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The association between social support and postpartum post-traumatic stress disorder

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Abstract

Background Postpartum post-traumatic stress disorder (PTSD) is a debilitating condition that can arise following childbirth. Despite a growing body of research on postpartum mental health, the relationship between social support and postpartum PTSD remains unclear. This study aimed to assess the association between social support and postpartum PTSD.

Methods A prospective cohort study was conducted at a tertiary hospital in Guangdong province of China between November 2022 and April 2023. Eligible mothers were assessed for social support using the Social Support Rating Scale (SSRS) at three days postpartum and for PTSD using the Perinatal Post-Traumatic Stress Disorder Questionnaire (PPQ) at 42 days postpartum. The association between social support and postpartum PTSD was analyzed using multiple linear and log-binomial regression, with adjustments for potential confounders.

Results Forty-six of 560 (8.2%) mothers developed PTSD within 42 days postpartum. Scores for subjective support (β=-0.319, $P<0.001$), objective support (β=-0.327, $P<0.001$), support availability (β=-0.285, $P<0.001$), and overall social support score (β=-0.428, $P<0.001$) were inversely associated with PTSD scores. Compared to mothers in the 1st quartile of the overall social support score, those in the 2nd, 3rd, and 4th quartiles had adjusted relative risks of 0.39 (95% confidence interval [CI]: 0.21–0.74), 0.20 (95% CI: 0.09–0.45), and 0.10 (95% CI: 0.03–0.33), respectively, of developing PTSD. An inverse linear trend in the risk of PTSD was observed with increasing social support (P-trend < 0.001).

Conclusions Social support may have a protective effect against postpartum PTSD, with practical implications for interventions targeting various dimensions of support.

Keywords Social support, Post-traumatic stress disorder, Postpartum, Cohort study

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Background

Post-traumatic stress disorder (PTSD), a prevalent psychiatric disorder that often arises following a severe traumatic event [1], is characterized by symptoms such as re-experience, avoidance, and hyperarousal [2]. Childbirth is a complex event and potentially traumatic experience, which can contribute to the development of postpartum PTSD [3]. A meta-analysis of 78 studies found that the prevalence of postpartum PTSD was 3.1% in community populations and 15.7% in at-risk populations [4]. Postpartum PTSD has detrimental effects on maternal well-being [5, 6], and can also impact the physical and social-emotional development of infants [7, 8]. Although the exact etiology of postpartum PTSD remains elusive, several risk factors have been identified through observational epidemiological studies, including perinatal and psychosocial stressors, as well as demographic and socioeconomic factors [6, 9, 10]. Among these factors, social support has emerged as one of the significant contributors to the development and progression of PTSD [11].

Social support is a multidimensional concept that includes subjective support, objective support, and support availability [12]. For postpartum women, the primary sources of social support typically include family members (e.g., husbands, children, parents), friends, and workplace colleagues. With the arrival of a newborn, the family dynamics and social networks of women often undergo significant changes. Additionally, the focus tends to shift towards the baby, rather than the well-being of the postpartum women themselves, which can lead to feelings of loneliness [13, 14].

Research suggests that social support plays a crucial role during critical transition periods such as childbirth, and can significantly affect women's reactions to childbirth and their overall mental health [10, 15]. According to the stress-buffering hypothesis [16], social support exerts a potential buffering effect on mental health. This protective effect may arise because social support strengthens an individual's coping abilities by providing solutions to problems [17]. Additionally, social support can help reduce the perceived severity of issues, making individuals less reactive to stress and more likely to experience psychological well-being [17–19].

It has been reported that a lack of social support contributes significantly to maternal mood disorders, whereas strong social support serves as a buffer against mental health issues [11, 16, 20–23]. For example, a population-based cross-sectional study involving 6,590 mothers revealed that those who lacked social support were at least three times more likely to develop postpartum depression compared to those who received support from their partners or others [23]. Previous cross-sectional studies [11, 24] have also highlighted the importance of social support in postpartum PTSD. However, there is a lack of specific prospective studies that explore the association between social support and postpartum PTSD. Moreover, no study to date has examined whether overall social support or its specific dimensions function differently with postpartum PTSD. Understanding the impact of social support and its various dimensions is of importance for the prevention and intervention of postpartum PTSD. Therefore, the aim of this prospective cohort study was to assess the association between social support and postpartum PTSD.

Methods

Study design and study population

This prospective cohort study was performed at a tertiary teaching hospital specializing in maternal and child health in Guangdong, China between November 2022 and April 2023. The study recruited mothers who aged 18 years or older and had given birth to a single full-term live birth infant at 3 days postpartum.

Mothers were excluded if they had: (1) a history of trauma leading to PTSD (e.g., experience traumatic events such as earthquakes, traffic accidents, physical assault, childbirth and leading to PTSD); (2) a history of or current of psychiatric disorders (e.g., anxiety, depression, schizophrenia); (3) severe obstetric complications (e.g., amniotic fluid embolism and postpartum hemorrhage); or (4) adverse neonatal outcomes (e.g., admission to neonatal intensive care unit and neonatal asphyxia). Medical information was obtained from both the electronic health record system and mothers' self-reports. All eligible mothers provided written informed consent before participating in the study. Approval was obtained from the Research Ethics Committee of the study hospital (FSFY-MED-2022-102) prior to commencing the study.

Collection of demographics, clinical, and social support data

A self-administered questionnaire was used to collect demographic and clinical data from the study participants in the obstetric ward at 3 days postpartum, based on self-report and records. Demographic information included maternal age, education, employment status, marital status, and monthly household income per capita. Clinical data included gestational age, parity, mode of delivery, premature rupture of membranes, infant sex, birth weight, early contact, early suckling, rooming-in, and mode of feeding.

The Social Support Rating Scale (SSRS) was used to measure social support among mothers 3 days after childbirth. The SSRS developed by Xiao [25] reflects the unique environmental and cultural conditions in China and is applicable to individuals aged 14 aged and older

in the general population. This scale consists of 10 items, with three dimensions: subjective support (4 items), objective support (3 items), and support availability (3 items). Subjective support reflects an individual's level of satisfaction with being respected, supported, and understood; objective support reflects the extent of practical support available from one's social network; and support availability evaluates the availability and effectiveness of social support in dealing with life events [22]. Items 1–4 and 8–10 are scored on a range of 1 to 4, item 5 is scored on a range of 5 to 20, and items 6 and 7 are scored on a range of 0 to 9. The total scale scores range from 12 to 66, with higher scores indicating greater social support and more diverse social networks (e.g., family, friends, neighbors, marriage, and organizations). The SSRS has been widely used in China and has shown high reliability and validity [26, 27].

Measurement of postpartum PTSD

At 42 days postpartum, mothers were assessed for PTSD using the 14-item Perinatal Post-Traumatic Stress Disorder Questionnaire (PPQ) [28]. This standardized self-report rating scale is based on the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition and aims to identify mothers suffering PTSD symptoms within 1 to 18 months postpartum. The PPQ measures the key symptoms of PTSD, including re-experience, avoidance, and hyperarousal. Mothers were asked to indicate the degree to which they experienced each symptom in relation to their recent delivery experiences within the past month, with responses ranging from 1 (not at all) to 4 (often for more than 1 month). A total symptom severity score ranging from 0 to 56 was derived by summing the scores from all items, with higher scores indicating more severe PTSD symptoms. A cut-off threshold of 19 or higher was selected as the optimal point to identify probable PTSD [6, 11, 29]. The Chinese version of the PPQ has shown good internal consistency and test-retest reliability, as well as adequate content and construct validity [30]. Considering that the PPQ evaluates PTSD symptoms in the past month, and existing research indicates that the highest prevalence of PTSD occurs at four to six weeks postpartum [31, 32], we decided to conduct a follow-up with participants at 42 days postpartum. This time point also aligns with the route postpartum follow-up for mothers as per the maternal and child healthcare policy in China, providing convenience for these mothers and ensuring the cost efficiency for the research.

Data analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS 26.0) and R 4.2.2 software. Descriptive statistics were employed to summarize the demographic and clinical characteristics of the mothers. A two-tailed t-test was conducted to compare the levels of social support between mothers with and without PTSD, with a significance level of $P<0.05$.

Multiple linear regression analysis was constructed to determine whether social support (the independent variable) was associated with PTSD (the dependent variable) after adjusting for potential confounders. Confounders and social support were entered in a sequential manner, beginning with the potential confounders and followed by social support. The coefficient of determination R^2, change in R^2, and the significance level of the F statistic were reported for regression model fit to the data.

Multiple log-binomial regression analysis was performed to assess the independent association of social support with postpartum PTSD. In this model, the SSRS scores were categorized into quartiles or halves, with the lowest quartile or lower half as the reference group. Estimated effects were expressed as relative risk (RR) with 95% confidence interval (CI). In all analyses, overall social support and its three dimensions were considered separately.

Confounders included in the linear regression and log-binomial regression models were selected based on prior knowledge and literature. The selected confounders included education (high school or below / diploma / bachelor degree or above), monthly household income per capita (<5,000 RMB, 5,000–8,000 RMB, > 8,000 RMB), parity (primiparous or multiparous), mode of delivery (vaginal or cesarean), and mode of feeding (exclusive breastfeeding, partial breastfeeding, or exclusive formula feeding).

Results

Characteristics of study participants

A total of 602 mothers who met the eligibility criteria were enrolled in this study 3 days after childbirth. Of them, 12 mothers were excluded because of invalid questionnaires and 30 mothers were lost to follow-up, leaving 560 eligible mothers (93.0%) for the final analysis (Fig. 1). The demographic and clinical characteristics of mothers in this study are summarized in Table 1. Mothers' ages ranged from 18 to 45 years, with a mean age of 30.0±4.2 years. Most mothers had a bachelor's degree or higher education, and a monthly household income per capita of 5,000–8,000 renminbi (RMB). The majority of mothers were employed, married, primiparous and had delivered vaginally. Additionally, most mothers had early contact and rooming-in with their babies and engaged in partial breastfeeding within 3 days after childbirth.

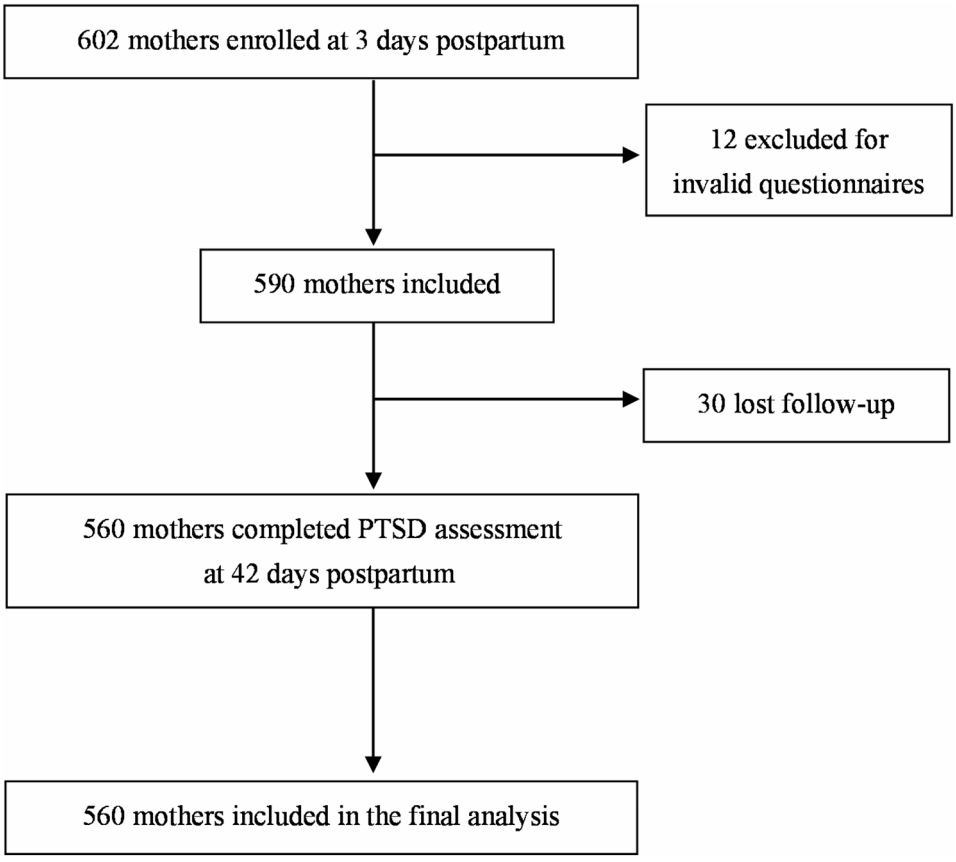

Fig. 1 Flowchart showing recruitment of mothers in this study

Comparison of social support scores between mothers with and without PTSD

Of the 560 eligible mothers, 46 (8.2%) developed postpartum PTSD within 42 days after childbirth. The overall social support score, as well as the scores for subjective support, objective support, and support availability, were significantly lower in mothers with PTSD when compared to mothers without PTSD (Table 2).

Results of multiple linear regression analysis

Table 3 presents the results of the multiple linear regression models. In the first step, potential confounders, including education, monthly household income per capita, parity, mode of delivery, and mode of feeding were entered in all the models. In the second step, scores for subjective support, objective support, and support availability, as well as overall social support score were entered respectively in the model 1, model 2, model 3, and model 4, with an additional 8.5%, 10.1%, 7.9%, and 16.9% of the variance in PTSD scores after controlling for the potential confounders. Specifically, overall social support score and scores of its three dimensions were all found to be inversely associated with postpartum PTSD scores.

Results of multiple log-binomial regression analysis

After adjusting for potential confounders, the risk of postpartum PTSD in mothers with higher social support scores remained lower than that in mothers with the lowest social support scores. This finding was consistent across the overall score and scores for the three dimensions of the SSRS scale. Specifically, compared to mothers in the 1st (lowest) quartile of the overall social support score, those in the 2nd, 3rd and 4th (highest) quartiles had adjusted RR of 0.39, 0.20, and 0.10, respectively, of developing PTSD. Similar patterns were observed for subjective support, objective support, and support availability. Compared with mothers in the 1st (lowest) quartile (or lower half), those in the 2nd, 3rd, and 4th (highest) quartiles (or higher half) also showed the reduced adjusted RRs of postpartum PTSD (Table 4). In addition, there was a significant inverse linear trend (P-trend < 0.001) across social support and the risk of postpartum PTSD, for overall social support as well as its three dimensions (Fig. 2).

Discussion

In this prospective cohort study in Guangdong province of China, we found a significant inverse association between subjective support, objective support, and

Table 1 Demographic and clinical characteristics of study participants, Guangdong, China, 2023 [a]

Characteristics	Participants (*n* = 560)	
	Number (*n*)	Percentage (%)
Maternal age in year, mean ± SD	30.03 ± 4.16	
Gestational age in week, mean ± SD	39.34 ± 0.95	
Education		
High school or below	144	25.71
Diploma	163	29.11
Bachelor's degree or above	253	45.18
Employment status		
Employed	465	83.04
Unemployed	95	16.96
Marital status		
Married	537	95.89
Unmarried	23	4.11
Monthly household income per capita (RMB)		
<5,000	123	21.96
5,000–8,000	246	43.93
>8,000	191	34.11
Parity		
Primiparous	345	61.61
Multiparous	215	38.39
Mode of delivery		
Vaginal delivery	317	56.61
Cesarean delivery	243	43.39
Premature rupture of fetal membranes		
Yes	98	17.50
No	462	82.50
Infant sex		
Male	292	52.14
Female	268	47.86
Birth weight in gram, mean ± SD	3218.89 ± 362.48	
Early contact		
Yes	531	94.82
No	29	5.18
Early suckling		
Yes	207	39.96
No	353	63.04
Rooming in		
Yes	531	94.82
No	29	5.18
Mode of feeding		
Exclusive breastfeeding	35	6.25
Partial breastfeeding	454	81.07
Exclusive formula feeding	71	12.68

Abbreviations SD standard deviation

a: Data are reported as numbers (n) and percentages (%) unless otherwise indicated

Table 2 Comparison of social support between mothers with and without PTSD, Guangdong, China, 2023

Variable	Mean ± SD		t	*P* value [a]
	Mothers without PTSD (*n* = 514)	Mothers with PTSD (*n* = 46)		
Overall social support score	44.57 ± 4.82	39.67 ± 4.78	-6.70	< 0.001
Subjective support score	25.52 ± 3.07	23.21 ± 3.10	-4.87	< 0.001
Objective support score	11.05 ± 2.07	9.52 ± 1.93	-4.82	< 0.001
Support availability score	8.12 ± 1.58	6.93 ± 1.27	-5.91	< 0.001

Abbreviations SD standard deviation

a: 2-tailed *t* test

support availability at 3 days postpartum, and the development of PTSD at 42 days postpartum. Mothers who had higher levels of social support were less likely to experience postpartum PTSD, as indicated by both the overall score and the scores for the three dimensions on the SSRS scale. Moreover, we observed a clear dose-response relationship: the higher the levels of social support, whether overall or across its three dimensions, the lower the risk of developing postpartum PTSD. These associations remained statistically significant even after adjusting for potential confounding variables including education, monthly household income per capita, parity, mode of delivery, and mode of feeding.

Incidence of postpartum PTSD

The overall incidence of postpartum PTSD in our study was 8.2%. It is important to note that we excluded mothers with a history of or current psychiatric disorders, including PTSD and postpartum depression, at the time of recruitment. As a result, only new cases of PTSD developed within 6 weeks after childbirth were included in the analysis. Our estimated incidence of PTSD is consistent with the findings of a recent survey involving 1,136 mothers in China, which reported a PTSD rate of 6.1% at 6 to 8 weeks after childbirth as assessed by the PPQ [11].

Interpretation of association between social support and postpartum PTSD

The main objective of our cohort study was to evaluate the association between social support and postpartum PTSD, both in terms of overall social support and its three dimensions (subjective support, objective support, and support availability). Our findings showed an inverse association between social support and postpartum PTSD, indicating that higher levels of social support were associated with a reduced risk of developing PTSD.

Table 3 Multiple linear regression of social support and postpartum PTSD, Guangdong, China, 2023

	Model 1		Model 2		Model 3		Model 4	
	β [a]	*P*	β	*P*	β	*P*	β	*P*
Step 1								
Education								
High school or below	Ref		Ref		Ref		Ref	
Diploma	-0.098	0.047	-0.096	0.049	-0.110	0.026	-0.081	0.082
Bachelor degree or above	-0.193	< 0.001	-0.155	0.002	-0.170	0.001	-0.139	0.004
Monthly household income per capita (RMB)								
<5,000	Ref		Ref		Ref		Ref	
5,000–8,000	-0.022	0.671	-0.019	0.714	0.006	0.913	-0.031	0.526
> 8,000	0.033	0.536	0.046	0.382	0.040	0.449	0.033	0.514
Parity								
Primiparous	Ref		Ref		Ref		Ref	
Multiparous	-0.052	0.224	-0.135	0.001	-0.176	< 0.001	-0.058	0.145
Mode of delivery								
Vaginal delivery	Ref		Ref		Ref		Ref	
Cesarean delivery	0.115	0.004	0.095	0.017	0.085	0.035	0.116	0.002
Mode of feeding								
Exclusive breastfeeding	Ref		Ref		Ref		Ref	
Partial breastfeeding	-0.004	0.954	0.024	0.713	0.007	0.920	-0.011	0.856
Exclusive formula feeding	0.106	0.101	0.110	0.085	0.121	0.062	0.077	0.210
Step 2								
Overall social support score							-0.428	< 0.001
Subjective support score	-0.319	< 0.001						
Objective support score			-0.327	< 0.001				
Support availability score					-0.285	< 0.001		
R^2 [b]	0.163		0.179		0.157		0.241	
ΔR^2 [c]	0.085		0.101		0.079		0.163	
F [d]	11.885***		13.285***		11.361***		19.369***	

Asterisks indicate the following p-values: ***$P < 0.001$

a: β is standardized regression coefficient

b: R^2 is coefficient of determination and represents the percentage of PTSD explained by the model

c: ΔR^2 is the difference in R^2, and means the amount of improve in the explanation of PTSD when social support (Step 2) is added to the model

d: *F* statistic indicates the ANOVA statistic for the model

Although no study to date has specifically examined whether overall social support and its specific dimensions have different effects on postpartum PTSD, previous studies [22, 33] assessed the role of different dimensions of social support in other perinatal mental health disorders. For example, a cross-sectional study [33] involving 128 pregnant women in China reported that objective support, subjective support, and support availability were significantly inversely correlated with depression during pregnancy. It is plausible that both overall social support and its specific dimensions have a similar impact on maternal depression or PTSD. Our results indicated that social support has a protective effect against postpartum PTSD in women. This aligns with similar observations in non-pregnant populations [34–36]. For instance, Dai et al. [37] conducted a follow-up assessment of PTSD in flood victims 13–14 years after their initial PTSD diagnosis in 2000 and found that recovery from PTSD was significantly associated with the overall social support, subjective support, and support availability, but not with objective social support. Another study [34] especially focused on parents over the age of 50 who had lost their only child, and found that compared to parents with limited social availability, those who had utilized more social support were less likely to develop PTSD. Additionally, the study [34] suggested that objective social support remained significantly associated with PTSD even after adjusting for multiple confounders. The slight variation in the impact of the three dimensions of social support on PTSD could potentially be attributed to differences in the targeted populations.

The mechanism underlying the relationship between social support and postpartum PTSD can be explained by the stress-buffering model [16]. According to this model, social support acts as a buffer that protects individuals from the negative effect of traumatic events by alleviating the impact of stress and facilitating the appraisal or reappraisal of the traumatic experience. In the context

Table 4 Association between social support and postpartum PTSD, Guangdong, China, 2023

Variable	PTSD		RR (95%CI)	
	Number (*n*)	Percent (%)	Crude	Adjusted [a]
Overall social support score				
1st quartile (31–40)	27	58.70	Ref	Ref
2nd quartile (41–43)	10	21.74	0.35 (0.18, 0.70)	0.39 (0.21, 0.74)
3rd quartile (44–47)	6	13.04	0.18 (0.08, 0.42)	0.20 (0.09, 0.45)
4th quartile (48–61)	3	6.52	0.10 (0.03, 0.32)	0.10 (0.03, 0.33)
Subjective support score				
1st quartile (16–22)	20	43.48	Ref	Ref
2nd quartile (23–24)	8	17.39	0.33 (0.15, 0.72)	0.41 (0.19, 0.86)
3rd quartile (25–26)	12	26.09	0.42 (0.21, 0.81)	0.44 (0.24, 0.80)
4th quartile (27–32)	6	13.04	0.15 (0.06, 0.37)	0.13 (0.06, 0.32)
Objective support score				
1st quartile (6–8)	15	32.61	Ref	Ref
2nd quartile (9–10)	20	43.48	0.41 (0.22, 0.75)	0.59 (0.33, 1.04)
3rd quartile (11)	4	8.70	0.20 (0.07, 0.58)	0.30 (0.11, 0.84)
4th quartile (12–18)	7	15.22	0.14 (0.06, 0.33)	0.19 (0.08, 0.43)
Support availability score				
Lower half (4–7)	35	76.09	Ref	Ref
Higher half (8–12)	11	23.91	0.27 (0.14, 0.51)	0.28 (0.15, 0.53)

a: Adjusted for education, monthly household income per capita, parity, mode of delivery, and mode of feeding

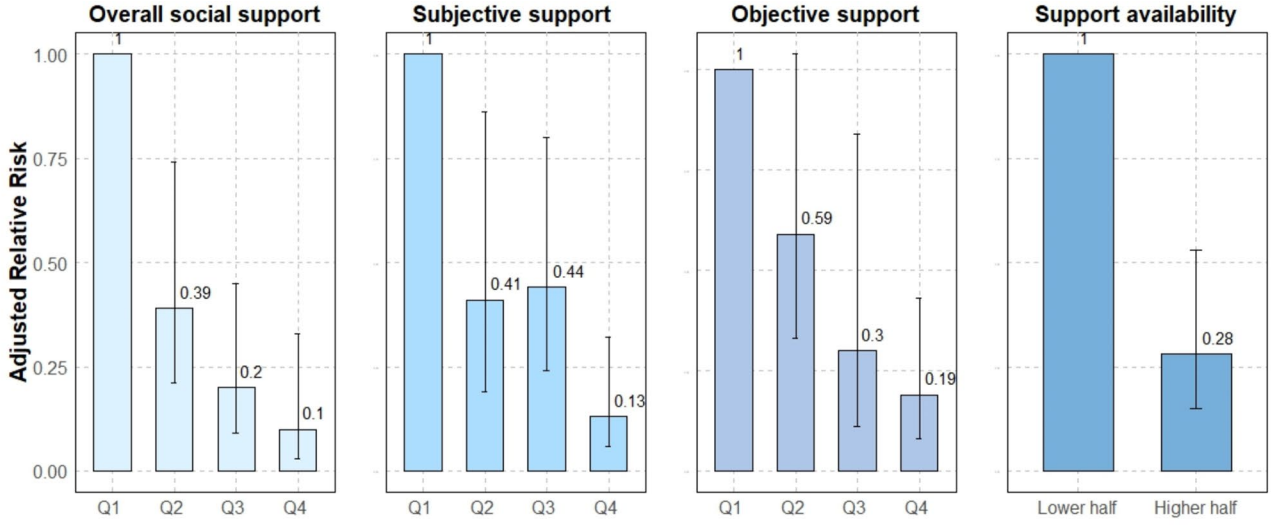

Fig. 2 Association between social support and postpartum PTSD, Guangdong, China, 2023. *Notes* The scores of overall social support, subjective support, and objective support were categorized into quartiles, ranging from the lowest (Q1) to the highest (Q4). The score for support availability was divided into the lower half and the upper half. The vertical bars in the graph represent 95% confidence intervals, while the point estimates indicate the adjusted relative risk. The *P*-trend value for the overall linear effect was < 0.001, adjusted for education, monthly household income per capita, parity, mode of delivery, and mode of feeding.

of postpartum PTSD, social support can enhance mothers' self-efficacy [38] in coping with trauma by providing solutions to the problem, reducing negative interpretations of the event, and minimizing harmful physiological responses [36]. This, in turn, interrupts the pathway between the experience of traumatic stress and the development of PTSD symptoms [37].

Strengths and limitations

To the best of our knowledge, this is the first study that examined the association between social support and postpartum PTSD, in both overall support and its three specific dimensions. By exploring subjective support, objective support, and support availability separately, we not only enhance the understanding of social support but also provide practical evidence for targeted interventions to improve social support in mothers with

PTSD. Our study excluded mothers with a history of or current psychiatric disorders, including PTSD and postpartum depression at recruitment and ascertained only new PTSD cases. Notably, our findings support the social causation model, which suggests that social support acts as a protective buffer against the development of PTSD. However, there are certain limitations to consider. First, since the study participants were recruited from a single center in China, caution should be exercised when generalizing the findings to other populations. Second, social support was assessed only once, specifically at 3 days after childbirth. Future studies should consider assessing social support at multiple time points throughout the perinatal period to capture its dynamic nature. Lastly, despite adjusting for potential confounders, the presence of residual confounding from unmeasured or unknown factors cannot be completely ruled out, given our limited understanding of the mechanisms linking social support and PTSD.

Conclusions

The prospective cohort study in China suggests that social support, including both overall support and its three special dimensions in subjective support, objective support, and support availability, may serve as a protective factor against postpartum PTSD. These findings have important practical implications for the development of interventions targeting various dimensions of social support.

Abbreviations

PTSD	Post-Traumatic Stress Disorder
SSRS	Social Support Rating Scale
PPQ	Perinatal Post-Traumatic Stress Disorder Questionnaire
RR	Relative Risk
CI	Confidence Interval

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Author contributions

JC and SW drafted the manuscript. RHX made a substantial contribution to the conception and design of the study. JC, SW, XL and LZ made major contributions to the material preparation, data collection and analysis. SWW, DK, and RHX critically revised the article for important intellectual content. RHX approved the final version for publication. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Approval was obtained from the Research Ethics Committee of Foshan Women and Children Hospital (FSFY-MED-2022-102) prior to commencing the study (2022-11-18). Informed consent was obtained from all individual participants included in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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