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The Mediating Effect of Sleep Quality on the Relationship Between Depression and Sense of Control in Women in the Third Trimester of Pregnancy: A Cross-Sectional Survey Study

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ABSTRACT

Background: Depression, poor sleep quality, and perceived lack of control all commonly impact women in the third trimester of pregnancy. Depression can influence sleep quality, whereas sense of control during pregnancy is correlated with both sleep quality and depression. However, the mediating effect of sleep quality on the relationship between depression and sense of control has not been examined in women in their third trimester.

Purpose: This study was designed to explore depression, sleep quality, and sense of control in pregnant women during the third trimester and determine the degree to which sleep quality mediates the relationship between depression and sense of control.

Methods: An exploratory correlational cross-sectional design was used to recruit 263 pregnant women with a gestational age of 35–36 weeks. Data were collected using questionnaires. Depression, sleep quality, and sense of control were respectively assessed using the Edinburgh Postnatal Depression Scale, Pittsburgh Sleep Quality Index, and Labor Agentry Scale. Data on the main outcomes were analyzed using the PROCESS macro for SPSS.

Results: Depression in pregnant women was found to correlate positively with poor sleep quality and negatively with sense of control (all *p*s < .001). Thus, higher levels of depression and poorer sleep quality were associated with lower sense of control. The results confirmed the relationship between depression and sense of control to be mediated by sleep quality ($p < .001$).

Conclusions: Pregnant women with lower levels of depression may experience better sleep quality and sense of control. Sleep quality mediates the relationship between depression and sense of control in women in the third trimester. Thus, prenatal counseling and psychological support should be provided to pregnant women to reduce depression while improving sleep quality and sense of control.

KEY WORDS:
prenatal depression, sleep quality, sense of control, mediation.

Introduction

In women, sense of control during pregnancy, in childbirth, and after birth is important because it provides an overview of perinatal experiences (Chabbert et al., 2021; Hodnett & Simmons-Tropea, 1987). Common descriptions of positive birth experience expectations given by women include support, being in control, safety, respect, joy, and confidence (Leinweber et al., 2023). In turn, women experience fear of losing control during childbirth because of projections of negative scenarios, which include professional services, worry about uncertainty and unpredictability, knowledge deficiency, and mental reaction (Beal et al., 2023; Souto et al., 2023). Fear of losing control is linked to adverse outcomes such as labor pain (Veringa-Skiba et al., 2022). One coping strategy used by pregnant women who fear losing control during childbirth is choosing to receive a planned cesarean section (Souto et al., 2023). Also, pregnant women deciding to have a physiological birth may consider using pharmacological analgesia during childbirth to feel more in control of the birthing process (Chen et al., 2023). However, using pharmacological analgesia during childbirth may increase the risk of postnatal depression, which can affect mother–infant attachment bonding (Brandão et al., 2020). Therefore, it is crucial for nurses to provide pregnant women with a means to identify factors that will improve prenatal sense of control to enhance sense of control in childbirth.

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Prenatal depression affects 27.12% of pregnant women during the third trimester, and 29.30% of women experience postnatal depression, which may be associated with prenatal depression in late pregnancy and have adverse effects on both mothers and infants (Al-Abri et al., 2024). Depression in the third trimester, which is marked by more discomfort and poorer sleep quality than the first and second trimesters, has been previously studied (Tsai et al., 2021). Depression may impair appetite, which may negatively impact the health of both the mother and infant (Mishkin et al., 2021). Pregnant women frequently experience mood swings because of life events (Chaibekava et al., 2022). Similar to fear of losing control, depression is an issue that decreases quality of life in pregnant women (Delale et al., 2021). Significant evidence has been published showing prenatal depression may decrease sense of control in women (Brandão et al., 2020; Çankaya & Şimşek, 2021; Chaibekava et al., 2022). Although more than half of pregnant women without anxiety or depression have experienced a fear of losing control, depression can increase the prevalence of fear of childbirth and negatively impact sense of control (Storksen et al., 2012). Therefore, pregnant women who feel in control and are confident of their ability to deal with challenges experience less depression than women who do not (Savory et al., 2022). The effects of depression on the brain include a reduced cortisol awakening response, which impairs cognitive functioning and reduces the ability to learn birth preparedness (Huang et al., 2020). Learning how to prepare for birth can influence feelings of control over the birth event (Çankaya & Şimşek, 2021; T. C. Kuo et al., 2022). As a result, reducing prenatal depression can help women enhance the effectiveness of childbirth education, while increasing their sense of control (Dencker et al., 2019; Molgora et al., 2018).

A meta-analysis of longitudinal studies shows that sleep quality declines gradually as pregnancy progresses from the second to third trimester (Sedov et al., 2018), with prevalence rates of poor sleep quality reaching as high as 65.5% in the third trimester (Hung et al., 2013). The many reasons for poor sleep quality in the third trimester include body pain and leg cramps (Buysse et al., 1989; Nazik & Eryilmaz, 2014), with poor sleep quality potentially resulting in cognitive, psychological, and physiological impacts (Mason et al., 2021). Moreover, poor sleep quality has been highly associated with depression (González-Mesa et al., 2019; Wang et al., 2020; Zhang et al., 2021) and memory impairment (Zhang et al., 2021) and has been correlated with an increased fear of losing control in childbirth (Mei et al., 2023). Based on the literature, the three issues of depression, sleep quality, and sense of control appear to be interrelated.

Biological studies have revealed serotonin (5-HT) to affect mood and certain drugs used to treat depression (e.g., selective serotonin reuptake inhibitors) to increase 5-HT plasma levels (Cai et al., 2022). 5-HT is converted via biosynthesis into melatonin, which is related to the circadian sleep–wake rhythm that directly influences sleep quality (Danilovich et al., 2021). Depression and poor sleep quality result in memory impairments that impact learning (Zhang et al., 2021). Education in cognition and learning can improve prenatal sense of control (T. C. Kuo et al., 2022). In summary, lowered 5-HT levels (i.e., depression) can reduce melatonin levels (i.e., sleep quality), which modulates memory (i.e., sense of control). However, the mediating role of sleep quality in the relationship between depression and sense of control in the third trimester has not been investigated. Addressing this knowledge gap may suggest strategies for improving sleep quality in pregnant women and increasing their sense of control in the third trimester.

Considering the above, this study was designed to assess depression, sleep quality, and sense of control in pregnant women during the third trimester and determine whether the relationship between depression and sense of control is mediated by sleep quality. The hypothesis in this study is that depression significantly affects both sleep quality and sense of control during the third trimester and that the relationship between depression and sense of control in pregnant women is mediated by sleep quality.

Methods

Design and Samples

An exploratory correlational cross-sectional design was adopted in this study, and convenience sampling was used to recruit 263 pregnant women with a gestational age of 35–36 weeks from the prenatal clinic of a medical center in northern Taiwan. The inclusion criteria were as follows: (a) age $\geq$ 20 years, (b) planning a vaginal birth, (c) able to speak and write Chinese, and (d) able and willing to complete the questionnaires. The exclusion criteria were women with a high risk of obstetric complications (such as severe physical or mental illness) or negative infant outcomes.

A Monte Carlo power analysis and the application (https://schoemanna.shinyapps.io/mc_power_med/) were used to estimate the minimum number of participants required. Considering the relationship between depression and sleep quality, the standardized coefficient was set to 0.2 and the power was set to 0.8 (Zhang et al., 2021). The standard deviations used respectively for depression, sleep quality, and sense of control were 3, 3.4, and 7 (Hung et al., 2013; S. C. Kuo et al., 2010). Based on this, a minimum of 257 participants were required to detect a meaningful effect. Ultimately, 263 qualified participants were enrolled as participants.

Instruments

Depression

The 10-item Edinburgh Postnatal Depression Scale (EPDS) developed by Cox et al. (1987) and previously used to measure mood disorders during pregnancy (Raglan et al., 2021; Tsai et al., 2021) was used to evaluate depression in this study. Items are scored on a 4-point Likert-type scale.

Total possible scale scores range from 0 to 30, with higher scores indicating more severe depression. The cutoff score for clinically screening depression has been recommended as 10 or higher (Cox et al., 1987). The internal reliability coefficient of this scale was .88 in a previous study (Raglan et al., 2021) and .82 in this study.

Sleep quality

Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality (Buysse et al., 1989). This scale consists of 19 items grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each item is scored from 0 to 3, and the sum of component scores ranges from 0 to 21, with higher scores indicating poorer sleep quality. The cutoff score for poor sleep quality is > 5. The Cronbach's α of the Chinese-version scale was .71 in a previous study (Hung et al., 2013) and .72 in this study.

Sense of control

In this study, a short (10-item) version of the Labor Agentry Scale (LAS) developed by Hodnett and Simmons-Tropea (1987) was used to measure sense of control in the prenatal period (S. C. Kuo et al., 2010). Items are organized into three components, including emotional control (total score range: 5–35), self-confidence (total score range: 3–21), and support (total score range: 2–14). Items are scored on a 7-point Likert scale ranging from 7 to 70, with higher scale scores indicating higher sense of control. The internal reliability coefficient of this scale was .75 in a previous study (S. C. Kuo et al., 2010) and .77 in this study.

Demographics datasheet

Considering the common factors of influence on maternal depression, sleep quality, and sense of control (Al-Abri et al., 2024; Mei et al., 2023), demographic data collected in this study included age, educational level, employment status, parity, and household income level.

Data Collection

After receiving approval for this study by the institutional review board at the study setting, pregnant women meeting the study criteria were approached in prenatal clinics, and a researcher explained the study purposes and procedures to them. Those who were interested to participate signed the consent forms and were enrolled as participants. The data were collected using self-report questionnaires from August 2020 to June 2022 at the prenatal clinic of a medical center in Taiwan. The first author administered the questionnaires, including the demographics datasheet, EPDS, PSQI, and LAS, to the participants individually in a quiet area of the clinic. The survey was offered in hard copy format (pen and paper) only. The questionnaires took 15–20 minutes for each participant to complete, and if participants had questions about scale items, the researcher explained the items and answered questions in a consistent manner.

Statistical Analyses

Statistical analyses were performed using SPSS Statistics 23.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequency and percentages, were used for demographic variables. Either an independent samples *t* test or a one-way analysis of variance was used to compare differences among EPDS, PSQI, and LAS scores by demographic characteristics. The mean and standard deviation (*SD*) of scores for the EPDS, PSQI, and LAS were obtained. Pearson correlation analyses were used to explore the relationship among depression, sleep quality, and sense of control. Values of $p < .05$ were considered statistically significant. Significant confounding variables in demographic factors such as parity and age that may affect the childbirth-related experiences or psychological stability of women, which may in turn affect PSQI and LAS scores (Mei et al., 2023; Zhang et al., 2021), were considered control variables in the statistical analyses. Based on the methodology of Baron and Kenny, a regression model was used to examine whether (a) EPDS and LAS scores were significantly associated, (b) EPDS and PSQI scores were significantly associated, (c) the PSQI score was associated with the LAS score when EPDS and PSQI scores were treated as predictors in the multiple regression, and (d) EPDS scores had no effect on LAS scores when controlling for PSQI score to confirm that the PSQI score fully mediates the relationship between EPDS and LAS scores. If the results are positive for the first three conditions but not the fourth, a partial mediation effect is indicated. The mediation analyses were conducted using the PROCESS macro for SPSS Version 4.0 if the indirect effect of depression (independent variable) on sense of control (dependent variable) through sleep quality (mediator variable) was significant. A significant mediation effect is confirmed when the bootstrapping test results meet the condition ($p < .05$).

Results

Participant Characteristics

The demographic characteristics of the study participants shown in Table 1. The majority were < 35 years old (71.1%), held a college degree or higher education (90.1%), were employed (82.1%), earned a median-level household income (700,001–1,470,000 NTD; 57.8%), and were primiparous (67.3%). The mean EPDS scores were 5.30–6.88 in groups with demographic variables, with no significant difference between groups (all $ps \geq .05$). The mean PSQI scores were 7.32–7.70 in groups with demographic variables, with no significant difference between groups (all $ps \geq .05$). The mean LAS scores were 46.93–50.06. The primiparous participants had lower mean LAS scores than their multiparous peers ($p < .01$), suggesting that primiparous women have a lower sense of control.

Table 1
Participant Demographic Characteristics

Characteristic	*n*	%	EPDS Score		*p*	PQSI Score		*p*	LAS Score		*p*
			M	*SD*		*M*	*SD*		*M*	*SD*	
Age					.90			.43			.44
< 35 years	187	71.1	6.11	4.00		7.35	2.96		48.18	7.49	
≥ 35 years	76	28.9	6.18	4.61		7.68	3.46		47.39	7.54	
Educational level					.33			.91			.79
High school or below	26	9.9	6.88	4.94		7.38	2.56		47.58	8.98	
College or above	237	90.1	6.05	4.08		7.46	3.17		48.00	7.34	
Employment status					.74			.65			.44
Yes	216	82.1	6.31	3.61		7.64	3.04		48.72	7.59	
No	47	17.9	6.09	4.29		7.41	3.13		47.79	7.49	
Household income (NTD)					.14			.99			.27
≤ 700,000	68	25.9	6.88	4.26		7.46	3.19		47.17	7.41	
700,001–1,470,000	152	57.8	6.03	4.27		7.46	3.06		47.86	7.42	
> 1,470,000	43	16.3	5.30	3.56		7.40	3.21		49.51	7.89	
Parity					.28			.37			< .01
Primiparous	177	67.3	6.33	4.30		7.32	3.17		46.93	7.53	
Multiparous	86	32.7	5.73	3.90		7.70	2.94		50.06	7.02	

Note. EPDS = Edinburgh Postnatal Depression Scale; PQSI = Pittsburgh Sleep Quality Index; LAS = Labor Agentry Scale; NTD = New Taiwan dollar.

Depression Level, Sleep Quality, and Sense of Control

The total scores and subscale item-average scores for depression, sleep quality, and sense of control, as indicated by EPDS, PSQI, and LAS scores, respectively, are presented in Table 2. The mean EPDS total score was 6.13 (*SD* = 4.17), and the prevalence of depression in participants (EPDS scores > 9) was 29.90%. In terms of the PSQI, 192 participants (73.0%) earned scores > 5, with the sample earning a mean PSQI total score of 7.45 (*SD* = 3.11). However, sleep quality scores were not consistent across the seven dimensions, with sleep disturbance earning a higher average score than the other dimensions. For the latent variables of sleep disturbance, 94.3% reported interrupted sleep because of urination. The mean score for use of sleep medication was 0.05, with five users (1.9%). With regard to sense of control, the mean LAS score was 47.95 (*SD* = 7.50). Emotional control consisted of five items, each scored between 1 and 7. The mean score was 4.08 (20.42 divided by 5), indicating a tendency to feel anxiety, powerlessness, fear, not relaxed, and not in control.

Correlation Analysis of Depression, Sleep Quality, and Sense of Control

Depression was found to relate positively to subjective sleep quality (r = .39, p < .001), sleep latency (r = .36, p < .001), sleep duration (r = .28, p < .001), habitual sleep efficiency (r = .23, p < .001), sleep disturbances (r = .36, p < .001), use of sleep mediation (r = .06, p = .298), daytime dysfunction (r = .37, p < .001), and overall sleep quality (r = .51, p < .001) and negatively to sense of control (r = –.54, p < .001). Sense of control was found to relate negatively with subjective sleep quality (r = –.41, p < .001), sleep latency (r = –.41, p < .001), sleep duration (r = –.27, p < .001), habitual sleep efficiency (r = –.28, p < .001), sleep disturbances (r = –.29, p < .001), use of sleep mediation (r = –.13, p = .037), daytime dysfunction (r = –.31, p < .001), and overall sleep quality (r = –.52, p < .001).

Table 2
Scores for Depression, Sleep Quality, and Sense of Control (N = 263)

Scale	*M*	*SD*
EPDS	6.13	4.17
Scores ≤ 9 vs. > 9	70.1% vs. 29.9%	
PQSI	7.45	3.11
Scores ≤ 5 vs. > 5	27.0% vs. 73.0%	
Subjective sleep quality	1.61	0.78
Sleep latency	1.59	0.94
Sleep duration	0.74	0.87
Habitual sleep efficiency	0.92	1.01
Sleep disturbances	1.77	0.53
Use of sleeping medication	0.05	0.35
Daytime dysfunction	0.77	0.66
Labor Agentry Scale	47.95	7.50
Emotional control	20.42	5.70
Self-confidence	15.33	2.72
Support	12.20	1.52

Note. EPDS = Edinburgh Postnatal Depression Scale; PQSI = Pittsburgh Sleep Quality Index.

Sleep Quality as a Mediator Between Depression and Sense of Control

The bootstrapping method was used to assess the mediating role of sleep quality between depression and sense of control. The final model with standardized path coefficients is presented in Figure 1. All of the coefficients were statistically significant using age and parity as covariates, including the effect of depression on sleep quality ($B = 0.38$, $p < .001$), effect of depression on sense of control when depression and sleep quality were both predictors ($B = -0.63$, $p < .001$), and effect of sleep quality on sense of control when depression and sleep quality were both predictors ($B = -0.86$, $p < .001$). As shown in Table 3, depression had a significantly negative indirect effect on sense of control mediated by sleep quality ($B = -0.33$, $p < .001$). The coefficient of the total effect was statistically significant ($B = -0.96$, 95% CI [–0.45, –0.22]). The effects of depression (independent variable) on sense of control (dependent variable) were significantly partially mediated by sleep quality (mediator variable).

Discussion

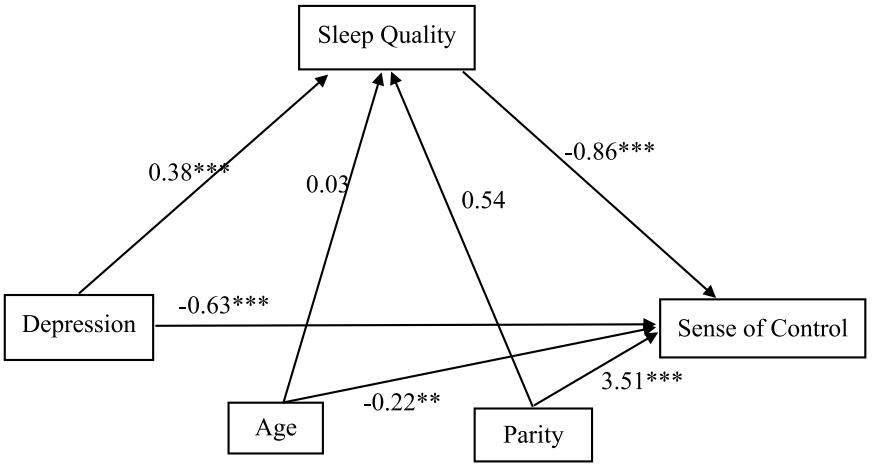
The findings of this study indicate depression significantly affects sleep quality, with both negatively associated with feelings of control. Consistent with the hypotheses, sleep quality was found to mediate the relationship between depression and sense of control.

The 29.90% prevalence of depression found in the third trimester based on EPDS score > 9 is similar to other studies (Hung et al., 2013; Tsai et al., 2021). Maternal depression may negatively affect the health of mothers and their infants (Mishkin et al., 2021). Therefore, it is important to enhance women-centered care and engage women in decision making to increase their sense of control and optimize their and their infants' health, thus making caring for women in their third trimester a critical goal in preventing depression (Savory et al., 2022). Poor sleep quality was found to be prevalent in the third trimester. A meta-analysis study previously associated poor sleep quality with depression (González-Mesa et al., 2019). Pregnancy can induce physiological and hormonal changes that promote physical discomfort, daytime sleepiness, and mood changes that influence sleep quality (Wang et al., 2020). In line with other findings, poor sleep quality scores observed among the participants in this study may have resulted from urination frequency causing interrupted sleep at night, which can influence sleep quality by causing daytime fatigue and anxiety (Hung et al., 2013; Zhang et al., 2021). In addition, 43.6% of pregnant women in their third trimester, on average, suffer from habitual snoring, which is another item affecting the sleep disturbance score (Raglan et al., 2021). The findings of this study provide further support to the presumption that pregnant women who suffer from fatigue, nap during the day, and have trouble sleeping at night have significantly higher depression scores than their peers who do not (Zhang et al., 2021). A previous study reported 0% of pregnant women using sleep medication (Hung et al., 2013), whereas 1.9% of the participants in this study used sleep medication. Even though taking prescription sleep medication is deemed to be safe, attention should be paid to interventions for pregnant women that improve sleep quality and reduce the need for prescription drugs.

Emotional well-being, self-confidence, and being supported by others contribute to sense of control in women (Souto et al., 2023). In this study, the average score for the emotional control subscale on the LAS scale was relatively low, indicating a higher risk of feeling anxious, powerless, fearful, not relaxed, and not in control. This finding concurs

Figure 1

The Coefficients of Sleep Quality Mediate on the Relationship Between Depression and Sense of Control Under Covariates



$^{**}p < .01$. $^{***}p < .001$.

Table 3
Mediation Analysis Summary

Relationship	Total Effect	Direct Effect	Indirect Effect	95% CI	Conclusion
Depression→ sleep quality → sense of control (covariates: age, parity)	−0.96 ($p < .001$)	−0.63 ($p < .001$)	−0.33	[−0.45, −0.22]	Partial mediation

Note. CI = confidence interval.

with previous work showing that depression can lead to a sense of lack of control in women (Brandão et al., 2020), showing that maternal depression correlates negatively with sense of control. Pregnant women with depression are more likely to fear losing control in childbirth due to mood- and birth-related aspects and pregnancy-associated discomfort (Dencker et al., 2019). In this study, multiparous participants scored higher for sense of control than their primiparous peers. Childbirth experience is crucial because of its strong association with sense of control (Beal et al., 2023). The self-help model combined with professional counseling is effective for pregnant women in preventing mental illness (Ceprnja et al., 2022). Therefore, maternal healthcare teams should work with personnel trained in self-help to address pregnancy and childbirth-related issues and teach skill-related knowledge to reduce depression due to mental load, thereby improving sleep quality and elevating sense of control.

The relationship between depression severity and sense of control still needs to take into account numerous factors that affect mood swings. For example, a significant event such as the COVID-19 pandemic likely exacerbated feelings of depression, anxiety, and stress in pregnant women (Chaibekava et al., 2022). Although depression characteristics associated with anxiety can influence sense of control in childbirth (Brandão et al., 2020), depression associated with worries about the COVID-19 pandemic did not influence women's sense of control (Chaibekava et al., 2022). Thus, although pregnant women with depression have a generally poor sense of control in facing childbirth events, non-childbirth factors such as disease prevalence, although influencing depression, do not influence sense of control in pregnancy.

The findings of this study revealed sleep quality not only to be associated with depression and sense of control but also to mediate the relationship between depression and sense of control in the third trimester. Because the total and direct effects were both shown to be significant, sleep quality played a partial mediating role in the relationship between sense of control and depression. These findings may be related to the gut microbiome, which influences health by modulating unique inflammatory and immune changes affecting maternal gut function (Edwards et al., 2017). Gut microorganisms and enterochromaffin cells in the human body produce 95% of 5-HT in the body, which is a key factor in the gut–brain axis (Danilovich et al., 2021). Although both 5-HT concentration and bowel movement frequency are positively correlated with the gut microbiome (Lu et al., 2022), the bacterial composition changes as pregnancy progresses (Edwards et al., 2017). The prevalence of constipation during pregnancy is as high as 40% due to elevated estrogen and progesterone levels (Kuronen et al., 2021). Functional constipation may upregulate the 5-HT transporter by gut dysbiosis, which decreases plasma 5-HT levels (Cao et al., 2017). A drop in 5-HT levels affects melatonin production in addition to mood because 5-HT is a melatonin precursor (Danilovich et al., 2021). Melatonin is an endogenous hormone produced by the suprachiasmatic nucleus, is closely associated with the circadian rhythm, and influences sleep–wake cycle patterns (Huang et al., 2020). Thus, depression can influence sleep quality. In addition, cortisol is the main end product of the hypothalamic–pituitary–adrenal axis, and melatonin acts directly on the adrenal gland to regulate the hypothalamic–pituitary–adrenal axis (Huang et al., 2020). Deficiencies in cortisol and melatonin levels lead to circadian rhythm deficits, which may impair cognitive function (Huang et al., 2020; Zhang et al., 2021), affecting the ability to learn childbirth skills, thereby affecting stress, depression, and fear of losing control (Çankaya & Şimşek, 2021; T. C. Kuo et al., 2022). Research findings indicate that foods may influence the gut microbiota (Lu et al., 2022). Consequently, nutrients may also influence sense of control, mental health, and sleep quality in women. We recommend further research into the impact of nutrients on this issue.

This study was affected by several limitations. First, selection bias was involved in our recruitment of participants who were mostly primiparous, under the age of 35 years, relatively well educated, and in a higher annual income bracket. These characteristics may reflect an enhanced ability to seek resources, potentially affecting EPDS, PSQI, and LAS scores. Consequently, the findings cannot be generalized to pregnant women, for example, from lower-income families and with lower levels of education. Second, sleep quality is generally worse for women in their third trimester than in the first two trimesters (Hung et al., 2013). The focus of this study was on pregnant women in their third trimester, which limits inferences that can be made to other pregnancy stages regarding the impact of sleep quality as a mediator of depression and sense of control. Third, the data collection period overlapped with the COVID-19 pandemic, although the spread was still effectively controlled in Taiwan and was not widespread in the community. With the exception of wearing masks and being required to take a Polymerase chain reaction test before admission to the hospital for childbirth, standard medical practices were maintained in obstetrics. Thus, this study likely does not reflect the full impact of

the pandemic on depression, sleep quality, and sense of control in pregnant women.

Conclusions

Depression in pregnant women can influence sleep quality and sense of control in the third trimester. Sleep quality mediates the relationship between depression and sense of control. Thus, learning self-help skills to reduce depression and enhance sleep quality should simultaneously have a positive effect on sense of control. To help pregnant women, prenatal clinic practitioners, who work under tight time constraints, should master how to effectively impart those skills. In addition, prenatal counseling and psychological support should be provided to pregnant women to reduce depression while improving sleep quality and sense of control. Given that the participants in this study were in their third trimester, future research on pregnant women in their first or second trimester will be necessary to fully understand the role of sleep quality as a mediator between depression and sense of control.

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Author Contributions

Conceptualization and methodology: MHW, JJL
Data collection: MHW
Data analysis and interpretation: All authors
Drafting of the article: MHW, JJL
Critical revision of the article: HCC, JJL

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