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Postprint: A Qualitative Study of Negative Emotional Experiences in Rural Women During Pregnancy

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Abstract

Background Depression and anxiety are relatively common negative emotions among pregnant women. Insufficient mental health services and external support often result in inadequate attention to the mental health issues of rural pregnant women, thereby affecting the physical and mental health of both mothers and infants. Objective From the perspective of the social ecosystem, this study analyzes the emotional management experiences of rural pregnant women in China to provide practical references for primary healthcare personnel to conduct early interventions. Methods Purposeful sampling was employed to recruit rural pregnant women with negative emotional experiences from villages under the jurisdiction of Anda City, Suihua City, and Honggang District, Daqing City, Heilongjiang Province, between October 1 and December 1, 2023, through outreach clinics and tours conducted by higher-level maternal and child health institutions and the process of establishing health records. Semi-structured interviews were conducted with the participants, and data were collected through audio recording and text transcription. Two independent coders analyzed the data using the Colaizzi descriptive analysis framework. Results A total of 13 participants were included. Analysis of the interview data yielded three themes and eleven sub-themes: (1) Microsystem level: impact of physical symptoms, increased childbirth anxiety, self-image disturbance, and lifestyle changes; (2) Mesosystem level: soaring parenting costs, prominent family conflicts, and lack of peer support; (3) Macrosystem level: healthcare experiences requiring improvement, weak information support, supply-demand mismatch, and increased social pressure. Conclusion The emotional problems faced by rural pregnant women are caused by multiple factors. Addressing the emotional issues of rural pregnant women in China should involve multiple stakeholders, including the pregnant women themselves, their families, and primary healthcare personnel. Attention should be paid to the negative emotional management experiences

of rural pregnant women, and targeted, scientific, and effective guidance and interventions should be provided to improve their emotional management capabilities and promote maternal and infant health.

Full Text

Preamble

Emotional Experience of Pregnant Women in Rural China: A Qualitative Study

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Abstract
Background: Depression and anxiety are among the most frequently observed adverse emotional states in pregnant women. The inadequacy of mental health services and the paucity of external support often result in the psychological well-being of rural expectant mothers being overlooked, thereby exerting a profound impact on both maternal and neonatal health.
Objective: This study, adopting a socio-ecological framework, explores the emotional regulation experiences of rural pregnant women in China, aiming to furnish empirical insights that may inform early intervention strategies for primary healthcare practitioners.
Methods: A purposive sampling strategy was utilized to recruit rural pregnant women exhibiting negative emotional experiences from villages under the jurisdiction of Anda City, Suihua, Heilongjiang Province, and Honggang District, Daqing, Heilongjiang Province, during the period spanning October 1 to December 1, 2023. Participants were enlisted through outreach medical consultations and maternal health record registration conducted by higher-tier maternal and child health institutions. Semi-structured interviews were employed for data collection, with information gathered via audio recordings and subsequently transcribed verbatim. The collected data underwent rigorous analysis through Colaizzi' s descriptive phenomenological framework, executed by two independent coders.
Results: A total of 13 participants were incorporated into the study. Through meticulous examination of the interview data, three principal themes and eleven subordinate sub-themes were delineated: (1) Microsystemic Level: The

ramifications of somatic symptoms, amplified anxieties regarding childbirth, perturbations in self-perception, and substantive alterations in lifestyle. (2) Mesosystemic Level: The precipitous escalation in child-rearing expenditures, pronounced familial discord, and a dearth of peer support mechanisms. (3) Macrosystemic Level: Suboptimal healthcare encounters, insufficiencies in informational support, structural disequilibrium between service provision and demand, and intensifying societal pressures.

Conclusion: The emotional adversities confronted by rural pregnant women emanate from a constellation of interwoven determinants. Mitigating these psychological challenges necessitates a holistic and stratified approach that engages the expectant mothers themselves, their familial environments, and the grassroots medical infrastructure. Recognizing and refining the emotional regulation experiences of rural pregnant women through empirically substantiated, tailored interventions is paramount. Such efforts are pivotal in augmenting their emotional resilience and, consequently, advancing maternal and neonatal health outcomes.

Keywords: Pregnant women; Rural; Anxiety; Depression; Emotional experience; Social ecosystems theory; Qualitative study

Introduction

In psychology, adverse emotions such as anxiety, depression, and fear are termed negative emotions, which not only generate distressing emotional experiences but also pose significant threats to physical and mental well-being. As medical science advances and modern healthcare paradigms evolve, maternal mental health has become an integral component of maternal and child healthcare. The physiological processes of pregnancy and childbirth trigger a cascade of psychological stress responses, and some women struggle to adapt to these changes, resulting in emotional disorders during this critical period—a phenomenon with particularly high prevalence in low- and middle-income countries worldwide. Anxiety and depression represent the most common negative emotions during pregnancy, with global prevalence estimates of 34% for prenatal depression and 22.9% for anxiety disorders. According to the 2023 China Mental Health Blue Book, depression rates among Chinese pregnant women range from 20.17% to 27.57% across different gestational stages, with substantially higher rates reported in rural areas. Compared to their urban counterparts, rural pregnant women face scarce resources for prenatal depression screening and prohibitive treatment costs, often leading to under-detection, delayed intervention, and enduring consequences for maternal and child health. Chronic prenatal depression correlates closely with high-risk pregnancy complications and adversely affects obstetric outcomes and offspring development. Research has demonstrated significant associations between prenatal depression and intrapartum fetal heart rate abnormalities, low birth weight, increased rates of cesarean delivery and preterm birth, as well as heightened risks of adverse neurodevelopmental out-

comes and attention-deficit/hyperactivity disorder in children. Furthermore, pregnancy-related anxiety exacerbates the risk of depression, profoundly impacting maternal physical and mental health, social functioning, and family quality of life.

Social-ecological systems theory emphasizes the reciprocal interaction between systems and individuals in shaping human development, conceptualizing social ecology as comprising three tiers: microsystems, mesosystems, and macrosystems. The microsystem encompasses individual-level biological, psychological, and social subsystems; the mesosystem comprises small-scale groups including family and workplace collectives; and the macrosystem consists of larger-scale entities such as organizations, institutions, communities, and sociocultural structures. This theoretical framework has been widely applied to analyze risk factors for chronic diseases and psychological problems and to promote health. Rural China faces dual constraints: tangible limitations in economic conditions, population dynamics, geographic environment, and maternal healthcare resources, alongside distinctive cultural contexts that preserve rich agricultural traditions and entrenched customs. Current research on negative emotional experiences among rural pregnant women remains limited and lacks in-depth exploration of their authentic experiences. Grounded in social-ecological systems theory, this qualitative study investigates the emotional management experiences of rural pregnant women to inform the development of targeted interventions.

Methods

1.1 Study Participants

A purposive sampling method was employed to select rural pregnant women from villages under the jurisdiction of Anda City, Suihua, Heilongjiang Province, and Honggang District, Daqing, Heilongjiang Province, between October 1 and December 1, 2023. Participants were recruited through outreach medical consultations and maternal health record registration conducted by higher-level maternal and child health institutions. Inclusion criteria were: (1) pregnant women; (2) permanent rural residents with a residence duration of $ $2 years; (3) a score of $ $4 on the Edinburgh Postnatal Depression Scale (EPDS-Dep-5) [?]; (4) a score of $ $50 on the Self-Rating Anxiety Scale (SAS) [?]; (5) clear consciousness and normal language expression; and (6) voluntary participation with signed informed consent. Exclusion criteria included: (1) intellectual disability, psychiatric disorders, language impairments, or other conditions preventing cooperation; and (2) refusal to participate. Sample size was determined based on the principle of data saturation, whereby participant data began to repeat and no new themes emerged during analysis. A total of 13 respondents were ultimately included, all participating voluntarily. General information about the respondents is presented in Table 1 . To protect participant privacy, names were withheld and replaced with codes 1–13.

1.2 Research Methods

1.2.1 Interview Protocol Development A semi-structured interview approach was adopted to explore rural women' s emotional management experiences during pregnancy. Through literature review and based on social-ecological systems theory, the research team developed the following interview protocol after repeated discussions. Micro-level questions: (1) "What changes have you experienced in your emotions during pregnancy compared to before? Please provide examples. What do you think are the main reasons for these changes?" (2) "How have you coped with the emotional changes during pregnancy? Please provide examples." Meso-level questions: (3) "What changes has pregnancy brought to your daily life, work, and family? How have these changes affected your emotions? Please elaborate." Macro-level questions: (4) "What external support have you received for emotional management during pregnancy? Please provide examples. What additional support do you need at this stage?" The order of questions was adjusted according to the actual interview process.

1.2.2 Data Collection The principle of informed consent was strictly followed. Before each interview, the purpose, methods, and content were explained to participants, with assurances of confidentiality and anonymity. Interviews lasted 30–40 minutes and were conducted in quiet, private, and convenient locations. The interviewer asked questions according to the protocol while recording the session, listening attentively without prompting, and encouraging participants to express their genuine feelings and experiences. The questioning approach and sequence were flexibly adjusted to maximize information collection. Non-verbal expressions, including tone, intonation, emotional changes, and body language, were objectively documented.

1.2.3 Data Analysis All interview data were coded and analyzed using NVivo 12.0 software. Colaizzi's phenomenological seven-step method [**?**] was employed to analyze the interview recordings: (1) thoroughly reading transcripts to ensure deep understanding; (2) extracting statements relevant to rural women' s pregnancy emotional experiences; (3) formulating meanings; (4) clustering themes and identifying common concepts to form thematic categories; (5) integrating themes into a comprehensive description of the phenomenon; (6) refining themes by identifying similar concepts; and (7) returning findings to participants for validation.

1.2.4 Quality Control All researchers in the team received training in qualitative research methods and mastered interview techniques. The selected pregnant women were representative in terms of age, education level, and gestational week. Before data collection, rapport was established with participants, and interview duration was extended as needed. Within 24 hours after each interview, recordings were repeatedly reviewed and transcribed verbatim. Transcripts were returned to participants for verification to enhance credibility.

Results

2.1 Microsystem Level

2.1.1 Impact of Somatic Symptoms Pregnancy represents a unique phase in a woman' s life cycle. As hormone levels fluctuate and organ function demands increase, pregnant women experience diverse somatic symptoms that interact synergistically, adversely affecting their emotional state and quality of life. Participant 13 stated: "I started experiencing morning sickness shortly after artificial insemination, and it got worse and worse. I felt I couldn' t persist, sometimes thinking that if I didn' t have this child, I would be liberated." Participant 3 shared: "My sleep became terrible after pregnancy. I can' t sleep during the day and suffer from insomnia at night. Every time I feel fetal movement, I wake up and find it hard to fall asleep again. The more I can' t sleep, the more irritable I become, and everything annoys me."

2.1.2 Increased Childbirth Anxiety Childbirth anxiety refers to women' s concerns about their own fertility, personal and children' s health, and childrearing. This anxiety constitutes a key factor triggering persistent depressive symptoms in pregnant women, severely impacting their emotional and psychological well-being. Such negative emotions persist not only during pregnancy but may also continue postpartum, posing challenges to women' s physical and mental health. Participant 10 noted: "Since becoming pregnant, I constantly worry about fetal abnormalities. I feel relieved after prenatal check-ups, but the anxiety returns soon after." Participant 6 shared: "I used to be very optimistic, but now I' m terrified of giving birth. At my age, I constantly experience aches and pains, and the thought of childbirth frightens me immensely."

2.1.3 Self-Image Disturbance Pregnancy often precipitates noticeable changes in personal appearance, and lower satisfaction with self-image can increase the risk of negative emotions during gestation. Participant 5 recounted: "After becoming pregnant, I couldn' t control urination well and even wet my pants in public, which never happened before pregnancy. Now I' m afraid to go out." Participant 12 stated: "Before pregnancy, my weight rarely exceeded 100 pounds, but now I' m too heavy. Many of my beautiful clothes no longer fit, and I can' t bear to look in the mirror."

2.1.4 Lifestyle Changes Lifestyle significantly impacts mental health, and pregnant women often modify their long-standing habits to prioritize fetal health. Participant 4 explained: "My blood sugar is quite high after pregnancy, so I need to strictly control my diet. The doctor won' t let me eat sweets, but I have a strong sweet tooth. Having to restrain myself feels like pregnancy is forcing me to deny myself." Participant 11 shared: "I used to enjoy exercising before pregnancy, but now even normal walking exhausts me. The doctor went to perform surgery again, and we had to keep waiting for them to return."

2.2 Mesosystem Level

2.2.1 Skyrocketing Child-Rearing Costs Amid modernization, evolving child-rearing philosophies and heightened family emphasis on child-rearing quality have escalated parenting expenses. In China, the burden of infant and toddler care falls primarily on families, with first-time parents—particularly young couples—experiencing multiple pressures related to family finances, caregiving time, and role transitions. Participant 2 stated: "Only my husband works in our family. I stopped working because of pregnancy, so financial pressure is significant. In rural areas, when boys grow up, we need to buy them houses for marriage and pay bride prices. Thinking about the future makes the pressure feel even greater." Participant 9 shared: "My parents need to care for my grandparents, and my in-laws must farm in the countryside. They can only help during my postpartum confinement period. After that, I' ll have to care for two children alone. Nowadays, children' s food and supplies cost more than adults' , and I don' t know how we' ll afford these two children."

2.2.2 Prominent Family Conflicts In rural China, couples often live with the husband' s parents, and son preference remains prevalent. Combined with diversified family lifestyles and the widespread two-child/three-child policy, families' capacity to fulfill economic support and caregiving responsibilities has diminished, intensifying inter-family conflicts. Participant 2 revealed: "My husband feels we don' t earn enough for one child, and now another pregnancy adds pressure. He thinks the burden of being the sole breadwinner is too heavy and even considered not keeping this baby. We fight constantly about this." Participant 11 shared: "My mother-in-law lives with us and constantly interferes in our marital life with her old-fashioned thinking. She tells everyone I' m carrying a boy, though we don' t even know the gender yet. When I complain to my husband, he sides with his mother. These thoughts make me want to cry."

2.2.3 Lack of Peer Support Peer support serves as a crucial protective factor against negative emotions in pregnant women, while inadequate peer support may exacerbate emotional symptoms. Participant 5 explained: "Due to physical reasons, I started trying for a baby late. At my age, I' m still preparing for my first child, while many people in the village already have their second child. They think childbirth is easy and consider me overly dramatic." Participant 8 shared: "After becoming pregnant, I rarely contacted my former classmates. I stopped studying after high school, returned to the countryside, and got married. Many of my classmates went to university and stayed in cities. They ask me why I had children so early, and I don' t know how to respond."

2.3 Macrosystem Level

2.3.1 Suboptimal Healthcare Experiences Limited by local diagnostic and treatment capabilities, rural pregnant women often must travel long distances to higher-level medical institutions and endure prolonged healthcare pro-

cesses. Participant 12 stated: "Pregnancy is too troublesome nowadays. Township hospitals can' t perform many tests, so we have to take long bus rides to city hospitals. Some tests can' t even be scheduled on the same day at large hospitals. Having a child has become extremely inconvenient." Participant 7 shared: "Every prenatal visit, we see doctors rushing about. After doctors write test orders, we pay and get tests done ourselves. We don' t understand what some tests are for, and doctors are too busy to explain. By the time results return, the doctor may have gone to perform surgery, and we have to keep waiting."

2.3.2 Weak Informational Support Participants universally lacked pregnancy-related knowledge and received insufficient informational support during medical visits. Participant 8 noted: "I look up pregnancy information online, such as on Baidu, TikTok, and Xiaohongshu. We also have a WeChat group with no doctors, just pregnant women. When someone has a question, everyone answers based on personal experience—none of it is professional." Participant 11 shared: "I don' t know how to count fetal movements; no one taught me. I just feel reassured when the baby moves morning and evening. I bought a fetal heart monitor and listen when I feel uncertain. I know it should be around 140, but I can' t specify the normal range. No one taught us how to monitor properly."

2.3.3 Imbalance Between Supply and Demand To improve maternal and child health, medical and maternal-child healthcare institutions at all levels in China actively organize various pregnancy-related activities and provide free public health services to pregnant women and their families. However, this study found low active participation among rural pregnant women. Participant 8 explained: "I' ve never attended hospital activities because the distance is too far. I need to transfer buses several times from the village—it' s too much trouble." Participant 1 stated: "I' ve never participated in hospital activities. No one informed me about them, and I don' t know whether they' re free or paid. If they cost money, I definitely wouldn' t attend."

2.3.4 Increased Social Pressure In rural areas, traditional pregnancy and child-rearing concepts predominantly rely on older generations' experiential knowledge, which hinders the dissemination of scientific prenatal and postnatal care information and subjects pregnant women to social pressure. Participant 5 recounted: "It took me eight years of marriage to become pregnant. Starting about a year after marriage, villagers would ask me why I wasn' t pregnant yet. In their eyes, married women who don' t conceive seem abnormal." Participant 9 shared: "I was under 20 when pregnant with my first child, below the legal marriage age, so I got pregnant before marrying and obtaining our certificate. This is quite normal in our countryside, but not in cities. Every prenatal visit, I face judgmental looks from others."

Discussion

3.1 Focus on Physical and Mental Health of Rural Pregnant Women to Promote Maternal and Infant Health Development

This study conducted in-depth interviews with 13 rural pregnant women to understand their emotional management experiences from microsystem, mesosystem, and macrosystem perspectives. The findings revealed prominent issues at the microsystem level, including somatic symptom exacerbation, increased childbirth anxiety, body image disturbance, and lifestyle changes, as well as economic burdens, family crises, and healthcare barriers resulting from pregnancy. Based on these findings, interventions should be developed to provide appropriate support, encourage proactive emotional problem-solving, and establish multidisciplinary teams centered on primary healthcare professionals to deliver specialized guidance. Additionally, promoting strong emotional support from family and social circles is crucial for improving mental health during pregnancy.

First, pregnant women endure somatic symptoms such as morning sickness, urinary frequency, pain, and sleep disturbances, which often intensify or accumulate with gestational age. Recent meta-analyses indicate that 38.2% of pregnant women suffer from insomnia [**?**], with sleep deficiency during pregnancy increasing risks of preterm birth, cesarean delivery, gestational hypertension, gestational diabetes, and prolonged labor, while also serving as a risk factor for maternal depression, childhood internalizing psychiatric problems, and ADHD symptoms. Another prospective cohort study involving 84,801 pregnant women revealed pain incidence rates of 69.6% in the first trimester and 84.0% in the second/third trimesters [**?**], which not only affects maternal mental health during pregnancy but also demonstrates significant linear dose-dependent relationships with postpartum depression rates. Given concerns about medication safety and treatment costs, rural pregnant women often choose to either ignore symptoms or rely solely on simple physical methods for self-relief. Therefore, emotional management interventions for rural pregnant women should strengthen symptom management, identify symptom cluster types and characteristics across different gestational periods, and provide scientific guidance.

Second, confronted with lifestyle changes, self-image alterations, and escalating childbirth anxiety, rural pregnant women tend to alleviate negative emotions through self-comfort. Evidence indicates that self-compassion relates to key mechanisms in depression and anxiety emotion regulation patterns, with emotion regulation mediating the relationship between self-compassion and mental health outcomes [**?**]. During this special gestational period, pregnant women often suppress personal emotional expression out of concern for fetal health. This suggests that family members and medical personnel should patiently listen to pregnant women' s concerns, encourage them to express genuine feelings and needs, and help them correctly understand their changes through timely guidance.

3.2 Build a Good and Equal Family Environment to Improve Support for Rural Pregnant Women

Influenced by traditional marriage and family concepts, rural newlyweds often live with the husband’ s parents, creating complex family relationships with differences in personality, habits, language, and behavioral patterns among members, making intergenerational conflicts unavoidable. Compared to urban women, rural women generally have lower education levels and employment rates, with limited economic resources and support pathways. Although son preference has gradually diminished with societal progress, it remains difficult to reverse in the short term due to practical needs at the rural grassroots level, cultural inertia, and the lag of spiritual-cultural transformation behind institutional-cultural transformation [?]. The goal and desire to bear a son are often imposed on pregnant women, creating enormous psychological burdens.

To address these issues, on one hand, state power should be leveraged to provide reasonable social coordination of childbearing costs, guide employers to implement family-friendly work policies, and strengthen protections for women in informal employment, enabling couples to better balance work and family responsibilities while gaining recognition and respect from society, others, and family. On the other hand, educational campaigns in rural areas through media channels should disseminate gender equality concepts, encourage family members to face problems together with pregnant women, alleviate psychological pressure, resolve conflicts and family crises, enhance pregnant women’ s sense of being supported, and enable them to cope with various pregnancy-related issues with a positive attitude.

3.3 Improve Medical Services and External Support Systems to Meet Rural Pregnant Women’ s Gestational Needs

In this study, macrosystem-level issues in rural pregnant women’ s emotional management primarily centered on inadequate medical services and external social support systems, manifested as suboptimal healthcare experiences, unmet needs, weak informational support, and increased social pressure. In China, rural pregnant women constitute a large population base with wide geographic distribution, while primary healthcare institutions have limited maternal health resources, high-level medical institutions suffer from insufficient staff-to-patient ratios, and long distances to designated medical units create additional barriers to healthcare access. Consequently, pregnant women cannot obtain adequate professional information support from medical personnel, and healthcare institutions fail to effectively reach rural pregnant women with pregnancy-related activities due to insufficient understanding of their genuine needs.

The key to solving these problems lies in fully leveraging the active role of rural primary healthcare personnel in prenatal care, extending their service responsibilities, optimizing temporal and spatial accessibility, providing professional prenatal guidance to rural pregnant women, listening to their genuine needs,

promptly identifying and intervening in psychological problems, and implementing pregnancy-related activities at the township level to facilitate rural pregnant women' s participation.

References

[1] DIENER E, EMMONS R A. The independence of positive and negative affect[J]. J Pers Soc Psychol, 1984, 47(5): 1105-1117. DOI: 10.1037//0022-3514.47.5.1105.

[2] RAHMAN A, FISHER J, BOWER P, et al. Interventions for common perinatal mental disorders in women in low- and middle-income countries: a systematic review and meta-analysis[J]. Bull World Health Organ, 2013, 91(8): 593-601I. DOI: 10.2471/BLT.12.109819.

[3] ALIPOUR Z, LAMYIAN M, HAJIZADEH E. Anxiety and fear of childbirth as predictors of postnatal depression in nulliparous women[J]. Women Birth, 2012, 25(3): e37-43. DOI: 10.1016/j.wombi.2011.09.002.

[4] YIN X, SUN N, JIANG N, et al. Prevalence and associated factors of antenatal depression: Systematic reviews and meta-analyses[J]. Clin Psychol Rev, 2021, 83: 101932. DOI: 10.1016/j.cpr.2020.101932.

[5] DENNIS C L, FALAH-HASSANI K, SHIRI R. Prevalence of antenatal and postnatal anxiety: systematic review and meta-analysis[J]. Br J Psychiatry, 2017, 210(5): 315-323. DOI: 10.1192/bjp.bp.116.187179.

[6] 傅小兰，张侃. 心理健康蓝皮书：中国国民心理健康发展报告（2019~2020）[J]. 北京：社会科学文献出版社，2021.

[7] CHANG F, FAN X, ZHANG Y, et al. Prevalence of depressive symptoms and correlated factors among pregnant women during their second and third trimesters in northwest rural China: a cross-sectional study[J]. BMC Pregnancy Childbirth, 2022, 22(1): 38. DOI: 10.1186/s12884-021-04340-0.

[8] GUO J M, ZHENG A H, HE J L, et al. The prevalence of and factors associated with antenatal depression among all pregnant women first attending antenatal care: a cross-sectional study in a comprehensive teaching hospital[J]. BMC Pregnancy Childbirth, 2021, 21(1): 713. DOI: 10.1186/s12884-021-04090-z.

[9] STEINIG J, NAGL M, LINDE K, et al. Antenatal and postnatal depression in women with obesity: a systematic review[J]. Arch Womens Ment Health, 2017, 20(4): 569-585. DOI: 10.1007/s00737-017-0739-4.

[10] PINTO T M, NOGUEIRA-SILVA C, FIGUEIREDO B. Fetal heart rate variability and infant self-regulation: the impact of mother' s prenatal depressive symptoms[J]. J Reprod Infant Psychol, 2023: 1-14. DOI: 10.1080/02646838.2023.2257730.

[11] ARAUJO D M R, VILARIM M M, SABROZA A R, et al. Depressão no período gestacional e baixo peso ao nascer: Uma revisão sistemática da literatura[J]. Cad Saúde Pública, 2010, 26(2): 219-227. DOI: 10.1590/s0102-311x2010000200002.

[12] BLANC J, RESSÉGUIER N, LORTHE E, et al. Association between extremely preterm Caesarean delivery and maternal depressive and anxious symptoms: a national population-based cohort study[J]. BJOG, 2021, 128(3): 594-602. DOI: 10.1111/1471-0528.16499.

[13] BEYENE G M, AZALE T, GELAYE K A, et al. The effect of antenatal depression on birth weight among newborns in South Gondar zone, Northwest Ethiopia: a population-based prospective cohort study[J]. Arch Public Health, 2021, 79(1): 121. DOI: 10.1186/s13690-021-00643-y.

[14] DIEBOLD A, JOHNSON J K, BRENNAN M, et al. Testing the effects of a prenatal depression preventive intervention on parenting and young children' s self-regulation and functioning (EPIC): protocol for a longitudinal observational study[J]. BMC Public Health, 2021, 21(1): 1368. DOI: 10.1186/s12889-021-13679-0.

[15] BIAGGI A, CONROY S, PAWLBY S, et al. Identifying the women at risk of antenatal anxiety and depression: a systematic review[J]. J Affect Disord, 2016, 191: 62-77. DOI: 10.1016/j.jad.2015.11.014.

[16] LADYMAN C, SWEENEY B, SHARKEY K, et al. A scoping review of non-pharmacological perinatal interventions impacting maternal sleep and maternal mental health[J]. BMC Pregnancy Childbirth, 2022, 22(1): 659. DOI: 10.1186/s12884-022-01343-2.

[17] KIRST-ASHMAN K K, ZASTROW C. Understanding human behavior and the social environment.

[18] 肖菊兰，文艺，罗伟香，等. 中文版简版爱丁堡产后抑郁量表在孕妇人群中的信效度检验 [J]. 现代预防医学，2022，49(18): 3320-3325. DOI: 10.20043/j.cnki.MPM.202203141.

[19] ZUNG W W. A rating instrument for anxiety disorders[J]. Psychosomatics, 1971, 12(6): 371-379. DOI: 10.1016/S0033-3182(71)71479-0.

[20] COLAIZZI P. Psychological research as the phenomenologist views it[M]//VALLE R S, MARK K. Existential phenomenological alternatives for psychology. New York: Oxford University Press, 1978: 6.

[21] MEERS J M, NOWAKOWSKI S. Sleep during pregnancy[J]. Curr Psychiatry Rep, 2022, 24(8): 353-357. DOI: 10.1007/s11920-022-01343-2.

[22] SHIGEMATSU-LOCATELLI M, KAWANO T, YASUMITSU-LOVELL K, et al. Maternal pain during pregnancy dose-dependently predicts postpartum depression: The Japan Environment and Children' s Study[J]. J Affect Disord, 2022, 303: 346-352. DOI: 10.1016/j.jad.2022.01.039.

[23] PAUCSIK M, NARDELLI C, BORTOLON C, et al. Self-compassion and emotion regulation: testing a mediation model[J]. Cogn Emot, 2023, 37(1): 49-61. DOI: 10.1080/02699931.2022.2143328.

[24] LIU Y W, GUO Q Y, SU Y T, et al. Gender differences in happiness in Chinese society: the role of parental preference for sons over daughters[J]. Soc Sci Med, 2023, 337: 116287. DOI: 10.1016/j.socscimed.2023.116287.

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