Original Research

The Identification of Relevant Factors for Breastfeeding Techniques in Postpartum Women Before Discharge in China: A Cross-Sectional Study

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Abstract

Background: To assess breastfeeding techniques and identify the relevant factors among postpartum women in hospital. **Methods**: A cross-sectional study was conducted from March, 2022 to April, 2022 at a general hospital in China. A total of 331 postpartum women were investigated using a questionnaire survey that included the LATCH (latch, audible swallowing, type of nipple, comfort, and hold) scoring system, a general information and behavior questionnaire, a breastfeeding knowledge questionnaire, and the Chinese version of the maternal breastfeeding evaluation scale. Multiple regression analysis was used to identify independent factors for in-hospital breastfeeding techniques. **Results**: The average score for breastfeeding techniques before discharge was 7.88. In the bivariate analysis, the factors found to be significantly associated with scores for breastfeeding technique were parity, number of births, participation in online antenatal classes during pregnancy, mastery of the hand expression technique, nipple cracking and satisfaction with breastfeeding (each $p < 0.05$). The result displayed parity, participation in online antenatal classes, and satisfaction with breastfeeding were included in a multiple linear regression model ($p < 0.05$). **Conclusions**: Although breastfeeding techniques prior to discharge are improving, more improvements can be made. Clinical medical staff should therefore pay particular attention to primiparas, postpartum women who did not participate in online antenatal courses during pregnancy, and postpartum women with a low satisfaction for breastfeeding. Measures that promote breastfeeding techniques, publicize online antenatal training courses, provide breastfeeding guidance shortly after delivery, and provide timely evaluation and targeted guidance should help to improve breastfeeding techniques before discharge and increase the exclusive breastfeeding rate.

Keywords: breastfeeding techniques; feeding behaviour; LATCH tool; hospitalization

1. Introduction

Exclusive breastfeeding for 6 months has many benefits, such as protection against gastrointestinal infections and supplying energy and nutrients for the infant, while reducing the risk of ovarian and breast cancer for the mother [1,2]. However, some studies have shown the average breastfeeding rate within 6 months of birth is <40% worldwide [3]. In China the situation is even worse, with some studies reporting an exclusive breastfeeding rate of just 28% in 2014, with no increase three years later. The "Comprehensive implementation plan on maternal, infant and young child nutrition" endorsed in May 2012 by member states includes 6 targets, one of which is to increase the rate of exclusive breastfeeding during the first 6 months to at least 50% by 2025 [1]. Urgent measures are therefore needed to improve the rate of exclusive breastfeeding.

Several breastfeeding techniques are significantly correlated with exclusive breastfeeding. Good breastfeeding techniques are critically important for the success of early breastfeeding and for continuous and exclusive breastfeeding. A lack of good breastfeeding techniques by parturient women can result in numerous problems, such as incorrect breastfeeding posture, incorrect holding of the breast, breast swelling, and breast pain. These can lead to premature termination of exclusive breastfeeding [4,5]. The optimal time to improve breastfeeding skills is during the hospital stay [6].

The aim of the present study was to investigate breastfeeding techniques and to analyze the relevant factors. This may assist healthcare providers in making specific interventions to optimize breastfeeding techniques of postpartum women while they are still in hospital, thus increasing the exclusive breastfeeding rate.

2. Methods

2.1 Design

A cross-sectional design was used for this descriptive, correlational study. A questionnaire survey was conducted with a convenience sample of postpartum women before hospital discharge.

2.2 Sample

Potential participants were recruited through the maternity ward of a metropolitan general teaching hospital in

the north of China from March 1, 2022 to April 30, 2022. Inclusion criteria for postpartum women were as follows: (a) full-term delivery and returned to the maternity ward after natural childbirth or cesarean section; (b) informed consent and voluntary participation in the study. Exclusion criteria were as follows: (a) communication difficulty; (b) unclear consciousness or mental disorder; (c) maternal or infant illness that could disrupt breastfeeding, such as cancer, human immunodeficiency virus (HIV) positive, or congenital disease of the infant; (d) separation of mother and baby (mothers whose newborns had been hospitalized or died in the neonatal ward); (e) women who had undergone emergency cesarean section. A total of 346 potential participants were initially recruited. The final sample size was 331, since 15 postpartum women did not fully complete the questionnaire.

2.3 Measures

The study was conducted using a questionnaire survey that included the LATCH (latch, audible swallowing, type of nipple, comfort, and hold) scoring system, the general information and breastfeeding behavior questionnaire, the breastfeeding knowledge questionnaire, and the Chinese version of the maternal breastfeeding evaluation scale (MBFES).

2.4 The LATCH Scoring System

The LATCH questionnaire was used to assess the breastfeeding techniques of postpartum women [7]. This evaluates five aspects: latch, audible swallowing, type of nipple, hold, and comfort. Each item received a score of 0, 1 or 2, with a total possible score of 10. A higher score infers better breastfeeding technique. The Cronbach's α for this questionnaire is 0.7 [8]. The LATCH questionnaire was translated into Mandarin. This scoring system is a simple and effective tool for evaluating breastfeeding techniques. It has moderate consistency and sensitivity among different ethnic groups, thus making it suitable for use in multi-ethnic populations [8].

2.5 General Information and Breastfeeding Behavior Questionnaire

This questionnaire was developed and modified by the authors following a literature review of local and international studies. It covers: (1) Sociodemographic characteristics: age, marital status, level of education, average monthly family income; (2) Obstetrics and maternal characteristics: time of delivery, participation in online antenatal classes during pregnancy, gestational complications, gestational weeks, mode of delivery, number of births, birth weight, condition of infant's neonatal jaundice, length of hospital stay, feeding frequency and sucking duration, mastery of the hand expression technique.

Table 1. Scores for breastfeeding technique of postpartum women before discharge (N = 331).

	Breastfeeding technique
	M (SD)
T (Type of nipple)	1.79 (0.53)
L (Latch)	1.64 (0.51)
C (Comfort)	1.59 (0.73)
A (Audible swallowing)	1.56 (0.71)
H (Hold)	1.30 (0.69)
Total score	7.88 (1.86)

M, mean; SD standard deviation.

2.6 Breastfeeding Knowledge Questionnaire

This questionnaire was developed by Chinese Zhao [9] and was used to determine the knowledge level for breastfeeding. It includes 17 items, with each item scoring one point for the correct answer, thus giving a total score of 0–17 points. A higher score indicates a better level of breastfeeding knowledge. The content validity index for this questionnaire is 0.91 and Cronbach's α is 0.80, indicating good consistency and sensitivity.

2.7 Maternal Breastfeeding Evaluation Scale (MBFES)

The Chinese version employed in this study was translated by Yu *et al.* [10] and evaluates the satisfaction of breastfeeding. It comprises 29 items in three dimensions, including maternal satisfaction, infant satisfaction, and the mother's lifestyle. Each item uses a 5-point Likert scale, giving a total maximum score of 145 points. A higher score indicates better satisfaction with breastfeeding. The Cronbach's α for this questionnaire is 0.952 and the content validity index is 0.896, implying good consistency and sensitivity.

2.8 Data Collection

All data were collected in the 24 h before the mother was discharged. One of the investigators was a nurse and was trained by the head nurse to evaluate the breastfeeding technique of postpartum women using the LATCH scoring system. The general information questionnaire, breastfeeding knowledge questionnaire, and MBFES were completed by the postpartum women. The investigator used general instructions to answer any questions by the postpartum women. They also checked the collected data for completeness and performed corrective measures as required. Questionnaires were distributed to 346 cases, and results from 331 cases were analyzed, giving an effective response rate of 95.66%.

2.9 Statistical Analysis

Double data entry was performed using EpiData statistical software version 3.1 (EpiData Association, Odense, Denmark). The entered data was exported into statistical package for social science (SPSS) software version 21

Table 2. *t*-test and One-way ANOVA analyses of Breastfeeding Techniques among postpartum women in hospital (N = 331).

	n (%)	Breastfeeding technique M (SD)	t/*F*	*p*-value
Level of education			0.893	0.410
Junior college or below	53 (16.0)	8.13 (1.776)		
Bachelor	143 (43.2)	7.92 (1.915)		
Master or above	135 (40.8)	7.74 (1.828)		
Average monthly family income			1.679	0.188
≤¥10,000	70 (21.1)	8.21 (1.605)		
¥10,000–¥15,000	124 (31.4)	7.87 (2.004)		
≥¥15,000	137 (36.6)	7.72 (1.831)		
Parity			–3.729	**0.0002**
primipara	243 (73.4)	7.65 (1.880)		
multipara	88 (26.6)	8.5 (1.654)		
Participated in online antenatal classes			–2.067	**0.04**
yes	216 (65.3)	8.03 (1.787)		
no	115 (34.7)	7.59 (1.960)		
Gestational complications			0.646	0.519
yes	106 (32.0)	7.78 (2.052)		
no	225 (68.0)	7.92 (1.762)		
Mode of delivery			1.275	0.261
vaginal	199 (60.1)	7.94 (1.75)		
cesarean section	132 (39.9)	7.89 (1.956)		
Feeding times per day			0.000	1.000
<8 times	131 (39.6)	7.88 (1.751)		
>or equal to 8 times	200 (60.4)	7.88 (1.801)		
Number of births			–2.026	**0.044**
singletons	322 (97.3)	7.84 (1.866)		
twins	9 (2.7)	9.11 (0.928)		
Birth weight			1.644	0.195
<2500 g	15 (5.2)	7.60 (1.502)		
2500–4000 g	294 (88.2)	7.84 (1.894)		
>4000 g	22 (6.5)	8.55 (1.471)		
Infant neonatal jaundice			–1.742	0.082
yes	97 (29.3)	7.76 (1.903)		
no	234 (70.7)	8.15 (1.722)		
Willing to breastfeed			1.170	0.243
yes	325	7.90 (1.843)		
uncertain	6	7.00 (2.608)		
Nipple cracking			2.282	**0.023**
yes	148	7.62 (2.085)		
no	183	8.09 (1.628)		
Sucking duration			0.600	0.615
<10 minutes	14 (5.2)	8.00 (1.797)		
10–20 minutes	127 (40.5)	7.77 (1.870)		
20–30 minutes	109 (34.0)	8.06 (1.978)		
>30 minutes	81 (20.3)	7.78 (1.688)		
Hand expression technique			–2.977	**0.003**
yes	230 (69.5)	8.08 (1.818)		
no	101 (30.5)	7.43 (1.878)		

*F value for one-way ANOVA analyses. $1 = ¥7.1636. Bold, $p < 0.05$, statistically significant.

(IBM Corp., Chicago, IL, USA) for analysis. Descriptive statistics for the respective variable were determined and the results for dichotomous variables presented as percentages, mean and standard deviation (SD). ANOVA was used for comparisons amongst multiple groups, while Pearson correlation analysis was used for measurement data. Variables with a p-value of <0.05 were included in the final multivariate analysis model. Factors that correlated with

Table 3. Pearson correlation analyses of Breastfeeding Techniques among postpartum women before discharge (N = 331).

	r	p-value
Breastfeeding knowledge	0.073	0.184
Satisfaction with breastfeeding	0.350	0.000

breastfeeding techniques before discharge were determined by multiple linear regression analysis. Statistical significance was considered to be $p < 0.05$.

3. Results

3.1 Sample Characteristics

A total of 331 postpartum women participated in the study. The mean age of study participants was 32.89 (SD = 3.79) years, all were married, and 83.9% (n = 278) had a bachelor's degree or above. Among the study participants, 73.4% (n = 243) were primipara, 65.3% (n = 216) participated in online antenatal classes during pregnancy, and 60.1% (n = 199) had a vaginal mode of delivery. The average length of hospital stay was 4.05 days (SD = 1.96). Prior to discharge, the mean breastfeeding knowledge score was 13.91 (SD = 2.44) and the mean satisfaction score for breastfeeding was 113.93 (SD = 14.45).

3.2 Breastfeeding Techniques of Postpartum Women Before Discharge

The total mean score for breastfeeding techniques was 7.88 (SD = 1.86). Mean scores for each of the 5 items are listed in Table 1.

3.3 Factors Correlated with Breastfeeding Techniques

In the bivariate analysis presented in Tables 2,3, the factors found to be significantly associated with scores for breastfeeding technique were parity, number of births, participation in online antenatal classes during pregnancy, mastery of the hand expression technique, nipple cracking and satisfaction with breastfeeding (each $p < 0.05$).

Using the breastfeeding technique score as the dependent variable, factors with a p-value < 0.1 in univariate analysis were then included as independent variables in multiple linear regression analysis. These included parity, participation in online antenatal classes during pregnancy, number of births, whether the newborn has jaundice, nipple cracking, mastery of the hand expression technique, and satisfaction with breastfeeding. The result displayed the variables of parity, participation in online antenatal classes, and satisfaction with breastfeeding were included in a multiple linear regression model ($p < 0.05$) (Table 4).

4. Discussion

4.1 Breastfeeding Techniques of Postpartum Women Before Discharge

The present study found the total breastfeeding technique score prior to discharge was 7.88. This was similar to the baseline score of 8.06 reported by an earlier evidence-based study [11]. The result suggests that breastfeeding techniques before discharge were satisfactory, but could still be improved. Amongst the five aspects of breastfeeding techniques, "Hold" and "Audible Swallowing" affected the final score result the most. When breastfeeding shortly after delivery, postpartum women often need the help of nurses or family members to hold the infant in an appropriate position so that it can be fed successfully. This is due to the energy required, the pain from wounds, and the lack of feeding skills, all of which make it difficult for the mother to lactate independently. Health care providers should therefore provide instructions on suitable feeding positions, for example the lateral position which avoids pressure on the wound and thus relieves pain. One or two days after delivery, health care providers can guide postpartum women to feed the infant in a sitting position until they are able to lactate independently. Audible swallowing is a sign of effective milk transfer [12]. To achieve effective breast milk intake, health care providers should pay attention to skin-to-skin contact and early sucking, as well as ensuring the correct feeding posture and latching skills. Appropriate breastfeeding posture and latching skills can also prevent pain or injury to the nipple [13].

4.2 Factors Correlated with Breastfeeding Techniques

In the present study, the breastfeeding techniques of multipara women were better than those of primipara, which is similar to the findings reported by Lau *et al*. [14]. Earlier work also reported that previous successful breastfeeding experience was correlated with good breastfeeding techniques [15,16]. Multiparous women are more likely to repeat their previous breastfeeding experiences and practices learned from preceding children [17]. In contrast, first-time mothers who had little prior experience with infant feeding reported difficulties in handling their infants and in coordinating their movements during breastfeeding [18]. Furthermore, first-time mothers were less likely to be aware of World Health Organization (WHO) guidelines for breastfeeding [19] and were more likely to use pacifiers, which have been negatively associated with breastfeeding techniques [20]. Thus, first-time mothers should be supported by being given advice on breastfeeding techniques during hospitalization. The importance of proficient breastfeeding techniques for the health of the mother and infant means that health services should ensure all postpartum women are evaluated and receive guidance on breastfeeding, particularly primipara women. Patel *et al*. [21] reported that lactation education or support programs using lactation consultants or lactation counselors improved

Table 4. Multiple regression analysis of Breastfeeding Techniques among postpartum women before discharge (N = 331).

	β	Standard error	t-test	p-value	95% CI
Intercept	1.328	0.968	1.372	0.171	−0.638 to 3.216
Parity	0.547	0.214	2.560	0.006	0.175 to 1.022
Participation in online antenatal classes	0.612	0.205	2.988	0.003	0.195 to 1.143
Satisfaction with breastfeeding	0.039	0.007	5.934	0.000	0.025 to 0.052

CI, confidence interval.

the rates of initiation and duration of breastfeeding compared with usual practice, as well as the rate of exclusive breastfeeding. Currently, limited hospital stays of just 2–3 days mean that timely assessment and targeted breastfeeding guidance are very important for improving the breastfeeding techniques of postpartum women before discharge. This includes providing information on the correct posture and latching, addressing common problems, and offering appropriate solutions for breastfeeding [8].

Participation in online antenatal programs during pregnancy significantly improve breastfeeding skills, as indicated by the results of the current study. This novel means of distance health education can overcome limitations of time and space, and provide targeted guidance on pregnancy health care according to gestational stage. Online antenatal programs can also use fragmented time to allow repeat learning. This has the advantage of strong operability and overcomes many of the shortcomings of traditional, large-class teaching modes for pregnant women. During the current period of prevention against pneumonia caused by pandemic COVID-19 infection, it is notable that online antenatal classes use WeChat, specific apps, and other digital training methods. These are used to provide maternal health education and for consultation and guidance. They are also effective for self-monitoring and for home protection during the suspension of face-to-face classes, thus ensuring the entire pregnancy and childbirth period can proceed easily and smoothly. Therefore, these online education methods can increase the safety of postpartum women and infants, as well as improve the treatment of maternal diseases [22]. However, only 216 (65.26%) of the women in this study participated in online antenatal classes during pregnancy. The publicity for online antenatal classes should be increased in future so that more pregnant women can obtain evidence-based knowledge and skills on breastfeeding. This should help to improve their breastfeeding skills during hospitalization and further improve the rate of breastfeeding.

Satisfaction with breastfeeding was found to be a factor affecting the breastfeeding technique in the present study. High levels of satisfaction with breastfeeding are likely to make postpartum women more willing to learn breastfeeding skills and to continue exclusive breastfeeding. On the other hand, low satisfaction may lead to a reluctance to breastfeed, a decline in breastfeeding skills, or even the termination of breastfeeding altogether. The main factors identified for satisfaction with breastfeeding were physical effects, difficulties in starting breastfeeding, and concerns about whether the infant would gain enough weight. Maternal skin-to-skin contact after birth has beneficial effects on breastfeeding and can increase the success rate and duration of the first lactation [23]. Early breastfeeding success and a high level of satisfaction are essential for continuous breastfeeding. Health care providers should therefore strengthen early guidance for postpartum women and eliminate doubts so that their confidence and satisfaction with breastfeeding is increased at an early stage. Abbass-Dick and Dennis [24] found that provision of breastfeeding information to parents, including fathers, was well received. Information should target both parents and be delivered in a variety of modes. According to the revised "Baby-Friendly Hospital Initiative" (2018), discharge should be coordinated so that parents and their infants have timely access to ongoing support and care.

In the current study, the mother's age, education level and breastfeeding knowledge were not significantly correlated with breastfeeding techniques before discharge. These findings were only partially consistent with those of other studies. Lau *et al.* [14] found that the age and ethnicity of postpartum women were not significantly associated with breastfeeding techniques, while Tiruye *et al.* [15] found that effective breastfeeding techniques correlated with higher educational level. A possible explanation may be that the women surveyed in this study were from a hospital located in the capital city of China and therefore had high financial and educational levels. A majority of participants were >30 years old, highly educated, and had many opportunities to acquire a high level of knowledge about breastfeeding. More counseling and education on breastfeeding during the perinatal period should still be emphasized [25,26] found that breastfeeding counseling was significantly correlated with the intention and practice of exclusive breastfeeding. Systematic education and guidance during the entire delivery period can significantly enhance the breastfeeding techniques of postpartum women and improve exclusive breastfeeding rates [27]. The perinatal period should also focus on providing support for mothers to continue breastfeeding through breastfeeding peer counselors, family members and healthcare providers.

4.3 Limitations

This study was conducted in one center with a limited number of participants. Larger-scale studies are there-

fore required in future to confirm these results. The factors found to be correlated with breastfeeding techniques in this study explain only a portion of the breastfeeding techniques, suggesting there may be other important factors that have yet to be identified.

5. Conclusions

Although the score for breastfeeding techniques before discharge was quite high in this study cohort, further improvements will require more effort. Favorable factors for good breastfeeding technique before discharge were multipara, participation in online antenatal training, and a high degree of satisfaction with breastfeeding. Clinical medical staff should therefore pay particular attention to primiparas, postpartum women who did not participate in online antenatal courses during pregnancy, and postpartum women with a low satisfaction for breastfeeding. Measures that promote breastfeeding techniques, publicize online antenatal training courses, provide breastfeeding guidance shortly after delivery, and provide timely evaluation and targeted guidance should help to improve breastfeeding techniques before discharge and increase the exclusive breastfeeding rate. Further research is also needed to identify other critical factors associated with breastfeeding techniques.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author Contributions

SL made substantial contributions to study design and literature review, participated in data auditing, analysis, and interpretation, involved in drafting the manuscript and revising it critically for important intellectual content. DZ made substantial contribution to data analysis and interpretation, involved in drafting the manuscript and revising it critically for important intellectual content. GL made substantial contributions to study design and literature review. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

This study was approved by the institutional review board of Peking University People's Hospital (No. 2019PHB227-01). All patient's informed consent is obtained.

Acknowledgment

Not applicable.

Conflict of Interest

The authors declare no conflict of interest.

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