

# The pregnancy intention to have a second child and antenatal depressive symptoms in Chinese women under the new two-child-per-couple policy

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## Research article

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# Abstract

**Background:** Few studies investigated the association between the pregnancy intention to have a second child and antenatal depressive symptoms. The aim of this study was to explore the association between the pregnancy intention to have a second child by pregnant women's own desires, pregnant women's husband own desires, parents who want to grandchild desires, couple's concordance desires and antenatal depressive symptoms.

**Methods:** A total of 306 participants who completed questionnaire were included in our analysis. Antenatal depressive symptom was assessed using the Chinese version of Edinburgh Postnatal Depression Scale. Logistic regression models were used to estimate the association between the pregnancy intention to have a second child by pregnant women's own desires, pregnant women's husband own desires, parents who want to grandchild desires and antenatal depressive symptoms.

**Results:** the prevalence of antenatal depressive symptoms was 36.3% among the second child pregnant women. Of the 306 participants, the proportion of the pregnancy intention to have a second child by pregnant women's own desires, pregnant women's husband desires, parents who want to grandchild desires and couple's concordance desires was 8.5%, 8.5%, 10.8% and 72.2% respectively. Compared with the pregnancy intention by couple's concordance desires, pregnant women's own desires to have a second child had higher risk of antenatal depressive symptoms after adjustment for potential confounders (OR=4.560, 95%CI: 1.603,12.973). No association was found between the pregnancy intention to have a second child by pregnant women's husband own desires, parents who want to grandchild desires and antenatal depressive symptoms after adjustment for confounders (OR=1.996, 95%CI:0.781,5.105; OR=0.744, 95%CI: 0.306,1.811, respectively).

**Conclusion:** These findings suggest the pregnancy intention to have a second child by pregnant women own's desires may be a risk factors for antenatal depressive symptoms among two-child pregnant women. A qualitative study should be carried out to investigate the real reason for the intention by pregnant women's own desires and antenatal depressive symptoms in the future, because of this study was a quantitative study. Key words: pregnancy intention; antenatal depressive symptoms; second child

## Background

Antenatal depression which can occur in any time during pregnancy, has been considered as a major public health problem. The consequences of antenatal depression may be severe and far-reaching, negatively affecting the mother and infant [1, 2], including the increased risk of perinatal complications, adverse perinatal outcomes[3], and adverse effects on the development of infant cognition, behavior, emotion and intellectual[4]. Evidence has shown that 50% postpartum depression begins at antenatal period[5], and antenatal depression is the most effective predictive factor for postpartum depression[6]. However, due to some physiological symptoms of pregnancy are overlapped with the antenatal depressive symptoms, it is difficult to well recognize the antenatal depressive symptoms[7]. Furthermore,

most of health-provider are focusing on the change of physiological health and ignore the identification of diagnosis of physiological signs and antenatal depressive symptoms[8].

A recent systematic review showed that pregnancy intention was one of the most relevant factors of antenatal depression[9], and unintended pregnancy could be detrimental to the health of mothers and their offspring children, such as preterm delivery, lower birth weight and breastfeeding duration[10] [11] [12] [13]. A study from Southwestern Ethiopia found that women with unwanted pregnancy were almost at two fold increased risk of experiencing depressive symptoms compared to those with wanted pregnancy[14]. Similarly, an Irish cohort study found unintended pregnancy could increase the risk of antenatal depression and perceived stress[15]. However, their study only investigated the pregnancy intention from the maternal aspect, having no considered from the paternal and the grandparental aspects.

Family plan has been implemented in China since 1970s and the “One-Child-Per-Couple” was the national policy by that time until 2015. In 2015, the “Two-Child-Per-Couple” plan has taken over and become a new national wide policy. Such a change in policy had resulted in a lot of conflicts in terms of desires for having a second child among couples and their parents[16–17]. Feng and colleges reported some women bearing a second child were whose parents desired to have the second grandchild[18]. Similarly, a qualitative study also suggested some women with no intention to have a second child would be compromised to their husbands or their parents’ desires, and a small proportion of women were desired to have a second child to improve the marital and family relationship[19]. Previous studies have linked pregnancy intention and maternal depression, but few studies have investigated the association between pregnant women’s husband desire, couple’s concordance desire, parents who want to grandchild desire and antenatal depressive symptoms[16].

The aim of this study was to explore the potential relationship between pregnancy intention from pregnant women’s own desire, pregnant women’s husband desire, couple’s concordance desire, parents who want to grandchild desire and antenatal depressive symptoms.

## Methods

A cross-sectional survey was used to identify the prevalence of antenatal depressive symptom among Chinese two-child pregnancy women.

## Participants

Participants were recruited from an obstetric clinics in the Third Xiangya Hospital of Central South University in Changsha Hunan province, China. Eligible criteria for participants were adult women (≥18 years old) who were in pregnancy for the second child in the family and in the third trimesters of pregnancy. Primiparous women, insufficient women and unplanned pregnancy were excluded.

# Measures

## Assessment of antenatal depressive symptoms

Edinburgh Postnatal Depression Scale (EPDS), which was originally developed by Cox[20], and is one of the most widely used self-rating measures for clinicians to screen postpartum depression. This scale is a 10-item Likert-style (4-point) rating scale for depression, with a total possible score ranged from 0 to 30, and higher scores indicating worse depressive symptoms. The Chinese version of the Edinburgh Postnatal Depression Scale was used to ascertain antenatal depressive symptoms, with the recommended threshold of 9[21]. Lee validated the Chinese version of EPDS and found that its sensitivity and specificity were 0.82 and 0.86[22], respectively.

## Assessment of the intention to have a second child

Information on the intention to have a second child was obtained via a question by asking pregnant women: what was the pregnancy intention to have second child? (1) pregnant women's own desires, (2) pregnant women's husband own desires, (3) parents who want to grandchild desires, (4) couple's concordance desires.

## Assessment of pregnancy stress

The Pregnancy Pressure Scale (PPS) was used to measure the pregnancy pressure levels, which consists of 30-item and four sub-domains: factor 1-Pressure related to the transition to parenthood; factor 2-Pressure related to concern for maternal and infant safety; factor 3-Pressure related to changes in body image and limitations in physical activity; factor 4-Pressure related to other sources of pregnancy[23]. Item responses are ranked from 0 'no stress' to 3 'high stress', all items' score ranges from 0 to 90. Higher scores denote greater pregnancy stress, with scores  $\geq 80$  indicative of high stress, scores 40 to 80 indicative of middle stress, scores  $\leq 40$  indicative of mild or no stress. The internal consistency of Cronbach's  $\alpha$  was 0.92[24].

## Assessment of family function

Family function was evaluated using Family APGAR Index(APGAR), which estimates the individual's satisfaction from the family functions[25]. The APGAR is comprised of 5-items: adaptation, partnership, growth, affection and resolve. Item responses are ranked from 2 'all the time' to 0 'no times'. The total scores ranged from 0 to 10, with scores ( $\geq 7$  as better family function,  $4 \leq$  as moderate family dysfunction,  $\leq 3$  as severe family dysfunction). The test-retest and Cronbach's alpha coefficient was 0.80-0.83[26].

# Assessment of covariates

Information on demographic characteristics (including age, residence, education level, household income, medical insurance, concerning on cost of raising children), pregnancy for the first child during One-Child-Per-Couple policy period such as pregnancy complications, economic concern, accommodation problem, career development problem, and conflicts with mother-in-law and clinical data of the index pregnancy (i.e., pregnancy for the second child) were collected using a questionnaire developed by the research team.

## Data collection

The study protocol was approved by the Research Ethics Board from the participating hospital prior to the commencement of the study. Written informed consent at enrollment was provided by all participants. We recruited 350 participants and a total of 320 women agreed to complete a questionnaire during May 1, 2018 and September 30, 2018. Midwives with trained research skills collected information. Finally, we excluded 14 participants with missing information, 306 participants included in the final analysis.

## Statistical analysis

Continuously distributed variables were summarized as means (standard deviations, or SDs), and categorical variables were presented as proportions (%). Difference between patients affected by antenatal depressive symptoms and normal pregnant women were examined by t-test (for continuously distributed variables) or Chi-square test (for categorical variables). Logistic regression analyses were performed to estimate adjusted odds ratios (ORs) and 95% confidence intervals (95% CIs) of the intention to have a second child with the risk of antenatal depressive symptoms, and the intention to have a second child by couple's concordance desires as the reference. Four models were performed, unadjusted model examined the association among the pregnancy intention by pregnant women's own desires, pregnant women's husband own desires, parents who want to grandchild desire and antenatal depressive symptoms without adjustment for any covariables. Model 1 included demographic characteristics (age, residence, education level, household income, medical insurance). Model 2 made an additional adjustment for the information on pregnancy for the first child during One-Child-Per-Couple policy period and pregnancy stress. Finally, Model 3 the fully adjusted model, included the covariates in model 2 plus conflicts with mother-in-law and family function. Those covariates have been reported to be associated with the risk of antenatal depressive symptoms[1,27]. The statistical analyses were performed using the version of SPSS18.0. All  $p$  values are two-tailed and statistical significance was accepted at  $p \leq 0.05$ .

## Results

### characteristics of study participants

A total of 306 pregnant women approached and completed the questionnaires, one hundred and eleven (36.3%) women had antenatal depressive symptoms. Age of the participants ranged from 23 to 45, with an average of  $32.95 \pm 3.71$  years. The proportion of the intention to have a second child by pregnant women's own desires, pregnant women's husband's own desires, parents who want to grandchild desires and couple's concordance desires was 8.5%, 8.5%, 10.8%, and 72.2% respectively. The second child pregnant women characteristics are presented in Table 1.

## **Table 1. Baseline characteristics of study participants (N = 306)**

### **Comparison of maternal characteristics between women with antenatal depressive symptom and those without**

Table 2 shows that there were statistically significant differences in education level, marital relationship, Conflicts with mother-in-law and information on pregnancy for the first child during the One-Child-Per-Couple policy period (all  $p \leq 0.05$ ). With antenatal depressive symptoms women had higher scores of pregnancy stress and lower scores of family function (all  $p \leq 0.001$ ).

## **Table 2. Comparison of characteristics between women who were affected by antenatal depressive symptom and those who were not (N = 306)**

*Unadjusted and multivariable-adjusted model according to the pregnancy intention to have a second child by pregnant women own desires, pregnant women's husband own desires, parents who want to grandchild desires and couple's concordance desires*

As shown in Table 3, compared with the intention to have a second child by couple's concordance desires, only the intention by pregnant women's own desires were at higher risk of antenatal depressive symptoms (OR = 6.107; 95%CI: 2.452,15.209) in the unadjusted model. After adjusted the demographic characteristics (model 1), a similar association still was observed in the intention by pregnant women's own desires, but the association also can be observed in the group of pregnant women's husbands own desires (OR = 2.309; 95%CI: 1.004, 5.311). After adjusted the information on pregnancy for the first child during One-Child-Per-Couple policy period and pregnancy stress (model 2), the association only existed in the group of pregnant women's own desires (OR = 4.896; 95%CI: 1.782,13.445). Finally, in the fully adjusted model for demographic characteristics, information on pregnancy for the first child during the One-Child-Per-Couple policy period, pregnancy stress, marital relationship, conflicts with mother-in-law and family function, the OR of the intention by pregnant women own desires was 4.436 (95%CI:

1.565,12.577). There was no association between the pregnancy intention by parents who want to grandchild desires and antenatal depressive symptoms.

## **Table 3. OR&95% CI&of antenatal depressive symptoms according to the intention to have a second child**

### **Discussion**

#### **Summary of main findings**

Our study found that the pregnancy intention from pregnant women's own desires had increased risk of antenatal depressive symptoms, compared with the pregnancy intention from pregnant women's husband's own desires and parents who want to have a second grandchild desire. After adjustments of potential confounding, no association was observed between pregnant women's husband's own desires, parents who want to have second grandchild desires and antenatal depressive symptoms.

Few studies explore the association between the pregnancy intention to have a second child from pregnant women's own desires and antenatal depressive symptoms. But the findings of the pregnancy intention to have a second child from pregnant women's own desire had a higher risk of antenatal depressive symptoms, which has been consistent with previous studies. Some studies from pregnant women, pregnant women's husband perspective to explore the association between pregnancy intention and maternal depression, which found couple's who unintended or unwanted pregnancy was a significant factor of maternal depression [28,29], and pregnant women's own intention to have a pregnancy could decrease the happiness of the pregnant women if her pregnancy intention was not gotten support from her partner[30]. However, there are also some converse research results. For example, a pregnancy intention survey of the National Longitudinal of Youth in United States suggested that pregnancy was not intended by the pregnant women had higher risk of health problems than the pregnancy that intended by both parents, and the association of pregnancy intention with health problems differed according to fathers intention[31]. In addition, a study of 1321 women's electronic medical records in Durham also shown that women were to give birth not on her own intention had the highest depression and perceived stress[32]. This inconsistent result may due to differences in the perspective of pregnancy intention and social culture. Some studies explored pregnancy intention by inquiring the pregnant women and her husband. Other studies may be explored the relationship by only ask pregnant women's own.

It is not clear of the reason for the association between the pregnancy intention to have second child from pregnant women's own desire and antenatal depressive symptoms. The pregnancy intention to have a second child from pregnant women's desire having higher risk of antenatal depressive symptoms may be indicative of marital distress, inadequate social support or family dysfunction, all of which have been associated with antenatal depressive symptoms[9]. Survey has shown that 5.8% women reported that there was disagreement of family member among 13% women who want to have second child [18].

Moreover, women having strong pregnancy intention usually shown hesitation, contradiction, and uncertainty if their own intention was not supported by family members, which could cause psychological conflict on women's physical and mental health [33].

Our results indicated that the intention to have a second child by parents who want to grandchild desires was not related to antenatal depressive symptoms, compared with the intention to have a second child by couple's concordance desires. A review of the effects of China's universal two-child policy has found one of the reasons why the couples who applied for a second child were parents who want a second grandchild, because they can get support from couple's parents[34]. In China, most children are raised by generations, over 70% child has cared for their grandparent [35,36]. In addition, some researches had shown that partner support and family support during women's pregnancy period was essential to mother's health and well-being [37, 38]. This may explain why the pregnancy intention to have a second child by pregnant women's husband desires and parents who want to grandchild desires was not associated with antenatal depressive symptoms after adjustment for multivariable, such as pregnancy information on pregnancy for the first child during One-Child-Per-Couple policy period, pregnancy stress, marital relationship, conflicts with mother-in-law and family function.

## Strength and limitations

The strength of this study was addressed a new maternal conflict and confusion regarding pregnancy intention to have a second child by pregnant women, pregnant women's husband and grandparents under the new Chinese government policy, which has a potential to develop a new antenatal intervention for Chinese pregnant women to prevent antenatal depressive symptoms. Furthermore, our study also adjusted for abundant potential confounder factors and used specific scales based on Chinese culture to make data more reliable.

There are some limitations that should be acknowledged. We had asked about pregnancy intentions by pregnant women, pregnant women's husbands, and grandparents desire for a second child only from pregnant women, which may be some selected bias. Though statistically adjustment for many potential confounding factors, we may not have fully captured relevant aspects of those factors, such as the psychological status of pregnant women's husband and their family member. Therefore, a large population study that comprehensively collects the influencing factors from pregnant women, husband and family members should be undertaken to explore the association of pregnancy intention with antenatal depressive symptoms. In our study, the pregnancy intention to have a second child from pregnant women's own desire, pregnant women's husband's own desires and parents who want to a grandchild desire were reported by relatively small participants, and the data only from a hospital. Therefore, our results may not be generalizable to all second child pregnant women who had antenatal depressive symptoms. In addition, the design of this study was a quantitative study, although we demonstrated that the pregnancy intention to have a second child from pregnant women's own desires had higher risk of antenatal depressive symptoms, the real reason why pregnant women's own desire for

a second child is unknown. Therefore, a qualitative study is needed to explore the causes of pregnancy intention to have a second child from pregnant women's own desires and antenatal depressive symptoms in the future.

## **Conclusions**

In conclusion, our study suggests that the pregnancy intention to have a second child by pregnant women's own desire is a risk factor of antenatal depressive symptoms among Chinese two-child pregnant women. These findings enhance our understanding of the risk factors of antenatal depressive symptoms and emphasized the need to explore the reason for the risk of antenatal depressive symptoms in Chinese two-child pregnant women who her pregnancy intention to have a second child.

## **Declarations**

## **Abbreviation**

EPDS: Edinburgh Postnatal Depression Scale; PPS: Pregnancy Pressure Scale; APGAR: Family APGAR Index.

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## **Availability of data materials**

All data generated or analyses during this paper are included in this manuscript and its supplementary information files.

## **Authors' contributions**

MX, Chen Pan and JL conceived, planned, and designed the study. MX wrote the first draft of the manuscript. JL and CP supervised the project, interpreted the data, over- saw the writing of the paper, and edited the manuscript. CM and BF collected data and abstracted the dataset. MX and SZ validated and analyzed the data under the supervision of JL. All authors contributed to the data analysis, interpretation of the results, and manuscript revisions. All authors reviewed and approved the sub- mitted manuscript.

## Competing interests

The authors declare that they have no competing interests.

## Consent for publication

Not applicable

## Ethics approval and consent to participate

This paper is part of the National Natural Science Foundation of China project which was approved by the IRB of Third Xiangya Hospital of Central South University.

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## Tables

**Table 1. Baseline characteristics of study participants (N=306)**

variables	n(%)
Intention to have a second child	
Pregnant women own desires	26(8.5%)
Pregnant women's husband own desires	26(8.5%)
Parents who want a grandchild desires	33(10.8%)
Couple's concordance desires	221(72.2%)
Age	
≤35	206(67.3%)
≥35	100(32.7%)
Residence	
Urban	268(87.6%)
Rural	38(12.4%)
Education level	
College above	149(48.7%)
High school	107(35.0%)
Junior school	50(16.3%)
Household income	
≤4000	46(15.0%)
4000~6000	91(29.7%)
≥6000	169(55.2%)
Medical insurance	
Yes	287(93.8%)
No	19(6.2%)
Marital relationship	
Good	203(66.3%)
Poor	103(33.7%)
Conflicts with mother-in-law	
Good	141(46.1%)
Poor	165(53.9%)
Information on pregnancy for the first child during the One-Child-Per-Couple policy period	
Pregnancy complication	

Yes	27	8.8%
No	279	91.2%
Economic concerns		
Yes	38	12.4%
No	268	87.6%
Accommodation problems		
Yes	57	18.6%
No	249	81.4%
Career development problems		
Yes	61	19.9%
No	245	80.1%
Conflicts with mother-in-law		
Yes	40	13.1%
No	266	86.9%

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**Table 2. Comparison of characteristics between women who were affected by antenatal depressive symptom and those who were not (N=306)**

	Without depressive symptoms	With depressive symptoms	$\chi^2/Z$	$P$
			0.322	0.564
	129(42.2%)	77(25.2%)		
	66(21.6%)	34(11.1%)		
			2.310	0.129
	175(57.2%)	93(30.4%)		
	20(6.5%)	18(5.9%)		
level			12.948	0.002
above	98(32.0%)	51(16.7%)		
below	76(24.8%)	31(10.1%)		
school	21(6.7%)	29(9.5%)		
family income			5.380	0.068
	34(11.1%)	12(3.9%)		
1000	50(16.3%)	41(13.4%)		
	111(36.3%)	58(19.0%)		
insurance			0.193	0.660
	182(59.5%)	105(34.3%)		
	13(4.2%)	6(2.0%)		
relationship			13.564	0.000
	144(47.0%)	59(19.3%)		
	51(16.7%)	52(17.0%)		
with mother-in-law			8.395	0.004
	102(33.3%)	39(12.7%)		
	93(30.4%)	72(23.5%)		
born on pregnancy for the first child during One-Child-Per-Couple policy period				
with complications			6.768	0.009
	11(3.6%)	16(5.2%)		
	184(60.1%)	95(31.0%)		
concerns			16.351	0.000
	13(4.2%)	25(8.2%)		
	182(59.5%)	86(28.1%)		
relation			8.108	0.004
	27(8.8%)	30(9.8%)		
	168(54.9%)	81(26.5%)		
development			6.973	0.008
	30(9.8%)	31(10.1%)		

	165(53.9%)	80(26.1%)		
with mother-in-			3.750	0.053
	20(6.5%)	20(6.5%)		
	175(57.2%)	91(29.7%)		
action	8.29±1.884	7.14±2.300	-4.317	0.000
7 stress	11.57±8.513	17.25±9.588	-5.420	0.000

**Table 3. OR 95% CI of antenatal depressive symptoms according to the intention to have a second child**

Couple's concordance desire	Pregnant Women's own desire	Pregnant women husband's own desire	Parents who want to grandchild desire
221(72.2%)	26(8.5%)	26(8.5%)	33(10.8%)
1.00	6.170(2.452,15.209)	2.250(0.991,5.109)	1.125(0.517,2.449)
1.00	6.173(2.403,15.857)	2.309(1.004,5.311)	1.094(0.494,2.423)
1.00	4.896(1.782,13.445)	2.242(0.919,5.469)	0.806(0.340,1.908)
1.00	4.436(1.565,12.577)	1.975(0.775,5.032)	0.752(0.309,1.830)

OR, odds ratio; CI, confidence interval

Model 1: age, education level, household income, residence, medical insurance

Model 2: model 1 + Information on pregnancy for the first child during One-Child-Per-Couple policy period (including high risk pregnancy, economic problems, accommodation problems, career development problems), pregnancy stress

Model 3: model 2+marital relationship, conflicts with mother-in-law and family function

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [renamedacea9.docx](#)