 \times 25 = 250$. The available sample ($n = 526$) more than met that requirement.

Data Processing Procedures

Data Audit

The following steps describe the audit process. Permission was obtained from the Health Department to access the survey forms. An audit of 10% of the data was planned. The first five percent of the survey forms were reviewed. Then an additional five percent of the survey forms were pulled using a random number list generated by the statistician. The error rate ($\text{\#wrong}/(\text{\#variables} \times \text{\#people})$) was $(37/(43 \times 599)) = 0.0014$ for the variables in the data set including the demographic data. This error rate was considered to be acceptable and the impact on summary statistics and p-values to not be substantial (Day, Fayers, & Harvey, 1998). Each error that was identified during the audit was corrected.

Following completion of the audit, logic checks were conducted where possible to identify discrepancies in the data. During this process it was noted that there was a discrepancy in the data for case number 811. This woman classified herself as both breast and bottle-feeding upon discharge from hospital (Q 19), but in answer to Q 32 (at six weeks postpartum) she stated that she was bottle-feeding and had never breastfed. Her responses to other questions make it clear that she did try to initiate breastfeeding in hospital. The data set was examined to identify similar cases. Twenty-nine other women also answered that they had no successful breast feedings prior to discharge, but their answer to the Q 36 was that they now classified themselves as bottle-feeding (breastfed but stopped). Therefore, following discussion with the thesis committee it was decided that for case 811, Q32 should be recoded to bottle-feeding (started breastfeeding but stopped). As well, other logic checks of randomly selected survey forms were done for

confidence, support, help selected, postpartum depression, number of successful breast feedings, education and age, breast or bottle-feeding. No further discrepancies were found.

Data Recoding

Following completion of the audit, breastfeeding cases were selected (Q19 - women who breastfed or both breast and bottle-fed their infant) ($n = 526$). A summary table of the variable recoding can be found in Appendix E – Table E3. Age, education, income and depression score variables were re-coded. The age and education categories were based on definitions from Health Canada (Advisory Committee on Population Health, 1999; Health Canada, 1999). The following categories were used: age (< 25 years versus ≥ 25 years), education ($\leq$ high school versus $>$ high school). The sample size was too small to warrant smaller categories. Income categories were determined by dividing the existing income groupings from the survey into quartiles.

The postpartum depression scores were recoded into two categories (< 12 and ≥ 12) based on the accepted cut-off score indicating probability for major postpartum depression (≥ 12) (Cox et al., 1993; Cox et al., 1987; Holden, 1991). Dummy variables were created for categorical variables with more than two categories (age, supplementation, and support). The categorical variables were coded with the reference category being the group with the least theoretical probability for early weaning.

Missing Data

Bias is defined as any systematic error in a study that could result in an incorrect association between variables (Hennekens & Buring, 1987). Two reasons that bias can occur are an unrepresentative sample or insufficient numbers to provide the power to

show an association in what is being measured. Missing data are important if the participants with missing data differ from the participants with complete data with respect to outcome and determinants of outcome (Hennekens et al., 1987). Missing data are also important if the sample size becomes too small to provide the power to detect the outcome being measured. In light of the fact that there were only small numbers of missing data, and the sample size was adequate, there is no power problem in this secondary analysis. A comparison of the variables with missing data was completed to look at the breastfeeding outcome trends for the participants who did not provide an answer to the few questions with missing data and those who did. No difference in breastfeeding outcome trends was observed.

There were a total of 526 cases in the sample consisting of women who were exclusively breastfeeding ($n = 367$), and those both breastfeeding and bottle-feeding ($n = 159$) at time of discharge from hospital. The sample size for analyses varied. Within the entire data set, there were 40 missing cells leaving 489 cases with complete data for all variables. Therefore, missing data constituted 7.0% of the total data set (Appendix E - Table E4 - Missing Data Summary). One case had missing data for two questions and another case had missing data for three questions. There were no cases that had missing data for more than three questions. The maximum amount of missing data for any of the variables under study was 1.7% ($n = 9$). This was found for the question about confidence with breastfeeding. Ten variables had a small amount of missing data (range $n = 1-9$, or 0.2-1.7%). Upon recommendation from the statistician, the decision was made to complete the analyses with the existing data set (without imputation) since the missing data constituted less than 10% of the total data set and as long as the data had been

screened for obvious errors the impact on the statistical results and p-values would not be substantial (Day et al., 1998). The sample with complete data still exceeded the projected sample size needed (250). Pair-wise deletion of incomplete cases was carried out for any analysis of the involved variables.

One exception was made however, and that was with the Edinburgh Postpartum Depression Score (EPDS). There are 10 questions that make up the EPDS score. There were two participants who did not respond to any of the questions on the EPDS and they were excluded from the analysis for this variable. There were four participants who did not answer question 10 of the EPDS. In order to retain all women who may have scored greater than or equal to 12 on the EPDS, values were imputed into the missing cells for question 10 of the EPDS for these four participants. Replacement values were calculated using the participant's mean score for question one to nine on the EPDS. The recalculated EPDS score was increased by one for the first two participants and by two for the third participant. The fourth participant's score did not change following imputation. The maximum score achieved (following imputation of the calculated value into each cell) was nine, therefore none of these cases contributed to the category of women whose EPDS score was greater than or equal to 12 on the EPDS.

Data Analysis

The Analytical Design Framework (Figure 3) illustrates the proposed relationship between the four modifiable and two non-modifiable vulnerability factors (independent variables) and breastfeeding outcome at six weeks postpartum (dependent variable). Age and education level are classified as non-modifiable variables in the context of this thesis because they are not possible to change over the short term. The data were analysed using

SPSS 10.0. First, descriptive statistics (frequencies, means, percentages) were generated, to describe the characteristics of the study sample group with respect to demographic factors and vulnerability factors (maternal lack of confidence with breastfeeding, perceived inadequacy of family and professional support, supplementation, postpartum depression, maternal age and education level) and breastfeeding outcome at six weeks postpartum. Women reported reasons why their infant was supplemented while in hospital and their comments about the breastfeeding issues they experienced were grouped into categories and summarized.

Figure 3: Analytical Design Framework

Second, to examine relationships between the outcome (breastfeeding at six months) and vulnerability factors, bivariate analyses of the data were completed. Crude odds ratio, chi-square and p values were calculated. Following this, relationships between breastfeeding outcome and each of the vulnerability factors were tested in a series of

stratified analyses, stratifying for age and then education. Adjusted odds ratio, chi-square and p values were calculated after controlling for age and education separately. A Mantel Haenszel chi-square value was calculated to determine whether the relationship between breastfeeding outcome and the vulnerability factor differed according to the level of age and education.

Third, in order to test for independent relationships between vulnerability factors and breastfeeding outcome, a series of logistic regression analyses were conducted with breastfeeding outcome at six weeks postpartum as the outcome variable and vulnerability factors as a predictor variable. Any predictor variable with a p-value < 0.25 in both the crude and stratified analyses was included in the initial model. Forward and then backward stepwise analysis was used. The Wald statistic was used to evaluate the significance of individual predictors in the logistic regression equation and determine the variables that remained in the model. The final step in the modelling procedure was to test for the significance of interaction terms representing possible effect modifiers. Two-way interaction terms were constructed using the following variables (depression, confidence, and age) and entered into the logistic regression model.

Finally, descriptive statistics were used to explore the use of community resources: lactation consultants (LC), Well Baby Drop-In (WBDI), Breastfeeding Support Drop-In (BSDI), and the Parent-Child Info Line (PCIL). A cross tabulation and chi-square calculation of each vulnerability factor and community resource was carried out to determine frequency of use and whether use was related to the vulnerability factor in question. The measure of use of community resources under study was taken from the column percent of the cross-tabulation table (the number and percent of participants

within each vulnerability category who indicated that they used a specific community resource).

As necessary, consultation and advice with statistical analysis was sought from the Research Institute, Children's Hospital of Eastern Ontario (Isabelle Gaboury, Biostatistician). The findings are described in Chapter Four.

Ethical Considerations

The primary study was submitted for ethical review through the Ottawa Health Department. Description of the process used for protection of human rights is included in Appendix D1. The student is a co-investigator on the primary study. The secondary analysis study was submitted for ethical review to the University of Ottawa and the Ottawa Health Department. The letters of approval are found in Appendix D2 and D3.

The only data that was released to the student from the original FCMC Study was the electronic data for the variables that were to be included in the secondary analysis. The actual questionnaires have been kept locked in a secure place at the City of Ottawa Health Department and no names of the participating women were released. No identifying data, such as names and places, will be mentioned in any report of this secondary analysis. Confidentiality will always be respected and no information that discloses the identity of the subject will be released or published without consent unless required by law. The data will be removed from the student's computer following completion of the study. The women who participated in the primary study were informed that the data would be used for regional planning of maternal infant care. The purpose of this study is consistent with the original study purpose.

Summary

In summary, the purpose of this secondary data analysis was to describe a sample group of women from the FCMC Study who were breastfeeding, and determine the relationship between selected vulnerability factors (supplementation, confidence with breastfeeding, postpartum depression and perceived adequacy of support) and breastfeeding outcome at six weeks postpartum. Secondary analyses of data collected for the FCMC Survey were completed. To explore the relationship between vulnerability factors and breastfeeding outcome, stratified bivariate analyses were completed. Following this, multivariate logistic regression analyses were carried out to determine the relationship between the vulnerability factors and breastfeeding outcome when the factors were combined together in the model. As well, use of community resources by women with these selected vulnerability factors was described. The next chapter will present the study findings with respect to vulnerability factors and breastfeeding outcomes.

CHAPTER FOUR

Results

This chapter presents the results of the secondary analysis of data collected for the Family-Centered Maternity Care (FCMC) Survey by the Ottawa-Carleton Health Department. The data is presented in sections. The first section includes descriptive statistics of the demographic and the selected vulnerability factors of the study participants. The second section addresses the two research questions using bivariate, stratified bivariate, and multivariate logistic regression analysis. The third includes descriptive data about the use of community resources.

The purpose of this study is to explore the relationships between selected vulnerability factors (supplementation, confidence with breastfeeding, postpartum depression and perceived adequacy of support) and breastfeeding outcome at six weeks postpartum. The research questions are:

1. After controlling for education and age, do vulnerability factors (maternal confidence with breastfeeding, perceived adequacy of family and professional support, supplementation, and postpartum depression) explain breastfeeding outcome at six weeks postpartum?
2. What percent of women with the selected vulnerability factors access available resources in the community?

Demographic and Birth Characteristics of the Sample Group of Breastfeeding Women

Detailed socio-demographic and birth information is presented in Table 1. The mean age of participants was 31.4 years (standard deviation, SD 5.3). The majority of women were between 25 and 35 years of age (61.8%, n = 325). Among the women who were less than 25 years of age, 2.5% (n = 13) were under 20. Most women reported having a partner (95.6%, n = 503) and were married or living common-law with their partner (92.2%, n = 485).

The majority of participants had completed some form of post-secondary school education (80.2%, n = 422). The level of education of the partners was similar to the participants with 79.0% (n = 415) of partners having completed some form of post-secondary school education.

The women who participated in the survey were mainly born in Canada (72.1%, n = 379). All participants understood English or French. Over half of the women reported English (59.5%, n = 313) as the language learned first and still understood. The remaining women were nearly equally split between those listing French as their mother tongue (20.3%, n = 107) and those whose mother tongue was neither English or French (19.8%, n = 104).

The average number of people being supported by the family income was 3.8 (SD 1.0). With respect to family income, 24.0% (n = 136) of participants refused to answer and there was missing data for 10 (1.9%) participants. Of the remaining 74.1% (n = 390) of respondents who provided information, 5.9% (n = 23) reported an income of less than \$17,000, 13.6% (n = 53) reported an income of \$17,000-\$39,999, 34.9% (n = 136) reported an income of \$40,000-\$79,999 and 45.6% (n = 178) reported an income of greater than or equal to \$80,000. The majority of women gave birth vaginally (75.5%, n = 397) with half delivering their first infant (51.0%, n = 268).

Table 1: Demographic and Birth Characteristics of the Sample of Breastfeeding Women

Demographic and Birth Characteristics	n (526)	%
Mother's age category (years)		
< 20	13	2.5
20-24	43	8.2
25-29	145	27.6
30-34	180	34.2
≥ 35	137	26.0
Missing	8	1.5
Mother's last year completed at school		
< High School	2	0.4
High School	101	19.2
Post High School	422	80.2
Missing	1	0.2
Does mother have a partner		
Yes	503	95.6
No	22	4.2
Missing	1	0.2
Present marital status		
Married/Common-Law	485	92.2
Single (single/separated/widowed)	39	7.4
Missing	2	0.4
Partner's last year completed at school		
< High School	3	0.6
High School	80	15.2
Post High School	415	79.0
Missing	28	5.2
Place of birth		
Canada	379	72.1
Other	146	27.7
Missing	1	0.2
Language first learned and still understand		
English	313	59.5
French	107	20.3
Other	104	19.8
Missing	2	0.4
Family income before taxes from all sources		
< 17,000	23	4.4
17,000-39,999	53	10.1
40,000-79,999	136	25.8
80,000 or more	178	33.8
Refused to answer	136	24.0
Missing	10	1.9

Table 1: Demographic and Birth Characteristics of the Sample of Breastfeeding Women (cont'd)

Demographic and Birth Characteristics	n (526)	%
Birth		
Vaginal	397	75.5
Cesarean Section	119	22.6
Missing	10	1.9
Parity		
Primipara	268	51.0
Multipara	248	47.1
Missing	10	1.9

Descriptive Statistics of Vulnerability Factors

While in hospital, 87.8% (n = 526/599) of mothers from the original FCMC study initiated breastfeeding. At six weeks postpartum, 71.6% (n = 430) of mothers from the original FCMC study were still breastfeeding. The following section describes the breastfeeding rates and distribution of vulnerability factors within the thesis sample, which included breastfeeding mothers only. More detailed information about the distribution of these factors can be found in Table 2.

Of the mothers who initiated breastfeeding in hospital, 69.8% (n = 367) reported breastfeeding only, while 30.2% (n = 159) both breastfed and bottle-fed. Despite this finding, nearly half of women reported that their infants were supplemented with formula during the hospital stay (48.3%, n = 254). At six weeks postpartum, 63% (n = 333) of women reported that they were still breastfeeding exclusively, 16.9% (n = 89) were breastfeeding while supplementing with one bottle of milk other than breast milk, and 19.8% (n = 104) had stopped breastfeeding completely. Therefore, at six weeks postpartum the number of women who were exclusively breastfeeding had dropped only slightly (n = 34, 5.5%), and the number of women who were breastfeeding and bottle-feeding was nearly reduced by half (n = 159, 30.2% to n = 89, 16.9%). Of the 19.8%

(n = 104) of women who discontinued breastfeeding completely by six weeks postpartum, most came from the combined breastfeeding and bottle-feeding group.

About one third (38.4%, n = 202) of women recalled feeling very confident about breastfeeding upon hospital discharge. The majority of women reported receiving enough help overall (92.6%, n = 487). Help received from family members was reported to be “more than enough” by 50.2% (n = 264) of women, and 40.3% (n = 212) of women reported receiving more than enough help from professionals. Most women (95.1%, n = 501) scored less than 12 on the Edinburgh Postpartum Depression Scale indicating they were less likely to be depressed at that time.

The majority of women had one (40.5%, n = 213) or two (32.8%, n = 173) of the vulnerability factors under study. Of the remainder, 10.3% (n = 54) had no vulnerability factors, 14.1% (74) had three factors and 2.3% (n = 12) of women were coping with all four vulnerability factors in their lives.

Table 2: Distribution of Vulnerability Factors in the Sample of Breastfeeding Women

Vulnerability Factors	n (526)	%
Feeding in the first 48 hours after birth		
Breastfeeding only	367	69.8
Breastfeeding and bottle-feeding	159	30.2
Missing	0	
Infant supplemented with formula in hospital		
No	263	50.0
Yes	254	48.3
I don't know	8	1.5
Missing	1	0.2
Infant supplemented with water in hospital		
No	440	83.7
Yes	14	2.7
I don't know	71	13.4
Missing	1	0.2
Maternal level of confidence about breastfeeding upon discharge		
1 (not at all confident)	19	3.6
2	34	6.5
3 (somewhat confident)	101	19.2
4	161	30.6
5 (very confident)	202	38.4
Missing	9	1.7
Method of feeding at 6 weeks postpartum		
Breastfeeding only	333	63.3
Breastfeeding with 1 bottle of alternate milk	89	16.9
Bottle-feeding only (was breastfeeding but stopped)	104	19.8
Missing	0	0
Help received from family		
1 (none)	11	2.1
2	27	5.1
3 (some)	73	13.9
4	143	27.2
5 (more than enough)	264	50.2
Missing	8	1.5
Help received from professionals		
1 (none)	33	6.3
2	32	6.1
3 (some)	97	18.4
4	150	28.5
5 (more than enough)	212	40.3
Missing	2	0.4
Enough help overall		
Yes	487	92.6
No	36	6.8
Missing	3	0.6
Postpartum Depression Score Category		
< 12	501	95.1
≥ 12	23	4.5
Missing	2	0.4

Use of Selected Community Resources by the Sample Group of Breastfeeding Women

Details of the use of the selected community resources by the sample of participating breastfeeding women is found in Table 3. About half of the women (49.8%, $n = 262$) did not seek help from any of the four identified community resources. One third of the women (29.5%, $n = 155$) reported using at least one resource, while 14.4% ($n = 76$) used two resources, 5.5% ($n = 29$) reported using three resources and 0.8% ($n = 4$) of the women reported accessing help from all four resources. Of the four community resources in this study, mothers reported they accessed the Parent Child Info Line (PCIL) the most ($n = 174$, 33.1%) and the Well Baby Drop-In Clinics second most frequently ($n = 106$, 20.2%).

Table 3: Community Resource Use by the Sample Group of Breastfeeding Women

Community Resources Used	n (526)	%
Total number of resources used		
0	262	49.8
1	155	29.5
2	76	14.4
3	29	5.5
4	4	0.8
Sought help from a lactation consultant		
No	481	91.4
Yes	45	8.6
Missing	0	
Sought help from a Well Baby Drop-In		
No	420	79.8
Yes	106	20.2
Missing	0	
Sought help from Parent Child Info Line		
No	351	66.7
Yes	174	33.1
Missing	1	0.2
Sought help at a Breastfeeding Support Drop-In		
No	441	83.8
Yes	85	16.2
Missing	0	

Reported Reasons for Infant Supplementation with Formula While in Hospital

Two hundred and fifty-four (48.3%) of the participating breastfeeding women in this study reported that their infant was supplemented with formula while in hospital. However, comments were received from 287 women about why they thought their infant had been supplemented with formula while in hospital. These comments have been grouped into five general categories. The categories were: breastfeeding problems (n = 94), supplementation necessary (n = 65), rest/fatigue (n = 55), infant health problems (n = 46), and mother unwell (n = 29).

Examples of 'breastfeeding problems' reported by women were: not enough milk/infant hungry, difficulty breastfeeding, latch, problems with suck or sore nipples, infant not nursing well and pain. The category of 'supplementation necessary' included such comments as: infant needed supplementing, supplementation without permission, mother's choice, infant in nursery, infant needed top-up, staff just did it, and medications (mother). Issues described in the category 'rest/fatigue' were: mom sleeping, mom needed a break, mom fatigued/tired. The 'infant health problems' category included comments such as: infant weight loss, infant in special care nursery or an isolette, jaundice, low glucose level, dehydration, sleepy infant, big infant, infant small/weak, and needed added calories. The category 'mother unwell' included such comments as: cesarean section, hard time, hemorrhage, unconscious, operating room, and passing out.

Reported Issues Related to Breastfeeding

Seventy-seven (14.6%) women also commented about breastfeeding issues they experienced. These issues have been grouped into five categories: feeling pressured about breastfeeding (n = 30); inconsistency of information received (n = 23); lack of

support (n = 14); pumping/supplementing issues (n = 7) and general breastfeeding problems (n = 5).

Feeling pressured about breastfeeding was the most frequently reported issue (n = 30). Women described such feelings as: being pressured by staff, feeling guilty, stressed or worthless and not being respected. Examples of comments received from women related to this theme were:

“Some nurses were too pushy about breastfeeding – this almost pushed mom to not breastfeed at all – way too pushy.”

“Nurses are too pro-breastfeeding; makes moms feel guilty if not able to – other options not mentioned.”

“Too much pressure to breastfeed; result is feelings of worthlessness.”

The next most frequently mentioned issue was related to inconsistency of information received (n = 23). Examples of comments received from women related to this theme included:

“Nurses in hospital all have different methods of breastfeeding, very inconsistent, very confusing.”

“Each nurse in hospital has a different way to teach nursing that differs also from PHN/I have given up.”

“Too many contradictory opinions; inexperienced student nurses were also offering their opinions.”

The third issue raised was related to feeling unsupported (n = 14). Examples of comments related to this theme are provided in the following quotes from women:

“No support in hospital for breastfeeding because it was her second child.”

“Need more help with breastfeeding in hospital.”

“For first time women, 48 hours is too short – if nursing, moms tend to stop because of lack of support.”

Research Question # 1

The first question to be answered in this secondary analysis is: After controlling for education and age, do vulnerability factors (maternal confidence with breastfeeding, perceived adequacy of family and professional support, supplementation, and postpartum depression) explain breastfeeding outcome at six weeks postpartum?

Bivariate Analysis

A bivariate analysis was completed to examine the relationship between each vulnerability factor and breastfeeding outcome at six weeks postpartum. Adjusted odds ratios (OR) were calculated after controlling for age and education separately. Statistical significance was set at the level of 0.05. A list of the variable categories used is found in Appendix E - Table E5. Detailed results of the crude and adjusted OR for vulnerability factors and breastfeeding outcome are presented in Table 4 to 6. Table 4 first presents data from the unstratified bivariate analysis of each vulnerability factor and breastfeeding outcome at six weeks postpartum. Table 5 provides details about the bivariate analysis of each vulnerability factor and breastfeeding outcome (stratified by age) at six weeks postpartum. Table 6 provides details about the bivariate analysis (stratified by education level) of each vulnerability factor and breastfeeding outcome at six weeks postpartum. The significant findings of the bivariate and logistic regression analyses are summarized in Table 7 and are discussed in the following section.

Table 4: Unstratified Bivariate Analysis of Vulnerability Factors and Breastfeeding Outcome (Weaning) at Six Weeks Postpartum

Factor	Breastfeeding Outcome			OR (95%CI)	χ^2	p value
	Wean	BF+	Total			
Age						
< 25	20	36	56	3.25 (1.58, 6.70)	9.54	0.002*
25-35	64	261	325	1.43 (0.83, 2.48)	1.36	0.240
>35	20	117	137	1.00 (reference)		
Total	104	414	518			
Education						
≤ High School	29	74	103	1.81 (1.10, 2.98)	4.98	0.030*
> High School	75	347	422	1.00 (reference)		
Total	104	421	525			
Formula Supplement						
Don't Know	1	7	8	0.85 (0.10, 7.07)	0.13	0.720
Yes	65	189	254	2.04 (1.31, 3.18)	9.37	0.002*
No	38	225	263	1.00 (reference)		
Total	104	411	525			
Water Supplement						
Don't Know	23	48	71	2.26 (1.30, 3.93)	7.70	0.006*
Yes	4	10	14	1.89 (0.58, 6.17)	0.51	0.480
No	77	363	440	1.00 (reference)		
Total	104	421	525			
Confidence						
1 (not at all)	16	3	19	34.57 (9.44, 126.59)	51.19	<0.001*
2	11	23	34	3.10 (1.36, 7.07)	6.42	0.010*
3 (somewhat)	21	80	101	1.70 (0.91, 3.19)	2.26	0.130
4	23	138	161	1.08 (0.59, 1.97)	0.01	0.920
5 (very)	27	175	202	1.00 (reference)		
Total	98	419	517			
Family Help						
1 (none)	5	6	11	3.48 (1.02, 11.85)	2.98	0.080
2	5	22	27	0.95 (0.34, 2.63)	0.02	0.880
3 (some)	15	58	73	1.08 (0.57, 2.06)	0.00	0.950
4	27	116	143	0.97 (0.58, 1.63)	0.00	0.980
5 (enough)	51	213	264	1.00 (reference)		
Total	103	415	518			
Professional Help						
1 (none)	7	26	33	1.12 (0.46, 2.77)	0.00	0.990
2	6	26	32	0.96 (0.37, 2.49)	0.03	0.870
3 (some)	18	79	97	0.95 (0.51, 1.76)	0.00	0.990
4	32	118	150	1.13 (0.67, 1.90)	0.11	0.740
5 (enough)	41	171	212	1.00 (reference)		
Total	104	420	524			
Overall Help						
No	8	28	36	1.16 (0.51, 2.63)	0.02	0.880
Yes	96	391	487	1.00 (reference)		
Total	104	419	523			
Depression						
≥ 12	9	14	23	2.78 (1.17, 6.62)	4.56	0.030*
< 12	94	407	501	1.00 (reference)		
Total	103	421	524			

+ BF = Breastfeeding

* p = < 0.05, χ^2 – Chi-square value after Yate's continuity correction

Table 5: Analysis of Vulnerability Factors and Breastfeeding Outcome (Weaning) at Six Weeks Postpartum (Stratified By Age)

	Age < 25 (n = 56)			Age ≥ 25 (n = 462)				
	OR (95%CI)	χ^2	P value	OR (95%CI)	χ^2	P value	MH χ^2	P value
Formula Supplement								
Don't Know	0.90 (0.08, 10.21)	0.28	0.600	1.64 (0.18, 15.13)	0.05	0.820	0.04	0.830
Yes	2.52 (0.80, 7.95)	1.72	0.190	2.00 (1.23, 3.27)	7.25	0.010	9.58	0.002*
No	1.00 (reference)			1.00 (reference)				
Water Supplement								
Don't Know	0.93 (0.24, 3.62)	0.06	0.810	2.59 (1.40, 4.77)	8.65	0.003	6.46	0.010*
Yes	1.87 (0.11, 32.01)	1.10	0.750	1.77 (0.47, 6.27)	0.20	0.650	0.36	0.550
No	1.00 (reference)			1.00 (reference)				
Confidence								
1 (not at all)	13.60 (1.22, 151.05)	3.71	0.050	42.55 (8.92, 202.89)	43.02	<0.001	45.37	<0.001*
2	5.10 (0.66, 39.55)	1.22	0.270	2.70 (1.07, 6.84)	3.52	0.060	5.82	0.020*
3 (somewhat)	1.46 (0.27, 7.82)	0.00	1.000	1.80 (0.91, 3.56)	2.30	0.130	2.44	0.120
4	1.36 (0.29, 6.28)	0.00	1.000	1.08 (0.56, 2.08)	0.00	0.960	0.04	0.840
5 (very)	1.00 (reference)			1.00 (reference)				
Family Help								
1 (none)	1.21 (0.07, 21.22)	0.36	0.550	5.19 (1.43, 18.82)	5.42	0.020	4.28	0.040*
2	1.21 (0.07, 21.22)	0.36	0.550	1.30 (0.46, 3.67)	0.04	0.840	0.06	0.810
3 (some)	0.30 (0.03, 3.04)	0.33	0.570	1.50 (0.76, 2.94)	0.99	0.320	0.31	0.570
4	0.61 (0.18, 2.03)	0.26	0.610	1.06 (0.59, 1.90)	0.00	0.970	0.00	0.950
5 (enough)	1.00 (reference)			1.00 (reference)				
Professional Help								
1 (none)	0.30 (0.03, 3.05)	0.32	0.570	1.73 (0.68, 4.44)	0.79	0.370	0.08	0.780
2	1.18 (0.07, 21.18)	0.39	0.530	1.25 (0.47, 3.30)	0.03	0.850	0.05	0.830
3 (some)	0.44 (0.09, 2.09)	0.45	0.500	1.16 (0.59, 2.30)	0.07	0.800	0.01	0.920
4	0.71 (0.19, 2.58)	0.04	0.840	1.26 (0.71, 2.26)	0.41	0.520	0.13	0.710
5 (enough)	1.00 (reference)			1.00 (reference)				
Overall Help								
No	0.40 (0.40, 3.84)	0.11	0.740	1.54 (0.67, 3.56)	0.61	0.440	0.12	0.730
Yes	1.00 (reference)			1.00 (reference)				
Depression								
≥ 12	0.55 (0.05, 5.65)	0.00	0.980	4.48 (1.76, 11.40)	9.59	0.002	5.93	0.010*
< 12	1.00 (reference)			1.00 (reference)				

* p = < 0.05

χ^2 - Chi-square value after Yate's continuity correction

MH χ^2 - Mantel Haenszel Chi-square after Yate's continuity correction

Table 6: Analysis of Vulnerability Factors and Breastfeeding Outcome (Weaning) at Six Weeks Postpartum (Stratified by Education)

	≤ High School (n = 103)			> High School (n = 422)				
	OR (95%CI)	χ^2	p value	OR (95%CI)	χ^2	p value	MH χ^2	p value
Formula Supplement								
Don't Know	1.00 (0.10, 10.07)	0.35	0.560	2.17 (0.22, 21.60)	0.00	0.950	0.00	0.970
Yes	2.35 (0.94, 5.88)	2.67	0.100	1.90 (1.14, 3.18)	5.56	0.020	8.78	0.003*
No	1.00 (reference)			1.00 (reference)				
Water Supplement								
Don't Know	1.45 (0.51, 4.10)	0.18	0.670	2.52 (1.30, 4.86)	6.89	0.010	6.43	0.010*
Yes	2.90 (0.38, 21.97)	0.24	0.620	1.53 (0.31, 7.55)	0.00	0.950	0.51	0.470
No	1.00 (reference)			1.00 (reference)				
Confidence								
1 (not at all)	21.00 (2.07, 213.29)	7.49	0.010	28.00 (7.23, 108.38)	36.8	<0.001	47.15	<0.001*
2	5.25 (0.89, 30.82)	2.07	0.150	2.80 (1.08, 7.24)	3.61	0.060	6.74	0.010*
3 (somewhat)	1.50 (0.39, 5.75)	0.05	0.820	1.80 (0.88, 3.70)	2.06	0.150	2.37	0.120
4	3.38 (1.09, 10.43)	3.51	0.060	0.80 (0.38, 1.66)	0.18	0.670	0.22	0.640
5 (very)	1.00 (reference)			1.00 (reference)				
Family Help								
1 (none)	2.63 (0.15, 44.53)	0.01	0.920	4.89 (1.34, 17.78)	4.87	0.030	5.15	0.020*
2	0.88 (0.08, 9.04)	0.22	0.640	1.03 (0.33, 3.21)	0.06	0.810	0.06	0.800
3 (some)	1.17 (0.31, 4.33)	0.01	0.910	1.12 (0.53, 2.37)	0.01	0.920	0.04	0.840
4	1.24 (0.45, 3.42)	0.02	0.890	0.94 (0.51, 1.73)	0.00	0.960	0.01	0.920
5 (enough)	1.00 (reference)			1.00 (reference)				
Professional Help								
1 (none)	0.71 (0.07, 6.98)	0.06	0.810	1.29 (0.48, 3.46)	0.06	0.810	0.01	0.930
2	0.71 (0.07, 6.98)	0.06	0.810	1.29 (0.48, 3.46)	0.06	0.810	0.01	0.930
3 (some)	1.42 (0.44, 4.61)	0.07	0.790	0.86 (0.41, 1.79)	0.05	0.820	0.01	0.920
4	1.49 (0.54, 4.09)	0.27	0.600	1.05 (0.57, 1.94)	0.00	1.000	0.16	0.690
5 (enough)	1.00 (reference)			1.00 (reference)				
Overall Help								
No	0.49 (0.06, 4.41)	0.03	0.860	1.44 (0.59, 3.48)	0.31	0.580	0.04	0.850
Yes	1.00 (reference)			1.00 (reference)				
Depression								
≥ 12	0.63 (0.07, 5.84)	0.01	0.930	4.60 (1.80, 11.75)	9.90	0.002	6.13	0.010*
< 12	1.00 (reference)			1.00 (reference)				

* p = < 0.05

χ^2 – Chi-square value after Yate's continuity correction

MH χ^2 - Mantel Haenszel Chi-square after Yate's continuity correction

Table 7: Significant Relationships in Bivariate and Logistic Regression Analyses

	Increased Probability of Weaning					
Factor	Bivariate Unstratified Analysis	Bivariate Stratified Analysis				Logistic Regression
		Age		Education		
		< 25	≥ 25	≤ HS	> HS	
Age	< 25					
Education	≤ HS					≤ HS
Formula Supplement	Yes		Yes		Yes	
Water Supplement	Don't know		Don't know		Don't know	
Confidence Level	1-2	1	1-2	1	1-2	Confidence Level
Family Help			1		1	
Professional Help						
Overall Help						
Depression EPDS	≥ 12		≥ 12		≥ 12	≥ 12

EPDS – Edinburgh Postpartum Depression Score

HS – high school

Confidence Level – 1(not at all) – 5 (very confident)

Family Help Level – 1(none) – 5 (enough)

Mother's younger age was statistically significantly associated with weaning by six weeks postpartum. As compared to women aged 35 years and older, women who were younger than 25 years of age were more likely to wean (crude OR: 3.25, 95% CI: 1.58, 6.70, $\chi^2 = 9.54$; $p = 0.002$). When women who were aged 35 years and older were compared to women aged 25 to 35 years of age, there was no statistically significant difference in weaning outcome (crude OR: 1.43, $\chi^2 = 1.36$; $p = 0.240$). For the remaining analyses, where age was used as a stratifying variable, it was recoded into two categories (< 25 and ≥ 25).

Mother's lower level of education was statistically significantly associated with weaning by six weeks postpartum (crude OR: 1.81, 95% CI: 1.10, 2.98, $\chi^2 = 4.98$; $p = 0.030$). As compared to women who had completed some post-secondary education, women who had not gone beyond a high school education were 80% more likely to wean by six weeks postpartum.

Formula Supplementation

Formula supplementation was associated with weaning. As compared to women who responded "No" to the question "Was your baby given formula while in hospital?", women who responded, "Don't know" were no more likely to wean ($\chi^2 = 0.13$; $p = 0.720$). However, there were small numbers in this category. Women who reported that their infant received formula supplementation while in hospital were twice as likely to wean by six weeks postpartum as women who reported their infant did not receive formula supplementation (OR: 2.04, 95% CI: 1.31, 3.18, $\chi^2 = 9.37$; $p = 0.002$). The findings were similar (OR: 2.05, 95% CI: 1.32, 3.18, $\chi^2 = 9.66$; $p = 0.001$) when women who responded, "Yes" were compared to the "Don't know" and the "No" groups collapsed together.

The magnitude of association between formula supplementation and weaning varied according to both age (MH $\chi^2 = 9.58$; $p = 0.002$) and education (MH $\chi^2 = 8.78$; $p = 0.003$). Among women less than 25 years of age or with less than high school education, the association between formula supplementation and weaning was not significant. Among women 25 years of age or more, there was a significant association between formula supplementation and weaning (OR: 2.00, 95% CI: 1.23, 3.27, $\chi^2 = 7.25$; $p = 0.010$). Among women with more than high school education there was a significant

association between formula supplementation and weaning (OR: 1.90, 95% CI: 1.14, 3.18, $\chi^2 = 5.56$; $p = 0.020$).

Water Supplementation

Water supplementation was associated with weaning. As compared to women who responded “No” to the question “Was your baby given water while in hospital?”, women who responded, “Yes” were no more likely to wean ($\chi^2 = 0.51$, $p = 0.480$). However, women who reported they did not know if their infant received water supplementation while in hospital were more than twice as likely to wean by six weeks postpartum as women who reported that their infant did not receive water supplementation (OR: 2.26, 95% CI: 1.30, 3.93, $\chi^2 = 7.70$; $p = 0.006$).

The magnitude of association between water supplementation and weaning varied according to both age (MH $\chi^2 = 6.46$; $p = 0.010$) and education (MH $\chi^2 = 6.43$; $p = 0.010$). Among women less than 25 years of age or with less than high school education, the association between water supplementation and weaning was not significant. Among women 25 years of age or more, there was a significant association between not knowing if their infant received water supplementation and weaning (OR: 2.59, 95% CI: 1.40, 4.77, $\chi^2 = 8.65$; $p = 0.003$). Among women with more than high school education there was a significant association between not knowing if their infant received water supplementation and weaning (OR: 2.52, 95% CI: 1.30, 4.86, $\chi^2 = 6.89$; $p = 0.010$).

Maternal Confidence with Breastfeeding

In the bivariate analysis maternal confidence with breastfeeding was associated with weaning. As compared to women who reported being very confident (5), women who reported being somewhat confident (3) ($\chi^2 = 2.26$; $p = 0.130$), or a confidence level

of 4, ($\chi^2 = 0.01$; $p = 0.920$) were no more likely to wean at six weeks postpartum.

However, as compared to women who reported being very confident (5), women who reported being not at all confident (1) had a 34-fold greater probability of weaning (OR: 34.57, 95% CI: 9.44, 126.59, $\chi^2 = 51.19$; $p = 0.001$). However, there was a wide confidence interval with this odds ratio. Women, who reported their confidence level at 2, were three times more likely to wean (OR: 3.10, 95% CI: 1.36, 7.07, $\chi^2 = 6.42$; $p = 0.010$).

The magnitude of association between maternal confidence with breastfeeding and weaning varied according to both age (MH $\chi^2 = 45.37$; $p < 0.001$) and education (MH $\chi^2 = 47.15$; $p < 0.001$) with stronger associations among the older women. Among women less than 25 years of age, those who reported being not at all confident (1) were more likely than those who reported being very confident (5) to wean (OR: 13.60, 95% CI: 1.22, 151.05, $\chi^2 = 3.71$; $p = 0.050$). Among women with high school education or less, those who reported being not at all confident (1) were more likely than those who reported being very confident (5) to wean (OR: 21.00, 95% CI: 2.07, 213.28, $\chi^2 = 7.49$; $p = 0.010$). Among women 25 years of age and older, those who reported being not at all confident (1) were more likely than those who reported being very confident (5) to wean (OR: 42.55, 95% CI: 8.92, 202.89, $\chi^2 = 43.02$; $p < 0.001$). Among women with more than high school education, those who reported being not at all confident (1) were more likely than those who reported being very confident (5) to wean (OR: 28.00, 95% CI: 7.23, 108.38, $\chi^2 = 36.8$; $p < 0.001$).

Maternal Perception of Adequacy of Family Help, Professional Help and Overall Help

In the bivariate analyses neither adequacy of family help, adequacy of professional help, nor adequacy of overall help were associated with weaning. There was

a trend for an association between adequacy of family help and weaning. As compared to women who reported having “enough” family help, women who reported having no family help (“none”) tended to be more likely to wean (OR: 3.48, 95% CI: 1.02, 11.85, $\chi^2 = 2.98$; $p < 0.080$).

The magnitude of the association between family help and weaning varied according to age (MH $\chi^2 = 4.28$; $p = 0.040$) and education (MH $\chi^2 = 5.15$; $p = 0.020$). Among women less than 25 years of age or with no more than high school education, family help was not associated with weaning. Among women 25 years of age and older, those who reported no (“none”) family help were more likely than those who reported “enough” family help to wean (OR: 5.19, 95% CI: 1.43, 18.82, $\chi^2 = 5.42$; $p = 0.020$). Among women with more than high school education, those who reported no (“none”) family help were more likely than those who reported “enough “ family help to wean (OR: 4.89, 95% CI: 1.34, 17.78, $\chi^2 = 4.87$; $p = 0.030$)

Postpartum Depression Score

Higher scores on the Edinburgh Postpartum Depression Scale were associated with weaning. As compared to women who scored less than the cut off of 12, women who scored above the cut off of 12 were more likely to wean (OR: 2.78, 95% CI: 1.17, 6.62, $\chi^2 = 4.56$; $p = 0.030$).

The magnitude of the association between depression and weaning varied according to both age (MH $\chi^2 = 5.93$; $p = 0.010$) and education (MH $\chi^2 = 6.13$; $p = 0.010$). Among women less than 25 years of age or with less than high school education, the association between depression and weaning was not significant. Among women 25 years of age or more, there was a significant association between depression

and weaning (OR: 4.48, 95% CI: 1.76, 11.40, $\chi^2 = 9.59$; $p = 0.002$). Among women with more than high school education there was a significant association between depression and weaning (OR: 4.60, 95% CI: 1.80, 11.75, $\chi^2 = 9.90$; $p = 0.002$).

Multivariate Analysis (Logistic Regression)

Based on the level of significance of their association with weaning in the unadjusted and adjusted analyses, six variables were included as potential predictors in the logistic regression analysis: age (< 25 versus ≥ 25), education ($\leq$ high school versus > high school), supplementation with formula (yes versus no/don't know) supplementation with water (yes versus no/don't know), maternal confidence with breastfeeding (level one to five), and postpartum depression status (< 12 versus ≥ 12). Family help was not included because four of the five categories were not significant in the bivariate analysis. With forward entry of variables, there were three independent predictors that remained in the model: education, confidence, and postpartum depression score. With backward entry of the variables there were four independent predictors that remained in the model: age, education, confidence, and postpartum depression score. The four-variable model (including age) was retained as the best model of the probability of weaning because age is related to weaning in the bivariate analysis, it was close to significance in the backward entry of variables and it has been reported in other research to be significantly related to weaning. Table 8 lists the variable coefficients, odds ratios, confidence intervals, and p values from the model. Figure 4 illustrates the adjusted OR for all variables selected for entry into the final logistic regression model.

Two-way interaction terms (age*confidence, depression* confidence) were also constructed and entered into the logistic regression model. The interaction terms were not

significant and were not retained in the final model. This indicates that when the main effects of age, education, confidence and depression were controlled for in the regression analysis, interactions between confidence and both age and depression, noted in the stratified analyses, were not significant.

Table 8: Odds Ratio for Continuing Breastfeeding

Variable	B Coefficient	OR (95%CI)	p value
Age			
< 25	-0.638	0.53 (0.27, 1.05)	0.068
≥ 25	0	1.00 (reference)	
Education			
≤ High School	-0.658	0.52 (0.29, 0.93)	0.028*
> High School	0	1.00 (reference)	
Depression Score			
Category			
≥ 12	-1.266	0.28 (0.11, 0.71)	0.007*
< 12	0	1.00 (reference)	
Confidence	0.614	1.85 (1.50, 2.27)	<0.001*
Constant	-0.564		

*p< 0.05

Using the model coefficients and the model of weaning developed in this study the probability of weaning for a woman with varying degrees of vulnerability can be calculated. To illustrate one case, Appendix E - Table E6, provides an example of the calculation of the probability of weaning by six weeks postpartum using the coefficients in the model. In this example, the probability of weaning is 77.7% for a women who is less than 25 years of age with no greater than high school education, whose postpartum depression score is less than 12 at six weeks postpartum on the Edinburgh Postpartum Depression Scale, and who described herself as “not at all confident” (1) about breastfeeding at hospital discharge. This is an example of a woman who has three

vulnerability factors to illustrate the effect on breastfeeding outcome when a combination of several vulnerability factors is involved. The predicted probability of weaning by six weeks postpartum for a woman with no vulnerability factors would be less than eight percent (Table 9). This suggests that as the number, type and combination of vulnerability factors change, the probability of weaning changes.

Figure 4: Adjusted OR for Variables Entered into the Logistic Regression Model**

* Reference Category

**The vulnerability factors under review are listed on the left side of the figure. The vertical line represents the number 1, meaning that the outcome would be the same whether the vulnerability factor was present or not. A dot and horizontal line beside each factor represent the odds ratio and confidence interval for that factor. If the horizontal line is completely to the left of the vertical line representing 1, this means that the mother is more likely to be bottle-feeding at six weeks postpartum. If the horizontal line is completely to the right of the vertical line representing 1, this means that the mother is more likely to be breastfeeding at six weeks postpartum. When the horizontal line crosses the vertical line, this means that there was no statistically significant association between that factor and breastfeeding outcome at six weeks postpartum.

Table 9 illustrates resulting probabilities for each of the vulnerability factors under study. The vulnerability factors are defined as follows: age (< 25 years), education ($\leq$ high school), depression (≥ 12 – Edinburgh Postpartum Depression Score), and confidence (1 – not at all confident with breastfeeding). Each vulnerability factor is associated with a different risk of weaning with age and education having the least probability of weaning and depression and lack of confidence with breastfeeding having the greatest probability of weaning.

Table 9: Probability of Weaning at Six Weeks Postpartum

Type of Vulnerability Factors	Probability of Weaning (1 – P) (%)
None	7.54
Age (< 25)	13.38
Education ($\leq$ HS)	13.61
Depression (≥ 12)	22.44
Confidence (1)	48.75

Age (< 25 years)

Education ($\leq$ high school)

Depression (≥ 12 – Edinburgh Postpartum Depression Score)

Confidence (1 – not at all confident with breastfeeding)

P = probability of breastfeeding

1-P = probability of not breastfeeding (weaning)

Research Question # 2

The second question examined in this study was: What percent of women with vulnerability factors accessed available resources in the community [Lactation Consultants (LC), Well Baby Drop-In Clinics (WBDI), Breastfeeding Support Drop-In Clinics (BSDI), Parent Child Info Line (PCIL)]?

Approximately half of the 526 women who initiated breastfeeding (49.8%,

n = 262), did not access any of the available community resources. One third of the participants (29.5%, n = 155) used one resource, 14.4% (n = 76) used two resources, 5.5% (n = 29) used three resources, and 0.8% (n = 4) of the women used all four of the community resources. Overall, the most commonly used resource, as reported by women, was the Parent Child Info Line (33.1%, n = 174), followed by Well Baby Drop-In clinics (20.2%, n = 106) Breastfeeding Support Drop-In clinics (16.2%, n = 85) and finally Lactation Consultants (8.6%, n = 45) (Table 10). The significant results of tests of association between the use of the selected community resources and vulnerability factors are found in Table 11. A detailed table, including non-significant findings is appended in Appendix E – Table E7. The percent of women within each vulnerability category who accessed a community resource is presented.

Table 10: Overall Use of Selected Community Resources

Resource* Use	Community Resources			
	PCIL n (%)	WBDI n (%)	BFDI n (%)	LC n (%)
Yes	174 (33.1)	106 (20.2)	85 (16.2)	45 (8.6)
No	351 (66.9)	420 (79.8)	441 (83.8)	481 (91.4)

* PCIL=Parent-Child Info Line, WBDI=Well Baby Drop-In, BSDI=Breastfeeding Support Drop-In, LC=Lactation Consultant

Table 11: Use of Community Resources by Vulnerability Factor (Significant Results)

Resources Used									
		PCIL		WBDI		BSDI		LC	
	n = 526	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Confidence									
1 (not at all)	19 (3.7)	5 (26.3)	14 (73.7)			5 (26.3)	14 (73.7)	3 (15.8)	16 (84.2)
2	34 (6.6)	13 (38.2)	21 (61.8)			12 (35.3)	22 (64.7)	12 (35.3)	22 (64.7)
3 (somewhat)	101 (19.5)	46 (45.5)	55 (54.5)			25 (24.8)	76 (75.2)	15 (14.9)	86 (85.1)
4	161 (31.1)	46 (28.8)	114 (71.3)			21 (13.0)	140 (87.0)	9 (5.6)	152 (94.4)
5 (very)	202 (39.1)	61 (30.2)	141 (69.8)			22 (10.9)	180 (89.1)	6 (3.0)	196 (97.0)
Total	517	171 (33.1)	345 (66.9)			85 (16.4)	432 (83.6)	45 (8.7)	472 (91.3)
Missing	9								
χ^2		9.99 (df 4)				21.1 (df 4)		46.58 (df 4)	
p value		0.041				<0.001		<0.001	
Depression									
< 12	501 (95.6)								
≥ 12	23 (4.4)								
Total	524								
Missing	2								
χ^2									
p value									
Age									
< 25	56 (10.8)			5 (8.9)	51 (91.1)	2 (3.6)	54 (96.4)	0	56 (100.0)
≥ 25	462 (89.2)			100 (21.6)	362 (78.4)	81 (17.5)	381 (82.5)	44 (9.5)	418 (90.5)
Total	518			105 (20.3)	413 (79.7)	83 (16.0)	435 (84.0)	44 (8.5)	474 (91.5)
Missing	8								
χ^2				4.99 (df 1)		7.24 (df 1)		5.83 (df 1)	
p value				0.025		0.007		0.009***	
Education									
≤ High school	103 (19.6)			12 (11.7)	91 (88.3)	8 (7.8)	95 (92.2)		
> High school	422 (80.4)			94 (22.3)	328 (77.7)	77 (18.2)	345 (81.8)		
Total	525			106 (20.2)	419 (79.8)	85 (16.2)	440 (83.8)		
Missing	1								
χ^2				5.80 (df 1)		6.70 (df 1)			
p value				0.016		0.010			
Formula/Supp									
No	263 (50.1)	73 (27.8)	190 (72.2)						
Yes	254 (48.4)	97 (38.3)	156 (61.7)						
Don't Know	8 (1.5)	3 (37.5)	5 (62.5)						
Total	525	173 (33.0)	351 (67.0)						
Missing	1								
χ^2		6.61 (df 2)							
p value		0.037							
Water/Supp									
No	440 (83.8)								
Yes	14 (2.7)								
Don't Know	71 (13.5)								
Total	525								
Missing	1								
χ^2									
p value									
6 Wk Outcome									
Breast/Both	422 (80.2)								
Bottle Only	104 (19.8)								
Total	526								
Missing	0								
χ^2									
p value									

*LC=Lactation Consultant, WBDI=Well Baby Drop-In, PCIL=Parent-Child Info Line, BSDI=Breastfeeding Support Drop-In

p<0.05

***=Fisher Exact Test

 χ^2 - testing whether there is a statistical difference between women who use the community resource and women who don't

Confidence with Breastfeeding

Five hundred and seventeen women responded to the questions related to confidence with breastfeeding and resource utilization. Nineteen women rated their confidence with breastfeeding as (1) “not at all confident”. Of these women, 15.8% (n = 3) reported seeing a lactation consultant, 36.8% (n = 7) attended a Well Baby Drop-In clinic, 26.3% (n = 5) called the Parent Child Info Line, and 26.3% (n = 5) attended a Breastfeeding Support Drop-In Clinic.

Maternal confidence with breastfeeding was significantly related to use of lactation consultants ($\chi^2 = 46.58$, df = 4; $p < 0.001$), Parent Child Info Line ($\chi^2 = 9.99$, df = 4; $p = 0.041$) and Breastfeeding Support Drop-In clinics ($\chi^2 = 21.1$, df = 4; $p < 0.001$). Higher reported use of Lactation Consultants was seen in women who scored between “not at all confident” (1) and “somewhat confident” (3).

Postpartum Depression

There were no statistically significant differences in resource use between women who scored less than 12 on the Edinburgh Postpartum Depression Scale and women who scored greater than or equal to 12.

Age

Maternal age was significantly related to use of Lactation Consultants ($\chi^2 = 5.83$, df = 1; $p = 0.009$), Well Baby Drop-In Clinic ($\chi^2 = 4.99$, df = 1; $p = 0.025$) and Breastfeeding Support Drop-In clinics ($\chi^2 = 7.24$, df = 1; $p = 0.007$), with older women more likely to use the resources.

Education

Maternal education level was significantly related to use of Well Baby Drop-In Clinic ($\chi^2 = 5.80$, $df = 1$; $p = 0.016$) and Breastfeeding Support Drop-In clinics ($\chi^2 = 6.70$, $df = 1$; $p = 0.010$). Women with more education were more likely to use the resources.

Supplementation with Formula or Water

Supplementation with water prior to discharge was not significantly related to use of any of the community resources under study. Supplementation with formula was significantly related to use of the Parent Child Info Line ($\chi^2 = 6.61$, $df = 2$; $p = 0.037$). Women who knew their infant was supplemented with formula were more likely to use the resource.

Breastfeeding Outcome

There were no statistically significant differences in the rate of use of community resources between women who were breastfeeding and those who were bottle-feeding at six weeks postpartum.

Summary

In summary, the women who participated in this survey were primarily between the ages of 25-35 years (61.8%, $n = 325$), with post secondary school education (80.2%, $n = 422$), married or living common-law (92.2%, $n = 485$), born in Canada (72.1%, $n = 379$) and spoke English or French as their mother tongue (79.8%, $n = 420$). The family size most commonly consisted of 4 members supported by a family income of greater than \$80,000 per year. The median income was between \$70,000-79,999.

The majority of participating women delivered vaginally (75.5%, $n = 397$), were exclusively breastfeeding during the first 48 hours following birth (69.8%, $n = 367$) and

continued to breastfeed to 6 weeks postpartum (63.3%, $n = 333$). Almost one fifth (19.8%, $n = 104$) of the women participating in the study discontinued breastfeeding by six weeks postpartum.

Over one third of women (38.4%, $n = 202$) recalled feeling 'very confident' about breastfeeding upon discharge from hospital. Half of women (50.2%, $n = 264$) reported receiving more than enough help from family, while 40.3% ($n = 212$) reported receiving adequate help from health care professionals. Most women (95.1%, $n = 501$) scored below the postpartum depression cut-off (less than 12) when screened with the Edinburgh Postpartum Depression Scale. Approximately half (49.8%, $n = 262$) of the participating women used none of the four identified community resources.

Women reported the major reasons their babies were supplemented in the hospital were related to breastfeeding problems, supplementation necessary, infant health problems, and maternal fatigue. The most common breastfeeding problems identified were that there was 'not enough milk' or the 'infant was hungry'. The most common infant problems associated with breastfeeding identified by women were that the 'infant lost weight' and was 'being cared for in the nursery'. Sixty-five women perceived that supplementation was needed and 30 women identified feeling pressured to breastfeed.

After adjusting for the effects of age and education, the vulnerability factors related to breastfeeding outcome were mother's lower level of confidence with breastfeeding and postpartum depression. Based on the logistic regression model, in this sample, if the mother had no vulnerability factors, the probability of weaning by six weeks postpartum was 7.5%. As the number of vulnerability factors increases the mean probability of weaning by six weeks postpartum increases.

Use of the four selected community resources under study was low.

Approximately half of the women (49.8%, $n = 262$) did not access any of the available community resources, one third (29.5%, $n = 155$) used one resource, 14.4% ($n = 76$) used two resources, 5.5% ($n = 29$) used three resources, and 0.8% ($n = 4$) of the women used all four of the community resources. The most commonly used resource, as reported by women, was the Parent Child Info Line (33.1%), followed by Well Baby Drop-In Clinics (2.2%), Breastfeeding Drop-In Clinics (16.2%) and finally lactation consultants (8.6%).

CHAPTER FIVE

Discussion

This final chapter focuses on the discussion of the study findings. General findings of question one and two will be presented first, and then a detailed review of the results of the study will be presented including discussion of the bivariate analysis, multivariate logistic regression analyses, and use of community breastfeeding resources. As well, limitations and strengths of the study, implications for advanced practice nursing and ideas for future research will be discussed.

General Summary of Findings

Research Question 1

Results demonstrate that for this group of women, after controlling for age and education together, vulnerability factors (confidence with breastfeeding, and postpartum depression) are related to breastfeeding outcome and do predict breastfeeding outcome at six weeks postpartum. Perceived adequacy of family and professional support, and supplementation were not independently significantly related to breastfeeding outcome when all variables were entered into the logistic regression model together.

Research Question 2

Approximately half of the women in this study did not access any of the available community resources and one third of participants used only one of the resources. The most commonly used resource, as reported by women, was the Parent Child Info Line, followed by Well Baby Drop-In Clinics, Breastfeeding Drop-In Clinics and finally lactation consultants.

Study Results

Demographic Factors and Vulnerability Characteristics

In general the participants in this study were similar to participants in other studies that have used convenience sampling (Barber et al., 1997; Papinzak et al., 2000; Sheehan et al., 1999). This was a well-educated, middle class population of non-single Caucasian women. Many international studies have looked at the issues surrounding breastfeeding duration with different cultural groups (Haider et al., 2000; Kum-Nji et al., 1999; Perez-Escamilla et al., 1993; Segura-Millan et al., 1994) and with socio-economically disadvantaged women (Arlotti, Cottrell, Lee, & Curtin, 1998; Humphreys, Thompson, & Miner, 1998; Long, Funk-Archuleta, Geiger, Mozar, & Heins, 1995; Whelan et al., 1998). With respect to demographic characteristics, this sample is similar to the Ottawa population (Statistics Canada, 1996) and the participants from TOMIS (The Ontario Mother and Infant Survey) (Sword et al., 2001; Watt et al., 2000).

The majority of participating women delivered vaginally and all were either exclusively breastfeeding or breastfeeding and bottle-feeding during the first 48 hours following birth. By six weeks postpartum the number of women who continued to exclusively breastfeed had dropped only slightly ($n = 34$, 5.5%), while the number of women who were breastfeeding and bottle-feeding was nearly reduced by half ($n = 159$, 30.2% to $n = 89$, 16.9%). Therefore, of the 19.8% ($n = 104$) of women who discontinued breastfeeding completely by six weeks postpartum, most came from the combined breastfeeding and bottle-feeding group, which suggests that, combined breastfeeding and bottle-feeding is an important factor in the discontinuation of breastfeeding. This finding is understandable since it is well documented in the research literature that early

supplementation with formula is related to early weaning (Hill et al., 1997; Martin-Calama et al., 1997). At 20%, the rate of discontinuing breastfeeding by six weeks, was similar to the TOMIS study where 13% to 24% of women who had initiated breastfeeding switched to formula by four weeks postpartum (Sheehan, Krueger, Watt, Sword, & Bridle, 2001).

Nearly half of the women ($n = 258$, 48.3%) reported that their infant was supplemented with formula during the hospital stay. Similar findings have been published in a recent national survey of women's childbearing experiences in the United States (2002), where 47% of infants were given water or formula to supplement breastfeeding (Declercq et al., 2002). In the thesis sample, women reported the major reasons their babies were supplemented were because they were experiencing breastfeeding problems (i.e. not enough milk/infant hungry, difficulty breastfeeding, latch, problems with suck or sore nipples, infant not nursing well and pain), they just felt supplementation was necessary, the infant was having a health problem (i.e. weight loss, infant in special care nursery or an isolette, jaundice, low glucose level, dehydration, sleepy infant, big infant, infant small/weak, and needed added calories), or the mother was just fatigued. These findings are comparable to those reported in the literature as the most common reasons for supplementation (i.e. unsettled infant, difficulties attaching to the breast, hungry baby, neonatal jaundice and hypoglycemia) (Martin et al., 2002). Infants often receive supplementation with formula because of perceived insufficient breast milk or fussiness (Barber et al., 1997; Blomquist et al., 1994).

According to the Academy of Breastfeeding Medicine (2000) *acceptable medical indications for supplementation* do not include such factors as: perceived lack of

milk/infant hungry, difficulty with breastfeeding or latch, problems with suck or sore nipples, infant not nursing well and pain, mother's choice, infant in nursery, medications, mom fatigued/tired, jaundice, big infant, cesarean section, and a hard time breastfeeding. Many of the reasons provided by the thesis sample are not acceptable medical indications for supplementing and suggest that unnecessary supplementation occurred.

Of issue here is the mother's knowledge and understanding of the normal process of breastfeeding, how milk is produced, normal infant behavior, volume and frequency of feeding, what constitutes "being supplemented" and generally understanding when supplements are really indicated. As well, this raises the question of how much nurses and physicians influence the decision to supplement. It is important that health care providers understand the appropriate reasons for use of supplementation, and provide appropriate interventions to help a mother establish breastfeeding, latch, and milk production so some of these problems are resolved before they become an issue. Education for all mothers and health care providers supporting breastfeeding mothers, about the process of breastfeeding and the implications of inappropriate supplementation, is essential. Standardized breastfeeding education would improve consistency of information given to mothers, and ensure practice based on best evidence with respect to supplementation. As well, since maternal breastfeeding knowledge is positively correlated with breastfeeding confidence (Chezem et al., 2003), education can impact on breastfeeding duration by increasing maternal confidence with breastfeeding.

Research findings indicate that limiting the use of formula supplementation to medically indicated reasons, does not interfere with breastfeeding duration (Blomquist et al., 1994). The authors suggest that supplementing a newborn for medical indications

may not interfere with mother-infant interaction and maternal confidence and therefore not impact on breastfeeding as much as it does when supplements are given inappropriately because of perceived insufficient milk. In fact, a number of authors have suggested that a mother's perception of insufficient milk may be a reflection of her lack of breastfeeding confidence rather than actual inadequacy in milk production and transfer to her infant (Dykes & Griffiths, 1998; Dykes & Williams, 1999; Stamp & Crowther, 1995). The findings of this thesis suggest that inappropriate use of supplementation occurred in this sample of women. Following evidence based guidelines for the appropriate use of supplementation would help to eliminate the indiscriminant early use of supplements that can be detrimental to the establishment of breastfeeding. As well, rationalizing the use of a formula supplements, based on established criteria, would require all health care providers to justify use.

Over 88% of women reported feeling somewhat confident (3) to very confident (5) about breastfeeding upon discharge from hospital. Approximately 10% of women rated their confidence with breastfeeding as less than somewhat confident. Other studies have reported similar findings that indicate the vast majority of women (84%), when questioned prior to discharge, had high levels of confidence in their ability to breastfeed for the short term (three months) compared to 49.7% of women reporting high level of confidence to breastfeeding for a longer term (nine months) (Papinczak et al., 2000). In a recent study by Chezem et al (2003) maternal confidence with breastfeeding was measured using The Maternal Confidence Survey (O'Campo et al., 1992). The mean confidence with breastfeeding score was 4.6 (range 2.3-5.9) out of a possible score of six when measured prenatally. One methodological limitation of the measure of confidence

with breastfeeding in this thesis is related to the fact that confidence at discharge/in hospital was measured by recall six weeks later. Mothers' perceived/recalled confidence with breastfeeding could well be influenced by their experience since discharge, especially if the mothers think confidence is associated with outcome.

Approximately half of the participants reported feeling they received more than enough help from family, and 40% reported receiving more than enough help from health care professionals. However, 21.1% of women reported receiving only some to no help from family. This is similar to the findings in the TOMIS study where 15% of mothers indicated they had little or no support or help at home (Roberts et al., 2001). These findings may be related to the mother's perceived need to access professional help or how accessible breastfeeding resources were in the community. Having adequate help and support at home is negatively correlated with utilization of health care resources ($r = -.266$; $p < 0.01$) (Roberts et al., 2001). These findings may explain the fact that approximately 50% of mothers in this thesis sample did not use any of the four community resources available for help with breastfeeding that were included in the study, and 30% of women used only one resource.

The vast majority of women (95.1%, $n = 501$) scored below the postpartum depression limit (12 or less) when screened with the Edinburgh Postpartum Depression Scale. Prevalence of postpartum depression (4.5%, $n = 23$) was lower in this sample group than has been found in other studies (8%-15%) (Gabbe et al., 1996; Hendrick, 2000; O'Hara et al., 1996; Hendrick, 2000). This could have occurred for a number of reasons. First, it could be a true reflection of the depression rate in this sample group. Second, the sample tends to be older, well educated with support systems in place and

perhaps less likely to suffer from depression. Third, perhaps depression in this sample group was just not apparent by six weeks postpartum when the second interview occurred. Postpartum depression most commonly occurs within the first three months postpartum (Cox et al., 1993), and may occur any time after delivery, but most frequently begins 2-3 weeks postpartum (Morris-Rush et al., 2002). Finally, perhaps social desirability bias played a role in shaping a woman's responses if she did not want to appear to be unable to cope. However, research has shown that social desirability bias is less problematic when interviews are conducted by phone rather than face-to-face so this effect on the responses is unlikely (Dillman, 1978).

The most common breastfeeding problems reported by mothers were "not enough milk" or the "infant was hungry". The most common infant problems reported by mothers were "infant lost weight" and "infant cared for in the nursery". "Feeling pressured to breastfeed" was an issue for 30 women. It is not clear whether this feeling was created from pressures exerted by the health care professionals the mother interacted with in hospital, or by general societal pressure to breastfeed. If the mother is breastfeeding to please the health care providers and the 'establishment' and is not motivated herself to breastfeed, she may be more likely to wean early once she is on her own at home. Research has shown that if women are ambivalent about whether to breastfeed, they are more likely to wean early (Wiemann, DuBois, & Berenson, 1998). Also, women who focus on the negative aspects of breastfeeding are more likely to discontinue when confronted with difficulties while women who are positive thinkers and problem solvers are more determined to succeed with breastfeeding (McNatt et al., 1992).

Even though these comments were expressed by a relatively small number of participants, there is an important message here for all health care professionals providing care to breastfeeding women. First, it is important to include information about breastfeeding in all prenatal contacts with pregnant women, in order to ensure that women are prepared to make informed decisions about infant feeding choices. Secondly, it is important to ensure that women are empowered to become proficient with the breastfeeding process so that their confidence with breastfeeding grows and doubt and anxiety are relieved. However, when all is said and done, and mothers have been provided with all the information and assistance with respect to breastfeeding that they may need, individual choice of infant feeding method must be respected. Pressure tactics are not the answer to increase breastfeeding duration rates.

Data from this thesis sample indicated that some mothers received conflicting information, suggesting that some health care professionals may have lacked current knowledge. Research has shown that health care providers can be a negative source of support for breastfeeding women when the information they provide is inconsistent or inaccurate (Coreil, Bryant, Westover, & Bailey, 1995; Humenick, Hill, & Spiegelberg, 1998). It is important for health care professionals to ensure that accurate information is provided to breastfeeding mothers in a way that the mother understands. As well, it is essential to develop rapport with any new mother who is learning about breastfeeding. This can help to ensure that misinterpretation of information is minimized. Care practices that follow the Family-Centred Maternity Care Guidelines (Health Canada, 2000) will ensure women are provided with the best care possible to support breastfeeding.

Bivariate Analysis

The vulnerability factors found to be related to breastfeeding outcome in the bivariate analysis were mother's level of confidence with breastfeeding, postpartum depression score and supplementation. These factors have been shown by other researchers to be related to breastfeeding duration and early weaning (Buxton et al., 1991; Chezem et al., 1998; Dennis, 1999; Hill et al., 1996; Hill et al., 1997; O'Campo et al., 1992; Papinzak et al., 2000; Schwartz et al., 2002; Watt et al., 2000).

There were relatively small numbers of women (4.5%, $n = 23$) who scored ≥ 12 on the Edinburgh Postnatal Depression Scale (EPDS) and higher scores have been associated with early weaning. The postnatal depression score was significantly related to breastfeeding outcome on the bivariate analysis and the association varied according to age and education level of the mother. The postnatal depression score was significant for older mothers but not for younger mothers, and for mothers with higher education ($\geq$ high school) but not those with lower education. However, It is important to take into consideration the small numbers within the cells for the adjusted analysis when interpreting the results. Although the association between depression and weaning varied according to both age and education, it was not statistically significant for women < 25 years or for women with $\leq$ high school education. This may be due to the fact that the numbers within the cells for age < 25 years ($n = 56$), and $\leq$ high school education ($n = 103$) were insufficient to show the relationship.

Confidence was significantly related to breastfeeding outcome on the bivariate analysis and the association varied according to age and education level of the mother. Women who reported being "not at all confident" (1) were more likely to wean by six

weeks postpartum than women who were “very confident” (5). This result occurred even though the number of women in category (1) was small (3.6%, $n = 19$), indicating that the effect of low confidence level on breastfeeding outcome is strong. Women, who reported their confidence level at two (out of a possible score of five), were three times more likely to wean than women who were “very confident” (score of five out of five). Similarly, O’Campo et al (1992) found that women who were only somewhat confident about breastfeeding (scored two or below on the confidence scale out of a possible score of six) were three times more likely to discontinue breastfeeding early than women who reported being very confident (maximum score of six on the confidence scale).

Since maternal confidence has a strong relationship with breastfeeding outcome, it is important that assessment of maternal confidence with breastfeeding be conducted in conjunction with use of intervention strategies that enhance confidence. Self-efficacy theory proposes that if level of confidence is high, the breastfeeding mother will have the reserves to persevere through many hurdles (Dennis, 1999; Pajares, 2003). Use of a validated tool (Breastfeeding Self-Efficacy Scale) (Dennis, 1999) to assess maternal confidence is important, but may not be essential since the one-item measure used for this thesis produced similar findings. However, what may be important about the use of a more extensive tool to measure confidence with breastfeeding is the ability to find out more about what aspects of breastfeeding the mother is not confident with. This in turn would be helpful in designing intervention strategies to target specific aspects of the breastfeeding process that the mother finds most difficult. According to self-efficacy theory, interventions that work towards enhancing confidence with breastfeeding would include emphasis on: performance accomplishments (reinforcement of positive

accomplishments and diffusing negative breastfeeding experiences); vicarious experiences (watching other women breastfeed and providing opportunities for frequent practice to master the skill of position and latch); verbal persuasion (encouragement from other influential people such as friends, family and lactation consultants); and decreased physiological responses (fatigue, stress, anxiety) (Bandura, 1986; Blyth et al., 2002; Dennis et al., 1999).

Another interesting finding with respect to confidence was the variation in the association according to age and education. Although the effect of low confidence was apparent for women less than 25 years of age and having no more than a high school education, the effect of low confidence was stronger in women greater than 25 years of age and those had more than high school education. These findings are in contrast to other research where the relationship between self-efficacy and breastfeeding outcome was the same across maternal age or education level (Blyth et al., 2002).

An explanation of these findings may come from Bandura's Self-Efficacy Theory (Bandura, 1977). Women who are greater than 25 years of age may be at a stage where they have accomplished goals (education and employment), and have established skills and feel more of a sense of confidence in their lives. When faced with new experiences such as the birth of a child and breastfeeding, the older woman may feel less confident. Perhaps the erosion of an otherwise well developed sense of confidence in one's life is impossible to cope with. Weaning is seen as a way to regain confidence. In addition, perhaps older, more educated women are in a better position in their lives to make a realistic appraisal of their likelihood of success with breastfeeding. They may have a better sense of the "rightness of fit" with their situation. The relationship between

intention to breastfeed, and level of confidence were not explored in this study, but may be important for further research.

Water or glucose water supplementation, for the mothers who did not know, was statistically related to breastfeeding outcome. This suggests that if a mother does not know whether her infant has been supplemented with water or glucose water, she will more likely be bottle-feeding by six weeks postpartum. Research has shown that infants receiving glucose water in hospital are less likely to continue breastfeeding at 16 weeks and are more likely to be formula fed at four weeks postpartum (Martin-Calama et al., 1997). If a mother does not know if her infant has been supplemented, perhaps this indicates that she has not been particularly concerned or assertive about ensuring it does not happen and is not worried if it did. Perhaps infants are spending more time in the nursery and therefore mothers are less aware of what the infant is receiving. Are these women uncertain breast feeders to begin with? Water or glucose water supplementation for the “Yes” group was not statistically related to breastfeeding outcome. However there were only 14 women who knew that their infant had glucose supplements and therefore there may not have been sufficient numbers in this group to show a relationship. Perhaps maternal recall is not the best way to measure whether glucose feeding occurred. Is it possible that some of the women who said no in response to this question were wrong? This data needs confirmation from a chart audit.

Not knowing whether formula supplementation has occurred did not influence breastfeeding outcome. However, if a mother knew her infant received formula, she was more likely to be bottle-feeding by six weeks postpartum. These results are in agreement with findings reported by Chezem and colleagues (2003) where women planning to

breastfeed and supplement their infants weaned earlier than women who planned to exclusively breastfeed ($p = 0.004$). Knowing that formula supplementation has occurred may imply knowledge or consent/acceptance or a conscious choice of the use of formula. If the mother knows that no formula supplementation has been used, it may indicate that she was involved in making sure supplementation didn't happen during the hospital stay by keeping her infant with her. This may suggest commitment to breastfeeding is important. Choice to supplement may be an indication of less certainty in the decision to breastfeed (Chezem et al., 2003).

Perceived adequacy of family or professional support was not significantly related to breastfeeding outcome at six weeks postpartum. Other researchers (Boettcher et al., 1999; McNatt et al., 1992) have also reported that mother's perception of support received is not related to breastfeeding outcome. There are four possible explanations for this finding. First, that there is no relationship in this sample population, and that a larger more heterogeneous, randomly selected sample may demonstrate differences between perceived support and breastfeeding outcome. Second, the questions asked to determine adequacy of support may not have been an ideal way to measure perception. The third possible explanation is that the mothers were not able to truly critique the adequacy of breastfeeding support received if they had not experienced breastfeeding before. This relates to the "What is must be best syndrome" described by Porter and MacIntyre (1984). The final explanation for this finding is that it is true and there actually is no relationship between perceived adequacy of family and professional support and breastfeeding outcome. It may be important to assess actual family and professional

support available to a breastfeeding mother rather than simply rely on her perception of the adequacy of the support.

Multivariate Logistic Regression

Logistic regression analysis determines significant relationships between predictor variables and a dichotomous variable while controlling for confounding variables. The results of this study demonstrate that selected vulnerability factors are related to breastfeeding outcome at six weeks postpartum. The more vulnerability factors that a women possesses, the more likely she will not be breastfeeding at six weeks postpartum.

The vulnerability factors found to be related to breastfeeding outcome in the multivariate logistic regression analysis were mother's level of confidence with breastfeeding, and postpartum depression score after controlling for age and education. These factors have been found by other researchers to be related to breastfeeding duration and early weaning (Buxton et al., 1991; Chezem et al., 1998; Dennis, 1999; Hill et al., 1996; Hill et al., 1997; O'Campo et al., 1992; Papinzak et al., 2000; Schwartz et al., 2002; Watt et al., 2000).

Supplementation with water or formula was not retained in the multivariate logistic regression model. These factors have been found by other researchers to be related to breastfeeding duration and early weaning (Chezem et al., 2003; Hill et al., 1997; Martin-Calama et al., 1997). One possible explanation for the contrasting findings of this study may be related to the small numbers within the supplementation groups. There were only 14 women who knew that their infant received glucose supplementation and there were only 8 women who did not know whether their infant received formula

supplementation. In order to avoid a mathematical “singularity” within the cells for the logistic regression analyses, a pragmatic approach was taken (Menard, 1995; Tabachnick & Fidell, 1989). The “don’t know” and “no” groups were collapsed together because they were similar. In reality, it is a professional responsibility for nurses to keep parents informed about the care their infant receives while in hospital. If an infant had been supplemented, it is more than likely the mother would have been told about it. Therefore, if a mother responded, “don’t know” to the question of supplementation, it is likely the infant was not supplemented. Even with this approach, these numbers may have been too small to show a statistically significant relationship and therefore caution must be taken with these results.

Using the model of probability of weaning developed in this study, women, who lack confidence with breastfeeding, or are coping with postpartum depression for example, have a greater probability of weaning by six weeks postpartum than women who are less than 25 years of age. Based on the logistic regression model, and this sample, if the mother had no vulnerability factors, the probability of weaning by six weeks postpartum was 7.5%. As the number of vulnerability factors increases the probability of weaning by six weeks postpartum increases.

When the two-way interaction terms (age*confidence, depression*confidence) were entered into the logistic regression model, the relationship between maternal confidence with breastfeeding and breastfeeding outcome at six weeks postpartum did not depend on maternal age or postpartum depression score. This indicates that when the main effects of age, education, confidence and depression were controlled for in the regression analysis, interactions between confidence and both age and depression, noted

in the stratified analyses, were not as powerful as the main effects. This suggests that low level of confidence with breastfeeding is a powerful predictor of early weaning and it overshadows the effects of the other variables.

Impact of Selected Vulnerability Factors on Breastfeeding Duration

How does being vulnerable impact on breastfeeding? According to MacMullen et al. (1992), being vulnerable leads to stress and anxiety and stress and anxiety impact directly on milk production (Lawrence et al., 1999). The physiological effects of stress include release of cortisone, thyroid hormone, glucose, cholesterol and endorphins into the blood stream leading to fatigue, weight loss, anorexia, insomnia, muscular tension, depression, back pain, and gastro-intestinal distress (Rogers, 1997). "The psychological effects of vulnerability include feelings of: helplessness, fear, desperation, anger, uncertainty, weakness, loss of control, embarrassment, powerlessness, isolation, anxiety/worry, changed effect, lowered self-esteem, loss of self-worth, inability to express feelings, challenge to transcend, inability to concentrate, emotionally labile" (Rogers, 1997, pg. 69). In the data from the National Longitudinal Survey of Children and Youth (NLSCY) (1995), and the National Population Health Survey (NPHS) (1994), the majority of women who were first-time mothers who found the arrival of a new infant overwhelming and described experiencing tumultuous emotions and a sense of vulnerability (Health Canada, 1999).

Women in the NPHS study, who stopped breastfeeding before three months, cited factors such as insufficient milk supply, difficulties with the technique, sore breasts, and inconvenience and fatigue as their reasons for weaning (Health Canada, 1999). Therefore, if establishment of adequate milk supply in the early postpartum period is key to

successful breastfeeding, what factors are critical to the development of inadequate milk supply? The two main factors contributing to insufficient milk supply are inadequate milk production and poor milk release. Fatigue is one of the most common causes of inadequate milk production (Lawrence et al., 1999). Another factor that impacts on the milk supply is decreased number of feeds due to separation of mother and infant or supplementation. This leads to decreased number of prolactin receptor sites and decrease in milk production (Lawrence et al., 1999). As well, interference with the milk ejection reflex may create a situation where a lactating mother is unable to 'let down' as the infant suckles at the breast so milk transfer to the infant is impaired. Though smoking, alcohol and medications are all associated with decreasing milk ejection reflex, the most common cause for failure of the milk ejection reflex is psychological inhibition or the mother's emotional state (Lawrence et al., 1999; Neville, 1999; Ueda, Yokoyama, & Irahara, 1994; Ueda et al., 1994). Psychological inhibition can occur from major stresses in the woman's life (Lawrence et al., 1999). A decrease or lack of oxytocin release due to stress has been shown by Ueda and colleagues (1994) to be the basis for failure of the milk ejection reflex.

It takes approximately six to eight weeks for breastfeeding to become established following birth (Health Canada, 1999). This is a critical time for the mother and infant to learn how to breastfeed. Correct position and latch, coordination of suck and swallow, adequate number of prolactin receptors, and development of increasing milk supply to meet the infant's growing needs occurs at this time. It is during this initial period that the infant is at most risk for inadequate milk intake and probability of weaning is highest.

This is the first study to address the relationship between vulnerability factors and probability of early weaning in order to better understand the relative predictive value of each vulnerability factor. Most studies in the literature used convenience sampling and looked at isolated probability factors for early weaning. Some studies assessed combined factors, but did not evaluate the degree to which each of these factors affected the mother – or in other words how powerful an effect each factor has on the mother’s probability of weaning. This study adds to the body of knowledge about the relationship between vulnerability factors and breastfeeding duration. Can we do anything about vulnerability and the impact it has on breastfeeding, given that we cannot change age and education in the short-term? The non-modifiable vulnerability factors are a challenge but are certainly not as great an influence on early weaning as is low confidence or depression.

It is important for health care providers to tailor interventions to target the needs of specific groups and individuals. Screening women for confidence/self-efficacy with breastfeeding and finding ways to improve confidence are key. As well, continuous screening for postpartum depression should be a standard for all health care providers working with breastfeeding mothers in all settings.

Research Question # 2

The second question examined in this study was: What percent of women with vulnerability factors accessed available resources in the community (lactation consultants (LC), Well Baby Drop-In (WBDI), Breastfeeding Support Drop-In (BSDI), and the Parent-Child Info Line (PCIL)?

Approximately half of the women (49.8%, $n = 262$) did not access any of the available community resources under study, and one third (29.5%, $n = 155$) used one

resource. The most commonly used resource, as reported by women, was the Parent Child Info Line, followed by Well Baby Drop-In Clinics, Breastfeeding Drop-In Clinics and finally lactation consultants. It is not clear why use of these breastfeeding resources was limited or whether it is a true reflection of community resource use in other groups. Data from TOMIS (The Ontario Mother and Infant Survey) indicated use of lactation consultants by breastfeeding women was limited and overall utilization of health care resources and costs were lower if the mother reported that she had adequate help and support at home ($r = -.266$; $p < 0.01$) and she had lower depression scores ($r = 0.174$; $p < 0.01$) (Roberts et al., 2001). Both of these factors existed within this thesis sample; however, the analyses did not test for relationships between support at home and use of resources. It did test for relationship between presence/absence of depression and use of resources, and did not find the same relationship that Roberts et al. (2001) found. This could be because this thesis was examining for the presence/absence of depression, not depression as a continuous variable and therefore was underpowered to find a relationship. Perhaps the relationship between depression and use of resources was not present in the thesis sample.

Data from TOMIS also indicated that the some of the most important factors for early discontinuation of breastfeeding included: not completing high school; not expecting to rely on a mom's group or drop-in center; and needing care or help with breastfeeding but unable to obtain it (Sheehan et al., 2001). These findings may suggest that it is important to ensure a mother understands that she may need help with breastfeeding and where she can go for help to access this help.

Perhaps, the group of women in this secondary analysis felt that breastfeeding was not difficult and there was no need to seek help from these selected community resources. This is difficult to know because this thesis did not test for a multivariate relationship between confidence, use of resources and outcome. Perhaps breastfeeding women were not able to recognize the need for help, or the available resources were not convenient to them (time of day, location in city, transportation). It is not surprising that the most highly used resource was the one that is accessible from home. This raises an issue for health care providers in that some breastfeeding support (i.e. helping a mother and baby with position and latch) needs to be provided 'face-to-face' in order for the problem to be accurately assessed and interventions tried. It is difficult to do over the phone. In fact support for breastfeeding women, limited to only phone contact, is not appropriate. A systematic review of studies that included analysis of five trials (1168 women) reported that breastfeeding support provided mainly by telephone failed to show benefit (Relative Risk (RR) for giving up breastfeeding 0.92, 95% CI: 0.78, 1.08) (Sikorski et al., 2002).

The community resources selected for this study were chosen from a larger group of resources because they can provide the breastfeeding mother with specific support for breastfeeding problems. They also require the mother to initiate contact herself. The most convenient resource of the four to access would be the Parent Child Info Line because it is just a phone call from home and accessible all day. It is logical that this would be the most utilized of the four resources.

It is important to note that there are costs associated with hiring a private lactation consultant while the other options for support are cost free. However, lactation consultant

support is available free of charge in hospitals and at Breastfeeding Support Drop-In Clinics. The fact that few mothers reported seeing a lactation consultant raises a question about whether lactation support services are adequately advertised to women in hospital or did women only define lactation consultant support if they paid for someone to come to their home. Three of the four hospitals participating in this study had lactation consultants on staff and a Breastfeeding Support Drop-In Clinic available for a few hours each day at the time this study was carried out. It is more than likely (based on the fact that all delivering hospitals in this study employed lactation consultants who visited with inpatients daily) that most breastfeeding women met with a lactation consultant at least once prior to discharge. However, they may not have known that they were seeing a lactation consultant while in hospital and may not have sought help from a lactation consultant after that. The issue here may be that women do not differentiate health care personnel well and see the lactation consultant as a nurse. This may not be a problem as long as women receive the support they need. However, it suggests the importance of ensuring women know that lactation consultants are specifically trained and certified to assist women with breastfeeding problems and where they can be accessed.

Use of the selected breastfeeding resources in this study was significantly related to some vulnerability factors (mother's level of confidence with breastfeeding, supplementation with formula and mother's age and education). Women who were less confident were more likely to use lactation consultants and the Breastfeeding Support Drop-In Clinics. Confidence was not related to use of Well-Baby Drop In Clinics and the relationship between confidence and use of Parent Child Info Line did not appear to be a linear one.

Women who knew their infant received formula supplementation were more likely to use the Parent Child Info Line. Formula supplementation was not related to use of lactation consultants, Well-Baby Drop In Clinics or Breastfeeding Support Drop-In Clinics. This may be related to the fact that women who acknowledge supplementation with formula do not feel the need for support services or in fact the questions they have can be dealt with by phone. The reason for the call is not described. It is important to clarify why mothers feel the need to call the help line. Is this group of mothers dealing with more breastfeeding problems?

Women who were at least 25 years old were more likely than women who were less than 25 years old to report using Lactation Consultants, Well Baby Drop-In Clinics, and Breastfeeding Support Drop-In Clinics. Women who had more than high school education were more likely than women who had not completed high school to report using Well Baby Drop-In Clinics and Breastfeeding Support Drop-In Clinics. This again raises the question about the configuration of support services for younger, less educated women and the need to provide support in a way that will reach this group.

There were no statistically significant differences in resource use between women who scored less than 12 on the Edinburgh Postpartum Depression Scale and women who scored greater than or equal to 12. However, the small numbers of women in the sample group who scored greater or equal to 12 on the Edinburgh Postpartum Depression Scale make the results impossible to interpret with assurance. A larger sample group is required in order to for resource use to be evaluated with any accuracy. This may not be an accurate reflection of the true relationship between depression and use of these four

selected community resources. The low prevalence of depression means that there is not enough statistical power to be sure that a true relationship was not missed (Type II error).

Implications for Advanced Practice Nurses

Based on the findings of this study, postpartum depression, lack of maternal confidence with breastfeeding and supplementation in hospital are related to early weaning. Developing strategies to deal with these issues involves consideration of all principles of Primary Health Care (PHC) (accessibility, public participation, intersectoral and interdisciplinary collaboration, appropriate use of technology, and health promotion and illness prevention) (Canadian Nurses Association, 1988; Canadian Nurses Association, 1993; World Health Organization, 1978). “Primary health care ... should be sustained by integrated, functional and mutually supportive referral systems, leading to the progressive improvement of comprehensive health care for all, and giving priority to those in need” (World Health Organization, 1978, pg. 2).

The Advanced Practice Nurse (APN) with advanced skills in clinical practice, research, leadership, collaboration (interdisciplinary, multidisciplinary, or across systems), and change management (Canadian Nurses Association, 2000; Hickey, 2000) is particularly suited to identify, and coordinate development of multiple intervention strategies and integrated systems to support all childbearing women, including those who are vulnerable (Refer to Appendix E - Table E10 - Advanced Practice Nursing – Primary Health Care Matrix for more details). Highlights from the table are present here.

Clinical Practice

As a clinical expert, the APN can work with individuals, groups and communities to develop ways to assess women for postpartum depression, confidence with

breastfeeding and to decrease use of unnecessary supplementation in the first three weeks postpartum. Practices that support breastfeeding women include: minimizing interventions during labour, ensuring that each labouring woman receives one-on-one support by a nurse, keeping mother and baby together after the baby is born, admitting mother and baby to the same room at the same time, caring for the baby in the mother's hospital room, avoiding routine supplementation. These practices will make a particular difference in the lives of vulnerable women (Fairbank et al., 2000).

Mutually Supportive Referral Systems

Currently each new mother is screened prior to discharge from hospital and asked to consent to early postpartum follow-up. A Parkyn form (Ministry of Health and Long Term Care, 2003) is completed and faxed to the health department (Appendix E – Figure E8). The Parkyn tool provides health care providers with limited information about the vulnerability threshold of each new mother. Factors linked to early weaning that are not screened by this tool and should be assessed are: supplementation, mother-baby separation, low maternal confidence/self-efficacy with breastfeeding, expectations around breastfeeding, analgesia, feeding schedule, and abuse.

The APN can support health care providers who work with breastfeeding women to anticipate, and develop strategies to enhance breastfeeding confidence, and identifying and managing postpartum depression. The hospital based APN could be instrumental in developing programs to educate breastfeeding women and health care providers about appropriate use of formula supplementation and partner with community agencies to establish breastfeeding peer support systems to enhance confidence for vulnerable mothers.

Research

The APN has a role to play to engage other health care providers by sharing current research on postpartum depression, confidence and supplementation and the effect these factors have on early weaning. The APN also has a responsibility to participate in research to develop a better understanding of the impact of these factors and other vulnerability factors on breastfeeding outcome. Future ideas for research stemming from this thesis are found in the next section.

Hospitals, public health and community perinatal service providers, managers and policy makers are faced with decisions about how best to provide maternity care to families. Effective decision-making can be improved with current information about the population and their use of health and social services (PPESO, 2003). The APN has a collaborative role to play as a member of regional committees within community-based agencies to facilitate data collection about the perinatal population, family-centered maternity care practices and use of community services. One such committee is the Regional Perinatal Database Committee of the Perinatal Partnership Program of Eastern and Southeastern Ontario (PPESO), which has a mandate to develop, monitor and facilitate use of this database in the region. The Niday Perinatal Database is an internet-based system of information on all births in Eastern and Southeastern Ontario (PPESO, 2003). The APN should work with the multidisciplinary database committee to identify, for example, variables to monitor prevalence and reasons for formula supplementation of newborns. This would provide information for health care providers to not only track the practice, but also determine the extent of inappropriate formula supplementation. Knowing why infants are being supplemented would give health care providers the

information to design intervention strategies, and develop policies to target specific issues.

Leadership

The APN can also provide a leadership role to support multidisciplinary groups in the development of maternity and newborn care policies that are compatible with the Baby-Friendly Initiative in Community Health Services Guidelines (Breastfeeding Committee for Canada, 2002) and Family-Centered Maternity Care Guidelines (Health Canada, 2000). The Population Health Promotion Model provides a framework around which the APN can use her leadership skills to work with individuals, groups and the community to develop multiple intervention strategies to target childbearing women, particularly those who have low sense of confidence with breastfeeding. Examples of strategies are:

1. Community action to establish peer support programs to enhance confidence of breastfeeding women;
2. Community action to make breastfeeding support and counselling more available and accessible;
3. Social marketing campaigns to heighten public awareness of the importance of breastfeeding and inappropriate use of supplementation;
4. Public participation in the implementation of mother/baby care guidelines and supplementation guidelines (Hamilton & Bhatti, 1996).

Collaboration

Childbearing women and their families receive care in many different settings as they move along the perinatal continuum (Bakewell-Sachs & Persily, 1995). Currently,

assessment and teaching about breastfeeding occurs in prenatal classes, in labour and birth and postpartum settings, during home visits and in clinic settings. Communication can be fragmented and information inconsistent (Ellis et al., 1984; Vogel et al., 1998). The APN can play a role to facilitate the linkages between organizations and health care providers (Bakewell-Sachs et al., 1995) that work with breastfeeding women. This study is important because it has shown that individual factors can affect each mother differently. In order to impact on early weaning, a system to accurately assess each mother and provide services to meet her individual needs must be in place. This will also ensure a more cost effective use of resources in the health care system if problems that lead to early weaning are prevented.

Accessibility

One of the most important principles of Primary Health Care is accessibility of services for all which includes ensuring that services are delivered so that they reach the clients who need them. Accessibility to health care resources means more than just ensuring breastfeeding drop-in clinics exist in the community, or that a public health nurse visits the home within 48 hours of discharge from hospital. Accessibility means ensuring that all breastfeeding women receive the assistance they need to enhance their confidence with breastfeeding. The APN has a role to play to work with multidisciplinary and intersectoral groups to determine whether clients are receiving the support they need, how services should be reconfigured, and whether new services are needed.

Change Agent

Fulton (1994) considers health to be, a reasonably optimistic and contented state of mind. In contrast to this broad definition, health care professionals tend to think of

health as the absence of physical abnormalities, or in the context of a breastfeeding situation, absence of problems. Health services have been created to respond to problems rather than prevent problems from occurring. Services for breastfeeding women should be offered in ways that are compatible with, and in support of, the priorities and needs of the women and their families. There is uncertainty in Canada's health care system regarding the extent to which access to services should relate to potential for benefit and therefore, much greater importance is given to the needs of people who are already receiving services than to those who are waiting in line (Fulton, 1994). However, the most effective way to realize efficiencies in health care services is to offer the most beneficial services at the lowest possible cost and this can occur in a variety of ways: through a change of location, a change of process, the elimination of some unnecessary elements, or the use of less expensive personnel (Fulton, 1994). According to the data from this thesis, even though resources were available in the community for breastfeeding women, few women accessed these resources. This raises the question of whether the resources were configured in the best way to meet the needs of women and their families in the early days postpartum. Further research is needed to determine exactly why resource use is low.

The APN can play a role in developing innovative ways to deliver health care services by advocating, negotiating, and networking with members from governments, municipalities, industries, and technology and health care organizations to influence their policies on families. In identifying and establishing policies for organizations that are individual and family friendly, Wharf, (1994) describes the need for organizations and governments to work together to connect public issues with personal troubles. One way

to do this is to strengthen existing agencies and create additional ones, which have as their mandate combining services for breastfeeding women with public education and social reform. A second strategy is to develop innovative ways of providing services to families (Wharf, 1994). An innovative way of providing family focused services for breastfeeding women is to change the focus of the care from one that is characterized by investigation of problems and is individual client based to one that focuses on prevention of problems, has a group and community work approach, and targets building the mother's confidence with breastfeeding. Examples of such strategies can be found with family centered maternity care policies in hospital settings and peer support networks in the community.

All health care providers who care for women should be fully educated about the best available evidence regarding postpartum depression, including ways to prevent, predict, promptly identify and treat depression and its sequelae in the postpartum period. The APN could facilitate this process by developing and offering education programs inclusive of content about postpartum depression to multidisciplinary groups of health care professionals. As well the APN, in a coordinating role should ensure routine screening of women for postpartum depression is undertaken in all perinatal settings, and that referrals for mental health services are made as appropriate. The APN can play an important role as a change agent by being involved in initiatives to prevent depression, ensure early diagnosis of women who are suffering from depression and facilitate coordination of services to treat postpartum depression.

Research has shown that verbal persuasion from others (lactation consultants, health care professionals, peer counsellors, family or friends) can impact on a mother's

level of confidence with breastfeeding (self-efficacy) (Bandura, 1986; Dennis, 1999).

Nurses' and physicians' knowledge, skills and attitudes towards breastfeeding are important factors in determining the amount and quality of support a mother receives.

Research has shown that women and nurses differ in their perceptions of adequate, appropriate breastfeeding support. Breastfeeding women report that they need nurses to provide them with information, encouragement, and interpersonal support. Nurses do not always identify encouragement of breastfeeding women as their role (Gill, 2001).

Because nurses and physicians have a powerful influence on the new mother's experience with breastfeeding, they need continuing education to identify their own personal biases and knowledge deficits, which may hinder breastfeeding promotion (Burglehaus, Smith, Sheps, & Green, 1997). The APN has a role to play to ensure mothers are given information about which individuals have the expertise to assist them with breastfeeding questions (i.e. lactation consultants, breastfeeding clinic nurses, public health nurses) and to educate health care providers about breastfeeding best practice.

Finally, the APN also has a role to play to facilitate increasing awareness, among health care professionals, of the appropriate use of formula supplementation. Exclusive breastfeeding for the first three weeks should be encouraged. After the first three weeks, bottles and manual expression are not associated with early weaning and may improve the likelihood of continuing breastfeeding until at least 12 weeks (Schwartz et al., 2002). Based on data from this thesis, inappropriate supplementation of infants in hospital remains an issue that needs to be addressed and policies that limit the use of formula supplementation in the first three weeks postpartum need to be developed (Breastfeeding Committee for Canada, 2002; Health Canada, 2000).

Implications for Future Research

Confidence with breastfeeding (a vulnerability factor for early weaning) was found to have a powerful effect on breastfeeding duration in this study. An intervention study to determine the strategies to increase maternal confidence/self-efficacy with breastfeeding and prolong breastfeeding duration should be done. Self-efficacy theory says that for an individual to choose, perform and maintain a behaviour (i.e. breastfeeding), there are four important points that must be addressed: performance accomplishments, vicarious experiences, verbal persuasion, and inferences made from one's physiologic and/or affective state (Bandura, 1977; Bandura, 1986).

Further exploration of the issues around confidence/self-efficacy with breastfeeding and early weaning should be done using a randomised control trial of multiple interventions designed to increase confidence with breastfeeding. The outcome measure would be breastfeeding duration at one week, six week and three months, and the independent variable would be maternal level of self-efficacy/confidence as measured by a validated tool such as the Breastfeeding Self-Efficacy Scale (Dennis et al., 1999). The objective would be to show that an increase in self-efficacy/confidence with breastfeeding is related to longer breastfeeding duration. Specific confidence building strategies that could be provided to breastfeeding mothers are: (a) Performance Accomplishments: emphasis on successful aspects of breastfeeding performance or outcomes rather than focussing on unsuccessful aspects of performance, practice with breastfeeding skills such as position and latch, and helping mother to think and problem solve breastfeeding situations, (b) Vicarious Experience: exposure to others who have successfully breastfed such as family, friends or peer counsellors, and recall of positive

aspects of the breastfeeding experience, (c) Verbal persuasion: provision of consistent advice, positive reinforcement of new and existing breastfeeding skills, (d) Physiological and Affective States: anticipatory guidance to normalize maternal anxiety, pain and fatigue and reinforce positive feelings of excitement or satisfaction with the breastfeeding experience, and practice at managing self-defeating thoughts (Dennis, 1999).

Even though the participation rate in this study was high and population-based, the current study should be repeated with sample group of different configurations in order to increase the generalizability of the results. Breastfeeding women from different cultural groups should be included. The study should also be repeated using valid and reliable tools to accurately measure the concepts under study such as confidence, family support and professional support.

In light of the fact that adequacy of support has been found by other researchers to impact on breastfeeding duration, questions should be developed to better measure a mother's perception of the adequacy of support. In this study, women were asked to rate their perception of "enough help". Each individual perspective of what "enough help" means may vary as you can only miss what you know you do not have. As well, use of the terms "none", "some" and "more than enough" with ratings between may have presented vague choices and been difficult to answer. "More than enough" may also carry with it connotations of interference. Perhaps a category "not enough" needs to be added to the support questions. As is stands, with the questionnaire that was developed, there are limitations to the anchors provided on support questions.

Another area in need of development is with respect to the questions related to breastfeeding prevalence. What does breastfeeding mean to women? Does it have a value

attached (i.e. successful, exclusive, frequent)? A small number of women responded that they had no successful breastfeeding episodes while in hospital. They classified themselves as non-breast feeders even though breastfeeding was initiated in hospital. Questions to more accurately pick up successful breastfeeding should be developed. As well, health care providers could work on ways to clarify expectations of the early breastfeeding experience with new mothers and work towards a more realistic perspective if necessary.

Some of the research questions generated from this research were:

1. Do other vulnerability factors (e.g. smoking, mother-infant separation) relate to breastfeeding outcome?
2. What is the impact of vulnerability on breastfeeding outcome for different cultural groups?
3. Does an intervention designed to increase a mother's confidence level with breastfeeding increase breastfeeding duration?
4. What is the relationship between the intention to breastfeed, confidence, and control?
5. Is confidence with breastfeeding related to supplementation with formula in the first three weeks postpartum?
6. Are simple and complex measures of confidence with breastfeeding equally able to predict breastfeeding outcome.
7. What constitutes adequacy of family or professional support for a breastfeeding mother?
8. What does 'successful breastfeeding' mean to women when in hospital?
9. What is the relationship between confidence and competence with breastfeeding?

Study Limitations

One limitation of this study was the use of measures of maternal confidence with breastfeeding, and perceived adequacy of support that have not been tested for reliability and validity. The second limitation in this thesis was with respect to the timing of the measure of confidence with breastfeeding at discharge/in hospital, which was measured by recall six weeks later. Mothers' perceived/recalled confidence with breastfeeding could well be influenced by their experience since discharge, especially if the mothers think confidence is associated with outcome. The third source of potential bias in this study is due to the fact that the measures of vulnerability factors were obtained after breastfeeding was discontinued and therefore, these measures may not be an accurate indication of the vulnerability status while breastfeeding was going on.

Two additional limitations of this study have to do with small sample sizes within some groups. The first is related to the small numbers of women who scored ≥ 12 on the Edinburgh Postpartum Depression Scale. It is important to take into consideration the small numbers within the cells for the adjusted analysis when interpreting the results. This presents a power problem with insufficient sample size to detect significant differences in outcome for this variable. An additional limitation is related to the small numbers of women within some cells for water and formula supplementation. It is important to take these small numbers into consideration when interpreting the logistic regression results, as there may be insufficient sample size to detect significant differences in outcome for this variable. Another limitation of this study has to do with the multiple comparisons that were carried out to explore vulnerability factors and resource utilization. The purpose of this section was to have a preliminary look at

resource utilization. Further exploration of these patterns is required using a Bonferroni Correction for multiple testing.

Although the use of phone interviews was seen to be a potential source of sampling bias by other researchers, because some potential participants may not have had a telephone in the home, 98% of Canadian households have phones (Manley, 1997), so this is an unlikely source of sampling bias in this secondary analysis. A more interesting problem may occur with the use of phone message machines, and the selective choice people make to screen calls and respond to messages in the first place. An additional problem associated with phone interviews relates to the ability of the interviewer to acquire valid answers to the questions that are asked. Several sources of bias are possible with phone interviews such as: social desirability responses, interviewer distortion and subversion, contamination by others, and consultation about accuracy of information when needed (Dillman, 1978). Research has shown that social desirability bias is less problematic when interviews are conducted by phone rather than face-to-face, so this effect on the responses is less likely (Dillman, 1978). Some additional problems with phone interviews include the complexity of the questions, reliance on the respondent's retention of what they hear, at a pace set by someone else, their understanding of the questions, and too many response categories (Dillman, 1978).

The vast majority of data was collected through from maternal self-reports. It is apparent from evidence in the research literature that maternal self-reporting is a reliable way to obtain data and that women are accurate in recalling events about their infants feeding patterns (Barnanowski, Bryan, Rassin, Harrison, & Henske, 1990; Launer et al., 1992). The results of this study generalize only to women and infants similar to our

sample group (full term, singleton births, well infants, born of women who are able to care for them, with similar demographic backgrounds).

The community resources in this study (PCIL, WBDI, BFDI, LC) provide support in different ways, but generally they target knowledge and skills about process of breastfeeding (i.e. position, latch, frequency, duration, cues), and focus on the management of problems. Each of these resources requires the mother to initiate contact and may require her to travel from her home. The PCIL was the most utilized resource, but the one that did not have face-to-face contact. It is the most convenient, immediate, and requires no travel. The WBDI are more available in the city. There are fewer BFDI. Both of these clinics are only available during a brief time each day and are not always located close to where a family lives. This requires travel that is not always convenient. The lactation consultant resources were utilized the least by this sample group of women. Lactation consultants are available in hospital and community settings at no cost to the clients. A small number of lactation consultants run a private service, which has a cost associated with use. It is not clear whom, the women in this study, identified as lactation consultants. As a result of these factors, utilization of specific community breastfeeding resources may be limited. Overall use may be more accurate. A cost-effectiveness analysis of the use of breastfeeding community resources is recommended.

A final limitation of this study has to do with the use of the vulnerability model itself. As stated previously, this model is not a mathematical model and as such does not provide the opportunity to quantify the concepts of vulnerability or vulnerability threshold in order to measure change within each of these concepts.

Study Strengths

The City of Ottawa Health Department, and the Perinatal Partnership Program of Eastern and South Eastern Ontario (PPESO) supported the FCMC Study. A multidisciplinary committee was formed, with members from the City of Ottawa Health Department, PPESO, The Children's Hospital of Eastern Ontario, The Ottawa Hospital, The University of Ottawa, and Queen's University. Breastfeeding has been and still is an area of interest in this community and is the focus of a number of committees (Perinatal Advisory Committee, Breastfeeding Promotion Committee, and Combined Care Committee). As well, the Registered Nurses Association of Ontario (RNAO) coordinated the development of Best Practice Guidelines for Breastfeeding for the province. The Family-Centered Maternity and Newborn Care Guidelines (Health Canada, 2000) included a chapter focusing on breastfeeding practices and support. Therefore, this study was timely in that it looked into issues of local, regional, provincial and national priority.

This study also had an excellent participation rate (95%) for the women who agreed to participate in being interviewed at six weeks postpartum. This sample group was a representative population-based sample.

Conclusions

While confidence, postpartum depression and supplementation were significantly related to breastfeeding in the bivariate analyses, only confidence with breastfeeding and postpartum depression were independently related to breastfeeding in the logistic regression analyses. Women, who rated themselves as very confident with breastfeeding and had depression scores of less than 12, breastfed longer. Women coping with increased number of vulnerability factors may have a greater probability of weaning early

(prior to six weeks postpartum). Women with increased vulnerability may be dealing with increased stress (MacMullen et al., 1992) and this may impact on milk production and ultimately on the duration of breastfeeding (Lawrence et al., 1999; Neville, 1999; Ueda et al., 1994). Intervention strategies to address these vulnerability factors need to be evaluated.

Assessment of women in the early postpartum period currently does not include routine assessment of some of the major vulnerability factors for early weaning. Therefore, it is important that a process to assess for vulnerability threshold be developed to determine how a breastfeeding mother is coping. Strategies to enhance breastfeeding confidence (increasing maternal knowledge, skills and confidence) should be developed and assessment of maternal confidence with breastfeeding using validated tools should be conducted.

Approximately half of the women in this study did not access any of the community breastfeeding resources under review. Since maternal use of community breastfeeding resources is limited, support systems, which are flexible and may be taken to the new breastfeeding mother, may be critical in the early days when breastfeeding is being established. A cost-effectiveness analysis of the use of community resources is recommended.

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APPENDICES

APPENDIX A

Figure A1: Model of Vulnerability: The Relationship of Personal Resources, Environmental Supports and Vulnerability

Table A2: Vulnerability Definitions of Terms

Figure A1: Model of Vulnerability: The Relationship of Personal Resources, Environmental Supports and Vulnerability

(Rogers, 1997, 68)

Table A2: Vulnerability Definitions of Terms

Definitions	
Vulnerability	<ul style="list-style-type: none"> ◆ Net result of an interaction between personal resources and environmental supports (Browne et. al., 2001) ◆ Susceptibility to health problems, harm or neglect (Phillips, 1992). ◆ A danger or threat to the person. This threat can be a concrete reality-based one or a feared threat (Rich, 1992). ◆ Vulnerable person is helpless and in need of protection (Miller, 1995; Rogers, 1997, 65).
Degree of Vulnerability	<ul style="list-style-type: none"> ◆ Greatly affected by the perception of the individual (Phillips, 1992). ◆ The less control one has over the situation, the more vulnerable one feels (Rogers, 1997, 65).
Situational Vulnerability	<ul style="list-style-type: none"> ◆ May not be particularly vulnerable to illness/harm in one environment, but may become highly vulnerable if placed in a different environment. ◆ Immigrants from a foreign country surrounded by people whose language and customs are foreign and who has no support system, becomes very vulnerable (Rogers, 1997, 65).
Determinants of Vulnerability	
Age	<ul style="list-style-type: none"> ◆ Infants and children are very vulnerable because they are usually totally dependent on others for their care and they are unable to speak up for their own needs. ◆ Adolescents engage in probability-taking behavior and are more likely to be involved in accidents as well as experiment with drugs and alcohol (Gitterman & Shulman, 1994; Miller, 1995; Rogers, 1997, 66).
Gender	<ul style="list-style-type: none"> ◆ Women suffer more stressors as a result of their child-bearing, child-rearing and caregiving roles (Rachlis & Kushner, 1989; Gitterman, 1991). ◆ Women are also more likely to suffer depression, eating disorders and injuries as a result of domestic conflicts. ◆ In Canada women continue to earn less money than their male counterparts (Rogers, 1997, 66).
Ethnic Origins	<ul style="list-style-type: none"> ◆ Native people – among the poorest, high rates of infant mortality and violence, and decreased life expectancy (Rachlis & Kushner, 1989; Rogers, 1997, 66).
Social Support	<ul style="list-style-type: none"> ◆ Level of social support is one of the most potent indicators of degree of vulnerability (Gitterman, 1991; Rogers, 1997, 66).
Education	<ul style="list-style-type: none"> ◆ Higher levels of education are directly associated with better health. People who have more education tend to access the health care system more and also practice preventive health (Gitterman, 1991). ◆ Women with a higher level of education are more likely to obtain prenatal care and have healthier infants (Smyke, 1993; Rogers, 1997, 66).
Income	<ul style="list-style-type: none"> ◆ Income is a major determinant of vulnerability. ◆ Those at greater probability of illness are those with fewer resources. ◆ Individuals who have a combination of high probability factors (e.g. Black, single mother, no job, and low education) are more vulnerable. (Rogers, 1997, 66).
Major Life Transitions	<ul style="list-style-type: none"> ◆ People are most vulnerable during transitions or major life changes such as during adolescence and pregnancy (Rose & Killien, 1983; Rich, 1992).

Probability Factors for Vulnerability	
Personal Factors	<ul style="list-style-type: none"> ◆ Inborn characteristics that influence health include the person's temperament, genetic predisposition to disease, susceptibility to illness, sensitivity to drugs and chemical imbalances (Lessick et al., 1992). ◆ The non-modifiable characteristics of age, gender and race ◆ Acquired characteristics - trauma, diseases, lifestyle and learned abilities such as coping skills. ◆ Both the inborn and acquired characteristics affect the individuals ability to respond to stress (Rose & Killien, 1983; Lessick et al., 1992; Miller, 1995)
Environmental Factors	<ul style="list-style-type: none"> ◆ Immediate environment - temperature, light, noise and pollution ◆ Broader environment - family, community and society. ◆ The modifiable factors - education, income, employment and level of social support ◆ The environment can have either a detrimental effect on the person's health or it can promote health. Social support, for example, has a protective effect influence on health (Rose & Killien, 1983; Rogers, 1997, 67).
Effects of Vulnerability	
Physiological Effects	<ul style="list-style-type: none"> ◆ The experience of being vulnerable leads to stress and anxiety (MacMullen et al, 1992) ◆ The physiological effects of stress include release of cortisone, thyroid hormone, glucose, cholesterol and endorphins into the blood stream leading to fatigue, weight loss, anorexia, insomnia, muscular tension, depression accident prone, back pain, urinary frequency, menstrual irregularities, acne, GI distress (Rogers, 1997, 69).
Psychological Effects	<ul style="list-style-type: none"> ◆ Feelings of helplessness, fear, desperation, anger, uncertainty, weakness, loss of control, embarrassment, powerlessness, isolation, anxiety/worry, changed effect, lowered self-esteem, loss of self-worth, inability to express feelings, challenge to transcend, inability to concentrate, emotionally labile (Rogers, 1997, 69). ◆ Leads to social isolation and alienation (Hall et al., 1994). ◆ May be ignorant of their rights and lack the negotiating skills needed to obtain resources (Gitterman & Shulman, 1994; Rogers, 1997, 69).
Social Effects	<ul style="list-style-type: none"> ◆ People who are poor and have little education tend to wait too long before accessing the health care system (Mondragon, 1993; Damron-Rodriguez et al., 1994). ◆ People who have little or no income and who are struggling in their day-to-day existence do not have the time, money or energy for preventive health measures (Rogers, 1997, 70). ◆ Vulnerable individuals may be afraid to access the health care system for fear of being reported to the police or immigration authorities (Rogers, 1997, 71).

APPENDIX B

Figure B1: Explanation for PHN doing Telephone Assessments to Postpartum Women

Figure B2: Informed Consent Form

Figure B3: Record of Calls Form

Figure B1: Family Centered Maternity Care Study - Explanation for PHN doing Telephone Assessments to Postpartum Women

The Ottawa Carleton Health Department is trying to learn about how women are managing in the first several days home following the birth of their baby. We are asking all women who gave birth in October if they would agree to participate in a telephone survey. Participation would mean answering a few brief questions within the first week after your baby is born and responding to a 15-minute telephone interview when your baby is six weeks of age.

Participation in the survey is voluntary. You may refuse to participate in the interview. If you do not wish to participate in the study your care from the Health Department will not be affected in any way. You also have the right to refuse to answer any question or to stop the interview at any time. Your answers are completely confidential and will be reported without any identifying information.

Would you be interested in helping us out with this project?

If yes → May I pass your name and phone number along to the project team?

Inclusion Criteria

1. Able to speak French or English well enough to complete the questionnaire
2. Have a telephone
3. Mother and baby come home from the hospital together

Figure B2: Family-Centered Maternity Care Study - Informed Consent Form

Fall, 2000

Dear Mother:

In the past few years there have been many changes to services provided to women and families at the time of giving birth to a baby and in the immediate postpartum period. It is important for the Ottawa Carleton Health Department to find out how you managed during your delivery and how you and your infant have been doing since your discharge from the hospital after the birth.

We are asking all women who gave birth to a baby between October 10 and November 20, 2000 to help us by answering a brief 15 to 20 minute telephone interview within the first few days of giving birth and another 20-minute telephone interview when the baby is six weeks of age. This first interview will deal with questions about your labour, delivery and your hospital experience. The second interview at 6 weeks will be about how you prepared for the birth of this new baby and your early postpartum experience.

We would like to hear about your experiences with caring for your new baby as well as your impression of the services you have received both from the health professionals during your labour and delivery and from the Ottawa-Carleton Health Department in the first few weeks after your baby's birth. Your family has been selected for this project from the information that you consented to share with the Health Department. All hospitals share information with the Health Department as part of community follow up. We are calling to do an evaluation of combined care overall.

Interviewer may explain to the respondent that there is a consent form which most women sign when they are in hospital to deliver their baby. This consent form allows the hospital to pass basic information about the mother and the baby along to the Health Department so that the Public Health Nurses may do community follow up either by telephone or by home visit to all new women.

Participation in the survey is voluntary. You have the right to refuse to participate in the interview without affecting the care you or your family will receive from the Health Department. You also have the right to refuse to answer any question or to stop the interview at any time you wish. You may also choose to stop the interview and continue it another day if you become tired. Your answers to questions will be completely confidential and no one will be able to link your name to the answers you give.

We value your knowledge and ideas and feel that your answers will help us provide more effective services to families living in Ottawa-Carleton.

Figure B3: Family-Centered Maternity Care Study - Record of Calls Form

ID# _____

Hello, may I please speak to _____? (Use both names of woman).

Hello, I am _____ a Research Assistant from the Ottawa-Carleton Health Department. We are conducting a telephone interview to find out how you managed during your baby's birth and how you, your infant and your family have been doing since your discharge from the hospital.

We are asking all women who gave birth to a baby between October 10 and November 20, 2000 to help us by answering a brief 15 to 20 minute telephone interview within the first few days of giving birth and another 20-minute telephone interview when the baby is six weeks of age. This first interview will deal with questions about your labour, delivery and your hospital experience. The second interview at 6 weeks will be about how you prepared for the birth of this new baby and your early postpartum experience.

Your family has been selected for this project from the information, which you consented to share with the Health Department. All hospitals share information with the Health Department as part of community follow up. We are calling to do an evaluation of combined care overall.

Interviewer may explain to the respondent that there is a consent form which most women sign when they are in hospital to deliver their baby. This consent form allows the hospital to pass basic information about the mother and the baby along to the Health Department so that the Public Health Nurses may do community follow up either by telephone or by home visit to all new women.

Participation in the survey is voluntary. You have the right to refuse to participate in the interview without affecting the care you or your family will receive from the Health Department. You also have the right to refuse to answer any question or to stop the interview at any time you wish. You may also choose to stop the interview and continue it another day if you become tired. Your answers to questions will be completely confidential and no one will be able to link your name to the answers you give.

If yes - Are you willing to participate in this project?

If yes - Is it convenient for you to answer the questions now? (If it is convenient for the respondent, proceed with the questionnaire. If it is not convenient, reschedule the interview)

Calls	Hour	Day	Month	Notes
1st				
2nd				
3rd				
4th				
5th				
6th				

_____ Unable to contact after 6 tries

Refusal _____ Reason _____

APPENDIX C

C1: The Family-Centered Maternity Care Study – Week One Questionnaire

C2: The Family-Centered Maternity Care Study – Week Six Questionnaire

C1: Family-Centred Maternity Care Study - Week One Questionnaire

ID# _____

1. Is your baby a boy or a girl? _____ **Boy** _____ **Girl**
2. What was your baby's birthweight _____
3. Was this your first baby?
 _____ **Yes**
 _____ **No** → 3.1 How many other children do you have? _____

Now I would like to ask you some questions about your baby's birth

4. Was your baby born:
 _____ **Vaginally?** → **GO TO QUESTION # 5**
 _____ **By cesarean?**
- 4.1 Did you have an: _____ **Epidural (needle in the back) anaesthetic**
 _____ **General anaesthetic**
- 4.2 Did you have a previous cesarean birth?
 _____ **Yes** → Did your doctor/midwife discuss the possibility of
 having a vaginal birth this time? _____ **Yes** _____ **No**
 _____ **No**
5. While you were in labour and giving birth, did one nurse stay with you all of the time?
 _____ **Yes**
 _____ **No**
 5.1 In total, how many nurses were with you? _____
6. Did you have anyone (other than your health care professional and hospital staff) with you during your labour and your baby's birth?
 _____ **Yes**
 _____ **No** → **GO TO QUESTION # 13**

7. Was your partner with you during labour and birth?

_____ Yes

_____ No → GO TO QUESTION # 8

7.1 How welcome did your partner feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all		Somewhat		Very
Welcome		Welcome		Welcome

8. Were your other children with you during labour and birth?

_____ Yes

_____ No → GO TO QUESTION # 9

8.1 How welcome did your other children feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all		Somewhat		Very
Welcome		Welcome		Welcome

9. Was another family member with you during labour and birth?

_____ Yes

_____ No → GO TO QUESTION # 10

9.1 How welcome did your family member feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all		Somewhat		Very
Welcome		Welcome		Welcome

10. Was a friend with you during labour and birth?

_____ Yes

_____ No → GO TO QUESTION # 11

10.1 How welcome did your friend feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all		Somewhat		Very
Welcome		Welcome		Welcome

11. Was a doula with you during labour and birth?

_____ Yes

_____ No → GO TO QUESTION # 12

11.1 How welcome did your doula feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all Welcome		Somewhat Welcome		Very Welcome

12. Was another person with you during labour and birth

_____ Yes (please specify) _____

_____ No → GO TO QUESTION #13

12.1 How welcome did this person feel?

Rate this on a scale from 1 to 5 with 1 being not at all welcome and 5 being very welcome.

1	2	3	4	5
Not at all Welcome		Somewhat Welcome		Very Welcome

13. Did you want anyone else to be with you during labour and birth?

_____ Yes

_____ No

If yes, please explain why they were excluded

14. During labour and birth how would you describe the support that you received from the hospital nursing staff? Rate this on a scale from 1 to 5 with 1 being not at all supported to 5 being very well supported.

1	2	3	4	5
Not at all Supported		Somewhat supported		Very well supported

15. During labour and birth, how would you describe the support that you received from your doctor/midwife? Rate this on a scale from 1 to 5 with 1 being not at all supported to 5 being very well supported.

1	2	3	4	5
Not at all Supported		Somewhat supported		Very well supported

16. During labour and birth, how would you describe the support that you received from the others present (e.g. your partner, friend, etc.)? Rate this on a scale from 1 to 5 with 1 being not at all supported to 5 being very well supported.

1	2	3	4	5
Not at all		Somewhat		Very well
Supported		supported		supported
☐ Not applicable				

17. Overall, how would you describe the support that you received? Rate this on a scale from 1 to 5 with 1 being not at all supported to 5 being very well supported.

1	2	3	4	5
Not at all		Somewhat		Very well
Supported		supported		supported

Now I would like to ask you about some of the things that may have happened during your labour and birth?

18. Did you have your pubic hair shaved?

☐ Yes ☐ No

19. Did you have an enema?

☐ Yes ☐ No

20. Was your baby's heart rate monitored by an electronic fetal monitor attached to you?

☐ Continuously (all the time) ☐ At intervals ☐ Not at all

21. Did you have an IV (intravenous)?

☐ Yes If yes, why _____
☐ No

22. Were you encouraged to drink fluids during labour?

☐ Yes ☐ No

23. Were you encouraged to eat during labour?

☐ Yes ☐ No

24. Were you encouraged to walk around during labour?

☐ Yes ☐ No

25. Were you able to choose the position that you wanted to give birth in?

☐ Yes ☐ No

26. What position did you give birth in?

- ☐ Lying on my back with stirrups
☐ Lying on my back, no stirrups
☐ Sitting or semi-sitting
☐ Lying on my side
☐ Squatting/standing
☐ Other (specify) _____

27. Did you have an episiotomy (a cut to make the opening of the vagina bigger)?

- ☐ Yes ☐ No

28. Did you use any of the following for pain relief/management? (Check all that apply.)

- ☐ Touch/massage
☐ Breathing techniques
☐ Relaxation techniques
☐ Visualization
☐ Shower
☐ Bath
☐ Injection of narcotics (e.g., Demerol)
☐ Nitrous oxide (gas)
☐ Other -- please specify _____

29. Did you have an epidural (a needle in the back) for pain?

- ☐ Yes → 29.1 If yes, what was done to help you cope with the pain before you had the epidural? _____

☐ No

30. Were any of the following used during your labour and birth?

- Antibiotics ☐ Yes ☐ No
 Forceps ☐ Yes ☐ No
 Vacuum extraction ☐ Yes ☐ No
 Pitocin/syntocin (drip) ☐ Yes ☐ No
 Other(specify) _____ -

31. Did you labour and give birth in the same room?

- ☐ Yes
☐ No

32. How long after the birth did you stay in the room you gave birth in?

- ☐ Less than an hour
☐ One hour
☐ Two/three hours
☐ Till discharge

33. When did you first hold/touch your baby:

- ☐ Immediately after birth (baby placed directly into your arms/on your abdomen)?
☐ Within the first ten minutes?
☐ Within the first half hour?
☐ Longer than a half hour?

34. Did your baby stay with you for the first few hours after birth?

- ☐ Yes
☐ No → Please explain

35. Were you moved to another room after birth?

- ☐ Yes 35.1 If yes, was your baby moved with you? ☐ Yes
☐ No, we were separated
☐ No, I stayed in the same room

36. Were you separated from your baby at all while you were in hospital?

- ☐ Yes 36.1 If yes, when did this occur the first time and why?

☐ No

37. How long did you stay in hospital after the birth of your baby?

- ☐ hours OR
☐ days

38. How did you feel about the length of stay in hospital after the birth of your baby?

Was it:

- ☐ too short
☐ OK
☐ Too long

38.1 Please state the reason for your answer.

39. During your postpartum stay in hospital, did you have rooming-in (your baby remained in your room)

- ☐ **During the day only**
☐ **24 hours (i.e., overnight)**
☐ **Not at all**
☐ **Other -- please describe**

40. During your postpartum stay in hospital, on any one shift who took care of you and your baby?

- ☐ **One nurse for both me and my baby**
☐ **One nurse for me and one (different) nurse for my baby**

41. How much time per day did your baby spend in the nursery?

hours

42. Do you feel that you had the opportunity to spend enough time with your baby while in hospital?

☐ **Yes** ☐ **No**

43. Do you feel that you had the opportunity to ask questions of your baby's doctor?
Rate this on a scale from 1 to 5 with 1 being never and 5 being always.

1	2	3	4	5
Never		Sometimes		Always

44. Do you feel that you had the opportunity to ask questions of the nurses?
Rate this on a scale from 1 to 5 with 1 being never and 5 being always.

1	2	3	4	5
Never		Sometimes		Always

45. Who could visit the baby in your room:

- ☐ **The baby's father?**
☐ **Your other children?**
☐ **The baby's grandparents?**
☐ **Others? -- please specify** _____

46. How would you describe the number/frequency of visitors you had while in hospital?

Rate this on a scale from 1 to 5 with 1 being far too many and 5 being just right.

1 2 3 4 5
Far too many Just right

47. How would you describe the number/frequency of visitors that your roommate(s) had while in hospital?

Rate this on a scale from 1 to 5 with 1 being far too many and 5 being just right.

1 2 3 4 5
Far too many Just right

_____ I had no roommates

48. How would you rate the amount of time you had while in hospital to learn to care for your baby?

Rate this on a scale from 1 to 5 with 1 being very inadequate and 5 being plenty of time.

1	2	3	4	5
Very Inadequate		Somewhat adequate		
Completely adequate				

49. How would you rate the amount of time you had while in hospital to learn to care for yourself?

Rate this on a scale from 1 to 5 with 1 being very inadequate and 5 being plenty of time.

1 2 3 4 5
Very Inadequate Somewhat adequate
Completely adequate

50. How would you rate the amount of time your partner had while in hospital to learn to care for your baby?

Rate this on a scale from 1 to 5 with 1 being very inadequate and 5 being plenty of time.

1	2	3	4	5
Very Inadequate		Somewhat adequate		
Completely adequate				

51. Was there a lounge for parents to use in the hospital?

Yes _____ No _____

52. Was there a kitchen for parents to use in the hospital?

Yes No

53. Was your partner able to stay overnight with or near you and your baby if you desired?

_____ Yes _____ No

54. When you left the hospital, were you aware of when your first visit was with your baby's doctor?

_____ Yes If yes, when was it: _____ days after discharge

_____ No

_____ I was under the care of a midwife

55. How confident did you feel about caring for yourself and your baby when you were discharged from hospital?

Rate this on a scale from 1 to 5 with 1 being not at all confident and 5 being very confident.

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

56. When you left the hospital, were you given information about the following community resources:

_____ Public health nursing visits/telephone calls?

_____ Healthy Babies/Healthy Children program?

_____ Well Baby Drop-Ins offered by the Health Department?

_____ Parent Child Information Line at the Health Department

_____ Breastfeeding Support Drop-Ins?

_____ Baby Passport?

_____ Other resources? -(please specify)

57. Did your baby spend any time in a special care nursery/neonatal intensive care unit?

_____ Yes 57.1 What was the reason?

_____ No → GO TO QUESTION # 63

58. Were you able to visit/be with your baby whenever you wanted?

_____ Yes

_____ No → 58.1 What were the

reasons? _____

59. Was the baby's father able to visit/be with your baby whenever he wanted?

☐ Yes

☐ No → 59.1 What were the reasons? _____

☐ Not applicable

60. Were you able to handle your baby?

☐ Yes ☐ No

61. Was the baby's father able to handle your baby?

☐ Yes ☐ No ☐ Not applicable

62. Was there a support group for parents whose babies need special care because they are very small or ill?

☐ Yes → If yes, did you attend? ☐ Yes ☐ No

☐ No

63. How would you rate the amount of information that you were given about your baby's condition from the health care professionals?

Rate this on a scale from 1 to 5 with 1 being inadequate and 5 being plenty of time.

1 2 3 4 5

Inadequate

Somewhat adequate

Completely adequate

64. Did the hospital staff support and encourage you to be involved in decisions about the following:

64.1 Having your other children present during your labour and/or birth

☐ Yes ☐ No

64.2 The location of your birth (labour, birth or "delivery" room)

☐ Yes ☐ No

64.3 Pain relief measures

☐ Yes ☐ No

64.4 The method used to check your baby's heart rate during labour (fetoscope or electronic fetal monitor)

☐ Yes ☐ No

64.5 Amount of time baby roomed-in with you

☐ Yes ☐ No

64.6 Being separated from your baby

_____ Yes _____ No

64.7 Frequency and number of postpartum visitors

_____ Yes _____ No

64.8 Circumcision

_____ Yes _____ No _____ N/A

64.9 When you were discharged from hospital

_____ Yes _____ No

Date of Interview:

Day

Month

Year

**THANK YOU FOR TAKING THE TIME TO PARTICIPATE IN THIS SURVEY
AND ANSWER ALL OF THESE QUESTIONS!**

C2: Family-Centred Maternity Care Study - Week Six Questionnaire

ID# _____

I would like to ask you some questions about the care, support and education that you received when you were pregnant.

1. Did you attend prenatal classes with this pregnancy?

_____ Yes 1.1 Who offered the classes? _____ Ottawa Carleton Health Department

_____ Birthcare

_____ Canadian Mothercraft

_____ Childbirth Education Association

_____ First Step Childbirth Education

_____ Hopital Montfort Hospital

_____ Lifepaths Certified Childbirth Educator

_____ Multiple Expectations (Ottawa Twin
Parents' Association)

_____ Ottawa Hospital Civic Campus

_____ Service Perinatal Service

_____ other (specify) _____

1.2 Did someone go to prenatal classes with you?

_____ Yes 1.2.1 If yes, who?

_____ Partner

_____ Friend

_____ Family member

_____ Other, Please specify _____

_____ No → GO TO QUESTION #2

1.2.2 Did your companion feel included in the prenatal classes?

_____ Yes _____ No

_____ No → GO TO QUESTION #2

2. Who was your health care provider during your pregnancy? (check all that apply)

_____ Family doctor

_____ Midwife

_____ Obstetrician

3. When did you first go for prenatal care?

_____ months of pregnancy

4. Did someone else attend your prenatal care visits with you?

_____ Yes

4.1 If yes, who:

_____ **Partner**

_____ **Other children**

_____ **Family member**

_____ **Friend**

_____ **Other – please specify**

_____ **No → GO TO QUESTION #5**

4.2 Were they made to feel included in the visit?

_____ Yes _____ No

5. Did your doctor/midwife discuss with you his/her approach to care, birth options, etc. during your pregnancy?

_____ Yes _____ No

6. Did you have a written birth plan that you developed with your doctor/midwife?

_____ Yes _____ No

7. Do you feel that you had the opportunity to ask questions of your doctor/midwife? Rate this on a scale from 1 to 5 with 1 being never and 5 being always.

1	2	3	4	5
Never		Sometimes		Always

8. Do you feel that you understood what to expect from labour and birth?

Rate this on a scale from 1 to 5 with 1 being not at all and 5 being well enough.

1	2	3	4	5
Not at all		Somewhat		Well
enough				

9. Did the following people discuss preterm labour with you:

Your doctor/midwife? _____ Yes _____ No

Your prenatal educator? _____ Yes _____ No

10. Do you feel you understood the signs/symptoms of preterm labour?

Rate this on a scale from 1 to 5 with 1 being not at all and 5 being well enough.

1	2	3	4	5
Not at all		Somewhat		Well
enough				

11. Did you arrange for any of the following supports while you were pregnant?

_____ **Support during labour and birth (person(s) other than your doctor/midwife)**

_____ **Support for breastfeeding postpartum**

_____ **Support for taking care of your baby in the early weeks**

12. During your pregnancy, were you aware of, or did you become aware of any of the following community resources: (check all that apply)

- ☐ **Public health nursing visits/telephone calls**
☐ **Healthy Babies/Healthy Children program**
☐ **Well Baby Drop-Ins offered by the Health Department**
☐ **Parent Child Information Line at the Health Department**
☐ **Breastfeeding Support Drop-Ins**
☐ **Other resources - please specify** _____

13. Did you have any problems/illnesses during your pregnancy?

- ☐ **Yes** – Please specify: _____
☐ **No**

Now I would like to ask you some questions about feeding your baby.

14. Did the following health professionals discuss breastfeeding with you?

	Yes	No
Your baby's doctor	_____	_____
Your own doctor/midwife	_____	_____
Prenatal educator	_____	_____
Hospital nurses	_____	_____

15. Did the following health professionals discuss bottle feeding with you?

	Yes	No
Your baby's doctor	_____	_____
Your own doctor/midwife	_____	_____
Prenatal educator	_____	_____
Hospital nurses	_____	_____

16. Did you receive support and encouragement for the way you chose to feed your baby (i.e. breast or bottle) from the following health professionals?

	Yes	No
Your baby's doctor	_____	_____
Your own doctor/midwife	_____	_____
Prenatal educator	_____	_____
Hospital nurses	_____	_____

17. Did you breastfeed any of your other babies?

- ☐ **No, this is my first baby**
☐ **No, I bottle-fed my other baby(ies)**
☐ **yes, I breastfed** _____ **babies (please indicate the number of babies you previously breastfed)**

18. When did you make the decision to breast or bottle feed your baby?

- ☐ **Before pregnancy**
☐ **During pregnancy**
☐ **After the baby's birth**

19. How were you feeding your baby in the first 48 hours after his/her birth (check one)

- ☐ **Breastfeeding**
☐ **Bottle feeding** → GO TO QUESTION # 33
☐ **Both**

20. Why did you decide to breastfeed your baby? (Do not read options)

- ☐ **Better for me**
☐ **Better for my baby**
☐ **More convenient**
☐ **Better for the family**
☐ **Less costly**
☐ **Other -- please specify** _____

The following questions relate to your breastfeeding experience in hospital.

21. When did you first breastfeed your baby after birth:

- ☐ **Within the first half hour?**
☐ **Within the first hour?**
☐ **After an hour?**
☐ **Not applicable (not breastfeeding)**

22. Was your baby given formula while in hospital?

- ☐ **Yes** → What was the reason? _____
☐ **No**
☐ **I don't know**

23. Was your baby given water or sugar water while in hospital?

- ☐ **Yes** ☐ **No** ☐ **I don't know**

24. Was your baby weighed before or after feedings?

- ☐ **Yes** ☐ **No** ☐ **I don't know**

25. Was your baby given a soother while in hospital?

- ☐ **Yes** ☐ **No** ☐ **I don't know**

Questions 26 to 32 are for Women who started breastfeeding in the hospital. If the Mother only bottled right from the beginning, Go To Question #33.

26. Were you taught/helped with any of the following while in hospital:

Positioning of the baby at your breast?	_____ Yes	_____ No
Your baby's latching onto your nipples?	_____ Yes	_____ No
Frequency of your baby's feeding?	_____ Yes	_____ No
Your baby's cues that he/she was ready to feed?	_____ Yes	_____ No
Your baby's cues that he/she was full?	_____ Yes	_____ No
Signs that your baby was feeding adequately?	_____ Yes	_____ No
Signs indicating that you should seek help?	_____ Yes	_____ No

27. Did someone (i.e., a nurse or doctor or midwife) examine your breasts postpartum?
 _____ Yes _____ No

28. How many successful nursings (breastfeeds with your baby) did you have before you left hospital? _____

29. How would you describe a successful nursing (breastfeed with your baby)?

30. How would you describe the support given by hospital staff for breastfeeding while you were in hospital?

Rate this on a scale from 1 to 5 with 1 being poor and 5 being excellent.

1	2	3	4	5
Poor		Good		Excellent

31. How would you describe the level of knowledge that the following had about breastfeeding? Rate this on a scale from 1 to 5 with 1 being poor and 5 being excellent.

31.1 The hospital (postpartum) nurses

1	2	3	4	5
Poor		OK		Excellent

31.2 The public health nurses

1	2	3	4	5
Poor		OK		Excellent

31.3 Your doctor/midwife

1	2	3	4	5
Poor		OK		Excellent

31.4 Your baby's doctor

1	2	3	4	5
Poor		OK		Excellent

32. How confident did you feel about breastfeeding when you were discharged from hospital?

Rate this on a scale from 1 to 5 with 1 being not at all confident and 5 being very confident.

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

NOW GO TO QUESTION # 36

33. Do you feel that you were supported in your decision to bottle feed by the hospital staff? Rate this on a scale from 1 to 5 with 1 being not at all and 5 being completely.

1	2	3	4	5
Not at all		Somewhat		Completely

34. Were you shown how to prepare formula while in hospital?

☐ Yes ☐ No

35. How confident did you feel about feeding your baby when you were discharged from hospital? Rate this on a scale from 1 to 5 with 1 being not at all confident and 5 being very confident.

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

The following questions relate to your feeding experience since you left hospital.

36. How are you presently feeding your baby?

☐ Breastfeeding only → GO TO QUESTION # 40

☐ Breastfeeding with 1 bottle of milk other than breastmilk or more a day → GO TO QUESTION # 40

☐ Bottle feeding only (was breastfeeding, but stopped) → GO TO QUESTION # 37

☐ Bottle feeding only (never breastfed) → GO TO QUESTION # 44

For women who are no longer breastfeeding

37. For how long did you breastfeed your baby?

Days OR Weeks OR Months

38. Why did you stop breastfeeding? (PROBE: Please tell me all the reasons you decided to stop.) (Interviewer do not read responses).

- ☐ Thought baby was not getting enough milk
- ☐ Cracked or sore nipples
- ☐ Had to go back to work/school
- ☐ Didn't feel comfortable/didn't enjoy breastfeeding
- ☐ Mother was too tired
- ☐ Other (Please specify) _____

39. Which was the most important reason you stopped breastfeeding? (Only indicate one reason)

- ☐ Thought baby was not getting enough milk
- ☐ Cracked or sore nipples
- ☐ Had to go back to work/school
- ☐ Didn't feel comfortable/didn't enjoy breastfeeding
- ☐ Mother was too tired
- ☐ Other (Please specify) _____

40. Did you attend one of the Breastfeeding Support Drop-Ins?

☐ Yes

40.1 Where was the drop-in you attended?

(write the street name here) _____

40.2 Why did you attend the drop-in?

(Interviewer do not read responses)

- ☐ problem breastfeeding (specify) _____
- ☐ reassurance needed
- ☐ a public health nurse told me to attend
- ☐ other reason (specify) _____

40.3 How useful did you find this drop-in

(Interviewer read responses)

1. Very useful
2. Somewhat useful
3. Not useful

☐ No

41. Please indicate your level of agreement with the following statement: "The expectations that I had about breastfeeding were the same as what I actually experienced".

- ☐ Strongly agree
- ☐ Agree
- ☐ Disagree
- ☐ Strongly disagree

42. Would you breastfeed your next baby?

☐ Yes ☐ No ☐ Undecided

43. Did you have any problems at home with breastfeeding?

_____ Yes _____ No GO TO QUESTION # 44

43.1 If yes, was(were) the problem(s) (check all that apply)

_____ baby fussy/crying

_____ baby had jaundice

_____ baby dehydrated

_____ baby too sleepy

_____ worried you did not have enough milk

_____ sore nipples

_____ mastitis (breast infection)

_____ thrush

_____ other (please specify) _____

43.2 Did you seek help from anyone?

_____ Yes If yes, who? _____ Friend, family member

_____ Your doctor/midwife

_____ Baby's doctor

_____ Public health nurse

_____ Lactation consultant

_____ No

Now I would like to ask you some questions about the early days at home with your baby.

44. When you went home was there someone there to help you?

_____ Yes 44.1 If yes, who? _____

_____ No

45. Has your baby had any significant health problems?

_____ Yes – please specify _____

_____ No

46. How much help have you received from family or friends since the birth of your baby?

Rate this on a scale from 1 to 5 with 1 being one and 5 being more than enough.

1	2	3	4	5
None		Some		More than
enough				

47. How much help have you received from health care professionals since the birth of your baby?

Rate this on a scale from 1 to 5 with 1 being one and 5 being more than enough.

1	2	3	4	5
None		Some		More than
enough				

48. Overall, do you feel you had enough help since the birth of your baby?

_____ Yes

_____ No

49. How confident have you felt about caring for yourself during your time at home?

Rate this on a scale from 1 to 5 with 1 being not at all confident and 5 being very confident.

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

50. How confident have you felt about caring for your baby during your time at home?

Rate this on a scale from 1 to 5 with 1 being not at all confident and 5 being very confident.

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

51. Have you received the following services:

_____ **Phone call from a public health nurse**

_____ **Visit from a public health nurse**

_____ **Services from the Health Babies Healthy Children program**

If yes, _____ **family visitor**

_____ **Public health nurse**

_____ **Visit to a Well Baby Drop-In**

_____ **Phone call to the Parent Child Information Line**

_____ **Visit to a Breastfeeding Support Drop-In**

_____ **Package of information in the mail from the Health Department**

_____ **Other – please**

specify _____

52. If extra assistance had been available, what would you have liked to have had? Please rank the following from 1 to 6 in the order from most important to least important with number 1 being the most important.

_____ **Help with baby care**

_____ **Help with keeping the house clean/laundry**

_____ **Help with meal preparation**

_____ **Help with other children**

_____ **Help with grocery shopping**

_____ **Other (Please specify)** _____

53. Has your baby ever had to be taken to the emergency department?

_____ Yes 53.1 If yes, What was his/her age at the time of the first visit to the emergency department? _____

53.2 What was the reason for the visit?

_____ No

54. Has your baby ever had to be admitted to hospital?

_____ Yes 54.1 If yes, How many times has your baby been admitted to hospital? _____ times

What was(were) the reason(s) for the visit(s)?

1st visit _____
 2nd visit _____
 3rd visit _____
 4th visit _____

_____ No

Now I would like to ask you a few final questions about yourself and your baby. As you have recently had a baby, we would like to know how you are feeling now. Please say the answer, which comes closest to how you have felt in the past 7 days, not just how you feel today.

INTERVIEWER TO SAY "IN THE PAST 7 DAYS" BEFORE EACH QUESTION

55. I have been able to laugh and see the funny side of things:
 (interviewer to read responses)

As much as I always could 0 _____
 Not quite so much not 1 _____
 Definitely not so much now 2 _____
 Not at all 3 _____

56. I have looked forward with enjoyment to things:
 (interviewer to read responses)

As much as I always did 0 _____
 Rather less than I used to 1 _____
 Definitely less than I used to 2 _____
 Hardly at all 3 _____

57. I have blamed myself unnecessarily when things went wrong:
(interviewer to read responses)

Yes, most of the time	3 _____
Yes, some of the time	2 _____
Not very often	1 _____
No, never	0 _____

58. I have felt worried and anxious for no very good reason:
(interviewer to read responses)

Yes, very often	3 _____
Yes, sometimes	2 _____
Hardly ever	1 _____
No, not at all	0 _____

59. I have felt scared or panicky for no very good reason:
(interviewer to read responses)

Yes, quite a lot	3 _____
Yes, sometimes	2 _____
No, not much	1 _____
No, not at all	0 _____

60. Things have been getting on top of me:
(interviewer to read responses)

Yes, most of the time I haven't been able to cope at all	3 _____	(ask if they would like a PHN to call)
Yes, sometimes I haven't been coping as well as usual	2 _____	
No, most of the time I have coped quite well	1 _____	
No, I have been coping as well as ever	0 _____	

61. I have been so unhappy that I have had difficulty sleeping:
(interviewer to read responses)

Yes, most of the time	3 _____	(ask if they would like a PHN to call)
Yes, sometimes	2 _____	
Not very often	1 _____	
No, not at all	0 _____	

62. I have felt sad or miserable:
(interviewer to read responses)

Yes, most of the time	3 _____	(ask if they would like a PHN to call)
Yes, quite often	2 _____	
Not very often	1 _____	
No, not at all	0 _____	

63. I have been so unhappy that I have been crying:

(interviewer to read responses)

Yes, most of the time	3 _____	(ask if they would like a PHN to call)
Yes, quite often	2 _____	
Only occasionally	1 _____	
No, never	0 _____	

64. The thought of harming myself has occurred to me:

(interviewer to read responses)

Yes, quite often	3 _____	(ask if a PHN can call)
Sometimes	2 _____	(ask if a PHN can call)
Hardly ever	1 _____	(ask if a PHN can call)
Never	0 _____	

TOTAL SCORE: _____

A score of 12+ indicates mother may have postpartum depression. Ask: It sounds as though you have been feeling down over the past few weeks. You may want to call your doctor or discuss these feelings). **If they do not have a doctor, advise to call Parent Child Info Line 724-4179 and ask if they would allow you to refer them to a PHN.**

Thanks for answering these questions on your feelings.

I know some of the questions may seem a little strange, but some women do experience problems feeling down after the birth of their baby.

Now a few final questions about yourself

65. What is your date of birth?

_____ Month _____ Year

66. What is the last year completed at school, college or university?

_____	No formal schooling
_____	Public school – grade _____
_____	High school – grade _____
_____	Some college
_____	Some university
_____	Completed college
_____	Completed university (one degree)
_____	Postgraduate degree

67. Do you have a partner?

- ☐ Yes
☐ No → **GO TO QUESTION # 69**

68. What was the last year your partner completed at school, college or university?

- ☐ No formal schooling
☐ Public school – grade _____
☐ High school – grade _____
☐ Some college
☐ Some university
☐ Completed college
☐ Completed university (one degree)
☐ Postgraduate degree

69. Where were you born?

- ☐ Canada → **GO TO QUESTION # 71**
☐ Caribbean ☐ Lebanon ☐ Italy
☐ Germany ☐ Mainland China ☐ United States of America
☐ Greece ☐ Poland ☐ Other, Please specify _____
☐ Holland ☐ Poland
☐ Hong Kong ☐ Somalia
☐ India ☐ United Kingdom (England, Scotland, Wales Northern Ireland) or Ireland

70. What year did you first come to live in Canada?

_____ (year immigrated to Canada)

71. What is the language you first learned and still understand?

- ☐ English
☐ French
☐ Other – Please specify _____

72. How many people in total (both children and adults) are supported by your family's income?

_____ People

73. What was your approximate family income from all sources, before taxes during the previous year – January 1, 1999 to December 31, 1999?

☐ Less than \$17,000	☐ \$36,000 to \$39,999	☐ \$60,000 to \$69,999
☐ \$17,000 to \$26,999	☐ \$40,000 to \$44,999	☐ \$70,000 to \$79,999
☐ \$27,000 to \$31,999	☐ \$45,000 to \$49,999	☐ \$80,000 or more
☐ \$32,000 to \$35,999	☐ \$50,000 to \$59,999	
- ☐ Refused to answer (*read each response but not this one*)

74. What is your present marital status? Are you:

- ☐ Married
☐ Common-law
☐ Single
☐ Separated
☐ Divorced
☐ Widowed
☐ Other – Please specify _____

75. Please share any comments that you might have indicating how the care you have received during your pregnancy, birth and postpartum period could be more responsive to your needs and your families needs.

Date of Interview: _____ _____ _____
 Day Month Year

**THANK YOU FOR TAKING THE TIME TO PARTICIPATE IN THIS SURVEY
AND ANSWER ALL OF THESE QUESTIONS!**

APPENDIX D

Figure D1: Family Centered Maternity Care Study: Protection of Human Rights

Figure D2: Ethics Approval University of Ottawa

Figure D3: Ethics Approval Ottawa Health Department

Figure D1: Family Centered Maternity Care Study: Protection of Human Rights

In order to obtain consent to contact families following delivery of their infant, ethical approval for the primary FCMC Survey was requested through the City of Ottawa Health Department. Permission to participate in the survey was requested during the normal early postpartum phone call made to all new women in the region by the Health Department. If the woman agreed, a research assistant called to conduct the interviews. All eligible participants received an explanation of the study. A Sample Letter of Informed Consent is included in Appendix E.

The questionnaires, are kept locked in a secure place at the City of Ottawa Health Department, so no one but the research assistant of the FCMC Study is privy to any information of a personal nature. A separate list of names of women who give birth with numbers assigned to each woman is also locked in a secure place. No identifying data, such as names and places, will be mentioned in any report of this study. Confidentiality will always be respected and no information that discloses the identity of the subject will be released or published without consent unless required by law.

Participation in this research project was voluntary and participants had the right to withdraw at any time. The research assistants stressed that the women are under no obligation to participate in the study and that participation will not affect their care and the care of their infants. The research assistant referred any women who had questions about care to a public health nurse at the end of the interview (OCHD, 2000).

Figure D2: Ethics Approval University of Ottawa

Figure D3: Ethics Approval Ottawa Health Department

File Number 050125

January 18, 2002

Ms. Sandy Dunn
Master's Candidate
University of Ottawa

Dear Sandy,

Re: Secondary Data Analysis: FCMC Study

I am pleased to inform you that you may proceed with your plan to perform a secondary data analysis on FCMC data as a requirement for your Masters of Nursing thesis.

You are reminded to inform the Community Medicine and Epidemiology Unit if you have any major changes from your original proposal. We ask that in any publication, a member of the Public Health and Long Term Care Branch is cited as a co-author.

On behalf of the CMEU, we wish you well in your endeavours. Please do not hesitate to contact me at 724-4122, ext. 23643 if you require further information.

Yours truly

Jane Simpson, RN, MSc(A)
Program Planning and Evaluation Officer
Community Medicine & Epidemiology Unit
Public Health and Long Term Care Branch
People Services, City of Ottawa

Attach.

cc:

Shaping our future together
Ensemble, formons notre avenir

City of Ottawa
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1811
www.1811ottawa.on.ca

APPENDIX E

Table E1:	Questions From Week Six Questionnaire Related To Variables Under Study In Secondary Analysis
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Table E1: Questions From Week Six Questionnaire Related To Variables Under Study In Secondary Analysis

NOTE: The questions related to the variables under study in this research project are all found in the Week Six Questionnaire (questions are highlighted in red in the questionnaire).

Question	Topic	Variable
19	Breast or Bottle at 48 hr	Sub-sample of women
22	Supplement formula	Supplement (IDV)
23	Supplement water or sugar water	Supplement (IDV)
32	Confidence with breastfeeding	Confidence (IDV)
36	Breastfeeding at 6 weeks	Breastfeeding Outcome (DV)
40	Attend Breastfeeding Drop-In	Access Resources (IDV)
43.2	Seek help	Access Resources (IDV)
46	Support from family	Perceived Support (IDV)
47	Support from professionals	Perceived Support (IDV)
48	Support overall	Perceived Support (IDV)
51	Received services	Access Resources (IDV)
55-64	Edinburgh Postpartum Depression Score	Mental Health Distress (IDV)
65	Maternal Age	Demographic (Age) (IDV)
66	Maternal education	Demographic (Education) (IDV)

Table E2: Variables from the Family Centered Maternity Care Study For Secondary Data Analysis

Variable	Question #	Question	Type of Data	Support for Data/Scale Used	# of Variables
Sample of Women	19	How were you feeding your baby in the first 48 hours after his/her birth (check one) ___ Breastfeeding ___ Bottle feeding ___ Both	Only women breastfeeding or both (breastfeeding & formula feeding) will be included.	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	Exclusion Criteria
Supplement (IDV)	22	Was your baby given formula While in hospital? ___ Yes ___ No	Nominal	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	1
Supplement (IDV)	23	Was your baby given water or sugar water while in hospital? ___ Yes ___ No	Nominal	National Survey (Levitt, 1995; Statistics Canada 1994/95)	1
Confidence (IDV)	32	How confident did you feel about breastfeeding when you were discharged from hospital? 1 - Not at all 2 - 3 - Somewhat confident 4 - 5 - Very confident	Ordinal	National Survey (Statistics Canada, 1994/95)	4
Breastfeeding Outcome at Six Weeks Postpartum (DV)	36	How are you presently feeding Your baby? ___ Breastfeeding only ___ Breastfeeding with 1 bottle of other than breastmilk or more a day ___ Bottle feeding only (was breastfeeding, but stopped)	Nominal	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	Outcome Variable 1
Perceived Family Support (IDV)	46	How much help have you received From family or friends since the Birth of your baby? 1 - None 2 - 3 - Some 4 - 5 - More than enough	Ordinal	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	4

Table E2: Variables from the Family Centered Maternity Care Study For Secondary Data Analysis (cont'd)

Variable	Question #	Question	Type of Data	Support for Data/Scale Used	# of Variables
Perceived Professional Support (IDV)	47	47. How much help have you received from health care professionals since the birth of your baby? 1 - None 2 - 3 - Some 4 - 5 - More than enough	Ordinal	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	4
Perceived Overall Support (IDV)	48	Overall, do you feel you had Enough help since the birth of Your baby? ____ Yes ____ No	Nominal	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	1
Resources Used (IDV)	51 & 43.2	Have you received the following services: ____ Well Baby Drop-In (yes/no) ____ Parent Child Info Line (yes/no) ____ Breastfeeding Drop-In (yes/no) ____ Lactation Consultant (yes/no) (question 43.2)	Nominal	National Survey (Levitt, 1995)	1
Mental Health Distress (IDV)	55-64	Edinburgh Postpartum Depression Score	Categorical (Clinical Depression Score < 12 or ≥ 12)	(Cox, 1987; Holden, 1991)	2
Demographic (Age) (IDV)	65	What is your date of birth? ____ Month ____ Year (Age)	Categorical (Age < 25 or ≥ 25 years)	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	2
Demographic (Education) (IDV)	66	What is the last year completed at school, college or university? ____ No formal schooling ____ Public school – grade ____ ____ High school – grade ____ ____ Some college ____ Some university ____ Completed college ____ Completed university ____ Postgraduate degree	Categorical (Education Level > High School or ≤ High School)	National Survey (Levitt, 1995; Statistics Canada, 1994/95)	2

Table E3: Variable Coding

Variable	Categories
Agecat	< 25 = 0 ≥ 25, <35 = 1 >35 = 2
Agecat1 (Dummy < 25/>35)	< 25 = 1 25-35 = 0 >35 = 0 (reference)
Agecat2 (Dummy 25-35/>35)	<25 = 0 25-35 = 1 >35 = 0 (reference)
Agecat3	< 25 = 1 ≥ 25 = 0 (reference)
Education	≤ High school = 1 > High school = 0 (reference)
Supplementation – Formula	Don't Know = 2 Yes = 1 No = 0 (reference)
Supplementation – Formula (Dummy 3 - Don't Know/No)	Don't Know = 1 Yes = 0 No = 0 (reference)
Supplementation – Formula (Dummy 4 - Yes/No)	Don't Know = 0 Yes = 1 No = 0 (reference)
Supplementation – Water	Don't Know = 2 Yes = 1 No = 0 (reference)
Supplementation – Water (Dummy 1 - Don't Know/No)	Don't Know = 1 Yes = 0 No = 0 (reference)
Supplementation – Water (Dummy 2 - Yes/No)	Don't Know = 0 Yes = 1 No = 0 (reference)
Confidence	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 (reference)
Family Help	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 (reference)
Professional Help	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 (reference)
Overall Help	No = 1 Yes = 0 (reference)
Depcat	≥ 12 = 1 < 12 = 0 (reference)
Is mom still breastfeeding at 6 weeks postpartum?	Yes = 1 No = 0

Table E4: Missing Data Summary – Post Data Audit

Question	Variable	Missing Cells** n (%)	Cases with Missing Data (ID #)
19	Feeding at 48 hours	0	
22	Formula Supplement	1 (.2%)	674
23	D/W Supplement	1 (.2%)	674
32	Confidence	9 (1.7%)	113, 185, 292, 399, 404, 589, 623, 691, 723
36	BF Outcome – 6 wk	0	
46	Help Family	8 (1.5%)	026, 065, 175, 184, 214, 586, 724, 727
47	Help Professionals	2 (.4%)	474, 568
48	Help Overall	3 (.6%)	172, 373, 416
43.2	Lactation Consultant	0	
51	Well Baby Drop-In	0	
51	Parent Child Info Line	1 (.2%)	606
51	Breastfeeding Drop-In	0	
64	PPD Score		
	- all questions	2 (.4%)	093 , 414
	- # 10 only	4 (.8%)	193, 208, 329, 601
65	Age	8 (1.5%)	093 , 089, 455, 573, 593, 634, 721, 734
66	School	1 (.2%)	093
Total	526 cases	40 missing cells	37 cases with missing data

** Missing Cells – number (%) of cells for each variable where no answer was provided

- 526 (total cases), 37 (cases with missing data), 489 (complete cases)
- unbolded case numbers had missing data for only one question
- bolded case number (# 674) had missing data for two questions
- bolded case number (# 093) had missing data for three questions
- no cases had missing data for more than three questions

Table E5: Variable Categories

Variable Categories	Categories
Maternal Age	< 25 years ≥ 25 years (reference**)
Maternal Education	≤ High school > High school (reference)
Infant Supplementation with Formula	Don't Know Yes No (reference)
Infant Supplementation with Formula (Don't Know vs No)	Don't Know No (reference)
Infant Supplementation with Formula (Yes vs No)	Yes No (reference)
Infant Supplementation with Water	Don't Know Yes No (reference)
Infant Supplementation with Water (Don't Know vs No)	Don't Know No (reference)
Infant Supplementation with Water (Yes vs No)	Yes No (reference)
Maternal Level of Confidence with Breastfeeding at Hospital Discharge	1 (not at all confident) 2 3 (somewhat confident) 4 5 (very confident) (reference)
Maternal Perception of Family Help Received	1 (none) 2 3 (some) 4 5 (more than enough) (reference)
Maternal Perception of Professional Help Received	1 (none) 2 3 (some) 4 5 (more than enough) (reference)
Maternal Perception of Overall Help Received	No (not enough) Yes (enough) (reference)
Edinburgh Postpartum Depression Score	≥ 12 (depression probability) < 12 (not depressed) (reference)
Breastfeeding at 6 Weeks Postpartum	Yes No

** Reference category - the least probability for early weaning group.

Table E6: Calculation of the Probability of Weaning at 6 Weeks Postpartum

For a woman who is < 25, has no more than a high school education, scores <12 on the Edinburgh Postpartum Depression Scale and reports a confidence level of 1 (not at all confident).

Logit Equation	$\text{Logit} = \ln(p/1-p) = \bullet + \bullet (\text{Age}) + \bullet (\text{Education}) + \bullet (\text{Depression}) + \bullet (\text{Confidence})$	
Variable Coding	Age	(< 25 = 1, $\geq 25 = 0$)
	Education	($\leq \text{HS} = 1$, $> \text{HS} = 0$)
	Depression Score Category	(Score $\geq 12 = 1$, $< 12 = 0$)
	Confidence level	(Level 1, 2, 3, 4, 5)
Coefficients in the Model	Constant	(-0.564)
	Age	(-0.638)
	Education	(-0.658)
	Depression Score Category	(-1.266)
	Confidence Level	(0.614)
Example Case	Age (<25)	
	Education ($\leq \text{HS}$)	
	Depression Score Category (<12)	
	Confidence level (1)	
Logit Equation for Case	$\text{Logit} = \ln(p/1-p) = -0.564 + \text{Age}(-0.638) + \text{Education}(-0.658) + \text{Depression}(0) + \text{Confidence}(0.614) = -2.512$	
Probability of Weaning by 6 Weeks Postpartum	$\text{Exponent of } -1.246 = P/1-P = 0.29$ $P = (1-P) 0.29$ $P = 0.29 - 0.29P$ $1P + 0.29P = 0.29$ $1.29P = 0.29$ $P = 0.29/1.29$ $P = 0.223$ $1-P = 1 - 0.223 = 0.777$	
Result	Therefore, the probability of weaning by 6 weeks postpartum is 77.7% for a woman who is < 25 years of age, has no more than a high school education, scores <12 on the Edinburgh Postpartum Depression Scale and reports a confidence level of 1 (not at all confident) compared with a woman who is > 25 years of age, has more than high school education, scores < 12 on the Edinburgh Postpartum Depression Scale and reports a confidence level of 5 (very confident).	

Table E7: Resource Utilization by Vulnerability Factor

		Resources Used							
		PCIL		WBDI		BSDI		LC	
	n = 526	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Confident									
1 (not at all)	19 (3.7)	5 (26.3)	14 (73.7)	7 (36.8)	12 (63.2)	5 (26.3)	14 (73.7)	3 (15.8)	16 (84.2)
2	34 (6.6)	13 (38.2)	21 (61.8)	10 (29.4)	24 (70.6)	12 (35.3)	22 (64.7)	12 (35.3)	22 (64.7)
3 (somewhat)	101 (19.5)	46 (45.5)	55 (54.5)	23 (22.8)	78 (77.2)	25 (24.8)	76 (75.2)	15 (14.9)	86 (85.1)
4	161 (31.1)	46 (28.8)	114 (71.3)	34 (21.1)	127 (78.9)	21 (13.0)	140 (87.0)	9 (5.6)	152 (94.4)
5 (very)	202 (39.1)	61 (30.2)	141 (69.8)	31 (15.3)	171 (84.7)	22 (10.9)	180 (89.1)	6 (3.0)	196 (97.0)
Total	517	171 (33.1)	345 (66.9)	105 (20.3)	412 (79.7)	85 (16.4)	432 (83.6)	45 (8.7)	472 (91.3)
Missing	9								
χ^2		9.99 (df 4)		8.47 (df 4)		21.11 (df 4)		46.58 (df 4)	
p value		0.041		0.076		<0.001		<0.001	
Depression									
< 12	501 (95.6)	164 (32.8)	336 (67.2)	104 (20.8)	397 (79.2)	84 (16.8)	417 (83.2)	45 (9.0)	456 (91.0)
≥ 12	23 (4.4)	10 (43.5)	13 (56.5)	2 (8.7)	21 (91.3)	1 (4.3)	22 (95.7)	0	23 (100.0)
Total	524	174 (33.3)	349 (66.7)	106 (20.2)	418 (79.8)	85 (16.2)	439 (83.8)	45 (8.6)	479 (91.4)
Missing	2								
χ^2		1.13 (df 1)		1.98 (df 1)		2.50 (df 1)		2.26 (df 1)	
p value		0.288		0.193***		0.150***		0.246***	
Age									
< 25	56 (10.8)	15 (26.8)	41 (73.2)	5 (8.9)	51 (91.1)	2 (3.6)	54 (96.4)	0	56 (100.0)
≥ 25	462 (89.2)	156 (33.8)	305 (66.2)	100 (21.6)	362 (78.4)	81 (17.5)	381 (82.5)	44 (9.5)	418 (90.5)
Total	518	171 (33.1)	346 (66.9)	105 (20.3)	413 (79.7)	83 (16.0)	435 (84.0)	44 (8.5)	474 (91.5)
Missing	8								
χ^2		1.12 (df 1)		4.99 (df 1)		7.24 (df 1)		5.83 (df 1)	
p value		0.289		0.025		0.007		0.009***	
Education									
< High school	103 (19.6)	30 (29.1)	73 (70.9)	12 (11.7)	91 (88.3)	8 (7.8)	95 (92.2)	7 (6.8)	96 (93.2)
> High school	422 (80.4)	144 (34.2)	277 (65.8)	94 (22.3)	328 (77.7)	77 (18.2)	345 (81.8)	38 (9.0)	384 (91.0)
Total	525	174 (33.2)	350 (66.8)	106 (20.2)	419 (79.8)	85 (16.2)	440 (83.8)	45 (8.6)	480 (91.4)
Missing	1								
χ^2		0.96 (df 1)		5.80 (df 1)		6.70 (df 1)		0.52 (df 1)	
p value		0.327		0.016		0.01		0.473	
Formula/Supp									
No	263 (50.1)	73 (27.8)	190 (72.2)	55 (20.9)	208 (79.1)	42 (16.0)	221 (84.0)	17 (6.5)	246 (93.5)
Yes	254 (48.4)	97 (38.3)	156 (61.7)	50 (19.7)	204 (80.3)	42 (16.5)	212 (83.5)	28 (11.0)	226 (89.0)
Don't Know	8 (1.5)	3 (37.5)	5 (62.5)	1 (12.5)	7 (87.5)	0	8 (100.0)	0	8 (100.0)
Total	525	173 (33.0)	351 (67.0)	106 (20.2)	419 (79.8)			45 (8.6)	480 (91.4)
Missing	1								
χ^2		6.61 (df 2)		0.42 (df 2)		1.58 (df 2)		4.19 (df 2)	
p value		0.037		0.811		0.454		0.123	
Water/Supp									
No	440 (83.8)	145 (33.0)	294 (67.0)	91 (20.7)	349 (79.3)	73 (16.6)	367 (83.4)	38 (8.6)	402 (91.4)
Yes	14 (2.7)	5 (35.7)	9 (64.3)	4 (28.6)	10 (71.4)	1 (7.1)	13 (92.9)	1 (7.1)	13 (92.9)
Don't Know	71 (13.5)	23 (32.4)	48 (67.6)	11 (15.5)	60 (84.5)	10 (14.1)	61 (85.9)	6 (8.5)	65 (91.5)
Total	525	173 (33.0)	351 (67.0)	106 (20.2)	419 (79.8)	84 (16.0)	441 (84.0)	45 (8.6)	480 (91.4)
Missing	1								
χ^2		0.06 (df 2)		1.65 (df 2)		1.13 (df 2)		0.04 (df 2)	
p value		0.971		0.439		0.570		0.980	
6 Wk Outcome									
Breast/Both	422 (80.2)	137 (32.5)	285 (67.5)	92 (21.8)	330 (78.2)	73 (17.3)	349 (82.7)	36 (8.5)	386 (91.5)
Bottle Only	104 (19.8)	38 (36.5)	66 (63.5)	14 (13.5)	90 (87.4)	12 (11.5)	92 (88.5)	9 (8.7)	95 (91.3)
Total	526	174 (33.1)	351 (66.9)	106 (20.2)	420 (79.8)	85 (16.2)	441 (83.8)	45 (8.6)	481 (91.4)
Missing	0								
χ^2		0.68 (df 1)		3.61 (df 1)		2.04		0.002 (df 1)	
p value		0.411		0.058		0.153		0.968	

*LC=Lactation Consultant, WBDI=Well Baby Drop-In, PCIL=Parent-Child Info Line, BSDI=Breastfeeding Support Drop-In

p<0.05 ***=Fisher Exact Test

 χ^2 - testing whether there is a statistical difference between women who use the community resource and women who don't

Figure E8: Healthy Babies, Healthy Children Postpartum Screening Tool (Parkyn Screen) (Ministry of Health and Long Term Care, 2003)

Ministry of Health
and Long-Term Care

Ministère de la Santé
et des Soins de longue durée

Healthy Babies, Healthy Children Postpartum Screening Tool
Outil de dépistage post partum
Programme "Bébés en santé, enfants en santé"

Names of mother and father / Noms de la mère et du père

Telephone / Téléphone

A. Children with Congenital or Acquired Health Challenge / Enfants ayant un problème congénital ou un problème de santé acquis

1. Major (probability of permanent disability) e.g., Down syndrome, cerebral palsy
Problème majeur (probablement une invalidité permanente) p.ex.: syndrome de Down, infirmité motrice cérébrale

Rating
Evaluation

Score
Note

2. Moderate (correction may be possible) e.g., cleft palate, loss of limb
Problème modéré (rémède possible) p.ex.: fente palatine, perte d'un membre

Rating
Evaluation

Score
Note

B. Development Factors / Facteurs de développement

3. Low birth weight / Poids de naissance insuffisant :

a) 0-1499 gm / 0 à 1 499 g

Rating
Evaluation

Score
Note

b) 1500-1999 gm / 1 500 à 1 999 g

Rating
Evaluation

Score
Note

c) 2000-2499 gm / 2 000 à 2 499 g

Rating
Evaluation

Score
Note

4. Pregnancy events / Circonstances de la grossesse :

a) Infections that can be transmitted in utero and may damage the fetus (e.g., AIDS, rubella)
Infections pouvant être transmises in utero et porter atteinte au fœtus (p.ex. : SIDA, rubéole)

Rating
Evaluation

Score
Note

b) Drugs (e.g., alcohol or drug abuse diagnosed in mother)
Drogues (p.ex. : abus de drogues ou d'alcool diagnostiqué chez la mère)

Rating
Evaluation

Score
Note

5. Labour and delivery events / Circonstances durant le travail et l'accouchement :

a) Labour requiring mid forceps, including breech delivery, or emergency cesarean
Travail nécessitant l'application par application de forceps à la paroi moyenne, y compris accouchement par le siège ou césarienne d'urgence

Rating
Evaluation

Score
Note

b) Infant trauma or illness (e.g., convulsions, respiratory distress syndrome)
Traumatisme ou maladie du nouveau-né (p.ex. : convulsions, syndrome de détresse respiratoire du nouveau-né)

Rating
Evaluation

Score
Note

c) If Apgar less than 7 at 5 min., deduct score from 10
Si l'indice d'Apgar est inférieur à 7 à 5 min., déduire la note de 10

Rating
Evaluation

Score
Note

6. Family history of a genetic health challenge that may affect development (e.g., distress, mentally challenged)
Antécédents familiaux, soit une maladie génétique pouvant influer sur le développement (p.ex. : surdité, difficultés mentales)

Rating
Evaluation

Score
Note

C. Family Interaction Factors / Facteurs d'interaction avec la famille

7. Age of mother / Âge de la mère

a) 15 and under / 15 ans et moins

Rating
Evaluation

Score
Note

b) 16 or 17 / 16 ou 17 ans

Rating
Evaluation

Score
Note

c) 18 or 19 / 18 ou 19 ans

Rating
Evaluation

Score
Note

8. Social situation / Situation sociale :

a) One parent firmly with adequate support / Famille uniparentale avec un soutien adéquat

Rating
Evaluation

Score
Note

b) One parent family - no support / Famille uniparentale sans soutien

Rating
Evaluation

Score
Note

c) Two parent family - no social support and/or severe isolation related to culture, language or geography
Famille avec deux parents mais soutien social ou isolement intense dû à la culture, la langue ou la géographie

Rating
Evaluation

Score
Note

9. Financial difficulties / Difficultés financières

Rating
Evaluation

Score
Note

10. No prenatal care before sixth month / aucuns soins prénatals avant six mois

Rating
Evaluation

Score
Note

11. Mental illness/mental challenge in mother and/or father / Maladie mentale ou problème mental chez la mère ou le père :
Double score if both parents positive (a) or (c) / Doubler le score en cas de réponse positive pour les deux parents aux questions a) ou c)

a) Schizophrenia or bipolar affective disorder / Schizophrénie ou trouble affectif bipolaire

Rating
Evaluation

Score
Note

b) Postpartum depression or psychosis / Dépression du post partum ou psychose

Rating
Evaluation

Score
Note

c) Mentally challenged parent / Parent aux prises avec des difficultés mentales

Rating
Evaluation

Score
Note

12. Prolonged postpartum maternal separation: / Séparation post partum prolongée avec la mère :

a) With frequent infant contacts (visits or phone or facetime)
Contacts fréquents avec le nouveau-né (visites ou appels de téléphone lorsque cela s'avère possible)

Rating
Evaluation

Score
Note

b) Little or no contact / Peu de contact, si ce n'est aucun

Rating
Evaluation

Score
Note

13. Assessed lack of bonding (e.g., minimal eye contact or touching) / Absence de liens affectifs notés (p.ex. : contact visuel ou tactile minime)

Rating
Evaluation

Score
Note

14. Other, e.g., marital distress, low education status, failure to thrive, parenting difficulties, family violence, no prenatal class attendance, high stress related to delivery, maternal smoking during pregnancy, maternal undernutrition
Divers p.ex. : problèmes conjugaux, sous-socialisation, retard stature-pondéral, rôle parental posant des problèmes, violence familiale, aucune participation à des cours prénatals, stress aigu dû à l'accouchement, mère fumeant durant la grossesse, malnutrition de la mère

Rating
Evaluation

Score
Note

Specify reason / Raison spécifique :

Priority score: 9 and over = high
Évaluation prioritaire : 9 et plus = élevée

6 to 8 = moderate
6 à 8 = moyen

3 to 5 = low
3 à 5 = faible

0 to 2 = minimal
0 à 2 = minime

Total Score
Note totale

This information is collected under the authority of Ontario Regulation 585/04 of the Health Care and Numbers Control Act and the Health Protection and Promotion Act, it will be used for postpartum identification of environmental factors, and for statistical purposes. For more information please contact:

Les données recueillies en vertu de la Loi sur la protection et la promotion de la santé et de la Loi sur le contrôle des numéros de santé et des renseignements de santé, ils serviront à l'identification post partum des familles en situation précaire et à des fins statistiques. Pour de plus amples renseignements, adresse de communiquer avec :

☐ Referral form / Dossier référer à :

☐ CAS

☐ Santé d'aide à l'enfance

☐ Infant development program
programme de développement du bébé

☐ other / autre

Signature

Date

Figure E9: Permission to Copy - Healthy Babies, Healthy Children Postpartum Screening Tool

Dear Ms. Dunn:

This reply is in reference to your e-mail of May 17, 2003 in which you requested permission to reproduce the form "Healthy Babies, Healthy Children Postpartum Screening Tool" (Ministry of Health and Long-term Care form 3460-64) in your dissertation for your Masters in Nursing at the University of Ottawa.

The form in question can be found on the Central Forms Site of the Government of Ontario at the following URL:

[http://www.forms.ssb.gov.on.ca/mbs/ssb/forms/FormsRepository.nsf/Forms/MOH-014-3460-64/\\$File/3460-64.PDF](http://www.forms.ssb.gov.on.ca/mbs/ssb/forms/FormsRepository.nsf/Forms/MOH-014-3460-64/$File/3460-64.PDF)

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I hope this answers your questions.

Yours truly
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Table E10: Advanced Practice Nursing (APN) – Primary Health Care (PHC) Matrix

APN Skills	PHC Principles				
	Accessibility	Public Participation	Intersectoral and Interdisciplinary Collaboration	Appropriate Use of Technology	Health Promotion and Illness Prevention
Clinical Competencies	Assess the vulnerability threshold of breastfeeding women with respect to confidence, postpartum depression and formula supplementation. Facilitate access to appropriate supports.	Partner with breastfeeding women to establish peer support systems for vulnerable mothers.	Support health care providers working with breastfeeding women by engaging team members in anticipating, discussing and developing strategies to deal with postpartum depression, enhancing breastfeeding confidence and inappropriate use of formula supplementation.	Assess need for formula supplements in breastfeeding newborns. Educate women and health care providers about milk production, assessing adequacy of milk supply, newborn behavior and appropriate use of formula supplementation.	Develop tools to assess vulnerability threshold of breastfeeding women.
	Inform health care providers of research findings with respect to postpartum depression, confidence with breastfeeding and inappropriate supplementation with formula.	Partner with breastfeeding women to develop measures to better assess “perceived adequacy of support”.	Work within a multidisciplinary team to collect data about the perinatal population, family-centred maternity care practices and use of community services. Develop variables to add to the Regional Perinatal Database to track prevalence and rationale for inappropriate formula supplementation.	Evaluate current practice of formula supplementation in the community, using the PPESO Perinatal Database. Design intervention strategies to eliminate inappropriate formula supplementation.	Participate in research to study the effect of interventions to increase breastfeeding self-efficacy. Participate in research to study the relationship between self-efficacy and use of formula supplements.

Table E10: Advanced Practice Nursing (APN) – Primary Health Care (PHC) Matrix (cont'd)

APN Skills	PHC Principles				
	Accessibility	Public Participation	Intersectoral and Interdisciplinary Collaboration	Appropriate Technology	Health Promotion and Illness Prevention
Leadership	Build individual and community capacity to support breastfeeding women by making breastfeeding support accessible to women wherever and whenever they need it. Empower women to identify their own needs and how best to access supports.	Ensure public participation in the implementation of Mother/Baby Care Guidelines. Partner with breastfeeding women to identify community-based supports that work to enhance self-efficacy, decrease postpartum depression and formula supplementation.	Work with multidisciplinary teams to implement Family-Centred Maternity Care Guidelines and the Baby Friendly Initiative Guidelines in hospital and community settings. Support community actions to establish peer support programs for breastfeeding women.	Establish policies for the appropriate use of formula supplements in hospital and community settings. Support social marketing campaigns to heighten public awareness of the impact of inappropriate formula supplementation on establishment of adequate milk supply.	Develop and offer education programs for health care providers including content about breastfeeding self-efficacy, postpartum depression and formula supplementation. Lobby Board of Education to ensure breastfeeding is included in school curriculum.
Collaboration	Collaborate, and communicate with other health care providers to ensure consistency of care for breastfeeding women during the transition from hospital to home.	Partner with breastfeeding women and their families to identify breastfeeding support needs.	Facilitate linkages between health care settings by working as a member of multidisciplinary practice committees within individual organizations and/or as a member of regional committees.	Work with representatives from other sectors such as government, municipalities, industry, and technology to communicate information to the public about breastfeeding best practice.	Develop documentation tools for tracking formula supplementation. Establish policies to deal with distribution of formula as a medication.

Table E10: Advanced Practice Nursing (APN) – Primary Health Care (PHC) Matrix (cont'd)

APN Skills	PHC Principles				
	Accessibility	Public Participation	Intersectoral and Interdisciplinary Collaboration	Appropriate Technology	Health Promotion and Illness Prevention
Change Agent	Act as a change agent to design health care services that meet the needs of breastfeeding women in the community.	Partner with breastfeeding women to develop strategies to deal with perceived inadequacy of milk production.	Work with regional multidisciplinary committees (i.e. PPFESO - Perinatal Advisory Committee, Breastfeeding Committee of Ottawa, and Mother/Baby Combined Care Committee) to develop policies to address postpartum depression, breastfeeding self-efficacy and formula supplementation.	Function as a mentor for health care providers re: appropriate use of formula supplements.	Develop education programs for health care providers to improve consistency of information given to mothers with respect to formula supplementation.