

## Original Article

# Prevalence and factors associated with male postnatal depression in China

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## Abstract

**Background and Objective:** Male postnatal depression has recently begun to attract more research attention. However, it often remains unrecognized despite affecting not only the health of the child but also the spousal relationship and family welfare. This study aimed to estimate the prevalence of male postnatal depressive symptoms in Guangzhou, South China. It also explored sociodemographic factors and psychological variables as predictors of postnatal depression symptoms. **Materials and methods:** Chinese men whose children had been born within the last six months were screened using the Edinburgh Postnatal Depression Scale for depressive symptoms, the Vulnerable Personality Style Questionnaire for personality, and the Social Support Rating Scale for social support. Sociodemographic and psychosocial variables were descriptively analyzed and logistic regression was also employed to analyze the predictive impact of factors associated with depression. **Results:** A total of 212 new Chinese fathers participated in the study. The prevalence of postnatal depression was 24.1% assessed by the Edinburgh Postnatal Depression Scale cutoff score of 10. Depressive symptoms were found to be significantly associated with employment status and vulnerable personality traits. Higher family income, wanted pregnancy, having a child of the desired gender, more family support and objective support (OR = 0.598, 95% CI = 0.312-0.896) were all protective factors for depressive symptoms among new Chinese fathers. **Conclusion:** This study indicated that there is a need to routinely screen for postnatal depressive symptoms in men. Early identification and timely referral to healthcare professionals may prevent postnatal depression and improve the mental health of new fathers. It is important for healthcare providers to develop and evaluate information resources in print and online so as to establish how best to identify and manage paternal postnatal mental health needs. This study also suggests that new fathers need to be provided with targeted resources concerning postnatal mental health and informed as to how to access them and who can be approached for professional support.

## Keywords

Postnatal depression; New fathers; Cross-section study; China

## Introduction

While postnatal depression in women has been a focus of research for a considerable time, the equivalent experiences for men have only recently begun to attract attention [1–5]. Maternal depression is common, with the prevalence of depressive symptoms among psychotic mothers reported to be 50% [6]. Postnatal depression, as used in this study, refers to depression or depressive symptoms occurring in the postnatal period [7]. Men are usually at lower risk of

depression than women during this time, but the prevalence of male postnatal depression is higher than in the general population [8]. Research indicates that many men experience depressive symptoms during this period, with prevalence estimates of a nearly twofold increase when compared with the general adult male population [5]. One meta-analysis has shown a prevalence of approximately 10.4% [9].

There is increasing evidence that male postnatal depressive symptoms can have either direct or indirect impacts on the development of their children [10]. Research has shown that

such symptoms are associated with increased risk of mental or behavioral problems in their children. This is the case even after controlling for numerous potential confounders, including maternal depressive symptoms [11, 12]. A child has about a 1.7-fold greater risk of mental and behavioral problems, including difficulties in peer relationship, if their father exhibits postnatal depressive symptoms [11, 13]. Further, men's mental health problems at this stage of life have been related to poor couple relationships and job quality [14]. Previous research also reported that new fathers had lower levels of social support and vulnerable personality, tending to have more depressive symptoms during the postnatal periods [15, 16]. Further investigation may result in the identification of risk factors and development of relevant interventions [5].

Given the relatively high prevalence of male postnatal depression and its risk of adverse effects on relationships with both the child and partner, it is important to understand who is most at risk of developing depression. Such an understanding could help healthcare professionals provide interventions to assist the whole family [10]. However, there is a gap in the research: in China, few studies have been conducted to estimate the prevalence and risk factors of male postnatal depression. Therefore, this study aimed to investigate the prevalence and impact of postnatal depression in men and to explore the predictors of postnatal depression symptoms in terms of both sociodemographic factors and psychological variables.

## Methods

A cross-sectional study was conducted on a sample of new Chinese fathers by face-to-face interview at a postnatal clinic, located at Guangzhou, South China.

### Study participants

As postnatal depressive symptoms are observed during the period three to six months postpartum [17], this study focused on males within six months of the birth of a child. Inclusion criteria included: being an adult Chinese male aged over 18, first-time father and birth of a child occurring within the previous six months. Exclusion criteria included: Fathers of newborns with either a severe disease or who had been admitted to a neonatal intensive care unit on the grounds that these new fathers were more likely to be irritable and some newborns admitted to a neonatal ICU were involved in disputes between the hospital and the parents.

### Sample size

Sample size estimation for this study used the sample size formula for survey design:  $n = Z^2 pq / d^2$  [18]. Previous research indicates that the prevalence of male postnatal depression in China is 14.5% [4], hence  $P = 0.145$ ,  $q = (1 - P) = 0.855$ . This study took a  $Z$ -value of 1.96 for a 95% confidence level (CI), and a  $d$ -value of 0.05, to achieve the precision expected at the 95% CI level. Therefore, 190 new fathers were recruited to the study.

## Outcome measures

### Paternal depressive symptoms

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report scale designed to assess maternal depressive symptoms during the postnatal period [19]. Edmondson and colleague suggest that the EPDS may also be a useful tool to screen for paternal depression [20]. The Chinese version of EPDS has been validated for Chinese women and their spouse during the perinatal period [21]. Thus, the Chinese version of the EPDS was employed to measure new Chinese fathers' depressive symptoms. Responses are collected using a four-point Likert scale with item scores ranging from zero to three. The total EPDS score ranges from zero to thirty. Fathers with depressive symptoms scored significantly higher on the EPDS than fathers without [20]. The optimal cutoff score of 10 can be used to screen for depressive symptoms among fathers, with acceptable sensitivity (89.5%) and specificity (78.2%) [20]. In this study, when tested on new Chinese fathers, the Cronbach's alpha of the EPDS was 0.83.

### Personality characteristics

The Vulnerable Personality Style Questionnaire (VPSQ) is a nine-item self-report scale including coping, nervous, timid, sensitive, worried, organized, obsessive, expressive and volatile items [22]. The VPSQ was used to assess personality traits that entail a vulnerability toward postnatal depression. The Chinese VPSQ has been translated, culturally adapted and validated by Jin [23]. Total VPSQ scores range from 9 to 45, with higher scores indicating a higher risk of vulnerability [24]. The internal consistency of Chinese VPSQ has been evaluated at 0.84 [23]. In this study, the Cronbach's alpha was 0.79.

### Social support

The 10-item Social Support Rating Scale (SSRS) was used to assess new fathers' social support in the domains of subjective and objective support, and the degree to which the respondent used social support. The SSRS was originally developed in China by Xiao [25], and has been widely used to assess the degree of social support among Chinese men [4]. Higher scores indicate better social support. In this study, the Cronbach's alpha of the SSRS was 0.86.

### Demographic variables

A demographic questionnaire was used to collect socio-demographic data including age, highest educational level, marital satisfaction, family income, infant gender, employment, history of depression and the presence or absence of unfavorable life events. Data on mode of delivery (vaginal delivery/cesarean section), birth weight and whether the birth was multiple or single were also collected from medical records.

### Data collection

A trained research nurse recruited new fathers consecutively in the postnatal ward of Zhujiang Hospital, Guangzhou,

TABLE 1. Sociodemographic characteristics of Chinese new fathers ( $n = 212$ ).

Variables	No depressive symptoms (n = 161)	Depressive symptoms (n = 51)	$t/\chi^2$	$P$
<b>Age</b>	33.78 (6.42)	29.04 (3.21)	27.32	< 0.001
<b>Education level</b>			33.41	< 0.001
High school or below	78	37		
College or above	83	14		
<b>Monthly income (USD)</b>			23.34	< 0.001
< 714	21	23		
714-1428	45	12		
> 1428	95	16		
<b>Employment status</b>			39.07	< 0.001
Employed	134	18		
Unemployed	27	33		
<b>Housing tenure</b>			3.08	0.051
Home owner	78	11		
Renting flat	54	27		
Living with parents	29	13		
<b>Marital satisfaction</b>			18.82	0.002
Unsatisfied	35	12		
General	27	34		
Satisfied	99	5		
<b>Family support for baby care</b>			2.84	0.063
Yes	124	42		
No	37	9		
<b>Wanted pregnancy</b>			6.27	0.043
Yes	127	34		
No	34	17		
<b>Desired child gender</b>			11.26	0.024
Yes	132	29		
No	29	22		

TABLE 2. Comparison of personality and social support scores between fathers with and without depressive symptoms.

Variables	No depressive symptoms	Depressive symptoms	$t$	$P$
VPSQ total score	21.39 (4.13)	25.47 (5.09)	1.851	0.019
SSRS total score	49.22 (5.84)	43.03 (7.54)	2.273	0.658
Objective support	17.33 (2.59)	9.69 (1.14)	10.409	0.003
Subjective support	25.97 (3.27)	21.07 (4.21)	3.142	0.632
Degree of using social support	8.46 (2.18)	8.03 (1.59)	0.787	0.084

Abbreviations: SSRS: Social Support Rating Scale; VPSQ: Vulnerable Personality Style Questionnaire.

Notes: The total scores of VPSQ, ranged from 9 to 45, a higher score indicates a higher vulnerability;

The SSRS has three domains: scores of objective supports ranged from 1 to 20; subjective support ranged from 8 to 32, degree of social support use ranged from 3 to 12, a higher score indicated better social support.

China. Data were collected from March to June 2017. Ethical approval was obtained from the ethical review committee of The Third Affiliated Hospital of Guangzhou Medical University. Verbal informed consent was obtained from all participants, who had received a letter explaining the purpose of this study. Voluntary and anonymity were maintained for the duration of the study.

## Statistical analysis

Data were analyzed using IBM SPSS Statistics 25. Descriptive statistics were presented as frequency, mean and standard deviation (SD). Comparison was performed using independent  $t$ -tests. Logistic regression analyses were also used to explore

the predictive relationships between the sociodemographic variables (age, education level, monthly income, employment status, marital satisfaction, family support for baby care, wanted pregnancy and desired child gender), psychosocial variables (vulnerable personality, and objective support) and depressive symptoms. The significance level was set as  $P < 0.05$  for all statistical tests.

## Results

### Descriptive analysis

240 potentially eligible participants were approached, of whom 212 consented, giving a response rate of 88.3%. Their

mean age was 35 (SD = 5.86) and all were first-time fathers. The sociodemographic characteristics of participants are given in Table 1.

It can be seen that 51 men had EPDS scores of 10 or more, so the prevalence of postnatal depression was 24.1%. From Table 2, new fathers with depressive symptoms had significantly higher scores for vulnerability ( $P = 0.019$ ), and significantly lower scores for objective social support, than non-depressed fathers ( $P = 0.003$ ).

**TABLE 3. Logistic regression analysis for predictors of depressive symptoms.**

Variables	B	SE	OR	95% CI		P
				Low	High	
<b>Sociodemographic variables</b>						
Age	-0.782	0.197	0.458	0.311	0.673	< 0.001
Education level						
High school or below (Ref.)	1					
College or above	-0.547	0.259	0.578	0.348	0.962	0.035
Monthly income						
≤ 1428 USD (Ref.)	1					
> 1428 USD	-0.291	0.105	0.747	0.608	0.919	0.006
Employment status						
Employed (Ref.)	1					
Unemployed	1.536	0.285	4.645	2.659	8.115	< 0.001
Marital satisfaction						
Unsatisfied (Ref.)	1					
Satisfied	-0.307	0.095	0.736	0.61	0.886	0.001
Family support for baby care						
No (Ref.)	1					
Yes	-0.395	0.089	0.674	0.566	0.802	< 0.001
Wanted pregnancy						
No (Ref.)	1					
Yes	-0.573	0.239	0.564	0.353	0.901	0.017
Desired child gender						
No (Ref.)	1					
Yes	-2.404	0.358	0.09	0.045	0.182	< 0.001
<b>Psychosocial variables</b>						
Vulnerable personality	0.287	0.111	1.333	1.072	1.657	0.012
Objective support	-0.195	0.08	0.598	0.312	0.896	0.025

### Logistic regression for predictors of depressive symptoms in new Chinese fathers

Table 3 presents the results of the logistic regression analysis predicting factors linked to depressive symptoms (i.e. EPDS  $\geq 10$ ) within the sample. The dependent variable was the presence or otherwise of depressive symptoms. The independent variables were age, education, marital status, employment status, family income, personality score and social support score. Variables that showed significant differences in the  $t$ -test or Chi-square analyses of depressive symptoms were included in the logistic regression.

As indicated in Table 3, being unemployed and having a vulnerable personality are risk factors among new fathers reporting depressive symptoms. Higher family income, a wanted pregnancy, having a child of the desired gender, hav-

ing more family support for caring for the baby and receiving objective support (OR = 0.598, 95% CI = 0.312-0.896) are all protective factors for the experience of depressive symptoms among this sample of Chinese new fathers.

### Discussion

This study explored the prevalence of postnatal depression and associated factors in Chinese men in Guangzhou, South China. Guangzhou had a population estimated to be 13.3 million in 2020, with the gender ratio preferring men over women by a 1.3-fold factor [26]. Findings show that the prevalence of postnatal depressive symptoms in new Chinese fathers is as high as 24.1%, which is similar to previous studies by Agarwala *et al.* (21.5%) [27], and Madsen (23.5%) [12], but higher than in one previous study conducted in China. Bao and colleagues find that only 14.5% of Chinese fathers reported depressive symptoms at six weeks postpartum [4]. These differences in prevalence estimates can be attributed to the different measurement periods in the studies, with research indicating that rates of depression tend to be higher during the three to six-month period postpartum [17]. In addition, this study found that there is high prevalence of postnatal depressive symptoms in men. It may be attributed to maternal depressive symptoms [21], and the transition to fatherhood as the encompassing “hands on” role with their baby needs to provide effective practical and emotional support to their spouse [7].

As men are expected to be actively involved in various childcare and child-rearing activities [5], it is important to explore the risk factors associated with postnatal depression in men so as to gain a better understanding of the phenomenon [28]. This study indicates that postnatal depression or depressive symptoms in men can be attributed to being younger, unemployed, on a low family income, having poor marital satisfaction, having a vulnerable personality and lacking in social support. These predictors are consistent with several previous studies indicating that new fathers who perceived themselves as having low levels of social support were more likely to experience postnatal depression [29, 30]. An increase in problems with the marital relationship since becoming a father was also significantly correlated with a fivefold increase in depressive symptoms in men [11]. Similar studies have found that unemployment is a significant risk factor for male postnatal depressive symptoms. This suggests both that healthcare providers should treat such depression in fathers of young children and that it is particularly important to consider their financial concerns [2, 28].

More support from family and friends may reduce the risk of depressive symptoms in men during postnatal periods [21, 30, 31]. Additionally, social support through practical assistance in childminding and advice on childbearing from family and friends may also help new fathers to alleviate depressive symptoms [32]. A vulnerable personality was found to be significantly correlated with more depressive symptoms in men and previous research has also reported that men's personality traits are significantly correlated with depressive symptoms following the birth of their offspring

[15]. Understanding which men are most at risk of developing depression could help healthcare providers develop better interventions to improve the wellbeing of the whole family [10].

One major limitation of this study is that it uses a self-report measure to assess postnatal depressive symptoms rather than a clinical diagnosis of depression. Self-report instruments such as EPDS may overestimate the prevalence of depression compared with clinician-administered structured diagnostic interviews [1]. Additionally, this study was undertaken at a single medical center with a relatively small sample size. Future research should be conducted using a larger sample size across multiple population centers to improve the power and generalizability of the results. Finally, the design of this study was cross-sectional, which means changes in postnatal depression or depressive symptoms could not be assessed over time. Thus, future research should take a prospective longitudinal approach, preferably starting at the point of pregnancy with follow-up for six months postpartum.

Despite such limitations, the findings of this study have important implications for clinical practice and future research. Healthcare providers should acknowledge that postnatal depression is a serious mental health problem for both women and men, with consequences which can negatively affect the cognitive and behavioral development of the child and put at risk the welfare of the whole family [33]. It is important for healthcare providers to develop and evaluate information resources in print and online so as to establish how best to identify and manage paternal postnatal mental health needs [5, 7]. Future research should consider the associations of the factors identified here and adopt an experimental design with longitudinal data analysis to test the causal relationships between such factors for male postnatal depression. Such an approach could inform more targeted treatments and interventions for such new fathers [34]. Additionally, this study suggests that new fathers need to be provided with targeted resources concerning postnatal mental health and informed as to how to access them and who can be approached for professional support [35].

## Conclusions

This study shows that the prevalence of postnatal depressive symptoms in men is relatively high, with nearly a quarter of men reporting these symptoms within the first six months of a child's life. Uniquely significant risk factors are related to having a vulnerable personality and being unemployed. Protective factors associated with postnatal depression in men include: increased education, wanted pregnancy, having a child of the desired gender, marital satisfaction and objective social support. This study suggests there is a need to routinely screen for postnatal depressive symptoms in men. With a wider assessment system in place, healthcare professionals can support families in the postnatal period more comprehensively and identify more opportunities to support the mental health of new fathers.

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## Conflict of interest

The authors declare no conflict of interest.

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