



Mediating effects of social support between antenatal depression and fear of childbirth among nulliparous woman

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Background: Although gestation and childbirth are progressive physical processes for most pregnant women, there are both physical and great psychosocial challenges throughout the process, which increase the sensitivity and vulnerability of women. Even for women with low-risk pregnancies, it is common to experience degrees of fear, especially for primipara women when faced with childbirth. During their first pregnancy, women may have no relevant health knowledge or experience with delivery and have difficulty identifying prenatal depression and other existing mental health factors; a fear of childbirth (FOC) may engender adverse outcomes for mothers and babies. Social support is a very important influential factor for prenatal depression.

Methods: This study adopted a descriptive cross-sectional design. The participant cohort involved 609 primipara women (≥ 18 years old) who had received routine prenatal care and visited a tertiary care hospital in Xi'an. The participants completed structured questionnaires, including the 10-item Edinburgh Postnatal Depression Scale (EPDS), 12-item Multidimensional Scale of Perceived Social Support (MSPSS), and 33-item Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ), alongside contribution of information regarding their demographic characteristics. Descriptive and correlation analyses were adopted to verify the correlations among these variables. Multiple regression models were examined by the SPSS PROCESS procedure with bootstrapping to confirm the significance of the mediation effect.

Results: The widespread prevalence of FOC in healthy pregnant women was 22.3% (WDEQ score ≥ 85). The mean scores of depression, social support, as well as FOC scores of participants were 9.50 (5.19), 70.91 (9.25), and 70.43 (20.88), respectively. Remarkable correlations were identified between pregnancy depressive symptoms, social support, and FOC. Results presented an indirect effect, indicating that the impacts of antenatal depression on FOC were mediated by social support.

Conclusions: Perceived social support played a mediating role between antenatal depression and FOC among healthy primipara women. Techniques and suggestions for boosting social support may be expected to have a positive impact on the depressive symptoms of pregnant women with FOC.

Keywords: Mediation; fear of childbirth (FOC); social support; antenatal depression; pregnant women

Submitted Mar 03, 2021. Accepted for publication May 19, 2021.

doi: 10.21037/apm-21-854

View this article at: <http://dx.doi.org/10.21037/apm-21-854>

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Introduction

Fear of childbirth (FOC) is commonly known as negative birth expectations (1). The fear often includes that of injury to the baby, genital tract, or death (2). Symptoms of fear increase in the third trimester, especially if the woman is expecting her first child (3). Severe fear is more frequent in nulliparous than in multiparous women (4,5).

Previous studies have found that FOC complicates 7.6–17.8% of pregnancies. A systematic review showed that the prevalence of severe FOC (tocophobia) is estimated at 14% and appears to have increased over recent years (5). Increased prevalence of FOC was shown to be associated with depression during pregnancy (6).

The presence of FOC can result in negative birth outcomes such as labor dystocia, more frequently used of epidural, increased request for elective caesarean section (CS), and obstetric complications (1,7,8). In addition, FOC has been linked to increased fetal heart rate and decreased fetal motility in utero, and it continues to affect infants after birth (9,10).

Psychosocial factors are remarkably associated with FOC and previous studies have revealed that depression is strongly linked to FOC (6,11). Among nulliparous women, FOC was most often present in individuals who were lacking in social support and psychological resources (12,13).

Pregnancy can be a time of joy and positive expectations, but is also a major life event involving both psychological and physiological changes. Antenatal depression is an important social health issue as it could potentially lead to harmful impacts for mothers such as postpartum depression (14), and subsequent adverse outcomes for infants (15). A previous systematic reviews and meta analyses report demonstrated that the percentage of antenatal depression in low- and middle-income countries and areas was about 30%, much lower in high-income countries (18%), and that 15% of pregnant women overall experienced major antenatal depression (16). The prevalence of perinatal depression was found to be 15–20% in China (17) and primipara was inferred to have an increased risk of perinatal anxiety and depression (18). Antenatal depression and anxiety have been linked to elective caesarean section (19), stillbirth, premature birth, low birth weight, low Apgar scores, and major congenital anomalies (6).

Factors related to antenatal depression include unemployment, marital status, parity, social support, and so on. It has been suggested that social support before and after childbirth is a strong protective factor for perinatal

depression and anxiety (20,21). Xie *et al.* found no significant difference in women's scores of social support prenatally and postnatally (22), but Li *et al.* found that women's scores of social support during the first week postpartum were higher than in the third trimester (23). Childhood abuse predicted lower levels of social support (24). In fact, childhood abuse has been identified as a particularly strong predictor of depression and anxiety during the antenatal period (25).

Psychosocial education could effectively in reducing stress and improving social support and lessening postpartum depression of primipara's prenatal depression (26).

People with reduced social support are more likely to experience sub-clinical symptoms of depression than those with a rich social support network (27).

Social support has been shown to be beneficial for alleviating psychological distress and to influence adverse medical outcomes. Strong social support is related to increased psychological well-being and positive responses to important life events (28). In times of increased pressure or stress, social support helps to reduce psychological distress, acting as a buffer for both physical and mental health (29).

Several studies have shown that low social support led to higher risk of FOC (12,30–32). Based on the W-DEQ scores, the levels of FOC were classified as low, moderate, high, and severe fear. Pregnant women with higher levels of childbirth fear report worse emotional (i.e., tense, desolate, panic), psychological (i.e., anxiety, depression) and physical health (i.e., high level of pain and/or discomfort; antenatal fatigue) (33). Several factors related to FOC have been reported, including maternal age, parity, gestational age, previous caesarean section, previous adverse perinatal outcome, lack of social support, and low self-esteem (34–36). Stress, anxiety, depression and lack of social support are associated with fear during pregnancy. Severe fear of childbirth was shown to be more common in nulliparous women, in later pregnancy (35,37). Social support is helpful in stressful situations (38); without emotional and social support, women are more prone to experience adverse pregnancy outcomes including preterm birth and perinatal depression (39,40).

Pregnant women with intense FOC can benefit from individualized psychological and obstetrical support (41). A study indicated that the central mitigating factor for FOC is the support received from women's informal networks including their partner, family members, and close friends (42).

Recent studies have shown that pregnant women with antenatal depression have comparatively lower levels of

social support (43). International researchers have described the relationship between FOC and social support using qualitative research methods (39,44). Although previous studies have described the correlation between each pair of variables, for example depression in pregnancy, social support, and FOC in healthy pregnant women, few studies have explored the relationships between all 3 variables together within this population.

Hence, we examined the effects of social support in order to explore how it might mediate between antenatal depression and FOC. In line with the abovementioned empirical findings, using Process Macro developed by Hayes (2013; [www.https://processmacro.org](http://www.processmacro.org)) to analyze the mediation effect, we made the assumptions that: (H1) prenatal depression is associated with FOC; (H2) prenatal depression is relevant to perceived social support; (H3) perceived social support is associated with FOC; (H4) perceived social support mediates the connection between prenatal depression and FOC.

We present the following article in accordance with the COREQ reporting checklist (available at <http://dx.doi.org/10.21037/apm-21-854>).

Methods

Ethical issues

The ethics review was approved by the Ethics Committee of Xi'an Medical University (XYLS2018170) before the survey. The participants provided written informed consent prior to commencement of the study. All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013).

Study design

This study employed a descriptive cross-sectional survey.

Participants and settings

All low-risk nulliparous women in the second and/or third trimester visiting the maternal-infant center of 2 tertiary hospitals in Xi'an (the First Affiliated Hospital of Xi'an Medical University, the Second Affiliated Hospital of Xi'an Medical University), China were recruited as potential participants. All participants were diagnosed based on their medical history and clinical examination, and were filtered

for inclusion in the research from June to October 2020 via convenience sampling. Among 800 initially screened patients, 72 declined participation. Thus, 728 pregnant women were included after providing written informed consent. A total of 119 questionnaires were not completed and deleted; 609 women remained, with a valid response rate of 83.7%.

Study procedure

This study received ethical approval from the university and the participated hospitals. All participants were informed that their participation was entirely voluntary and they could withdraw at any time, which would not affect the quality of their obstetric health services. The data would be kept confidential and, after ethical approval, a pilot tested of 30 qualified participants would be conducted with no problems reported. Researcher and assistant were responsible for data collection and they were trained to ensure the accuracy and consistency of the data collection. All eligible participants were invited to participate in the study while waiting for their appointments at the chosen hospital's obstetric out-patient service. After the consent of the pregnant women was obtained, participants were required to complete the Socio-demographic and Obstetric Questionnaire, Chinese version of EPDS and MSPSS, and WDEQ in the interview room. It took about 25 minutes to complete the questionnaires and were withdrawn on site.

Materials

Antenatal depression

The Edinburgh Postnatal Depression Scale (EPDS) was used to assess a woman's level of depression over the most recent 7 days during her perinatal period (45). A Chinese version of the EPDS had been earlier translated by Lee *et al.* (46), which showed good reliability and validity. This instrument included 10 items, with each item rated on a 4-point Likert scale that ranged from 0 to 3. The total EPDS score range was 0–30 points; higher scores indicated more severe depressive symptoms. A total score of 13 or more indicates depressive symptoms (45).

Social support

The Multidimensional Scale of Perceived Social Support (MSPSS) is a self-reported questionnaire developed to assess social support. The original questionnaire was developed in 1988 by Zimet *et al.* (47). The MSPSS

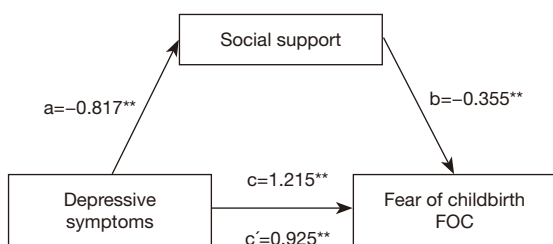


Figure 1 Model of the mediating role of social support between depressive symptoms and FOC. FOC, fear of childbirth. ** $P < 0.01$.

contains 12 items and measures perceived social support from 3 aspects: family, friends, and significant others. Each item is assigned a 7-point Likert scale from 1 (absolutely agree) to 7 (absolutely disagree). The minimum score is 12 points and the maximum score is 84 points. Higher scores suggest a stronger sense of social support. The Cronbach alpha coefficient of the instrument is 0.88.

FOC

The level of FOC was measured using the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) (48), a self-report measure of FOC. This questionnaire consists of 33 items with a 6-point Likert scale from 0 (not at all) to 5 (extremely). The total score ranges from 0 to 165. A score ≥ 85 indicates severe FOC, and a score ≥ 100 is considered a phobia. In this study, the cut-off point of greater than or equal to 85 was used for fear of childbirth. The questionnaire can be used to compare levels of birth fear between primipara and multipara (48). Based on the W-DEQ scores, the levels of FOC were classified as low [≤ 37], moderate [38–65], high [66–84], and severe [≥ 85] (49). The Chinese version of the questionnaire was validated and tested for reliability during the study, revealing a Cronbach's alpha of 0.88 (50). In this study, the WDEQ-A was found to have a Cronbach's alpha coefficient of 0.85.

Statistical analysis

Descriptive analysis was adopted during data processing including calculation of frequency, percentage, mean, and standard deviation (SD) of women's characteristics. Differences among these characteristics were analyzed in relation to FOC by independent *t*-test and one-way analysis of variance (ANOVA).

Pearson correlation (*r*) was used to explore the correlation of continuous variables among depressive

symptoms, social support, and FOC.

PROCESS mediation analysis was used on the basis of the ordinary least squares regression analysis (51). In this study, the simple mediation analysis was conducted by PROCESS Macro (Model 4) for SPSS, with a 95% bias-corrected bootstrap confidence interval (CI) using 5,000 bootstrap samples (52). In order to examine the mediation effects of social support on the relationship between depressive symptoms and FOC, we hypothesized a mediation model with depressive symptoms (continuous independent variable), social support (continuous mediator), and FOC (continuous dependent variable) after controlling covariates. Regarding data, firstly, the total effect of having depressive symptoms on FOC was estimated (*c* path) (Figure 1). Secondly, the direct effect of having depressive symptoms on social support was estimated (*a* path). Thirdly, the direct effect of social support on FOC was estimated (*b* path). Lastly, the indirect effect of having depressive symptoms on FOC, mediated by social support, was estimated (*c'* path). If the bias-corrected bootstrap 95% CIs of the indirect effect ($a \times b$) did not contain 0, it indicated significant mediation. All statistical analyses were conducted using the software SPSS 24.0 (IBM Corp., Armonk, NY, USA), and a *P* value less than 0.05 was considered statistically significant.

Results

Participant socio-demographic and clinical characteristics

Among 609 Chinese pregnant women who participated in this study, the mean age was 28.47 (SD: 4.26) years old and 586 (96.22%) participants were of Han ethnicity. Around 343 (56.32%) women had obtained degrees of education above the college level and 220 (36.12%) resided in rural areas. Moreover, 110 participants (18.1%) were white collar workers, while 77 (12.6%) were low income earners. A total of 136 (136/609, 22%) primiparous women experienced severe levels of fear (defined as ≥ 85 scores on the WDEQ-A).

Differences in FOC according to women's characteristics

The differences in FOC according to women's socio-demographic and clinical characteristics is shown in Table 1. The level of FOC differed significantly according to age ($F = 3.18$, $P = 0.024$), educational level ($t = 4.99$, $P = 0.002$), occupation ($F = 3.25$, $P = 0.02$), monthly income ($F = 7.65$, $P = 0.001$), marital status ($t = 9.84$, $P = 0.002$), relationship

Table 1 Female sociodemographic and clinical characteristics and differences in FOC (n=609)

Characteristics	N (%)	Mean (SD)	t or F	P value
Age			3.18	0.024
<24	74 (12.15)	73.74 (20.15)		
24–29	314 (51.56)	71.09 (20.75)		
30–35	184 (30.21)	69.80 (21.02)		
>35	37 (6.08)	61.30 (20.76)		
Nationality Group			0.25	0.617
Han	586 (96.22)	70.34 (20.74)		
Others	23 (3.78)	72.56 (24.43)		
Education level			4.99	0.002
Junior school	125 (20.53)	73.39 (19.01)		
Senior school	141 (23.15)	74.43 (18.83)		
College	308 (50.57)	68.11 (21.87)		
Master or above	35 (5.75)	64.11 (22.50)		
Occupation			3.25	0.02
White collar	110 (18.06)	66.26 (22.11)		
Blue collar	159 (26.11)	68.52 (20.09)		
Freelancer	247 (40.56)	72.77 (21.54)		
Farmer	93 (15.27)	72.40 (17.91)		
Marital status			9.84	0.002
Married	584 (95.89)	69.88 (20.90)		
Unmarried/single/divorced	25 (4.11)	83.16 (15.89)		
Monthly income			7.65	0.001
<¥2,000	77 (12.64)	77.49 (16.07)		
¥2,000–5,000	353 (57.96)	70.83 (19.55)		
>¥5,000	179 (29.39)	66.60 (24.21)		
Support of partner during pregnancy			3.21	0.074
Very supportive	562 (92.28)	69.99 (21.07)		
Unsupportive	47 (7.72)	75.66 (17.73)		
Preferred route of delivery			0.04	0.84
Vaginal delivery	506 (83.09)	70.51 (21.04)		
Cesarean section	103 (16.91)	70.05 (20.17)		
Relationship with partner			4.89	0.008
Close	346 (56.82)	68.33 (22.26)		
Good	227 (37.27)	72.55 (18.93)		
General	36 (5.91)	77.22 (15.89)		

Table 1 (continued)

Table 1 (continued)

Characteristics	N (%)	Mean (SD)	t or F	P value
Depressive symptoms			25.85	0.000
No <13	438 (71.92)	67.79 (21.82)		
Yes ≥13	171 (28.08)	77.17 (16.47)		
Gestational age			1.984	0.138
<28 W	71 (11.66)	70.44 (23.88)		
28–36 W	137 (22.50)	67.37 (21.44)		
>36 W	401 (65.84)	71.47 (20.05)		

FOC, fear of childbirth.

Table 2 Correlations between depression, social support, and FOC (N=609)

Variable (Scale)	Mean (SD)	EPDS	MSPSS	W-DEQ
EPDS	9.50 (5.19)	1		
MSPSS	70.91 (9.25)	-0.459**	1	
W-DEQ	70.43 (20.88)	0.302**	-0.263**	1

**P<0.01. FOC, fear of childbirth; SD, standard deviation; EPDS, Edinburgh Postnatal Depression Scale; MSPSS, Multidimensional Perceived Social Support Scale; W-DEQ, Wijma De-livery Expectancy/Experience Questionnaire.

with partner ($F = 4.89$, $P = 0.008$), and depressive symptoms ($t = 25.85$, $P = 0.000$).

No statistically significant differences among other characteristics were found, such as spouses' attitude towards pregnancy, expected delivery mode, or nationality group.

Correlation between FOC, social support, and depressive symptoms during pregnancy

It was found that women with prenatal depressive symptoms were defined by the cutoff of ≥ 13 (Table 2). Participants' mean scores of social support and FOC were 70.90 (SD: 9.25) and 70.43 (SD: 20.88), respectively.

The Pearson's correlation analysis showed that having antenatal depressive symptoms correlated significantly negatively with social support ($r = -0.459$, $P < 0.001$) and correlated positively with FOC ($r = 0.302$, $P < 0.001$), while social support was significantly negatively correlated with FOC ($r = -0.263$, $P < 0.001$) (Table 3).

Mediation effect of social support in the relationship between prenatal depressive symptoms and FOC

The results of the mediation effect analysis are shown

in Table 3 and Figure 1. The results of the model are diagrammatically represented in Figure 1. Broadly, social support had a mediation effect between antenatal depression and FOC. Paths *a*, *b*, and *c* manifest standardized coefficients among the paths. Path *c* displays the link between antenatal depression and FOC; *a* displays the link between antenatal depression and social support; *b* demonstrates social support and FOC; and *c'* displays the effect of antenatal depression on FOC incorporating mediating social support.

Table 3 presents the significance test of the mediating pathways. The results of this study indicated that the correlation between FOC and depressive symptoms was partially mediated by social support (95% CI: 0.13 to 0.46), with an indirect effect ($ab = c - c'$) of social support of 0.29, which comprised 23.87% of the total effect.

Discussion

This study showed that healthy nulliparous women with depressive symptoms were significantly and positively associated with FOC. This finding is consistent with previous studies (6,33,53). Prenatal depression has been inferred as an independent risk factor for FOC. Social support was negatively related to depressive symptoms

Table 3 The results of mediation analysis (N=609)

Path	Coefficient	SE	t	P value	95% CI			
					LLCI	ULCI	R ²	F (P)
c	1.215	0.155	7.82	0.000	0.91	1.52	0.09	61.09**
a	-0.817	0.064	-12.72	0.000	-0.94	-0.69	0.21	161.90**
b	-0.355	0.097	-3.65	0.000	-0.55	-0.16	0.11	37.83**
Direct effect (c')	0.925	0.173	5.34	0.000	0.59	1.27	-	-
Indirect effect	0.290	0.085	-	-	0.127	0.461	-	-

**P<0.01. SE, standard error; CI, confidence interval; LLCI, lower limit confidence interval; ULCI, upper limit confidence interval.

after potential covariates were controlled, revealing it as a protective factor against FOC. Social support was found to be vital for prevention of FOC, comprising 23.87% of the total effect between antenatal depression and FOC.

Additionally, the prevalence of antenatal depressive symptoms was 28.08%, with 171 of the 609 participants displaying this quality. Life stress, lack of social support continued to be associated with antenatal depression (54). Several studies have shown that depressive/stress episodes occur more frequently during the first and third trimester of pregnancy, compared with the second (55,56). The most vulnerable women are more likely to experience stress when they are coping with the new event of becoming mothers, and when they are about to deliver and start a new life (56). Interventions for prenatal and postpartum stress and/or anxiety to date include, but are not limited to, cognitive behavioural therapy (CBT), mindfulness, music, and exercise (57). Good preparedness for delivery could reduce depressive symptoms (20). Therefore, healthcare givers are encouraged to increase their knowledge and skills surrounding the treatment of pregnant women with depressive symptoms. Hence, further studies are required with a focus on customized interventions to minimize FOC among nulliparous women with depressive symptoms.

Social support, especially spousal support, is a key factor during pregnancy and the perinatal period (58), as it enables prenatal women to draw from social resources, helping them manage stress and anxiety more easily and prepare for their transition into motherhood (59). In our study, lower antenatal depression was found to be significantly negatively associated with higher levels of social support, which was similar to the findings of previous studies (60,61). This finding was verified by a reduction in mean EPDS scores accompanied by a rise in MSPSS scores. Expressly, the more perceived social support improved, the more psychological

problems caused by stressful life events were reduced.

The prevalence of high FOC (scores 66–84) and severe FOC (≥ 85) in nulliparous women in this study was 45.5% and 22.3% respectively. Severe FOC was much higher than in Ireland (7.4%) (62), and similar with previous Asian population studies (25%) (5).

Social support was significantly and inversely associated with FOC. Higher levels of social support were associated with lower FOC. Lack of family and social support has been found to increase FOC, which is in line with the finding in this study (4,5,12,30,63-65). Pregnant women of lower socio-economic status with limited family support may have diminished access to resources and decreased ability to obtain relevant information, either from antenatal care staff or online resources. Insufficient knowledge of the delivery process may have resulted in the higher degree of FOC in this study.

More importantly, it was revealed that social support could act as a mediator between depressive symptoms and FOC in nulliparous women. Nulliparous women with depressive symptoms who received more social support could experience more confidence when preparing birth, compared with women receiving less social support. This finding suggested a possible mediating effect of social support on the relationship between antenatal depression and FOC for nulliparous women.

Interestingly, previous studies have emphasized on the impact of improving social support to reduce depressive symptoms (66,67), while this study found that a higher level of depressive symptoms may lead to poorer social support and further give rise to severe levels of FOC. These findings suggested that we may reduce the FOC in pregnant women by addressing lowering the level of depressive symptoms and/or enhancing the level of social support. Women could be high self-esteem and high self-efficacy

with adequate partner/social support and satisfaction in the marital relationship, thereby overcoming the difficulties experienced in the transition to parenthood, protecting maternal mental health (20).

Social support is associated with FOC in pregnant women, and assists in strengthening women's sense of self-efficacy, which might further decrease the number of elective cesareans. Hildingsson *et al.* (68) found that women who felt they were in control of their bodies and were well-informed about the process of labor were more likely to show a decrease in or elimination of fear symptoms. The fact that social support mediated the correlation between antenatal depression and FOC implies in part that strengthening social support for women with depressive symptoms may decrease their FOC. It is helpful for nulliparous women to obtain guidance and support from women who have prior experience with bearing children, including mothers, sisters, family members, and friends. Support can also come from healthcare professionals such as obstetricians, midwives, or psychologists.

Nonetheless, it is worth mentioning that depressive symptoms did have a remarkably direct impact on FOC, manifesting that social support was only a partial mediator and other variables might have been overlooked in this study.

Conclusions

Perceived social support played a mediating role between depressive symptoms and FOC among healthy pregnant women. Solutions and suggestions to improve social support are anticipated to have a positive effect on reducing depressive symptoms for pregnant women with FOC.

Limitations

This study had some inescapable limitations, which could be improved in further researches. This study only collected small scale samples from 2 hospitals in Xi'an, China. In the future, the sample size could be increased to conduct further studies in different regions of China. Further analysis could be made from the perspectives of economic level, health literacy, and cultural background to encompass the diversity in status of economic, cultural, and characteristic regional differences. Above all, this cross-sectional study did not allow us to extrapolate a causal relationship among depressive symptoms, social support, and FOC. Additionally, variables in this study were assessed

by self-report questionnaires, which might overstate the symptoms of depression or FOC. In addition, self-report questionnaire is limited for pregnant participants to state their personal feelings or information that was omitted, which could be supplemented in interviews in further studies. Finally, only low risk nulliparous women in the second and/or third trimester were recruited and involved in this study. It is recommended to consider examining high risk and multiparous women in their first trimester in further studies.

Acknowledgments

Funding: None.

Footnote

Reporting Checklist: The authors have completed the COREQ reporting checklist. Available at <http://dx.doi.org/10.21037/apm-21-854>

Data Sharing Statement: Available at <http://dx.doi.org/10.21037/apm-21-854>

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/apm-21-854>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The ethics review was approved by the Ethics Committee of Xi'an Medical University (XYLS2018170) before the survey. The participants provided written informed consent prior to commencement of the study. All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013).

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Cite this article as: Zhou XL, Liu H, Li XH, Li F, Zhang SM, Zhang SR. Mediating effects of social support between antenatal depression and fear of childbirth among nulliparous woman. *Ann Palliat Med* 2021;10(6):6399-6409. doi: 10.21037/apm-21-854