

The Role of Acceptance, Psychological Flexibility, and Resilience in the Sleep Quality of Pregnant Women with the Mediation of Mindfulness

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Abstract

Background: This study was conducted aiming to determine the role of acceptance, psychological flexibility, and resilience in the sleep quality of pregnant women through the mediation of mindfulness. **Materials and Methods:** This was a descriptive-correlational study. The statistical population consisted of all pregnant women referred to Al-Zahra Hospital in Tabriz city in 2024. Based on Klein's guidelines, a sample of 300 participants was selected (of whom 13 were excluded) using convenience sampling method. Data were collected using The Pittsburgh Sleep Quality Index (PSQI), The Acceptance and Action Questionnaire – version 2 (AAQ-II), The Psychological Flexibility Questionnaire (PFQ), The Connor-Davidson Resilience Scale (CD-RISC), and The Five Facet Mindfulness Questionnaire (FFMQ). Data analysis was conducted using Pearson's correlation coefficient in SPSS version 21 and structural equation modeling (SEM) in LISREL version 8.8. **Results:** The findings revealed that acceptance, resilience, and mindfulness have a direct and negative effect on the sleep quality of pregnant women ($p < 0.05$). The direct effects of psychological flexibility on mindfulness and sleep quality were not significant ($p > 0.05$). The investigation of indirect effects indicated that acceptance and resilience had an indirect and negative effect on the sleep quality of pregnant women through mindfulness ($p < 0.05$); however, the indirect effect of psychological flexibility on sleep quality through mindfulness was not significant ($p > 0.05$). **Conclusion:** According to the findings, it is suggested that acceptance and resilience along with mindfulness play a significant role in sleep quality of pregnant women and should be incorporated into relevant counseling programs. **Keywords:** Sleep Quality, Acceptance, Psychological Flexibility, Resilience, Mindfulness, Pregnant Women.

Introduction

Women experience significant sleep disturbances across the life course, especially during pregnancy (Fu et al., 2023). Expectant mothers typically face more sleep disturbances like sleep-disordered breathing (SDB), reduced sleep duration, and poor sleep quality due to physical discomfort, back pain, frequent urination, mental stress, insomnia, and frequent awakenings (Aprilyadi, 2022). Kline (2013) defines sleep quality as an individual's satisfaction with the sleep experience, incorporating aspects of sleep initiation, sleep maintenance, sleep quantity, and vitality upon waking. In other words, sleep quality is defined as an individual's satisfaction with all aspects of the sleep experience (Nelson et al., 2022). Sleep quality has four attributes: sleep efficiency, sleep latency, sleep duration, and wake after sleep onset (Phillips et al., 2020). Sleep quality is influenced by the balance of body's internal sleep-wake cycle. A sleep drive, known as the homeostatic sleep drive, is generated during the day and increases the need for sleep. As the need for sleep accumulates, the urge to sleep becomes stronger and sleep quality can improve as body seeks to restore balance (Deboer, 2018). Cognitive-behavioral theory states that thoughts, beliefs, and behaviors also play a significant role in sleep quality. This theory posits that distorted or negative thoughts about sleep, known as sleep-related cognitions, can lead to insomnia and poor sleep quality (Brooks et al., 2021; Gorgoni et al., 2021).

The underlying factors and causes of sleep quality can be multifaceted. Sleep disturbances can significantly affect sleep quality. These disturbances can disrupt the natural structure of sleep and lead to sleep fragmentation, inadequate sleep efficiency, and reduced overall sleep quality (Jha, 2023). Nevertheless, various factors can directly and indirectly affect sleep quality, one of which is acceptance. Acceptance refers to an individual's willingness to experience and accept their thoughts, emotions, and feelings without judging or attempting to control or change them (Herbert et al., 2009). Acceptance and commitment theory emphasizes acceptance as a key component and highlights that mental suffering results from attempts to control or avoid unwanted thoughts, emotions, and feelings (Li et al., 2022). This theory suggests that acceptance, along with mindfulness and value-based action, helps individuals develop psychological flexibility and effectively engage in meaningful behaviors, even in the presence of discomfort (Kiken et al., 2017). Regarding sleep, acceptance can play a role in the way pregnant women perceive and react to sleep-related experiences. A higher level of acceptance can help pregnant women approach problems with an open mind and without judgment. By accepting these experiences, rather than resisting or fighting them, pregnant women may reduce mental resistance and discomfort which can thereby help to improve sleep quality (Sun et al., 2023). In this regard, Tao et al. (2023) noted a significant and negative relationship between self-acceptance and social support with the level of insomnia in patients. Emad et al. (2016) reported a positive and significant relationship between mindfulness and acceptance.

Psychological flexibility is another important protective factor, besides acceptance, for pregnant women's sleep quality. Psychological flexibility is defined as the ability to freely alter cognitive sets to perceive or respond to the external environment in various ways, including thinking about multiple solutions to a problem and freely shifting between different knowledge domains to achieve a certain goal (Dennis & Vander Wal, 2010). Psychological flexibility consists of two components: problem-solving processing and perception of controllability. Problem-solving processing refers to a process by which an individual obtains effective and efficient solutions to various problems and challenges by using various skills and strategies. Perception of controllability refers to an individual's perception of their power and ability to control surrounding events and incidents (Peltz et al., 2020). Psychological flexibility involves recognizing and distancing oneself from futile thoughts (Tyndall et al., 2020). It does not entail freedom from stress or negative emotions; rather, it involves responding to these experiences in ways that facilitate ongoing growth and a

meaningful life. It is considered a dynamic process which enables individuals to respond effectively to changing life conditions (Ramaci et al., 2019). It can help pregnant women manage stress more effectively. With greater psychological flexibility, pregnant women can regulate their emotions, reduce stress, and improve their ability to relax, which in turn leads to better sleep (Felder et al., 2018). In this regard, Ye et al. (2023) reported a significant relationship between poor sleep quality and psychological inflexibility in adolescents. Peltz et al. (2020) found that higher levels of stress and inflexibility were associated with lower sleep quality.

Resilience is another construct that plays a role in the sleep quality of pregnant women. Resilience refers to an individual's ability to adapt to, overcome, and even be strengthened by adversity or grinding pressures. This trait is supported by the individual's internal ability, social skills, and interaction with the environment; and it is manifested as a positive trait (Connor & Davidson, 2003).

Resilience includes various dimensions such as personal competence, trust in personal instincts, positive acceptance of changes and secure relationships, control, and spiritual influences (Pascal et al., 2023). In the face of life's inevitable challenges, resilient individuals demonstrate a unique ability to overcome difficulties, learn from failures, and emerge stronger (Jemere et al., 2021). This dynamic quality encompasses a range of psychological traits such as adaptability, optimism, and effective coping mechanisms. Resilience is an innate trait in some individuals, and also a skill that can be enhanced and developed over time (Kuldas & Foody, 2022). Resilience may also affect the understanding and interpretation of sleep disturbances. Resilient pregnant women may adopt a more positive outlook and interpret sleep disturbances as temporary and controllable, which can reduce the psychological discomfort often associated with poor sleep. This positive mindset can improve sleep quality and overall well-being during pregnancy (Jemere et al., 2021). In this regard, Xie et al. (2023) pinpointed a direct and positive effect of psychological resilience on students' sleep quality. Zhang et al. (2024) showed that mindfulness had a direct and positive effect on resilience in both genders. Lenzo et al. (2022) reported an inverse correlation between resilience and sleep quality measured across two waves of COVID-19 and also found that resilience could predict sleep quality.

A review of literature indicates that a direct relationship among acceptance, psychological flexibility, and resilience with sleep quality has been pointed out in previous studies; however, the examination of indirect relationships of these variables in relation to sleep quality is overlooked in this context and can be considered as a significant research gap. Consequently, the present study examined the mediating role of mindfulness in the relationship between the variables of acceptance, psychological flexibility, and resilience with sleep quality. According to Kabat-Zinn (2015), mindfulness is defined as paying attention to present-moment experiences with an attitude of acceptance and without reaction and judgment. Mindfulness includes the components of observation, description, conscious action, not judging internal experience, and not reacting to internal experience (Teoh and Wong, 2023). Mindfulness is a way to deal with the constant stream of thoughts, worries, and distractions that can lead to stress, anxiety, and dissatisfaction (Wu et al., 2023). Mindfulness can play a significant role in improving sleep quality in pregnant women. Through mindfulness, expectant mothers can develop greater awareness of their thoughts, emotions, and physical sensations. This enhanced awareness allows them to observe and acknowledge sleep disturbances without judgment, and it reduces the emotional discomfort that often accompanies poor sleep (Chen et al., 2020). In this regard, Teoh and Wong (2023) found that mindfulness is associated with lower levels of sleep procrastination and, consequently, better sleep quality.

Wu et al. (2023) stated that mindfulness interventions have a significant effect on enhancing sleep quality. Despite the substantial importance of sleep quality for the performance and well-being of pregnant women, research on the psychological factors affecting it is scarce. In particular, a review of the literature reveals a significant research gap concerning the mediating role of mindfulness.

Therefore, this study aims to fill this research gap and answer the question of whether acceptance, psychological flexibility, and resilience mediated by mindfulness affect the sleep quality of pregnant women.

Materials and Methods

In terms of purpose, this is a fundamental study; and methodologically, this is a descriptive-correlational study that utilized structural equation modeling (SEM) for analysis. The statistical population consisted of all pregnant women referring to Al-Zahra Hospital in Tabriz in 2024. Based on Klein's guidelines, the sample included 300 individuals, of whom 13 were later excluded, selected using a convenience sampling method. Inclusion criteria were informed consent, literacy, and age range between 20 and 45 years, as per pregnancy records. Exclusion criteria were unwillingness to participate and failure to complete the questionnaires.

This study is registered with the Ethics Committee of Tabriz University of Medical Sciences under the ethics code IR.TBZMED.REC.1403.304. To adhere to ethical principles of research, informed consent was obtained from the participants in this study. Then, explanations were given regarding the principle of confidentiality and the anonymity of their data, and they were assured that the data obtained would be used solely for research purposes. Participants were also told that participation in the study was voluntary and that if they did not wish to continue cooperating, they could withdraw from the process at any stage of the study. Data analysis was performed using Pearson's correlation coefficient in SPSS version 26, and structural equation modeling (SEM) in LISREL version 8.8.

Instruments

The Pittsburgh Sleep Quality Index (PSQI): This questionnaire is developed to assess sleep quality over a one-month interval (Lotfi Saeidabad et al., 2022). It has 19 self-report items that belong to 7 categories, which are scored on a Likert scale from 0 to 3, including sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, daytime dysfunction, and subjective sleep quality. The total score on this scale ranges between 0 and 21, and higher scores indicate poorer sleep quality. A total score greater than 5 indicates that the participant suffers from sleep deprivation and has severe problems in at least 2 domains or moderate problems in more than 3 domains (Lotfi Saeidabad et al., 2022). Buysse et al. (1988) reported the internal consistency of the questionnaire using Cronbach's alpha as 0.83 (as cited in Lotfi Saeidabad et al., 2022). Ahmadi et al. (2010) obtained its reliability using Cronbach's alpha as 0.88 and its construct validity as 0.89 via factor analysis (as cited in Lotfi Saeidabad et al., 2022). In the present study, the reliability of the scale, using Cronbach's alpha, was 0.86 for the entire scale.

The Acceptance and Action Questionnaire – version 2 (AAQ-II): This questionnaire is developed by Bond et al. (2011) and is comprised of 7 items. The scoring of this scale ranges from 1 (never true) to 7 (always true). The minimum and maximum scores on this scale are 10 and 70. Higher scores on this scale indicate lower psychological flexibility and acceptance. The psychometric properties of the original version across six samples showed that this instrument has satisfactory reliability and construct validity, with an alpha coefficient of 0.84 and test-retest reliability of 0.81 and 0.79, respectively, over a 3 to 12 months period (Berta-Otero et al., 2023). According to Imani (2016), in order to determine the convergent validity of AAQ-II, its correlation with the scores of the depression, anxiety, and stress scales was calculated since numerous studies have observed a positive relationship between experiential avoidance, psychological flexibility, and acceptance. The results showed that the validity coefficients were significant at a level less than 0.01 which indicates adequate validity of the scale. Furthermore, the reliability of the scale using Cronbach's alpha was 0.75 (Sotoudeh, 2020). In the present study, the reliability of the scale, using Cronbach's alpha, was 0.80 for the entire scale.

The Psychological Flexibility Questionnaire (PFQ): This scale was designed by Ben-Itzhak et al. (2014). The scale consists of 20 items and 5 subscales. The subscales include positive interpretation

of change (5 items), defining oneself as a flexible person (5 items), identifying oneself as an open and creative person (3 items), interpreting reality as dynamic and changeable (4 items), and interpreting reality as multidimensional (3 items). The questionnaire is scored based on a six-point Likert scale from 1 (not at all) to 6 (very much). The total score on this scale ranges from 20 to 120, and higher scores indicate greater flexibility (Safarzaei et al., 2020). Ben-Itzhak and colleagues examined the construct validity and convergent validity of the scale in a study. For construct validity, exploratory factor analysis with Varimax rotation was used, and the five questionnaire factors explained 66.8% of the total variance. For convergent validity, a positive correlation was found between the questionnaire and the openness scale and the self-efficacy scale (Ben-Itzhak et al., 2014). The reliability of the scale was also reported through Cronbach's alpha as 0.918. In a study, Safarzaei et al. (2020) examined the construct validity of the scale through exploratory factor analysis and confirmed its factor structure with a total variance of 58.8%. Also, the reliability of the scale using Cronbach's alpha was 0.89 for the entire scale and 0.82 for the component of positive interpretation of change, 0.79 for defining oneself as a flexible person, 0.80 for identifying oneself as an open and creative person, 0.84 for interpreting reality as dynamic and changeable, and 0.77 for interpreting reality as multidimensional (Safarzaei et al., 2020). In the present study, the reliability of the scale, using Cronbach's alpha, was 0.88 for the entire scale.

The Connor-Davidson Resilience Scale (CD-RISC): This questionnaire was developed by Connor and Davidson (2003) to measure the ability to cope with pressure and threat. It includes 25 items in 5 subscales: tenacity and competence (questions 10, 11, 12, 16, 17, 23, 24, and 25), trusting in one's instincts and tolerating negative affect (questions 6, 7, 14, 15, 18, 19, and 20), accepting of change and secure within relationships (questions 1, 2, 4, 5, and 8), control (13, 21, and 22) and spirituality (3 and 9). This questionnaire is scored on a Likert scale from 0 (not true at all) to 4 (true nearly all the time), and the total score ranges between 0 and 100 where higher scores indicate the subject's higher resilience. Connor and Davidson (2003) reported the Cronbach's alpha coefficient of the resilience scale as 0.89. Also, the reliability coefficient obtained from the test-retest method over a 4-week time interval was 0.87. This scale was validated in Iran by Keyhani et al. (2015) and its construct validity was confirmed through exploratory factor analysis. The Cronbach's alpha was used to determine the reliability of the CD-RISC and its reliability coefficient was reported as 0.89 (Keyhani et al., 2015). In the present study, the reliability of the scale, using Cronbach's alpha, was 0.83 for the entire scale.

The Five Facet Mindfulness Questionnaire (FFMQ): This is a 39-item self-report scale developed by Baer et al. (2006). This questionnaire measures five components of mindfulness, including observing (8 items), describing (8 items), acting with awareness (8 items), nonjudging of inner experience (8 items), and nonreactivity to inner experience (7 items), based on a five-point Likert scale from 1 (never or rarely true) to 5 (very often or always true). The total score of this scale ranges between 39 and 195, and higher scores indicate higher mindfulness (Tamannaefar et al., 2016). Results showed that the internal consistency of the components was desirable, and the alpha coefficient ranged from 0.75 (in the nonreactivity component) to 0.91 (in the describing component). The correlation between the components was moderate and significant in all cases, ranging from 0.15 to 0.34 (Neuser, 2010). Also, in a study conducted to examine the validation and reliability of this questionnaire in Iran, its test-retest correlation coefficients in the Iranian sample were reported to be between 0.57 (nonjudging component) and 0.84 (observing component). Also, the alpha coefficient was obtained at an acceptable level between 0.55 for the nonreactivity component and 0.83 for the describing component (Tamannaefar et al., 2016). In the present study, the reliability of the scale, using Cronbach's alpha, was 0.78 for the entire scale.

Findings

In this study, 300 participants were initially selected. After excluding 13 individuals due to Mahalanobis distance criteria, the final sample consisted of 287 pregnant women. The mean age and standard deviation of the women's age were 32.42 and 7.60, respectively.

Table 1. Descriptive indices of study variables

Variable	Dimensions	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
Acceptance	AAQ1	4	28	15.36	6.09	0.171	-0.996
	AAQ2	3	21	11.69	4.85	0.083	-1.065
	AAQ3	3	21	11.23	4.61	0.121	-0.941
	Total score	14	65	38.28	13.18	0.059	-1.067
Psychological flexibility	Positive interpretation of change	13	58	34.71	10.65	0.290	-0.920
	Identifying oneself as an open and creative person	11	46	28.56	8.72	0.275	-0.983
	Interpreting reality as multidimensional	2	12	7.47	2.75	-0.079	-0.755
	Total score	39	114	70.75	19.62	0.443	-0.939
Resilience	Tenacity and competence	7	31	19.50	7.77	-0.107	-1.366
	Trusting in one's instincts and tolerating negative affect	5	28	17.21	7.33	-0.175	-1.371
	Accepting of change and secure within relationships	6	20	12.97	4.35	-0.037	-1.319
	Control	3	12	6.80	3.15	0.248	-1.375
	Spirituality	2	8	4.59	1.90	0.075	-1.226
	Total score	29	91	61.08	15.01	-0.111	-0.809
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Mindfulness	Observing	12	40	23.33	9.64	0.443	-1.260
	Describing	9	38	20.65	9.59	0.456	-1.216
	Acting with awareness	14	40	24.90	8.97	0.447	-1.281
	Nonjudging	8	37	19.83	9.46	0.371	-1.240
	Nonreactivity	7	33	16.87	9.05	0.501	-1.341
	Total score	53	182	105.60	34.71	0.529	-0.906
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Sleep quality	Subjective sleep quality	0	3	1.33	1.09	0.277	-1.228
	Sleep latency	0	3	1.67	0.96	-0.159	-0.953
	Sleep duration	0	3	0.95	0.63	0.201	0.034
	Habitual sleep efficiency	0	3	1.07	1.01	0.554	-0.919
	Sleep disturbances	0	24	11.42	6.28	0.043	-0.956
	Use of sleeping medication	0	3	1.70	1.09	-0.270	-1.243

	Daytime dysfunction	0	3	1.88	1.01	-0.428	-0.976
	Total score	3	38	19.97	8.12	0.073	-0.867

As presented in Table 1, the means for study variables were as follows: acceptance ($M = 38.28$), psychological flexibility ($M = 70.75$), resilience ($M = 61.08$), mindfulness ($M = 105.60$), and sleep quality ($M = 19.97$). Assessment of skewness and kurtosis indices also indicated that the data distribution in all variables was within the normal range of -2 to $+2$. The correlation matrix between the latent variables of the study is shown in Table 2; as it can be seen, all correlations are at an adequate level ($-0.403 \leq r \leq 0.203$).

Table 2. Correlation matrix of latent variables of the study

	Variables	1	2	3	4	5
1	Acceptance	1				
2	Psychological flexibility	0.157**	1			
3	Resilience	0.152**	0.151*	1		
4	Mindfulness	0.203**	0.169**	0.188**	1	
5	Sleep quality	-0.292**	-0.244**	-0.403**	-0.340**	1

** $P < 0.01$; * $P < 0.05$

Data presented in Table 2 show that there is a positive and significant correlation between acceptance, psychological flexibility, and resilience with mindfulness. There is a significant and negative correlation between acceptance, psychological flexibility, and resilience with sleep quality. Also, there is a significant and negative correlation between mindfulness and sleep quality. Examining the assumptions of structural equation modeling (SEM) is of great importance. A common method for assessing univariate normality is calculating the skewness and kurtosis of each observed variable. As shown in Table 1, the skewness of the observed variables ranged from -0.42 to 0.55 and their kurtosis ranged from -1.37 to 0.03 . These values confirm that the assumption of univariate normality is met. Multivariate normality was assessed by calculating the relative multivariate kurtosis index and yielded a value of 1.301 for the conceptual model, which is desirable. Examination of the correlation matrix between the observed variables indicated the absence of multicollinearity among them. The correlation coefficients for the hypothetical model of the present study fall in the range ($-0.32 \geq r \geq 0.59$). Correlation coefficients above 0.85 disturb proper estimation of the model due to multicollinearity issues. Therefore, the assumption of no significant multicollinearity was also met. In the present study, to identify univariate outliers from the box plot table and to identify multivariate outliers, Mahalanobis distances were calculated for each individual, as a result of which 13 participants were excluded from the analysis.

The structural model of the study was examined using LISREL version 8.8. After the adjustment of the structural equations, the desired model was evaluated using the maximum likelihood method and the model fit was assessed at two levels. The first level involved assessing the overall model fit using fit indices. The second level involved assessing the fit of the study structural model by examining the significance of the path coefficients (structural coefficients). At the first level, after conducting the analysis, the overall fit of the conceptual model was evaluated. The fit indices of the study conceptual model, reported in Table 3, indicate an optimal fit of the model. Therefore, the structural model that examines the mediating role of mindfulness in the relationship between the variables of acceptance, psychological flexibility, and resilience with sleep quality problems demonstrates a desirable fit with the empirical data.

Table 3. Fit indices of the study structural model

Fit index	Acceptable range	Measured value
Chi-Square (χ^2)	-	211.98
Degrees of Freedom (DF)	-	179
Chi-Square to Degrees of Freedom Ratio	Lower than 5	1.18
Normed Fit Index (NFI)	Higher than 0.90	0.91
Comparative Fit Index (CFI)	Higher than 0.90	0.98
Incremental Fit Index (IFI)	Higher than 0.90	0.98
Goodness-of-Fit Index (GFI)	Higher than 0.90	0.93
Root Mean Square Error of Approximation (RMSEA)	Lower than 0.08	0.025
Standardized Root Mean Square Residual (SRMR)	Lower than 0.08	0.051

At the second level, subsequent to the initial analysis, the path coefficients of the model and the coefficients of determination for the endogenous variables were evaluated. Figure 1 and Figure 2 present the conceptual structural model featuring the standard coefficients.

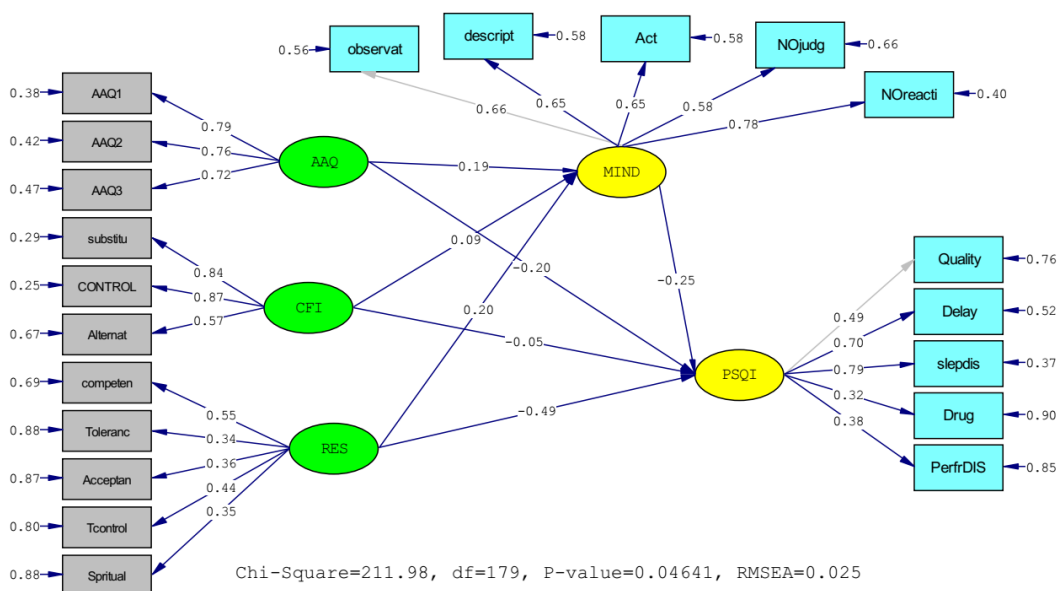


Figure 1. Conceptual model of the study along with the model's standard coefficients

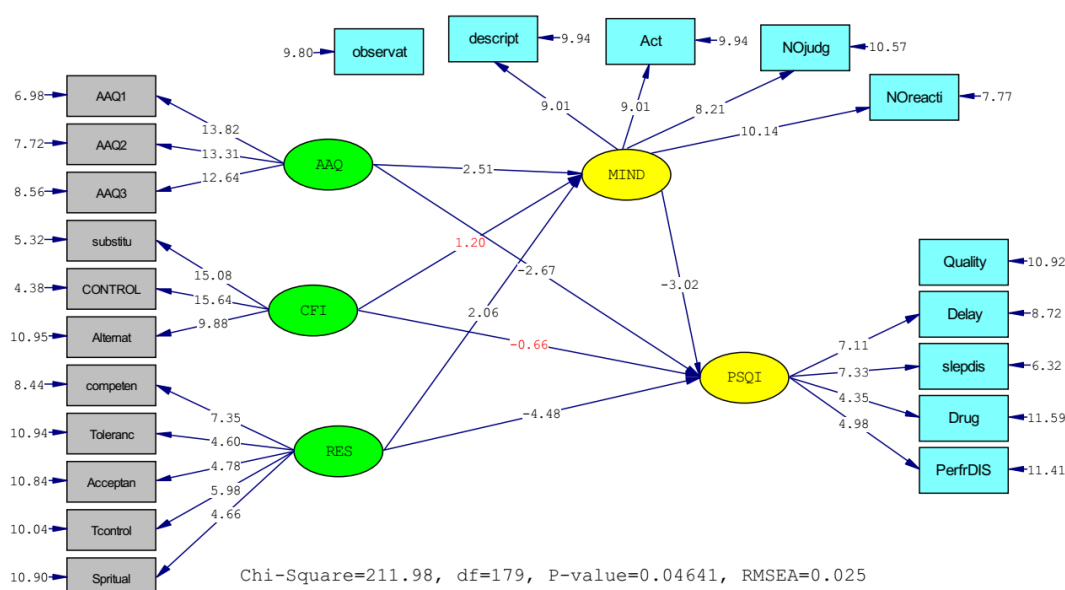


Figure 2. Conceptual model of the study along with critical t-values

The results presented in Figures 1 and 2 show that almost all of the model paths have significant coefficients (with exceptions of the paths from psychological flexibility to mindfulness and psychological flexibility to sleep quality). Model's coefficients of determination for the endogenous variables are also at a desirable level. Overall, these results indicate that the present model explains 50% of the variance in sleep quality. Furthermore, the independent variables explain 5% of the variance in BAS and 12% of the variance in mindfulness; therefore, the fit of the structural model is desirable. As shown in Figures 1 and 2, acceptance as an exogenous variable has a significant effect on mindfulness and sleep quality with standard coefficients of 0.19 (t-values = 2.51) and -0.20 (t-values = -2.67), respectively. Similarly, resilience as an exogenous variable has a significant effect on mindfulness and sleep quality with standard coefficients of 0.20 (t-values = 2.06) and -0.49 (t-values = -4.48), respectively. In contrast, psychological flexibility as an exogenous variable has no significant effect on mindfulness and sleep quality variables with standard coefficients of 0.09 (t-values = 1.20) and -0.05 (t-values = -0.66), respectively. Finally, the mediating variable of mindfulness has a significant effect on the ultimate dependent variable of sleep quality with a standard coefficient of -0.25 (t-values = -3.02).

Table 4. Results of the bootstrap test for mediation effects

Independent variable	Mediating variable	Dependent variable	Standard coefficient	Standard error	95% Lower bound	95% Upper bound	Significance level
Acceptance	Mindfulness	Sleep quality	-0.047	0.015	-0.042	-0.009	0.021
Psychological flexibility	Mindfulness	Sleep quality	-0.022	0.029	-0.065	0.121	0.085
Resilience	Mindfulness	Sleep quality	-0.050	0.063	-0.103	-0.013	0.014

As shown in Table 4, the path from acceptance to sleep quality mediated by mindfulness with a standard coefficient of -0.047 is significant at the $p < 0.05$ level. Thus, based on the results obtained

from the bootstrap test, acceptance mediated by mindfulness has a significant effect on sleep quality. Similarly, the path of resilience to sleep quality mediated by mindfulness with standardized coefficient of -0.050 is significant at the $p < 0.05$ level. Accordingly, the results obtained from the bootstrap test confirm that resilience mediated by mindfulness has a significant effect on sleep quality. On the other hand, the path from psychological flexibility to sleep quality mediated by mindfulness with a standard coefficient of -0.022 is not significant at the $p < 0.05$ level. Therefore, according to the results obtained from the bootstrap test, psychological flexibility mediated by mindfulness does not have a significant effect on sleep quality.

Discussion and Conclusion

This study aimed to determine the role of acceptance, psychological flexibility, and resilience in the sleep quality of pregnant women, with mindfulness as a mediating variable. The study findings revealed that the path of acceptance to sleep quality problems is significant through the mediation of mindfulness. This finding suggests that acceptance with mediation of mindfulness has a negative and significant effect on sleep quality problems. In other words, an increase in acceptance leads to increased mindfulness, which in turn results in reduced sleep disturbance scores (better sleep quality) in pregnant women. Conversely, a decrease in acceptance leads to reduced mindfulness and thereby increases sleep disturbance scores (worse sleep quality) in pregnant women. This finding is consistent with the research by Teoh and Wong (2023), Wu et al. (2023), Zakiei et al. (2022), Fabbri et al. (2022), and Emad et al. (2016).

To explain this finding, it can be stated that the relationship between acceptance, mindfulness, and sleep quality in pregnant women is complex and interconnected. A pregnant woman's level of acceptance of the challenges and changes that come with pregnancy plays a critical role in shaping her mental and emotional responses. When a woman exhibits acceptance, she is more likely to approach stressors with a more positive outlook, thereby enhancing her resilience and adaptability in the face of difficulties (Liu et al., 2022). Furthermore, mindfulness acts as a bridge between acceptance and sleep quality. By developing mindfulness, pregnant women can cultivate greater non-judgmental awareness of their thoughts, emotions, and physical sensations. This practice enables them to more easily navigate stressful situations, manage anxiety, and reduce the impact of negative emotions on their well-being (Siew, 2023). The indirect effect of acceptance on sleep quality mediated by mindfulness can be understood as a sequential process. When faced with challenges, a pregnant woman with acceptance is more likely to employ mindful coping mechanisms. By being present in the moment and acknowledging their thoughts and emotions without feeling overwhelmed, individuals can regulate their stress and anxiety levels more effectively. Consequently, this mindful approach fosters improved sleep patterns. Reducing stress and anxiety together with a positive and accepting mindset create an ideal condition conducive to restful sleep. By interrupting the cycle of rumination and worry through mindfulness, pregnant women can experience higher quality sleep, which is necessary for their well-being and fetal growth (Gan et al., 2023).

The study findings revealed that the path of psychological flexibility to sleep quality mediated by mindfulness was not significant. This finding indicates that psychological flexibility does not have a significant indirect effect on sleep quality through the mediation of mindfulness. This finding is inconsistent with the research by Ye et al. (2023), Martínez-Rubio et al. (2021), Peltz et al. (2020), Mak et al. (2021), and Yadegari et al. (2021).

To explain this finding, it can be stated that psychological flexibility is a concept that includes the ability to adapt to different situations, regulate emotions, and act in line with personal values. Although psychological flexibility can have significant effects on psychological well-being, it may not always directly or indirectly affect women's sleep quality through mindfulness for a number of reasons. Psychological flexibility may not directly affect sleep quality as sleep is influenced by a range of factors beyond emotional regulation and adaptability. Sleep quality can be influenced by

physiological factors, environmental conditions, hormonal changes, and other individual variables that may not be directly linked to psychological flexibility (Orouji et al., 2022). While mindfulness can enhance emotional regulation and stress management, it may not consistently mediate the relationship between psychological flexibility and sleep quality. The effects of psychological flexibility on sleep quality may operate through a variety of mechanisms that are not necessarily dependent on mindfulness processes (Talley et al., 2020).

The study findings revealed that the path of resilience to sleep quality is significant through the mediation of mindfulness. This finding indicates that resilience mediated by mindfulness has a significant and negative effect on sleep quality. In other words, an increase in resilience leads to greater mindfulness, which results in lower sleep disturbance scores (better sleep quality) in pregnant women. Also, a decrease in resilience leads to reduced mindfulness and thereby increases sleep disturbance scores (worse sleep quality) in pregnant women. This finding is consistent with research by Lenzo et al. (2022), Teoh and Wong (2023), Xie et al. (2023), Zhang et al. (2024), Parizadeh et al. (2021), and Arpaci and Gundogan (2022).

To explain this finding, it can be stated that resilience mediated by mindfulness has an indirect effect on the sleep quality of pregnant women as resilience helps individuals cope with stress and adversity, and mindfulness acts as a mechanism that enhances the positive effects of resilience on sleep (Jiang et al., 2024). Resilience refers to a person's capacity to bounce back from adversity or adapt to challenging conditions. During pregnancy, women often experience physical discomfort, hormonal changes, emotional stress, and anxiety. Resilience enables them to more effectively manage and recover from these stressors and prevents the negative emotional and psychological impacts that commonly disrupt sleep. Resilient individuals typically experience less distress in response to adversity as they have developed coping mechanisms (e.g., problem-solving and emotion regulation) that help them manage stress more efficiently. Consequently, this reduces the possibility of stress-related sleep disturbances (van der Zwan et al., 2017).

Mindfulness is the ability to be present in the moment and pay attention to thoughts, emotions, and feelings without judgment. Resilience helps to strengthen mindfulness as resilient individuals are better equipped to manage stress, making it easier for them to adopt and maintain a state of mindfulness. For example, resilient pregnant women may be more likely to employ mindfulness practices as a part of their coping strategies, which helps them remain calm and collected in stressful situations (Pidgeon & Keyes, 2014).

One limitation of the present study was the use of convenience sampling method which limits the generalizability of the results. To address this, future studies can employ random sampling method to increase the generalizability of the findings. A further limitation was the lack of differentiation between participants based on factors such as high-risk pregnancy status, gestational stage, and history of previous pregnancies and miscarriages, which may have affected the results. Consequently, it is suggested that future studies consider pregnancy risk level and obstetric history. Based on the findings, it is suggested that educational programs focusing on acceptance, resilience, mindfulness, and their impact on sleep quality be offered at local mental health centers for pregnant women to enhance individual well-being and social functioning.

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