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A Survey Study on the Current Status of Standardized Prenatal Care and Self-Management Behaviors among Rural Women (Postprint)

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Abstract

Background In China, the participation rate in standardized prenatal care is increasing slowly, with prominent issues of unbalanced and insufficient development of maternal and child health between urban and rural areas, and the principal role of rural women' s self-management in prenatal care has not been fully realized.

Objective To investigate the current status of standardized prenatal care and the level of self-management behaviors among rural women, and to analyze the influencing factors of their prenatal care self-management behaviors.

Methods From January to August 2023, 470 rural pregnant women from Suihua City and Daqing City in Heilongjiang Province and Changchun City in Jilin Province were selected as survey subjects using a convenience sampling method. The survey was conducted using a General Information Questionnaire, Pregnant Women' s Self-Management Scale, Short Edinburgh Postnatal Depression Scale (EPDS-Dep-5), and Maternal Social Support Scale (MSSS). The current status of standardized prenatal care among rural women was statistically analyzed, scores of prenatal care self-management behaviors were compared among women with different characteristics, and multiple linear regression analysis was used to explore the influencing factors of rural women' s prenatal care self-management behaviors.

Results Among the participants, 218 (46.4%) had participated in preconception checkups, 388 (82.6%) had their first prenatal visit within 12 weeks of gestation, 303 (64.5%) received prenatal care at county-level or higher medical and health institutions, 276 (58.7%) had a number of prenatal visits meeting gestational age requirements, and only 103 (21.9%) had a number of prenatal

examination items meeting gestational age requirements. The average prenatal care self-management score was (70.18$±$16.42) points. The score indices of each dimension, from highest to lowest, were medical compliance behavior dimension (79.75%), daily life behavior management dimension (77.33%), self-protection behavior management dimension (76.73%), and fetal monitoring behavior management dimension (70.43%). Multiple linear regression analysis showed that distance from residence to the nearest designated prenatal care institution (B=0.732, 95%CI=0.139~1.325), gestational age (B=-1.336, 95%CI=-2.119~-0.553), pregnancy complications (B=3.776, 95%CI=1.532~6.019), risk of depression during pregnancy (B=-0.356, 95%CI=-0.663~-0.049), and social support (B=2.635, 95%CI=2.508~2.762) were influencing factors of rural women' s prenatal care self-management behaviors (P<0.05).

Conclusion Rural women have low participation and qualification rates in standardized prenatal care, and their prenatal care self-management behavior scores are at a moderate level. Distance from residence to the nearest designated prenatal care institution, gestational age, pregnancy complications, risk of depression during pregnancy, and social support are influencing factors of rural women' s prenatal care self-management behaviors. Healthcare providers at all levels should strengthen attention to rural pregnant women, standardize their prenatal care behaviors, enhance their self-management capabilities, and develop a scientifically appropriate, cost-effective, and simple-to-implement intervention model for rural women' s prenatal care self-management.

Full Text

Preamble

Investigation on the Current Status of Standard Pregnancy Health Care and Self-Management Behavior of Rural Women

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Abstract

Background: The participation rate in standard pregnancy health care in China is increasing slowly, with prominent imbalances and insufficiencies in

women' s and children' s health development between urban and rural areas. The potential of rural women's self-management as the cornerstone of pregnancy health care has not been fully utilized.

Objective: To examine the current status of standard pregnancy health care among rural women, assess their level of self-management behavior, and identify the factors influencing their self-management behavior in pregnancy health care.

Methods: From January to August 2023, 470 rural pregnant women from Suihua City in Heilongjiang Province, Daqing City in Heilongjiang Province, and Changchun City in Jilin Province were selected through convenience sampling. Data were collected using the Basic Information Questionnaire, Maternal Self-Management Scale, 5-item Short Form of the Edinburgh Postnatal Depression Scale (EPDS-Dep-5), and Maternity Social Support Scale (MSSS). The current status of standard pregnancy health care among rural women was documented, and self-management behavior scores were compared across different characteristics. Multiple linear regression was used to identify factors influencing rural women' s self-management behavior in pregnancy health care.

Results: Among participants, 218 (46.4%) underwent pre-pregnancy checkups, 388 (82.6%) had their first prenatal examination within 12 weeks, 303 (64.5%) received care at county-level or higher medical institutions, 276 (58.7%) had adequate number of prenatal examinations for their gestational age, but only 103 (21.9%) had adequate number of examination items for their gestational age. The average self-management score was (70.18$±$16.42). Dimension scores in descending order were: medical compliance behavior (79.75%), routine life behavior management (77.33%), self-protection behavior management (76.73%), and fetal monitoring behavior management (70.43%). Multiple linear regression showed that distance from family residence to the nearest designated prenatal care facility (B=0.732, 95%CI=0.139-1.325), gestational week (B=-1.336, 95%CI=-2.119-0.553), pregnancy complications (B=3.776, 95%CI=1.532-6.019), risk of depression during pregnancy (B=-0.356, 95%CI=-0.663-0.049), and social support status (B=2.635, 95%CI=2.508-2.762) significantly influenced self-management behavior (P<0.05).

Conclusion: Rural women exhibited low rates of participation and eligibility for standardized pregnancy health care, with moderate self-management behavior scores. Distance to nearest prenatal care facility, gestational week, pregnancy complications, depression risk, and social support influenced self-management behavior. Healthcare providers at all levels should strengthen attention to rural pregnant women, standardize their pregnancy health care behaviors, enhance self-management capabilities, and establish a scientifically sound, cost-effective, and easily implementable self-management intervention model for rural women' s pregnancy health care.

[**Key words**] Pregnancy health care; Rural women; Self-management; Root cause analysis

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Introduction

Maternal and child health care is fundamental to safeguarding the rights and interests of women and children and promoting their comprehensive development. With the effective implementation of various measures, China has achieved significant improvements in maternal and child health status, more diverse pathways for women' s participation in decision-making and management, steadily improved social security levels, and increasingly optimized development environments. Pregnancy health care, as an accessible and scientific health service, plays a direct and critical role in maintaining maternal and infant health and promoting optimal childbearing. However, compared with the expanding coverage of pregnancy health care services, the participation rate in standardized pregnancy health care in China has increased slowly, and the imbalance and insufficiency in women' s and children' s health development between urban and rural areas remain prominent. An important reason for this phenomenon is the failure to fully leverage rural women' s self-management as the mainstay of pregnancy health care. Against this backdrop, this study focuses on rural women to understand their current status of standardized pregnancy health care, explore their self-management behavior levels and influencing factors, and provide references for establishing standardized intervention and health management practice strategies for rural women' s pregnancy health care that align with China' s national conditions.

Methods

Study Design and Participants

From January to August 2023, convenience sampling was used to select 470 rural pregnant women from 16 villages under the jurisdiction of Anda Town in Suihua City (Heilongjiang Province), Honggang District in Daqing City (Heilongjiang Province), and Erdao District in Changchun City (Jilin Province) during the process of designated assistance provided by higher-level maternal and child health institutions. **Inclusion criteria** were: (1) pregnant women; (2) rural permanent residents with residence time $ $2 years; (3) aged 15-49 years; (4) basic reading and comprehension ability; (5) voluntary participation

with signed informed consent. **Exclusion criteria** were: (1) individuals unable to cooperate due to intellectual disability, mental illness, language barriers, or other reasons; (2) those who refused to participate. A total of 493 questionnaires were distributed, with 470 valid questionnaires recovered, yielding a valid response rate of 95.33%.

Measurement Tools

1.2.1 Basic Information Questionnaire Based on preliminary literature review, the research team designed a basic information questionnaire for rural pregnant women. (1) **Demographic characteristics:** age, education level, occupation, residence location (distance from family residence to nearest designated prenatal care facility), annual family income, annual family health investment ratio, gravidity, parity, and gestational week. (2) **Clinical disease characteristics:** family genetic history, chronic disease history, adverse pregnancy history, and pregnancy complications. (3) **Pregnancy health care status:** pre-pregnancy and prenatal examination status, including timing of first prenatal examination, examination location, total number of examinations, and examination items.

1.2.2 Maternal Self-Management Scale The Maternal Self-Management Scale was developed by Li Jinzhi et al. in 2013 to assess pregnant women' s self-management levels. The scale comprises four dimensions: routine life behavior management, fetal monitoring behavior management, medical compliance behavior, and self-protection behavior management. Each item is scored 1-5 points, with total scores ranging from 25-125 points; higher scores indicate stronger self-management ability. The scale has a test-retest reliability coefficient of 0.957, Cronbach' s α coefficient of 0.926, and content validity index (CVI) of 0.907. For dimensional comparison convenience, raw scores were converted to a 100-point scale: converted score = (actual raw score - theoretical minimum raw score) / (theoretical maximum raw score - theoretical minimum raw score) $\times$ 100. Theoretical minimum raw score = number of items $\times$ 1; theoretical maximum raw score = number of items $\times$ 5.

1.2.3 5-item Short Form of the Edinburgh Postnatal Depression Scale (EPDS-Dep-5) The Edinburgh Postnatal Depression Scale (EPDS) is a globally recognized depression assessment tool. In 1998, Professor Lee et al. translated and compiled the Chinese version of EPDS, which contains 10 items scored 0-3 points each, with total scores ranging from 0-30 points; higher scores indicate more severe depression. This study used the Chinese version of EPDS-Dep-5, comprising items 1, 2, 8, 9, and 10 from the EPDS, covering emotional absence and depression dimensions. A total score $ $4 indicates high-risk for depression. The scale' s overall Cronbach' s α coefficient is 0.759, with dimensional coefficients of 0.774 and 0.743; the overall SpearBrown split-half reliability coefficient is 0.757, with dimensional coefficients of 0.776 and 0.732.

1.2.4 Chinese Version of the Maternity Social Support Scale (MSSS)
The MSSS was originally developed by Webster at the Australian Women' s Mental Health Research Center for assessing social support in pregnant and postpartum women, and later translated and adapted by Chinese scholars Li Guannan et al. The scale includes two dimensions (positive social utilization and negative events) with six items scored 1-5 points each, with total scores ranging from 6-30 points; higher scores indicate greater social support. The scale' s Cronbach' s α coefficient is 0.75, with test-retest reliability of 0.71.

Data Collection Methods

Two investigators received unified training from the research team and were required to strictly screen participants according to inclusion criteria before data collection and obtain signed informed consent. For illiterate participants, family members were instructed to sign on their behalf. Investigators explained the study' s purpose and significance in detail, guided participants in completing questionnaires, and assisted illiterate participants. After questionnaire collection, investigators immediately checked for missing or unclear items and supplemented them as needed.

Statistical Analysis

SPSS 25.0 software was used for statistical analysis. Normally distributed measurement data were expressed as ($\bar{x}\pm s$), and count data were expressed as relative numbers. t-tests and one-way ANOVA were used to examine the effects of different demographic and clinical characteristics on rural pregnant women' s pregnancy health care self-management behavior. Pearson correlation analysis was used to explore the relationships among EPDS-Dep-5, MSSS, and self-management behavior. Multiple linear regression was used to identify influencing factors of rural women' s pregnancy health care self-management behavior. $P<0.05$ was considered statistically significant.

Results

Participant Characteristics and Current Status of Standardized Pregnancy Health Care

This study included 470 rural pregnant women aged 18-45 years, with a mean age of $(30.3\$\pm4.6)years.EPDS-Dep-5scoreswere(4.91\pm2.16)points, andMSSSscoreswere(17.97\pm\$5.42)$ points. Other basic characteristics are shown in Table 3 . The survey results of standardized pregnancy health care among rural women are presented in Table 1 .

Self-Management Behavior Scores for Pregnancy Health Care

The average self-management behavior score for pregnancy health care among the 470 rural women was (70.18$±$16.42) points, with a score index of 76.15%, indicating a moderate level. Dimension scores in descending order were: medical compliance behavior dimension (79.75%), routine life behavior management dimension (77.33%), self-protection behavior management dimension (76.73%), and fetal monitoring behavior management dimension (70.43%), as shown in Table 2 .

Comparison of Self-Management Behavior Scores Across Different Characteristics

Significant differences in self-management behavior scores were found among rural pregnant women with different education levels, occupations, health investment ratios, residence distances, gestational weeks, and pregnancy complications, as shown in Table 3 .

Correlation Analysis of Depression Risk/Social Support and Self-Management Behavior

Rural women' s pregnancy health care self-management behavior scores were positively correlated with social support scores (r=0.895, P=0.000) and negatively correlated with depression risk (r=-0.227, P=0.000), as shown in Table 4 .

Multiple Linear Regression Analysis of Influencing Factors

Using the total self-management behavior score as the dependent variable and variables with significant differences in univariate analysis as independent variables, multiple linear regression analysis was conducted. Variable assignments were: education level (primary school or below=1, junior high school=2, high school=3, college/university or above=4); occupation (public institution/civil servant/government staff=1, professional=2, service personnel=3, company employee=4, worker=5, housewife=6, other=7); distance from residence to nearest designated prenatal care facility (<10 km=1, 10-19 km=2, 20-29 km=3, $ $30 km=4); annual family health investment ratio (<10%=1, 10%-19%=2, 20%-29%=3, $ 30 $12 weeks=1, 13-28 weeks=2, >28 weeks=3); pregnancy complications (yes=1, no=2); EPDS-Dep-5 and MSSS total scores entered as original values. Results showed that distance from residence to nearest designated prenatal care facility, gestational week, pregnancy complications, EPDS-Dep-5 total score, and MSSS total score were influencing factors of rural women's pregnancy health care self-management behavior (P<0.05), as shown in Table 5 .

Discussion

Improving Participation and Eligibility Rates in Standardized Pregnancy Health Care

The Ministry of Health' s "Pregnancy and Perinatal Health Care Work Standards" stipulates that women preparing for pregnancy and pregnant women should receive health education and guidance according to different stages, establish maternal health records before 12 weeks of gestation, and undergo at least five standardized examinations at county-level or higher hospitals (at least once in the first trimester, at least twice in the second trimester [recommended at 16-20 weeks and 21-24 weeks], and at least twice in the third trimester [including at least once after 36 weeks]), with additional examinations as needed for abnormalities. Standardized pregnancy health care can help women assess high-risk pregnancy risks early and match optimal prevention and treatment measures to safeguard maternal and infant health and promote optimal childbearing. Data show that China' s pregnancy health care coverage rate has reached over 92%, while the participation rate in standardized pregnancy health care is only 69.1%, with rural areas lagging far behind this average, and frequent problems of missed examinations, insufficient examinations, and omitted items. Overall, this survey found low participation and eligibility rates for standardized pregnancy health care among rural women, particularly the prominent problem of omitted examination items, consistent with findings from other domestic studies. During the survey, rural pregnant women reported that, aside from free screening items (such as blood tests for hepatitis B, syphilis, and HIV), they preferentially selected visual and audible examinations like fetal heart monitoring and ultrasound to intuitively understand fetal development, while most expressed unclear understanding of specific contents for Down syndrome screening, glucose screening, and psychosocial assessments, and cited high costs as the main reason for omitting these items. This suggests that health education for rural pregnant women should fully consider incorporating the content and significance of prenatal examinations at different time points to help women understand the importance of standardized participation in various prenatal examinations to improve their active participation rates, while also strengthening pre-pregnancy risk prevention awareness among rural women of childbearing age and leveraging national free pre-pregnancy health examination programs to shift the focus from disease treatment to prevention.

Enhancing Self-Management Behavior Levels in Pregnancy Health Care

This study found that rural women's pregnancy health care self-management behavior scores were $(70.18\$\pm16.42)points, withascoreindexof76.15\pm19.67)points, relativelyhighamongdimensi$
$term, multi-stageco-participationandguidancecooperation.Additionally, China'slargeruralpregnantwome$
$levelpersonnelinpregnancyhealthcareshouldbefullyleveraged.Routinelifebehaviormanagementandself-$
$protectionbehaviormanagementdimensionsscored(71.66\pm16.45)pointsand(70.92\pm17.46)pointsrespectively, b$
$basedinformationnetworkcoverage, andalsorelatedtorelativelysimpleassociatedknowledgethatiseasierforpr$

term, dynamic nature of pregnancy, incorporating the time dimension to combine short–term and long–term evaluations and adjusting intervention models according to score levels to maintain these dime term are currently key issues requiring urgent solutions. The fetal monitoring behavior management dimension ha
points. Fetal monitoring behavior refers to pregnant women' s home monitoring of fetal health status, including fetal heart rate and movement monitoring, which is crucial for identifying fetal abnormalities and safeguarding maternal and infant health. Compared with other dimensions, fetal monitoring behavior requires stronger professional skills, lacks operational guidance, and has poor information feedback timeliness. Consideration should be given to incorporating a "skill training + skill consolidation + supervision guidance + stable maintenance" sequential program into rural pregnant women' s self-management behavior intervention models.

Key Influencing Factors and Intervention Strategies

Extending Primary Care Services This study found that rural women' s pregnancy health care self-management behavior is associated with the distance from family residence to the nearest designated prenatal care facility. Unlike the high density distribution of urban medical institutions and community health stations, township-level and below medical institutions mainly undertake basic services such as early pregnancy record establishment, publicity, and mobilization, while specific implementation and information processing of pregnancy health care are handled by county-level and above maternal and child health institutions. Therefore, pregnant women and families need to invest time and funds to overcome spatial environmental interference with pregnancy health care behaviors. Statistics show that the average direct medical cost per pregnancy health care visit for Chinese women is 400 yuan, with half of women additionally paying over 20 yuan in transportation costs, and some rural areas far exceeding this amount, plus lost wages from pregnancy health care, which invisibly increases family economic burden. Thus, extending primary-level personnel service responsibilities could optimize rural women' s pregnancy health care time and space accessibility to some extent.

Meeting the Needs of Working Women This survey found that housewives had the highest pregnancy health care self-management behavior scores, possibly because they have more flexible time to actively participate in pregnancy health care activities and understand related knowledge. Occupation has rarely been included in previous surveys to determine its impact on pregnancy health care behavior. However, with the implementation of various favorable national policies, pregnant women have more choices and rights protection for their work rights. In the future, particularly under the comprehensive three-child policy, more pregnant women will engage in various jobs during pregnancy, suggesting that interventions should focus on improving working women' s participation in pregnancy health care activities and their knowledge of pregnancy health care, making full use of online and offline combined intervention methods.

Monitoring Gestational Age Changes With increasing gestational weeks, rural women's pregnancy health care self-management behavior scores decreased. Pregnant women are the primary responsible persons for self-management, and personal factors directly affect final behavioral decisions. However, pregnancy is a long-term process during which most women' s lifestyles, hobbies, and daily behaviors change significantly compared with pre-pregnancy. Behavioral transformation and maintenance require continuous self-control and correct supervision guidance. Medical personnel should pay more attention to women in mid-to-late pregnancy and provide correct dynamic management during interventions.

Integrating Routine and Disease Management Rural women with pregnancy complications had lower pregnancy health care self-management behavior scores at (61.07$±$19.96) points, differing from other related studies. The possible reason is that women with pregnancy complications passively shift their focus to disease treatment and management, while this survey' s items emphasized daily management. This suggests that for pregnant women with pregnancy complications, needs-oriented approaches combining disease management with daily management should be adopted to form scientifically reasonable intervention models.

Addressing Mental Health in Pregnancy Antenatal depression is the most common and hidden emotional disorder during pregnancy. Long-term antenatal depression is not only closely associated with high-risk pregnancy risks but also negatively affects obstetric outcomes and offspring development. This survey found that depression risk during pregnancy is associated with self-management behavior levels, suggesting that while focusing on pregnant women' s physical health, guidance for actively coping with emotional disorders during pregnancy is also needed, which has important potential significance for maternal mental health and children' s long-term developmental trajectories.

Leveraging Social Support Functions Pregnant women are the main participants in pregnancy health care, but besides individual factors, positive guidance from peers and family members can directly affect pregnant women' s self-management behavior. Pregnant women and family members jointly participating in management and problem-solving also helps enhance their self-confidence. Therefore, fully leveraging the educational functions of peers and families should be a focus in subsequent intervention research.

Conclusion

Rural women have low participation and eligibility rates in standardized pregnancy health care, with moderate self-management behavior scores. Distance to the nearest designated prenatal care facility, gestational week, pregnancy complications, depression risk, and social support status are influencing factors.

It is recommended to construct a rural women' s pregnancy health care self-management intervention model integrating "primary-level main body - family participation - peer mutual assistance - pregnant women' s self-help" with dynamic evaluation and adjustment of intervention results to improve the maternal and child health care network, optimize maternal and child health services, and enrich and improve health management for pregnant women. This survey primarily focused on rural pregnant women in Northeast China. Considering regional economic development and health resource distribution differences, future studies could include rural pregnant women from more regions in China to directly understand and compare regional pregnancy health care conditions.

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Author Contributions

ZHOU Yuqiu proposed the main research objectives, was responsible for quality control and review of the article, took overall responsibility for the article, and provided supervision and management. LUO Xiaoxi was responsible for research conception and design and writing the manuscript. LI Chunhong, YANG Nana, and HAN Guangli were responsible for surveys in Suihua City, Changchun City, and Daqing City, respectively. JIA Honghong, LIU Li, and CHEN Junyu were

responsible for data collection and organization, statistical processing, and figure and table preparation and presentation.

Conflict of Interest

The authors declare no conflict of interest.

Note: Figure translations are in progress. See original paper for figures.

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