HEALTHCARE IN MAINLAND CHINA

Correlation between primary family caregiver identity and maternal depression risk in poor rural China

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ABSTRACT

Introduction: Prenatal and postpartum depression are important public health challenges because of their long-term adverse impacts on maternal and neonatal health. This study investigated the risk of maternal depression among pregnant and postpartum women in poor rural China, along with the correlation between primary family caregiver identity and maternal depression risk.

Methods: Pregnant women and new mothers were randomly selected from poor rural villages in the Qinba Mountains area in Shaanxi. Basic demographic information was collected regarding the women and their primary family caregivers. The Edinburgh Postnatal Depression Scale was used to identify women at risk of depression, and the Perceived Social Support Scale was used to evaluate perceived family support.

Results: This study included 220 pregnant women and 473 new mothers. The mean proportions of women at risk of prenatal and postpartum depression were 19.5% and 18.6%, respectively. Regression analysis showed that identification of the baby's grandmother as the primary family caregiver was negatively correlated with maternal depression risk (β=-0.979, 95% confidence interval [CI]=-1.946 to -0.012, P=0.047). However, the husband's involvement in that role was not significantly correlated with maternal depression risk (β=-0.499, 95% CI=-1.579 to 0.581, P=0.363). Identification of the baby's grandmother as the primary family caregiver was positively correlated with family support score (β=0.967, 95% CI=-0.062 to 1.996, P=0.065).

Conclusion: Prenatal and postpartum depression are prevalent in poor rural China. The involvement of the baby's grandmother as the primary family caregiver may reduce maternal depression risk, but the husband's involvement in that role has no effect.

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New knowledge added by this study
• Prenatal and postpartum depression are prevalent in poor rural areas of China. Despite evidence regarding the importance of family support during prenatal and postpartum periods, husbands in poor rural China did not provide effective support.
• There was a persistent risk of maternal depression during both prenatal and postpartum periods.
• Maternal depression persists in the absence of external interventions.

Implications for clinical practice or policy
• High-quality family support is necessary to ensure that pregnant women maintain good mental health. Compared with husbands, grandmothers may be better primary caregivers because they are experienced in terms of parenting and housework.
• Husbands in poor rural China should receive training that enables them to provide effective maternal care.

Introduction

Maternal depression is a common mental health problem during the prenatal and postpartum periods. The World Health Organization estimates that approximately 10% of pregnant women and 13% of postpartum women worldwide have mental health problems, mainly depression.[1] In China, the prevalence of maternal depression ranges from 8.2% to 28.5%.[2-7] Women in urban areas have access to specialised maternity care services and mental health services that can help manage these mental health problems and difficulties.[8] However, these

中國貧困農村地區的家庭主要照護者身份與孕產婦抑鬱風險的相關性研究

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引言：產前和產後抑鬱症是重要的公共衛生挑戰，因為它對孕產婦和新生兒健康有長期的不利影響。本研究調查了中國貧困農村地區孕婦和產後婦女患抑鬱症的風險比例，以及家庭主要照護者身份與孕產婦抑鬱症風險之間的相關性。

方法：本研究從陝西省秦巴山區的貧困農村地區隨機選出孕產婦，並收集了有關孕產婦及其家庭主要照護者的基本人口統計學資料。我們使用愛丁堡產後抑鬱量表來識別有抑鬱風險的孕產婦，以及領悟社會支持量表來評估領悟家庭支持程度。

結果：本研究包括220名孕婦和473名產婦。有產前和產後抑鬱症風險的婦女佔比分別為19.5%和18.6%。迴歸分析顯示，嬰兒的外祖母為家庭主要照護者與孕產婦的抑鬱症風險呈負相關（β=-0.979，95%置信區間=-1.946至-0.012，P=0.047）。然而，丈夫參與這一角色與孕產婦抑鬱症風險沒有明顯的相關性（β=-0.499，95%置信區間=-1.579至0.581，P=0.363）。以嬰兒的外祖母作為主要的家庭照護者與家庭支持得分呈正相關（β=0.967，95%置信區間=-0.062至1.996，P=0.065）。

結論：產前和產後抑鬱症在中國貧困農村地區很普遍。嬰兒的外祖母擔當家庭主要照護者可能會降低孕產婦的抑鬱症風險，但丈夫作為這一角色時則沒有影響。

commercialised services are usually expensive and distant from poor rural areas of China. Therefore, it is particularly important for pregnant and postpartum women in poor rural areas to rely on family and social relationships for reasonable care and support.

There is evidence that the level of perceived social support, particularly family support, is associated with a woman's mental health status during pregnancy.[9,10] China's rapid societal and economic development have resulted in substantial changes to family structure in both urban and rural areas. For example, modern couples are more likely to live with only their children, rather than with family members from multiple generations.[11] When grandparents are absent from a family's daily life, the role of the husband becomes more important because he must be more engaged in housework[12] and provide greater support.

The changes in primary family caregiver identity during prenatal and postpartum periods reflect this transformation of family structure.[13] The results of multiple studies in developed countries and the urban areas of China have suggested that husbands are able to care for their wives and children during pregnancy and after delivery; moreover, a husband's companionship has a positive impact on the mental health status of his pregnant wife.[2,10,14]

However, in poor rural areas, no consensus has been reached concerning whether a husband can provide effective family support for his pregnant wife.[15] For example, husbands usually have lower awareness of maternity care because of limited education and limited housework experience. However, in a traditional Chinese family with patrilocal features, the husband is the main worker and is responsible for the economic well-being of the family,[16] whereas the wife stays at home and cares for the family. This stereotype of traditional household arrangement prevents some men from providing maternal care, regardless of their presence at home. Accordingly, grandmother, the mother of the baby's mother, becomes a possible caregiver for the mother and baby,[17] although this may lead to mother-in-law conflict.[18]

Here, using data from a large-scale survey of pregnant and postpartum women in poor rural areas, we analysed the status of maternal mental health in poor rural areas, with family support as an intermediate variable, to understand the correlation between primary family caregiver identity and maternal depression risk.

Methods

Sampling

The data analysed in this study were collected during a survey of maternal and neonatal health and nutrition statuses among residents of poor rural villages in the Qinba Mountains area; the survey was conducted by Shaanxi Normal University from March 2019 to April 2019. The Qinba Mountains area spans six provinces including Gansu, Sichuan, Shaanxi, Chongqing, Henan, and Hubei. Its primary portion is situated in Shaanxi's southern region. In 2019, the per capita annual disposable income in the Qinba Mountains area was RMB 11 443, similar to that of rural residents in poverty-stricken counties (RMB 11 567).[19] In 2018, the mean poverty rate in this area was 3.6%; for comparison, the national mean was 1.7% and the rate in poverty-stricken counties was 4.5%.[20] This study included women aged ≥18 years who were either pregnant (≥4 weeks of gestation) or in the postpartum period (0-6 months after delivery).

The following multilevel cluster-based random sampling method was used in this study. First, 13 national-level poor counties in two prefectures in the Qinba Mountains area were selected. Then, a list of villages was obtained for each county, and the total numbers of pregnant women and households with babies aged ≤6 months in each village were counted with assistance from local government officials. Considering the financial limitations and overall feasibility of the study, villages with a small sample size (<3) or large sample size (>15) were

excluded. Finally, we used Stata 15.0 (Stata Corp, College Station [TX], United States) to analyse the data. The sample size was estimated to achieve, for an average incidence of independent variables of 0.15 in consideration of our pilot study, a sampling standard error (SE) of 0.03 with a 95% confidence interval (CI). The final 131 villages were randomly selected as sample villages, and all households in the sample villages that met the above criteria were considered eligible for the study.

Data collection

The data used in this study were collected through face-to-face interviews. To ensure accuracy and consistency during data collection, enumerators were selected from a group of interested university students in Xi'an. The enumerators underwent extensive training, then completed a pilot study with 20 participants prior to formal data collection. Each eligible participant received a consent form with information regarding programme objectives, procedures, potential risks, and benefits, as well as an explanation of privacy protection. Participants provided oral consent for inclusion in the study before engaging in a face-to-face interview with a single enumerator. Each interview only involved the participant, and interruptions from other family members were avoided.

Assessments

Basic participant information

A questionnaire was used to collect basic participant information, including their age, education level, and self-rated health status, along with whether the baby had been born and whether it was the firstborn child. The women were also asked whether they had access to any support groups where mothers could seek help and exchange information concerning parenting experiences. Furthermore, they were asked nine yes/no questions regarding family assets (eg, possession of a computer, an air conditioner, and a car). The above questions were also included in our questionnaire to better understand maternal social interactions and household assets in order to control for them in the regression analysis and thus produce more accurate regression results. Each participant's decision-making power was measured using a scale of eight items compiled by Peterman et al.[21] A higher score on the decision-making power scale was presumed to indicate greater autonomy concerning childcare and the management of other family issues.

Primary family caregivers

A questionnaire was used to collect information about all family members living in the participant's home for >3 months, who were more likely to be the primary caregivers and to have an impact on maternity. Each participant was asked to identify the family member who served as the primary family caregiver, providing the most care for the participant and her baby during the prenatal and postpartum periods. Considering the sample size and sample distribution, three primary family caregiver categories were used in this study: the husband, the baby's grandmother (the mother of the baby's mother or the baby's father), and other family members or no caregivers.

Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item scale used to identify women at risk of maternal depression.[22,23] The total EPDS score ranges from 0 to 30, where a higher score indicates a greater risk of depression. Although the original cut-off value was an EPDS score of ≥13 points, we used the standard cut-off value in China (≥9.5 points[24,25]) as an indicator of sufficient depression risk to merit psychiatric examination and possible treatment. Previous research has demonstrated that the EPDS has satisfactory reliability and validity. Specifically, Wang et al[26] reported that the EPDS had a content validity ratio of 0.93 and good internal consistency (Cronbach's α coefficient of 0.76). The correlation coefficients between the 10 individual item scores and the total score ranged from 0.37 to 0.67, with P values <0.01.

Perceived Social Support Scale

The Perceived Social Support Scale, developed by Zimet et al[27] and translated into Chinese by Jiang,[28] is a 12-item self-assessment questionnaire that measures three sources of social support (ie, three subscales): family support, friends' support, and other people's support. Responses to questionnaire items are recorded using a seven-point Likert scale that ranges from 'completely negative' to 'completely positive' (1-7 points), indicating the respondent's level of agreement with each item. The total score is 84 points (28 points per subscale), and a higher score indicates the receipt of greater social support. The Cronbach's α coefficient of the scale is 0.88; the Cronbach's α coefficients for family support, friends' support, and other people's support subscales are 0.81, 0.85, and 0.91, respectively.[27] Because this study focused on family support, only the family support subscale was used as an intermediate variable to analyse the correlation between primary family caregiver identity and maternal depression risk.

Statistical methods

STATA 15.1 software was used to clean the data and perform statistical analysis. Descriptive statistical analysis was performed and presented as mean

± standard deviation. F-test and *t* test were used to detect differences in depression scores among subgroups of women with different characteristics. Multiple linear regression was used to explore correlations between primary family caregiver identity and maternal depression risk or family support score. P values <0.05 were considered statistically significant. Additionally, we adjusted the SE at the village level and calculated coefficients with greater precision because individual values within the same village are correlated, which might result in biased SE in multiple linear regression.

Results

In total, 715 women were interviewed, including 220 pregnant women and 495 new mothers. Twenty-two samples with missing values were excluded to ensure sample uniformity throughout the analysis procedure. Finally, analyses in this study were based on the data of 693 participants (220 pregnant women and 473 new mothers) and the questionnaire return efficiency was 96.9%, which is the percentage of survey responses that were valid.

Maternal depression risk in poor rural areas

Among the 220 pregnant women, 37 (16.8%), 66 (30.0%), and 117 (53.2%) were in the early, middle, and late stages of pregnancy, respectively (Table 1). In total, 226 of the 473 new mothers (47.8%) had babies aged 1 to 3 months, whereas 247 new mothers (52.2%) had babies aged 4 to 6 months.

The mean maternal EPDS score was 5.85 and the proportion of women at risk of depression was 18.9% (131/693). The proportion of women at risk of depression was generally stable regardless of pregnancy stage. Specifically, the proportion of women at risk of depression during early pregnancy was 16.2% (6/37); during middle and late pregnancy, the proportions of women at risk were slightly increased. The proportions of women at risk of depression were 16.8% (38/226) and 20.2% (50/247) at 1-3 months and 4-6 months after delivery, respectively. However, the maternal EPDS scores and proportions of women at risk of depression did not significantly differ according to pregnancy stage or time since delivery.

Univariate analysis of maternal depression risk

Overall, the mean participant age was 28.13 ± 4.70 years. In total, 239 women (34.5%; mean age, 25.52 ± 3.95 years) reported that the current pregnancy or ≤6-month-old baby was their firstborn child. The remaining 454 women (65.5%; mean age, 29.50 ± 4.49 years) were experienced mothers who have already had children and are familiar with caring for them. Overall, 116 women (16.7%) had an education level above junior high school. The self-rated health status was good in 89 women (12.8%), and 102 women (14.7%) were involved in a parenting support group. Table 2 summarises the participant characteristics.

As shown in Table 2, the participants were clustered into three groups according to primary caregiver identity: the husband for 151 women (21.8%), the baby's grandmother for 452 women (65.2%), and other family members or no caregiver for 90 women (13.0%). The mean EPDS scores of women in the three groups were 6.23 ± 4.34, 5.56 ± 4.01, and 6.63 ± 4.84, respectively (P=0.039). Additionally, univariate analysis revealed statistically significant differences in depression scores according to education level, self-rated health status, and parenting support group involvement. There were no statistically significant differences in other variables.

Correlation between primary family caregiver identity and maternal depression risk

As shown in Table 3, identification of the baby's grandmother as the primary family caregiver was significantly negatively correlated with EPDS score (β=-0.979, 95% CI=-1.946 to -0.012, P=0.047). However, identification of the husband as the family caregiver was not significantly correlated with EPDS score (β=-0.499, 95% CI=-1.579 to 0.581, P=0.363).

Correlation between primary family caregiver identity and family support score

As shown in Table 4, after adjustment for other variables, there was no significant correlation between identification of the husband as the primary family caregiver and the family support score (β=0.375, 95% CI=-0.704 to 1.455, P=0.493). However,

TABLE 1. Maternal depression risk in poor rural areas*

Pregnancy and postpartum period	All participants (n=693)	Early pregnancy (1-3 months) [n=37]	Middle pregnancy (4-6 months) [n=66]	Late pregnancy (7-10 months) [n=117]	1-3 Months after delivery [n=226]	4-6 Months after delivery [n=247]	P value
Depression rate	131 (18.9%)	6 (16.2%)	12 (18.2%)	25 (21.4%)	38 (16.8%)	50 (20.2%)	0.811
Depression score	5.85 ± 4.21	5.49 ± 3.85	5.76 ± 3.87	5.82 ± 4.68	5.50 ± 3.97	6.24 ± 4.32	0.409

* Data are shown as No. (%) or mean ± standard deviation, unless otherwise specified

identification of the baby's grandmother as the primary family caregiver was significantly positively correlated with family support score (β=0.967, 95% CI=-0.062 to 1.996, P=0.065). Furthermore, identification of the baby's grandmother as the primary family caregiver had the largest standardised regression coefficient among the three caregiver categories, indicating that pregnant and postpartum women felt the greatest family support when the baby's grandmother was the primary family caregiver.

Discussion

Maternal depression risk in poor rural areas

In this study, the overall proportion of women at risk of maternal depression was 18.9%, including a mean proportion of 19.5% among pregnant women and a mean proportion of 18.6% among women ≤6 months postpartum. This overall proportion of women at risk of maternal depression is much higher than the proportion in a western urban area of China (12.4%)[29] and comparable with the proportions in low- and middle-income countries such as Ethiopia (19.9%)[30]—both previous studies also used the EPDS to identify women at risk of maternal depression. The high proportion in the present study may be related to the location (poor rural areas): compared with women in urban areas, women in poor rural areas are more likely to have a lower socio-economic status.[31] The lack of knowledge regarding mental health and its services in rural areas also makes women in such areas more likely to become depressed if they do not receive timely treatment for mental health problems.[32] Therefore, the mental health of rural mothers should receive greater attention from their family members and the relevant health departments.

This study also revealed a persistent risk of depression during the prenatal and postpartum periods (Table 1). Notably, the proportion did not substantially decrease by 6 months after delivery. Yue et al[33] investigated the mental health of caregivers for babies aged 6 to 36 months in a rural area in western China. Their results showed that the proportion of caregivers at risk of depression was similar to the proportion in the present study. These findings suggest that maternal depression persists in the absence of external intervention. Thus, there is an urgent need for timely external mental health interventions among pregnant women and mothers of young children. The present study also showed that the maternal depression risk in poor rural areas is influenced by factors such as a woman's education level, self-rated health status, and parenting support group involvement. These results are consistent with the findings by Zhou et al,[7] Lancaster et al,[10] and Lee et al.[18]

TABLE 2. Univariate analysis of maternal depression risk (n=693)

Variable	No. of participants	Depression score	
		Mean ± standard deviation	P value*
Primary family caregiver			**0.039**
Other family member or no caregiver (as reference)	90 (13.0%)	6.63 ± 4.84	
Husband	151 (21.8%)	6.23 ± 4.34	
Baby's grandmother	452 (65.2%)	5.56 ± 4.01	
Whether baby had been born			0.669
Yes	473 (68.3%)	5.89 ± 4.17	
No	220 (31.7%)	5.75 ± 4.30	
Maternal age, y			0.073
≤30	513 (74.0%)	5.61 ± 3.94	
>30	180 (26.0%)	6.51 ± 4.86	
Education level			**0.020**
≤Junior high school	577 (83.3%)	6.01 ± 4.28	
>Junior high school	116 (16.7%)	5.02 ± 3.76	
Self-rated health status			**<0.001**
Poor	279 (40.3%)	6.96 ± 4.37	
Fair	325 (46.9%)	5.25 ± 3.98	
Good	89 (12.8%)	4.50 ± 3.74	
Family asset index			0.692
≤0	317 (45.7%)	5.91 ± 4.19	
>0	376 (54.3%)	5.79 ± 4.23	
Parenting support group involvement			**0.046**
Yes	102 (14.7%)	6.62 ± 3.81	
No	591 (85.3%)	5.72 ± 4.26	
Household decision-making power score			0.432
≤16	117 (16.9%)	6.35 ± 4.33	
>16	576 (83.1%)	5.74 ± 4.18	
Only-child status			0.154
Yes	239 (34.5%)	5.53 ± 3.95	
No	454 (65.5%)	6.01 ± 4.33	

* P values in bold are statistically significant (P<0.05)

Correlation between primary family caregiver identity and maternal depression risk

Our results showed that identification of the husband as the primary family caregiver was not significantly correlated with maternal depression risk in poor rural areas (Table 3). This finding was considerably different from the results of previous studies in urban areas. Xie et al[34] found that insufficient or poor-quality emotional support from the husband was significantly associated with an increased risk of postpartum depression among

TABLE 3. Multiple linear regression analysis of correlation between primary family caregiver identity and maternal depression risk

Dependent variable	Depression score			
	B coefficient	β coefficient	95% Confidence interval	P value*
Primary family caregiver (other family member or no caregiver as reference)				
Husband	-0.049	-0.499	-1.579 to 0.581	0.363
Baby's grandmother	-0.111	-0.979	-1.946 to -0.012	**0.047**
Control variables				
Whether baby had been born	0.002	0.019	-0.631 to 0.670	0.953
Maternal age	0.023	0.021	-0.059 to 0.101	0.606
Education level	-0.056	-0.631	-1.468 to 0.206	0.138
Self-rated health status				
Fair	-0.180	-1.513	-2.211 to -0.816	**<0.001**
Good	-0.182	-2.302	-3.284 to -1.319	**<0.001**
Family asset index	-0.048	-0.186	-0.504 to 0.132	0.248
Parenting support group involvement	0.086	1.023	0.321 to 1.725	**0.005**
Household decision-making power score	-0.057	-0.086	-0.219 to 0.047	0.205
Only-child status	0.011	0.100	-0.673 to 0.873	0.798

* P values in bold are statistically significant (P<0.05)

TABLE 4. Multiple linear regression analysis of correlation between primary family caregiver identity and family support score

Dependent variable	Family support score			
	B coefficient	β coefficient	95% Confidence interval	P value*
Primary family caregiver (other family member or no caregiver as reference)				
Husband	0.041	0.375	-0.704 to 1.455	0.493
Baby's grandmother	0.120	0.967	-0.062 to 1.996	0.065
Control variables				
Whether baby had been born	-0.046	-0.378	-0.901 to 0.145	0.156
Maternal age	-0.019	-0.015	-0.088 to 0.057	0.681
Education level	0.044	0.454	-0.302 to 1.210	0.237
Self-rated health status				
Fair	0.066	0.505	-0.133 to 1.142	0.120
Good	0.120	1.378	0.479 to 2.278	**0.003**
Family asset index	0.103	0.366	0.040 to 0.693	**0.028**
Parenting support group involvement	-0.049	-0.526	-1.294 to 0.242	0.178
Household decision-making power score	0.055	0.078	-0.062 to 0.218	0.274
Only-child status	-0.011	-0.087	-0.742 to 0.567	0.792

* P values in bold are statistically significant (P<0.05)

mothers in Changsha, Hunan Province, China. In contrast, Wan et al[2] found that the proportions of women at risk of maternal depression were 1.9- to 2.6-fold higher among women without support from the husband before and after delivery than among women with support from the husband, based on a study of mothers in Beijing, China. The results of these studies suggest that the husband's involvement as the primary family caregiver can reduce the risk of maternal depression in urban areas, but this effect was not apparent in poor rural areas.

We also found that maternal depression risk was significantly lower when the baby's grandmother was identified as the primary family caregiver (Table 3).

Our results are consistent with the findings by Wan et al[2] in a study of 342 pregnant women in Beijing, China: during the 'confinement' period, care and support from the baby's grandmother(s) were important for relieving depression. However, Lee et al[18] showed that mother-in-law conflict remains prominent in China, which may have negative emotional outcomes for grandmothers and new mothers. Although pregnant and postpartum women in poor rural areas may experience similar conflict, our findings suggest that support from the baby's grandmother(s) remains predominantly positive.

Correlation between family support and maternal depression risk

We attempted to determine why support from the husband did not reduce maternal depression risk in poor rural areas through the analysis of an intermediary variable. Initially, we hypothesised that the positive effect of the husband acting as the primary family caregiver would be offset by the loss of income caused by the husband's inability to seek work opportunities in other locations. However, data analysis revealed that the husband's role as the primary caregiver had no impact on the family income and family asset index (online supplementary Table 1). Thus, we explored the effect of family support. Multiple previous studies demonstrated that family support influenced maternal depression risk[14]; consistent with those findings, our analysis showed that family support was significantly negatively correlated with maternal depression risk (online supplementary Table 2).

There may be two main reasons for this negative correlation. First, husbands in poor rural areas have insufficient knowledge and skills related to maternal care.[16] Husbands do not have first-hand experience in childbirth and can only acquire it through education. However, compared with men in urban areas, men in poor rural areas have lower levels of education and may be less inclined to learn on their own, making it more difficult to acquire such knowledge and skills.[35] In contrast, grandmothers are more experienced overall, which may enable them to provide more effective family support. For example, based on their own experience, grandmothers can help new mothers to prepare for and manage pain that sometimes occurs during breastfeeding, which can alleviate anxiety and provide a feeling of greater support.[17] Second, in poor rural areas, husbands may lack sufficient time and energy to provide effective family care. Compared with families in urban areas, families in poor rural areas are more economically disadvantaged[33]; therefore, husbands in such families may prioritise financial stability and be unable to expend time or energy in support of maternal care, despite their physical presence in the home. In contrast, the baby's grandmother(s) may

have sufficient time and energy to provide effective maternal care (eg, by feeding the baby and changing its diapers), thus relieving the mother's psychological stress.

The findings in this analysis of women in poor rural areas differ from the results of studies in urban areas, indicating important differences in family structure between urban and rural areas. There is evidence that a gradual transformation of the family is underway in urban areas, whereby husbands have begun to actively engage in caregiving. However, the transformation of family structure is much slower in poor rural areas,[13] and husbands in those areas are not yet prepared for this new role. Because of constraints regarding their education level and skills, as well as family finances, husbands in poor rural areas continue to prioritise financial stability[36]; their support does not have a positive impact on the risk of maternal depression. Thus, women in poor rural areas must continue to rely on family members outside of the nuclear family, such as the baby's grandmother(s), to assume some caregiving responsibilities.

Commercialised and specialised mental health counselling services in urban areas play important roles in improving maternal mental health.[8] Xiao[37] found that postnatal care through a menstrual club provided continuous physical, psychological, and emotional support that was sufficient to reduce the incidence of postpartum depression. However, such clubs are not available in poor rural areas. Therefore, it is important to promote better caregiving from family members, including husbands. For example, husbands could receive training that enables them to provide practical support, as well as guidance concerning the early identification of depressive tendencies and the development of communication skills for psychological adjustment.

Limitations

This study had some limitations. First, its cross-sectional design prevented the assessment of maternal depression trends during pregnancy and after delivery, although such an assessment could have been conducted in a cohort study. Second, this study focused on primary family caregiver identity and did not explore the type or form of caregiving provided. Third, all participants were residents of rural northwest China, and thus the results may not be generalisable to other populations. These limitations should be addressed in future studies.

Conclusions and policy implications

The prevalence of maternal depression is high in poor rural areas of Shaanxi Province. Identification of the husband as the family caregiver was not significantly

correlated with maternal depression risk, whereas the involvement of the baby's grandmother in that role was significantly negatively correlated with maternal depression risk. Based on our findings, we make the following suggestions. In rural areas, high-quality family support is necessary to ensure that pregnant women maintain good mental health. Compared with husbands, grandmothers may be better primary caregivers because they are more experienced in terms of parenting and housework. Husbands in poor rural China should receive training that enables them to provide effective maternal care.

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