ORIGINAL

Analysis of basic conditioning factors in the mother/child affecting breast-feeding

Mari Haku[1], *and Kazutomo Ohashi*[2]

[1] *Major of Nursing, School of Health Science, The University of Tokushima, Tokushima, Japan ; and*

[2] *School of Allied Health Sciences, Faculty of Medicine, Osaka University, Osaka, Japan*

Abstract Purpose: The purpose of this study was to clarify basic conditioning factors affecting the continuation of breast-feeding until 1 month after delivery and find parameters for its continuation and the assessment of care need.

Methods: As basic conditioning factors in the mother/child affecting the continuation of breast-feeding, 5 factors (age, number of children previously cared for, delivery time, bleeding volume at delivery, and birth weight), which were suggested to affect breast-feeding by the literature, were analyzed by logistic regression analysis, and the degrees of their influences were calculated. In addition, to evaluate the influences of 3 factors (absence of breast-feeding in the last child, smoking habit, and absence of breast-feeding at discharge), which were major influential factors but had to be deleted in the process of the production of a questionnaire of breast-feeding limitation factors (Haku, M. 2004), on the feeding method 1 month after delivery, differences were analyzed by Fisher's direct method and the χ^2 test.

Results: 1. Basic conditioning factors affecting the milk feeding method 1 month after delivery

The odds ratio for each factor in the mother/child was 1.033 for age, 0.872 for the number of children previously cared for, 1.012 for delivery time, 1.659 for bleeding volume at delivery, and 2.861 for birth weight. Bleeding volume at delivery ($p=0.042$) and birth weight ($p=0.021$) were significantly correlated with mixed/bottle-feeding 1 month after delivery.

2. Three factors affecting breast-feeding 1 month after delivery

Mixed/bottle-feeding 1 month after delivery was significantly more frequently observed in mothers with the absence of breast-feeding in the last child (Fisher $p=0.0006$), a smoking habit (Fisher $p=0.04$), and the absence of breast-feeding at discharge ($\chi^2=7.28$, $p=0.007$) than in those otherwise.

Conclusion: These results suggest that 5 basic conditioning factors "bleeding volume at delivery ≥500 ml", "birth weight<2,500 g", "absence of breast-feeding in the last child", "smoking habit", and "absence of breast-feeding at discharge" can be parameters for the assessment of breast-feeding limitation factors.

Key words: basic conditioning factors, breast-feeding, limitation factors, 1 month after delivery, Orem's model

Introduction

The purpose of this study was to clarify basic conditioning factors affecting the continuation of breast-feeding until 1 month after delivery.

Breast-feeding with many advantages for the mother

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徳島大学医学部保健学科看護学専攻

and child has universally been encouraged. Previous studies on the continuation of breast-feeding can be classified into "survey of physical/psychological/ social factors preventing the continuation of breast-feeding", "clarification of the structure and function of the breast/mammary glands", "studies on scientific/psychosocial aspects of breast milk", "evaluation of the effectiveness of care for breast-feeding", and "development of scales associated with breast-feeding". The "scales associated with breast-feeding" include scales for the evaluation of the association between breast-feeding and mother's attitude toward breast-feeding such as the feeling of self-efficacy[1] and satisfaction[2] and scales for the evaluation of the breast-feeding state of the mother/child such as child's sucking state and mother's breast-feeding posture[3]. However, these scales have problems in the contents and number of questions for convenient clinical use, requiring further evaluation.

To develop a tool that can be readily used in clinical practice, we have evaluated factors affecting breast-feeding from 3 aspects and performed surveys. The 3 aspects are breast-feeding restriction (psychosocial) factors, breast morphological factors, and basic conditioning factors. Breast-feeding restriction (psychosocial) factors were analyzed by the dependent care model proposed by Orem, and breast-feeding restriction factors 1 month after birth were clarified[4]. Breast morphological factors were analyzed in terms of mammary gland thickness and nipple morphology[5]. In this study, we report basic conditioning factors. Orem (1995) defined basic conditioning factors as internal/external factors that help to estimate dependent care ability and include personal characteristics (such as age, sex, and the health state) affecting dependent care behavior, the living situation, socio-cultural orientation, and environmental factors. These basic conditioning factors contribute to the screening for mothers who wish to continue breast-feeding but discontinue breast-feeding 1 month after delivery, and the clarification of care necessary for the continuation of breast-feeding in each mother.

Methods

1) Survey methods

Some obstetrician reported that the factors associated with prolonged lactation include the age of the mother, delivery time, bleeding volume at delivery, use of uterotonics, and cesarean section. These factors have been suggested to remain influential factors 1 month after delivery.

Based on the results of these studies and those of our previous surveys (the above 2 factors:breast-feeding restriction psychosocial factors and breast morphological factors), we evaluated basic conditioning factors in the mother/child that affect breast-feeding.

The influences of the following basic conditioning factors affecting breast-feeding were statistically analyzed : 5 factors (age, number of children previously cared for, delivery time, bleeding volume at delivery, and birth weight), and 3 factors (absence of breast-feeding in the last child, smoking habit, absence of breast-feeding at discharge), that had to be deleted in the process of the production of the questionnaire of breast-feeding limitation factors [5].

Data on the 5 factors were collected from delivery records, and those on the milk feeding method 1 month after delivery from outpatient medical records. Data on the 3 factors were collected from data obtained by a statistical analysis of breast-feeding limitation factors 1 month after delivery.

2) Analysis methods

The degree of the influence of each factor in the mother/child was calculated by logistic regression analysis using the feeding method 1 month after delivery as an explanatory variable and age, number of children previously cared for, delivery time, bleeding volume at delivery, and birth weight as dependent variables.

To evaluate the influences of the 3 factors on the feeding method 1 month after delivery, differences were analyzed by Fisher's direct method and χ^2 test.

3) Subjects of survey

The subjects of the survey of the 5 factors were 388 mothers.

The subjects of the survey of the 3 factors were 108 mothers.

4) Survey institution

This survey was performed in an institution in a local city where the annual number of deliveries is about 400, and "WHO's Ten Steps to Successful Breast-feeding" are performed.

5) Survey period

The survey period was from January 2002 to December 2004.

6) Ethical considerations

Investigators gave both oral and written explanations of the study to individual subjects and requested cooperation in the study, telling them that obtained information is strictly stored and managed, the individual subjects will not be identified, and the presence or absence of consent will not affect subsequent care.

Results

1) Characteristics of subjects (Table 1)

The mean age of the subjects was 29.9±5.1 years, which was similar to the mean delivery age in mothers in Japan in fiscal 2002 (29.8 years). Childcare experience was observed in 170 mothers (43.8%) but not in 218 (56.2%). The mean delivery time was 8.5±6.3 hours (20 minutes-43.7 hours). The mean bleeding volume at delivery was 382±248 ml (28-1,538 ml). The mean birth weight was 3,073±401 g (2,054-4,658 g).

Table 1. Characteristics of subject (n=388)

Age (Mean±SD)	29.9±5.1 years
Childcareing	
Without childcare experience	218 cases (56.2%)
With childcare experience	170 cases (43.8%)
The mean delivery time	8.5±6.3hours (20 minutes～43.7 hours)
The mean bleeding volume at delivery	382±248ml (28 ml～1538 ml)
The mean birth weight	3073±401 g (2054 g～4658 g)
1 month after delivery	
Breast-feeding	175 cases (45.1%)
Mixed/Bottle-feeding	213 cases (54.9%)

The feeding method 1 month after delivery was breast-feeding in 175 mothers (45.1%) and mixed/bottle-feeding in 213 (54.9%).

2) Basic conditioning factors affecting breast-feeding 1 month after delivery (Table 2)

The degree of the influence of each factor in the mother/child was analyzed by logistic regression analysis using the feeding method 1 month after delivery as an explanatory variable (breast-feeding, 0; mixed feeding, 1) and age, the number of children previously cared for, delivery time, bleeding volume at delivery, and birth weight as dependent variables. Bleeding volume at delivery (≥500 ml, 1; <500, 0) and birth weight (<2,500 g, 1; ≥2,500 g, 0) were converted into categorical data and analyzed. As a result, the odds ratio was 1.033 for age, 0.872 for the number of children previously cared for, 1.012 for delivery time, 1.659 for bleeding volume at delivery, and 2.861 for birth weight. Bleeding volume at delivery (p=0.042) and birth weight (p=0.021) were significantly correlated with mixed/bottle-feeding 1 month after delivery.

Table 2. The degree of the influence of each factors (logistic regression analysis) n=388

	Odds ratio	95% C.I	p
Age	1.033	0.991-1.077	0.131
The number of childcare	0.872	0.651-1.167	0.358
The mean delivery time	1.012	0.978-1.048	0.489
Bleeding volume: ≧500 ml	1.659	1.018-2.705	0.042*
Birth weight: <2500 g	2.861	1.174-6.971	0.021*

3) Three factors affecting breast-feeding 1 month after delivery (Table 3)

The influences of the 3 factors (absence of breast-feeding in the last child, smoking habit, absence of breast-feeding at discharge), which were major influential factors but had to be deleted in the production process of the questionnaire of breast-feeding limitation factors, on breast-feeding 1 month after delivery were analyzed.

Mothers with the absence of breast-feeding in the last child (Fisher p=0.0006), a smoking habit (Fisher p=0.04), or the absence of breast-feeding at discharge (χ^2=7.28, p=0.007) more frequently showed mixed/bottle-feeding 1 month after delivery than those otherwise.

Discussion

The infant nutritional statistics in fiscal 2000 showed a breast-feeding rate of 44.8% and a mixed/bottle-feeding rate of 55.2% from 1 to less than 2 months after delivery. The breast-feeding rate in this study (45.1%, 175 mothers) was similar to this figure. At our survey institution, we

Table 3. Three factors affecting breast-feeding 1 month after delivery

1 month after delivery	Breast-feeding	Mixed/Bottle-feeding	χ^2	p
Breast-feeding in the last child	15	1		Fisher 0.0006
Absence of breast-feeding in the last child	14	19		
No smoking	61	40		Fisher 0.04
Smoking habit	1	6		
Breast-feeding at discharge	53	29	7.28	0.007
Absence of breast-feeding at discharge	9	17		

have practiced WHO's Ten Steps to Successful Breast-feeding since fiscal year 2002. The breast-feeding rate at discharge is near 100% for healthy neonates. However, the mixed/bottle-feeding rate increases in the health examination 1 month after birth, presenting problems in care after puerperal discharge. At present, we provide regular care after discharge.

Basic conditioning factors have been suggested to affect mother's dependent care agency to perform breast-feeding and child's self-care agency (involved in suckling behavior)[7, 8]. The measurement of child's self-care agency is difficult. In this study, differences in background factors were evaluated between the breast-feeding group and mixed/bottle-feeding group 1 month after delivery. The factors predicting the absence of breast-feeding after 1 month were "high breeding volume (≥500ml)", "low birth weight (<2,500g)", "absence of breast-feeding in the last child", "smoking habit", and "absence of breast-feeding at discharge".

As factors associated with persistent lactation, mother's age, delivery time, bleeding volume at delivery, use of uterotonics, and cesarean section have been reported. Taketani *et al*.[9-11] suggested that these factors remain influential factors 1 month after delivery. In this study, bleeding volume at delivery and child's birth weight affected the continuation of breast-feeding 1 month after delivery.

In addition, mothers with"absence of breast-feeding in the last child", "a smoking habit", and"absence of breast-feeding at discharge" more frequently showed mixed/bottle-feeding 1 month after delivery than those otherwise. Psychologically, abandonment due to the "absence of breast-feeding in the last child" and the situation"absence of breast-breeding at discharge" may reduce mother's eagerness for and confidence in breast-feeding. Hill and Colin *et al*[12, 13]. reported that mothers' inadequate awareness of lactation reduces their perception of childcare ability, making them to abandon breast-feeding. The breast-feeding self-efficacy scale[1] under development is an attempt to measure mothers' self-efficacy to explain its association with the continuation of breast-feeding. In addition, Coreil[14] reported that confidence in breast-feeding is an important factor predicting the continuation of breast-feeding. Breast-feeding care by midwives places importance in support of mothers' feeling, and encouragement of mothers to have confidence and appropriate support of mothers' feelings have been reported to be important[15] The Breast-feeding Management and Promotion in a Baby-Friendly Hospital, an 18-hour Course for Maternity Staff UNICEF/WHO[16] showed"breast-feeding experience" is a risk factor for breast-feeding and proposed the necessity for support by soothing and encouraging mothers as"counseling that empowers mothers and provides information". The"absence of breast-feeding in the last child" appeared to be a factor affecting the continuation of breast-feeding.

Mothers with a "smoking habit" may worry about the adverse influences of smoking on the child. Mothers may tend to avoid or discontinue breast-feeding to avoid the harmful effects of smoking on their precious children. The smoking habit should be evaluated as a breast-feeding limitation factor.

The situation "absence of breast-feeding at discharge" suggests that the continuation of breast-feeding is difficult after discharge because of a decrease in expert support. Shimada *et al*.[17, 18] who performed a nation-

wide breast-feeding survey, reported a significantly higher breast-feeding rate after 1 month in mothers who did not give their children anything other than mother's milk during hospitalization. The "WHO's Ten Steps to Successful Breast-feeding" also propose that nutrients or water other than mother's milk should not be given to neonates unless medically necessary. This suggests that childcare only by breast-feeding during hospitalization is important in the success of breast-feeding.

We have evaluated factors affecting breast-feeding from 3 aspects and performed surveys. For the continuation of breast-feeding, it is necessary for the mother, her family, and expert care providers to understand breast-feeding restriction factors and make efforts to eliminate or reduce these factors. Mothers' need for breast-feeding can be met by support for the continuation of breast-feeding by screening of mothers using these factors at puerperal discharge. In addition, such screening may provide useful information for the evaluation of effective care methods for the continuation of breast-feeding.

Conclusion

Based on the results of this study, "bleeding volume at delivery≥500 ml", "birth weight＜2, 500", "absence of breast-feeding in the last child", "smoking habit", and "absence of breast-feeding at discharge" as basic conditioning factors were determined to be assessment items.

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References

1) Dennis CL : The breastfeeding self-efficacy scale, psychometric assessment of the short form, Journal Obstetric Gynecol Neonatal Nursing 32(6) : 734-744, 2003

2) Left EW, Jefferis SC : The development of the maternal breast-feeding evaluation scale, Journal Human Lactation 10(2) : 105-111, 1994

3) Jensen D, Wallace S, LAYCH : a breastfeeding charting system and documentation tool,Journal Obsted Gynecol Neonatal Nursing 23(1) : 27-32, 1994

4) Haku M, Ohashi K : Evaluation of the breast-feeding limitation scale as a useful tool for prediction of continuing breast-feeding, The Journal of Nursing Investigation 3(1) : 27-34, 2004

5) Haku M, Takeuchi M, Morimoto T, Yamano S, Takebayashi K : Relationship between mammary gland structures during pregnancy and breast-feeding. The Journal of Nursing Investigation 2 : 16-20, 2004

6) Orem, D.E. : Nursing : Concepts of practice (5th ed.) Mosby, St.Louis 1995, pp. 242-244

7) Taylor SG, Renpening K E, Geden E A, Neuman, BM, Hart M A : A theory of dependent-care : A corollary theory to Orem's theory of self-care, Nursing Science Quarterly 14(1) : 39-47, 2001

8) Connie MD, Onodera T : SelfCare Deficit Theory of Nursing, Igaku-Shoin,Tokyo, 1999, pp. 28-33

9) Taketani Y, Mizuno M : Factors of milk secretion after birth, Obstet. Gynecol 36 : 149-154, 1986

10) Taketani Y : Puerperium : Mammary change and lactation, Comprehensive Handbook of Women's Medicine, Nakayama-Shoten,Tokyo, 2001, pp. 27-37

11) Nezu Y, Hama M : The change of breast-feeding guidance method, Obstetrical and Gynecological Therapy 73(4) : 374-379. 1996

12) Hill PD, Jean A : Potential Indicators of Insuf-ficient Milk Supply Syndrome, Research in Nursing & Health 14 : 11-19, 1991

13) Colin W B, Jane A S : Breastfeeding : Reasons for starting, reasons for stopping and problems along the way, Breastfeeding Review 10(2) : 13-19, 2002

14) Coreil J, Brtant C, Westover B, Bailey D : Health professional and breastfeeding counseling, Journal of Human Lactation 11 : 265-271, 1995

15) Noguchi M : Psychological Care for Breastfeeding Mothers, J Jpn Acad Mid 13(1) : 13-21, 1999

16) UNICEF/WHO/Hashimoto T : Breastfeeding Management and Promotion in a Baby-Friendly Hospital. Igakusyoin, Tokyo, 2003, pp. 20-106

17) Shimada M, Watabe N, Toda R, *et al*. : Connection with breast-feeding care and maternal feeding es-

tablishment during hospitalization, A national survey about breast-feeding. Shoni Hoken Kenkyu 60(6) : 749-756, 2001

18) Shimada M,Watabe N, Kamiya S, et al. : A national survey about anxiety of the mother and child and child care support needs during one month after delivery. Shoni Hoken Kenkyu 60(5) : 671-679, 2001