

# Effect of the theory of planned behavior on primipara breastfeeding

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**Background:** Breastfeeding is the most effective way to provide food for the healthy growth and development of babies. It has been reported in the literature that interventions on parturients, with the theory of planned behavior (TPB) as the guiding framework, can achieve good results. The purpose of the present study was to explore the effect of the TPB on primipara breastfeeding.

**Methods:** A total of 70 primiparas, who were given regular intervention mode at Haian People's Hospital from May 2017 to May 2018, were selected as the control group, and a total of 70 primiparas, who were given the TPB model from June 2018 to June 2019, were selected as the observation group. Exclusive breastfeeding rates, continuous breastfeeding rates, and breastfeeding confidence and breastfeeding impact factors were compared between the two groups.

**Results:** After the intervention, the pure breastfeeding rates of the observation group at discharge, 1 month after delivery, and 4 months after delivery were higher than those of the control group (P<0.05). After intervention, the continuous breastfeeding rates of the observation group was higher than that of the control group at 4 months after delivery (P<0.05). After intervention, the skill dimension, inner activity dimension, and total score of the observation group were higher than those of the control group (P<0.05). After intervention, scores of attitude, perceptual behavior control, and knowledge in the observation group were higher than those of the control group (P<0.05).

**Conclusions:** The application of the TPB to primipara breastfeeding can significantly increase the rate of exclusive breastfeeding and continuous breastfeeding, and effectively improve the impact factors of breastfeeding.

Keywords: Theory of planned behavior (TPB); primipara; breastfeeding

Submitted Dec 30, 2020. Accepted for publication Mar 03, 2021. doi: 10.21037/apm-21-255 View this article at: http://dx.doi.org/10.21037/apm-21-255

#### Introduction

Breastfeeding is the most effective way to provide food for the healthy growth and development of babies. It is an important part of the reproductive process and has an important impact on both the mother and the baby (1,2). The importance of breastfeeding is generally well known, but there are still many parturients who are not aware of exclusive breastfeeding. The World Health Organization (WHO) recommends that infants should be exclusively breastfed during the first 6 months to achieve optimal growth and development. Relevant studies have shown that some parturients have enough breast milk, but they will choose to stop exclusive breastfeeding after returning to work 4 months postpartum. The rate of exclusive

breastfeeding is low in some areas; therefore, the current breastfeeding rate has not met the WHO requirements (3,4). Increasing the rate of exclusive breastfeeding and enabling parturients to continue breastfeeding are currently the main measures to ensure the health of mothers and babies. At present, it is believed that the factors that hinder parturients' continued breastfeeding are usually closely related to factors, such as parturients' age, education level, physiological status, and family environment. By previously published literature has suggested that breastfeeding feeding log can be used in practice settings to monitor feeding patterns in the newborn, it is a valuable tool in self-regulating breastfeeding and promoting a longer duration of full breastfeeding, but its acceptability may be impacted by socio-demographic variables (5). A prenatal breastfeeding workshop, based on the theory of self-efficacy and on adult learning principles, can increases maternal breastfeeding self-efficacy in the early postpartum period and the increased maternal breastfeeding self-efficacy results in increased breastfeeding duration (6). Intervention on the parturients with the theory of planned behavior (TPB) as the guiding framework can also achieve good results (7,8). To explore the more effective intervention model applied to primipara breastfeeding, this study integrated TPB with breastfeeding diary and workshop concept to primipara breastfeeding, and explored the influence of the TPB on the exclusive breastfeeding rates, continuous breastfeeding rates, and breastfeeding confidence and breastfeeding impact factors.

We present the following article in accordance with the STROBE reporting checklist (available at http://dx.doi. org/10.21037/apm-21-255).

# Methods

# Patient selection

A total of 70 primiparas, who were given regular intervention mode at Haian People's Hospital (Nantong, China) from May 2017 to May 2018, were selected as the control group, and a total of 70 primiparas, who were given the TPB model from June 2018 to June 2019, were selected as the observation group. Inclusion criteria were as follows: (I) primipara women; (II) age  $\geq$ 20 years; (III) gestational age  $\geq$ 37 weeks; (IV) no mental illness; (V) have normal communication and writing skills; and (VI) voluntary participation in the study. Exclusion criteria were as follows: (I) primiparas or infants affecting the implementation of breastfeeding due to special reasons (e.g., high-risk pregnancy, multiple births, infant congenital defects); (II) high-risk pregnancy; (III) infants with congenital defects; and (IV) lack of tools for telephone follow-up. The study was approved by the Ethics Committee of Haian People's Hospital (No. [2017]KY024) and was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All participants provided informed consent.

#### Interventions

The control group was given a routine intervention mode. The specific measures were as follows: (I) medical staff should pay attention to whether the maternal mammary glands are blocked, and guide primiparas to breastfeed as soon as possible, and delay the use of artificial teats; (II) during the maternity check-up, the medical staff will provide primiparas with breastfeeding-related knowledge and skills; (III) conduct 1-to-1 education for primiparas during the hospitalization, introduce them to the importance of breastfeeding, encourage them to actively implement breastfeeding, and guide them to continue exclusive breastfeeding for 4–6 months as much as possible; (IV) medical staff demonstrate and assist primiparas in breastfeeding, ensure that the baby is in the correct posture, and teach primiparas the correct feeding method; (V) pay attention to the guidance of maternal diet and psychology; and (VI) medical staff should provide guidance on discharge before primiparas are discharged from the hospital, distribute the knowledge manual of precautions during lactation, and inform them of the department telephone hotline so that medical staff can solve the problems of primiparas during breastfeeding at any time.

The observation group was given the TPB mode, and the specific interventions were as follows: (I) theoretical framework, based on the TPB, comprising five elements: attitude, important support from others, perceptual behavior control, behavior intention, and behavior. The theory holds that the more positive attitudes, important support from others, and perceived behavior control, the more positive the primipara's behavioral intentions, which effectively promotes her breastfeeding behavior; (II) prenatal intervention. Medical staff organized primiparas to participate in lectures on the importance of breastfeeding methods and duration, recommended high-quality maternal and child websites to them, and encouraged them to share their knowledge of breastfeeding with each other so that they could gain breastfeeding confidence. This lecture

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adopted a small-scale teaching method (30 min), and the families of the primiparas were encouraged to participate. After the lecture, the medical staff invited all primiparas and all members of the breastfeeding research team into a WeChat group or QQ group so that the primiparas could communicate with relevant personnel in time; (III) intervention during hospitalization. Medical staff conducted ward inspections twice a day and talks with the primiparas. Each conversation lasted about 15 min. During the ward inspection, medical staff reintroduced the importance of breastfeeding to the primipara, increased awareness of breastfeeding, taught the correct feeding posture, and ensured that the primipara could breastfeed successfully. Next, they introduced the baby's initial stomach volume and initial lactation volume to the primipara and her family to avoid overfeeding the baby. The baby's father was shown how to assist the primipara to adjust breastfeeding posture and judge the baby's demeanor, and let the primipara feel the support of her family members for breastfeeding. Finally, family members were asked to supervise and help the primipara breastfeed effectively; (IV) postpartum intervention. After the primiparas were discharged from hospital, medical staff continued to conduct telephone follow-ups to solve problems, such as breast engorgement during breastfeeding and lumps in breast milk, and continued to introduce the advantages of breastfeeding. Medical staff provided Q&A services in WeChat or QQ groups on a weekly basis to encourage mothers to communicate with each other and share their experiences and feelings. During the telephone follow-up, the medical staff urged the primipara to breastfeed, and kept abreast of the feeding situation, so that the primipara could feel the care and support of the medical staff. Telephone followup was conducted at 4 months after delivery to monitor the primipara's recuperation, teach her how to store breast milk to avoid termination of breastfeeding due to work or other reasons, and increase her self-confidence in continuing breastfeeding. When the baby returned to the hospital for an examination 4 months after delivery, the medical staff organized 5-6 primiparas to communicate, discuss, and share breastfeeding experiences.

# **Evaluation** indexes

# Exclusive breastfeeding rate

The medical staff asked and recorded the primipara's exclusive breastfeeding status at the time of discharge, 1 month after delivery, and 4 months after delivery.

#### **Continuous breastfeeding rates**

Medical staff asked questions and recorded responses about whether the primipara was continuously breastfeeding when she was discharged from the hospital, 1 month after delivery, and 4 months after delivery.

#### **Breastfeeding confidence**

The Breastfeeding Self-Efficacy Scale was used to evaluate the skill dimension and inner activity dimension. The skill dimension includes breastfeeding skills and special principles. The inner activity dimension includes breastfeeding beliefs and attitudes. The total score is 30– 150, and higher total scores indicate higher maternal selfefficacy (9).

#### Breastfeeding impact factors

The revised Breastfeeding Behavior Prediction Tool (BAPT) and the revised Breastfeeding Questionnaire (BKQ) were used to evaluate breastfeeding impact factors before and after intervention (7,10). The original BAPT was based on the TPB, with 51 items and 4 subscales as follows: Positive Breastfeeding Attitudes Scale, the Breastfeeding Negative Attitudes Scale, the Breastfeeding Support Scale, and the Breastfeeding Control Scale. BAPT had 44 items in total, and each item used a 5-level scoring method. Cronbach's  $\alpha$  of BAPT was verified to be 0.869, indicating that it had good reliability and validity. The original BKQ was in Chinese, and its main content included the benefits of exclusive breastfeeding and breastfeeding techniques, with a total of 17 items. After revision, "knowledge of breastfeeding" and "storage and use of breast milk" were added. The BKQ has 25 items in total, and each item uses a 5-level scoring method. The questionnaire's Cronbach's a=0.892 was tested and was found to have good reliability and validity. The higher the score, the better the improvement of the impact factor.

# Statistical analyses

The statistical analysis in the present study was performed using SPSS version 20.0 (IBM, Armonk, NY, USA). Breastfeeding confidence and breastfeeding impact factor scores were expressed as mean standard deviation and compared using 2-tailed *t*-tests. Exclusive breastfeeding rate and continuous breastfeeding rate were expressed by rates and percentages, and compared using the  $\chi^2$ -test or ranksum test. P<0.05 was considered statistically significant in the present study.

Table 1 Comparison of general information of primiparas between the two groups

| Item                            | Control group (n=70) | Observation group (n=70) | Statistical value     | P value |
|---------------------------------|----------------------|--------------------------|-----------------------|---------|
| Age (x                          | 26.58±4.36           | 26.90±4.45               | t=0.430               | 0.668   |
| Delivery method, n (%)          |                      |                          | χ <sup>2</sup> =0.029 | 0.866   |
| Normal delivery                 | 34 (48.57)           | 33 (47.14)               |                       |         |
| Caesarean section               | 36 (51.43)           | 37 (52.86)               |                       |         |
| Education, n (%)                |                      |                          | χ <sup>2</sup> =0.136 | 0.934   |
| High school and below           | 27 (38.57)           | 26 (37.14)               |                       |         |
| College or undergraduate degree | 23 (32.86)           | 22 (31.43)               |                       |         |
| Masters degree and above        | 20 (28.57)           | 22 (31.43)               |                       |         |
| Family income (yuan), n (%)     |                      |                          | χ <sup>2</sup> =0.136 | 0.934   |
| <4,000                          | 3 (4.29)             | 3 (4.29)                 |                       |         |
| 4,000–8,000                     | 39 (55.71)           | 36 (51.43)               |                       |         |
| >8,000                          | 28 (40.00)           | 31 (44.29)               |                       |         |
|                                 |                      |                          |                       |         |

 $\overline{x}\pm S$ , mean standard deviation.

# **Results**

#### General information

The present study included 140 primiparas. Participants in the control group were 20-35 years old, with an average age of 26.58±4.36) years; 34 cases had natural delivery, 36 cases had cesarean section; 27 cases had a high school education and below, 23 cases had a college or undergraduate degree, 20 cases had a masters degree and above; and 3 cases had a family income of <4,000 yuan, 39 cases 4,000-8,000 yuan; 28 cases >8,000 yuan. Participants in the observation group were 20-36 years old, with an average age of 26.90± 4.4 years; 33 cases had natural delivery, 37 cases had cesarean section; 26 cases had a high school education and below, 22 cases had a college or undergraduate degree, 22 cases had a masters degree and above; and 3 cases had a family income <4,000 yuan, 36 cases 4,000-8,000 yuan, 31 cases >8,000 yuan. There were no statistically significant differences between the two groups for age, delivery method, education level, and family income (P>0.05) (Table 1).

# Exclusive breastfeeding rate

In the control group, 10 cases were exclusively breastfeeding at the time of discharge, 26 cases were at 1 month after delivery, and 29 cases were at 4 months after delivery. In the observation group, 23 cases were exclusively breastfeeding at the time of discharge, 38 cases at 1 month after delivery, and 41 cases at 4 months after delivery. After intervention, the rates of exclusive breastfeeding in the observation group at discharge, 1 month after delivery, and 4 months after delivery were higher than those in the control group, and the differences were statistically significant ( $\chi^2$ =6.701,  $\chi^2$ =4.145,  $\chi^2$ =4.114, respectively; P=0.010, P=0.042, P=0.043, respectively) (*Table 2*).

# Continuous breastfeeding rates

In the control group, 63 primiparas continued breastfeeding when they were discharged from the hospital, 64 cases 1 month after delivery, and 55 cases 4 months after delivery. In the observation group, 66 primiparas continued breastfeeding when they were discharged from the hospital, 65 cases 1 month after delivery, and 65 cases 4 months after delivery. After intervention, compared with the control group, the observation group had no significant differences in the rates of continuous breastfeeding at discharge and 1 month after delivery ( $\chi^2$ =0.888 and 0.099, respectively; P=0.346 and P=0.753, respectively). The continuous breastfeeding rates of the observation group were higher than those of the control group at 4 months after delivery, and the difference was statistically significant ( $\chi^2$ =5.833, P=0.016) (*Table 3*).

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Time  $\chi^2$  value Control group (n=70), n (%) Observation group (n=70), n (%) P value 6.701 0.010 At discharge 10 (14.29) 23 (32.86) 1 month after delivery 26 (37.14) 38 (54.29) 4.145 0.042 0.043 4 months after delivery 29 (41.43) 41 (58.57) 4.114

Table 2 Comparison of the rates of exclusive breastfeeding between the two groups

Table 3 Comparison of the rates of continuous breastfeeding between the two groups

| Time                    | Control group (n=70), n (%) | Observation group (n=70), n (%) | $\chi^2$ value | P value |
|-------------------------|-----------------------------|---------------------------------|----------------|---------|
| At discharge            | 63 (90.00)                  | 66 (94.29)                      | 0.888          | 0.346   |
| 1 month after delivery  | 64 (91.43)                  | 65 (92.86)                      | 0.099          | 0.753   |
| 4 months after delivery | 55 (78.57)                  | 65 (92.86)                      | 5.833          | 0.016   |

**Table 4** Comparison of breastfeeding confidence score between the two groups ( $\bar{x}\pm s$ , points)

| Time                | Group                    | Skill dimension | Inner activity dimension | Total score  |
|---------------------|--------------------------|-----------------|--------------------------|--------------|
| Before intervention | Control group (n=70)     | 51.12±4.55      | 50.28±5.11               | 100.24±9.22  |
|                     | Observation group (n=70) | 51.26±4.71      | 49.97±6.08               | 101.19±9.13  |
|                     | t value                  | 0.179           | 0.327                    | 0.613        |
|                     | P value                  | 0.858           | 0.745                    | 0.541        |
| After intervention  | Control group (n=70)     | 62.13±9.23      | 60.89±10.46              | 123.09±8.93  |
|                     | Observation group (n=70) | 69.99±13.02     | 66.74±11.47              | 135.21±12.49 |
|                     | t value                  | 4.120           | 3.153                    | 6.604        |
|                     | P value                  | 0.001           | 0.002                    | 0.000        |

#### Breastfeeding confidence

Before the intervention, there were no statistical differences in the skill dimension, inner activity dimension, and total score of the two groups of primiparas (t=0.179, t=0.327, t=0.0.613, respectively; P=0.858, P=0.745, P=0.541, respectively). After the intervention, the skill dimension, inner activity dimension, and total score of the observation group were higher than those of the control group, and the differences were statistically significant (t=4.120, t=3.153, t=6.604, respectively; P=0.001, P=0.002, P=0.000, respectively) (*Table 4*).

#### Breastfeeding impact factors

Before the intervention, there were no statistical differences between the two groups of primiparas in their attitudes, support from others, perceptual behavior control, and knowledge scores (t=0.142, t=0.396, t=0.611, t=0.507, respectively; P=0.888, P=0.692, P=0.542, P=0.613, respectively). After intervention, attitudes, perceptual behavior control and knowledge scores of the observation group were higher than those of the control group, and the differences were statistically significant (t=5.310, t=0.955, t=4.090, t=4.079, respectively; P=0.000, P=0.341, P=0.000, P=0.000, respectively) (*Table 5*).

# **Discussion**

Breastfeeding is important for parturients after delivery. Breastfeeding intention determines breastfeeding behavior, and breastfeeding intention is closely related to whether the parturient has the correct knowledge of breastfeeding and the influence of the surrounding environment (11,12). Some primiparas have insufficient knowledge of breastfeeding, so

| Time                   | Group                    | Attitude     | Important support<br>from others | Perceptual behavior control | Knowledge    |
|------------------------|--------------------------|--------------|----------------------------------|-----------------------------|--------------|
| Before<br>intervention | Control group (n=70)     | 100.13±12.09 | 106.76±20.43                     | 40.54±6.87                  | 104.57±12.65 |
|                        | Observation group (n=70) | 100.42±12.15 | 105.40±20.16                     | 41.23±6.49                  | 103.45±13.46 |
|                        | t value                  | 0.142        | 0.396                            | 0.611                       | 0.507        |
|                        | P value                  | 0.888        | 0.692                            | 0.542                       | 0.613        |
| After<br>intervention  | Control group (n=70)     | 104.35±6.57  | 108.73±11.43                     | 43.26±4.67                  | 107.68±10.07 |
|                        | Observation group (n=70) | 109.76±5.43  | 110.50±10.47                     | 46.75±5.40                  | 114.34±9.23  |
|                        | t value                  | 5.310        | 0.955                            | 4.090                       | 4.079        |
|                        | P value                  | 0.000        | 0.341                            | 0.000                       | 0.000        |

**Table 5** Comparison of breastfeeding impact factors between the two groups ( $\bar{x}\pm s$ , points)

they reject breastfeeding and fail to continue breastfeeding. Therefore, changing the feeding intention of primiparas and urging them to continue breastfeeding are important measures to encourage breastfeeding (13,14). The TPB was first proposed by US psychologist Ajzen in 1985. On the basis of the TPB, it is believed that human behavior is the result of careful consideration (15). The core view of the TPB is that behavior is determined by behavioral intentions, which are determined by behavioral attitudes, important support from others, and perceptual behavior control. At the same time, perceptual behavioral control can directly determine behavior (16,17). The TPB model is widely used in dietary behavior, AIDS prevention behavior, exercise, smoking or drinking, and other health-related behaviors and healthcare research, and has achieved good results (18).

In the present study, we found that the breastfeeding confidence scores of the observation group after the intervention were higher than those of the control group, and exclusive breastfeeding rates in the observation group at discharge, 1 month after delivery, and 4 months after delivery were higher than those of the control group (P<0.05). The results showed that the application of the TPB in primipara breastfeeding could significantly improve breastfeeding confidence and increase the rate of exclusive breastfeeding. The main reasons for the analysis are that, during the intervention process, medical staff can introduce the methods and importance of breastfeeding to primiparas, improve their knowledge of breastfeeding, increase their awareness of breastfeeding, and encourage them to actively breastfeed (19,20). In addition, the primiparas were introduced to the baby's initial stomach volume and initial

lactation volume so as to prevent the primiparas from using milk powder to feed their babies who think that their breast milk is insufficient, thereby effectively increasing the rate of exclusive breastfeeding.

In the present study, the continuous breastfeeding rate in the observation group was higher than that of the control group at 4 months postpartum after the intervention (P<0.05). This finding indicated that the TPB applied to primipara breastfeeding could significantly increase the rate of continuous breastfeeding. The main reasons for the analysis are that medical staff can promptly solve the problems related to breastfeeding of mothers through telephone follow-up, inform them of the advantages of breastfeeding, and teach them how to correctly store breastmilk so as to avoid breastfeeding cessation due to work or other reasons, thereby effectively improving the continuous breastfeeding rate (21).

The results of the present study also showed that attitudes, perceptual behavior control, and knowledge scores of the observation group after intervention were higher than those of the control group (P<0.05). The results showed that the application of the TPB to primipara breastfeeding could significantly improve their attitudes, perceptual behavior control, and knowledge about breastfeeding. The main reasons for the analysis are that medical staff can improve primiparas' awareness of breastfeeding through TPB intervention and teach their families relevant methods to reduce maternal stress. With a high level of relevant knowledge, the primiparas can control their own behavior more effectively and continue to breastfeed successfully. In addition, there was no significant difference in the important support from others before and

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after the intervention, which may be related to the frequent occurrence of adverse milk powder incidents (such as the Sanlu milk powder incident) in recent years, supporting the premise that breastfeeding is best (22). The research objects included in this study are insufficient, further research should include multi-sites with a more diverse sample, refine the intervention protocol.

# Conclusions

The application of the TPB to primipara breastfeeding can significantly increase the rate of exclusive breastfeeding and continuous breastfeeding, and effectively improve the impact factors of breastfeeding.

#### **Acknowledgments**

Funding: None.

# Footnote

*Reporting Checklist:* The authors have completed the STROBE reporting checklist. Available at http://dx.doi. org/10.21037/apm-21-255

Data Sharing Statement: Available at http://dx.doi. org/10.21037/apm-21-255

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi. org/10.21037/apm-21-255). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was approved by the Ethics Committee of Haian People's Hospital (No. [2017]KY024) and was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All participants provided informed consent.

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**Cite this article as:** Zhang Y, Yuan R, Ma H. Effect of the theory of planned behavior on primipara breastfeeding. Ann Palliat Med 2021;10(4):4547-4554. doi: 10.21037/apm-21-255

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(English Language Editor: R. Scott)

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