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**THE EFFECT OF A PRENATAL TEACHING
INTERVENTION ON POSTPARTUM NIPPLE PAIN AND
TRAUMA**

BY

**ELIZABETH P. DUFFY,
BSc (Hons) Nursing**

**A Thesis Submitted in Partial Fulfilment of the Requirements for the Award
of**

MASTER OF NURSING

at the School of Nursing, Edith Cowan University

Date of Submission: January 1996

ABSTRACT

The purpose of this experimental study was to investigate whether a prenatal teaching intervention on position and attachment of the baby on the breast had any effect on postpartum nipple pain and trauma, and breastfeeding rates at six weeks. Many mothers who initiate breastfeeding, discontinue because they experience nipple pain and trauma. Correct position and attachment of the baby on the breast for feeding is paramount in preventing these problems. Using Orem's supportive-educative nursing system, it was hypothesised that the teaching intervention would result in significantly less nipple pain and trauma, and would increase breastfeeding rates at six weeks. The teaching in this intervention was given by a qualified midwife, who was also a lactation consultant, and who was not involved in any data collection. Seventy primiparae at a suburban hospital in Perth, Western Australia were randomly assigned to the experimental group ($n = 35$), who received the teaching intervention as well as the usual prenatal education, or the control group ($n = 35$) who received the usual prenatal education. During the first four postpartum days the LATCH instrument was used to measure position and attachment of the baby on the breast; the Visual Analogue Scale (VAS) measured nipple pain, and the Nipple Trauma Severity Index (NTSI) was developed to measure nipple trauma. A questionnaire measured demographic data, breastfeeding progress and breastfeeding rates at six weeks postpartum. The researcher was observer

blind to group allocation until all observations were completed on day four postpartum. A significance level of 0.05 was set for all statistical procedures. There was no difference between groups for other variables which have the potential to influence breastfeeding success. All hypotheses were supported. Repeated measures ANOVA showed a significant difference between groups, with the experimental group having less nipple pain and trauma. Breastfeeding rates were analysed by Chi-Square (χ^2) and showed 92% of mothers in the experimental group and 29% in the control group still breastfeeding at six weeks postpartum. The findings of this study will have implications for health professionals educating mothers on breastfeeding. It is anticipated that such an intervention has the potential to increase breastfeeding rates and encourage the continuation of breastfeeding up to at least six weeks postpartum.

DECLARATION

"I certify that this thesis does not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text."

Date:10 - 04 - 96.....

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CHAPTER ONE

Introduction

Background

Breastfeeding is widely accepted as the best method of feeding newborn babies. Breast milk is biologically perfect to provide nutrition for the newborn infant and also contains antiallergic and immunological factors (Lindenberg, Artola and Jimenez, 1990; Poskitt, 1992). In addition, the mother benefits both physically and psychologically from breastfeeding. Infant sucking releases oxytocin which diminishes the placental site and minimises blood loss and the potential for infection. Similarly, the psychological benefits of successful breastfeeding have the potential to increase bonding and enhance the mother-infant relationship (Beck, 1989; Renfrew, Fisher and Arms, 1990; Rubin, 1967; Virden, 1988).

The World Health Organisation (WHO, 1981) recommended that mothers continue to breastfeed their babies to four months. The problem is that although most mothers choose to breastfeed their babies, many have discontinued by 6 - 8 weeks after the birth (Percival, 1990; Royal College of Midwives (RCM) 1991; WHO, 1981). Interest in the factors which influence breastfeeding success and duration has been demonstrated by individuals from many disciplines as wide ranging as sociology, medicine, nursing and psychology (Alder, 1984; Houston & Field, 1991; Minchin, 1989; Woolridge, 1986a). Some of these factors are the socio-economic status of the mother;

nipple pain and trauma; position and attachment; time of first breastfeed; analgesia and anaesthesia, duration and frequency of feeds; inconsistent advice; insufficient postpartum support; and support and education for the breastfeeding mother.

The major reasons given by mothers for discontinuing breastfeeding are insufficient milk, and nipple pain and nipple trauma (Fetherston, 1995; Glover, 1991; Woolridge, 1986a). The stimulus for this study originated from the researcher's recognition in clinical practice of mothers' willingness to breastfeed their infants, but who experienced problems of nipple pain and trauma.

Many of the factors that influence breastfeeding success and duration are beyond the control of health professionals. However, there are areas where help can be provided. Correct position and attachment of the baby on the breast is a critical factor in establishing breastfeeding and one in which midwives have an important role (Bono, 1992; Frank, 1994; Newman, 1994; Walker, 1989; Woolridge, 1986a). Good position and attachment of the baby on the breast results in less nipple pain and trauma and fewer reports of insufficient milk (RCM, 1991; Fisher, 1995).

Health professionals can offer help on correct position and attachment of the baby on the breast, as breastfeeding is a learned skill which a mother must acquire through education, observation and experience. The opportunity to acquire the skill in western culture is largely denied to young women due to the nuclear family and the loss of role models found in the extended family. It is the

midwife who must pass on these essential skills to the mother. Although teaching breastfeeding skills may lack the glamour and urgency of intrapartum care, it is also an integral and rewarding part of a midwife's role.

In Western Australia about 80% of primiparae attend prenatal classes (Health Department of Western Australia, 1995). With respect to breastfeeding education, limitations of these classes may lie in the large numbers of parents in each class and in the lack of opportunity for specific "hands on" demonstration of position and attachment of the baby on the breast. In most cases, specific practical education on positioning and attachment of the baby on the breast is given after the birth. However, with pressures of staff shortages and time constraints in the postpartum period there is limited time for the midwife to ensure that good position and attachment occurs as the mother establishes breastfeeding.

In addition, Rubin (1967) argued that mothers are unreceptive to education in the first two postpartum days. More recently other researchers have supported Rubins findings (Becker, 1980; Raphael, 1981). Therefore, teaching a mother the new skill of position and attachment of the baby on the breast during the first two postpartum days may not be the ideal time. Orem (1985) suggested that "the time must be right" for the person to learn. Research has shown that the timing of education for new mothers is important (Becker, 1980; McKenzie, Canaday & Carrol, 1982). This is further supported by a recent learning theory, based on the adults readiness to learn (Knowles,

1990). Furthermore, Knowles argued that adults will benefit from knowledge when they see that they have a need for the information.

A teaching intervention in the prenatal period on position and attachment of the baby would provide the mother with the knowledge she needs, at a time when she is receptive to education. Group teaching is also a more efficient use of limited health service resources. The skills and confidence gained from this intervention would further enable the mother to be less affected by any conflicting advice and reduced staff levels during the postpartum period.

It seems apparent that the new mother's knowledge of breastfeeding technique is paramount for successful breastfeeding. Empirical evidence suggests that emphasis on good attachment will prevent nipple pain and trauma as well as increase the mother's milk supply. As insufficient milk, nipple pain and nipple trauma are the most commonly cited reason for discontinuing breastfeeding, correct position and attachment are, therefore, important in overcoming these problems.

Significance

Breastfeeding has immense benefits for both the baby and the mother, but failure rates are a concern, especially amongst lower socio-economic women (Hitchcock & Coy, 1988). Midwives must, therefore, consider when and how to educate mothers on the important skill of position and attachment of the baby on the breast. By evaluating the effect of a prenatal teaching intervention

on position and attachment of the baby on the breast, this study will have significance for all health professionals educating mothers on breastfeeding, as it has the potential to increase breastfeeding rates in lower socio-economic women. This research targeted women in a public hospital where socio-economic status was lower. The present intervention is inexpensive, and has the potential to be easily integrated into existing prenatal classes.

Purpose

The purpose of this study was to investigate the effect of a teaching intervention for primiparous mothers in the third trimester of pregnancy. The effect on position and attachment of the baby on the breast, nipple pain and trauma for the first four postpartum days, and breastfeeding progress at six weeks were measured. The teaching intervention was specifically on correct position and attachment of the baby on the breast for feeding.

Hypotheses

The research hypotheses to be tested in this study were:

1. Primiparous mothers in the experimental group, receiving the prenatal teaching intervention, will have significantly higher overall LATCH scores, indicating better position and attachment during the first four postpartum days than the control group, receiving the usual prenatal education.

2. Primiparous mothers in the experimental group, receiving the prenatal teaching intervention, will have lower overall VAS scores, indicating less nipple pain, during the first four postpartum days than those in the control group, receiving the usual prenatal education.
3. Primiparous mothers in the experimental group, receiving the prenatal teaching intervention, will have significantly lower overall NTSI scores, indicating less nipple trauma, during the first four postpartum days than those in the control group, receiving the usual prenatal education.
4. There will be a higher number of primiparous mothers in the experimental group breastfeeding at six weeks postpartum, than those in the control group.

Definition of Terms

<u>Primipara</u>	A woman who has given birth to her first child (Adams, 1983).
<u>Nipple trauma</u>	One or more of the following: reddened, bruised, blistered, crusted, cracked or bleeding nipples.
<u>Latch On</u>	Attachment of the baby on the breast for feeding (Royal College of Midwives, 1991)
<u>Mastitis</u>	Reddened, tender, hot, wedge-shaped area of the breast with the mother experiencing chills, flu-like aches and a fever over 38°C.

Prenatal

Occurring before the birth of the baby (Adams, 1983).

Postpartum

The six weeks following the birth of the baby (Beischer, Mackay & Purcal, 1989).

**Teaching
Intervention**

A one hour class by an experienced midwife and lactation consultant on the best possible way to position and attach the baby on the breast for feeding. (See Appendix A).

CHAPTER TWO

Literature Review

The purpose of this chapter is to examine the body of knowledge on breastfeeding by reviewing the literature and discussing current practice. It includes sections on the benefits of breastfeeding, breastfeeding rates, socio-economic status, nipple pain and trauma, positive and negative breastfeeding practices and breastfeeding support and education. A summary of findings and conclusions drawn from the literature are presented. The review concludes with implications of the relevance of conducting this research.

Benefits Of Breastfeeding

The World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) recognised the importance of the prevalence and duration of breastfeeding as key elements of primary health care and a means of achieving health for all by the year 2000 (WHO, 1981; UNICEF, 1989). The positive aspects of breastfeeding are innumerable as it not only provides optimal nutrition for the baby but is also a source of immunological, antiallergic and anti-infective factors (Howie, Stewart, Forsythe & Ogston, 1990; Lindenberg, et al., 1990; Martin & Monk, 1982; McDonald, 1979; Minchin, 1981, Palmer, 1986; Riordan, 1991). A recent example of the benefits of breastfeeding were reported from a case-control study of sudden infant deaths

(SIDS) in New Zealand. The researchers found a significant association between higher levels of breastfeeding and a lowered risk of SIDS, (69% of the control group breastfed versus 49% of the SIDS group) (Ford, Taylor, Mitchell, Enright & Becroft, 1993).

In addition to the benefits to the infant, the new mother also benefits from breastfeeding. Infant sucking stimulates the pituitary gland to release oxytocin which contracts the uterus. In turn, this diminishes the placental site quicker and minimises blood loss and the potential for infection. Moreover, for many mothers, successful breastfeeding equates with successful mothering (Mercer, 1986; Rubin, 1967). Rubin argued that the giving of food is important in establishing the mother-infant relationship and, therefore, the success or failure of breastfeeding reflects the mother's perception of the infant's acceptance or rejection of herself. More recently, Laufer (1990) and Yeung (1983) supported Rubins' view that failure to breastfeed attacked the mother's self-confidence causing her to doubt her success as a mother.

Breastfeeding Rates

The WHO (1981) have accepted that 97% of women are physiologically capable of breastfeeding their babies successfully and recommended complete breastfeeding until four months. In 1985 the National Health and Medical Research Council (Australia) published guidelines to promote breastfeeding in which they recommended that all infants should be exclusively breastfed for the

first four to six months of life. In 1987, The Better Health Commission's Nutrition Task Force formulated goals in support of these recommendations. Their aim for 1995 was to have 95% of Australian infants breastfed at discharge from hospital and 75% still breastfeeding at three months of age.

Although the number of women breastfeeding has increased worldwide since 1972, research suggests that, on average, only 50% of mothers in developed countries continue to breastfeed to six weeks postpartum (Martin & White, 1988; McNatt & Freston, 1992; Minchin, 1985). Furthermore, in recent years in the United Kingdom (UK), the initiation of breastfeeding has been on the decline. In 1977, 70% of mothers initiated breastfeeding and in 1988 the figure had fallen to 66% (Martin & White, 1988). Figures for the United States are similar, with a decrease in initiation of breastfeeding (Rassin, Markides, Baranowski, Richardson, Mikrut, & Bee, 1994). Conversely, in Australia a survey by Scott and Binns (1995) showed that figures for the initiation of breastfeeding are not on the decline as in the United States and United Kingdom, but are static at 90%.

Although the survey by Scott and Binns (1995) showed that initiation of breastfeeding is higher in Australia than in the United Kingdom or the United States, the number of Australian mothers who discontinue breastfeeding by six weeks postpartum is similar to these countries (Bartlett & Pennebaker, 1989; Percival, 1990).

A Western Australia study found 89% of mothers indicated they wished to breastfeed when their baby was born, but within the first seven days 21% had changed to formula feeding (Bartlett & Pennebaker, 1989). Similarly, Percival (1990), in a descriptive exploratory study of 214 new mothers, found that although 99% of subjects intended to breastfeed, only 86% were breastfeeding at one week postpartum and the number had reduced to 69% at seven weeks. These 1990 statistics show little difference from 1984, Western Australia figures where 84% of 911 babies born in a variety of hospitals were breastfed when discharged and 66% were still breastfeeding at six weeks (Hitchcock & Coy, 1988).

These Western Australian statistics of Bartlett & Pennebaker (1989); and Percival (1990) fall well below the Commonwealth Health Department's 1995 aims for the duration of breastfeeding by 1995. Although a greater number of mothers are now choosing to breastfeed their babies, these high failure rates are of concern.

Socio-Economic Status

A number of factors are important in influencing breastfeeding duration. One of these is the socio-economic status of the mother. Prior to 1972, only a minority of mothers in the higher socio-economic groups breastfed their babies. Now most mothers in these groups breastfeed their babies and as research shows, they are more successful than mothers in the lower socio-economic

groups. A study by Hitchcock & Coy (1988) indicated that continuity of breastfeeding was directly related to socio-economic status. In their study all mothers from the higher socio-economic groups continued to breastfeed to six weeks in comparison to 64% of those from the lowest socio-economic group. Other researchers have also found that breastfeeding success is socio-economically related (Bailey & Sherriff, 1992; Hartmann, 1995; Jenner, 1988; Howie, 1985; Rundall, 1981). Bailey and Sherriff studied a sample of 45 mothers in a low socio-economic community in a Perth northern suburb and found that only 47% of these mothers were still breastfeeding at four weeks postpartum.

Moreover, further research found that mothers from a higher social class and with a better basic education were more successful breastfeeding (Da Vanzo, Sine, Peterson & Haaga, 1994; Maxwell & Burnmaster, 1993; Peterson & Da Vanzo, 1992; Quarles, Williams, Hoyle, Brimeyer & Williams, 1994).

Nipple Pain and Trauma

A further important factor influencing breastfeeding duration is nipple pain and trauma. The two most common reasons given by breastfeeding mothers for terminating breastfeeding are insufficient milk and nipple pain (Fisher, 1995; Glover, 1991; Hartmann, 1995; Martin & Monk, 1982; Sloper, Elsdon & Baum, 1977; Wichelow, 1982). Research has shown that these two

correlate positively and significantly with one another and with nipple trauma (Fisher, 1995; Glover, 1990; Inch, 1990; Woolridge, 1986a).

A recent study in Western Australia of 87 mothers in a private maternity hospital, concluded that nipple pain and trauma were still common amongst breastfeeding mothers (Fetherston, 1995). Results from the structured, self-administered questionnaire revealed that 71% of mothers experienced nipple pain and 35% reported nipple trauma.

Inch (1990), in reviewing ten studies of potential treatments aimed to alleviate nipple pain and trauma, concluded that no treatment or application had been shown to be of any discernible benefit in protecting the nipple from damage caused by trauma. Therefore, in the absence of any protective therapy, the only policy should be to prevent the trauma. The literature indicates that the best way to do this is to promote the best possible position and attachment of the baby on the breast (Fisher, 1995; Glover, 1990; Inch, 1990; RCM, 1991; Woolridge, 1986a). In the developing world where 95% of mothers successfully breastfeed, no physical interventions are used (Woolridge, 1990). The move towards medicalisation in western society may make health professionals feel they need to prescribe a cure for nipple problems (Woolridge, 1990).

Positive Breastfeeding Practices

A number of factors which concern the practice of breastfeeding have been shown to be positively related to successful feeding. These factors include good positioning and attachment of the baby on the breast; early feeding following the birth of the baby and unrestricted frequency and duration of breastfeeds.

Good Position and Attachment

Good position and attachment of the baby on the breast is crucial to breastfeeding success. Correct attachment involves a comfortable interaction between the mother's and baby's body positions, and the baby's mouth to breast position (Borovies, 1984; Drewlett & Woolridge, 1981; Fisher, 1983; Fisher, 1995; Glover, 1991; Inch, 1990; Jensen, Wallace & Kelsay, 1994; Rajan, 1993; Schlegal, 1983; Weber, Woolridge & Baum, 1986; Woolridge, 1986a). These researchers found that not only will nipple damage result from incorrect positioning and attachment but the baby will be unable to obtain milk efficiently. Poor attachment of the baby on the breast deprives the baby of forming an efficient teat from the breast tissue, causing frictional damage to the nipple (Woolridge, 1986a). Inadequate emptying of the breasts due to poor attachment causes breast engorgement. In turn, engorgement has been found to correlate positively and significantly with nipple trauma and subsequently with mastitis (Dahlen, 1993; Hewart & Ellis, 1987). As milk production after the

first week, depends on milk removal from the breast rather than on high prolactin levels, the production of milk declines if the baby is poorly positioned and attached on the breast. Insufficient milk is the most common reason mothers give for abandoning breastfeeding (Fetherston, 1995; Fisher, 1995; Glover, 1990; Michin, 1985; Percival, 1990).

According to Woolridge (1986a) one can only be sure the baby is correctly attached on the breast when the mother feels no pain. He stated "pain is a biological protection mechanism" (p.172) and this should be a signal to the midwife that feeding technique needs to be improved. He concluded that if pain is present during breastfeeding, even in the mildest form, then the baby is damaging the nipple. Woolridge's recommendation was supported by the International Lactation Consultants Association (ILCA) statement that "pain during breastfeeding is preventable in most circumstances by correct attachment and position of the baby on the breast" (ILCA, 1991, p2).

Although many researchers argued that correct position and attachment of the baby on the breast prevents nipple pain and trauma, a study by Ziemer and Pigeon (1993) argued that these were not always caused by incorrect positioning of the baby. In their descriptive study of 20 breastfeeding mothers in America, 96% experienced nipple pain and 65% visible nipple damage was obvious. They concluded that the nipple skin changes were "a result of suction damage from normal infant suckling" (p.255). The authors of this study did not develop an operational definition of normal sucking and provided no means for

its assessment. They also did not control for position and attachment of the baby on the breast. A further limitation of the study was that 25% of mothers supplemented their infants with formula up to twice each day.

Other researchers have found no relationship between sucking strength and nipple pain (Buchko, Pugh, Bishop, Cochran, Smith & Lerew, 1994). In this experimental study of 73 primiparae, these researchers found no correlation between sucking strength and pain intensity on any of the first seven postpartum days. A post-hoc analysis revealed that high levels of sucking strengths did not lead to increased pain or nipple soreness.

The interventions which have been used to prescribe a cure for breastfeeding mothers with nipple pain and trauma are numerous. Garcia, Garforth, & Ayers (1987) found 32 different treatments being offered to mothers in England. Only three of these treatments had been evaluated by means of a randomised controlled trial, and only one, re-positioning and improved attachment of the baby on the breast, showed any statistical difference in nipple healing during the 48 hour period when these three treatments were compared. The other two treatments, "resting and expressing" and the use of a nipple shield, were significantly less acceptable to the mother. Other researchers have found that resting and expressing and the use of a nipple shield added to the breastfeeding mother's problems by gradually suppressing lactation (Houston, Howie & McNeilly, 1983; Howie, 1985).

Early First Breastfeed

The time of the first breastfeed is another factor which influences breastfeeding rates. Research has shown that initiation of breastfeeding within the first two hours after birth promotes successful breastfeeding (De Chateau & Winberg, 1978; Houston, et al., 1983; Salariya, Easton & Carter, 1987). The ideal time for the first breastfeed is when the baby's instinct to suck is heightened during the first hour after delivery (Harris, 1994; Righard, 1990; Widstrom, Ransjo-Arvidson, Christensson, Mattieson, Winberg & Uvanas-Moberg, 1987).

Early gratification of this first instinct to suck can assist in the development of optimal sucking patterns in the infant (RCM, 1991). Widstrom et al. (1987) reported the behaviour of ten babies born to mothers in Scandinavia who had received no drugs in labour. Spontaneous sucking and rooting movements occurred after 15 minutes and spontaneous sucking after an average of 55 minutes. These findings were supported in a later study by Righard (1990) in the United Kingdom. He photographed the behaviour of babies also born to mothers who had not had any drugs in labour. The babies were placed on their mother's abdomen following birth, and demonstrated rooting reflex in the first five minutes and made their way to their mother's breast and initiated spontaneous sucking after an average of 40 minutes. Other researchers have indicated that intrapartum analgesia and anaesthesia were

associated with problems in establishing breastfeeding (Rajan, 1994; Righard & Alade, 1990).

Although the research literature demonstrated that the first hour following the birth is the optimum time to commence breastfeeding, some researchers suggested that this is not always done. A survey by Emery (1990) in the United Kingdom found that babies in this sample were not put to the mother's breast in the labour ward after the birth, but that the first breastfeeding experience was in the postnatal ward. He argued that the first breastfeed was the most crucial for further breastfeeding experiences. Research by Garforth and Garcia (1987) in eight health districts in England found that the average time that elapsed between normal birth and the first breastfeed was 98 minutes. Jackson (1990) also argued that the first breastfeed did not always take place within the first two hours following the birth, Emery suggested that the reason for this was staff shortages.

Unrestricted Duration and Frequency of Feeds

A further factor which influences breastfeeding is the duration and frequency of feeds. Since the early part of this century, mothers have been erroneously advised to limit the baby's sucking time at the breast, especially in the first postpartum days (Inch, 1990; King, 1913; Nash, 1913).

Research has shown that limiting the baby's sucking time at the breast has no effect on nipple pain or trauma. In 1981, Slaven and Harvey conducted a randomised controlled trial of 200 mothers to test the effect of limiting sucking time. Not only did they fail to demonstrate any benefit in terms of nipple trauma but significantly more of the mothers in the restrictive group had abandoned breastfeeding by six weeks postpartum. The authors concluded that nipple trauma was more likely the result of poor positioning and ineffective sucking than the length of time the baby fed or the interval between feeds.

Results from smaller controlled studies which combined early contact with flexible feeding regimes supported the findings of Slaven and Harvey (1981). These studies include those from the United States (Johnson, 1986), Sweden (De Chateau, 1980), Canada (Thomsen, Hartstock & Larsen, 1979) and United Kingdom (L'Esperance, 1980). These researchers found that unrestricted breastfeeding resulted in the early establishment of lactation: the frequent stimulation increased milk supply, frequent emptying of the breasts reduced engorgement, and there was no increase in nipple trauma.

New evidence from a study in Western Australia by Hartmann (1995) supports flexible feeding times and varying lengths of feeds. Hartmann measured the storage capacity of breastfeeding mothers' breasts and found that the storage capacity for milk varied, but that mothers were still able to produce the same amount of milk for their babies. The mothers with smaller storage capacities fed their babies more often. This research finding demonstrates a need for flexibility in breastfeeding.

However, this potentially damaging advice of limiting the baby's sucking time at the breast was still being offered to mothers in clinical practice in the 1980's and 1990's, in the belief that it would prevent nipple pain and trauma (Ajayi, 1980; Arneil & Stroud, 1984; Freeman & Lowe, 1993; Hannah-Munster, 1990; Inch, 1990; Perez-Escamilla, Reiman-Perez, Majia & Dewey, 1993; Rice, 1987; Stoppard, 1982).

A recent survey by Freeman and Lowe (1993) of 116 Ohio hospitals found that limiting sucking time was still part of most of these hospitals' policies. A study of feeding practices in hospitals in Mexico had similar findings (Perez-Escamilla, et al., 1993). Other studies in New Zealand (Franks, 1989) and the United Kingdom (Inch, 1990; Klaus, 1987) have shown that despite empirical evidence to the contrary hospital nursing staff still continue to limit the feeding time of breastfed babies.

There is limited Australian research that has measured flexible breastfeeding in hospital. On current observation, by the researcher, in clinical

practice in Western Australia staff continue to place great emphasis on recording how long a normal healthy baby fed at the breast and the interval between feeds.

A survey of breastfeeding policies in hospitals in England (Inch, 1990) found that there were many interpretations of demand feeding and differences in interpretation between policy and practice. They also found differences in practice between one part of a midwifery unit and another. Franks (1989) supported this finding. She found in her survey of nursing staff in a neonatal unit in New Zealand, that staff found the question on “demand feeding”, confusing to answer. Although 87% stated there was demand feeding in the unit they, nevertheless, were unsure of how much the infant was allowed to demand. However, it must be noted that 62% of the staff working in the unit were non-midwives.

Negative Breastfeeding Practices

Two factors in particular have the potential to have a negative effect on breastfeeding practice. They are, inconsistent advice and insufficient postpartum support.

Inconsistent Advice

Midwives have a responsibility to mothers to refrain from deliberate acts that interfere with the establishment of breastfeeding (Inch, 1990). However,

every mother who has started breastfeeding her baby, and every midwife who has tried to help will be familiar with the widespread experience of conflicting advice. Conflicting advice about breastfeeding is mentioned by women in the majority of research on postpartum care (Ball, 1982; Ball, 1984; Ball, 1987; Field, 1987; Filshie, Williams, Osbourn, Senior, Symonds & Backett, 1981a; Filshie et al., 1981b; Lipsett, 1984; Lissenden, 1984; Murphy-Black, 1990; Percival, 1990).

In Ball's (1987) study in England 37% of mothers complained of conflicting advice. Ball concluded that conflicting advice had a negative effect on the mother's self-image and emotional well-being. Furthermore, that it contributed to the mother's lowered self-esteem and emotional distress. However, Ball found that mothers who had more confidence and a higher self-esteem were not distressed by conflicting advice, and only felt irritated by it. In Western Australia Percival (1990) reported that 72% of subjects stated they had been confused by conflicting advice on infant feeding.

In order to reduce the effect of conflicting advice that a new mother receives, and give her confidence in her own unique ability to feed her baby, she must have a sound knowledge of breastfeeding technique. The knowledge of position and attachment of the baby on the breast for feeding before the birth will help to give her some of this confidence.

Insufficient Postpartum Support

The second factor that has a negative effect on breastfeeding practice is insufficient postpartum support. The demand on health service resources often leads to staff shortages in the postpartum area (Emery, 1990). Postpartum care was once described as the “Cinderella” of maternity care (Robinson, Golden & Bradley, 1983) as it was considered of little interest or challenge to midwives. Until recently, this area lacked sound theory or research on which to base practice or assess its effectiveness and appropriateness.

Emery (1990) blamed staff shortage in maternity hospitals as the reason why mothers discontinued breastfeeding. The establishment of breastfeeding took time and harassed and pressurised staff found it impossible to maintain the necessary support for these breastfeeding mothers, with reports of mothers being left unattended by a midwife at the first breastfeed (Emery, 1990; Fisher, 1995; Woolridge, 1990). Jackson (1990) also reported that a mother can be told to “hang on a minute” (p.260), when she wanted to breastfeed her baby and this diminished the whole breastfeeding experience. Observation in clinical practice in Western Australia would support these United Kingdom findings.

The teaching intervention in this present study would enable the primiparae to have the knowledge of position and attachment of her baby on the breast before she commences breastfeeding. This has the potential to reduce the effects of any insufficient postpartum support. The breastfeeding mother with the knowledge of position and attachment would be able to breastfeed her

baby with minimal support, therefore, requiring less time from staff. Education for mothers in small groups is also cost effective for Health Departments concerned about increasing health costs.

Breastfeeding Support and Education

An important factor for the breastfeeding mother are her supportive relationships within the family and her social environment. These appear to be critical for successful breastfeeding (Becker, 1992; Freed, Jones & Schanier, 1992; Raphael, 1981).

The establishment of successful breastfeeding for many mothers requires access to a lot of information, education and support, for although breastfeeding is natural, it is not instinctive and has to be learned (Inch, 1990; Percival, 1990; Woolridge, 1990). In some cultures the skills and information a mother needs to breastfeed are acquired through almost daily observation of babies at the breast and the social support she receives from other mothers after the birth (Inch, 1990).

However, in western societies new mothers depend almost entirely on the skill and knowledge of health professionals. The midwife is the key worker in the early postpartum days and has the opportunity and privilege of making a tremendous difference to the experience and success of breastfeeding for the mother and baby. The care given by midwives in support of breastfeeding mothers is an important component in contributing to a positive breastfeeding

experience especially, in those mothers experiencing difficulties (McNatt & Freston, 1992) and is of particular relevance to this study.

Flint (1984) saw the role of the midwife in breastfeeding not as a physical role but rather as a supportive-educative role. Orem (1985) reiterated this view with her supportive-educative system of nursing. It is this nursing system that forms the theoretical framework for the present study.

If, through support and education from the midwife, the new mother experiences correct position and attachment of the baby on the breast for the first breastfeed, it is unlikely that she will tolerate incorrect position and attachment at later feeds (Emery, 1990). It would seem then, that it is essential for the new mother to have had appropriate education on correct position and attachment of the baby before the first breastfeed. She would then be able to use this knowledge after the birth to position and attach her baby on the breast. The midwife could then act in a supportive role as suggested by Bragg (1991).

Prenatal Education

Breastfeeding support and education is usually given during both the prenatal and postpartum periods. In Western Australia about 80% of first time mothers attend prenatal education classes (Department of Health, Western Australia, 1995).

Inch (1990) suggested prenatal education classes should contain information on basic physiology of milk production, sucking mechanism and

attachment techniques. Most prenatal classes offer education on breastfeeding as one part of the course. This education covers the benefits of breastfeeding and general information on breastfeeding. It may be that the education given at the prenatal classes is not specific enough and does not meet the new mothers' needs for establishing breastfeeding. A video on breastfeeding is generally shown at these prenatal classes. However, some mothers in Percival's (1990) study found the video at these classes to be "glossy and idealistic" (p.389). A disadvantage of these prenatal classes is that groups are often large, with no provision for practical demonstration of position and attachment of the baby on the breast, or application of these skills.

Interventions to Promote Breastfeeding

A number of researchers have trialed support and educational interventions to increase breastfeeding rates. These include intervention packages in the pre and postpartum periods.

Jenner's (1988) experimental study of 38 white working class primiparae in England aimed to identify which intervention element had an effect on breastfeeding success amongst disadvantaged women. She measured the impact of an information package accompanied by support in the pre and postpartum periods and found that 68% of the experimental group and 21% of the control group were breastfeeding at three months. Caution is necessary when interpreting these findings, as the experimenter and the deliverer of the

intervention were the same person, creating a possibility of bias. It must be noted that Jenner did acknowledge the limitations of her study. The results of Jenner's study are in contrast to Rundall's (1985) findings where 50% of mothers, from all social classes combined, had stopped breastfeeding by 14 days.

A more recent study by Hauck and Dimmock (1994) in Western Australia used an information booklet on breastfeeding as an education intervention. The booklet was given to mothers in the postpartum period. These researchers found that the experimental group who received the booklet were no more successful breastfeeding than the control group.

Findings similar to Hauck and Dimmock (1994) were reported by Hill (1987) in the United States. Hill's research used a slide presentation, lecture and booklet on breastfeeding. These were given to 31 mothers in the prenatal period. She found no difference in breastfeeding duration or mothers perception of success between the two groups in her experimental study.

Timing of Education

At the present time education on position and attachment of the baby is given in the early postpartum days (Minchin, 1985; RCM, 1989; Woolridge, 1986a; Woolridge, 1986b). It could be argued that for a number of reasons this may not be the appropriate time to educate mothers. The best time to educate new mothers on the skills of correct position and attachment of the baby on the

breast has not been studied. The timing of education in this present study is based on Rubins (1967) theory and the Theory of Adult Learning (Knowles, 1990).

Both Becker (1980) and Gay, Edgil and Douglas (1988) argued that during these first few days after the birth, which Rubin (1967) called “the taking-in phase”, the mother herself needed mothering. Rubin saw these first few days as a time when the new mother was not receptive to education. Indeed, research by Raphael (1981) identified this as a key element in the early postpartum days where the mother is orientated towards her own physical and emotional needs.

Research by McKenzie, et al. (1982) also suggested that the new mother has sensory overload during the first two to three days postpartum. This can be prolonged by the stress of an involved and difficult labour and delivery. This is supported by Martell, Imle & Horwitz (1989) who also implied that the attention span of new mothers may be affected by fatigue and sleep deprivation resulting in difficulty focusing on the new skills and information necessary to breastfeed.

Brouse (1988) used a teaching intervention on the third postpartum day to determine whether 15 primiparae showed less anxiety at three weeks postpartum than a control group. The teaching intervention in her study was on the care of a new baby. No statistical difference was found between the two groups in her experimental study. Although the sample of 31 mothers was small, the findings appear to support those of other researchers, that new

mothers are less receptive to education within the first three days postpartum (Becker, 1980; Bull, 1981; Gay, et al., 1988).

Furthermore, hospital stay for postpartum women is now shorter with many mothers being discharged home on the third postpartum day (Johnston, 1993). The “taking-hold” phase described by Rubin (1967) is usually present by the third postpartum day. Rubin described this phase as a desire for independent action and an interest in the baby and in his/her care. As most mothers have left hospital by the third postpartum day, the opportunity to teach mothers further about breastfeeding is reduced. However, the primiparae requires the confidence in her ability to breastfeed her infant on discharge from hospital.

Health professionals must look at the timing of education for breastfeeding mothers so that they have the knowledge and confidence to be able to breastfeed. Rubin (1967) found that new mothers were not receptive to education during the first few days after the birth. Therefore, Knowles' (1990) theory of adult learning is appropriate for the timing of education on position and attachment of the baby on the breast.

Knowles (1990) suggested there are several assumptions about adult learners, in this case the mother. He argued that adults benefit from knowledge when they see a reason for learning. The knowledge of correct position and attachment of her baby on the breast will give the new mother the information necessary and the confidence to be able to breastfeed. Knowles also

emphasised adults readiness to learn. He again argued that adults were motivated to learn when they perceived that the knowledge would benefit them in real-life situations. In the prenatal period, the mother planning to breastfeed her infant after the birth would be motivated to learn about breastfeeding.

Knowles (1990), who refers to adult learning as “androgogy” also suggested that adults learn better from each other and in a group situation. The group provides motivation, encouragement, support, sharing of ideas and empathy especially when group members are striving to meet a shared goal. For mothers in the prenatal period the acquisition of the basic principles and accurate information on breastfeeding is essential and a goal shared by all mothers who are going to breastfeed. Group teaching is also an economical way to teach several individuals at one time (Rylatt, 1994).

Education for mothers, especially in the prenatal period, and in particular education and demonstration of position and attachment would provide mothers with the knowledge necessary to start breastfeeding after the birth. This would, therefore, reduce any possibility of conflicting advice when problems do arise with breastfeeding. It would also reduce the effects of staff shortages. Anxiety and feelings of inadequacy which further inhibit the let-down reflex would be minimised (RCM, 1989). In turn, a settled, happy baby has the potential to increase the mother's confidence in her ability to care for her infant (Mercer, 1986). Flint (1984) argued that the establishment of breastfeeding was dependent on the mother's confidence in herself in the pre and postpartum

periods. This was supported by Hauck and Dimmock (1994) in their Western Australian study of 150 breastfeeding mothers. They argued that the mother's breastfeeding knowledge increased her confidence and helped her reach her intended goal for breastfeeding duration.

It could be argued, therefore, that the best time to educate new mothers on the skills of position and attachment of the baby on the breast may not be in the early postpartum period but rather during the prenatal period. The early postpartum period should be a time when knowledge of breastfeeding is reviewed and reinforced, and the breastfeeding mother is supported by the midwife (Albers, 1981). It should not be a time of initial learning.

Summary

Breastfeeding is recognised to be important for both mother and baby. Mothers who choose to breastfeed possibly do so because they feel that it is best for their baby and because they find it satisfying and enjoyable. However, the literature review has established that although the majority of mothers initiate breastfeeding they encounter problems and stop breastfeeding before they wish to do so. In Australia, 30-50% of these mothers discontinue breastfeeding by six weeks postpartum.

There are many factors which influence successful establishment and maintenance of breastfeeding. The mother's socio-economic status, her social

support, education, elements of care during pregnancy, childbirth and the early postpartum period can all influence breastfeeding success.

In reviewing the literature it was apparent that the problems of nipple pain and trauma still exist for many breastfeeding mothers and are common reasons for discontinuing breastfeeding. The literature has established that the key to successful breastfeeding is the position and attachment of the baby on the breast. In clinical practice in Western Australia there is a definite lack of specific education on this important skill of position and attachment of the baby on the breast. In reviewing the education needs of mothers, the timing of education also becomes crucial to the mother's readiness to learn. The mother's motivation to gain this specific knowledge before she begins to breastfeed will enable her to use the knowledge to successfully breastfeed after the birth.

This study will investigate the effect of educating mothers in the perinatal period on position and attachment of the baby on the breast. Nipple pain and trauma will then be measured and the continuation of breastfeeding to six weeks postpartum. No research has been found that used a teaching intervention specifically on position and attachment of the baby during breastfeeding, or that gave mothers the opportunity for a practical demonstration of position and attachment of the baby on the breast. The results of this study will add to the body of knowledge on successful breastfeeding. It will also serve as a basis for reviewing breastfeeding

education for new mothers, for future research and improved midwifery education.

CHAPTER THREE

Conceptual Framework

Theoretical frameworks provide “direction and guidance for structuring professional nursing practice, education and research” (Creasia & Parker, 1991, p.5). The theoretical framework guiding this study was derived from Orem’s general theory of nursing, the Self-Care Deficit Theory. This theory is composed of the three interrelated theories: the theory of self-care, self-care deficit theory, and the theory of nursing systems.

Dorothea Orem’s General Theory of Nursing

The major tenet of Orem’s theory is the concept of self-care, defined by Orem (1985) as “activities that individuals initiate and perform on their own behalf to maintain life, health and well-being” (p.31). The concept of people helping themselves in health matters is not new. Orem (1985) suggested that the practice of self-health care probably began before recorded history, and noted that early references appeared in ancient Greek, Chinese, and Hebrew writings. However, with the development of a scientific and biological orientation towards disease, and a new focus on treatment and cure, self-health care has gradually been de-emphasised and there is a growing dependence on persons with specialised knowledge and training. According to Orem, when the self-care demand of the person exceeds the person’s ability, that person experiences a self-care deficit, and thus there is a need for nursing intervention.

Nursing systems are designed by the nurse when it has been determined that nursing care is needed. The systems comprise of wholly compensatory, partly compensatory, and supportive-educative which specify the roles of the nurse and the patient (Orem, 1985).

According to Orem (1991) nurses should select the type of nursing system that will have “an optimum effect in achieving the patient’s self-care requisites” (p. 292). Orem defines three steps in this process: 1) assessment of the self-care need, 2) design of a nursing system for the delivery of care and 3) use and management of the nursing system.

1. Assessment of self-care need

One of the most important roles of the midwife is to assess the self-care needs of the new mother. The primiparae who wishes to breastfeed will have self-care needs in the prenatal and postnatal periods. Breastfeeding is a learned skill. The opportunity to learn the skill in western society is lost through limited observation of mothers breastfeeding their babies and the loss of support from the extended family. Orem (1991) explains that a person who must incorporate a newly complex measure into their self-care system must acquire the knowledge and skills through education and experience. The new self-care measure in this study is the establishment of breastfeeding, enabling the mother to self-care and provide dependent care for her baby.

It is important that midwives assess their own practice and develop strategies to determine the right time to teach new mothers these skills of breastfeeding. Education in the prenatal period will benefit the mother, enabling her to meet her self-care needs of establishing breastfeeding. The midwives' time will also be used more efficiently.

Orem (1991) specifies that the action system in self-care is deliberate. This can only be performed by mature and maturing individuals. Therefore, infants cannot meet the requirements of self-care because of their immaturity. The mother must act as a dependent care agent.

2. Design of a nursing system

The nursing system designed by the nurse is based on the self-care needs and abilities of the patient to perform self-care activities. If there is a deficit between what the individual can do and what needs to be done to maintain optimum functioning, then nursing is required. The supportive-educative nursing system is the system of choice for this study as it would provide appropriate nursing information for primiparae who may lack the knowledge and skills to enable them to meet the demands of establishing breastfeeding.

Therefore, it could be suggested that breastfeeding education for mothers in the prenatal period, together with the perceived importance of correctly positioning and attaching the baby on the breast, would meet the new

mother's self-care needs in the early postpartum period. The literature on timing of education in regard to breastfeeding indicates that new mothers are not receptive to education in the first few days after the birth (Bull & Lawrence, 1985; McKenzie, et al., 1982; Martel, et al., 1989). Orem (1985) states that "the time must be right for the patient to learn" (p.275). This is supported by Knowles, a learning theorist, who argues that adult education at the optimum time influences the adult's ability to learn. Therefore, the usual time for intensive education on position and attachment of the baby on the breast in the days following delivery may not be the optimum time for new mothers to learn this skill.

The breastfeeding mother's self-care needs in the postpartum period are support from the midwife and reinforcement of the education already given in the prenatal period.

3. Use of the nursing system: Supportive - educative

The third step in this process is the use and management of the supportive-educative nursing system for this study to meet the needs of primiparae both in the prenatal and postnatal periods to enable her to breastfeed successfully. In this system the person "is able to perform required measures of self-care but cannot do so without assistance" (Orem, 1991, p.291).

As shown in Figure 1, the individual's ability to engage in self-care is affected by what Orem (1991) calls basic conditioning factors. For the breastfeeding mother these include supportive relationships, ethnic identity, family income and the mother's basic education.

Application of Theoretical Concepts to the Study

The central focus of this research was to investigate the effect of a teaching intervention in the prenatal period on postpartum nipple pain and trauma. The teaching intervention was on correct position and attachment of the baby on the breast as this was found to be the most important factor in successfully establishing breastfeeding (Borovies, 1984; Fisher, 1983; Glover, 1991; Schlegal, 1983; Woolridge, 1986a; Woolridge, 1986b;).

Orem's (1985) conceptual framework recognises that other factors are related to the mother's ability to self-care and act as a dependent care agent. These include supportive relationships, ethnic identity, mother's education and occupation, and family income.

Orem (1985) perceives nursing as a science, an art and a helping service given to persons with a legitimate need for it, by nurses who have specialised knowledge and skills. The primiparae mother, with no experience of breastfeeding or limited knowledge of breastfeeding, requires the supportive-educative nursing system. This would enable her to meet anticipated demands in the prenatal period, existing demands postpartum for self-care, and would

enable her to establish breastfeeding and act as a dependent care agent for her baby.

A diagrammatical representation of the application of Orem's theoretical concept of self-care to this study is provided in Figure 1.

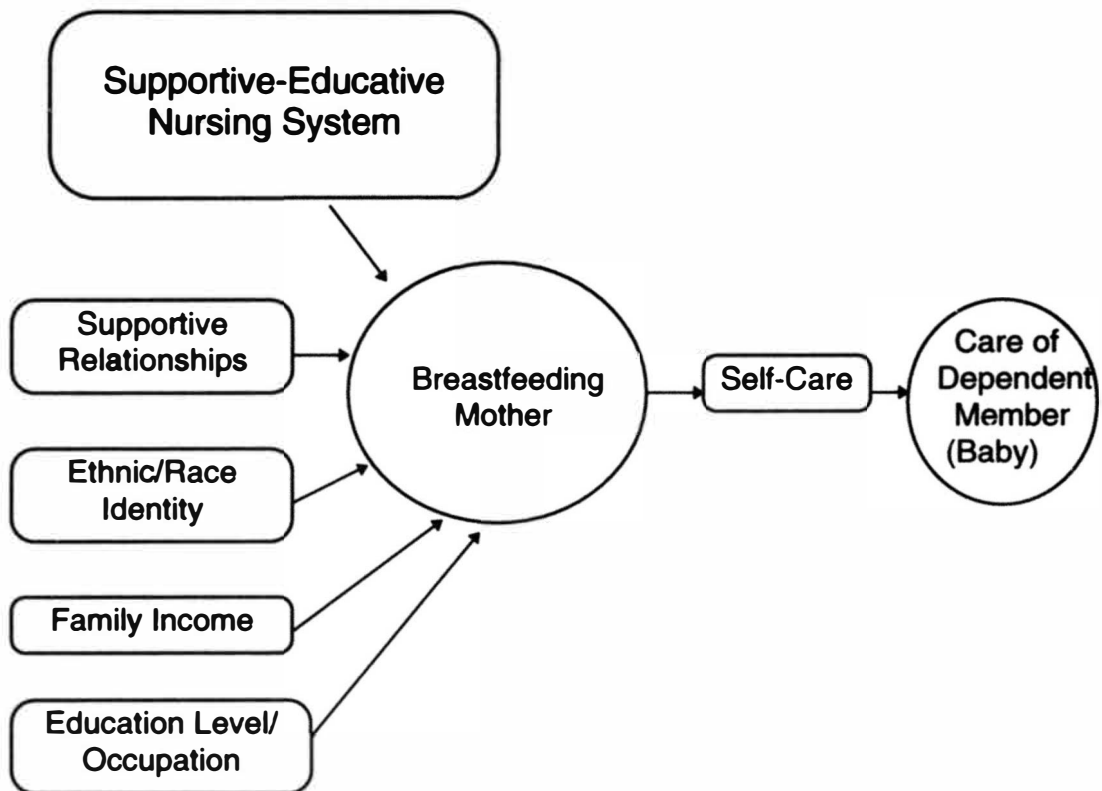


Figure 1. A model for guiding the breastfeeding mother towards self-care and care of dependent member (baby). Adapted from Orem (1985)

Summary

The study investigated the effect of a prenatal teaching intervention on postnatal nipple pain and trauma. A comparison was made between those

mothers who received the teaching intervention and those who did not. The results of the study will provide midwives and healthcare professionals with precise knowledge of the effects of this prenatal teaching intervention on postpartum nipple pain and trauma and breastfeeding progress at six weeks. Conceptualised within Orem's self-care theory, this knowledge can be implemented in practice by providing education for small groups of mothers in the prenatal period on position and attachment of the baby on the breast. The knowledge gained will also assist midwives in providing pertinent support for mothers in the postpartum period so that mothers who wish to breastfeed will continue to be educated and supported to accomplish trouble-free lactation.

Nursing intervention may need to focus on the following: first, expanding the mother's knowledge of the physiology of breastfeeding, second, a practical demonstration of position and attachment of the baby on the breast, and third, expanding the mother's self-care capabilities to overcome problems of nipple pain and trauma should they arise. The timing of this intervention is of prime importance to this study.

The data should provide impetus and direction for midwives and educators to evaluate their breastfeeding education and management, leading to a revision in the timing of this education and the importance of teaching correct positioning and attachment to mothers prenatally. Further, the knowledge gained will assist midwives in providing support and education for the breastfeeding mother in the postpartum period, and reinforcement of the

knowledge already gained on position and attachment of the baby on the breast, which will prevent problems of nipple pain and trauma. This support and education will enable the mother to self-care and care for her dependent baby.

It must be noted, however, that the midwife in the supportive-educative nursing system does not take over the care of the mother but encourages her to take responsibility for her own self-care and care of her dependent baby. This notion adheres to the principles of “intervention free” breastfeeding advocated by Woolridge (1990).

CHAPTER FOUR

Method

The purpose of this chapter is to describe the methods and procedures used for the conduct of this research study. The chapter starts with a description of the research design, followed by an outline of the research setting and sample. The instruments used in the study are then described, together with reliability and validity levels of the instruments presented. The procedure used for data collection is summarised. The chapter concludes with a discussion of ethical considerations.

Design

The study used an experimental design with repeated measures and random allocation of primigravida mothers to an experimental or a control group. The researcher was observer blind to group allocation until completion of all observations on the fourth postpartum day. All participants received the standard prenatal education offered by the study hospital. The independent variable was an additional one hour teaching session for primiparae of more than 36 weeks gestation. This was conducted by a midwife who was also a senior lactation consultant, and who was not involved in the data collection. The content of the teaching session was the correct position and attachment of the baby on the breast for feeding. The dependent variables in this study were

position and attachment of the baby on the breast, the severity of nipple pain and trauma and breastfeeding duration.

Setting

The setting for this study was the maternity unit of a suburban hospital in the metropolitan region of Perth, Western Australia. This hospital provides total obstetric care for public and private patients, with a prenatal clinic, delivery and postpartum care. The hospital also provides prenatal education for parents. These classes are one hour long and are held at the hospital three times each week. Parents are encouraged to attend one class each week for four weeks. One of these four classes is education on breastfeeding. The content of these classes focuses on the benefits of breastfeeding for the baby and the mother but not on specific skills of breastfeeding techniques.

An early discharge programme is available to mothers who wish to be discharged home on the 3rd postpartum day if there are no complications following the birth. The majority of mothers in this hospital choose to do this. These mothers are visited at home by the hospital midwife daily for the following two consecutive days and as necessary up to ten days postpartum.

Sample

Seventy-five primiparous mothers who attended the maternity unit of the hospital for their prenatal care during August 1995, were fluent in the English

language, and who intended to breastfeed were invited to take part in the study. Participants were recruited into the study in the prenatal clinic from 36 weeks gestation. Mothers were excluded from the study in the post partum period if their infant was born before 37 weeks gestation or was ill or had any known diseases.

Following enrolment in the study, five participants were subsequently excluded from the study. One telephoned the researcher stating she was unable to attend the teaching class and requested an alternative teaching class. Another participant contacted the researcher personally following the teaching session to inform her of the immense benefits of the teaching session and to state how pleased she was to be included in the experimental group. The researcher was, therefore, no longer blind to the group allocation of these two mothers. Although these two participants continued in the study their results were not included in the final data analysis. The third participant had a positive Hepatitis C blood result and had been advised to formula feed her baby following the birth. The fourth participant excluded from the study gave birth to a stillborn baby at 37 weeks gestation. Another participant gave birth to an infant with congenital abnormalities at 37 weeks gestation and the infant was transferred to Western Australia's sick premature baby unit.

All of the 75 mothers approached to take part in the study consented to do so. Of these mothers, 37 were randomly assigned to the experimental group and 38 mothers to the control group. There was a 6.6% ($n = 5$) attrition rate,

therefore, 70 mothers completed the study, 35 mothers in the experimental teaching group and 35 mothers in the control group.

Instruments

Both established and specifically designed instruments were used in this study. A questionnaire was designed for this study to collect demographic and obstetric data. Position and attachment of the baby on the breast was measured using the LATCH instrument (Jensen, Wallace & Kelsay, 1994). To test the hypothesis related to nipple pain the visual analogue scale (VAS) (Clarke & Spear, 1964) was used. The Nipple Trauma Severity Index (NTSI) was designed for this study and tested the hypothesis related to nipple trauma.

LATCH Assessment Instrument

The LATCH instrument (Jensen, Wallace & Kelsay, 1994) was used to assess position and attachment of the baby on the breast (See Appendix B). This instrument, which consisted of five sections, provided a systematic method of gathering information about individual breastfeeding sessions. It measured how well the baby attached onto the breast and the amount of help the mother needed to hold her baby to the breast. The instrument also measured the mother's level of comfort. The instrument has been found to be valuable and effective in the clinical setting and is presently being evaluated by its authors

(Jensen et al., 1994). Formal reliability and validity testing have not been published.

In the present study each of the five sections of LATCH were scored from zero to two, daily. A score was given at the end of each day with a possible range of 0 - 10, and a total LATCH score at the end of four days with a possible range from 0 - 40. A high score indicated better position and attachment of the baby on the breast, a low score indicated poor attachment. Permission to use this instrument was given by the authors (See Appendix C). However, permission was restricted and did not permit modification of the instrument. Despite the limitations and modifications not being permitted, the instrument was used in this study as it was the only suitable published instrument found.

Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS) (Clarke & Spear, 1964) was used to measure nipple pain in this study. The VAS is generally accepted as a valid and reliable measure of the intensity of pain in clinical research (Frank-Stromberg, 1992). It consists of a horizontal line 10cm long, with the words “no pain” at one end and “pain as bad as it could possibly be” at the other end (See Appendix D). This scale is scored from zero to ten, with zero representing no pain and an increase to a maximum of ten representing increasing pain. Scales of this type have previously been used to measure nipple pain (De Carvalho et al, 1984; L'Esperance, 1980). Test-retest reliability was established for this

instrument in a previous study on nipple pain and found to be 0.88 (Ziemer, Paone, Carroll, and Cole, 1990). In the present study participants were asked to place a mark through the line at the point that best described how much nipple pain they experienced daily during a breastfeed.

Development of the Nipple Trauma Severity Index (NTSI)

An instrument to measure nipple trauma (See Appendix E) was designed by the researcher as no suitable tool was found in the literature. Ziemer and Pigeon (1993) measured skin changes in the nipple of the breastfeeding mother during the first week of feeding. However, their procedure involved lighted magnification lenses and serial photographs, which were not available for this study.

The NTSI consisted of four parts. Part 1 and Part 2 were data concerning nipple status, part 3 of the instrument was data on discharge from the nipple, and part 4 was the mother's assessment of her nipples. This instrument was scored daily with a possible range of 0 - 34. A total score was given at the end of the four postpartum days with a possible range of 0 - 136. A higher score indicated less nipple trauma.

Content Validity. To ensure content validity of the NTSI the researcher used the four point option scale developed by Lynn (1986) and recommended by Burns and Grove (1993, p.344-345). The "judgement - quantification" stage

of Lynn's procedure to determine content validity of a research tool entails "the assertion by a specific number of experts that the items are content valid, and that the entire instrument is content valid" (p.383).

Six midwifery and academic experts were asked to rate each item on the instrument either 1 = not relevant, 2 = unable to assess relevance without item revision, 3 = relevant but needs minor alteration, 4 = very relevant and succinct. Some items on nipple status scored 1 - 2 and were removed from the instrument (white patches, dark patches, peeling and crusts). In addition, discharge from the nipple was changed to "blood" rather than "dark red" and "bright red". Content validity was established following these modifications with a correlation coefficient of 0.98..

Interrater Reliability. Reliability of the NTSI was established before data collection. The researcher and two expert midwives unassociated with the study, independently observed the nipples of five mothers for four consecutive days. Comparisons made between the results of the three raters indicated that there were no observed differences in the reporting of nipple status. It was important to establish interrater reliability between the researcher's ability and accuracy in assessing nipple trauma in comparison with other expert midwives.

Test - retest reliability. The stability of the NTSI was also measured before data collection to test its reliability over time. Since nipple status was

likely to change in newly breastfeeding mothers, it seemed more logical to conduct test retest stability of the NTSI with established breastfeeding mothers whose nipple status was likely to be stable over time. Therefore, six experienced breastfeeding mothers were asked to complete the score sheet for four days to establish test retest reliability. The result demonstrated a correlation coefficient of 1.00. Modifications were made in one area of the instrument as a result of these mothers' suggestions. In the section on mother's assessment, the word "satisfactory" was replaced with "unchanged". The expert midwives agreed that this was a practical worthwhile modification to the NTSI.

Development of the Questionnaire

A questionnaire specifically designed for this research was also used to collect background information as no suitable tools were found in the literature (See Appendix F). The questionnaire was divided into three sections A, B, and C. Part A identified demographic details of the baby, and the mother's first breastfeeding experience. Part B (at four days post partum) identified demographic details of the mother, her education, supportive relationships and breastfeeding education. Participants were also asked if they received the additional prenatal teaching session, so that the researcher was then aware of the group allocation. Part C (at six weeks post partum) sought details on the progress of breastfeeding.

Content validity. Content validity of the questionnaire was established prior to the pilot study. This was achieved using Lynn's (1986) four point option scale, as previously described for content validity of each item in all sections of the questionnaire. Areas of omission in the questionnaire were also identified by the experts. One item was removed from Section A regarding mother's first breastfeeding experience, as the LATCH instrument covered this area. The question "In which country were you educated"? was added to Section B to give some indication of the mother's culture. The question on breastfeeding progress was changed to read "breastfeeding plus bottle feeding with expressed breast milk" to be specific about what was being fed to the baby. Item 18 was added to the questionnaire as it was felt that mothers in the experimental group may pass on the leaflet "The Key to Successful Breastfeeding" (Glover, 1991) to mothers in the control group. This was done to avoid contamination of the control group. Two items were changed in Section C of the questionnaire. "Other" was added to item three to include those mothers who had given up breastfeeding for reasons other than nipple pain and trauma, for example, returning to work. Item eight was changed to read "Has your doctor diagnosed mastitis?" to be specific about the incidence of mastitis in the research. Following modifications to the questionnaire, content validity was established with a correlation coefficient of 0.98.

Pilot Study

The purpose of the pilot study was to test the VAS, LATCH and NTSI instruments for feasibility, reliability and validity. Six mothers in the postnatal ward were invited to take part. They had each given birth to a healthy baby less than 24 hours previously. Section A of the questionnaire was completed at the initial visit and the mother was visited daily for four days for observation of her nipples and completion of the NTSI and LATCH score sheets. The mothers completed the pain score sheet for the four days. Part B of the questionnaire was completed with the mothers on the 4th postpartum day. Following analysis of this study, some minor modifications were made. The word “healthy” was added to the NTSI under mother’s assessment. “Grazed” was added to the nipple status section of NTSI. The problems in scoring the LATCH were identified in the pilot study and addressed as far as possible. The instrument did not allow for variations in right and left breast, especially related to nipple type and mother’s comfort. Data collected in this study indicated that several participants had two variations of the nipple types in LATCH. When this was the case the lower score was given. Data collected also showed a discrepancy when using the instrument to score mother’s comfort. Many participants in this research experienced “filling” of the breasts on days three and four postpartum but did not have any nipple trauma. LATCH gave this section a score of one. In this research study, if participants had no nipple trauma but the breasts were filling, a score of two was given.

Procedure

Recruitment

All primiparous women of more than 36 weeks gestation were approached by the researcher in the prenatal clinic of the study hospital. They were informed of the research and invited to take part in the study. The information letter (See Appendix G) was given to all participants and their written, informed consent obtained (See Appendix H.). Randomisation was achieved by using a sealed envelope technique containing group allocation in blocks of twelve, six to the control and six to the experimental groups as the teaching intervention required six participants. To ensure that the researcher remained observer blind for the first four postpartum days until all the observations were complete, random assignment to groups was done by the lactation consultant giving the education sessions. Randomisation continued until a sample of 75 was obtained. Mothers in the experimental group were informed by the lactation consultant of the day, time and venue of the special teaching session on correct position and attachment of their baby. Mothers in the control group received the usual prenatal education given to all mothers attending the study hospital.

Teaching Intervention

The teaching intervention was given by a senior lactation consultant who was also an expert midwife. Mothers were taught in groups of six with each

session lasting for one hour. Each mother in the group used a doll, to simulate the baby, for demonstration during the teaching session. Mothers were shown how to hold, position and attach the baby on the breast. Assistance was given, as necessary, by the lactation consultant. Mothers were also taught alternative ways of positioning the baby on the breast. These mothers were given a leaflet entitled "The Key to Successful Breastfeeding" (Glover, 1991) (see Appendix A) which reinforced the teaching of correct position and attachment of the baby on the breast. The mothers were encouraged to bring this leaflet to the hospital for reference following the birth of their baby.

Data Collection

Section A of the questionnaire (See Appendix F) was completed in the first 24 hours after the birth. Mothers were asked to keep a daily record of their nipple pain (if any) for the next four days (See Appendix D). The mother was visited daily to observe her nipples and record their status on the NTSI (See Appendix E). The LATCH score sheet was also completed daily (See Appendix B).

On the fourth postpartum day, mothers who were in the hospital's early discharge programme and had been discharged on the third postpartum day were visited at home by the researcher. Section B of the questionnaire was completed with the mothers on the fourth postpartum day and it contained questions on breastfeeding. The mother disclosed to the researcher at this time

the group to which she had been allocated. Mothers were reminded of the follow-up telephone call six weeks from this date (See Appendix F). This was Section C of the questionnaire and gave information about breastfeeding progress at six weeks. The type of instruments and when they were used to collect data in this study are shown in Figure 2.

LATCH	X	X	X	X	
VAS	X	X	X	X	
NTSI	X	X	X	X	
QUESTIONNAIRE	A			B	C
	Day 1	Day 2	Day 3	Day 4	6 Weeks

Figure 2. Type of instrument and time used to collect data.

Data Analysis

Univariate and multivariate statistical analyses were applied to the data using the Statistical Package for the Social Sciences (SPSS for Windows, Release 6.0.1). An alpha level of 0.05 was established for use throughout the data analysis and, as recommended by Gore (1981), exact *p* values have been quoted in tables throughout the results chapter. The difference between groups

were assessed using independent sample t tests. Analysis of Variance (ANOVA) with repeated measures were used to test the hypotheses.

Ethical Considerations

Ethical approval and permission to conduct this study was obtained from the Faculty of Health and Human Sciences Ethics Committee of Edith Cowan University, and the study hospital. Participants for the study were approached by the researcher and invited to take part in the research. Verbal and written explanation of the study was given as well as an explanation of the completely voluntary and confidential nature of the research. Mothers were assured that this study would involve no risk to themselves or their baby. They were not deprived of any treatment, as the teaching intervention was in addition to the usual prenatal education available to all mothers. An informed consent was obtained (See Appendix H). All care was taken to ensure the confidentiality of participants in the study; code numbers were used on the questionnaires and score sheets. A master list of participant's names, telephone numbers and code numbers was kept separate from the completed instruments in a locked file. The consent forms were kept in a different, secured filing cabinet and available only to the researcher. Participants were informed that they could withdraw from the study at any time without consequence. Consent forms and completed data sheets will be kept for five years.

CHAPTER FIVE

Results

This chapter presents the results of the analysis of data collected for this study. Demographic analysis will be presented first, followed by obstetric characteristics of the sample. The four hypotheses will then be tested and lastly, content analysis of the qualitative data arising from comments collected on completion of Section B of the questionnaire on the fourth postpartum day and at the six week follow-up.

Demographic Analyses

Of the 75 participants invited to take part in the study, five were subsequently excluded, resulting in a response rate of 96% (n=70). Participants were randomly assigned to the experimental or control groups with 35 participants in each group. All participants in the final sample completed all aspects of the study.

Age and Education

The age of participants ranged from 16 years to 36 years with a mean age of 25 years (SD = 4.62). All were first time mothers.

The majority of participants in the study (71.4%) were born in Australia. The other 28.6% of the sample were born in the United Kingdom, New Zealand, Asia and Europe. Table 1 shows where participants in the sample were born. The majority of the sample (98.6%) were educated in the country of their birth. The participant born in New Zealand was educated in Australia.

Table 1

Country of Birth

Country of birth	<u>n</u>	<u>%</u>
Australia	50	71.4
United Kingdom	7	10
New Zealand	1	1.4
Asia	3	4.3
Europe	9	12.9
Total	70	100

Family Income

The majority of participants in the sample (80%) had a family income below \$30,000 per year with 37% below \$20,000 per year. Details of family income are shown in Table 2. Most participants indicated that they reported only their partner's income as it was the sole income at the time of the birth.

Table 2

Family Income at Time of Birth

Income per year	<u>n</u>	<u>%</u>
Less than \$20,000	26	37
\$20,000 to \$30,000	30	43
\$30,001 to \$40,000	13	18.6
More than \$40,000	1	1.4

Usual Occupation

Participants in the sample had a wide range of occupations. Secretarial or clerical work was the most frequently occurring occupation (40%).

Nine (13%) of participants were unemployed. See Table 3 for details of occupation.

Table 3

Participant's Usual Occupation

Occupation	<u>n</u>	<u>%</u>
Secretarial/clerical	28	40
Trades: hairdresser, cook, pharmacy assistant, shop assistant, construction worker	16	22.8
Unemployed	9	12.9
Student	6	8.6
Nurse	4	5.7
Teacher	3	4.3
Computer Programmer	2	2.9
Research Assistant	1	1.4
Fashion Designer	1	1.4

Education

Participants' highest education levels are shown in Table 4. Some participants (15.7%) did not complete High School leaving before Year 12.

Table 4

Participants Education

Education Level	<u>n</u>	<u>%</u>
Less than Achievement Certificate	3	4.3
Achievement Certificate (Year 10)	8	11.4
TEE/Leaving (Year 12)	30	42.9
Trade/Apprentice Certificate	15	21.4
Diploma	6	8.6
Undergraduate Degree	4	5.7
TOTAL	70	100

Social Support of Participants

The majority of participants (96%) had a supportive partner. Although the questionnaire did not ask specifically about relationship of partner, anecdotal notes revealed that the majority of participants were married. The support network of the sample is shown in Table 5. All participants in the sample had a supportive person.

Table 5

Participant's Support Network

Variable	Experimental		Control	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Supportive Partner	33	47.1	34	48.6
Parents/Mother	28	40	21	30
Friends/Neighbour	6	9	10	14

Obstetric Data

The Birth and Gender of Infants

The majority of participants (70%) had a normal vaginal delivery. Proportions of normal delivery and other types of delivery can be found in Figure 3. The gender of babies born to participants in the sample were 57% (n = 40) male, and 43% (n = 30) female.

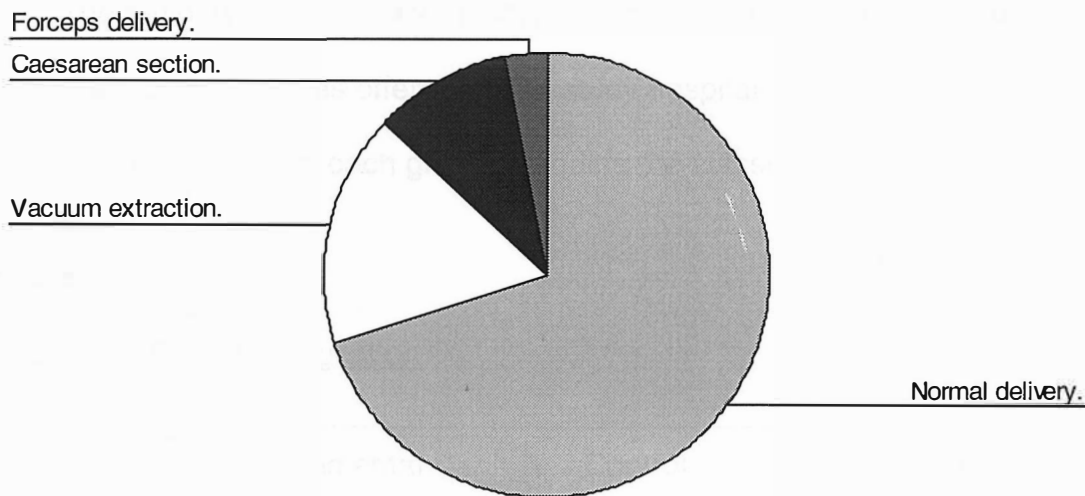


Figure 3: Type of delivery. Pie chart showing types of delivery for the sample

First Breastfeed

The midwife was present for all of the first breastfeed for 43% ($n = 30$) of participants and for part of the first feed for the remaining 57% ($n=40$). The first breastfeed lasted from 3 to 20 minutes with a mean time of 8.3 minutes ($SD = 2.4$).

Prenatal Education

The majority of participants (78%) attended the full four sessions of prenatal education classes offered by the study hospital. Table 6 shows the number of participants in each group attending the classes.

Table 6

Participants' Prenatal Education

Classes Attended	Experimental		Control		Total	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Full Course	29	41.4	26	37.1	55	78.5
Part Course	3	4.3	6	8.6	9	12.9
None	3	4.3	3	4.3	6	8.6
Total	35	50	35	50	70	100

Differences Between Groups for Demographic and Obstetric Data

Demographic and selected obstetric data related to the participants are shown in Table 7. The difference between experimental and control groups were assessed using independent sample t tests for the variables of age, education, family income, supportive partner, attendance at study hospitals prenatal classes, time of first breastfeed and the presence of the midwife at the first breastfeed. Frequency distribution was used for delivery type.

No significant differences were detected between the experimental group and the control group for any of the demographic and obstetric variables, indicating the groups were homogenous for these items.

Table 7

Differences Between Groups for Demographic and Obstetric Data

	Variable	Experimental	Control	t	df	p
¹	Age	24.5(44)	26.0(4.7)	-1.30	68	.725
¹	Education	3.3(1.2)	3.6(1.6)	-1.00	68	.108
¹	Family Income	2.8(0.6)	2.8(0.8)	-0.46	68	.131
²	Supportive Partner	33(47)	34(48)	0.58	68	.243
²	Attended Study Hospital Prenatal Classes	29(41.4)	26(37.1)	4.03	68	.604
²	Type of Delivery:					
	Normal	25(35.7)	24(34.3)			
	LUCS	2(2.9)	3(4.3)			
	Vacuum	6(8.5)	6(8.5)			
	Forceps	2(2.9)	2(2.9)			
¹	Time 1st Breastfeed	26.2(11.5)	35.1(15.8)	2.59	68	.698
¹	Midwife present at 1st Breastfeed	1.7(0.4)	1.4(0.4)	-0.86	68	.390

Note: ¹ = M (SD). ² = n (%)

Position and Attachment

Descriptive Data

Source of participants' knowledge of position and attachment of the baby on the breast was measured. Table 8 shows the source of this knowledge. Participants could respond to more than one category. None of the control group was instructed by a lactation consultant outside of the study.

Table 8

Source of Participants' Knowledge of Position and Attachment

Gained from:	Experimental		Control	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Prenatal classes	31	44.3	29	41.4
Lactation consultant	35	50.0	-	-
Video	13	18.6	29	41.4
Books, newspapers, magazines, pamphlets	35	50.0	12	17.1
Friends, relatives	14	20.0	25	35.7

All the participants in the experimental group responded that they had “quite a lot of knowledge” of position and attachment of the baby. None of the control group felt they knew a lot about position and attachment of the baby on the breast. The results are presented in Table 9.

Table 9

Participants' Knowledge of Position and Attachment at Four Days Postpartum

Knowledge of position and attachment	Experimental		Control	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
A lot	35	50	-	-
A little	-	-	33	47.1
None	-	-	2	2.9

Hypothesis Testing

Hypothesis 1 investigated whether participants in the experimental group, who received the extra teaching session, would have significantly higher overall LATCH scores, indicating better position and attachment of the baby on the breast, during the first four postpartum days than those in the control group who received the usual prenatal education.

To investigate this hypothesis the LATCH scores for the first four postpartum days were analysed in a 2 x 4 (2 groups x 4 days) analysis of variance (ANOVA) with repeated measures on the day factor. The ANOVA

results are presented in Table 10. The main effect for group was statistically significant. The experimental group had a higher overall LATCH score ($M = 35.2$, $SD = 3.1$) than the control group ($M = 24.1$, $SD = 4.6$), indicating better position and attachment of the baby on the breast for the experimental group. The main effect for day was also statistically significant. The mean LATCH scores for the whole sample for day one to day four were 6.2; 7.1; 7.6; and 8.1 respectively. In addition to a statistically significant day effect, there was also a significant group by day interaction.

Table 10

2 x 4 ANOVA Source Table for LATCH Scores

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Group	621.03	1,68	621.03	109.21	.000
Day	136.18	3	45.39	42.25	.000
Group by day	10.87	3	3.62	3.37	.019

As hypothesised, the experimental group were significantly better at positioning and attaching their babies on the breast than the control group. Therefore, hypothesis 1 was supported.

Post-Hoc Analysis Concerning Position and Attachment

In addition to hypothesis testing, further analyses were undertaken concerning position and attachment of the baby on the breast to provide clinical data. The mean LATCH scores across days for the experimental and control groups are presented in Figure 4.

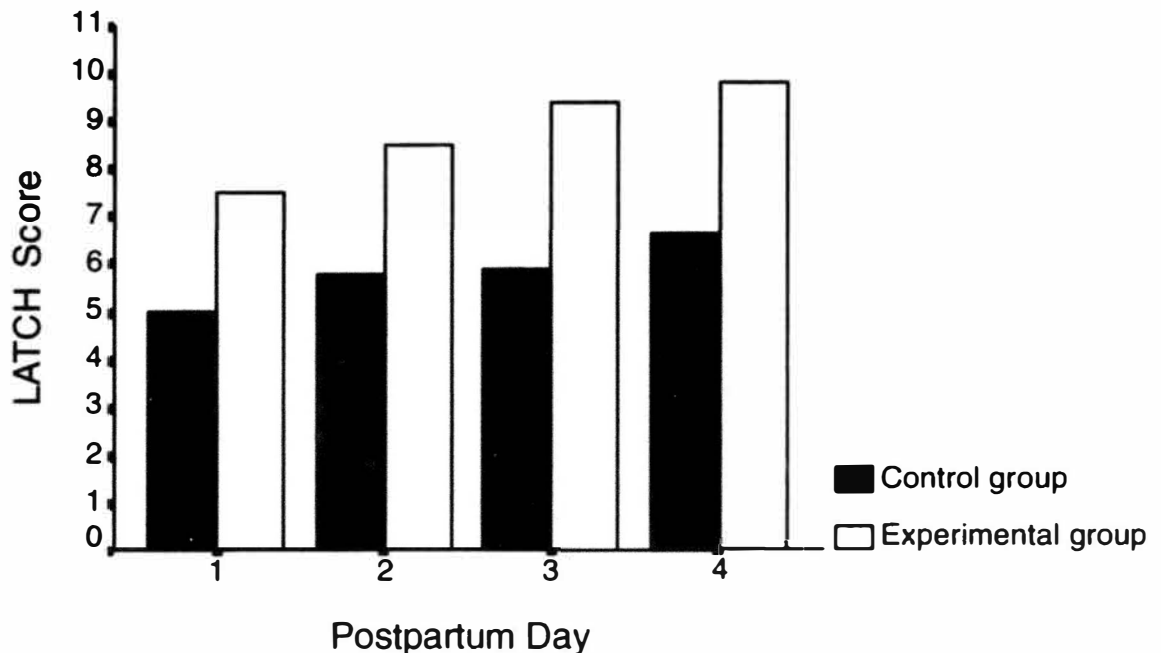


Figure 4: Bar graph showing mean LATCH scores for experimental and control groups for the first four postpartum days.

Scores show that the experimental group had a higher score on each of the four days postpartum than the control group, indicating better position and attachment of the baby than the control group. The means also suggest that the LATCH scores increased across days for

both groups, but that this overall increase was greater for the experimental group.

To determine the difference between groups on each day, the mean LATCH scores for the experimental and control groups for each day were also subjected to independent sample t tests. The t test results are presented in Table 11 and show that the two groups differed significantly on days three and four.

Table 11

LATCH Scores: t Test for Differences Between Groups on Days 1 - 4

Postpartum

Postpartum Day	t	df	p
Day 1	10.11	68	.593
Day 2	8.59	68	.987
Day 3	8.15	43.89	.006
Day 4	7.91	36.71	.000

In addition to the between group analysis, comparing the experimental and control groups, further analysis was conducted for position and attachment of the baby within each group. To determine on which days there was significant improvement within each group, paired sample t tests were used to compare the day means. For the experimental group, there was a significant difference in LATCH scores on each day. Examining the means for direction of change indicates that participants in this group improved in positioning and attachment of the baby on the breast. The results are shown in Table 12.

Table 12

Experimental Group: Paired Sample t Tests for LATCH Scores Across Days

Postpartum Days	t	df	p
Days 1 & 2	-5.15	34	.000
Days 2 & 3	-5.44	34	.000
Days 3 & 4	-3.26	34	.003

For the control group there was also a significant difference between days one and two, and three and four. However, days two and three did not reach significance, indicating no significant improvement in positioning and attachment of the baby on the breast over these two days. The results are shown in Table 13.

Table 13

Control Group: Paired Sample t Tests for LATCH Scores Across Days

Postpartum Days	<u>t</u>	<u>df</u>	<u>p</u>
Days 1 & 2	-4.10	34	.000
Days 2 & 3	0.28	34	.784
Days 3 & 4	-3.76	34	.001

In summary, hypothesis 1 was supported as shown by the higher overall LATCH scores for the experimental group who received the extra teaching session on positioning and attaching the baby. The experimental and control groups differed statistically from each other on days three and four, due to higher LATCH scores for position and attachment by the experimental group. Although there was still a significant difference in scores between groups, both groups improved in positioning and attaching the baby on the breast by day four postpartum.

Nipple Pain

Descriptive Data

Descriptive analysis on the overall mean scores for nipple pain showed that participants in the experimental group had less nipple pain on each of the four postpartum days than those in the control group. The mean pain scores across days for the experimental and control group are presented in Table 14. They show that the experimental group experienced less nipple pain on each of the four days than the control group.

Table 14

Nipple Pain: Mean Scores for Groups on Each of the Four Postpartum Days

Postpartum Day	Experimental		Control	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Day 1	0.4	(1.1)	4.9	(3.7)
Day 2	1.0	(1.4)	5.9	(2.9)
Day 3	1.1	(1.1)	6.2	(2.5)
Day 4	1.2	(1.5)	6.6	(2.2)

Table 15 shows that a higher percentage of participants in the experimental group experienced “no nipple pain” than those in the control group. All participants in the control group experienced nipple pain on days two, three and four.

Table 15

Number of Participants in Both Groups With “No Nipple Pain”

Postpartum Day	Experimental		Control	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Day 1	28	80.0	5	14.2
Day 2	14	40.0	0	0
Day 3	8	22.8	0	0
Day 4	11	31.4	0	0

Hypothesis Testing

Hypothesis 2 investigated whether participants in the experimental group, receiving the teaching intervention, would have significantly lower overall nipple pain scores during the first four postpartum days than those in the control group.

Nipple pain was measured using the VAS for the first four postpartum days with a higher score indicating more nipple pain. To investigate this

hypothesis the pain scores were analysed in a 2 x 4 (2 groups x 4 days) ANOVA with repeated measures on the day factor.

The main effect for group was statistically significant. The experimental group had significantly less nipple pain ($M = 3.7$, $SD = 4.1$) than the control group ($M = 23.5$, $SD = 9.2$). The main effect for day was also statistically significant. The mean pain scores for the sample for day one to day four were 2.7; 3.4; 3.6; and 3.8; respectively. The group by day was not significant. The ANOVA results are presented in Table 16.

Table 16

2 x 4 ANOVA Source Table for Nipple Pain

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Group	1725.09	1,68	1725.09	133.89	.000
Day	53.24	3	17.75	7.52	.000
Group by Day	7.57	3	2.52	1.07	.364

The large number of participants in the experimental group who did not experience any nipple pain ($n = 28$) means that the data for the experimental group were heavily skewed $F(1,68) = 133.89$ $p < .000$. This violates one assumption of ANOVA. However, the differences were so great that the

descriptive statistics alone are sufficient to illustrate that the two groups differed on nipple pain scores.

In summary, Hypothesis 2 was supported as shown by the lower levels of nipple pain for participants in the experimental group and also by the number of participants in this group who experienced no nipple pain on each of the four postpartum days. Participants in the control group experienced more nipple pain on each of the four days, and all participants ($n = 35$) in this group experienced some degree of nipple pain on day two, three and four postpartum.

Nipple Trauma

Hypothesis Testing

Hypothesis 3 investigated whether participants in the experimental group who received the extra prenatal teaching intervention, would have significantly lower overall nipple trauma scores during the first four postpartum days than those in the control group who received the usual prenatal education.

Nipple trauma was measured using the NTSI for the first four postpartum days. A higher score indicated less nipple trauma, 136 being the highest score attainable for NTSI over four days. To investigate this hypothesis, the NTSI scores were analysed in a 2 x 4 (2 groups x 4 days) ANOVA with repeated measures on the day factor. The ANOVA results are presented in Table 17. The main effect for group was statistically significant. The experimental group had a higher overall NTSI score (M = 132.85, SD = 5.5) than the control group (M = 94.20, SD = 16.3), indicating less nipple trauma for the experimental group. The main effect for day was also statistically significant. The mean NTSI scores for day one to day four were 31.8; 28.5; 27.1; and 25.9 respectively. In addition to a statistically significant day effect, there was also a significant group by day interaction.

Table 17**2 x 4 ANOVA Source Table for NTSI Scores**

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Group	6605.71	1,68	6605.71	168.01	.000
Day	1380.54	3	460.81	57.54	.000
Group By Day	893.06	3	297.69	37.22	.000

As hypothesised, the experimental group had significantly less nipple trauma than the control group. Therefore, hypothesis 3 was supported.

Post-Hoc Analysis Concerning Nipple Trauma

In addition to hypothesis testing, further analyses were undertaken concerning nipple trauma to provide clinical data. The mean NTSI scores across days for the experimental and control groups are presented in Figure 5. Mean scores show that the experimental group had a higher score on each of the four postpartum days than the control group, indicating less nipple trauma than the control group. The control group scores decreased over the four days indicating an increase in nipple trauma. The experimental group scores remained fairly stable.

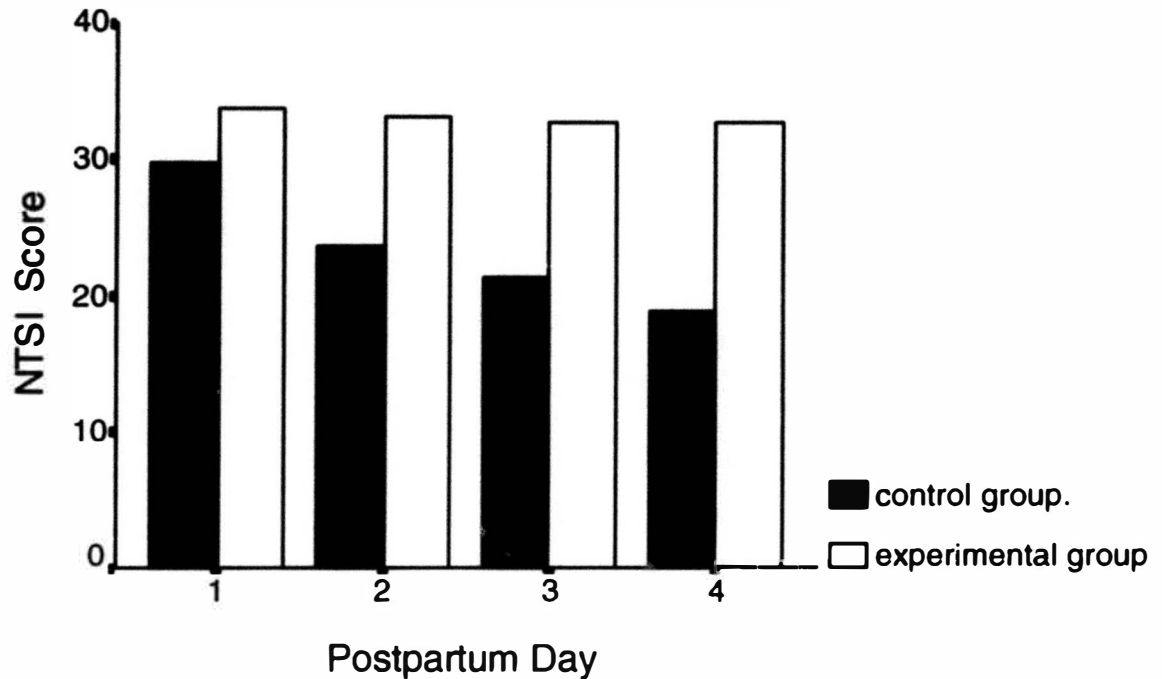


Figure 5: Bar graph showing mean NTSI scores for the experimental and control groups for the first four postpartum days.

To investigate the difference between groups on each day, the mean NTSI scores for the experimental and control groups for each day were also subjected to independent sample t tests. The t test results are presented in Table 18 and show that the two groups differed significantly on each of the four postpartum days.

Table 18**NTSI Scores: t Test for Differences Between Groups on Days 1 - 4 Postpartum**

Postpartum Day:	<u>t</u>	<u>df</u>	<u>p</u>
Day 1	4.35	34.56	.000
Day 2	8.83	41.17	.000
Day 3	11.69	40.28	.000
Day 4	17.69	44.74	.000

In addition to the between group analysis, comparing the experimental and control groups, further analysis was conducted for nipple trauma within each group. To determine on which days there was significant improvement within each group, paired sample t tests were used to compare the day means. The experimental group showed a statistically significant difference between days one and two and two and three. However, days three and four showed no statistical difference indicating no increase in nipple trauma. The results are shown in Table 19.

Table 19**Experimental Group: Paired Sample t Tests for NTSI Scores Across Days**

Postpartum Days	Experimental		
	<u>t</u>	<u>df</u>	<u>p</u>
Days 1 & 2	2.34	34	.026
Days 2 & 3	2.94	34	.006
Days 3 & 4	0.00	34	1.000

The control group showed a significant difference between all the postpartum days compared. Examining the means for direction of change indicates that participants in this group had an increase in nipple trauma over the four days. The results are shown in Table 20.

Table 20**Control Group: Paired Sample t Tests for NTSI Scores Across Days**

Postpartum Days	Control		
	<u>t</u>	<u>df</u>	<u>p</u>
Days 1 & 2	6.71	34	.000
Days 2 & 3	3.27	34	.002
Days 3 & 4	3.70	34	.001

Further analysis on the Nipple Trauma Severity Index (NTSI) showed a significant difference between the two groups in three parts of the instrument: Part 1 : $\bar{E} (1,68) = 89.48, p .000$, Part 2: $\bar{E} (1,68) = 104.68, p .000$, (these two parts were data on nipple status). Part 4: $\bar{E} (1,68) = 138.96, p .000$, (the participant's own assessment of her nipples). However, there was no significant difference in Part 3: $\bar{E} (1,68) = 2.80, p .098$ which was data on discharge from the nipple. The differences in scores can be seen in Figure 6, where a higher score indicates less nipple trauma.

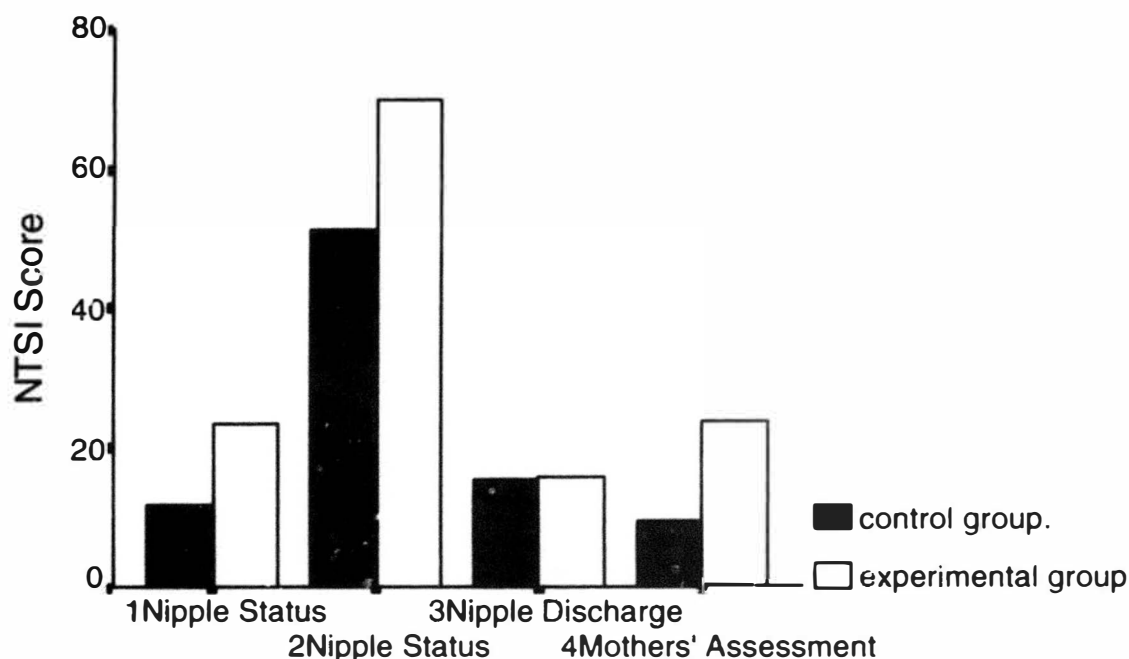


Figure 6: Bar graph showing mean scores for the four parts of NTSI for the experimental and control groups for the first four postpartum days.

In summary, hypothesis 3, was supported as shown by the higher overall NTSI scores for participants in the experimental group for the four postpartum days. Participants in the control group had a consistently lower NTSI on each of these four days. Further analysis within the experimental and control groups showed no change in nipple trauma occurred for the experimental group between days three and four postpartum, indicating no further damage to the nipples. There was no improvement in nipple trauma for the control group across days.

Duration of Breastfeeding

Descriptive Data

At the fourth postpartum day 83% (n = 58) of participants in the sample were fully breastfeeding. Of those who were not fully breastfeeding, 12.7% (n=9) had given their baby a bottle feed of either expressed breast milk (EBM) (n = 4) or formula (n = 5) as well as breastfeeding. The remaining 4.3% (n=3) had changed to complete formula feeding. The majority of participants either changed to formula feeding or gave their baby a bottle feed on the second postpartum day. The results are presented in Table 21.

Table 21

Participants in Whole Sample Breastfeeding and Bottle Feeding at Four Days Postpartum

Variable	<u>n</u>	%
Fully breastfeeding	58	83
Breastfeeding plus EBM	4	5.7
Breastfeeding plus formula	5	7.0
Formula feeding	3	4.3
Total	70	100

Of the 12 participants who introduced bottle feeding, feeds of either EBM, breastmilk and formula, or formula, 83% (n = 10) complained of nipple pain and trauma. The remaining 17% (n = 2) stated they had insufficient milk.

The majority of participants ceased breastfeeding during the first two weeks postpartum. Table 22 shows the time breastfeeding ceased during the six weeks postpartum.

Table 22

Time Participants Stopped Breastfeeding

Time	Experimental	Control
	<u>n</u>	<u>n</u>
Week 1	-	11
Week 2	-	9
Week 3	2	3
Week 4	-	3
Week 5	-	-
Week 6	-	-
Total	2	26

Hypothesis Testing

Hypothesis 4 investigated whether there would be a greater number of participants in the experimental group breastfeeding at six weeks postpartum than those in the control group.

A Chi Square (χ^2) test for two independent samples was used to address this fourth hypothesis. A significant relationship was found between groups breastfeeding $\chi^2 (1, N = 70) 28.8 p .000$. Of the 60% of the total sample of participants still breastfeeding at six weeks 46% were in the experimental group. Therefore, 92% of participants in the experimental group were breastfeeding at six weeks, compared to 29% of participants in the control group. Breastfeeding progress is shown in Table 23.

Table 23

Participants in Whole Sample Breastfeeding and Formula Feeding at Six Weeks Postpartum

Variable	Experimental		Control		Total	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Fully Breastfeeding	32	46	10	14	42	60
Formula Feeding	3	4	25	36	28	40

The results of Chi-square analysis show, therefore, hypothesis 4 was supported and significantly more participants in the experimental group were breastfeeding at six weeks postpartum than those in the control group.

Post-Hoc Analysis Concerning Duration of Breastfeeding

In addition to hypothesis testing, further analyses were undertaken concerning duration of breastfeeding to provide clinical data. Participants who had discontinued breastfeeding were asked about their reasons for ceasing. Participants in the experimental group who had changed to formula feeding by six weeks gave insufficient milk ($n = 2$) and embarrassment ($n = 1$) as reasons for ceasing breastfeeding. The most frequently stated reason given by participants in the control group for discontinuing breastfeeding was nipple pain and trauma ($n = 23$). A less frequently stated reason was insufficient milk ($n = 2$). The results are shown in Table 24.

Table 24

Participants' Reasons for Discontinuing Breastfeeding at Six Weeks Postpartum

Variable	Experimental	Control
	<u>n</u>	<u>n</u>
Nipple pain and trauma	-	12
Nipple trauma	-	10
Insufficient Milk	2	2
Nipple Pain	-	1
Embarrassment	1	-

Participants who continued to breastfeed at six weeks postpartum were asked if they experienced any nipple pain or trauma since discharge from hospital. Seven participants answered yes to this question, two of these participants were in the experimental group and five in the control group. The experimental group used better position and attachment to treat the pain and trauma experienced, whilst the control group used various other methods as shown in Table 25.

Table 25

Participants' Own Way of Treating Nipple Pain and Trauma

Variable	<u>n</u>	<u>%</u>	Group
Change position of baby on the breast	2	28.5%	Experimental
Nipple Shield	2	28.5%	Control
Nipple Cream	2	28.5%	Control
No treatment	1	14.5%	Control
Total	7	100%	

The frequency of mastitis was also measured in both groups. Two participants (3%) had developed mastitis by six weeks. Both these participants were in the control group and both had experienced nipple trauma before the onset of mastitis. These two participants had discontinued breastfeeding at six weeks.

Qualitative Analysis

Following completion of Section B and C of the questionnaire, and following completion of all observations, many participants in the study made comments which were later analysed by content analysis.

There was universal agreement amongst all the participants in the experimental group that the prenatal education session, especially the “hands on” teaching using a doll for demonstration of position and attachment of the baby on the breast, was the most beneficial part of the breastfeeding education. Participants spoke of the confidence this knowledge gave them. This was typified by one mother who stated:

“When they handed me my baby, I just knew what to do, I knew how to feed her. I didn’t know where I got the knowledge. Then I realised two days later that I had learned it all at the class.” (participant no.18: experimental group)

Another mother stated:

“I know I was successful breastfeeding because of the knowledge I gained from the teaching class. The most beneficial part was using the doll for the demonstration, it gave me the knowledge of the right way to hold the baby and then when I had my baby I knew what to do. You are so vulnerable after you have a baby and its just wonderful when the breastfeeding goes well.” (participant no. 59: experimental group)

All participants in the experimental group acknowledged the benefit of the teaching class. These participants maintained that it was this education that enabled them to breastfeed their babies. This was summed up by one mother:

“Every mother should have that teaching class before they start to breastfeed. I didn’t realise I knew so little about breastfeeding. I thought it would all come naturally, but all that bit about position and attachment, I never heard of it before, but now that I’m doing it, it makes so much sense. You just know she (baby) is on the breast properly and that she is getting the milk.” (participant no. 50: experimental group)

Another mother said:

“I would recommend that teaching class to everyone who is going to breastfeed. It just made so much sense. You came away from it with so much knowledge. It was especially good to be able to hold a doll for the demonstration of position and attachment, it helped me remember what to do when I started to breastfeed. I’m just glad I was in the group that went to the teaching class. But if I had not been in that group, then I would never have known how beneficial it was.” (participant no. 64: experimental group)

Participants in the control group expressed concern that they lacked the knowledge on how to breastfeed. This general feeling was expressed by one mother.

“I just don’t seem to be able to breastfeed. Every time I put him (the baby) on the breast, he screams, he’s screaming all the time. My nipples are so painful and they are cracked. I wish I knew how to do it properly. (Name of patient) over there doesn’t seem to have any problems. She says she went to a special class.” (participant no. 49: control group)

Other participants in the control group reported lacking confidence in themselves when they were having problems breastfeeding. This is summed up in comments by one mother at the six week follow up:

“I just lost all confidence in myself when I wasn’t able to breastfeed, everything seemed to go wrong then ... I cried a lot. It was better when I gave her the bottle.” (participant no. 12: control group)

Another mother in the control group spoke about how the problems breastfeeding affected other parts of her life:

“When I was having problems breastfeeding in those first few days, I lost all confidence in myself as a mother. I can tell you, there were some days I didn’t even want to know that baby.” (participant no. 7: control group)

Participants in experimental group acknowledged the confidence the extra education gave them, and this enabled one participant to be unaffected by conflicting advice, she said:

“The special teaching class gave me so much confidence. It was wonderful to have all that knowledge about something before you actually do it. I didn’t worry then when the staff told me to do things differently. I just knew that the way ... (name) told us was the right way, as it made so much sense.” (participant no. 44: experimental group)

Many participants in the experimental group were extremely grateful that they were in the group that received the extra teaching session and expressed gratitude. One participant said:

“Thank you so much for putting me in that teaching group. I didn’t know anything about breastfeeding and my husband wanted me to breastfeed our son. I could never have done it without going to that teaching session. I liked the small group of mothers in the class and it was good to know everyone had concerns about breastfeeding” (participant no. 15: experimental group)

This gratitude was reinforced by another mother:

“I am just so glad I went to that class, I never realised how important it was to get him (baby) on the breast properly. When he’s on properly, everything else goes right.” (participant no. 69: experimental group)

Participants' responses following completion of Section B of the questionnaire, and comments made on completion of Section C, identified similar themes that related to a lack of knowledge about breastfeeding. Many respondents from these two groups expressed that they lacked specific information about a right and a wrong way to breastfeed. Participants said, before the birth they had thought breastfeeding would be easy and natural. Many said they did not know they required information on how to position and attach their baby on the breast. Participants in the experimental group expressed that they couldn't see a lot of importance in a teaching class on position and attachment of the baby before they attended the class. After attending the class many stated that getting the baby correctly positioned and attached on the breast was the most essential part of breastfeeding. Many participants expressed concern that education classes on position and attachment of the baby on the breast were not on-going.

Comments expressed by the midwives in the research hospital related to a noticeable increase in mothers' knowledge of breastfeeding, mothers' being confident breastfeeding their baby and staff needing to spend less time with the breastfeeding mother. They commented that many mothers were less anxious about breastfeeding, even when they were having difficulties and that many of these mothers attributed it to the knowledge they had gained at the teaching class on position and attachment.

Summary

This chapter presented the results of the analysis of data collected in this study. The study sought to investigate the effect of a prenatal teaching intervention on postnatal nipple pain and trauma. Descriptive statistics, repeated measures ANOVA, and paired sample t tests were used to analyse the data. A content analysis was made of qualitative data collected.

Prior to the teaching intervention in this study, there were no significant differences found between the groups for age, level of education, family income, supportive partner, attendance at the study hospital's prenatal education classes, type of delivery, time of first breastfeed and the presence of a midwife for the first breastfeed.

The findings indicated that participants in the experimental group, who received the teaching intervention, were able to position and attach their baby on the breast better during the first four postpartum days than participants in the control group. Furthermore, participants in the experimental group had significantly less nipple pain and trauma during the first four postpartum days. There was also a significantly greater number of participants in the experimental group continuing to breastfeed at six weeks postpartum than those in the control group. Therefore, all four hypotheses set for this study were supported.

Many of the participants in the experimental group expressed gratitude at being in the teaching intervention group. They were grateful for the extra

knowledge, especially the “hands on” teaching when positioning the doll. They also expressed feelings of confidence and contentment. All participants in this group said they could not have breastfed their baby without the knowledge they gained at the teaching class.

CHAPTER SIX

Discussion

This chapter evaluates and interprets the findings from this study in relation to the literature on breastfeeding. The final chapter will then present the conclusions for this study, along with the implications and recommendations for midwifery practice, education and further research.

The study used the supportive-educative nursing system of Orem (1985) as a framework to examine the effect of a prenatal teaching intervention on postnatal nipple pain and trauma. This conceptual model provided structure and direction for the intervention. The variables, which affected the breastfeeding mothers' self-care abilities, were identified as, knowledge of position and attachment of the baby on the breast, nipple pain and trauma and continuation of breastfeeding to six weeks postpartum. These variables, and others known to have an impact on breastfeeding success, were investigated in order to measure the breastfeeding mother's ability to self-care and care for her dependent infant.

The study tested the hypotheses that mothers in the experimental group who received the teaching intervention would be able to position and attach their babies better on the breast, have less nipple pain and trauma, and a higher number would be breastfeeding at six weeks postpartum than the control group.

The impetus for this study came from the researcher's interest in breastfeeding and observation in clinical practice of the high number of mothers initiating breastfeeding but encountering problems of nipple pain and trauma and ceasing breastfeeding for these reasons. It is argued that correct position and attachment of the baby on the breast for feeding prevents these problems of nipple pain and trauma (Fisher, 1995; Glover, 1990; Woolridge, 1986a).

The midwifery intervention used in this study based on the supportive - educative nursing system, was an extra teaching class lasting one hour for groups of six mothers in addition to the usual prenatal education available to all primiparae 36 weeks pregnant. The content of the class was on correctly positioning and attaching the baby on the breast, with each mother using a doll to practice breastfeeding skills.

Position and Attachment

During the first four postpartum days in this study position and attachment of the baby on the breast was measured by the LATCH instrument. These scores, for the first four postpartum days, were significantly better for the experimental than the control group, indicating that the experimental group were able to position and attach their babies better on the breast than the control group. Therefore, the first hypothesis was supported.

On the first two postpartum days there was no significant difference in LATCH scores between the two groups. There was, however, a clinical

difference in the mean scores of both groups on these two days. The experimental group had a higher mean score than the control group on each of these two postpartum days.

The fact that there was no significant difference between groups for LATCH score on the first two postpartum days, but there was a significant difference on days three and four, may indicate several things. Firstly, there may have been decreased midwifery support for mothers in both groups following the birth. This is unlikely considering that 43% of the sample had a midwife present for all of the first breastfeed and for the remaining 57% a midwife was present for part of the feed. Secondly, in the first two postpartum days, which Rubin (1967) calls “the taking-in phase”, mothers may have been unreceptive to education. Rubin suggested that “the mother herself needs mothering at this time”. Thirdly, the researcher in the present study found areas of the LATCH instrument unclear and difficult to score. For example, for three parts of the instrument, audible swallowing, nipple type, and comfort, mothers in both groups had similar scores in these three areas during the first two postpartum days. The instrument was not specific enough to pick up smaller differences between groups on these days. It did, however, pick up the significant differences between the two groups when they became more obvious on days three and four postpartum.

On days three and four postpartum mothers in the experimental group, who had been given the teaching on position and attachment, were significantly

better at positioning and attaching their baby on the breast than mothers in the control group. It is interesting to note that over the four days mothers in both groups increased their LATCH score but the control group never achieved the same mean score as the experimental group on any of the four days.

Moreover, the experimental group still had higher scores on each of the four days. It could be argued that the control group learned to position and attach their baby on the breast by experience, but this was gained at the expense of increased nipple pain and trauma.

It was apparent from the data that the second and third postpartum days were the most difficult for mothers in the control group for positioning and attaching the baby on the breast. These mothers had a minimal increase in LATCH score on these two days. Other studies have also shown these days to be the most difficult for breastfeeding mothers (Bailey & Sherriff, 1992; Fetherston, 1995, Hill, 1991; Virden, 1988; Wiles, 1984).

Fetherston (1995) found in her study that all primipara who ceased breastfeeding experienced attachment difficulties. Many variables may have had an affect on the mother's self-care abilities at this time. She may have been tired following a long and difficult labour, although 70% of the sample had a normal delivery. Mothers were randomly assigned and analysis showed that there were no differences between groups for type of delivery. The amount of analgesia and anaesthesia administered to the mothers was not measured in this study, again this may have had an effect on the mother's self-care abilities.

Other researchers have indicated that obstetric procedures and intrapartum analgesia and anaesthesia were associated with problems in establishing breastfeeding (Rajan, 1994; Righard & Alade, 1990). To obtain information in this study, on the mothers' intrapartum analgesia and anaesthesia, the researcher would have required permission to access the mothers' medical notes. However, because of random assignment in this study, it is anticipated these variables could have had an impact on either group.

In summary, as postulated in the conceptual framework, mothers in the experimental group who received the extra teaching session in the prenatal period and the supportive-educative nursing system of Orem, were able to meet their self-care requirements of positioning and attaching the baby on the breast in such a way as to minimise nipple pain and trauma. This enabled the breastfeeding mother to meet her self-care needs and those of her dependent infant.

Nipple Pain

During the first four postpartum days in this study the intensity of reported nipple pain was assessed by visual analogue scale (VAS). The overall main effect showed a significant difference between the pain experienced by the experimental group and those in the control group. Mothers in the experimental group had significantly less nipple pain than the control group. Therefore, the third hypothesis was supported.

In addition, on each of the four postpartum days the experimental group had consistently and significantly less nipple pain than the control group. Eighty per cent of mothers in the experimental group, compared to 14% of mothers in the control group, experienced no nipple pain.

These findings of nipple pain are of particular significance since pain “is a biological protection mechanism” (Woolridge, 1986a, p.172) and indicates that breastfeeding technique needs to be improved. Woolridge (1986a) and ILCA (1990) both agree that breastfeeding should be pain free, and that if pain is present the baby is damaging the nipple. The results in this study of mothers experiencing nipple pain, indicate that these mothers demonstrated one of the features leading to nipple trauma.

It is of particular concern that mothers in the control group of the study were not even aware that the pain they experienced during breastfeeding, due to improper positioning and attachment, was causing damage to their nipples. These mothers did not have the knowledge of the physiology of breastfeeding and how a baby attaches on the breast correctly to prevent nipple damage.

Of clinical significance in this study were contrasts from repeated measures ANOVA which found mothers in the control group experienced a greater increase in nipple pain on the second postpartum day and continued to have higher levels of pain until day four. A significant difference was found between all days in the control group indicating that the nipple pain steadily got worse for this group. This is consistent with the findings of other studies where

the peak pain was experienced on day three postpartum and nipple pain was reported up to six weeks postpartum (DeCarvalho, et al., 1984; Fetherston, 1995; L'Esperance, 1980, Ziemer et al, 1990).

However, the pain scores for the experimental group indicated that these mothers experienced no increase in nipple pain after day two. This further demonstrated that by day three mothers in the experimental group had improved position and attachment of the baby on the breast, so no further nipple pain was caused.

It is clear from the results of this present study that nipple pain was extreme for many participants in the control group, with 40% of mothers indicating their nipple pain was "as bad as it could possibly be" on at least one of the four postpartum days. In contrast to this, 80% of mothers in the experimental group reported no nipple pain on at least one of the four postpartum days. Nipple pain was extremely common in other studies (Drewett & Woolridge, 1981; Fetherston, 1995; Zierner & Pigeon, 1993). Fetherston found that 72% of participants had nipple pain. Zierner and Pigeon reported 90% of their sample had nipple pain.

An interesting finding in the present study was that only one mother in the control group who ceased breastfeeding gave nipple pain as her reason, whereas 33% of mothers reported a combination of nipple pain and trauma. Moreover, Woolridge (1986a) studied the aetiology of nipple pain and concluded that nipple pain and trauma were synonymous. He suggested the

two sources of nipple pain were frictional trauma and suction lesions, both of which are caused by incorrect positioning and attachment of the baby on the breast.

In summary, as postulated in the conceptual framework, mothers in the experimental group, breastfeeding for the first time, who received the extra teaching intervention and the supportive-educative nursing system of Orem, were able to meet their self-care requirements. This prenatal knowledge of position and attachment of the baby on the breast enabled these mothers to have relatively “pain-free” breastfeeding and, therefore, meet their self-care needs and the needs of their dependent baby.

In addition to the findings of this study on the first four postpartum days the researcher’s informal observation during data collection found that some mothers were having no difficulty breastfeeding their babies. Other mothers were having many problems. At this stage of data collection the researcher was unaware of the group allocation of these mothers but there was an obvious, observable difference between individual women. This phenomena was also supported by subjective observations of midwives in the postnatal ward. These midwives consistently remarked that some mothers required minimal help with breastfeeding compared to other mothers. By the fourth postpartum day it became obvious to the researcher that the mothers who required less midwifery staff time were in the experimental group.

Nipple Trauma

During the first four postpartum days of this study the nipple trauma severity index (NTSI) measured mothers' nipple trauma. This assessed nipple status, discharge from the nipple and the mother's own assessment of her nipples.

Overall, mothers in the experimental group had significantly less nipple trauma than mothers in the control group. On each of the four days measured they also had significantly less nipple trauma than the control group. In addition, these mothers in the experimental group assessed their nipples to be more comfortable than the control group, on each of the four days. Some mothers in the experimental group (47%) reached the maximum score attainable on this instrument on each of the four days, indicating that almost half of this group had no nipple trauma for the first four postpartum days. Another 50% of this group had redness and bruising of the nipples over the four days. The remaining mothers (3%) had cracked nipples. Conversely, all mothers in the control group had some nipple trauma over the four postpartum days; 69% had cracked nipples and the remaining 31% had redness and bruising of the nipples. Again, this finding was of particular importance. It indicated that mothers in the experimental group were able to position and attach their baby on the breast better, so less nipple trauma was caused to the nipple by improper attachment causing friction on the nipple. This observation of redness

of the nipples was also made by Ziemer and Pigeon (1993) in mothers who had not started to breastfeed their infants.

Previous studies have examined the correlation between nipple pain and nipple trauma (Walker & Driscoll, 1989; Ziemer, Paone, Schupay & Cole, 1990). Irrespective of the degree of nipple pain reported, these authors have also shown an association between reports of increased nipple pain and nipple trauma.

The only study that measured the severity of nipple trauma used photographic magnifying lens and reported that 65% of the sample had severe nipple skin damage (Ziemer & Pigeon, 1993). This is in contrast to the findings of the present study where just 3% of the experimental group had cracked nipples.

On day two postpartum a further interesting finding emerged from the results of repeated measures ANOVA in this research. The experimental group remained the same over days three and four, indicating no further nipple trauma. However, the data suggests that nipple trauma became obvious on day two for the control group and became steadily worse until day four. The pattern shown by the control group seems consistent with previous studies (De Carvalho, et al., 1984; Fetherston, 1995; L'Esperance, 1980; Ziemer & Pigeon, 1993).

Of the 40% of mothers in the whole sample who had ceased breastfeeding by six weeks postpartum, 33% of these reported nipple pain and

trauma as their reasons. This is comparable with other studies (Hill, 1991; Nicholson, 1985; Percival, 1990). Bailey and Sherriff (1992) investigated mothers' reasons for ceasing breastfeeding, and although 36% complained of sore nipples, nipple trauma was not included in the list of reasons compiled by the researchers for mothers to select.

In summary, as postulated in the conceptual framework, mothers in the experimental group receiving the extra teaching intervention and the supportive-educative nursing system were able to meet the self-care demands of breastfeeding. These mothers were able to position and attach their baby better on the breast and so did not encounter the self-care deficit of nipple trauma the mothers in the control group experienced.

Breastfeeding Progress

The fourth hypothesis for this study concerned breastfeeding progress at six weeks postpartum. This data was obtained in a follow-up telephone call to mothers to ask about duration of breastfeeding.

At six weeks postpartum a significant difference was found between groups in the number of mothers continuing to breastfeed, with 92% of mothers in the experimental group and 29% of mothers in the control group still breastfeeding.

Mothers in the experimental group of this study were significantly more successful in maintaining breastfeeding to six weeks than in previous Western Australia lower socio-economic samples (Bailey & Sherriff, 1992; Hitchcock & Coy, 1988). The experimental group were also significantly more successful than mothers in private Western Australia maternity hospitals (Fetherston, 1995; Percival, 1990). Of particular concern was the 29% of mothers in the control group of this study who had ceased breastfeeding by six weeks postpartum. This is significantly lower than previous Western Australian samples of both lower and higher socio-economic status (Bailey & Sherriff, 1992; Fetherston, 1995; Hitchcock & Coy, 1988; Percival, 1990). It is not possible to compare the 29% of mothers in this study with previous hospital records, as no records are kept of breastfeeding progress following discharge.

At six weeks postpartum, the 60% of all mothers in this study who were still breastfeeding is below that set by the Commonwealth Department of Health (1987) of 75% still breastfeeding at three months. However, the 92% of participants in the experimental group in this study who were still breastfeeding at six weeks postpartum is well above that set by the Department of Health.

This high percentage of mothers in the experimental group still breastfeeding at six weeks postpartum has innumerable benefits for both the mother and baby. As previously discussed, breastfeeding provides the optimal nutrition for the baby and is also a source of immunological, antiallergic and anti-infective factors (Howie et al., 1990; Lindenberg et al., 1990; Martin &

Monk, 1982; McDonald, 1979; Minchin, 1981; Palmer, 1986). The mother also benefits from breastfeeding as successful breastfeeding, for some mothers, equates with successful mothering (Rubin, 1967), leaving the mother feeling satisfied with her mothering experience.

In the present study it is interesting to note that there was a definite trend for the introduction of formula feeding to be followed very quickly by the total cessation of breastfeeding. No mothers in the study were partially breastfeeding at six weeks postpartum. No reasons were given by these mothers for not continuing with partial breastfeeding. This is contrary to other Western Australia studies where mothers were both breastfeeding and bottle feeding at six weeks (Hitchcock & Coy, 1988; Johnston, 1993).

A large proportion of mothers in this study, who discontinued breastfeeding by six weeks postpartum, reported nipple pain and trauma as the reason. All of these mothers were in the control group. Two mothers in each group who had ceased breastfeeding at three and four weeks postpartum reported insufficient milk as their reason. The other mother in the experimental group, aged 17 years, with no supportive partner, reported embarrassment as a reason.

It is possible that these mothers in both groups who reported insufficient milk were unprepared for the typical growth spurt of their baby at three weeks postpartum. Unless a mother has been prepared for her baby's increase in appetite she may assume that her milk supply is insufficient. This argument has

been advanced by others (Bailey & Sherriff, 1992; Feinstein, Berkelhamer, Gruszka, Wong & Carey, 1986; Fetherson, 1995; Neifert, Seacat & Jobe, 1985). From a physiological point of view, inability to produce adequate milk in the absence of disease is considered very rare in both western and non western cultures (Feinstein et al, 1986; Shrago & Bocar, 1990).

There were two other interesting findings in the present study. One was that only 2.8% ($n = 2$) of mothers reported mastitis at the six week follow-up. Both these mothers reported nipple pain and trauma and had discontinued breastfeeding for this reason. These findings are in contrast to a recent study by Fetherston (1995) which reported 23% of the sample of higher socio-economic mothers with mastitis.

Secondly, it was interesting to note that no participants in this study reported returning to work as a reason for ceasing breastfeeding. Returning to work was found to be a factor involved in the early termination of breastfeeding by many researchers (Feinstein et al, 1986; Lowe, 1993; McNatt & Freston, 1992). An examination of the demographic information in this present study indicated that the majority of participants came from a low socio-economic background and few had professional qualifications. The fact that returning to work was not an important determinant for most mothers has also been noted by Bailey and Sherriff (1992) and Palmer (1986) in their studies of lower socio-economic samples.

During the six weeks postpartum mothers in the study reported many methods of management of nipple pain and trauma. In contrast to Ziemer et al. (1990), where most participants used air drying of the nipples, mothers in this study reported altering the breastfeeding technique and position of the baby on the breast. For mothers in the experimental group, this also included more careful attention to position and attachment of the baby on the breast.

In summary, as postulated in the conceptual framework the supportive-educative nursing system of Orem enabled the breastfeeding mother to meet her self-care deficits after discharge from hospital. If the mother has the knowledge of, position and attachment of the baby on the breast, and the physiology of breastfeeding, before she begins to breastfeed she would then be able to meet her self-care demands as they arise. This would enable her to meet her self-care demands after discharge from hospital and the loss of support of the hospital midwife.

Demographic Characteristics

Conceptualised within Orem's framework are other variables that have a direct impact on the mother's ability to self-care and care for her dependent member. For example, a supportive partner, the mother's education and family income are important variables that impact on the mother's ability to breastfeed.

In this study there were no differences between the groups for these variables. Only 4% of mothers had no supportive partner, two in each group.

Sixty per cent of the sample had support from parents and maternal mother; again was evenly divided between groups. These findings of the mothers' support network are consistent with those of other researchers (Bailey & Sherriff, 1992; Lowe, 1993).

There was also no significant difference between groups in mothers education. Eighty per cent of mothers completed High School. Only 4% had professional occupations. Most mothers indicated their partner's income, as they were the sole income earner at the time of delivery. Eighty per cent received a family income below \$30,000 per year. It could be concluded that the results of this study generally apply to low-income, first time mothers.

Bailey & Sherriff (1992) and Aberman and Kirchoff (1985) found that a greater number of mothers in the higher socio-economic groups continue to breastfeed for longer. This is supported by other researchers (Fetherston, 1995; Hitchcock & Coy, 1988; Lowe, 1993). Hitchcock and Coy found that all of the mothers in the higher socio-economic group of their study were still breastfeeding at six weeks postpartum. It is, therefore, necessary to improve breastfeeding duration rates for mothers in the lower socio-economic groups. The prenatal teaching intervention used in this study did provide these mothers with the necessary education and support to enable them to continue breastfeeding, as shown by the 92% of mothers in the experimental group who were still breastfeeding at six weeks postpartum.

All of the mothers in the experimental group, who were still breastfeeding at six weeks postpartum, attributed their success to the education gained at the extra prenatal teaching class on position and attachment of the baby on the breast. McIntyre (1991) postulated that, to be successful at breastfeeding the mother must believe she can breastfeed. The implication could be then, that the knowledge gained at this teaching intervention gave the mothers the confidence to believe that they could breastfeed their babies.

It is important to note that random assignment to the experimental and control groups in this study was effective. It ensured that other extraneous variables, which may influence breastfeeding, were equally distributed between groups. The findings indicate that there was no difference between the experimental or control groups in demographic characteristics or obstetric data.

Teaching Intervention

As discussed, the prenatal teaching intervention in this study had a significant effect on nipple pain and trauma and continuation of breastfeeding to six weeks. The results of this study are in contrast to a study by Hill (1987) where a slide presentation, lecture and booklet, given prenatally, failed to make any significant difference on the success of breastfeeding. An intensive pre and postpartum education programme in a recent Australian study also failed to make a significant difference to breastfeeding progress (Redman, Watkins & Evans, 1995). The findings of the Hill and Redman et al. study are congruent

with those of Entwistle & Doering (1982); Ellis (1983); Kaplowitz & Olsen (1983); Jenner (1990); Mazen & Leventhal (1972); and Ross et al. (1983). In all four studies, an increase in breastfeeding education among low income mothers did not result in an increased duration of breastfeeding. Furthermore, participants in Hauck and Dimmock's (1994) Western Australian study, who received an information booklet on breastfeeding in the postpartum period, also failed to increase the duration of breastfeeding.

Conversely, Buchko et al. (1990) supports the theory that education on breastfeeding promotes successful breastfeeding. These researchers found that mothers in their control group, who had only education, did not change to formula feeding when they had nipple pain, they implied that education only may be the method most successful in helping mothers to breastfeed.

A formalised group teaching in the form of a prenatal breastfeeding education class, on position and attachment of the baby on the breast, did provide primiparous mothers, in this instance, with the information they needed to have a successful breastfeeding experience.

In this research study, the teaching intervention was different from other prenatal educational interventions found in the literature. In the present study, the lactation consultant, who was also an expert midwife, educated all the mothers in the experimental group. It would be interesting to find out if results would be similar with another lactation consultant, or several lactation consultants, conducted the education classes.

In addition, the teaching intervention in this study used a combination of the three different approaches to learning: audio, visual and kinesics. For audio learning mothers in the group were able to listen to what was being said about good position and attachment of the baby on the breast. The women also watched the lactation consultant position and attach the baby, using a doll for the demonstration. Mothers were also given a leaflet "The Key to Successful Breastfeeding" (Glover, 1991) and were encouraged both to read and refer to this leaflet and to bring it to hospital with them for the birth. This added to their visual learning. Thirdly, the opportunity to learn through kinesics, by practicing position and attachment using a doll, while the mother was assisted and supported by the lactation consultant.

A further advantage of the teaching intervention in this present study was that mothers were educated in groups of six. This number was small enough to enable them to feel comfortable in the group. Large groups can make adults feel threatened (Rylatt, 1994). It was also an appropriate number for the lactation consultant to be able to spend time with each mother, assisting with good position and attachment using the doll.

In summary, conceptualised within Orem's support-educative nursing system the primiparae requires education and support from the midwife, specific to her needs, to enable her to self care and care for her dependent infant. The specific education that she requires is that of position and attachment of the

baby on the breast and she requires this knowledge in the prenatal period before she begins her self care ability of breastfeeding.

Limitations and Strengths

The generalisability of the findings of this study are limited as only primiparae with full term healthy babies were selected for the study. There were limitations in scoring the LATCH instrument on days one and two postpartum. The instrument was not precise enough to detect differences between groups on these two days. However, as all four hypothesis were supported, the study has implications for health professionals implementing prenatal teaching sessions on correct position and attachment of the baby on the breast for all mothers.

The researcher remained observer blind to the group allocation of mothers until all observations were completed on day four postpartum as no observations were made at six weeks postpartum. Furthermore, effective randomisation was achieved for this study, therefore, controlling for the effects of extraneous variables which may influence breastfeeding e.g. age, socio-economic status, supportive partner, attendance at study hospital prenatal classes, delivery, time of first breastfeed, and the presence of a midwife for the first breastfeed. To obtain data on the mothers' intrapartum analgesia and anaesthesia would have involved permission to access the patients' medical notes.

CHAPTER SEVEN

Conclusions, Implications and Recommendations

Conclusions

In this research the effect of a group teaching intervention, on positioning and attaching the baby on the breast, in the last trimester of pregnancy was investigated. The supportive-educative nursing system of Orem (1985) was the theoretical framework used in this study of 70 primiparae, in which the experimental group (n = 35) received a group teaching session, in addition to their normal prenatal classes. This framework demonstrated that it is possible to affect change in a mother's self-care abilities through the support and education in a nursing system.

All four hypotheses tested in this study were supported. During the first four postpartum days the experimental group had significantly less nipple pain and trauma, and were significantly better at positioning and attaching the baby on the breast than the control group. In addition, more of the mothers in the experimental group were breastfeeding at six weeks postpartum than the control group. Randomisation was effective and no differences were detected in demographic and obstetric variables between the experimental and control groups prior to the teaching intervention.

It would appear the benefits of the education intervention in this research enabled 92% of mothers from a low socio-economic group to continue

breastfeeding to at least six weeks postpartum. Previous research studies of lower socio-economic mothers in Western Australia found 47% breastfeeding at six weeks postpartum (Hitchcock & Coy, 1988). As previously discussed, the success of breastfeeding has immense benefits for both the baby and the mother.

Mothers in the experimental group, who attended the extra teaching class on breastfeeding, reported that this knowledge gave them confidence when they began breastfeeding. In particular, mothers reported that using a doll in the class for the demonstration of position and attachment was effective in helping them remember how to position and attach their baby after the birth. These mothers already had the knowledge of position and attachment and so were less affected by conflicting advice or reduced staffing levels in the postpartum period.

In addition to the gain in breastfeeding knowledge, attending a group had many potential benefits for mothers in the experimental group. Mothers established support networks within the group, and commented that group discussion also provided some useful practical suggestions for breastfeeding. The group support also had the potential to make mothers feel less isolated in their concerns about lack of knowledge on breastfeeding.

The group session in the present study differed from other recent breastfeeding interventions in that it used the three strategies for learning; audio, visual and kinesics. This may be responsible for the positive findings in

this research, which have not been demonstrated in other research studies. In addition, with six mothers in each group, the lactation consultant had time to spend with each mother, helping her achieve good position and attachment using a doll for demonstration.

From an economic perspective, the teaching intervention in this study has the potential to reduce health authority costs. Breastfed babies are less susceptible to infection, and even maintain immunity after breastfeeding has ceased (Jackson, 1990). Moreover, this teaching intervention in the prenatal period could lead to less pressure on midwives in the postpartum period, where there are often staff shortages and time constraints. The teaching intervention was inexpensive, and required only one hour, per class, of the lactation consultant's time at a cost of \$60 per hour. Similarly, it required only one hours commitment from the mother in the third trimester of pregnancy. The teaching class was simple and easy to conduct, with the only equipment needed being six infant size dolls.

Implications and Recommendations

The results of this study have implications for health planners, midwives and community (child health) nurses. In 1987 The Nutrition Taskforce for the Better Health Commission recommended that by 1995, 80% of Australian babies be breastfed to three months (Nutrition Taskforce, Australian Government, 1987). If this recommendation is to be realised, it is essential that

education, such as that given in the teaching intervention in this study, be put into place by health authorities.

The results of this study have implications for midwives and child health nurses in the area of anticipatory guidance, specifically prenatal breastfeeding education. There is a trend today for prospective parents to enrol in classes to prepare them for their roles as new parents. This study provides empirical evidence that prenatal breastfeeding education on position and attachment, which includes a “hands on” format, is a form of anticipatory guidance that provides primiparae with the knowledge they require to successfully breastfeed.

The prospective mother’s motivation in the third trimester of pregnancy to learn about breastfeeding makes this the ideal time for the education. One of the principles of Orem’s (1985) theory is that “the time must be right for the person to learn”. Knowles’ (1990) adult learning theory supports this. He acknowledged that adults learn when they are motivated by a need for the education. Mothers in the third trimester of pregnancy are usually motivated by a need for information and education on breastfeeding to enable them to care for their baby.

The limited time available, in the now common short hospital stay, should be used for reinforcement of the education already given in the prenatal period and not as a time of initial learning. Ample opportunities exist for this teaching to take place. Breastfeeding education, specifically on position and attachment of the baby on the breast, could be offered by midwives, child health nurses or

lactation consultants during prenatal classes. This could easily be integrated as part of a hospital programme or private prenatal classes.

Recommendations for Research

The empirical evidence provided by this midwifery study has highlighted the need for prenatal education on correct position and attachment of the baby on the breast. Further research is required to validate the findings of this research and also to replicate the study with higher socio-economic groups. The research should also target the days in this study when nipple pain and trauma increased and poor attachment of the baby on the breast was achieved to observe for possible causes on these days. Additional research is also needed to establish whether an education class such as this would have a similar beneficial effect for multiparae. Successful breastfeeding has been shown to equate with successful mothering. Therefore, further research is needed on mother's feelings and coping strategies when breastfeeding ceases before reaching the mother's intended breastfeeding duration.

Summary of Recommendations

- Prenatal education for all mothers and their partners on the correct position and attachment of the baby on the breast.
- On-going education for midwives to ensure consistent and up to date information on position and attachment of the baby on the breast is given to all breastfeeding mothers.
- Longer term follow-up should be carried out on mothers in this study who were still breastfeeding at six weeks postpartum.
- Further research should be conducted to replicate this study with both a higher and lower socio-economic sample of mothers.
- Research on the impact of an effective lactation educator on breastfeeding outcomes for mothers and babies.
- Research targeting the postpartum days in this research when nipple pain and trauma increased and poor position and attachment of the baby on the breast was achieved.
- Research on how mothers cope who cease breastfeeding before reaching their intended breastfeeding duration.

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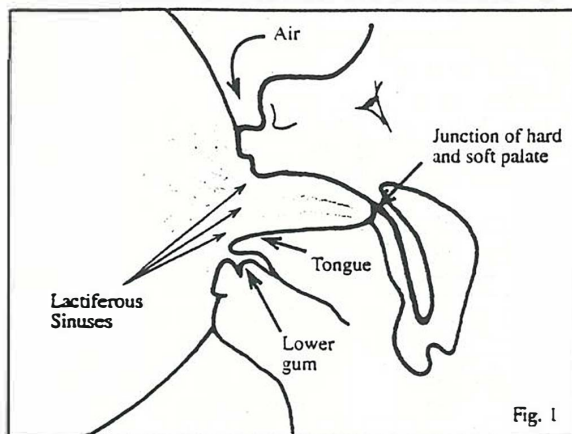
APPENDIX A

THE KEY TO SUCCESSFUL BREASTFEEDING

By Rebecca Glover
Midwife/Lactation Consultant



THE MECHANISMS OF SUCKLING



There are three important mechanisms involved when a baby suckles at the breast. (Ref. 1)

Understanding these mechanisms has enabled us to develop a simple technique for attaching baby in the best possible way. (Ref. 2)

SUCTION

We all know that babies love to suck. Now we know the function this performs.

If enough breast and nipple tissue is presented to a baby, the negative suction pressure in the mouth will form a teat, which is approximately three times as long as the nipple at rest, and extends to the junction of the hard and soft palate.

(Try running your tongue back along the roof of your mouth until you feel the soft part, and you will realise how far back this is.)

The suction also creates a vacuum which causes the "breast nipple teat" to completely fill the mouth. There are no gaps between the nipple and mouth and the lactiferous sinuses and ducts within the "breast nipple teat" expand and fill with milk from the breast.

(See Figure 1)

THE "LET DOWN" REFLEX

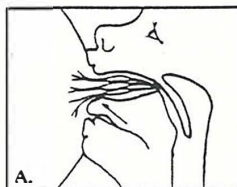
Under the influence of the "let down" reflex, milk flows into the expanded sinuses. Initially the "let down" causes active expulsion of milk into baby's mouth. This soon subsides but a positive pressure remains in the ducts and sinuses to ensure milk flows into the expanded teat to be ready for the third mechanism.

MILK EXPRESSED BY TONGUE

The tongue and lower jaw rise up trapping the milk in the full expanded teat. The tongue maintains its position over the lower jaw, and a wave of muscular compression begins at the tip of the tongue and rolls backwards pushing the breast against the hard palate. This squeezes the milk out into baby's throat to be swallowed. (See Figure 2)

Figure 2 shows a complete "suck" cycle.

A. The suck cycle is initiated by the welling up of the anterior of the tongue. At the same time, the lower jaw, which had been momentarily relaxed (not shown) is raised to constrict the base of the nipple, thereby pinching off milk within the ducts of the teat (these movements are inferred as they lie outside the sector viewed in ultrasound scans).



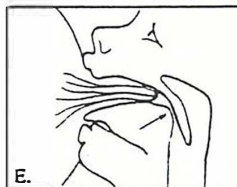
B. The wave of compression by the tongue, moves along the underside of the nipple in a posterior direction, pushing against the hard palate. This roller-like action squeezes milk from the teat. The posterior position of the tongue may be depressed as milk collects in the oropharynx.



C. & D. The wave of compression passes back past the tip of the nipple, in a posterior direction, pushing against the soft palate. As the tongue impinges on the soft palate the levator muscles of the palate contract raising it to seal off the nasal cavity. Milk is pushed into the oropharynx and is swallowed if sufficient has been collected.



E. The cycle of compression continues and ends at the posterior base of the tongue. Depression of the back portion of the tongue creates negative pressure drawing the nipple and its milk contents once more into the mouth. This is accompanied by a lowering of the jaw which allows milk to flow back into the nipple.



In ultrasound scans it appears that compression by the tongue, and negative pressure with the mouth, maintain the tongue in close conformation to the nipple and palate. Events are portrayed here rather more loosely to aid clarity.

© Churchill Livingstone.

ESSENTIAL FACTS

In these mechanisms there are **two fundamental facts** that **influence** almost everything we do to attach baby at the breast in the best possible way.

First, we need to present **enough breast and nipple tissue** into baby's mouth for baby to form an adequate teat, which will fill the mouth and extend to the junction of the hard and soft palate.

Secondly it is the **underside of the breast** which lies over the baby's tongue and lower jaw, that is of most importance when attaching baby at the breast.

HERE IS A LIST OF THINGS THAT WILL HELP YOU ATTACH BABY IN THE BEST POSSIBLE WAY

Ensure privacy - feed where you feel comfortable, especially at first, until you gain confidence.

Ensure comfort - use pillows, especially for lumbar support, a foot stool and/ or an air cushion, (for sore tail!).

WHETHER YOU FEED CRADLING YOUR BABY, TWIN-FASHION OR LYING DOWN SEVERAL BASIC PRINCIPLES APPLY

POSITIONING YOURSELF

Allow your breast to fall naturally. This causes the breast tissue to fall forward into the nipple and gives baby maximum access to the deep sinuses. Removing bra and excess clothing is helpful.

WHEN YOU ARE POSITIONED COMFORTABLY, THEN YOU ARE READY TO BRING BABY TO THE NATURAL POSITION OF YOUR BREAST

POSITIONING YOUR BABY

Support baby behind the shoulders and neck **allowing baby's head to tilt slightly backwards**.

Position baby **touching** and **facing** your body CHEST to BREAST with baby's arms wrapped around your body.

(If baby can get arms and hands in between your bodies you are not holding baby close enough.)

Remove any clothing which may come between you and baby.

Turn baby's face up towards the breast with the **chin pointing into the areola** and the mouth directly opposite the nipple. Remember to achieve this by **moving the baby's body, not your own.**

This important positioning ensures the tongue, lower jaw and chin make good contact with the breast and enables the breast to fall to the back of the mouth when attaching baby.

(Try to put a finger in your mouth with your head in normal position. The first thing you hit is your tongue. Now tilt your head back, your finger just falls to the back of your mouth.)

If you see an older baby at the breast you will notice they adopt this position chin forward and their nostrils clear. Newborns do not have this control so we need to do it for them.

POSITIONING YOUR BREAST

Hold your breast well back from the nipple and present the whole breast to baby. **Not just the nipple.** (Fingers too close to the nipple prevent baby from grasping an adequate amount of breast.)

The "**C-hold**", with flat fingers underneath and thumb on the top of the breast can be recommended. Use the thumb to **tilt your nipple upwards presenting the underside of the breast to baby.** Check your fingers are well away from your nipple and areola.

Experiment. to find a hold which suits you.

Avoid. holding your breast tightly after baby is attached as this may compress ducts within the breast and interfere with the flow of milk.

You may find it helpful to support the underside of your breast with flat fingers, however in most cases you should not need to hold your breast once baby is attached.



ATTACHMENT TECHNIQUE

- With baby's **chin pointing at the breast** and your **nipple pointing at baby's nose**, initiate the rooting reflex by brushing the underside of the breast and nipple **down** across baby's lips.

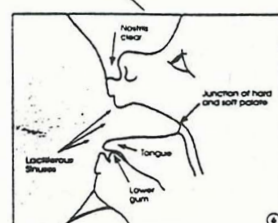
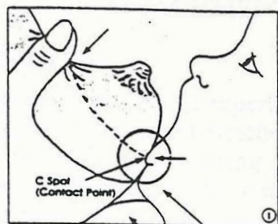
- When baby's mouth is **wide open** with the tongue down, **BRING BABY QUICKLY FORWARD ONTO THE UNDERSIDE OF YOUR BREAST.**

- Baby's lower lip should make first contact with the breast (approx. 2.5 cm from the tip of your nipple).

- **THIS FIRST POINT OF CONTACT NEEDS TO BE MAINTAINED THROUGHOUT THE ATTACHMENT.**

- As baby is brought forward the breast is then swept or folded down over the tongue.

- This places the breast along the infants tongue, right to the back of the mouth. Baby will bring the top jaw down and begin suckling.



INDICATIONS OF GOOD ATTACHMENT

NO PAIN

You may feel some tenderness, but if you experience pinching, burning or stinging, baby is not attached in the best possible way and will be damaging your nipples. Ease your finger into the side of baby's mouth and gums letting air in to break the suction. Take baby off the breast and try again.

OBSERVE BABY'S FEEDING RHYTHM

When attached in the best possible way, baby will be relaxed and comfortable and will maintain a rhythmic suckling pattern. This consists of:

Several rapid shallow sucks, which establish and maintain the "breast nipple teat" in the correct place in the baby's mouth.

Several longer, slower, suck-and-swallows, when the baby is stripping the "teat" with the muscular waves of the tongue.

And a pause. The pause is an important part of the normal feeding pattern. If baby is attached beautifully he/ she will begin the suckling cycle again **without prompting**.

OBSERVE BREAST MOVEMENT

As milk is "stripped" from the breast the **whole breast** moves slightly. You should be able to observe slight movement at the base of your breast, close to the chest wall. If you are holding your breast you can feel the whole breast moving under your fingers.

OBSERVE BABY'S MOUTH

Baby's mouth should be **wide open, lips curled back**. There should be no hollows in the cheeks and no clicking noises in the mouth. However, we do have to distinguish between clicking and noisy swallowing.

During the suck-and-swallow phase baby's **whole jaw** moves which in turn causes movement of baby's ear.

If your breast can be seen moving in and out of the baby's mouth, or just slips out, baby has not been attached in the best possible way. However, if you would have to break the suction to remove the nipple, and you can observe all the above indications, then you can be pretty sure that you and baby have achieved a good attachment.

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**IF YOU HAVE DIFFICULTY ATTACHING
BABY IT MAY BE BECAUSE OF:**

Lack of confidence, or practice, or knowledge. Remember breastfeeding is a learned skill, and practice makes progress.

Secondly, the **size** and **shape** of your breast and nipples in relation to the size and shape of baby's mouth tongue and palate can also effect the degree of difficulty you may experience, e.g. large nipples and/or baby with a small mouth.

Finally, if baby is sleepy or easily frustrated, attachment can be more difficult.

When attachment difficulties arise, they can often be overcome by practising an exaggerated attachment technique.

However, if you are experiencing difficulties **seek help** from your Midwife, Child Health Nurse Nursing Mother's Counsellor or a Lactation Consultant.

Rebecca Glover R.M. I.B.C.L.C.

[REDACTED]

[REDACTED]

Illustrations: Figure 1. Redrawn by Rebecca Glover.
Figure 2. By kind permission Churchill Livingstone.
Attachment Technique Series by Rebecca Glover.

References: (1) Woolridge M. W. 1986 "The Anatomy of Infant Suckling". Midwifery, 2. 164-171
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Cover Illustration: Carol Craen Graphic Design [REDACTED]

Verbal permission has been given by Rebecca Glover to reproduce "The Key to Successful Breastfeeding" for this thesis.

APPENDIX B

Code No:

LATCH Breastfeeding Charting System ©

(Jensen, Wallace & Kelsay, 1994)

© Nursing Service Division SACRED HEART GENERAL HOSPITAL

	0	1	2			
"L"	Too sleepy or reluctant No latch achieved	Repeated attempts Hold nipple in mouth Stimulate to suck	Grasps breast Tongue Down Lips flanged Rhythmic sucking			
"A" Audible Swallowing	None	A few with stimulation	Spontaneous and intermittent <24 hrs old Spontaneous and frequent >24 hrs old			
"T" Type of Nipple	Inverted	Flat	Everted (after stimulation)			
"C" Comfort Breast/Nipple	Engorged Cracked, bleeding, large blisters or bruises Severe discomfort	Filling Reddened/small blisters or bruises Mild/moderate discomfort	Soft Non-tender			
"H" Hold (Positioning)	Full assistance (staff holds infant to breast)	Minimal assistance (ie elevate head of bed; place pillows for support. Teach one side; mother does other Staff holds and then mother takes over	No assistance from staff Mother able to position/hold infant			
	L	A	T	C	H	TOTAL
Day 1						
Day 2						
Day 3						
Day 4						

The scores for each area of assessment are added together to achieve a total for each breastfeeding session.

Breastfeeding not observed is recorded by asking the mother the following questions:

“L” (Latch-on)

How easily did your infant grasp your breast?
Did it take several attempts?

“A” (Audible Swallowing)

Did you hear your infant swallow? How frequently did you hear it?

“T” (Type of Nipple)

Do your nipples stand out or do they flatten easily?

“C” (Comfort)

Are your nipples tender? Are your breasts becoming full and heavy?

“H” (Help/holding)

Did someone help you put the infant to breast? Would you like help with the next feeding?

APPENDIX C



SACRED HEART
GENERAL HOSPITAL

1255 MILYARD STREET
POST OFFICE BOX 10905
EUGENE, OREGON 97441

Elizabeth

Thank you for your interest in the LATCH Charting System. I was pleased to receive your letter. I apologize for the delay in responding to you. Following are several ways to contact me if you need any further information:

Work phone: 503-686-6320

Work fax: 503-686-8393

You are welcome to use the LATCH System in your clinical setting and/or research study. We ask that the LATCH grid and also the assessment criteria identified for each area of the tool not be changed; please note whenever the grid and criteria are reproduced, that they are copyrighted by Sacred Heart Health System; and that authorship of the LATCH assessment tool be cited in any published materials. Beyond that, we welcome you to use the system.

We have used LATCH in our clinical setting and have found it to be valuable and effective. The key to LATCH's effectiveness as a charting system is assessment skills. The origins of the criteria used in each assessment area of the tool were identified in the JOGNN article. Those references provide an excellent resource for developing staff assessment skills.

A short questionnaire is attached. Please, share your experience and progress with the LATCH Charting System by returning the completed questionnaire to us.

Please let us know if we can help you further.

Sincerely,

Sheila Wallace, R.N., IBCLC
Breastfeeding Specialist
Sacred Heart General Medical Center
P.O. Box 10905
Eugene, OR 97440

APPENDIX D

Visual Analogue Scale (VAS) (Clarke and Spear, 1964)

Code No:

Directions:

1. Please complete this scale once daily for four days.
It measures pain of increasing intensity.
2. Place a mark through the line at the point that describes your
Nipple Pain during a breastfeed each day.

Day 1 Time: _____
No Pain _____ Pain as bad as it
could possibly be

Day 2 Time: _____
No Pain _____ Pain as bad as it
could possibly be

Day 3 Time: _____
No Pain _____ Pain as bad as it
could possibly be

Day 4 Time: _____
No Pain _____ Pain as bad as it
could possibly be

Thank you for taking the time to complete this sheet.

NIPPLE TRAUMA SEVERITY INDEX (NTSI)

Code No:

Date				
Post Partum Day				

Nipple Status	R	L	R	L	R	L	R		TOTAL
Intact = 3 Grazed = 2 Blistered = 1 Cracked = 0									
Score									
3 = Nil Erythema									
2 = Mild Bruised									
1 = Moderate Oedema									
0 = Severe									
TOTAL									

Discharge from Nipple								
None (Milk only) = 2 Blood = 1 Purulent = 0								
Score								

Mother's Assessment								
Healthy/Healed = 3 Improved = 2 Unchanged = 1 Deteriorating = 0								
Score								

APPENDIX F

Questionnaire

Section A. Within 24 hours after birth

(completed by researcher)

Code No:

- | | | | | | | | | | | | | |
|--------------------------|---|--------|---|-------------------|---|---------|---|------|---|--------|---|-----|
| 1. Baby's age (in hours) | <input type="text"/> | (1) | | | | | | | | | | |
| 2. Baby's sex | Male 1 Female 2 | (2) | | | | | | | | | | |
| 3. Delivery | <table border="0" style="width: 100%;"> <tr> <td style="width: 70%;">Normal</td> <td style="width: 30%; text-align: right;">1</td> </tr> <tr> <td>Vacuum extraction</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Forceps</td> <td style="text-align: right;">3</td> </tr> <tr> <td>LUCS</td> <td style="text-align: right;">4</td> </tr> <tr> <td>Breech</td> <td style="text-align: right;">5</td> </tr> </table> | Normal | 1 | Vacuum extraction | 2 | Forceps | 3 | LUCS | 4 | Breech | 5 | (3) |
| Normal | 1 | | | | | | | | | | | |
| Vacuum extraction | 2 | | | | | | | | | | | |
| Forceps | 3 | | | | | | | | | | | |
| LUCS | 4 | | | | | | | | | | | |
| Breech | 5 | | | | | | | | | | | |

Infant's First Breastfeed

4. How soon after the birth did you breastfeed your baby?

hrs mins (4)

5. How long was the feed?

hrs mins (5)

- | | | | |
|--------------------------------|------------------|---|-----|
| 6. Was the midwife present for | All of the feed | 1 | |
| | Part of the feed | 2 | |
| | None of the feed | 3 | (6) |

Questionnaire

Section B: Day 4 Post partum

(Completed by researcher)

Code No.

Demographic Data

1. Mother's age (in years) (1)
2. Where were you born? (country) _____ (2)
3. In which country were you educated? _____ (3)
4. Education (please circle highest achievement)

Less than Achievement Certificate	1	
Achievement Certificate	2	
TEE/Leaving	3	
Trade/Apprentice	4	
Certificate	5	
Diploma	6	
Undergraduate Degree	7	
Higher Degree	8	(4)
5. Supportive partner Yes 1 No 2 (5)
6. Other persons supportive to mother Yes 1 No 2 (6)
7. If yes, state relationship _____ (7)
8. Mother's occupation (before giving up work)? _____ (8)
9. Family annual income (see over) Group (9)

Breastfeeding Progress

10. Are you

fully breastfeeding	1	
breastfeeding plus bottle feeding with EBM (Expressed breast milk)	2	
breastfeeding plus artificial feeding	3	
artificial feeding	4	(10)
11. If artificial feeding, when did you start? _____ (11)
12. Why? _____ (12)

Questionnaire

Section B

Breastfeeding Education

13. Attended prenatal classes
- | | | |
|-------------|---|------|
| Full Course | 1 | |
| Part Course | 2 | |
| None | 3 | (13) |
14. Number of breastfeeding education sessions? (14)
15. Length of each? hrs mins (15)
16. Did you know about position and attachment of your baby on the breast before having this baby?
- | | | |
|-------------|---|------|
| Nothing | 1 | |
| A little | 2 | |
| Quite a lot | 3 | |
| A lot | 4 | (16) |
17. If you knew something about position and attachment of your baby on the breast, where did the knowledge come from?
(There may be more than one answer)
- | | | |
|---|---|------|
| Prenatal classes | 1 | |
| Lactation consultant | 2 | |
| Video | 3 | |
| Reading books, newspapers, magazine, pamphlet | 4 | |
| Friend or relative | 5 | (17) |
18. Have you seen any other materials about breastfeeding since you have been in hospital? Yes 1 No 2 (18)
19. If yes state _____ (19)
20. Did you attend the teaching session by the lactation consultant on attachment and position of your baby for breastfeeding as part of this study? Yes 1 No 2 (20)

MOTHERS TO COMPLETE

Which group would you say best represents your family annual income? (Please circle)

1. Less than \$12,000 per year
or less than \$230 per week.
2. \$12,001 to \$20,000 per year
or \$230 to \$385 per week.
3. \$20,001 to \$30,000 per year
or \$385 to \$578 per week.
4. \$30,001 to \$40,000 per year
or \$578 to \$769 per week.
5. \$40,0001 or more per year
or \$769 or more per week.

Thank you for your co-operation in completing this sheet.

Questionnaire

Section C

FOLLOW-UP TELEPHONE CALL AT SIX WEEKS POST PARTUM

1. Are you

fully breastfeeding your baby	1	
breastfeeding plus bottle feeding with EBM	2	
breastfeeding plus artificial feeding	3	
artificial feeding	4	(1)

2. If artificial feeding, when did you start? _____ (2)

3. Why?

Nipple Pain	1	
Nipple Trauma	2	
Both	3	
Other	4	(3)

4. If breastfeeding, do you now experience:

nipple pain	Yes 1 No 2	
nipple trauma	Yes 1 No 2	(4)

5. If yes, what do you do about it? _____ (5)

6. Have you developed any of the following since I saw you in hospital?

breast tenderness	1	
redness of any part of the breast	2	
a high temperature	3	(6)

7. Have you been prescribed antibiotics for breast redness or tenderness?

Yes 1 No 2	(7)
------------	-----

8. Has your doctor diagnosed mastitis?

Yes 1 No 2	(8)
------------	-----

APPENDIX G

Information Letter

Research Project: The effect of a prenatal teaching intervention on postnatal nipple pain and trauma

Dear

My name is Elizabeth Duffy. I am a registered nurse/midwife and I am doing research on breastfeeding. I am interested in finding the best possible way to prepare new mothers for breastfeeding. This research will also contribute to a Master of nursing degree that I am doing at Edith Cowan University.

Mothers receive information on breastfeeding from many different people, and at many different times during their pregnancy and after the birth. I am interested in a new way of preparing mothers for breastfeeding. To see how effective it is, I need to look at two different kinds of preparation for breastfeeding. I would really appreciate your help in this research and if you are willing to help this is what will happen:

1. You will be allocated to one of these two ways of preparing mothers for breastfeeding, neither of which will involve any discomfort or harm to you or your baby.
2. I will complete a questionnaire with you after the birth of your baby. This includes some background information and details about breastfeeding your baby.
3. For the next 4 days, I would like you to keep a daily record of your nipple pain while breastfeeding your baby on the score sheet provided.
4. During these 4 days I will visit you daily to observe your nipples and record any skin changes.
5. At the end of these 4 days I will complete a second short questionnaire with you.
6. I will telephone you at home when your baby is six weeks old to ask you further short questions about breastfeeding your baby.

Your name will not be on any of the questionnaires or score sheets. The information you give me will be given a code number and will be treated in the strictest confidence. To ensure that anything you say is confidential, the card with your name and telephone number on it will be kept separate from the questionnaires and score sheets and in a locked file. Only I and my University supervisors will have access to this information. Your name and telephone number will be destroyed when the research data has been gathered. In the research report that is subsequently published, no one taking part in the study will be referred to by name.

Participation in this study is entirely voluntary, and the care given to you and your baby will not be affected in any way whether or not you choose to participate in the study. You may refuse to answer any of the questions on the questionnaires and you are free to withdraw from the study at any time.

Should you have any queries at all, please feel free to contact me, or my supervisors at Edith Cowan University, Dr Patricia Percival on telephone number (09) 273 8591, Ms Esme Kershaw on telephone number (09) 273 8608, or Mrs Davina Poroch on telephone number (09) 273 8623

Yours sincerely

ELIZABETH DUFFY
Research student

[Redacted Signature]

APPENDIX H

CONSENT FORM

The effect of a prenatal teaching intervention on postnatal nipple pain and trauma

I,

Surname

Given Name

of

Address

I have read the information given to me on the above research project. I have been informed of all aspects of the research and any questions I have asked have been answered to my satisfaction. I agree to participate in this study, realising that I may withdraw from the study at any time.

I agree that the research data gathered for this study may be published, provided I am not identifiable.

Signature: _____ Date: _____
(Participant)

Signature: _____ Date: _____
(Researcher)

APPENDIX I

INFORMATION SHEET MATERNITY DEPARTMENT

The effect of a prenatal teaching intervention on postpartum nipple pain and trauma.

I have been granted permission to research the above topic. I will be interviewing mothers on the ward within twenty four hours post partum who have consented to take part in the research. There will be a sample of approximately 60 first time breastfeeding mothers. I will complete a questionnaire with the mother at this initial visit. Some of the mothers will have had the prenatal teaching session and some will not. I will be unaware of the groups the mothers are in to enable me to be observer blind in the study.

All mothers will be asked to keep a daily record of any nipple pain on a score sheet. I will visit the mothers daily to assess their nipples and complete a breastfeeding sheet. At the end of four days I will complete another short questionnaire with the mothers.

I trust that you will not find my presence on the ward too intrusive on your busy workload.

If you have any queries about the study please contact me, telephone [REDACTED] [REDACTED] and I will be happy to help you if I can.

Elizabeth Duffy
Researcher