RELATIONSHIP BETWEEN SLEEP AND MENTAL HEALTH AMONG PREGNANT WOMEN IN SAUDI ARABIA

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ABSTRACT

Anxiety and depression are caused by altered sleep patterns during pregnancy. Previous reports demonstrated an association between poor sleep quality and an enhanced risk of adverse birth outcomes. The purpose of this study was to ascertain the connection between sleep and mental health in Saudi Arabian expectant mothers. Between December 2020 and December 2022, pregnant women at Saudi Arabian healthcare facilities participated in the current cross-sectional study. Convenience sampling was used to select women with singleton pregnancies from selected health centers. All the data were collected by using validated questionnaires. Utilizing the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Insomnia Severity Index (ISI), sleep outcomes were evaluated. The Beck Depression Inventory short form (BDI-II SF), the State-trait Anxiety Inventory (STAI), the exhaustion Severity Scale (FSS), and the Perceived Stress Scale (PSS) were used to evaluate mental health and exhaustion. 110 people in total participated in the study. Participants' average ages ranged from 29.22±10.11 years. The mean stress, fatigue, insomnia, daytime sleepiness, sleep quality, anxiety, and depression were 29.10±20.08, 4.45±3.77, 24.62±8.90, 15.04±10.15, 6.73±3.29, 44.61±28.07 and 17.90±11.70 respectively. Stress, poor sleep, exhaustion, and mental health measures (depression and anxiety) were shown to be significantly correlated with one another (p < 0.001) in pregnant women. According to regression models, insomnia and exhaustion were very significant predictors of anxiety and sadness. According to the study's findings, pregnant women who have poor sleep quality are more likely to have mental health issues, including anxiety and despair.

Introduction

Globally, sleep, mental health, and substance use disorders contribute to 14% of the disease burden in males and females [1]. Females are more prone to stress owing to family responsibilities and pregnancy during their life than males [2]. Pregnancy is a sensitive period in female life reflecting an enhanced risk of poor sleep, psychological oscillations, and poor oral hygiene [3]. Stress and psychological symptoms are a very prevalent concern among females during pregnancy that cause dreadful birth outcomes [4-6]. According to epidemiological studies, psychological alterations during pregnancy in developed and developing countries were 10%-15% and 33% respectively [7-10]. Studies have demonstrated an association between psychological alterations during pregnancy and their effect on overall health, birth outcomes, and all aspects of oral health during pregnancy [11-13]. Approximately 30% of pregnant women are affected by periodontal disorders [14]. Pregnant women frequently experience anxiety, which increases the risk of postpartum depression in the mother while also causing behavioral and emotional changes in the unborn child [15]. Antenatal anxiety is more likely to occur during pregnancy [16]. Evidence has shown that antenatal anxiety is 2-3 times more commonly occurring in pregnant women than antenatal depression [16, 17]. Poor sleep is also a predominant contributing factor during pregnancy among females due to psychological and physiological changes [18, 19]. In pregnant women, hormonal changes such as increased plasma cortisol, progesterone, and estrogen cause sleep patterns to change [20]. Researchers have demonstrated a significant association between alteration in sleep patterns and cardiovascular disorders, depression, diabetes, and hypertension [21]. Sleep problems affect over 49% of expectant mothers [22]. During the third trimester, sleep difficulties affect pregnant women in 75.2% of instances, whereas they affect them in 63% of cases and in 48% of cases, respectively [23]. Numerous studies have demonstrated that sleep

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deprivation is connected to a number of pregnancy-related problems, including hypertension, gestational diabetes, preterm labor, retarded fetal growth, stillbirth, and negative effects on neurodevelopment [24-28].

Considering the impact of sleep quality and psychological symptoms especially during pregnancy on pregnant women, it is critical to assess how sleep loss and psychological changes during pregnancy affect a woman's health [29]. Hence, we hypothesized that sleep outcomes, stress, and fatigue would be prevalent among pregnant women and linked to more severe mental health issues [30]. In this investigation, we looked at the prevalence and potential links between pregnant women's mental health and sleep quality.

Participants

This research was a component of a wider cross-sectional investigation designed to evaluate Saudi Arabia's general populace. The project was approved by an ethical committee from a local institute. The survey was sent electronically, and participants of at least 18 years of age were allowed to participate after consenting online.

Materials and Methods

Materials

The survey consisted of a wide variety of validated questionnaires that were available in both Arabic and English and it would take about 20 minutes to be completed. The Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Insomnia Severity Index (ISI) were used to evaluate the results of sleep. The Perceived Stress Scale (PSS), State-trait Anxiety Inventory (STAI), exhaustion Severity Scale (FSS), and Beck Depression Inventory Short Form (BDI-II SF) were used to evaluate mental health and exhaustion [31-37].

Procedure

The survey was distributed across social media platforms and was available between December 2020 and December 2022. Participation was voluntary and anonymous. Microsoft Forms were used to collect responses from the participants.

Statistical Analyses

To analyze the data, JASP software for statistical analysis was used (Mac version). The data were normally distributed. To study the connection between sleep and mental health, correlation was utilized. Then, to examine predictors for mental health, linear regression was the test of choice.

Results and Discussion

The sample size for the current study was 110 participants. The mean age was 29.22 (SD = 10.11) years. No significance was detected in correlations between age and sleep and mental health outcomes. Participants reported a mean stress level of 29.10 (20.08) suggesting a high perceived stress level, mean fatigue = 4.45 (3.77) suggesting a significant fatigue level, mean insomnia = 24.62 (8.90) suggesting severe clinical levels of insomnia, mean daytime sleepiness = 15.04 (10.15) suggesting moderate sleepiness level, mean sleep quality = 6.73 (3.29) suggesting poor sleep quality, mean anxiety = 44.61 (28.07) suggesting a clinical level of anxiety, and mean depression = 17.90 (11.70) suggesting severe depression level.

Table 1 displays the relationship between depression and anxiety measures and other research factors. Depression and stress, exhaustion, insomnia, and sleep quality were all shown to have substantial positive relationships (all $p < .001$). Additionally, medium-sized significant positive associations between depression and daytime drowsiness were discovered (all $p < .05$). A significant positive association between anxiety and stress, tiredness, insomnia, daytime drowsiness, and sleep quality was also found ($p < .001$). In general, pregnant women who score higher on various sleep-related difficulties also score higher on melancholy and anxiety [38].

Table 1. Correlations between mental health and sleep variables

Variable	Depression	Anxiety
Stress	.33**	.31**
Fatigue	.49**	.46**
Insomnia	.54**	.53**
Daytime sleepiness	.28*	.34**
Sleep Quality	.49**	.46**

Note. *$p < .05$, **$p < .001$

Based on all factors with moderate to high associations, a stepwise linear regression was conducted to predict depression and anxiety **(Table 2)**. The variables tiredness and sleeplessness were included in a significant regression model that predicted depression ($F(2, 101) = 37.59$, $p < .001$), accounting for 58% of the variation in depression. The following model equation

$(F_{(2, 102)} = 28.89, p < .001)$, which accounts for 44% of the variation in anxiety, predicted anxiety by sleeplessness and tiredness.

Table 2. Stepwise linear regression predictors of depression and anxiety

Variable	B	SE B	β
Depression			
Constant	-16.57		
Insomnia	.28	2.83	
Fatigue	.40	<.001	.24*
Adjusted R^2	.58	<.001	.31**
F	37.59**		
Anxiety			
Constant	10.46	4.49	
Insomnia	.84	<.001	
Fatigue	.33	<.001	.28*
Adjusted R^2	.44		.30**
F	28.89**		

Note. *$p < .05$, **$p < .001$, B = unstandardized regression coefficient, SE = standard error, β = standardized regression coefficient.

The objective of the current study was to evaluate pregnant women's sleep and mental health and look into any potential connections between the two. With a mean age of 29.22±10.11 years, a practical sample of 110 pregnant Saudi Arabian women took part in the study. The perceived stress levels among the participants were high or extremely high, and they also experienced tiredness, insomnia, daytime drowsiness, poor sleep quality, anxiety, and depression. Participants' levels of stress, exhaustion, insomnia, daytime drowsiness, and sleep quality were all substantially linked with their levels of depression and anxiety [39]. A stepwise linear regression analysis was used to evaluate participant determinants of mental health (depression and anxiety). The present sample of pregnant women's sadness and anxiety were both significantly predicted by both sleeplessness and exhaustion, according to the model.

Insomnia and mental health among pregnant women are significantly positively correlated, according to the current study [40]. An important positive association between sleeplessness and sadness and anxiety was shown in recent research [16]. They also showed that depression was more frequent with insomnia. It has been shown that insomnia during pregnancy is significantly related to postpartum anxiety and depression [41]. A meta-analysis that included nine studies found a significant positive correlation between insomnia during pregnancy and depression and anxiety [42]. Cohort studies demonstrated a positive relationship between insomnia during pregnancy and anxiety and depression [43, 44].

Insomnia and mental health (depression and anxiety) in pregnant women have been strongly linked, according to another study [45]. According to research conducted by Asltoghiria *et al*. [46], 56.2% of pregnant women experience sadness and anxiety as a result of insomnia. According to Field *et al*. [47], pregnant women who have sleeplessness are more likely to experience sadness and anxiety.

In the current study, it was shown that pregnant women's exhaustion and mental health had a substantial beneficial association. One study showed that fatigue prevalence among pregnant women was 64% [47]. Pregnant women's exhaustion and mental health were found to be related in several lines of research [48-53]. Pregnant women's exhaustion was found to be positively correlated with both anxiety and depression, according to Chou *et al*. [49]. A recent study also showed a positive link between fatigue and mental health among pregnant women [49].

The current study also showed that stress, sadness, and anxiety are significantly correlated with pregnancy among women. Stress and pregnant women's mental health are related, according to research by Corwin *et al*. [54]. Stress, anxiety, depression, and other mental health issues are significantly correlated, according to a recent study [54].

Age, sleep duration, and outcomes for pregnant women's mental health were all shown to be non-significantly correlated in the current study. Khouj *et al*. [55] showed a non-significant relationship between age and stress, sleep, anxiety, and depression. According to one study, there is no statistically significant link between pregnancy-related stress, age, and mental health [55]. Age, sleep quality, and outcomes for pregnant women's mental health were all shown to be unrelated in research conducted in China [56]. These results support the inclusion of prenatal depression as well as other mental health problems, including anxiety, in the screening for sleep disorders and mental health in pregnant women [57]. We will better comprehend the connection between sleep difficulties and mental health problems by doing this. The following are the study's limitations: (i) absence of a follow-up, (ii) inability to determine a causal association between poor sleep and mental health issues, and (iii) the existing data's lack of some crucial details, such as (trimester, first pregnancy or not, etc.).

Conclusion

According to the study's findings, pregnant women who have poor sleep quality are more likely to have mental health issues, including anxiety and despair. We also observed a significant association between stress, fatigue, sleep disorders, and mental health problems. Age, sleep duration, and results for pregnant women's mental health were shown to be non-significantly

correlated. The results of this study need to be confirmed by additional research in order to establish a causal link between sleep disturbances, stress, exhaustion, anxiety, and depression using a multi-centric study.

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