# Promoting Maternal Health Literacy

# through Family-Centered Care

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## Abstract

Maternal health literacy is an important public health work. It is a specialized literacy because healthy pregnant women require specific health literacy skills. Confirming the level of maternal health literacy among pregnant women is critical given the impact of maternal health literacy on the health of mothers and their children (Pirzadeh et al.,2019). To reduce adverse maternal and newborn outcomes and to improve the level of maternal health literacy, an effective maternal health literacy promotion strategy must be established. The study aims to identify the level of maternal health literacy among pregnant women and to establish a family-centered care promotion program based on the maternal health literacy level and the demographic profile. This study research was carried out in a descriptive design. A total of 251 pregnant women were selected by purposive sampling method in Shandong province, China. Data were collected using Maternal Health Literacy Questionnaires. The data were analyzed using Mean, Frequency, Percentage, ANOVA, and post hoc analysis. The findings of the study showed the maternal health literacy level of pregnant women in the western region of Shandong province was generally low. The study found the main factors influencing maternal health literacy of pregnant women include age, gestational weeks, occupation, education attainment, monthly income, and area of living. The Family-centered care promotion program was established according to the results of the study in the study.

 *Keywords:* *maternal health literacy, family-centered care, maternal health behavior, maternal health skills, pregnant women*

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## Introduction

Pregnant women are a special kind of people. In the period of pregnancy and delivery, there are physiological and psychological changes in women. Their role has also been transformed and adjusted. They need to bear the pressures from economic, social, and other aspects of family relationships. These changes can directly affect the quality of family life. Childbirth is a life event for the whole family.

In China, due to the influence of traditional practices, pregnant women should observe some special rules during the perinatal period such as avoiding cold foods during pregnancy; no brushing of teeth, no washing of hair, or taking a bath after giving birth. Even in hot summer, the woman has to cover herself with a thick quilt, windows cannot be opened as well as the fan, air conditioning, and so on. There is also the maternal impression that the pregnant woman will give birth to a child with big eyes if she eats a lot of grapes. These traditional customs and practices affect the living habits of pregnant women and may even result in some life-threatening conditions for both the mother and her unborn child. These conditions indicate that mothers and their families have low maternal health literacy. Excessive protection during pregnancy and reduce exercise, unreasonable diet resulting more than normal weight during pregnancy and increase the rate of cesarean section and macrosomia birth rate (Wang, 2016). A study (Tan et al., 2021) on the maternal health literacy level of 1661 pregnant women in Lanzhou showed that rural areas, low age, low education level, and population mobility were the obstacles to maternal health literacy.

In recent years, China's health service system has been greatly improved (Xu, 2016). A pre-pregnancy consultation clinic provides fertility evaluation and pregnancy guidance, and educated people establish a concept of science. Encourage the working institutions to open schools for pregnant women, strengthen the health education of pregnant women and their families, promote the development of health knowledge, health behavior, and health skills, and improve the health literacy level. The Mother and Son Health Handbook is the carrier, free for pregnant women with five prenatal examinations and the promotion of the overall health care service (National Health Commission of China, 2019). To strengthen the systematic management of pregnant women, a systematic and standardized management system and service model for pregnant and pregnant women have been gradually established to protect pregnant women and newborns (National Health Commission of China, 2019). The maternal system management rate is the ratio of the women's number in a certain region who have received early pregnancy examination, antenatal examination ≥8 times in urban areas and ≥5 times in rural areas, sterilized delivery and post-natal visits to the local number of live births during the year from pregnancy to 28 days after delivery. （Sun,et al., 2012).

The rate of prenatal examination in China increased from 83.7 % in 1996 to 96.6 % in 2018. There were 15.23 million births in 2018 (National Health Commission of China, 2019). While the national rate of prenatal examination is improving, nearly 640,000 babies were born in 2018 without prenatal examination. To strengthen the

systematic management of pregnant women, a systematic and standardized management system and service model for pregnant and pregnant women have been gradually established to protect pregnant women and newborns. The rate of systematic management of pregnant women rose from 65.5 % in 1996 to 89.9 % in 2018 (National Health Commission of China, 2019). According to the data, China's maternal system management rate has been improving continuously, but nearly 10% of them still cannot complete the systematic management.

The miscommunication between the health provider and a pregnant mother is an important challenge to the continuing problem of low levels of maternal health literacy (Smith et al.,2017). Family-centered Care (FCC) intervention is an effective way of nurse-client communication. It focuses on family harmony and health and paying attention to family members as an important participant in maintaining health. Its core concepts include respect, support, flexibility, selection, cooperation, information, authorization, and power (Hoying et al., 2009).

The FCC intervention involves prenatal, delivery, and postnatal care. It can provide maternal health education and training throughout the process, improve maternal ability to get, understand, and use information, and facilitate maternal access to family support to promote maternal and child health.

The researcher has observed in her clinical experience that many primigravida have inadequate knowledge of care and nursing for themselves and their babies. Many studies focused on improving Maternal Health Literacy through prenatal care, which mainly focuses on training and education on Maternal Health Literacy during pregnancy and rarely involves knowledge and skills of postnatal and newborn care. The researcher is a nurse who is interested in improving the Maternal Health Literacy Level for primigravida and their ability to self-care and newborn care. The study aims to identify the maternal health literacy level among perinatal women and to establish a family-centered care promotion program based on the level of maternal health literacy and the maternal demographic profile. Implementing the family-centered care promotion program for maternal health literacy, improving the maternal health literacy level among perinatal women, and helping nurses understand the importance of providing the family with the needs each family member requires.

## Method

### Research Design

The research adopted a descriptive design. Descriptive studies are often used in epidemiological studies to describe the distribution of diseases or health conditions and exposure factors in the population, aiming to propose causal hypotheses and provide clues for further investigation and research, and are the basis of analytical studies.

This design described and documented the level of the maternal health literacy of pregnant women and compared the maternal health literacy level when grouped according to demographic profile. This study established a maternal health literacy promotion program according to the level of maternal health literacy.

## Population and Sample

**The research adopted a descriptive design that was conducted on 251 patients. The population of the study is pregnant women who are having their prenatal check-ups at a Hospital in Shandong province from August to December 2021. Using purposive sampling, with the following inclusion criteria and exclusion criteria. The investigator submitted the research proposal to the Ethics Review Committee of Far Eastern University for approval. The investigator obtained permission from the selected hospitals. The study was conducted after approval.**

*Inclusion and Exclusion criteria*

Inclusion criteria: primigravida who are 20-39 years old; in any stage of pregnancy; willing to participate in the study. Pregnant women with high-risk pregnancies and unwillingness to participate in the study were considered as exclusion criteria in this study.

## Research Instrument

The main data-gathering instrument is the Maternal Health Literacy Questionnaire (MHLQ). The MHLQ is a questionnaire tool from the study of Chunyu Li from Yanbian University (Li, 2012). It includes two parts which are the socio-demographic profile scale of the subjects and the maternal health literacy questionnaire. The MHLQ is subdivided into three sections-- Maternal Health Knowledge Scale, Maternal Health Behavior Scale, and Maternal Health Skills Scale. Socio-Demographic Profile Scale of the Subjects: This part consists of demographic profiles, such as age, gestational weeks, occupation, educational attainment, monthly income, and area of living.

Maternal Health Literacy Questionnaire: (1) Maternal Health Knowledge Scale. There are 19 items on this scale, including pregnancy risk status, family self-monitoring, postpartum rehabilitation knowledge, contraception, breastfeeding, pregnancy and delivery, and maternal and infant nutritional diet. Use the answer "Yes" or "No" to score, score 1 for the correct answer and 0 for the wrong answer. The correct answer means master and the wrong answer means can't master. The total score on the scale is 19. The Cronbach's Alpha is 0.791. (2) Maternal Health Behavior Scale. There are 10 items on this scale, including self-weight monitoring, a reasonable combination of a nutritious diet, nutrient supplementation under the guidance of doctors, an appropriate amount of daily exercise, assess own physical condition, prenatal examination, and proactive access to health knowledge. The content of the question is choice questions, and the answers are "not do", "rarely do", "often do" and "completely do". Choose "not do" to get a 0 score, "rarely do" to get an I score, "often do" to get a 2 score, and "completely do" to get a 3 score. The total score on the scale is 30. The Cronbach's Alpha is 0.815. (3) Maternal Health Skills Scale. There are 5 items on this scale, including regular monitoring of fetal movement count, calculation of due date, fetal education, and taking the medicine under the guidance of doctors. The content of the question is choice questions, and the answers are "not do", "rarely do", "often do" and "completely do".

Choose "not do" to get a 0 score, "rarely do" to get an I score, "often do" to get a 2 score, and "completely do" to get a 3 score. The total score on the scale is 15. The Cronbach's Alpha is 0.815.

## Data Analysis

After collecting the data, SPSS-26 software was used for analysis, using descriptive statistics (frequency, percentage, mean, and standard deviation) and statistical tests (T-test, ANOVA).

## Ethical Considerations

The study was conducted (FEU-ERC Code:2020-2021-068) with the approval of the Ethics Review Committee of Far Eastern University.

## Results

**Table 1 Frequency and percentage distribution of demographic variables of the participants**

| S.No | Demographic Variables | Frequency | Percentage |
|------|-----------------------|-----------|------------|
| 1 | **Age** | | |
| | 20-29 years | 221 | 88.05 |
| | 30-39 years | 30 | 11.95 |
| **Total** | | 251 | 100 |
| 2 | **Gestational weeks** | | |
| | The first trimester | 40 | 15.94 |
| | The second trimester | 98 | 39.04 |
| | The third trimester | 113 | 45.02 |
| **Total** | | 251 | 100 |
| 3 | **Occupation** | | |
| | Nonprofessional occupation | 203 | 80.88 |
| | Professional occupation | 48 | 19.12 |
| **Total** | | 251 | 100 |
| 4 | **Educational attainment** | | |
| | Junior high school or below | 52 | 20.72 |
| | Senior High school | 84 | 33.46 |
| | Junior College or above | 115 | 45.82 |

| | | | |
|---|---|---|---|
| **Total** | | 251 | 100 |
| **5** | **Monthly Income** | | |
| | Low income (3000 yuan or below) | 59 | 23.51 |
| | Moderate income (3001-7000 yuan) | 148 | 58.96 |
| | High income (more than 7000 yuan) | 44 | 17.53 |
| **Total** | | 251 | 100 |
| **6** | **Area of Living** | | |
| | Rural | 91 | 36.25 |
| | Town | 35 | 13.95 |
| | City | 125 | 49.80 |
| **Total** | | 251 | 100 |

Table 1 describes the frequency and percentage distribution of demographic variables of maternal mothers concerning age, gestational weeks, occupation, educational attainment, monthly income, and area of living. About age, participants were grouped according to their optimal reproductive age: 20-29, 30-39. The optimal age for women to give birth is between 24 and 29 years old, and those older than 35 years old are considered elderly pregnant women (the Office of the Ministry of Health, 2012). A study of 7.81 million pregnant women showed that the risk of preterm birth was lowest between the ages of 25 and 29（Cavazos-Rehg et al., 2015). Women's age has a certain influence on the pregnancy outcome. The lowest risk of adverse pregnancy outcomes is from 26 to 30 years old, and 27 years old is the lowest (Weng et al., 2014). Hypertensive disease during pregnancy is the lowest between 20 and 29.9 years, and the risk gradually increases with increasing age. Taking the age group of 25 to 29.9 years as a reference, the risk of 30 to 34.9 years old is 1.02 times higher, and Between 35-39.9 years old is 1.22 times higher. The incidence of placenta previa increases with age. From 25 to 29 years and 29 years old as controls, the incidence of 30-34,35-39, and 40 to 44 years was 2.11,2.7, and 5.73 times. Consideration is associated with age-induced vascular and endometrial lesions (Timofeev et al., 2013). Gestational diabetes, macrosomia, fetal intrauterine growth and development restriction, and hypertensive diseases during pregnancy of $\geqslant$30 years old were higher than those of pregnant women aged 20 to 29 years old (Li, 2019). Therefore, participants were grouped into 20-29, and 30-39 years old. The gestational week was divided into the first, second, or third trimester. Occupation was classified according to the nature of the occupation into Nonprofessional occupation and Professional occupation. Education attainment was divided into junior high school or below, senior high school, junior college or above. Monthly income was classified according to economic status as low income (3000 yuan or below), moderate-income (3001-7000 yuan), and high income (more than 7000 yuan). Household income is measured by the highest and lowest 20% of households or population in the income distribution level. All households or populations are divided into five stratified groups: low-income, lower-middle income, middle-income, upper-

middle income, and high-income. Academics call this the "rule of five."(Li, 2009). In 2021, the per capita disposable annual income of Chinese residents was 29,975 yuan. According to their permanent residence, the per capita disposable annual income of urban residents was 43,504 yuan, and rural per capita disposable annual income was 16,902 yuan. To better collect data and make statistical analysis, take its integer, and reduce the grouping gap, the monthly income was divided into low-income (3000 yuan or below), moderate-income (3001-7000 yuan), and high-income (more than 7000 yuan). The area of living was divided into rural areas, towns, and cities.

**Table 2    Mean and Standard Deviation of the Maternal Health Literacy among the participants**

| Scale | Mean | Standard Deviation | Interpretation |
|---|---|---|---|
| Maternal Health Literacy | 37.49 | 8.289 | Low level |
| Maternal Health Knowledge | 12.72 | 3.149 | Moderate level |
| Maternal Health Behavior | 17.39 | 3.250 | Low level |
| Maternal Health Skills | 7.37 | 3.074 | Low level |

Table 2 indicated that the maternal health literacy level was at a low level, the maternal health knowledge level was at a moderate level, the maternal health behavior level was at a low level, and the maternal health skills level was at a low level. A survey on maternal health literacy was conducted among 1062 pregnant women in 17 towns and streets of Beibei District. The results showed that the average level of maternal health literacy in the Beibei district was 1.79%, the proportion of basic knowledge and basic health literacy, healthy lifestyle and behavior, and health skills were 4.52%, 4.24%, and 3.48%, respectively (JING et al., 2016). Pregnant women with low levels of maternal health literacy not only affect their health outcomes but also the safety and quality of life of their newborns and fetuses.

**Table 3 Assessment of the Level of Maternal Health Knowledge Among the Participants**

| Maternal Health Knowledge | Yes | | No | | Total | |
|---|---|---|---|---|---|---|
| | f | % | f | % | | % |
| 1. I am aware of the dangerous symptoms I might be experiencing. | 160 | 63.75 | 91 | 36.25 | 251 | 100 |
| 2. I am not familiar with the content of home self-monitoring. | 137 | 54.58 | 114 | 45.42 | 251 | 100 |

| Item | f | % | f | % | f | % |
|---|---|---|---|---|---|---|
| 1. I don't know what to prepare supplies for delivery. | 138 | 54.98 | 113 | 45.02 | 251 | 100 |
| 2. I know about knowledge of postpartum rehabilitation. | 73 | 29.08 | 178 | 70.92 | 251 | 100 |
| 3. I know foods rich in folic acid. | 196 | 78.09 | 55 | 21.91 | 251 | 100 |
| 4. I know how to prevent obesity during pregnancy. | 234 | 93.23 | 17 | 6.77 | 251 | 100 |
| 5. I don't know how to prevent anemia. | 105 | 41.83 | 146 | 58.17 | 251 | 100 |
| 6. I know the advantages of breastfeeding. | 220 | 87.65 | 31 | 12.35 | 251 | 100 |
| 7. I don't know about the method of breast care during lactation. | 167 | 66.53 | 84 | 33.47 | 251 | 100 |
| 8. I know about the method of feeding the baby. | 183 | 72.91 | 68 | 27.09 | 251 | 100 |
| 9. I know how to care for a baby's umbilical cord. | 72 | 28.69 | 179 | 71.31 | 251 | 100 |
| 10. I don't know about the proper way to bathe the baby. | 138 | 54.98 | 113 | 45.02 | 251 | 100 |
| 11. Prenatal tests are not required at 12 weeks of pregnancy. | 32 | 12.75 | 219 | 87.25 | 251 | 100 |
| 12. Vaginal delivery bleed less than cesarean section. | 216 | 86.06 | 35 | 13.94 | 251 | 100 |
| 13. Cesarean section is better than vaginal delivery. | 22 | 8.76 | 229 | 91.24 | 251 | 100 |
| 14. The couple can't have sexual life until 42 days after a vaginal delivery. | 197 | 78.49 | 54 | 21.51 | 251 | 100 |
| 15. The couple can't have sexual life within 3 months after cesarean section. | 217 | 86.45 | 34 | 13.55 | 251 | 100 |
| 16. A variety of foods during pregnancy means nutrition is appropriate. | 204 | 81.27 | 47 | 18.73 | 251 | 100 |
| 17. Milk is rich in vitamin C. | 48 | 19.12 | 203 | 80.88 | 251 | 100 |

*Note:* f - frequency        % - percentage

Table 3 indicated that the maternal health knowledge level of pregnant women was at the moderate level, and it showed that the maternal health knowledge with the high accuracy were obesity prevention (93.23%), cesarean section (91.24%), breastfeeding (87.65%), prenatal examination (87.25%), and the low accuracy were

umbilical cord care (28.69%), postpartum rehabilitation (29.08%), breast care (33.47%). Tan et al. (2017) conducted a study in the western region of China. It showed that in terms of maternal basic knowledge of pregnancy, pregnant women had the highest known rate of when to take folic acid supplements (84.5%), and the known rate of five health knowledge was less than 40%: (1). Which prenatal tests in the third trimester do not need to be checked every time; (2). How much is a pregnant woman's normal blood pressure; (3) What kind of pet is toxoplasmosis most likely to be associated with; (4). what is the full term; (5). Pregnant women before childbirth which situation can be temporarily not eager to go to the hospital. In terms of basic knowledge of newborns, in addition to the known rate of breast-feeding and breast-milk substitutes is more than 80%, the known rate of five newborn health knowledge is less than 20%: (1). How many percent does newborn birth weight drop after birth does not exceed birth weight commonly; (2). How much weight gain is normal when a newborn is one month old; (3). Thrush, false menstruation, breast enlargement, and horse teeth which do not belong to the normal physiological phenomenon of the newborn period; (4). When is the anterior fontanelle closed in infants?

**Table 4    Assessment of the Level of Maternal Health Behavior Among the Participants**

| Maternal Health Behavior | Not do | | Rarely do | | Often do | | Always do | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % | f | % |
| 1. Self weight test | 0 | 0.00 | 152 | 60.56 | 99 | 39.44 | 0 | 0.00 | 251 | 100 |
| 2. The reasonable combination of nutritious meals | 0 | 0.00 | 41 | 16.25 | 158 | 62.95 | 52 | 20.80 | 251 | 100 |
| 3. Eat appropriate amounts of fruits and vegetables | 3 | 1.20 | 43 | 17.13 | 205 | 81.67 | 0 | 0.00 | 251 | 100 |
| 4. Take supplements under the guidance of doctors | 0 | 0.00 | 33 | 13.15 | 200 | 79.68 | 18 | 7.17 | 251 | 100 |
| 5. Moderate daily exercise | 0 | 0.00 | 63 | 25.10 | 179 | 71.31 | 9 | 3.59 | 251 | 100 |
| 6. Standing posture, sitting posture, or walking posture properly | 0 | 0.00 | 56 | 22.31 | 185 | 73.71 | 10 | 3.98 | 251 | 100 |
| 7. Assess own physical condition and seek medical advice timely | 0 | 0.00 | 2 | 0.80 | 179 | 71.31 | 70 | 27.89 | 251 | 100 |

| Maternal Health Behavior | Not do f | % | Rarely do f | % | Often do f | % | Completely do f | % | Total f | % |
|---|---|---|---|---|---|---|---|---|---|---|
| 8. Prenatal tests according to doctor's instructions | 0 | 0.00 | 14 | 5.58 | 167 | 66.53 | 70 | 27.89 | 251 | 100 |
| 9. Attend a maternity school regularly and communicate with others | 140 | 55.78 | 69 | 27.49 | 36 | 14.34 | 6 | 2.39 | 251 | 100 |
| 10. Proactive access to health knowledge | 1 | 0.40 | 54 | 21.51 | 170 | 67.73 | 26 | 10.36 | 251 | 100 |

*Note:* f - frequency        % - percentage

Table 4 shows the level of maternal health behavior among the participants. The known rate of maternal health behaviors, such as pregnancy weight, breastfeeding, and baby physical examination, is less than 20% (Tan et al., 2017).

**Table 5    Assessment of the Level of Maternal Health Skills Among the Participants**

| Maternal Health Skills | Not do | | Rarely do | | Often do | | Completely do | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % | f | % |
| 1. Monitor fetal movement count regularly | 108 | 43.03 | 92 | 36.65 | 43 | 17.13 | 8 | 3.00 | 251 | 100 |
| 2. Calculate the due date | 41 | 16.33 | 103 | 41.04 | 57 | 22.71 | 50 | 0.80 | 251 | 100 |
| 3. Correct sleeping decubitus during pregnancy | 2 | 0.80 | 104 | 41.43 | 118 | 47.01 | 0 | 0.00 | 251 | 100 |
| 4. Do fetal education | 40 | 15.94 | 141 | 56.18 | 60 | 23.90 | 8 | .17 | 251 | 100 |
| 5. Take the medicine under the guidance of doctors | 0 | 0.00 | 19 | 7.57 | 146 | 58.17 | 3 | .59 | 251 | 100 |

*Note:* f - frequency        % - percentage

Table 5 shows the level of maternal health skills among the participants. There was a total of five questions in the maternal health skills scale and the mean score was 7.37. The findings are consistent with similar studies (Li, 2013; Qi, 2012). Li (2013) reported only 4.8 percent of pregnant women attended maternity schools. The reason for this result may be related to the low prevalence of maternity schools for pregnant women and the low awareness of pregnant women's participation in the region. Generally, pregnant women can feel the fetal movement after 18 weeks of pregnancy

and counting the fetal movement on time can help early detection of fetal abnormalities. The study found only 20.3 percent of pregnant women can monitor fetal movement count regularly. A study showed that the known rate of the calculated expected date of delivery was high, reaching 74.1 percent, while the known rate of the normal number of fetal movements in the third trimester was only 21.2 percent (Tan, 2017).

**Table 6    Difference between the level of Maternal Health Literacy among Participants when grouped according to the profile variables**

| S.No | Demographic Variables | Maternal Health Literacy | | t/F | P | Decision | Level of Significance |
|---|---|---|---|---|---|---|---|
| | | Mean | Standard Deviation | | | | |
| 1 | Age | | | 5.416 | 0.021 | Reject H0 | S |
| | 20-29 years | 37.04 | 8.431 | | | | |
| | 30-39 years | 40.77 | 6.484 | | | | |
| 2 | Gestational weeks | | | 67.679 | 0.000 | Reject H0 | S |
| | The first trimester | 30.20 | 4.874 | | | | |
| | The second trimester | 34.46 | 7.328 | | | | |
| | The third trimester | 42.69 | 6.687 | | | | |
| 3 | Occupation | | | 17.344 | 0.000 | Reject H0 | S |
| | Nonprofessional occupation | 36.46 | 8.352 | | | | |
| | Professional occupation | 41.83 | 6.544 | | | | |
| 4 | Education attainment | | | 37.336 | 0.000 | Reject H0 | S |
| | Junior high school or below | 31.54 | 6.602 | | | | |
| | Senior high school | 35.65 | 7.636 | | | | |

| | | Mean | SD | | | | |
|---|---|---|---|---|---|---|---|
| | Junior College or above | 41.51 | 7.361 | | | | |
| 5 | **Monthly Income** | | | 32.160 | 0.000 | Reject H$_0$ | S |
| | Low income | 32.24 | 7.617 | | | | |
| | Moderate income | 37.61 | 7.732 | | | | |
| | High income | 44.09 | 5.953 | | | | |
| 6 | **Area of Living** | | | 30.116 | 0.000 | Reject H$_0$ | S |
| | Rural | 33.09 | 7.254 | | | | |
| | Town | 36.31 | 7.116 | | | | |
| | City | 41.02 | 7.726 | | | | |

*Note:* Level of Significance is at $\alpha = 0.05$

S- Significant.        NS- Non significant.

Table 6 shows the comparison of the mean and standard deviation of the level of maternal health literacy among participants with the demographic variables. The study findings showed that there was a statistically significant difference in the level of maternal health literacy when grouped according to age, gestational weeks, occupation, education attainment, monthly income, and area of living and all the P-values is <0.05. The research hypothesis was rejected. Hence, there is significance. The results revealed that demographic variables such as age, gestational weeks, occupation, education attainment, monthly income, and living area of pregnant women have an impact on maternal health literacy level. According to research, sociodemographic characteristics are the influencing factors of healthcare behavior, among which age, education level, occupation, and economic income level can all influence health care behavior (Berkman et al., 2011; Sun et al., 2018). A study conducted in Laos showed that the number of antenatal care (ANC) for pregnant women was generally low, with only a third of mothers receiving more than four ANC during pregnancy, and the proportion was significantly higher in urban areas than in rural areas (Phommachanh, 2021). Due to the imbalance of economic and social development in China, the health knowledge level of pregnant women is different among regions in China, and the knowledge level of pregnant women's health care in eastern coastal areas is higher than that in western areas. There are also differences in maternal health knowledge between urban and rural areas, Urban pregnant women have a higher educational level and better economic conditions, while rural pregnant women have a relatively poor level of health knowledge because

of low educational level, poor economic conditions, access to pregnancy health knowledge channels, and they do not pay attention to the importance of pregnancy health knowledge to their own health and fetal growth (Sun et al., 2018; Wang et al., 2021; Yao, 2021).

In the survey of maternal health literacy, it was found that maternal health knowledge was insufficient in postpartum rehabilitation and neonatal umbilical cord care. Self-monitoring of weight and attendance in maternity schools are inadequate in maternal health behaviors. Maternal health skills related to fetal movement monitoring and fetal education are inadequate.

Maternal health literacy promotion programs can be developed based on the findings of the study. Maternal health literacy promotion program mainly includes two aspects: (1) provide more personalized care for pregnant women and their families by grouping pregnant women according to their gestational age; (2) The mode of combining mobile health and offline courses. With the development of modern science and technology and the rapid development of the Internet, mobile phones are becoming increasingly popular and powerful. Mobile health platforms can be used to promote the improvement of maternal health literacy.

Male involvement in maternal health is recommended as one of the interventions to improve maternal and newborn health (World Health Organization, 2015). Another study (Xie, 2008) reported that high-quality care could meet the needs of pregnant women and their families, be willing to cooperate in nursing work, remember the nurse's instructions or presentations, have a high rate of knowledge mastery, nurse-patient relationship harmony, and increase satisfaction. The mastery of health care, parenting knowledge, postpartum visits, hotline consultation, and other extended-care services, so that the best safety care for puerperal and newborn babies, reduce the occurrence of complications, to promote maternal and child health has played an important role.

The findings of the study showed the maternal health literacy level of pregnant women in the western region of Shandong province was generally low, and the mean score of maternal health knowledge was 12.72, the mean score of maternal health behavior was 17.39 and the mean score of maternal health skills was 7.37. The study found the main factors influencing maternal health literacy of pregnant women include age, gestational weeks, occupation, education attainment, monthly income, and area of living.

Family-centered care promotion programs can be developed based on the findings of the study. Family-centered care promotion programs mainly include two aspects: (1) provide more personalized care for pregnant women and their families by grouping pregnant women according to their gestational age; (2) The mode of combining mobile health and offline courses. With the development of modern science and technology and the rapid development of the Internet, mobile phones are becoming increasingly popular and powerful. Mobile health platforms can be used to promote the improvement of maternal health literacy.

### *Family-centered Care Promotion Program*

**Purpose**

Provide a more comprehensive and personalized family-centered care promotion program. The MHLQ was used to assess the impact of family-centered care on the health literacy of pregnant women through nursing interventions for pregnant women and their families, to promote the level of maternal health literacy and the development of family-centered care, and to promote the healthy development of pregnant women and newborns.

**Objectives**

(1) To provide personalized and professional pregnancy care for pregnant women through implementing a family-centered care promotion program model;

(2) To improve the level of health literacy of pregnant women, promote their mastery of maternal and infant health knowledge, and promote the formation of healthy behaviors and skills;

(3) To improve the choice ability of information, knowledge, behavior, and skills of pregnant women and enhance their sense of self-efficacy;

(4) To relieve the tension and anxiety of pregnant women and other adverse emotions;

(5) To promote the harmonious nurse-patient relationship and improve the satisfaction of pregnant women and their families;

(6) To master health care, parenting knowledge, postpartum visits, hotline consultation, and other extended-care services, so that pregnant women and newborns get the best safe care, reduce the occurrence of complications, and promote maternal and infant health.

**Strategies**

(1) Provide more personalized care for pregnant women and their families by grouping pregnant women according to their gestational age. The program mainly targets pregnant women in the second trimester and their family members. Pregnant women in the first and third trimesters and their family members can also be included in their relevant groups according to their needs.

(2) The mode of combining mobile health and offline courses.

### *Content and Methodology*

(1) Build a health care team: health care teams are formed by obstetricians, psychologists, nurses, and midwives, who discuss and formulate health care plans based on the maternal health literacy level and the actual situation of pregnant women and ensure that pregnant women and their families can master the health knowledge, behavior and skills.

(2) Provide a home environment: Provide a home environment for pregnant women, create a family atmosphere, allow pregnant women to bring their favorite decorations and photos, create a familiar atmosphere for pregnant women themselves,

and ease the anxiety and tension of pregnant women. Home appliances and infrastructure are provided to facilitate the lives of pregnant women and their families.

(3) Family support: to improve family support for pregnant women, promote family harmony, and relieve the tension, anxiety, and other adverse emotions of pregnant women.

**Table 8   Family Support**

| | |
|---|---|
| Dietary Instruction | In the maternal diet, family members should pay attention to the rationality of diet and nutrition, increase the intake of protein and vitamins, enhance the maternal body resistance. |
| Fetal Movement Count Instruction | Pregnant women begin to consciously feel the fetal move at about 18 to 20 weeks of pregnancy. Family members should remind pregnant women to carry out fetal movement count, one hour in the morning, in the afternoon and in the evening. add three times and multiply by 4,12 hours of normal fetal movement count should be 30 or more. |
| Production Inspection Instruction | The number of antenatal examinations is about 14-15 times. The first antenatal examination is appropriate at 6-8 weeks of early pregnancy; Every four weeks for 12-28 weeks, every two weeks for 28-36 weeks and weekly for 37-40 weeks. If the pregnant woman or the fetus has special conditions, the number of antenatal examinations should be increased accordingly. It is recommended that pregnant women take at least one family member to participate, preferably accompanied by their husband. |
| Postpartum Rehabilitation Instruction | The family members should provide a good rest environment for the mother, the mother room should be clean and ventilated, comfortable clothes. Provide mothers with a balanced diet. Family member should assist parturient postpartum |

| | |
|---|---|
| | rehabilitation exercise to avoid and reduce the occurrence of embolic diseases. |
| Feeding Instruction for Newborns | The family members can assist the newborn and mother early contact, feeding as far as possible to let the newborn contain the whole areola, help the newborn to adjust the comfortable position, the correct feeding position can make the newborn effectively sucking the nipple, stimulate lactation reflex, increase milk volume, and also conducive to the newborn to adapt to and accustomed to breastfeeding. |

(4) Pregnancy care course arrangement: The course is divided into 6 periods of 2 hours each. According to the findings, gestational age and education attainment have a great influence on the health literacy level of pregnant women. Pregnant women are arranged in groups according to their gestational age and educational attainment. Based on the results of the maternal health literacy questionnaire, pregnant women at low levels, as well as pregnant women in the first and second trimesters and high school or below education of middle and high health levels are included in the course, and post-questionnaire tests would be conducted after the delivery. Maternal and Infant Health Literacy -- Basic Knowledge and Skills (General Office of the Ministry of Health of China, 2012) would be issued to pregnant women in the third trimester of pregnancy and a college degree or above education of the middle and high levels of health literacy. Post-questionnaire test will be conducted during the next prenatal examination, and according to the results of the questionnaire, pregnant women wound be assigned to the corresponding courses for learning. During presentation and discussion, professional health knowledge is displayed in a vivid and easy-to-understand way to ensure that pregnant women and their families can fully grasp.

**Table 9   Pregnancy Care Course of the Family-Centered Care Promotion Program**

| Aspects | The main contents | Time | Method |
|---|---|---|---|
| Know company | Introduce each other; Introduce the environment of the department and home ward; | 120 min | Watching the video; Detailed explanation; Discussion |

| | | | |
|---|---|---|---|
| Cesarean section and vaginal delivery | The pros and cons of cesarean section and vaginal delivery | 120 min | Watching the video; Invite pregnant women who have already given birth to share their experiences; Discussion |
| Prenatal health education on delivery | Monitor fetal movement count; Do fetal education; Recognize signs of labor such as broken water, redness, and regular contractions; Introduce the delivery position; Introduces various methods of relieving pain in delivery. | 120 min | Watching the video and pictures; Model demonstration and explanation; Discussion |
| Postpartum rehabilitation guidance | Incision nursing for women in cesarean section; Urination guidance for women in vaginal delivery; Dietary guidance for parturient women; Breast nursing guidance for puerpera; Content and time of postpartum reexamination; Postpartum contraception guidance. | 120min | Watching the video; Detailed explanation; Discussion |
| Neonatal care | The key points of breastfeeding; Observation and nursing of neonatal fecal stool and jaundice; Observation and nursing of baby's umbilical cord; Explains bath and touch for newborn; The purpose and time of vaccination of newborn; Content and method of neonatal disease screening. | 120 min | Watching the video and pictures; Model demonstration and explanation; Discussion |
| Review | Summarize what they have learned; Encourage pregnant women to participate in making childbirth plans. | 120 min | Watching the video and pictures; Discussion |

(5) Mobile health: The public account of maternal and child health has been established through Wechat application to provide pregnant women with information related to pregnancy preparation, pregnancy and perinatal nutrition, sports, lifestyle, and psychological problems. The content of the information is diverse and easy to understand. In addition, pregnant women can communicate with experienced personnel on this platform about common physiological changes and psychological problems during pregnancy, as well as issues such as breastfeeding and postpartum rehabilitation.

### Monitoring Indicator

The observation period would be the whole pregnancy and one week after the birth. The pregnant women would be provided with family-centered care according to the program. The status, antenatal examination frequency, and BMI of the pregnant women would be recorded, and the corresponding health education would be provided according to the pregnancy.

### Evaluation

The level of maternal health literacy is assessed again after delivery and compared with the maternal health literacy level before the implementation of the intervention in the family-centered care promotion program.

## Conclusion

The present study assessed the pregnant women's maternal health literacy level. The results of the study showed that pregnant women and their families in the first trimester, lower educational years, low income, and living in rural areas should be paid more attention to during the whole pregnancy nursing. According to the pregnant women's Maternal Health Literacy, providing personalized care throughout pregnancy for pregnant women and their families, promoting the development of a maternal health literacy promotion program, providing enough social support for pregnant women, encouraging family members to participate in, learning health care knowledge, behavior, and skills, to improve health knowledge level, behavior and skills of pregnant women and their families, to promote and maintain good maternal and newborn health.

Based on the results, the maternal health literacy level was at a low level. The family-centered care promotion program should be carried out throughout pregnancy.

## Recommendations

This study is highly relevant to nursing because it aims to promote family-centered care through improving maternal health literacy. Through interaction and empowerment with mothers and their families, staff nurses can create opportunities for them to learn and improve their level of maternal health literacy, help pregnant women and their families acquire the new skills they need as quickly as possible, and promote healthy development of pregnant women and newborn babies as well as the other members of the family.

This study may encourage other researchers to conduct further research on

primigravida and multigravida patients to assess their maternal health literacy. Primigravida lacks knowledge as it is their first time to be pregnant and had no experience in the various stages of pregnancy, labor, delivery, and the postpartum period. This could lead to the development of more research that could effectively improve maternal health literacy. The findings of this study may serve as baseline data for similar studies on maternal health literacy and family-centered care.

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## AUTHOR INFORMATION
**Shengnan Fan** completed her M.A. in nursing at Far Eastern University. Her research interests include maternal care and childcare, and the work issues of community care advisers.

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