The mediating effect of family support in the relationship between socio-economic status and postpartum depressive symptoms

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Abstract

Background The aim of this study is to explore the mediation effect of family support on the relationship between SES and postpartum depressive symptoms.

Methods A total of 1887 mothers of newborn babies under 6 months of age in selected community health service centers in Shanghai were included in the analysis. A multi-stage probability sampling method was applied to select the sample. We generated a composite index for measuring each sample household's SES using a categorical principal component analysis approach. The mothers' perceived family support scale was used to reflect family functioning status. Regression models were used to verify the research hypotheses and assess the impact of intermediating variables.

Results 8.90% of participants had postpartum depressive status. The data showed that there was variability in the SES index, ranging from -4.18 to 0.81 (with lower SES being a low index value). According to the findings, the SES index was negative associated with depressive symptoms, the lower the SES level of the household, the higher the probability of the mother being at risk for depressive symptoms. (β = -0. 115, $P < 0.001$). When examining the analysis that adds family support as a mediator between SES and depressive symptoms, the coefficient of the mediator (family support) was significant (meaning the higher the family support, the lower the risk of depressive symptoms (β = -0.447, $P < 0.001$) and the coefficient relating the SES index to depressive symptoms became non-significant (β = -0.023, $P = 0.280$).

Conclusion The association between SES and depressive symptoms among postpartum women is strongly mediated by family support. The finding suggests that the focus of interventions to prevent or mediate postpartum depression should consider developing strategies to strengthen family support.

Keywords Postpartum depressive symptoms, Socioeconomic status, Family support

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Introduction

Postpartum depression is a common depressive disorder that occurs in mothers during the postpartum period, usually between 4 and 24 weeks after birth [1, 2]. The symptoms of postpartum depression include difficulty in concentrating, lack of patience, lack of energy and interest in performing daily activities, feelings of powerlessness and hopelessness, and sleep disturbance [3, 4]. A recent meta-analysis found that the overall prevalence of postpartum depression was 17% globally with large regional differences [5]. Studies have shown that maternal postpartum depression affects the interaction between mother and child, and can have a series of effects on children's social, behavioral, cognitive, and physical development [6–9]. If postpartum depression persists, the risk of early childhood development disorders increases significantly [10, 11]. The impact of persistent postpartum depression on the family's young children is a major public health concern [12].

Among a number of factors that have been shown to contribute to postpartum depression, the socioeconomic status (SES) of the mothers and her family has consistently shown an impact. Socioeconomic status usually includes factors such as education level, occupation, and household income. El-Sayed et al. reported that postpartum depression was significantly associated with SES, and the severity of postpartum depression was negatively correlated with SES [13]. Studies of different groups from different countries have shown differences in the impact of different sub-dimensions of SES on postpartum depression. A cross-sectional study among Canadian women showed that, compared with education and occupation, total household income had a greater impact on postpartum depression [14]. A U.S. state-level study showed that women with less education or lower household income tended to report higher levels of depressive symptoms [15]. The same study also demonstrated that women living in states with higher employment and income indices had lower rates of postpartum depression than states with lower rankings on the employment and income indices [15]. Early studies in urban areas of China have confirmed that education is a significant predictor of postpartum depression [16]. However, another study focusing on the interaction of genetic and environmental factors on postpartum depression showed that the educational level of the mother had a significant and negative effect on postpartum depression only for those mothers with specific combinations of genes, rather than for all mothers [17].

While the relationship between SES (and its sub-factors) and depression is well-established, it is also important to understand that there are different pathways through which SES may affect postpartum depression.

Low levels of family support may be one of the factors that is able to explain the poorer mental health outcomes among groups of mothers from low SES households [18]. In the context of the bio-psycho-social medical model, the family is considered to be the most important aspect of the patient's social environment [19]. Compared with healthy families, maternal depression is associated with impaired family relationships that are characterized by lower cohesion and expressiveness, and a higher frequency of conflict and/or apathy [20, 21]. A small-sample study also confirmed that disorganization in family activities and family roles may be potential factors contributing to maternal depression [22]. In contrast, positive family communication and support can lead to secure family attachment, allowing vulnerable partners to better regulate their emotions in a timely manner. Better communication and support has also been shown to enable new mothers to seek more secure attachment from family members during times of stress which has been shown to often slow down the development of depressive symptoms [23]. Moreover, a lack of family support has been linked to a higher likelihood of depressive relapse among mothers [24].

Family functioning also may be a relevant variable when considering depression in groups of Asian mothers, as many studies have documented the importance and centrality of the family in Asian cultural awareness [25, 26]. Traditional practices associated with the delivery and post-deliver of Asian children can in part explain the cultural context in which women give birth [27]. For example, many Chinese women go through the process of "doing the month" (or spending an entire 30 days in bed) after childbirth with the purpose of promoting the health of the mother and newborn [27]. During the "doing the month" period, they may be more dependent on the family's care and support [28]. Studies have shown that postpartum depression stems from the activation of the biological system of mammalian maternal-infant attachment behavior[29]. With adequate support and low stress, the activation has been shown to promote attachment between the mother and newborn. Conversely, growing up with the expectations embedded in Asian culture may actually make the mother more vulnerable to stress and increase the risk of depression [29]. Since new mothers may not be well prepared for parenting [30], support from family members, to no small extent, can frequently relieve the pressure felt by new mothers [31]. For families with low SES, however, worrying about how to make ends meet (or other related concerns) can be a significant source of stress for many mothers [32]. Unfortunately, other family members in low SES households may need to devote more time to their work (e.g., in order to earn income to support the family), and thus

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may be less able to provide adequate support for postpartum mothers. In contrast, households with high income are able to provide family members with more choices for health care, entertainment and other commodities, ensuring that mothers are more fully supported by the family which may alleviate the occurrence of (or reduce the severity of) postpartum depression [33].

Although many studies have examined the differences in the impact of SES and family support on depression, few studies have explored the pathway of the impact of SES on depression (or what factor mediates the impact). In addition, in previous studies family support was usually measured as an aspect of social support and was assessed mostly by a single item, resulting in what might be a somewhat-biased evaluation [34]. Considering the special status of the family for postpartum group support (especially in the context of Asian families), we separated family function from social support and evaluated it as a separate structural concept.

In this study, we aim to investigate the relationship among SES, depressive symptoms, and family support in postpartum women. We hypothesize that there is a significant relationship between SES and depressive symptoms among postpartum women. (Hypothesis 1) and that the relationship between SES and postpartum depressive symptoms is mediated by family support (Hypothesis 2).

Methods
Study design and selection of participants
The data collection was conducted in Shanghai from August through November 2022. A multi-stage probability sampling approach was applied to collect the data for this study. In the first stage, we used a stratified random sampling protocol to divide the region into central urban areas; sub-central areas; and other areas. Two administrative districts were selected from each of the three types of areas. In the second stage, we determined the number of community health service centers (CHSCs) that would be included from each administrative district. To do so, we decided to choose the actual number of CHSCs for the different types of the areas differed according to the size of the overall administrative district. When the size of the administrative area was relatively small (i.e., the number of CHSCs inside the administrative district was less than 30), 50% of the CHSCs were included in the study. In contrast, when the size of the administrative area was relatively large (i.e., the number of CHSCs was greater than or equal to 30), we chose 20% of the CHSCs to be included in the study's sample. A total of 45 CHSCs were selected for the study. The diagram of multi-stage probability sampling is shown in Additional file S1. As can be seen from Additional file S1, in our sample, 5 of the 6 administrative areas (both of the administrative areas in the Central urban areas; both of the administrative areas in the Sub-central areas; and one in the "other areas") were "relatively small" and only one (the one administrative area in the "other areas") was "relatively large."

All of the CHSCs in Shanghai have child health care clinics. At the specified time periods, parents are asked to bring their children to the community child health clinic to receive child health care services, such as physical examinations and vaccinations. Specifically, according to the requirements of Shanghai's primary public health care service program, children under the age of 6 months are supposed to complete at least four child health care service visits to the CHSC. During the study period, all mothers of children under 6 months of age in the selected community health service center were invited to participate. It should be noted that mothers will not participate in this baseline survey more than once. All participants were informed of the study's objective and procedures of the research upon their recruitment. After obtaining their written consent, online quantitative surveys were conducted. A total of 2023 questionnaires were collected and 1887 of them were included in the analysis in this study after eliminating observations (136 of the questionaires) that had missing values from the samples. The final response rate was 93.28%. This study was reviewed and approved by the Ethics Committee of School of Public Health, Shanghai Jiaotong University.

Measures
Depression
Depressive symptoms was measured using the depression anxiety stress scale: depression (DASS-D) which is derived from DASS-21, a scale that was originally developed by Lovibond & Lovibond (1995) [35]. The scale seeks to measure seven aspects depression, namely dysphoria, hopelessness, devaluation of life, self-depreciation, lack of interest, anhedonia, and inertia [36]. The scale itself consists of 7 items and is scored from 0 (never happened) to 3 (most of the time) in the week before the survey to reflect how often the state occurs. Studies have shown that the sensitivity and specificity of DASS-D in detecting depression are 80.8% and 77.4% respectively [37]. We used the Chinese version of DASS-D, which was validated inside China [38]. The total score for the DASS-D scale ranges from 0 to 42. When an individual's total score for DASS-D exceeds 9, it indicates that he/she is at risk for depression. The scale has been shown to perform with reasonable reliability with a Cronbach's α coefficient of 0.795. The scale also has good construct validity with the factor-loadings of the measured items being greater than 0.500.

Socioeconomic status

Socioeconomic status (SES) is defined as a measure of an individual's combined economic and social status [39]. The SES index in this study focuses on three common measures of SES: occupation, education, and household income [40]. In this study, the occupation component measures if the mother was a blue-collar worker or farmer / self-employed / salaried employee / manager); the level of education component measures if the mother had achieved education levels of junior high school or below / high school / junior college / bachelor's degree or above); per capita annual household income component measures if the family could be counted as being in the lower / upper-lower / middle / upper-middle / and upper income category. The final SES index was calculated using a categorical principal component analysis (CAT-PCA) approach for variables of mixed measurement levels (nominal or ordinal) that may not be linearly related to each other [41]. When the SES index has a higher value it indicates that the family has a relatively higher combined status of occupation, education level and annual household income (that is the family has a higher SES level). The CATPCA results showed that the internal consistency coefficient (Cronbach's α) was 0.701, the eigenvalue was 1.877, and the variance percentage was 62.58%.

Family support

Family support was measured on the five aspects proposed by Smilkstein in 1978, including adaptability, partnership, growth, affection, and resolve [42]. The survey used a 5-item scale, each with a 3-point Linkert scale (0 = never; 1 = sometimes; 2 = often). All scores were added to obtain the overall score. A high score indicated that the participants received good support from their families. If the total score of a family is 7–10 points, it is counted as a family that functions well. If the total score of a family is 4–6 points, it is assumed that the family is suffering from moderate family dysfunction. If the total score of a family is 0–3 points, it is assumed that the family is suffering from severe family dysfunction. The Cronbach's α coefficient of the scale was 0.907, suggesting high reliability. The factor loadings of the measured items using a factor analysis were 0.780–0.872, indicating good construct validity of the scale.

Other variables

The characteristics of the participants/households were also collected during the survey. The other variables included measures of gender; age (≤ 25 years old / 26–30 years old / 31–35 years old / > 35 years old); area where the family lives (central urban area / sub-central area / other area); nature of the baby's delivery (cesarean delivery / vaginal delivery); delivery history (that is, did the mother deliver a baby before the current baby—yes / no); and the difference between the gender of the current baby and what they expected (consistent / inconsistent / not care).

Statistical analysis

The data were stored in Microsoft Access (Microsoft, Seattle, WA, USA). We used the software of STATA/SE 15 (StataCorp LP, College Station, TX) to perform descriptive statistical analyses and the scale reliability tests as well as to calculate the Cronbach's coefficients. Exploratory factor analysis was performed to examine the structural validity of the scales. AMOS software (Version. 24.0; IBM Corp.) was used for the confirmatory factor analysis and construct validity verification of the scales. The bivariate analysis to test the overall differences on all indicators between the two groups (e.g., those who were measured at risk for depression / those not at risk for depression) was conducted using the Mann–Whitney U test and a chi-square test. The SES index was calculated using a categorical principal component analytical approach. Spearman correlation coefficients were estimated for observed variables, including the SES index, the scores of family support, and depressive symptoms. We also constructed several linear regression models to verify the research hypotheses and assess the impact of intermediating variables:

$$F_i = \alpha + \beta_1 S_i + \beta_2 X_i + \varepsilon_i, \tag{M1}$$

$$Y_i = \alpha + \beta_1 S_i + \beta_2 X_i + \varepsilon_i, \tag{M2}$$

$$Y_i = \alpha + \beta_1 F_i + \beta_3 X_i + \varepsilon_i, \tag{M3}$$

$$Y_i = \alpha + \beta_1 F_i + \beta_2 S_i + \beta_3 X_i + \varepsilon_i, \tag{M4}$$

where F_i refers to the family support; S_i is the SES index; Y_i is the score for each sample observation's level of depressive symptoms; X_i is a set of control variables, including each of the sample baby's gender, the age of the caregiver, area in which the family lives, nature of the baby's delivery, delivery history of the mother, and the difference between the actual gender of the sample baby and what the mother expected the gender to be prior to delivery. We also checked the multicollinearity among independent variables and found no issue of the multicollinearity among the independent variables.

We also used heterogeneous effects analyses and found that the regression results were consistent across different subgroups. When looking that main effects of the paper, we examine the heterogeneous effects by different

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baby's gender, area in which the family lives, nature of the baby's delivery, delivery history of the mother and several others.

Results

Characteristics of the participants

Table 1 shows the characteristics of the sample's 1887 participants. Mothers that were between 30 and 35 years old accounted for 46.7% of the sample. The data showed that 28.5% of the participants lived in the central urban area. In terms of the type of delivery, 876 (46.4%) were delivered by cesarean section while 1011 (53.6%) were delivered vaginally. Most of the participants had never given birth before the current baby was delivered (74.8%). There was no difference between the gender of the baby that most of the sample mothers (71.7%) expected and the actual gender of the baby.

The average postpartum depressive symptoms score was 2.72 ± 4.35, and 8.9% of the participants were measured to be at risk for postpartum depression. Of the participants with depressive symptoms (depression scores greater than 10 points), 60.7% were categorized with mild levels of depressive symptoms; 31.0% with moderate levels of depressive symptoms; and 8.3% with severe levels of depressive symptoms. Table 1 shows that there were no significant differences between depressed or non-depressed participants regarding their distributions

of age, the areas in which they lived, the mode of how they delivered their babies; if they had ever delivered a baby before the current one; and the difference between the gender of the current baby and what they expected ($P > 0.05$).

Descriptive statistics of family support, postpartum depressive status, and SES status

The survey also showed that the average family support score was 8.30 ± 2.40. According to the data, 19.0% and 4.7% of the participants had the moderate and severe levels of family dysfunction, respectively. There were significant differences in the depressed and non-depressed status among the participants with different levels of family support ($P < 0.001$). Specifically, 40.5% among all groups with depression were at moderate risk in terms of family support, and 23.8% were at severe risk, which is much higher than the non-depressed group.

Table 2 shows the socio-economic status characteristics and family support of the sample in relationship with the depression levels of the sample mothers. The participants had different education levels: 68.5% of them had bachelor's degree or above, and 19.1% of them had junior college degrees. Of all the participants, 1.6% were blue-collar workers or farmers, 13.6% were self-employed, 69.7% had with formal employment, and 15.0% were managers. Table 2 also shows that there were significant

Table 1 Comparison of the sample characteristics and depression status among postpartum woman

Item	Category	N (%)	Depressed (n = 168) %	Non-depressed (n = 1719) %	P (Chi-Square Test)
Mother's Age					
	≤ 25	91(4.82)	7.74	4.54	0.243
	(25–30]	529(28.03)	27.98	28.04	
	(30,35]	881(46.69)	47.02	46.66	
	> 35	386(20.46)	17.26	20.77	
Area					
	Central urban area	537(28.46)	33.33	27.98	0.339
	Sub-central	620(32.86)	30.95	33.04	
	Others	730(38.69)	35.71	38.98	
Forms of delivery					
	Cesarean delivery	876(46.42)	46.43	46.42	0.999
	Vaginal Delivery	1011(53.58)	53.57	53.58	
Delivery history					
	Yes	476(25.23)	27.98	24.96	0.390
	No	1411(74.77)	72.02	75.04	
Expectations of the child's gender					
	Consistent	1353(71.70)	72.62	71.61	0.301
	Inconsistent	49(2.60)	4.17	2.44	
	Not care	485(25.70)	23.21	25.95	

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Table 2 Comparison of the sample SES characteristics, family support, and depression status among postpartum woman

Item	Category	N (%)	Depressed (n = 168) %	Non-depressed (n = 1719) %	P
Education					
	Junior high school and below	70(3.71)	6.55	3.43	0.026[a]
	High school	164(8.69)	12.50	8.32	
	Junior college	361(19.13)	20.83	18.96	
	Bachelor's degree and above	1292(68.47)	60.12	69.28	
Occupation					
	Worker & farmer	31(1.64)	4.17	1.40	< 0.001[a]
	Self-employed	256(13.57)	22.02	12.74	
	Employee	1316(69.74)	61.90	70.51	
	Manager	284(15.05)	11.90	15.36	
Yearly Income					
	Lower	374(19.82)	25.60	19.26	0.008[a]
	Upper-Lower	303(16.06)	20.24	15.65	
	Middle	358(18.97)	18.45	19.02	
	Upper-Middle	473(25.07)	14.29	26.12	
	Upper	379(20.08)	21.43	19.95	
Family support					
	Good	1440(76.31)	35.71	80.28	< 0.001[a]
	Moderate dysfunction	358(18.97)	40.48	16.87	
	Severe dysfunction	89(4.72)	23.81	2.85	
SES index Median (IQR)			0.11(−0.96,0.71)	0.58(−0.36,0.71)	< 0.001[b]

[a] Chi-Square test

[b] Mann–Whitney U test

Table 3 Correlations of SES index, the scores of family support and depressive symptoms

Correlations	SES index	Family support	Depressive symptoms
SES index	1.00		
Family support	0.180***	1.00	
Depression	-.078***	-.407***	1.00

*** p < 0.001 (2-tailed)

Table 4 Results of hypothesis testing

	Family Support	Depressive symptoms		
	M1	M2	M3	M4
Intercept	8.298	2.722	9.529	9.459
SES	0.206***	-.115***		−0.023
Family Support			-.452***	-.447***
R²	0.042	0.013	0.204	0.204
F	83.493***	25.178***	484.069***	242.639***

*** P < 0.001(2-tailed)

differences in depressed or non-depressed status among the participants related to their education levels, occupation, and per capita annual household income ($P < 0.05$). The SES index ranged from −4.18 to 0.81. There were significant differences in depressed or non-depressed status among the participants with higher and lower levels of the SES index ($P < 0.001$).

Hypothesis testing

Table 3 shows the correlation coefficients among the three main research indicators. The SES index ($r = −0.078$, $p < 0.001$) and family support ($r = −0.407$, $p < 0.001$) were negatively correlated with depressive symptoms. The SES index ($r = 0.180$ $p = 0.000$) was positively correlated with family support.

Table 4 shows that the SES index was directly associated with depressive symptoms (M2, $\beta = −0.115$, $P < 0.001$). A one-unit increase in the SES index was associated with a 0.115-point reduction in the depression score. Family support alone also was strongly associated with depressive symptoms (M3, $\beta = −0.452$, $p < 0.001$). After the addition of family support as a mediating

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indicator, the coefficient of the mediator (family support) was significant (M4, $\beta = -0.447$, $P < 0.001$) while the coefficient of the independent variable (the SES index) became non-significant (M4, $\beta = -0.023$, $P = 0.280$). The results support the finding that family support has a mediating effect in the relationship between the SES index and depressive symptoms among postpartum women.

Discussion

In the context of continuous emphasis on prenatal and postnatal care, it is of great significance to pay attention to maternal depressive status both for the mother itself and for the early childhood development of her child. In this study, 8.90% of participants had postpartum depressive status, of which 60.71% were classified as the mild level, 30.95% as the moderate level, and 8.33% as the severe level. We also found a statistically significant relationship between SES and depressive symptoms in postpartum women, which was mediated by family support.

For the participants in this study in Shanghai, that is, mothers that had given birth within the previous 6 months, we found that the prevalence of depressive symptoms was 8.9%. In another study of urban mothers in China, the authors reported the rate of postpartum depression at a time of 6 months postpartum was 8%, which is consistent with our observed rate [43]. A large population-based cohort study conducted between 2013 and 2016 showed that the prevalence of postpartum depression in women from Shanghai at six weeks postpartum was 11.8%, which is also is similar to the rate found in our study [44]. Comparable studies, including sample mothers from rural communities, reported slightly higher rates of postpartum depression (13–19%) in similar postpartum periods [45, 46]. The advantages of resources and opportunities in urban areas demonstrate that the economic levels and education levels of urban populations are relatively higher that those from rural communities. Higher socioeconomic status may also lead to more adequate family support, which may be one of the reasons for the relatively lower rates of postpartum depression in areas with better economic development.

Also similar to the findings of most previous studies, we found that there were significant differences in depressed or non-depressed participants regarding their levels of education ($P = 0.026$), occupation ($P < 0.001$) and per capita annual household income ($P < 0.001$). Participants with a lower levels of SES had higher risks of depressive symptoms compared to those with higher levels of SES. The existing results were relatively more consistent regarding the effect of low education level on depression [47, 48]. The main reason may be that education levels of the adult group are relatively stable compared with levels of income and occupation [49]. Education as a source of human capital can enable broader success, and causal-based research has demonstrated its effectiveness in the pursuit of outcomes, including positive outcome regarding mental health [49, 50]. Studies have also shown that the difference in depression levels between highly educated and less educated adults increases with age [51]. At the same time, education may also affect the types of occupation and levels of income [52].

However, socioeconomic status can sometimes be an ambiguous concept [47]. Current research has no consensus on the exact definition of or how to measure SES. Some studies include education and income level as observed variables of SES [53], while others are represented by characteristics such as education, income, occupation, assets, and social class [54]. These differences in the fundamental concepts can make it difficult to objectively compare the results of existing studies. Because of this we believe that the level of education, occupation, and income need to be considered as a whole to represent an individual's SES. Previous studies have done similar attempts in generating a socioeconomic index. Gillian's research incorporated different occupational classifications into their socioeconomic scores and updated them based on the results of the social census [55]. In order to avoid the problem of collinearity, some studies calculated their SES indices by multiplying the education level and income level [53, 56]. In addition, there are studies that use principal component analysis to synthesize indicators that reflect the SES of the elderly [57]. Considering that variables, such as the level of education, income, and occupation are categorical variables, in this study we generated a socioeconomic index using an approach called categorical principal component analysis, and it appears to work well.

We also found that the relationship between SES and postpartum depressive symptoms is mediated by family support rather than being a direct relationship between SES and depressive symptoms. The results suggest that promoting family support for postpartum women can act as a bridge between SES and depressive symptoms. One possible explanation is that most observed variables of SES are established facts and difficult to change in a short period, especially factors like education level. However, postpartum depressive status is a condition occurring within a specific time frame. In contrast, the state of family support perceived by mothers during this period is more direct and has higher sensitivity. Therefore, it is particularly important to study the path of how SES affects depression outcomes. Although existing studies have shown that close family relationships have a protective effect on depression [58], we further found that SES status can affect postpartum depression status, which is

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dependent on the availability of family support. Maternal mothers with lower family functioning were more likely to experience depressive symptoms, which is consistent with previous findings [59]. During the perinatal period, the environment with weak family support makes it difficult for the mother to express her emotions in a timely, adequate and effective manner and to obtain further understanding or necessary support [60]. In addition, the factors of role and economic conflict faced during the perinatal period may affect intimate relationships, which may further lead to the development of depression [61]. This result indicates that the focus of the intervention and prevention of postpartum depression in the in clinical settings should be, at least in part, shifted to the construction of family network relationships and the promotion of functional support. Obtaining SES information is relatively challenging, and assessing family functional risks may be a more effective way to help identify potential postpartum depression risks.

This study had four main limitations. First, this was a cross-sectional study, which made it difficult to determine the causal relationship between SES and depressive status, as well as its applicability to predict depressive symptoms by SES index over time. Second, considering the differences in SES and cultural background in Shanghai, the results of this study may not be generalizable to other places within China or in other low or middle-income countries. Third, the lack of standardization of SES makes it difficult to compare across research areas. Reaching a consensus on the comprehensive measurement of SES remains an important issue to address in the future, and the SES index calculated in this study offers a potential solution. Fourth, we only gathered information on family support from the mothers' perceived perspective. Future research could conduct a comprehensive assessment of family support by combining both subjective and objective perspectives.

Conclusion

There was a statistically significant relationship between SES and depressive symptoms in postpartum women. Further analysis revealed that the relationship between SES and postpartum depressive symptoms was not a direct one, but was mediated by family support. The findings support the notion that the focus of intervention and prevention of postpartum depression should (at least in part) be shifted to developing strategies to strengthen family support that will help protect mothers against the development and persistence of depression. In addition, we generated a socioeconomic index using a categorical principal component analysis approach based on previous literature and applied it to the analysis in this study.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-024-20849-3.

Supplementary Material 1: Supplementary Figure 1.

Data Availability
The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This study was reviewed and approved by the Ethics Committee of School of Public Health, Shanghai Jiaotong University. All participants completed an informed consent form.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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