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Effectiveness of Breastfeeding Techniques to Improve Latching and Prevention of Nipple Soreness among Primipara Mothers. A Randomized Control Trial

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ABSTRACT

BACKGROUND

Breastfeeding is crucial for reducing child mortality but challenges like nipple soreness and improper latching techniques can lead to early cessation. Breastfeeding status assessment rely on subjective, Not assessd objectively.

METHODOLOGY

A study of 100 postpartum primipara mothers used an experimental design with non-probability convenient sampling. Participants were divided into two groups:SVD and Pfannenstiel incision, each split into intervention and control subgroups by randomization. The intervention group received breastfeeding supportive techniques, while the control group received routine care.

Data was gathered by socio-demographic form, the LATCH scoring system, and a nipple soreness scale by using SPSS version 3023. Data Analysis was conducted by using descriptive statistics, t-tests and ANOVA to evaluate the effectiveness of techniques.

RESULTS

The study results revealed significant reductions in nipple soreness among intervention group mothers as Latch observations of intervention group was (8.84 ± 1.22). Nipple soreness score of intervention group was (0.44 ± 0.85) & control (2.12 ± 1.20) accordingly.

CONCLUSION

Proper positioning and latch are crucial for minimizing nipple soreness and newborns can efficiently draw milk from the breast. Therefore, it is crucial for nurses to objectively assess breastfeeding by implementing a LATCH charting system.

Keywords: *LATCH, Nipplesoreness, Primipara mothers, Breastfeeding. Prevention*

1. INTRODUCTION

In accordance to the World Health Organization exclusive breastfeeding possesses the potential for saving almost 820,000 lives of children per year. According to Kadam et al., achieving a 90% exclusive breastfeeding rate around the world could result in an 11.6% drop in child mortality. [1] The Global Breastfeeding campaign improves breastfeeding rates by 32.0% and minimizes late mortality by 13.0%. It also reduces infection related newborn death rates by 13.1%. [2]

Despite numerous efforts, policies, and programs emphasized on significance of mother feeding, the percentage of infants under the age of six months who are exclusively breastfed globally is only around 44% far below the standard requirement of 90% coverage. [3] Breastfeeding faces numerous challenges worldwide, including maternal and child physiology, social and cultural factors, education, economics, maternal age, delivery methods, nipple characteristics, breastfeeding positions, environment, employment, and family dynamics. Inadequate professional support and prenatal/postnatal care also contribute [4].

In Pakistan, breastfeeding rates are among the lowest in Asia, with only 37.7% of mothers practicing exclusive breastfeeding. Barriers include delayed lactation initiation, insufficient breastfeeding knowledge, societal challenges, and environmental factors. [5] Furthermore, breastfeeding challenges such as nipplesoreness, attributed to incorrect latch techniques, are generally recognized and frequently reported around the world. Nipple soreness and discomfort pose significant challenges for primipara mothers during breastfeeding and leading to the early termination of breastfeeding Identifying effective strategy for alleviating nipple soreness and pain is crucial for enhancing maternal and infant health on a global scale. [6]

Similarly, poor positioning and latching technique are most prevalent cause of nipple pain in early postpartum period accounting for 72.3% of cases. Fortunately, these underlying causes are preventable. Understanding and addressing these challenges are essential for supporting breastfeeding mothers and increasing breastfeeding success rates. [7] In another study, approximately one-third (32%) of postpartum women experience sore nipples survey conducted conducted in Pakistan, Tanzania, and Ghana. [8] For instance, nipple soreness is a typical issue that needs to be addressed. Other complications that may arise during breastfeeding include improper positioning or latching techniques, flat or inverted nipples, maternal discomfort and lack of social support from the family [9]. Problem of Nipple injuries can result from the friction effect infant sucking. Dysfunctional sucking, inadequate breastfeeding technique, and lack of previous breastfeeding history are common causes of nipple pain during breastfeeding. [10]

Breastfeeding difficulties such as improper infant latch onto the breast is the most prevalent difficulty in breastfeeding process lead to nipple pain or soreness, contributed as 65.7%, [11]. In addition, a study conducted in Nigeria selected 396 mother- child pairs this study explored many mothers were unaware of proper latching skills and positioning for successful breastfeeding. Moreover, proper positioning, attachment, and sucking are key components of effective breastfeeding technique. [12]

Various strategies and procedures are used to increase breastfeeding rates, with an emphasis on treating nipple pain rather than preventing it. One such tool is the LATCH system, which offers a systematic assessment of breastfeeding dyad, including both mother and child, with a preventive approach**.** [13]

However, according to massive amount of literature as evidence, Health care personnel can provide valuable guidance and assistance in mastering these techniques, there by promoting a positive breastfeeding experience for primipara mothers and their infants. The literature also supports, employing latch scoring systematic as evaluative tool for diagnoses and corrects the breastfeeding problems on a preventive basis. Importance of this study are also expected to serve as a reference for nurses to pay more attention to breastfeeding mothers, assess their breastfeeding status, identify their problems and rectify these issues using latch breastfeeding assessment and scoring system as providing innovative techniques for breastfeeding.Furthermore, evidence suggests that Latch charting system may be incorporated into health care system to monitor the individual breastfeeding process objectively including mother and infant dyad.

2. METHODOLOGY

A Randomized Control Trial study was conducted over six months. Ethical approval was granted by the Ethics Review Board (ERB) of University of Health Sciences, Lahore, Pakistan (No:UHS/DPS/2023/525).The trial was registered on ClinicalTrials.gov with the ID number 06108154. Data collection took place from April 9, 2024, to July 15, 2024. The current study was conducted in the Institute of Nursing, University of Health Sciences Lahore, in collaboration with District Head Quarter (DHQ) Hospital Sheikhupura Punjab Pakistan. The objective of study was to determine the impact of breastfeeding supportive techniques on primipara mothers early postpartum in prevention of breastfeeding induced nipple soreness. It was hypothesized that (H1): There is significant difference in nipple soreness incidence and LATCH score, between control group and interventional group. (H0): There is no significant difference in nipple soreness incidence and LATCH score, between Control group and interventional group.

Sample size100 primipara motherswere recruited, 50 participants from the SVD group and the other 50 from the Pfannenstiel incision group by non probability sampling technique.In the Groups were divided into corresponding subgroups of interventional and control groups using a simple random sampling design lottery method. Sample size calculated by using WHO sample size formula based on the following parameters, level of confidenence 95%, a 0.05, power of study 80%. Inclusion Criteria*;*The researcher included the mothers who had a first live birth underwent a full-term normal vaginal delivery with an episiotomy or by Pfannenstiel within first 48 hours of postpartum, along with healthy infant outcomes, able to initiate breastfeeding within 24 to 48 hours after the baby's birth, able to communicate and have no speaking or hearing difficulties. The researcher excluded the mothers who were with serious illness admitted in ICU or critical care units, had Premature or anomaly infant, chosen formula feed and had any contraindication for breastfeeding.

2.1 Data Collection Tools

The instrument used for the study comprised of two parts: Part I included the socio-demographic characteristics of the study participants, and Part II included two scales, the LATCH tool, this tool was developed by Jensen et al., [14]. The LATCH score assessment is a tool used by nurses to evaluate individual breastfeeding sessions. It consists of assigning a numerical **score of 0, 1, or 2** to five key components of breastfeeding: **L** for the infant's ability to latch onto the breast, **A** for the presence of audible swallowing, **T** for the mother's nipple type, **C** for the mother's comfort, and **H** for holding. Coefficient reliability calculated by National Institute of Health was observed 0.95 which showed the tool is reliable to use.

Scoring Criteria of LATCH,the total score ranges from 0 to 10, with higher scores indicating a greater likelihood of successful breastfeeding. The scoring of LATCH during the early postpartum period: **0-3 is considered poor, 4-7 is moderate/fair, 8-10 is good/well**.

The mothers were observed for the LATCH score for **5-10 minutes** during each breastfeeding session, and the nipple soreness rating scale (NSRS), this tool was developed by Storr [15]. It is used to determine the pain severity and fissure/cracks on nipples during breastfeeding. **Scoring Criteria of NSRS:** 0 = No pain or tenderness, normal in color,1 = Nipple is slightly red or tender for the first 5-10 seconds of feeding, 2 = Tender between feedings, 3 = Nipple beginning to crack, involuntary grasp of pain when the baby starts feeding, 4 = Severe pain, nipple is cracked. In the current study the Cronbach's alpha of both scales was 0.91. The tool has been utilized in several countries.

2.2 Teaching / Educational Material

The breastfeeding training session was designed to provide educational support and hands-on training for breastfeeding techniques using written, visual, and practical methods.

The written educational content according to UNICEF guidelines on breastfeeding in Urdu. Secondly, the visual approach included images of different breastfeeding positions and proper latch techniques, as well as video demonstrating proper and improper latch techniques that can cause nipple soreness.(https://youtu.be/jyOt9aB6sOo?feature=shared), Finally, the practical approach involved hands-on training sessions for the above-mentioned breastfeeding skills. The researcher assessed breastfeeding status objectively and corrected improper breastfeeding techniques during the intervention.

Practice of Proper breastfeeding techniques. the mother was in a comfortable position. The newborn was brought to the breast with the baby's face and toe facing the mother. It was ensured that the baby's head, neck, and back were straight and well-supported. The baby was positioned and held firmly. The baby's mouth was wide open. The nipple was touched to the corner of the baby's mouth to elicit a rooting reflex. The baby's mouth attached to the breast adequately by taking a good amount of breast, including the nipple and much of the areola, into the baby's mouth.

2.3 Interventional Group

After the baby's birth, breastfeeding support and hands-on training session was started within 24 to 48 hours for the intervention groups, which included both the mother and infant. Privacy was ensured during the intervention and observation. At STEP 1:The educational session began by emphasizing the benefits of breastfeeding for mothers. Correct breastfeeding techniques were demonstrated to mothers using written instructions, images, and videos. STEP 2:After the educational session, a hands-on practice session was conducted to train the mother how to position and attach the infant to the breast using correct breastfeeding latch techniques. Mothers were able to understand the suckling and swallowing mechanism of milk by infants, either on their own or with the help of a video. They were trained and practiced how to hold the baby in different breastfeeding positions. STEP 3: Diagnosis and Correction:Make sure to wait for a appropriate time to feed the baby. During breastfeeding, the researcher assessed the mother and baby for 5-10 minutes to check the baby's position, how well baby was attached to the breast, and how effectively suckling on both breasts according to latch tool. If improper breastfeeding techniques were identified, the investigator used the Latch breastfeeding diagnostic tool to take corrective measures. After breastfeeding, any nipple soreness was also assessed using a nipple soreness rating scale.STEP 4: Assessment.The initially breastfeeding status was assessed within 24 to 48 hours after the baby's birth, following a training session according to LATCH scoring system as well, fair, or poor status and also considered nipple soreness.

The control group received routine hospital care. The researchers assessed and recorded their LATCH scores and nipple soreness scores within 24 to 48 hours after the birth of their baby.

LATCH & Nipple soreness score was reassessed at subsequent two follow-ups of both groups. 1st follow up was after 1 week of hospital discharge and 2nd follow up was after two weeks of hospital discharge or two weeks after initially assessment.

3. STATISTICAL ANALYSIS

Descriptive statistics was used to compute and represent the frequencies; percentage of socio demographical characteristics of study population and Mean $\pm$ SD was calculated for numerical value. Independent sample t test was used to compare nipple score between study and control groups as the collected data was normally distributed. Furthermore, ANOVA test was used to compare the numerical data of nipple score and Latch score for four study groups. A p-value of <0.05 was

considered statistically significant.

4. RESULTS

Table 1 shows the sociodemographic profiles of the study participants.

Demographic charectristics	Frequencies	Percentages%
Age groups		
21-25	43	43%
26-30	39	39%
31-35	18	18%
Educational level		26
Illiterate	26	39%
Secondary	39	17%
Higher Secondary	17	11%
Graduate and above	11	7%
Professional degree	7	
Occupational status	47	47%
House Wife	53	53%
Employed		
Types of family	75	75%
Joint	25	25%
Nuclear		50%
Mode of Baby birth	50	50%
SVD with Episiotomy		
Pfannenstiel incision (LSCS)		
N	**100**	**100%**

With regard to age groups, approximately 43% of the study participants were in the 21-25 age groups, 39% were in the 26-30 age groups, and 18% were in the 31-35 age group. **In terms of educational level**, 26% were illiterate, 39% had completed secondary education, 17% possessed higher secondary education, 11% were graduates or above, and 7% hold professional degrees. **As for occupation of participating mothers**, 47% were involved in house-hold chores and 53% were employed. **With regard to family type**, 75% were living in joint family system while 25% were belonging to nuclear families. **For mode of delivery**, half of the mothers delivered babies via normal vaginal delivery with episiotomy, and the other half were delivered babies through lower segmental cesarean section (LSCS) or Pfannenstiel incision.

Impact of breastfeeding supportive techniques on the prevention of nipple soreness. Table1. Comparison of Mean & Standard deviation (Group 1 Intervention and Control scores):

Score	Observation 1	Observstion 2	Observation 3
LATCH Score:	**Mean+std.deviation**		
Intervention	(5.28 ± 1.56)	(7.76 ± 1.39)	(9.16 ± 0.92)
Control	(4.28 ± 1.40)	(5.44 ± 1.15)	(6.28 ± 0.93).

Nipple Soreness Score:	(1.72 ± 0.68)	(0.67 ± 0.74)	(0.20 ± 0.408)
	(1.04 ± 0.45)	(1.72 ± 0.54)	(2.12 ± 0.92)
Intervention			
Control			
Total observations=3			

presents the observations for latch and nipple soreness scores for intervention and control groups. In all three observations of Latch score and nipple soreness, a significant mean difference between intervention and control group is observed as latch score in intervention group increased and nipple soreness decreased. The trend can be observed in each observation. Latch observations 1, intervention (5.28 ± 1.56) & control (4.28 ± 1.40), Latch observations 2, intervention (7.76 ± 1.39) & control (5.44 ± 1.15), Latch observations 3, intervention (9.16 ± 0.92) & control (6.28 ± 0.93). Nipple soreness observations 1, intervention (1.72 ± 0.68) & control (1.04 ± 0.45), observation 2, intervention (0.67 ± 0.74) & control (1.72 ± 0.54) and observation 3, intervention (0.20 ± 0.408) & control (2.12 ± 0.92) accordingly.

Table 2: Independent Sample T test-Group 1(SVD group)

Score	**Observation 1**	**Observstion 2**	**Observation 3**
LATCH Score:			
T	2.35	6.32	10.8
Sig	.023	.000	.000
Nipple Soreness Score:			
	.74	-5.56	-9.37
T	.460	.000	.000
Sig			
Total observations=3			

Table 2: indicates a significant impact of breastfeeding supportive techniques on preventing nipple soreness. Latch score and nipple soreness score s' trends can be observed in each observation as latch score increased nipple soreness decreased Observation 1, 2 and 3 show a significant impact of Latch on nipple soreness with significant P value.023 for observation 1 and .000 for observation 2 and 3.

Table 4. Comparison of Mean & Standard deviation (Group2 Intervention and Control scores):

Score	**Observation 1**	**Observstion 2**	**Observation 3**
LATCH Score:	**Mean±std.deviation**		
Intervention	(6.32±1.09)	(7.60 ± 1.06)	(8.84 ± 1.22)
Control	(4.76 ± 1.39)	(6.04 ± 1.56)	(6.96 ± 1.51)
Nipple Soreness Score:	(0.32 ± 0.47)	(0.36 ± 0.56)	(0.44 ± 0.85)
	(0.84 ± 0.55)	(1.64 ± 0.86)	(2.12 ± 1.20)
InterventionControl			
Total observations=3			

Table 4.Presents the observations for latch and nipple soreness scores for both the intervention and control groups. In all three observations, a significant mean difference between the intervention and control groups was observed, as the latch score in the intervention group increased and nipple soreness decreased. This trend is consistent across all observations. The trend can be observed in each observation. Latch observations 1, intervention (6.32±1.09) & control (4.76 ± 1.39), Latch observations 2, intervention (7.60 ± 1.06) & control (6.04 ± 1.56), Latch observations 3, intervention (8.84 ± 1.22) & control (6.96 ± 1.51). Nipple soreness observations 1, intervention (0.32 ± 0.47) & control (0.84 ± 0.55), observation 2, intervention (0.36 ± 0.56) & control (1.64 ± 0.86) and observation 3, intervention (0.44 ± 0.85) & control (2.12 ± 1.20) accordingly.

Table 5: Independent Sample T test-Group 2:

Score	**Observation 1**	**Observstion 2**	**Observation 3**
LATCH Score:			
T	4.383	4.098	4.793
Sig	.000	.000	.000
Nipple Soreness Score:			
	-3.560	-6.206	-5.663
T Sig	.001	.000	.000
Total observations=3			

Table 5: indicates a significant impact of breastfeeding supportive techniques on preventing nipple soreness. Latch score and nipple soreness score s' trends can be observed on each follow-ups observation as latch score increased nipple soreness decreased. Observation 1,2 and 3 show a significant impact of Latch on nipple soreness with significant P value.023 for observation 1 and .000 for observation 2 and 3.

Table 6: Comparison of the scores of nipple soreness and latch for both groups (Intervention & Control) in all three observations:

ANOVA was conducted to compare the differences in LATCH scores and nipple soreness scores among the three observations between groups.

Score	**Observation 1**	**Observstion 2**	**Observation 3**
LATCH Score:	**Between groups**	Between groups	Between groups
F	20.02	53.45	97.88
Sig	.000	.000	.000
Nipple Soreness Score:			
	2.63	69.70	98.92
	.000	.000	.000
F Sig			
Total observations=3			

5. DISCUSSION

The current study demonstrates the significant impact of breastfeeding supportive techniques in preventing nipple soreness. After implementing the intervention, the participants in the intervention group showed a marked improvement in their latch score, which increased to a normal value of 9.16 ± 0.92, compared to the control group, which had a lower latch score of 6.28 ± 0.93 at the final follow-up. This difference indicates that the intervention group adopted more appropriate breastfeeding techniques, which likely contributed to better overall breastfeeding performance.

In addition to improved latch, the intervention group also reported less nipple soreness, with a nipple soreness score of 0.44 ± 0.85, significantly lower than the control group's nipple soreness score of 2.12 ± 1.20. This reduction in pain further supports the effectiveness of the breastfeeding supportive techniques in enhancing maternal comfort during breastfeeding.

Our findings align closely with the results of a quasi-experimental study by (Crasta et al., 2022), which also found that their intervention group experienced a substantial reduction in nipple soreness. In their study, the intervention group's nipple soreness score dropped to 0.200 ± 0.407, while the control group's score remained higher at 2.200 ± 0.61. This consistency between the two studies underscores the positive role that breastfeeding supportive interventions can play in improving both latch and maternal comfort, also lower the nipple soreness, thereby promoting a more successful breastfeeding experience.

A similar study conducted by the nursing department at Gazi University in Turkey supports the findings of our research. This randomized controlled experiment also demonstrated that breastfeeding training sessions significantly improved breastfeeding techniques, as measured by the latch scoring system. In this study, the intervention group, who received targeted breastfeeding support, achieved an average latch score of 9.18 ± 2.50, indicating a strong improvement in breastfeeding practices. In contrast, the control group, which did not receive the intervention, had a much lower average score of 2.2 ± 4.13. The difference between these groups was statistically significant, with a p-value of 0.001, highlighting the effectiveness of breastfeeding techniques in enhancing proper breastfeeding practices. (Çelik and Kılıçarslan Toruner, 2024).

Our study also yielded similar findings, showing that the intervention groups achieved improved latch scores, averaging around 9. This increase in latch scores had a meaningful impact on reducing nipple soreness, as mothers in the intervention group reported less pain or discomfort compared to those in the control group. These outcomes are in line with experimental study conducted in Brazil by (Souza et al., 2020a) which aimed to assess the effectiveness of breastfeeding educational techniques. The study revealed, 64.04% of mothers in the intervention group adopted proper breastfeeding techniques, enabling them to avoid nipple soreness. This reinforces the importance of breastfeeding supportive techniques in promoting comfort and preventing nipple soreness, ultimately benefiting both mother and infant.

Most studies' results are congruent with our study which revealed that breastfeeding latch techniques have a significant effect on lowering nipple soreness and ensuring efficient milk transfer. However, an experimental study conducted by nurses in Jammu and Kashmir presented contradicting results from our study. In this study, both the intervention and control groups reported high latch scores, consistently above seven. However, despite these high scores, nipple soreness varied between groups. The intervention group applied hind milk to their nipples, which appeared to reduce breastfeeding-induced soreness compared to the control group, who received only routine hospital care. Notably, the intervention group reported significantly lower soreness scores (1.33 ± 2.25) than the control group (8.07 ± 2.05). This suggested that, in this case, high latch scores were not strongly associated with reduced nipple soreness, as nipple soreness still occurred even with good latch quality.

The study further proposed that breast milk itself might be a more effective preventive measure for nipple soreness than proper latch technique alone. According to this study breast milk creates a protective barrier on the skin that retains moisture in the deeper layers, supporting skin health, cellular regeneration, and preventing nipple damage. This research found no statistically significant link between high latch scores and lower nipple soreness, suggesting that while a good latch is beneficial, breast milk application might play a unique role in promoting comfort and healing. (Rashid and Mir, 2023)

Contradictory results were noted in a study from Jammu and Kashmir, where both groups achieved high latch scores, but nipple soreness varied, suggesting that breast milk application may offer unique benefits for reducing soreness. This discrepancy highlights other contributing factors, such as skin dryness, education, socio-economic status, and hospital practices, which can influence breastfeeding outcomes.

Overall, breastfeeding supportive techniques play a crucial role in promoting maternal comfort, successful breastfeeding, and infant well-being, emphasizing the need for their integration into hospital and community care settings.

6. CONCLUSIONS

The present research concluded that breastfeeding supportive approaches had a significant impact on preventing nipple soreness and crucial aspect of successful breastfeeding. The majority of participants in intervention group did not experience nipple soreness whereas those in control group experienced. As a result, appropriate latching ensures that the newborn can efficiently draw milk from breast, minimizing risk of nipple pain. Proper positioning and an adequate latch are essential strategies for avoiding and managing nipple soreness. By mastering such strategies and taking proactive steps toward addressing challenges, mother can enhance their breastfeeding experience and boost health of both mother and baby. For consequently, it is crucial that nurses objectively assess breastfeeding and resolve the issues before they become complicated.

Recommendations and future implication.

The study highlights the utility of the LATCH tool for early identification of breastfeeding issues and reducing nipple soreness. It advocates for breastfeeding training programs, evidence-based non-pharmacological interventions, cost-effective care, and integration of breastfeeding concepts into nursing and health curricula. Future research could explore prenatal

breastfeeding education, demographics' impact on breastfeeding challenges, paternal roles, and workplace influences on breastfeeding practices. Recommendations include adopting nursing theories like Betty Neuman's and Maternal Role Attainment, implementing breastfeeding protocols, using assessment tools, addressing mothers' concerns, and establishing hospital systems to support lactation and nurse education.

Study Limitations

The sample size was limited. The study was conducted primarily in one hospital s' maternity unit and for a short period of time, which affected the ability to generalize the results.

Study results could have been affected by confounding variables such as milk supply, nipple size, baby and mother health between follow ups, maternal information and compliance to techniques, lifestyle of parents and anxiety level of mothers and social support system of mothers and environmental factors such as distraction which were difficult to overcome.

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