



Predictors of the family sense of coherence in pregnant women: a cross-sectional study

Reta Tsegaye Gayesa^{1,2} · Caixin Yin³ · Yao Jie Xie¹ · Fei Wan Ngai¹

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Abstract

Aim This study aimed to explore the factors associated with the family sense of coherence (FSOC) among pregnant women, focusing on sociodemographic, obstetric, and psychosocial-related aspects.

Subject and methods A total of 1153 eligible pregnant women were involved in the study. After obtaining informed consent, participants were asked to complete all questionnaires to assess the study outcomes. A multiple linear regression model was employed to identify significant predictors of FSOC. Data were analyzed with a multiple linear regression model.

Results The findings show that six variables in this study strongly predicted the FSOC. These predictors were income ($\beta=0.088$, $t=3.72$, $P<0.001$), having a university education ($\beta=0.061$, $t=2.546$, $P=0.011$), sleep quality index ($\beta=-0.116$, $t=-4.736$, $P<0.001$), perceived level of stress ($\beta=-0.065$, $t=-2.876$, $P=0.004$), family and marital functional measures ($\beta=0.419$, $t=15.843$, $P<0.001$), and social support ($\beta=0.219$, $t=8.401$, $P<0.001$).

Conclusion The results showed that key socioeconomic and psychosocial factors can influence women's family sense of coherence, highlighting the importance of strengthening family and community support programs and offering stress-coping mechanisms for pregnant women. Moreover, future researchers should consider these factors for further interventional studies.

Keywords Family sense of coherence · Pregnant women · Salutogenesis · Stress

Abbreviations

CNY	Chinese Yuan
FSOC	Family sense of coherence
SD	Standard deviation
SOC	Sense of coherence

Introduction

Pregnancy and the transition to motherhood are among the significant changes in women's lives, with substantial implications for family dynamics and child development (Deave et al. 2008). Although some couples feel happy and satisfied, pregnancy can also be a source of stress that can adversely impact both maternal and fetal health (Coussons-Read 2013; Traylor et al. 2020). A healthy transition to motherhood is crucial and involves adaptation to pregnancy changes, experiencing various emotional fluctuations, shifting perceptions from being a woman to someone's mother, and adjusting the family relationship (Hwang et al. 2022). If these changes are not effectively managed, they can result in stress and depression. When the family can cope with these changes, it can foster a healthy pregnancy and facilitate a positive transition to parenthood, implying the importance of having a strong family sense of coherence (FSOC) (Guardino and Schetter 2014; Sekizuka-Kagami et al. 2015).

FSOC is the family's ability to cope with stresses and deal with environmental stresses for positive health outcomes (Antonovsky 1993). The sense of coherence is the core concept in salutogenesis theory, which emphasizes people's

✉ Fei Wan Ngai
vivian.ngai@polyu.edu.hk

Reta Tsegaye Gayesa
retatg@gmail.com

Caixin Yin
1034974590@qq.com

Yao Jie Xie
grace.yj.xie@polyu.edu.hk

¹ School of Nursing, The Hong Kong Polytechnic University, Hong Kong, Hong Kong S.A.R, China

² Institute of Health Sciences, Wollega University, Nekemte, Oromia, Ethiopia

³ Nursing Department, Guangzhou Women and Children Medical Centre, Guangzhou, China

resources and strengths to promote health and well-being, rather than the traditional medical focus on risks, illness, and disease (Antonovsky 1996). It is the perception that different situations and immediate surroundings are coherent and made up of subordinate ideas of meaningfulness, manageability, and comprehensibility (Antonovsky 1996). It means a person with a strong sense of coherence wants to be motivated and cope, believes that the challenge is understood, and resources to manage are available (Antonovsky 1996). The sense of coherence in the family context was later extended to address the individual's perception of how the family deals with stressors to bring about positive health outcomes. While a sense of coherence at the individual level is essential, the family sense of coherence in how individuals perceive their family handles potential stressors (Carneiro et al. 2021), which is particularly vital during pregnancy. FSOC could be necessary during pregnancy because it emphasizes the family's collective resources and strengths for managing stress, helping with a healthy pregnancy and outcomes.

During pregnancy, having a good level of FSOC benefits the mother, the newborn, and the family. Various studies have been conducted to identify the impact of low FSOC on pregnancy and childbirth outcomes. For example, a systematic review of studies has shown that low SOC was linked with poorer health outcomes during the perinatal period (Alcantara et al. 2023). Low SOC score was also correlated with threatened preterm birth among pregnant women (Sekizuka-Kagami et al. 2015). Other studies have shown that a strong FSOC plays a significant role in promoting family functioning and reducing postpartum depression (Ngai and Ngu 2014a). In the context of chronic disease patients, FSOC was found to be associated with higher hope and lower anxiety and symptoms of depression levels in both persons with cancer and their family members (Mollerberg et al. 2019). A family sense of coherence also played a predictive role in explaining psychological distress (Cecen and Mert 2023). This correlation shows that a strong sense of coherence is crucial during the perinatal period to facilitate a healthy transition to parenthood and achieve positive outcomes. The stronger the sense of coherence that pregnant women possess, the better they assess their well-being, anxiety levels, and vulnerability to depression (Sjostrom et al. 2004), enabling them to confront motherhood challenges positively.

Despite its effects on health outcomes, FSOC can be influenced by various factors, including individual, environmental, and psychosocial elements (Bargehr et al. 2023; Kucab et al. 2023). A study conducted in India among rural pregnant women revealed that the FSOC was low and linked to their education level (Krishnan and Dhananjaya 2022). According to a study on adolescents' sense of coherence, age and positive family relationships were important predictors

for developing strong SOC (Garcia-Moya et al. 2012). Other studies revealed that women's age, multiparity, lack of husband support, and the risk of perinatal depression were associated with low FSOC (Przestrzelska et al. 2018). Similarly, another study showed that sociodemographic factors, such as education and living conditions, significantly impacted the sense of coherence (Kucab et al. 2023). A study conducted among university students in China revealed that perceived stress was negatively associated with a sense of coherence (Chu et al. 2016).

Many previous studies have examined the family sense of coherence as an independent predictor of health-related outcomes, but little attention has been given to it as an outcome variable. Though few previous studies have explored the factors associated with FSOC, particularly from a sociodemographic perspective, there is still a paucity of research on the predictive roles of obstetric factors such as gestational age, parity, and pregnancy complications among pregnant women. In addition, a study on the predictive roles of psychosocial factors such as sleep quality, perceived stress, social support, and family functioning on FSOC among pregnant women is limited and should be further investigated. Thus, this study aimed to explore the associations between FSOC and sociodemographic, obstetric, and psychosocial factors among Chinese pregnant women.

Methods and materials

Study design and settings A cross-sectional study was conducted from February 2021 to June 2021 in a public hospital in Guangzhou, South China, where approximately 24,000 babies are born yearly.

Participants and sample size

This study is part of a cross-sectional study conducted to assess postnatal depression. The sample size was calculated using a single population proportion formula with the following parameters: 95% confidence level, a margin of error of 3%, and a previous prevalence of postnatal depression of 46% (Zhang et al. 2024b). A 10% contingency was considered to account for nonresponses during data collection, resulting in a final estimated sample size of 1166. Eligible pregnant women were enrolled in the study through convenience sampling during their antenatal care follow-up.

Inclusion criteria

- Pregnant women aged ≥ 18
- Understand Chinese
- No psychiatric illness

Data collection procedure

An online survey using the Qualtrics platform was used to collect participant data. A research assistant gave participants a detailed explanation of the survey procedure, outlining its benefits and risks, and obtained informed consent. The consent form was presented on the first page of the platform, allowing study participants to agree or decline participation. Only those who agreed on the survey platform could complete the questionnaire.

Measures

Family sense of coherence

The family sense of coherence was the outcome variable in this study. It was measured by a 12-item Chinese version of the family sense of coherence-short form (FSOC-SF) scale (Ngai and Ngu 2011). A higher score indicates a greater sense of family life as comprehensible, manageable, and meaningful. This scale has shown good internal consistency (Cronbach's $\alpha=0.83$) and test–retest reliability (intraclass correlation coefficient=0.75) among the Chinese population (Ngai and Ngu 2011).

Family and marital functioning This was one of the predictor variables that was evaluated using a 10-item Chinese version of the Medical Outcomes Study Family and Marital Functioning Measures (Ngai and Ngu 2012). A higher score suggests higher family and marital satisfaction, while a lower score reflects lower family and marital functioning. This scale has shown good internal consistency (Cronbach's $\alpha=0.79$) and test–retest reliability (intraclass correlation coefficient=0.74) (Ngai and Ngu 2012).

Social support Perceived social support was measured by a 6-item social support questionnaire (SSQ6) (Sarason et al. 1987). A higher score indicates greater satisfaction with the social support received and vice versa. The Chinese version of the scale has shown good internal consistency (Cronbach's $\alpha=0.94$) and test–retest reliability (intraclass correlation coefficient=0.88) (Chang 1999).

Perceived sleep quality The participants' sleep quality was measured by a 19-item Chinese version of the Pittsburgh Sleep Quality Index (PSQI) (Ho and Fong 2014). A higher score suggests higher sleep impairment and vice versa. The Chinese version of the scale has shown good internal consistency (Cronbach's $\alpha=0.79$) and test–retest reliability ($r=0.79$) (Ho and Fong 2014).

Perceived stress level This was measured using the Chinese version of the Social Re-adjustment Rating Scale (SRRS)

(Holmes and Rahe 1967; Zheng and Lin 1994). A higher score suggests a higher stress level and vice versa. The 39-item Chinese scale version has shown good internal consistency (Cronbach's $\alpha=0.78$) (Zheng et al. 2022).

Data quality control measures

Some quality insurance measurements were employed to enhance the accuracy and reliability of the data. The research assistant received training in collecting data online using the Qualtrics platform. A validated tool was employed to assess the outcome measures and predictor variables, all measured using validated instruments in their Chinese versions. Digital data collection tools such as Qualtrics were used to minimize data entry errors, ensure data consistency, and simplify the data collection process.

Data processing and analysis

The collected data were exported to SPSS version 29 for data analysis. Before analysis, assumptions for multiple linear regression were checked. Accordingly, the multicollinearity between independent variables was checked by a variance inflation factor (VIF), resulting in a value between 1 and 2 for all predictor variables, which is acceptable (Akinwande et al. 2015). The residuals were also found to be normally distributed, checked by a normal-P-P plot. The linearity between dependent and predictor variables and the homoscedasticity of the error terms were tested using a scatterplot, and the independence of residuals was determined by the Durbin–Watson test, resulting in an acceptable value of 1.970 (Statistics How To 2024).

The characteristics of participants were described using the mean and the median for continuous variables and frequencies and percentages for categorical variables. Multiple linear regression analysis, with a 95% confidence interval (CI), was used to determine which independent variables were significantly predicted with the outcome variable. Findings were reported in descriptive statistics, including frequency and percentages, and inferential statistics, such as β values with 95% confidence intervals. The statistical significance level was declared at a P value of <0.05 .

Results

Of the 1166 eligible participants, about 1153 successfully completed the questionnaire, giving a response rate of 98.9%. The participants' mean age ($\pm$ SD) was 30.8 ($\pm$ 3.86) years. The mean ($\pm$ SD) years of marriage was 1.04 ($\pm$ 0.23). Nearly all participants were married (97.9%), and the majority were university graduates (67.9%). Over three-fourths of participants earned more than 10,000 Chinese Yuan (CNY)

and were employed full-time. Less than 10% of participants reported pregnancy complications (Table 1).

Family sense of coherence

The family sense of coherence was the outcome variable in this study. This study's mean (SD) of FSOC was 63.61 (11.61). The result of multiple linear regression has shown that six predictors explained 44% of the variance in FSOC by having statistically significant results (adjusted $R^2=0.44$, $F(14, 1138)=65.53$, $P<0.001$). Looking at the individual contributions of the predictors, the result shows that income ($\beta=0.088$, $t=3.72$, $P<0.001$), having a university education ($\beta=0.061$, $t=2.546$, $P=0.011$), sleep quality index ($\beta=-0.116$, $t=-4.736$, $P<0.001$), perceived level of stress

($\beta=-0.065$, $t=-2.876$, $P=0.004$), family and marital functional measures ($\beta=0.419$, $t=15.843$, $P<0.001$), and social support ($\beta=0.219$, $t=8.401$, $P<0.001$) had significantly predicted the family sense of coherence (Table 2). Obstetric-related factors such as trimester ($\beta=-0.038$, $t=-1.609$, $P=0.108$), pregnancy complications ($\beta=-0.036$, $t=-1.597$, $P=0.110$), and parity ($\beta=-0.024$, $t=-0.972$, $P=0.331$) were not significantly correlated with the sense of coherence among pregnant women. Accordingly, the result suggests that pregnant women earning a higher income above 10,000 CNY, attending a university education, and having higher family and marital functioning scores were more likely to have a higher family sense of coherence. On the other hand, those who had low sleep quality and higher perceived stress levels were less likely to have a strong family sense of coherence.

Table 1 Sociodemographic characteristics of the study participants

Characteristics	Frequency	Percent
Marital status		
Married	1129	97.9
Cohabit	6	0.5
Single	18	1.6
Education		
Secondary	64	5.6
Tertiary	313	27.1
University	776	67.3
Occupation		
Full time	881	76.4
Part-time	8	0.7
Self-employed	117	10.1
Housewife	103	8.9
No employment	44	3.8
Income		
<CNY\$5,000	61	5.3
CNY\$5,001–10,000	209	18.1
CNY\$10,001–20,000	372	32.3
CNY\$20,001–30,000	257	22.3
CNY\$30,001–40,000	107	9.3
CNY\$40,001–50,000	65	5.6
>CNY\$50,000	82	7.1
Parity		
Primipara	702	60.9
Multipara	451	39.1
Trimester		
First	76	6.6
Second	679	58.9
Third	398	34.5
Pregnancy complications		
No	1051	91.2
Yes	102	8.8

CNY Chinese Yuan

Discussion

The present study highlighted the factors associated with a family sense of coherence (FSOC) during pregnancy from different perspectives, such as sociodemographic, obstetric, and psychosocial factors among pregnant Chinese women. Among sociodemographic factors, the women's income and educational status positively affected their FSOC, whereas psychosocial factors, such as sleep quality and perceived stress level, negatively affected their FSOC. In addition, family functioning and social support were positively associated with FSOC. On the other hand, obstetric factors such as pregnancy complications, parity, and gestational age did not reach a significant level in predicting the FSOC.

In this study, income strongly predicted the FSOC, such that those who earned a higher income (> 10,000 CNY) had a stronger sense of coherence than their counterparts. This study is consistent with previous studies, which showed that higher-income participants scored a higher sense of coherence (Bargehr et al. 2023; Barnard 2016; Fok et al. 2005). This could be because financial stability can alleviate the stress associated with economic insecurity and allow them better access to healthcare services, enhancing their ability to cope with life's challenges (Ryu and Fan 2023). This implies that women's financial-related worry is a crucial aspect that healthcare workers should assess during perinatal care to promote the women's coping capability with stressors during pregnancy.

The educational status of pregnant women was also positively associated with the FSOC, such that those who completed university education had a higher sense of coherence than those who only completed secondary education. This finding is in line with studies conducted in Poland, India, and Germany, in which the sense of coherence was higher among those who completed higher education (Bargehr

Table 2 Multiple linear regression of family sense of coherence based on predictor variables

Variables	<i>B</i>	β	<i>t</i>	<i>P</i> value	95% CI	
					Lower	Upper
Age	0.056	0.018	0.737	0.461	−0.093	0.204
Income (ref = low income)	2.422	0.088	3.720	< 0.001	1.144	3.700
Education	1.510	0.061	2.546	0.011	0.346	2.673
University education (ref = secondary education)						
Employment (ref = unemployed)	1.066	0.031	1.313	0.189	−0.527	2.659
Marital status	−1.464	−0.018	−0.693	0.488	−5.605	2.678
Married	−0.505	−0.003	−0.122	0.903	−8.609	7.599
Cohabited (ref = single)						
Trimester	−1.778	−0.038	−1.609	0.108	−3.946	0.390
1 st trimester	−0.146	−0.006	−0.261	0.794	−1.244	0.951
2nd trimester (ref = 3rd trimester)						
Parity	−0.575	−0.024	−0.972	0.331	−1.736	0.585
Multipara (ref = primipara)						
Pregnancy complication (ref = no complication)	−1.484	−0.036	−1.597	0.110	−3.307	0.339
Sleep quality	−0.601	−0.116	−4.736	< 0.001	−0.850	−0.352
Perceived stress level	−0.020	−0.065	−2.876	0.004	−0.034	−0.006
Family and marital functioning	0.875	0.419	15.843	< 0.001	0.767	0.984
Social support	0.659	0.219	8.401	< 0.001	0.505	0.813

refreference

et al. 2023; Krishnan and Dhananjaya 2022; Przestrzelska et al. 2018). This may be because higher educational levels provide individuals with more opportunities to learn and develop problem-solving and decision-making skills, which can improve their adaptability, self-efficacy, and resilience in coping with stress.

The women's perceived sleep quality was another predictor of a family sense of coherence among pregnant Chinese women. Though the direction of the relationship between FSOC and sleep quality remains unclear, the low sleep quality of the participants significantly contributed to a low sense of coherence in the current study. A study conducted in India (Dhivya et al. 2023) and China (B. Zhang et al. 2024a) also reported similar findings, such that low sleep quality had correlated with a low sense of coherence. When individuals sleep well, they can have better mental health (Scott et al. 2021), equipping them to handle life challenges and enhancing their coping with stress. Moreover, good sleep supports cognitive and emotional well-being (Su and He 2023), which improves resilience and effective coping, leading to strong FSOC.

Perceived stress also predicted the sense of coherence in the current study. High levels of perceived stress were strongly associated with lower levels of sense of coherence among Chinese pregnant women. A cross-sectional study among Chinese University students revealed that perceived stress was negatively associated with FSOC

(Chu et al. 2016). Another study involving cancer patients found that perceived stress had a negative correlation with FSOC (Guo et al. 2021). This could be because women who feel their stress is unmanageable are likely to doubt the meaningfulness and comprehensibility of life, resulting in a lower sense of coherence. Furthermore, stress can contribute to physical fatigue, further restricting an individual's ability to cope with challenges and adversely influencing their FSOC.

Another factor positively associated with the family sense of coherence was family and marital functioning (FMF) in this study. The FMF refers to the quality of family interaction and indicates a person's overall happiness with family and marital life (Ngai and Ngu 2014b). Two studies from Spain and Turkey also reported a positive association between family functioning and FSOC (Garcia-Moya et al. 2012; Kaya and Cenkseven Önder 2023). Furthermore, strong family relations positively correlate with happiness, a sense of coherence, and perceived health (Chiang and Lee 2018). Healthy family dynamics enhance stronger resilience and a sense of coherence (Grevenstein et al. 2019), which could help women feel equipped to handle life challenges and make them feel that life is comprehensible, manageable, and meaningful. Quality marital functioning can promote healthy lifestyle behaviors and encourage couples to cope with stress (Haghighi et al. 2024). This suggests that family and marital functioning

can strengthen pregnant women's sense of coherence, helping them manage the stress associated with pregnancy and the transition to parenthood.

Social support was the final factor that positively affected the women's family sense of coherence in the current study. This is consistent with a study conducted in Japan (Fujitani et al. 2017), where instrumental and emotional family support improved a sense of coherence among young women. A study conducted in China to identify factors associated with the sense of coherence among university students also revealed the positive impact of social support on improving the sense of coherence (Chu et al. 2016). Furthermore, a study in Israel reported the positive impact of social support, where women who received it could cultivate a positive and optimistic outlook for the future and a greater sense of meaning in their lives (Sagi et al. 2021). The strong correlation between social support and a sense of coherence may be because social support usually encompasses the practical and emotional support that helps individuals feel valued and understood, enabling them to navigate difficult situations more effectively and contribute to a strong sense of coherence.

In this study, obstetric factors such as parity, pregnancy trimester, and pregnancy complications did not significantly affect the FSOC. The lack of association may be attributed to other factors, such as social support and marital and family functioning, that might have reduced the influence of the trimester of pregnancy and the presence of complications on FSOC. Furthermore, these factors may influence the outcome through other mediating factors, such as stress, which requires further exploration.

Strengths and limitations of the study

This study used large sample sizes to increase statistical power and the precision of estimates, thereby increasing generalizability. Its extensive assessment of potential predictors can be viewed as a strength. Despite the strengths, the study had its limitations. The study's cross-sectional nature cannot determine the cause and effect between some predictor variables and outcome variables. The non-probability selection of sampling and the inclusion of a single hospital may also limit the generalizability of the findings. Though enrolment in higher education is increasing, the study participants were from an urban city, where their educational status was from a higher educational category. This may impact the external validity, as the rural population, where the higher education completion rate is assumed to be lower, was not included. In addition, despite including several potential factors in this study, variables such as cultural factors and personality traits were not assessed and are recommended to be studied in future research.

Implication to practice

The current study's findings have important implications for enhancing pregnant women's capability to address new life challenges by addressing identified predictor variables. The findings can also provide inputs for the healthcare system to develop integrated care models involving a team of healthcare providers, social workers, and mental health professionals to address the identified factors of FSOC and enhance effective perinatal care. Researchers should also consider identified factors for interventional studies to improve pregnant women's family sense of coherence.

Conclusion

The current study found that various socio-economic and psychosocial factors can influence the family's sense of coherence. Variables such as income, educational status, perceived stress, perceived sleep quality, family and marital functioning, and social support predicted the family's sense of coherence. Therefore, these factors should be given due attention for intervention to promote a family sense of coherence. Additionally, future researchers should consider interventional studies to determine the causal inference identified in this study.

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Authors' contributions Reta Tsegaye Gayesa: Formal analysis, writing an original draft, writing a review, and editing. Fei Wan Ngai: Conceptualization, methodology, writing—review and editing. Yao Jie Xie: Methodology, writing—review and editing. Caixin Yin: Investigation, data curation, and supervision.

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Data availability The data used for this study are presented in the manuscript.

Declarations

Ethical approval This study was performed according to the principles of the Declaration of Helsinki. Ethical approval was granted by The Hong Kong Polytechnic University (PolyU) institutional review board (Ref. HSEARS20200521003). Permission to conduct the study was also obtained from the hospital before participant enrollment.

Consent to participate Written informed consent was obtained from eligible participants through the Qualtrics data collection platform, and they needed to agree to participate voluntarily before filling out the questionnaire. The confidentiality of the participants' information was preserved by anonymizing data, using unique identifiers instead of names, storing data securely with restricted access, and ensuring that data was not shared with third parties throughout the data analysis.

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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