Original Article
Factors affecting breast feeding for premature infants in the neonatal intensive care unit

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Abstract: Objective: To analyze the factors affecting breast feeding and explore measures for related factors for breast milk production in the mothers of premature infants in the neonatal intensive care unit (NICU). Methods: This was a on the clinical data of 45 premature infants who were admitted to the NICU and their mothers, from March 2018 to December 2018 in Fujian Provincial Maternity and Children's Hospital, Affiliated Hospital of Fujian Medical University. According to the quantity of breastmilk collected from the mothers on the 14th day, the premature infants were divided into two groups: the adequate lactation group (29 cases) and the inadequate lactation group (16 cases). Univariate as well as multivariate logistic regression analyses were used to analyze the factors affecting breast feeding success, including age of the puerpera, gestational age, Edinburgh Postpartum Depression Scale (EPDS) score, number of sucking attempts and start-up time of lactation phase II. According to nursing measurements, the premature infants were divided into two groups: the observation group (nursed with breastfeeding quality improvement intervention, 23 cases) and the control group (nursed with the regular method, 22 cases). Then the lactation status of the puerperae as well as the growth and complications of the premature infants between the two groups were compared. Results: Age of puerpera, delivery mode, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, prenatal training, pattern of sucking, number of sucking attempts and start-up time of lactation phase II were all independent factors affecting the breast feeding for premature infants in the NICU (all P<0.05). Compared with the inadequate lactation group, the age of the puerpera, EPDS score, number of sucking attempts as well as start-up time of lactation phase II were significantly lower in the adequate lactation group, while the gestational age was significantly higher (all P<0.05). After intervention, the improvement of breast milk collection, the growth status and the incidence of complications of premature infants in the observation group were all significantly better than those in the control group (P<0.05). Conclusion: Ability to breast feed premature infants in the NICU was related to age of the mother, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, number of sucking attempts and start-up time of lactation phase II. The breastfeeding quality intervention could improve maternal lactation quality and the growth of premature infants in the NICU, which provides guidance for clinical practice.

Keywords: NICU, preterm infant, breastfeeding quality improvement, influential factors, growth and development

Introduction

The neonatal intensive care unit (NICU) is a special ward for neonates with critical illnesses, such as neonatal asphyxiation, or hemolytic disease [1]. According to a report from the World Health Organization (WHO), globally each year, more than 15 million preterm infants are born [2]. Improving the management quality of NICU premature infants, promoting their growth and development, and reducing the incidence of complications has become a ma-

jor focus in the clinic. The WHO advocates exclusive breastfeeding for infants within the first 6 months from birth, and supplementary food should be added 6 months after, and breastfeeding can last for up to 2 years or longer [3]. Breast milk is the best nutrition source for neonates, especially for preterm infants with low living capacity and low nutritional level whose organs have not yet matured. In addition, breastmilk also contains abundant immunoglobulins, which are beneficial for improving the immune function of preterm infants in

the NICU. Exclusive breastfeeding plays an important role in improving the short-term complications and long-term prognosis of preterm infants in the NICU; for example, it can reduce the risks of gastrointestinal intolerance, nosocomial infections, retinopathy, and necrotizing enterocolitis in preterm infants. Therefore, it is generally clinical consensus to improve the quality of breastfeeding for preterm infants in the NICU [4].

However, there are certain obstacles to breastfeeding preterm infants in the NICU due to diseases, separation of mothers and infants, and difficulties in breast milk management. Hence, the number of times of breast feeding, milk volume, maternal breastfeeding rates, milk volume and the amount of the mother's milk ≥350 mL/d within 7 days are all lower than those of the mothers with healthy full-term neonates; further leading to slower growth and development and higher incidences of complications of preterm infants in NICU. Meanwhile, it can severely impact the living quality of families [5]. Therefore, this study aimed to provide guidance for improving breastfeeding for preterm infants in the NICU by analyzing factors affecting breast milk collection for preterm infants in the NICU, and measures were made to improve the quality of breastfeeding, and strengthen the management of breast milk production and collection.

Materials and methods

General information

The clinical data of 45 premature infants in the NICU who were admitted to our hospital and their mothers from March to December 2018 were retrospectively analyzed. This study was approved by the medical Ethical Committee of Fujian Provincial Maternity and Children's Hospital, Affiliated with Hospital of Fujian Medical University.

Inclusion criteria: All infants met the diagnostic criteria for preterm delivery described in the Ninth *Edition of Pediatrics* published by the People's Medical Publishing House [6]. The mothers of the preterm infants were all at least 20 years old, but younger than 30 years old. All the preterm infants stayed in the NICU for more than 2 weeks. The family members of

the preterm infants had normal communication abilities. The family members of the mothers and preterm infants signed an informed consent.

Exclusion criteria: If the infants' mothers were unconscious and could not cooperate. The mothers had contraindications to breastfeeding. The mothers had hematological diseases and coagulation dysfunctions. The mothers had a depression tendency and or a family history of depression.

First, the premature infants were divided into the adequate lactation group (29 cases) and the inadequate lactation group (16 cases) according to whether the amount of breastmilk collected on the 14th day was lower than 500 mL. Second, according to the nursing measures they received, they were divided into one of two groups: the observation group (nursed with breastfeeding quality improvement interventions, 23 cases) and the control group (nursed with regular methods, 22 cases).

Methods

Test methods: All participants were recorded for their general information after admission, including the gender of preterm infants, maternal age, the Body Mass Index (BMI) of mothers, delivery mode, gestational age, history of gestational hypertension, Edinburgh Postpartum Depression Scale (EPDS) score, postnatal first milk-feeding time, prenatal training, pattern of sucking, number of sucking attempts and start-up time of lactation phase II.

Nursing methods: The control group: All the infants received routine care, including monitored for warmth, anti-infection treatment, and maintenance of water-electrolyte and acid-base balance. Based on this, the control group was given routine breastfeeding management. Briefly, the family members of the infants were educated orally about the benefits and importance of breastfeeding and the mothers of the preterm infants were encouraged to start breastfeeding as early as possible. Meanwhile, the breastmilk used to feed preterm infants was supplied in the following order: maternal breastmilk and donated breastmilk, or fresh breastmilk to frozen breastmilk. Finally, the breastmilk was smeared to the mouth of the

preterm infants once a day. Before discharge, the parents were guided about how to breast-feed [7].

The observation group: On the basis of the care in the control group, the preterm infants in the observation group were given quality improvement nursing interventions.

1) Health education: Health education about breastfeeding was taught to the mothers and other family members of preterm infants, especially to the mothers with high-risk factors. First, the advantages and benefits of breastfeeding were introduced to enhance their awareness of breastfeeding and eliminate any negative emotions of the mothers. Personalized breastfeeding plans for preterm infants were designed according to their conditions. Second, the mothers were encouraged to milk within 1 hour after delivery. Finally, the method of milking, storing of breastmilk, and transporting breastmilk were introduced to the mothers and families, and health care workers assessed the quantity of collected breastmilk in a timely manner.

2) Breastmilk pumping: A personal breast pump was provided for the mothers to promote the colostrum excretion and breastmilk secretion. First, the mother tried to milk within 1 hour after the delivery and every 3 hours with the electric breast pump. Second, after the preterm infants and their mothers were discharged from the hospital, a breast pump was sent home with them and the mothers were instructed to keep breast feeding the baby every 2~3 h, 8 times a day. Meanwhile, the mothers are told to breast feed the baby before sleep, during sleep, and after waking in the morning [8].

3) Oral care: Once breastmilk can be collected; oral application of breast milk was performed to preterm infants as the breastmilk contained a variety of anti-globulin and other antibacterial ingredients, which can provide preterm infants with the first-line of defense in the oral cavity. To be specific, a few drops of breastmilk were used to smear around the oral cavity of the preterm infants until they could suck the breastmilk.

4) Home care: First, parents were allowed to enter the NICU to visit preterm infants, have contact with them, and be involved in the nursing work, such as participating in the oral care of the preterm infants, so as to enhance a close relationship between preterm infants and their parents. Second, the mothers were given the opportunity to breastfeed the preterm infants as soon as possible, which will not only enhance the sucking reflex of the children, but also increase the benefits of sucking for the mothers.

5) Breastmilk analysis: First, the desired amount of collected breastmilk should be in the range of 440 to 1200 mL so as to control the breastmilk intake of the preterm infants. Second, the composition of breastmilk was analyzed to provide guidance on the nutritional supplements for the preterm infants in NICU. Third, according to the total volume and nutritional components of breastmilk, the frequency and the amount of breastfeeding were individually guided [9].

6) Breastmilk management. The breastfeeding procedures were formulated. First, as the colostrum contains more abundant IgA and other immunoglobulins, the preterm infants were given colostrum first to enhance their digestive function. Then, as the infants' immune function increased, mature breastmilk was given. Second, fresh breastmilk and the mothers' own milk were the primary choices, while frozen breastmilk and donated breastmilk were secondary choices. The donation of breastmilk and the establishment of a breast milk storage center were encouraged to ensure the supply of breastmilk for children whose mothers were lacking breastmilk.

Outcome measures

Influential factors of breast milk production and collection. The clinical data of subjects were collected, including the gender of preterm infants, maternal age, the Body Mass Index (BMI) of mothers, delivery mode, gestational age, history of gestational hypertension, Edinburgh Postpartum Depression Scale (EPDS) score, postnatal first milk-feeding time, prenatal training, pattern of sucking, number of sucking attempts and start-up time of lactation phase II. EPDS score criteria [10]: EPDS score is a widely used self-depression evaluation scale. It includes ten items, each of which is divided into 4 levels according to the severity of the

symptoms, the EPDS score should be performed 6 weeks after delivery within 5 minutes; mothers with a total score of 12 to 13 may have different degrees of depression; those whose total score is ≥13 can be diagnosed with postpartum depression.

Independent influential factors of breast milk production and collection. The maternal age, gestational age, EPDS score, number of sucking attempts, and start-up time of lactation phase II were compared between the adequate lactation group and the inadequate lactation group.

Lactogenesis status of the mothers of the preterm infants. The number of times of breast feeding per day, milking volume per day, maternal breastfeeding rates, breastfeeding volume as well as the number of mothers who milked ≥350 mL/d for 7 days, and the time when the milking volume reached 350 mL/d were recorded and analyzed. A mother's daily milk production ≥350 mL was considered to be the minimum milk supply required for breastfeeding the preterm infants in NICU [9].

The growth of preterm infants. The weight, height, and head circumference of preterm infants during hospitalization were recorded and analyzed.

The incidence of complications. The incidence of complications such as necrotizing enterocolitis, retinopathy and nosocomial infections of preterm infants were recorded and analyzed. The total incidence rate (%) = the number of preterm infants with complications/total number of preterm infants * 100%.

Statistical analysis

All data in this study were analyzed by SPSS 21.0 statistical software. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd), and independent t test was adopted. All enumeration data were shown in number of cases/percentage (n/%) and analyzed by χ^2 test. The univariate and multivariate logistic regression analysis were used to analyze the influential factors of breast feeding for preterm infants in the NICU. P<0.05 indicated the difference was statistically significant.

Results

The univariate analysis of influential factors of breast feeding for preterm infants in the NICU

The results showed that the breast feeding for preterm infants in the NICU had a significant correlation with maternal age, delivery mode, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, prenatal training, pattern of sucking, number of sucking attempts and the start-up time of lactation phase II (all P<0.05, **Table 1**).

Multivariate logistic regression analysis of breast feeding for preterm infants in the NICU

The adequate or inadequate amount of breast-milk collected from mothers of preterm infants in the NICU was used as the dependent variable. The maternal age, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, number of sucking attempts and start-time of lactation phase II were used as independent variables. Logistic regression showed all the above indexes could be independent factors affecting the breast milk production and collection from mothers of preterm infants in the NICU (all P<0.05, **Table 2**).

Comparison of maternal age, gestational age, EPDS score, number of sucking attempts, and start-time of lactation phase II between the adequate lactation group and the inadequate lactation group

The maternal age, EPDS score, number of sucking, and start-time of lactation in the adequate lactation group were significantly less than those in the inadequate lactation group; while the average gestational age in the adequate lactation group was significantly older than that that in the inadequate lactation group (all P<0.05, **Table 3**).

Comparison of milking status of mothers between the two groups

As showed in **Figure 1**, six weeks after delivery, the daily milking times of mothers, daily milking volume, maternal breastfeeding rates, breastfeeding volume and the number of mothers

Table 1. Univariate analysis of the influencing factors for inadequate breastfeeding (n, %)

Index	Inadequate lactation group (n=16)	Adequate lactation group (n=29)	χ^2	P
Gender of preterm infants			0.012	0.912
Male	8 (36.36)	14 (63.64)		
Female	8 (34.78)	15 (65.22)		
Maternal age (years)			4.185	0.041
<30	6 (23.08)	20 (76.92)		
≥30	10 (52.63)	9 (47.37)		
Maternal BMI (kg/m^2)			0.012	0.912
≥25	8 (34.78)	15 (65.22)		
<25	8 (36.36)	14 (63.64)		
Delivery mode			4.185	0.041
Natural delivery	6 (23.08)	20 (76.92)		
Cesarean delivery	10 (52.63)	9 (47.37)		
Gestational age (weeks)			6.774	0.009
<30	12 (54.55)	10 (45.45)		
≥30	4 (17.39)	19 (82.61)		
History of gestational hypertension			9.388	0.002
Yes	12 (60.00)	8 (40.00)		
No	4 (16.00)	21 (84.00)		
EPDS score (score)			4.865	0.027
>10	11 (52.38)	10 (47.62)		
≤10	5 (20.83)	19 (79.17)		
Postnatal first milk-feeding time (h)			4.185	0.041
>6	10 (52.63)	9 (47.37)		
≤6	6 (23.08)	20 (76.92)		
Prenatal training			5.940	0.015
Yes	5 (20.00)	20 (80.00)		
No	11 (55.00)	9 (45.00)		
Pattern of sucking			3.919	0.048
Fed by mother	5 (21.74)	18 (78.26)		
Fed by milk bottle	11 (50.00)	11 (50.00)		
Delivery times			0.012	0.912
Primipara	8 (36.36)	14 (63.64)		
Multipara	8 (34.78)	15 (65.22)		
Number of sucking (h/per time)			4.865	0.027
>6	11 (52.38)	10 (47.62)		
≤6	5 (20.83)	19 (79.17)		
Start-up time of lactation phase II (h)			3.919	0.048
>72	11 (50.00)	11 (50.00)		
≤72	5 (21.74)	18 (78.26)		

Notes: BMI, Body Mass Index; EPDS, Edinburgh Postpartum Depression Scale.

who milked ≥350 mL/d for 7 days in the observation group were significantly more than those in the control group (all P<0.05). The time when the milking volume reached 350 mL/d was significantly less than that in the control group (P<0.001).

Comparison of children's growth status during hospitalization between the two groups

As is shown in **Figure 2**, six weeks after delivery, the weight, height, and head circumference of the preterm infants during hospitaliza-

Table 2. Multivariate logistic regression analysis for inadequate breastfeeding

Index	OR	95% CI	P
Maternal age	1.102	1.011~1.232	0.000
Gestational age	13.321	13.211~15.211	0.000
History of gestational hypertension	1.176	1.122~1.314	0.000
EPDS score	1.031	1.318~1.431	0.000
Postnatal first milk-feeding time	1.598	1.966~2.012	0.000
Number of sucking	11.234	11.243~14.321	0.000
Start-up time of lactation phase II	1.335	1.763~2.023	0.000

tion in the observation group were significantly larger than those in the control group (all P<0.001).

Comparison of the incidence of complications during hospitalization between the two groups

As is shown in **Table 4**, the incidence of complications such as necrotizing enterocolitis, retinopathy and nosocomial infection of the preterm infants in the observation group (13.04%) was significantly lower than that in the control group (45.45%, P=0.038).

Discussion

The nutritional needs of preterm infants in the NICU are higher than those of normal term infants. The proper proportions of proteins, fat, sugar, and essential amino acids in breastmilk can effectively promote the growth and development of children. Meanwhile, the large amount of immune substances contained in breastmilk can enhance children's improve the immune system of the children, so breastfeeding is of great significance to preterm infants, and breastfeeding for preterm infants in the NICU is very important [11]. However, the current clinical problem is that preterm infants in the NICU are often separated from their mothers, which is not conducive to the lactation of the mothers, resulting in insufficient breastfeeding of preterm infants [12]. Therefore, improving breastfeeding for preterm infants in the NICU is a key clinical issue that needs to be urgently solved [13]. In view of the fact that breastfeeding is affected by several factors, in this study, we tried to find the influential factors of breast feeding for preterm infants in the NICU by analyzing the general data of preterm infants in NICU, so as to explore improvement strategies.

This study showed that the maternal age, delivery style, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, prenatal training, pattern of sucking, number of sucking attempts and start-up time of lactation phase II were the influential factors of breast feeding for preterm infants in the NICU. Elizabeth et al. reported that among the mothers of preterm infants with insufficient breast mild in the NICU, the mothers with delayed start-up time of lactation phase II accounted for a large proportion [14]. Marly et al. showed that the mothers of preterm infants with older maternal age, younger gestational age, complicated with hypertension during pregnancy and higher EPDS scores should be treated with immediate and effective interventions to improve their breastmilk secretion and increase their breastfeeding rates [15]. Bonet M et al. also found that the risk factors of insufficient breastfeeding included a gestational age of less than 30 weeks, the number of breast sucking attempts being less than 8 times, and cesarean section; which could provide guidance to the early differentiation and intervention for high-risk puerperae [16]. The results of our study were basically consistent with the results of the above studies, which proved the validity of the results of our study [17]. In addition, the above studies had suggested that the inadequate breastfeeding could be improved by distinguishing puerperae with high risks according to the factors affecting breast feeding and performing effective interventions.

Logistic regression analysis of our study showed that maternal age, gestational age, history of gestational hypertension, EPDS score, postnatal first milk-feeding time, number of sucking attempts and start-up time of lactation phase II were all independent factors affecting breast feeding for preterm infants in the NICU. The maternal age of preterm infants in the NICU was closely related to mothers' physiological functions, especially the function of mammary glands which is significantly related to lactation [18]. Namely, older mothers tend to have a decline in the body's physiological functions and decrease in acini of mammary glands, leading to a delay and reduce of lactation [19].

Table 3. Comparison of maternal age, gestational age, EPDS score, number of sucking attempts, and the lactation II period start time between the adequate lactation group and the inadequate lactation group ($\bar{x} \pm$ sd)

| Groups	The adequate lactation group (n=29)	The group with deficiency lactation (n=16)	t	P
Maternal age (years)	26.77±2.27	33.01±2.43	8.439	0.000
Gestational age (weeks)	35.87±4.65	28.96±3.22	5.853	0.000
EPDS score (score)	8.13±1.75	12.87±2.45	6.836	0.000
Number of sucking (h/time)	4.71±1.45	8.31±2.04	6.242	0.000
Start-up time of lactation phase II (h)	65.12±9.76	77.88±10.13	4.097	0.000
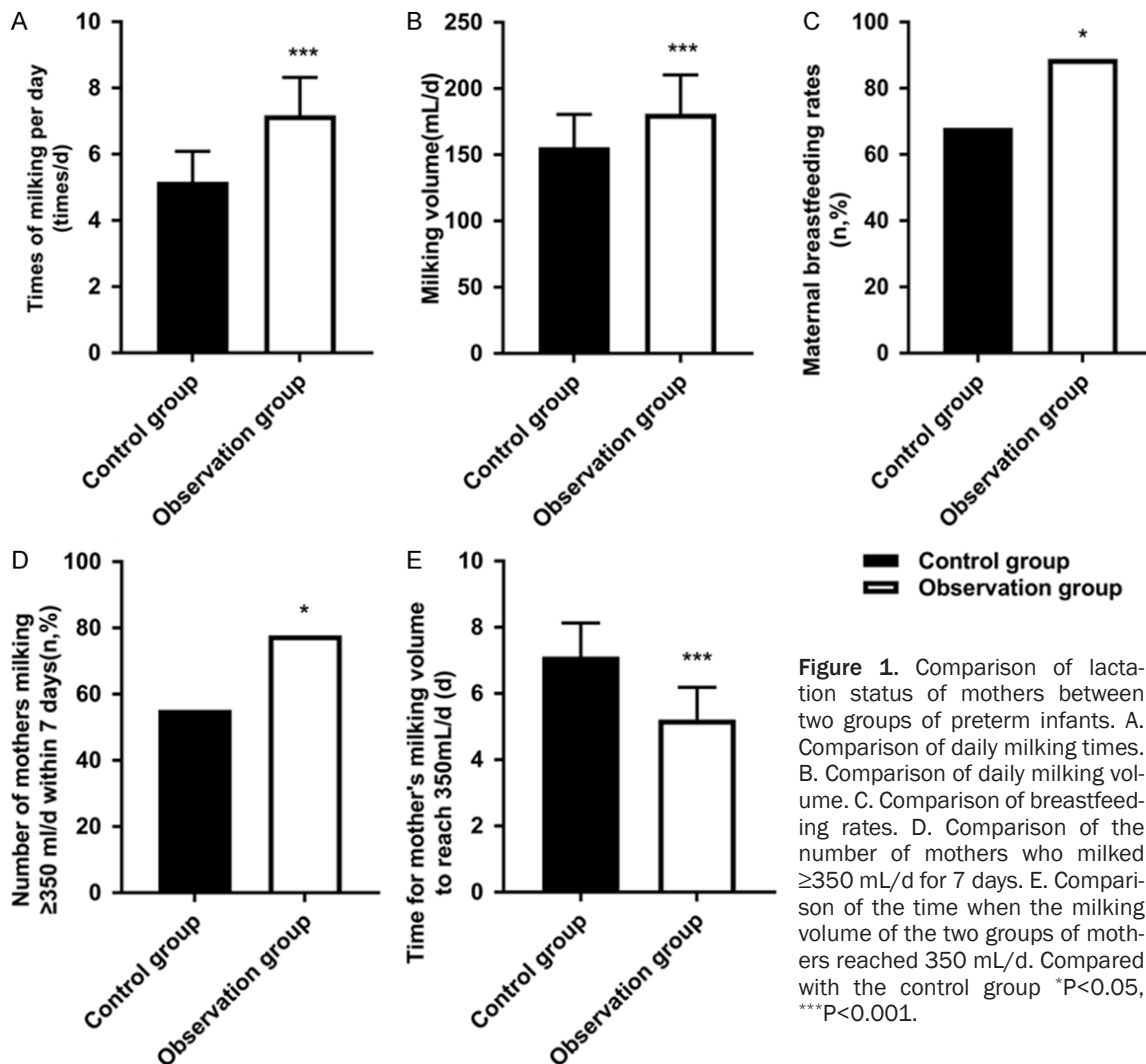
Figure 1. Comparison of lactation status of mothers between two groups of preterm infants. A. Comparison of daily milking times. B. Comparison of daily milking volume. C. Comparison of breastfeeding rates. D. Comparison of the number of mothers who milked ≥350 mL/d for 7 days. E. Comparison of the time when the milking volume of the two groups of mothers reached 350 mL/d. Compared with the control group *P<0.05, ***P<0.001.

In addition, research indicates that the endocrine levels of pregnant women were extremely diverse at different gestational ages [20]. Therefore, gestational age may be closely related to the lactation levels of mothers of preterm infants in the NICU. With the increase of gestational age, the levels of various hormones such as placental prolactin, estrogen, cortisol, and prostaglandin E2 changing constantly in the puerperae's body, and the level of prolactin is continuously increasing. As a result, puerperae with higher gestational age had higher mater-
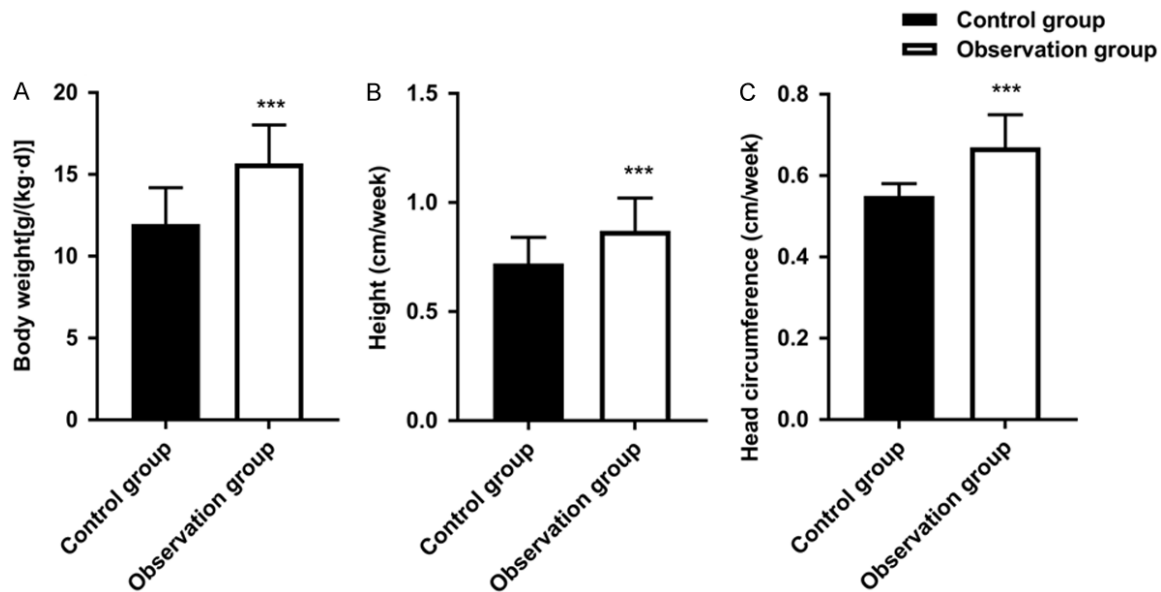
Figure 2. Comparison of preterm infants' growth. A. Comparison of weights of preterm infants during hospitalization. B. Comparison of preterm infants' height during hospitalization. C. Comparison of head circumference of preterm infants during hospitalization. Compared with the control group, ***P<0.001.

Table 4. Comparison of the incidence of complications during hospitalization between the two groups of preterm infants (n, %)

Groups	Control group (n=22)	Observation group (n=23)	χ^2	P
Necrotizing enterocolitis	3 (13.64)	1 (4.35)	0.325	0.568
Retinopathy of prematurity	3 (13.64)	1 (4.35)	0.325	0.568
Nosocomial infections	4 (18.18)	1 (4.35)	1.003	0.316
Total incidence	10 (45.45)	3 (13.04)	4.280	0.038

nal prolactin levels, stronger postpartum lactation capacity as well as higher milk production. Previous study has pointed out that the history of hypertension during pregnancy could have a great impact on maternal hormone levels. On the one hand, hypertension could affect the placental prolactin levels, which directly led to a decrease in postpartum lactation. On the other hand, most women with a history of gestational hypertension had low protein levels, leading to low nutritional levels, which also affected their postpartum lactation levels [21]. In addition, studies have shown that the postpartum lactation levels were greatly affected by emotions [22]. In this study, the EPDS score was used to evaluate the degree of depression of mothers of preterm infants. High EPDS score indicates a high degree of depression of the mothers. Depression could cause the increase of adrenaline and norepinephrine in body, the

decrease of secretion of prolactin and the reduction of lactation. Most postpartum mothers secreted a large amount of milk from the time of lactation phase II. An early beginning of this period could assist the body to establish and maintain lactation function, while the delay of this period could cause decrease of lactation ability. Moreover, sucking times also had a great impact on the mother's breastmilk secretion. Frequent sucking can stimulate the nipple nerve endings, this stimulation is conducted into the anterior pituitary gland, leading the releasing of prolactin, so as to eventually promote breastmilk secretion [23]. The above analysis showed that older maternal age, younger gestational age, history of gestational hypertension, higher EPDS score, smaller number of sucking attempts and delay of the start-time of lactation phase II were associated with the inadequate breast milk production and collection from mothers of preterm infants in the NICU. Meanwhile, we found that the maternal age, EPDS score, number of sucking attempts, and the start-time of lactation phase II in the adequate lactation group were significantly less than those in the adequate lactation group; while the gestational age in the adequate lacta-

tion group was significantly older. These results have further proved the correlation between the independent factors and the lactation volume.

Therefore, active and effective nursing interventions for puerperae with high risk factors can improve breastfeeding. In our study, we designed an intervention method according to the results of the influential factor analysis to improve inadequate breastfeeding. The basic principles of this breastfeeding quality improving intervention were problem discovery, analysis, improvement, implementation, and evaluation [24]. In addition, our intervention comprised six steps: health education, breast sucking, oral care, home care, breastmilk analysis, and breastmilk management; which aim to solve the problems of inadequate knowledge of breastfeeding in families of preterm infants, low sucking ability, low oral protection level and weak immune system of preterm infants, etc. The health education step in the intervention of this study increases the breastfeeding rates by encouraging mothers and preterm infants to stay in the same room and develop a plan to increase the awareness of breastfeeding in their families. Second, nursing for education of breastmilk sucking can not only promote the milk secretion of the mother, but also ensure the basic nutritional status of the preterm infants. In addition, the oral care for the preterm infants could give them the first line of defense for their oral cavity, thereby enhancing their immunity. Meanwhile, the home care for the preterm infants can not only improve the intimacy of preterm infants with their families, but also improve the uterine recovery of mothers through breastfeeding. Finally, the breastmilk analysis and breastmilk management can effectively ensure the comprehensiveness of nutrition and the improvement of digestive function of preterm infants, and strengthen the mothers' enthusiasm for lactation and improved the milk production [25]. Our study showed that the lactation status in the observation group was significantly better than that in the control group. The growth and development of the preterm infants in the observation group were significantly better than those in the control group; which proved that the quality improvement interventions can significantly promote breast feeding and further promote the growth and development of preterm infants.

The results of this study also indicated that the incidence of complications in the observation group was significantly lower than that in the control group. Moreover, the breastfeeding quality improvement interventions could also improve preterm infants' digestive function; reduce the incidence of necrotizing enterocolitis, retinopathy and nosocomial infections, which may be related to the improvement of immune function.

The advantage of this study is that we studied the factors affecting breast feeding for preterm infants in the NICU, which is comprehensive and reliable. However, the sample size in our study needs to be expanded.

In conclusion, maternal age, gestational age, history of gestational hypertension, EPDS score, number of sucking attempts, and start-time of lactation phase II were the main factors affecting breast feeding for preterm infants in the NICU. With the breastfeeding quality improvement interventions, the mother's lactation status and the preterm infants' growth status have improved, which can provide guidance for clinical care.

Disclosure of conflict of interest

None.

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