A survey of postpartum depression and health care needs among Chinese postpartum women during the pandemic of COVID-19

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ABSTRACT

Background: The COVID-19 pandemic seriously endangers the public's mental health, especially to pregnant and postpartum women. But little is known about postpartum depression and health care needs among Chinese postpartum women.
Aim: To investigate the status and risk factors of postpartum depression and health care needs among Chinese postpartum women during the COVID-19 pandemic.
Methods: In this cross-sectional study, 209 Chinese postpartum women were recruited from May to July 2020 by convenience sampling and assessed online with self-designed Maternal General Information Questionnaire, Edinburgh Postpartum Depression Scale (EPDS) and Chinese Version of the Perceived Stress Scale (CPSS). Descriptive statistics, chi-square test, independent samples *t*-test, one-way ANOVA, Pearson correlation and multiple linear regression were used for data analysis.
Results: With the EPDS cut-off value of 10, the incidence of postpartum depressive symptoms was 56.9%. Age, history of abortion and perceived stress were the influencing factors of postpartum depression (adjusted $R^2 = 0.432$, $F = 23.611$, $p < .001$). The top three health care needs were infant rearing guidance (78.0%), maternal and infant protection guidance (60.3%) and dietary guidance (45.0%). The proportion of psychological rehabilitation guidance needs in the depressed group was significantly higher than that in the non-depressed group (34.5% vs. 20.0%, $p < .05$).
Conclusions: Maternal postpartum depression in China was at a high level during the COVID-19 pandemic. Women aged 25–34, with a history of abortion and high stress levels were at higher risk for postpartum depression. Timely psychological counselling, intervention and COVID-19-related health education are in great need for postpartum women.

Introduction

Since the end of December 2019, the COVID-19 pandemic triggered by SARS-CoV-2 has continued to spread globally after the outbreak in Wuhan, Hubei province, China (Kinross et al., 2020). At present, Wuhan, the worst-hit city, has achieved phased results. However, new confirmed cases have been reported in other Chinese cities and the pandemic abroad is relatively severe. As of 11:47 am CEST, 20 October 2020, the WHO reported that there had been 40,114,293 confirmed cases and 1,114,692 deaths (WHO, 2020). COVID-19 is characterized by acute respiratory diseases, and in severe cases can damage the heart, liver, kidneys and other organs (Yang et al., 2020). Moreover, due to its sudden, unpredictable and infectious characteristics, it has brought varying degrees of negative impact on the public psychology, such as panic disorder, stress, anxiety and depression (Qiu et al., 2020; Xiong et al., 2020). Based on U.S. Census Bureau data, American adults were more likely to screen positive for anxiety and depressive symptoms during the COVID-19 pandemic in 2020 than in 2019 (Twenge & Joiner, 2020). A survey of the mental health status among the general population during the initial outbreak in China reported that moderate-to-

severe stress, anxiety and depressive symptoms accounted for 8.1%, 28.8% and 16.5% (Wang et al., 2020). Studies further found that female gender was related to greater stress, anxiety and depression (Qiu et al., 2020; Wang et al., 2020; Xiong et al., 2020).

Especially during pregnancy and childbirth, there are a series of changes in the physiological-psychological-social environment of pregnant and postpartum women (Moya et al., 2014). Pregnant and postpartum women as a special susceptible group are more likely to suffer from psychological problems after experiencing emergencies, which will increase the risk of mental illness (Thapa et al., 2020). Most of the current studies showed an increased incidence of prenatal anxiety and depressive symptoms among pregnant women in the outbreak period of COVID-19, and pregnant women reported fear at the thought of childbirth during the COVID-19 pandemic (Lebel et al., 2020; Liu et al., 2020; Ravaldi et al., 2020; Wu et al., 2020). According to four existing studies conducted in Canada, Belgium, Italy and Japan, the COVID-19 pandemic exacerbated maternal anxiety, depressive symptoms and the worse mother-infant bonding (Cameron et al., 2020; Ceulemans et al., 2020; Suzuki, 2020; Zanardo et al., 2020). But there are few studies about Chinese postpartum women's mental health status.

Lebel et al. (2020) found that depressive symptoms among pregnant women were significantly related to unmet health care needs because of the pandemic. In a survey of antenatal health care needs in Shanghai of China, pregnant women were highly concerned about preventive measures and needed online services during the COVID-19 epidemic (Du et al., 2020). Thus, the management of perinatal health care during the COVID-19 pandemic may face different challenges. Perinatal women expressed that they actively sought information from multiple sources, but the information could be ambiguous or inconsistent, and the general information about COVID-19 did not meet their needs (Chivers et al., 2020). Little is known about maternal perceptions, behaviors of asking for help and health care needs related to COVID-19.

Therefore, the purpose of this study was to investigate the current status of postpartum depression and health care needs among Chinese postpartum women during the COVID-19 pandemic, and further explored the influencing factors of postpartum depression.

Methods

Participants, ethics and data collection

The convenience sampling was adopted to recruit postpartum women as participants from May 13 to July 13, 2020. Postpartum women were included if they were aged ≥18 years, with gestational age at childbirth ≥28 weeks and of Chinese nationality. Women with cognitive impairment who could not read and answer questionnaires independently were excluded.

The approval for this study was acquired from the Medical Ethics Committee of Wuhan University, Wuhan, China (Approval number: WHU2020-YF0046). A cross-sectional survey was conducted and electronic questionnaires were made using an online survey platform (www.wjx.cn). A QR Code was scanned through WeChat to send the questionnaire in the form of group sharing. The participants filled in the questionnaire anonymously with unified instruction and comprehended the purpose of the study. We obtained the informed consent of the participants and checked the validity of the collected questionnaires. A total of 248 questionnaires were issued, 39 invalid questionnaires were excluded. This was mainly due to the fact that 3 of them refused to participate and 36 postpartum women filled in incomplete questionnaires ($n = 3$) or had obvious errors in the contents ($n = 33$). Finally, 209 valid questionnaires were collected, and the effective recovery rate was 84.3%.

Measures

Self-designed Maternal General Information Questionnaire

The questionnaire included age, education level, occupation, parity, type of birth, neonate birth weight, postpartum complications, history of abortion and items related to COVID-19 (knowledge of the COVID-19 and related maternal and child protection, self-report possibility of infection, the behavior of asking for help in times of panic or anxiety, health care needs).

Edinburgh Postnatal Depression Scale (EPDS)

EPDS was a self-evaluation scale compiled by Cox et al. (1987), and Lee et al. (1998) of the Chinese University of Hong Kong compiled the EPDS into Chinese version. There are 10 items in total, and each item is 0–3 points, with a total score of 0–30 points. The higher the score, the more severe the postpartum depressive symptoms. EPDS has satisfactory reliability and validity in China. A cutoff of 10 of EPDS score was recommended for Chinese women (Lee et al., 1998). The Cronbach's alpha of EPDS in this study was 0.86.

Chinese Version of the Perceived Stress Scale (CPSS)

The self-evaluation scale modified by Yang and Huang (2003) based on the PSS compiled by Cohen et al. (1983) had been applied in the assessment of maternal psychological status. In this study, CPSS was used to assess the perceived stress level of postpartum women in the last month. There are 14 items in total, 0–4 points for each item and a total score of 0–56 points, including two dimensions (senses of strained and out of control). The higher the score, the higher the perceived stress. A score of more than 25 is considered as "health risk stress", meaning the perceived stress has impact on health (Yang & Huang, 2003). The Cronbach's alpha of CPSS in this study was 0.81.

Statistical analysis

SPSS 26.0 was used for data analysis. Categorical data were expressed as "n (%)". Ratio data were described as "Mean ± SD". Independent samples t-test and one-way ANOVA were used to compare EPDS scores among groups. Pearson correlation analysis was used to explore the relationship between perceived stress and postpartum depression. Multiple linear regression was used to analyze the influencing factors of postpartum depression. In addition, differences in health care needs of depressed and non-depressed postpartum women were further compared using the Chi-square analysis (χ^2). $P < .05$ was considered statistically significant.

Results

Sample characteristics

The average age of 209 postpartum women was 30.39 ± 4.66 ranged from 20 to 44 years, and more than 70.0% of them were aged 25–34 years. A majority of the postpartum women were junior college or undergraduate degrees (74.2%), non-medical workers (67.5%) and primiparous (61.2%). About 10.0% of the women had a history of abortion. Fewer than half of the women knew a lot about the knowledge of COVID-19 (48.8%) and maternal and infant protection (40.2%). There was 52.2% of the women expressed concern about COVID-19 infection, and 69.4% of the women asked for help voluntarily when they were in panic or anxiety during the pandemic (Table 1).

Postpartum depression

The average EPDS score was 10.51 ± 5.31, ranging from 0 to 25. There were 56.9% of postpartum women had an EPDS scored 10 points or higher, of which 23.4% scored 10–12 ($n = 49$, depressive tendency) and 33.5% scored higher than 12 ($n = 70$, depressive symptoms).

Table 1
Sample characteristics of participants ($N = 209$).

Characteristics	N (%)
Age (years)	
<25	18 (8.6)
25–34	156 (74.6)
≥35	35 (16.8)
Education level	
Junior high school or below	15 (7.2)
Technical secondary or high school	27 (12.9)
Junior college or undergraduate	155 (74.2)
Masters or above	12 (5.7)
Occupation	
Medical workers	68 (32.5)
Non-medical workers	141 (67.5)
Parity	
Primiparous	128 (61.2)
Multiparous	81 (38.8)
Type of birth	
Vaginal birth	114 (54.5)
Caesarean birth	95 (45.5)
Neonate birth weight	
Normal birth weight	189 (90.4)
Abnormal birth weight	20 (9.6)
Postpartum complications	
No	192 (91.9)
Yes	17 (8.1)
History of abortion	
No	188 (90.0)
Yes	21 (10.0)
Knowledge of COVID-19	
Know a lot	102 (48.8)
Know generally or little	107 (51.2)
Knowledge of maternal and infant protection	
Know a lot	84 (40.2)
Know generally	117 (56.0)
Know little	8 (3.8)
Self-report possibility of infection	
Impossible	100 (47.8)
Possible	109 (52.2)
Ask for help in times of panic or anxiety[a]	
No	64 (30.6)
Yes	145 (69.4)

[a] When postpartum women were panic or anxious, they asked for help from the following ways: families or friends (58.6%), medical workers (55.9%), network information (36.6%) and psychological consultants (4.1%).

Univariate analysis of postpartum depression

As shown in Table 2, univariate analysis of EPDS scores indicated that there were statistically significant differences in age ($F = 3.948$, $p = .021$), parity ($t = 2.384$, $p = .018$), history of abortion ($t = -1.981$, $p = .049$) and knowledge of maternal and infant protection ($F = 4.306$, $p = .015$). There was no statistically significant difference in EPDS scores among postpartum women of different education levels, occupations, types of birth, neonate birth weights, postpartum complications, levels of knowledge about COVID-19, self-report possibility of infection and the behavior of asking for help in times of panic or anxiety ($p > .05$).

Correlation analysis between perceived stress and postpartum depression

There were 95 (45.5%) postpartum women in a state of health risk stress. The average score of CPSS was 23.77 ± 7.71, its strained dimension was 11.79 ± 5.48 and out of control dimension was 11.98 ± 6.14. Pearson correlation analysis found that postpartum depression score was positively correlated with perceived stress level ($r_1 = 0.645$, $p < .001$), and the postpartum depression score was also positively correlated with the senses of strained and out of control ($r_2 = 0.565$, $r_3 = 0.306$, $p < .001$).

Table 2
Comparison of EPDS scores of maternal different characteristics (N = 209).

Variables	Mean (SD)	t/F	p
Age (years)		3.948	0.021[b]
<25	11.61 (6.27)		
25–34	10.88 (5.24)		
≥35	8.29 (4.59)		
Education level		2.419	0.067[b]
Junior high school or below	13.67 (6.99)		
Technical secondary or high school	10.67 (4.32)		
Junior college or undergraduate	10.32 (5.22)		
Masters or above	8.58 (5.11)		
Occupation		−1.099	0.273[a]
Medical workers	9.93 (5.10)		
Non-medical workers	10.79 (5.40)		
Parity		2.384	0.018[a]
Primiparous	11.20 (5.24)		
Multiparous	9.42 (5.26)		
Type of birth		0.031	0.975[a]
Vaginal birth	10.52 (5.46)		
Caesarean birth	10.49 (5.14)		
Neonate birth weight		−1.957	0.052[a]
Normal birth weight	10.28 (5.29)		
Abnormal birth weight	12.70 (5.08)		
Postpartum complications		−1.598	0.112[a]
No	10.33 (5.29)		
Yes	12.47 (5.29)		
History of abortion		−1.981	0.049[a]
No	10.27 (5.19)		
Yes	12.67 (5.94)		
Knowledge of COVID-19		−1.616	0.108[a]
Know a lot	9.90 (5.09)		
Know generally or little	11.08 (5.47)		
Knowledge of maternal and infant protection		4.306	0.015[b]
Know a lot	9.45 (4.93)		
Know generally	11.01 (5.36)		
Know little	14.25 (6.25)		
Self-report possibility of infection		−1.142	0.255[a]
Impossible	10.07 (5.16)		
Possible	10.91 (5.42)		
Ask for help in times of panic or anxiety		−1.088	0.278[a]
No	9.91 (5.78)		
Yes	10.77 (5.08)		

[a] Independent samples *t*-test.
[b] One-way ANOVA.

Multiple linear regression analysis of postpartum depression

Multiple linear regression analysis was carried out with EPDS scores as the dependent variable and factors with statistical significance in univariate analysis and correlation analysis as the independent variable.

Table 3
Multiple linear regression analysis of postpartum depression (N = 209).

Variables	B	SE	β	t	p
(Constant)	−3.866	1.818	–	−2.126	0.035
Age (years)					
≥35	Reference				
<25	1.293	1.190	0.069	1.087	0.279
25–34	1.772	0.769	0.146	2.306	0.022
Knowledge of maternal and infant protection					
Know a lot	Reference				
Know generally	0.475	0.580	0.045	0.818	0.414
Know little	1.499	1.513	0.054	0.991	0.323
Parity					
Primiparous	Reference				
Multiparous	0.114	0.596	0.010	0.191	0.849
History of abortion					
No	Reference				
Yes	2.033	0.923	0.116	2.203	0.029
CPSS	0.430	0.038	0.625	11.348	<0.001

Note: $R = 0.672$, $R^2 = 0.451$, adjusted $R^2 = 0.432$, $F = 23.611$, $p < .001$.
CPSS: Chinese Version of the Perceived Stress Scale.

As presented in Table 3, age, history of abortion and perceived pressure were the influencing factors of postpartum depression and significantly predicted the level of postpartum depression. Women aged 25–34 had higher depression scores than women aged ≥35 ($t = 2.306$, $p = .022$). The level of depression in women with a history of abortion was significantly higher than in women without a history of abortion ($t = 2.203$, $p = .029$). The higher the perceived stress, the higher the level of postpartum depression ($t = 11.348$, $p < .001$). No significant difference was observed in the levels of depression between primiparous and multiparous ($t = 0.191$, $p = .849$). There was no significant difference in EPDS scores among postpartum women with different levels of knowledge about maternal and infant protection ($p > .05$). These variables explained 43.2% of the variance of postpartum depression among postpartum women during the COVID-19 pandemic (adjusted $R^2 = 0.432$, $F = 23.611$, $p < .001$).

Health care needs

Health care needs among Chinese postpartum women during the COVID-19 pandemic were ranked from highest to lowest as follows: infant rearing guidance (78.0%), maternal and infant protection guidance (60.3%), dietary guidance (45.0%), exercise guidance (34.9%), maternal communication (32.5%), psychological rehabilitation guidance (28.2%), remote medical services (12.9%). Other needs included solutions to common problems in the baby, such as eczema, and maternal early recovery.

The difference in health care needs between depressed and non-depressed postpartum women was further analyzed using the EPDS cut-off value of 10. The results found that the proportion of psychological rehabilitation guidance needs in the depressed group (34.5%) was higher than that in the non-depressed group (20.0%), and the difference was statistically significant ($\chi^2 = 5.284$, $p = .022$). Differences in other needs were not statistically significant ($p > .05$).

Discussion

Our results indicated that the incidence of postpartum depressive symptoms was 56.9%, which was higher than that under normal conditions in China (Mu et al., 2019). In addition, the incidence in this study was higher than that during the COVID-19 lockdown period in Belgian (56.9% vs. 42.4%), as were the average EPDS score (10.51 ± 5.31 vs. 8.90 ± 5.2) and the proportion of postpartum women with the EPDS score higher than 12 (33.5% vs. 23.6%) (Ceulemans et al., 2020). A study on the effect of COVID-19 quarantine measures on immediate postpartum depressive symptoms in mothers in northeastern Italy found that the average EPDS score was 8.50 ± 4.6, and 28.6% of mothers scored higher than 12, also lower than the results in this study (Zanardo et al., 2020). Chinese postpartum women may face a higher risk of postpartum depression during the pandemic, possibly because an early outbreak of COVID-19 occurred in China. Although Wuhan has achieved phased results, new outbreaks are emerging in other cities, and the pandemic prevention and control work has never been lax. Thus, a prolonged pandemic and related prevention and control measures may have a great impact on maternal mental health, leading to a higher incidence of postpartum depression. Therefore, it is necessary for medical workers to pay attention to the mental health problems among postpartum women during the COVID-19 pandemic.

Our study indicated that women aged 25–34 was a risk factor for the level of postpartum depression. This probably because most Chinese women mainly play the role of caregiver in the family. The mothers aged 25–34 are also mostly working women and therefore they often need to balance career and family. Similarly, a study found that pregnant women aged <35 were at increased risk of experiencing depressive symptoms during the COVID-19 outbreak in China (Wu et al., 2020). However, most studies prior to the COVID-19 outbreak suggested that advanced maternal age was a risk factor for postpartum depression

(Matsumoto et al., 2011; Youn et al., 2017). Therefore, medical workers should not ignore postpartum depression levels in women aged 25–34 during the COVID-19 pandemic.

Women with a history of abortion increase their risk of postpartum depression, and women with multiple abortions have a higher risk of major depression than women with a history of one abortion (Giannandrea et al., 2013). Similarly, our study discovered that compared with women without a history of abortion, women with a history of abortion had significantly higher levels of postpartum depression. Women experienced high levels of depression after abortion, although it declined over time, it remained at a high level after 9 months (moderate to severe depression accounted for 6%) (Farren et al., 2020). Therefore, abortion has a long-term psychological impact on postpartum women. Due to the negative impact of abortion on re-pregnancy and newborns, women may worry about the neonatal health status from the first trimester to childbirth. And pregnant women and children are susceptible to the COVID-19, which can aggravate the depressed mood of postpartum women and lead to increased levels of depression. Studies have highlighted the importance of using EPDS to screen for depression in women with a history of abortion, whether spontaneous or induced (Mutiso et al., 2018). This suggests that medical workers can provide early screening for women with a history of abortion and increase maternal confidence in feeding newborns through health education during the COVID-19 pandemic.

We found that the higher the stress perceived by postpartum women, the higher the level of postpartum depression during the COVID-19 pandemic. A prospective study of postpartum women at 6 months postpartum reported that high levels of perceived stress were a risk factor for postpartum depression ($r = 0.72$, $p < .001$) (Ahn & Corwin, 2015), which was similar to the results of our study. Luo et al. (2020) found that 39.9% of Chinese residents were under health risk stress during the COVID-19 outbreak. A large-scale survey of the psychological distress among Chinese people during the COVID-19 pandemic emphasized that women were significantly more stressed than men and were more susceptible to stress (Qiu et al., 2020). The percentage of postpartum women in a state of health risk stress in our study was as high as 45.5%. Firstly, the possible reason was that postpartum women had the fear of COVID-19 infection. There was 52.2% of the postpartum women surveyed in our study expressed concern about COVID-19 infection, which was higher than a previous study in prenatal and postnatal women (37.7%) (Lee et al., 2020). There is a possibility that the mother has to go to the hospital on time for postnatal checkups or vaccinations of her newborn during the COVID-19 pandemic. As a result, the postpartum woman may be more concerned about the health of herself, her newborn and her family members than ever before (Lee et al., 2020). Secondly, mental health problems were related to frequently social media exposure (Gao et al., 2020). Only 48.8% of the postpartum women knew a lot about the COVID-19 in this study. Therefore, whether it is real news report or false information on the Internet, to some extent, too much exposure to the negative news due to social isolation may lead to more stress symptoms. Thirdly, previous studies support that high levels of psychological stress were closely associated with more exposure to adverse daily life events (Clout & Brown, 2015). Some industries were greatly affected by the COVID-19 pandemic, such as catering, transportation and tourist industries. In severe cases, some families would be at risk of temporary or even permanent unemployment. People on furlough had higher levels of distress because of employment instability during the COVID-19 pandemic (Mimoun et al., 2020). The economic income of maternal families may be affected to different degrees at once, leading to high economic pressures. Scheyer and Urizar (2016) found that high levels of postpartum perceived stress were significantly correlated with postpartum depressive symptoms among low-income women.

Stress is the inducement of recurrent and persistent episodes of depression (Chow et al., 2019). If the stress brought by individuals, families or society is not alleviated in time, it may increase the level of

postpartum depression. Therefore, it is necessary to identify the source of maternal stress early and release maternal stress timely during the COVID-19 pandemic, so as to reduce the level of postpartum depression.

According to the health care need survey, 78.0% of the postpartum women chose infant rearing guidance, 60.3% chose maternal and infant protection guidance, followed by dietary guidance and exercise guidance. Infant rearing guidance was a basic need for most parents (Zhang et al., 2019). More than half of the postpartum women in this study were primiparous, perhaps they lacked experience in infant rearing, while parental parenting behaviors played a key role in the emotional and behavioral development of their children (Lomanowska et al., 2017). Different from health care needs under normal conditions, COVID-19's susceptibility has significantly improved the awareness of maternal protection. However, only 40.2% of the postpartum women knew a lot about maternal and infant protection. Consequently, it is particularly important to strengthen maternal and infant protection guidance during the pandemic. In a survey on needs for health care knowledge during the COVID-19 pandemic, pregnant women had the highest need for personal protection against infection during pregnancy and parturition, followed by nutrition and exercise guidance (Du et al., 2020). Based on the results of this study, postpartum women still have high demands for protection, dietary and exercise guidance.

In addition, 32.5% of mothers wished to communicate with other mothers. Studies have found that peer education was an effective way to disseminate information about child feeding among mothers, and mothers were also highly interested in becoming peer educators (Duncanson et al., 2014). This is mainly because in the communication process, postpartum women may be more likely to accept the information provided by other mothers with similar experiences, thus changing their attitudes and behaviors. Therefore, peer communication is also a feasible way to provide social support for postpartum women, which contributes to alleviating their negative emotions, such as postpartum depression (O'Neill et al., 2019).

There was 28.2% of the postpartum women needed psychological rehabilitation guidance, and the proportion of psychological rehabilitation guidance needs in the depression group (34.5%) was significantly higher than that in the non-depression group (20%), revealing that mental health problems should not be ignored. We found that 69.4% of postpartum women chose to ask for help voluntarily when they were in panic or anxiety during the pandemic, more than half of them sought help from families or friends, followed by medical workers and network information. Only 4.1% of them asked help from psychological consultants. Firstly, families or friends were the most accessible sources of social support and possibly help reduce postpartum depression levels (Honjo et al., 2018; O'Neill et al., 2019). Secondly, medical workers provide more comprehensive and accurate health care guidance, and postpartum women would give them a high degree of trust (Lee et al., 2020). It is worth noting that, on the one hand, the network information is easy to obtain during the COVID-19 pandemic, but the accuracy of the health guidance needs to be considered. On the other hand, some postpartum women who really need psychological rehabilitation guidance may not seek help voluntarily or even avoid psychological consultants and thus delay treatment (Cameron et al., 2020). This requires relevant professionals to conduct a general survey of postpartum women to identify those at risk of mental illness as early as possible and to provide them with psychological interventions to reduce the risk of postpartum depression.

Only a small number of postpartum women (12.9%) chose remote medical services. These postpartum women may think that online communication during the COVID-19 pandemic is a feasible approach to obtain information (Cameron et al., 2020). Nevertheless, the telemedicine also has some disadvantages. Some postpartum women had poor service experiences, such as a lack of trust due to the inability to perform actual physical examinations. In conclusion, medical workers need to provide more effective interventions based on the specific needs of postpartum women.

Limitations

This study has some limitations. Firstly, convenience sampling and online questionnaires may not be representative of the characteristics of the entire maternal population. We filtered the data rigorously, but the data quality control of online questionnaires may not be as good as that of paper questionnaires, which affects the effective recovery rate of questionnaires. Secondly, the cross-sectional study could not conclude a causal relationship between variables. Thirdly, abortion is usually divided into two categories, including miscarriages and planned abortions. However, the types of abortions were not collected in our study, which make it impossible to further analyze the impact of types of abortions on postpartum depression. In addition, abuse may be an important factor affecting maternal mental health. In our study, however, screening for abuse was not conducted using an established instrument, which needs to be improved in future studies. Fourthly, there is a lack of data on whether postpartum women have depressive symptoms during pregnancy. Moreover, the maternal self-reported instrument was used to assess postpartum depression, with results that may differ from standard medical diagnoses. However, EPDS is widely used for postpartum depressive symptoms screening and can truly reflect the level of postpartum depression.

Conclusions

This study indicated that a high incidence of postpartum depressive symptoms among Chinese postpartum women during the COVID-19 pandemic, and age, history of abortion and perceived stress were important factors affecting the level of postpartum depression. The main health care needs of postpartum women were infant rearing guidance and maternal and infant protection guidance. There were significant differences between the depressed group and the non-depressed group in the proportion of psychological rehabilitation guidance needs. Medical workers should conduct early screening and psychological interventions for postpartum women at risk of postpartum depression. Meanwhile, according to different health care needs, the publicity of COVID-19 knowledge and postpartum health care knowledge should be strengthened to improve the maternal health services during the COVID-19 pandemic, so as to promote maternal and child health.

CRediT authorship contribution statement

Ran An has contributed to conception and design, data analysis, data interpretation and manuscript writing. Xiaoli Chen, Yanqun Liu and Hongxia Guo have contributed to conception and design and manuscript writing. Yuanyuan Wu, Juan Liu and Che Deng have contributed to data collection.

Declaration of competing interest

We declare there is no conflict of interest.

Ethical statement

The study obtained approval from the Medical Ethics Committee of Wuhan University, Wuhan, China (Approval number: WHU2020-YF0046).

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