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Effects of Artificial Intelligence-based Health Education Courses on Primipara Delivery

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Abstract: ***Objective**: to study the first-time mothers, perinatal health education curriculum based on artificial intelligence, combined with health education group of network stations, fear of primarily childbirth, the influence of birth outcomes. **Methods**: From 2025.2.10 to 2025.5.10, 50 primiparous women who were waiting for delivery and giving birth in the obstetrics department of a tertiary hospital in Xianyang City were selected, divided into the control group and intervention group. Control group to provide routine obstetric health education contents and methods, intervention group in conventional health education, on the basis of systematic health education based on artificial intelligence course, combining group of network stations intervention of health education model, compared two groups before and after the intervention degree of childbirth fear and birth outcomes. **Results**: After the intervention measures, the intervention group childbirth fear score lower than the control group (P<0.05), intervention group the cesarean section rate and the total labor time and perineal injury rate is lower than the control group (P<0.05). **Conclusion**: Health education curriculum based on artificial intelligence, combined with health education group of network stations, can effectively reduce the primipara childbirth fear, improve birth outcomes.*

Keywords: Artificial intelligence, Health education, First-time mothers, Fear of childbirth, The outcome of childbirth.

1. Introduction

Prenatal fear refers to the physiological and psychological changes that women experience during pregnancy due to the influence of female hormones, including anxiety, fear, and emotions [1]. A study shows that 12.4%-54% of pregnant women will appear different degrees of antenatal is fear [2]. First-time mothers lack of maternal experience compared with those of multipara, more prone to psychological stress and excessive concern, the chance of prenatal fear is higher [3]. At the same time, if prenatal keep negative emotions for a long time, a pregnant woman's bod y synthesis increased catecholamine, will directly affect the maternal sensitive to pain, which can affect the health of the fetus and easy childbirth, cause adverse birth outcomes [4]. Therefore, scientific and effective maternal health knowledge, can reduce prenatal fear, to help mothers should be a better delivery and postnatal life, avoid adverse birth outcomes, improving maternal quality [5]. At present, each big hospital for maternal health education curriculum in line in the majority class, and susceptible to the limitations of time and place of the course, the continuity of learning and motivation [6] affect the pregnant woman. At the same time, the health education course for more pregnancy health care, not enough to cope with the problems after admission. Therefore, to build a series aimed at first-time mothers in perinatal health education curriculum is particularly important. The rapid development of artificial intelligence can assist in generating videos that meet requirements and help maternal families successfully spend time in the hospital.

2. The Research Object and Research Method

2.1 Study Subjects

2025.2.10-2025.5.10 during tertiary hospital in Xian-yang regular prenatal and hospital to give birth, the convenience sampling method is used to select 50 cases, 25 maternal 2025.2.10-2025.3.25 admitted to hospital for control group, 25 maternal 2025.3.26-2025.5.10 admitted to hospital for the intervention group. Inclusion criteria: (1) the first pregnancy and childbirth way (2) pregnant for naturally conceived (3) single tire live births (4) comply with the requirements for breastfeeding, and is willing to breastfeeding (5) in our hospital by inputting and regular prenatal. Exclusion criteria: (1) with pregnancy complications (2) has a history of mental illness (3) serious communication disorders, have deaf or visually impaired. Excluding criteria: (1) not complete learning course content again; (2) those who did not cooperate to complete the scale or were lost to follow-up were included in the sample (n=50).

2.2 Research Method

2.2.1 Control intervention plan

Control group accepted routine obstetric prenatal health education, including prenatal health education, clinic of classroom, pregnant women health education materials and WeChat group instruction. (1) when the prenatal health education: to guide pregnant monitoring blood pressure during pregnancy, weight control, adjust the structure of nutritional meals, etc. (2) for pregnant women pregnant women in prenatal class schedule, remind pregnant women choose time to participate in the study.(3) pregnant women health education class: determine admission opportunity, need to prepare goods, pregnant women sports guidance, newborn basic nursing content, etc. (4) health education materials: obstetric corridor posters, nurse station placed brochures and the qr code can sweep code online learning. (5) establish WeChat group, provide maternal exchange experience, learn from each other.

2.2.2 Intervention group intervention plan

(1) Build a course team

The course team consists of 9 multidisciplinary members, including 1 associate chief physician in obstetrics, 1 midwife in delivery room, 2 nurse in charge in obstetrics, 1 dietitian with 5 years of experience in nutrition department, 1 doctor in charge in palaeontology department, 1 lecturer in medical psychology in medical college, and 1 graduate student engaged in maternal, infant and child research. One is an information engineer with 3 years of professional experience.

(2) Construction of health education curriculum

a) Determine the content of the course: Based on the latest guidelines and expert consensus [7] on maternal and newborn care, the 7th edition of the "Nursing of Obstetrics and Gynecology" textbook of Human Health, supplemented by the clinical experience of teachers of various disciplines, combined with the willingness of parturition, and the division of labor and cooperation of multidisciplinary teachers, the content of the health education course was determined, which was divided into 8 sections. Course content includes: the normal physiological changes, prenatal postpartum maternal and newborn items list, delivery instruction, clean sanitation, breastfeeding guide, activity, diet, humanistic care to rest.

b) To make a short video courses: with the help of the AI tool to generate the lecture video, strong operational guidance content, recording reality operation demo video.

(3) Implementation of the intervention program

In intervention group, on the basis of prenatal health education, increase with the aid of AI software to generate short video forms of health education curriculum and the group of network stations health education model.

a) Into the maternal hospitalization, nurse to introduce women and their families to intelligent interactive instrument used by the bed, to help mothers and families find health course smoothly. Guide mothers and families must complete finish at least 1 times courses together, a section in each course will set up 2, in the process of video playback timing bounce, 15 seconds to answer, a total of eight questions right within the given time, read as a complete video course. Pregnant and maternal families who have completed high-quality learning will be given a baby bathtub as a gift to improve the enthusiasm of participating in learning.

b) After the video is played, the intelligent interactive instrument randomly blunts a small family homework. The homework content is selected from the operation teaching in the video course, and multiple family members are required to participate and practice to complete the operation. For example, it can practice assisting pregnant women to move to the head of the bed, simulating the "waking up trilogy" when they get out of bed 24 hours after delivery, dressing the baby, changing diapers and other operations. Able to finish his homework, after birth give baby a bath.

c) Carry out half-hour group health education every day, and the time is scheduled from 16:30 to 17:00, by the shift of responsibility, team leader in the nurses' station through the terminal system, intelligent interaction to ward bed instrument issued a circular, maternal and their families to the classroom, unified answering questions on maternal health problem.

d) According to the level of maternal care, according to the level of wards, once found not the right way to care, to stop in time, help to solve. And repeatedly urged women and their families to learn health education courses, if in doubt, next to the bed for personalized answering questions.

e) When discharged from the hospital, pregnant women can join the obstetric Be-answering WeChat group, and each WeChat group is guaranteed to have a supervisor obstetrician and nurse in charge. Any questions related to pregnancy and childbirth can be exchanged and asked in the group, and the questions can be answered by the staff. Other families can also learn together, share experience, and do a good job in continuous care after discharge.

2.3 Evaluation Indicators

2.3.1 personal information questionnaire

Through literature review, self-designed questionnaire. The questionnaire included general information questionnaire and specialized information questionnaire.

2.3.2 Fear of Childbirth Scale

The Cronbach's α coefficient of the Chinese version of Fear of Childbirth Scale was 0.910, and the reliability was 0.803. The questionnaire used Likert scoring method (1=none, 2=mild, 3=moderate, 4=severe), including 16 items, covering 4 dimensions, the total score ranged from 14 to 64. The higher the score, the higher the perpetrate childbirth fear severity, classified according to the total score: no (16-27 points), light (28-39), medium (40-51 points) and heavy (52-64 points) four grades [8].

2.3.3 Outcomes of childbirth

Observed two groups of mothers cesarean section births, the total labor time, perinatal injury rate, two hours postpartum and neonatal apgar score [9].

2.4 Statistical Analysis

spss27.0 statistical software was used for data analysis and processing. Measurement data were expressed as mean and standard deviation, and two independent sample t test was used for comparison between groups. The count data were described by frequency and percentage, and chi-square test was used for analysis and statistics. $P<0.05$ was considered statistically significant.

3. Results

A total of 50 subjects were included in this study. One case dropped out (did not complete the course) in the control group, and the effective sample size was 24 cases. In the intervention group, 1 case was excluded (emergency admission for delivery), 1 case was excluded (did not complete the questionnaire), and 23 cases were effective. Finally, a total of

47 pregnant women participated in this study.

3.1 Comparison of General Data of Primulas between Two Groups

There were no significant differences in age, gestational age, occupation, main caregiver during pregnancy, ways to receive pregnancy and childbirth knowledge, and education level between the two groups (P>0.05). For details, see Table 1.

Table 1: Two groups of mothers general data comparison

Items	Control group (n=24, %)	Intervention group (n=23, %)	Statistic value	P
Age (years $\overline{X}$±S)	28.7±3.5	27.5±4	0.062(1)	0.287
Gestational age (weeks $\overline{X}$±S)	36±2.7	36±1.6	1.078(1)	0.951
Occupation			1.692(2)	0.429
No fixed occupation	11 (46)	14 (61)		
Personnel of government	8 (33)	7 (30)		
Self-employed	5 (21)	2 (9)		
Primary caregiver during pregnancy			0.196(2)	0.906
spouse	9(38)	8(35)		
Mother or mother-in-law	10(42)	11(48)		
Relatives or caregivers	5(20)	5(17)		
Access to maternity knowledge			1.075(2)	0.584
Family and friends	6(25)	4(17)		
Online media	10(42)	8(34)		
Maternity school	8(33)	11(49)		
Education			4.447(2)	0.217
Junior high school and below	0	1(4)		
High school/secondary school	2(8)	0		
college	8(33)	12(52)		
Bachelor's degree or above	14(59)	10(44)		

Notes: (1)t (2) x^2

Table 2: Comparison of the scores of primiparous women before and after intervention between the two groups

group	Pre-intervention	After the intervention	t	P
Control group (n=24)	48±10.7	38±7.1	-5.137	<0.01
Intervention group(n=23)	52±10	25±3.8	17.569	<0.01
t	-1.327	7.132		
p	0.191	<0.01		

Table 3: Comparison of delivery outcomes between the two groups

group	Mode of delivery (%)	Total duration of labor	Perineal injury (%)	Bleeding volume at two hours postpartum	Neonatal apgar score
	Vaginal delivery Cesarean		Yes Not		
Control group (n=24)	8(33) 15(67)	690	13(54) 11(46)	263.13±25.27	8.71±0.46
Intervention group (n=23)	19(83) 4(17)	580	4(17) 18(83)	258.04±18.87	8.7±0.47
t/x^2	-3.854	25	2.66	3.380	0.009
P	<0.01	<0.01	0.011	0.996	0.924

3.2 Comparison of Fear of Childbirth before and after Intervention

The results showed that before the intervention, there was no statistically significant difference in the score of childbirth fear between the two groups (P>0.05). After intervention, the total score of fear of childbirth was lower than that before intervention (P<0.05). The total score of fear of childbirth in the intervention group was lower than that in the control group, and the difference was statistically significant (P<0.05). Details are shown in Table 2.

3.3 Comparison of Delivery Outcomes between the Two Groups

The results showed that this study could effectively reduce the cesarean section rate, shorten the labor process and reduce the incidence of perinatal injury (P<0.05). However, there was no significant difference in the amount of bleeding two hours after delivery and the agar score of newborns within 1min after birth (P>0.05). Details are shown in Table 3.

4. Summary

Primiparas lack childbirth experience and are closer to the third trimester of pregnancy, the degree of childbirth fear is higher. This negative psychological state is not conducive to the health of mother and child. Through systematic prenatal health education, primiparas can fully understand painless delivery, reduce non-medical indications of cesarean section and the occurrence of antepartum cesarean section due to pain [10]. At the same time in the process of childbirth actively cooperate with the midwife in ramah ze breath, can shorten the labor [11], reduce the perineal injury rates, improve birth experience, effectively improve adverse birth outcomes.

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