Brief Report

Association between Some Demographic and Fertility-related Characteristics and Sleep Quality among Women with Infertility: A Cross-sectional Study

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Abstract

Background: Infertility is associated with a considerable psychological and social burden that can negatively impact women's quality of life and sleep quality. The current study aimed to examine the association of sleep quality with some demographic and fertility-related characteristics among women with infertility.

Methods: A cross-sectional study was carried out in the fertility clinic of AL Kadhomiya Teaching Hospital from January to December 2024 in Baghdad, Iraq. In total, 273 women with infertility aged 20–49 years were recruited. Participants' sleep quality was assessed using the Pittsburgh Sleep Quality Index. Data analysis was done using descriptive statistics, chi-square test, and a binary logistic regression model through SPSS version 25.

Results: At least 193 participants (70.70%) said they slept poorly. In binary logistic regression analysis, age and sleep duration were predictors of poor sleep quality. Women aged 40–49 years had significantly higher odds of poor sleep quality compared with women 20–29 years old (OR=2.53, 95% CI: 1.13–5.67, P=0.024). Women who slept 6-7 hours per night had reduced risks of poor sleep quality compared to those who slept less than 4 hours (OR=0.24, 95% CI: 0.13–0.46, P<0.001). Poor sleep quality was not associated with body mass index and the duration of trying to conceive (P>0.05).

Conclusions: Poor sleep was common among women with infertility. Older age and shorter sleep duration were found to be associated with poor sleep quality. Attention to these variables may help identify women with infertility at risk for sleep quality disturbances and design a program to manage their problem.

Keywords: Infertility; Sleep disorders; Sleep quality; Women

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Introduction

Infertility is a complex disorder affecting millions of couples worldwide that typically brings physical as well as psychological suffering.[1] The prevalence has been suggested to be 8–12% of couples in the reproductive age group worldwide. It is more common in areas like the Middle East and South Asia, where there are disparities in culture and health care.[2] Endocrine disorders, reproductive system diseases and environmental pollutants are considered as the causes of reproductive health problems.[3, 4] Sleep quality is increasingly considered to have consequences for reproductive health. Getting the right amount of sleep is important for general health and a healthy reproductive endocrine system. Lack of sleep or poor-quality sleep can lead to disturbances in the circadian rhythm, the hypothalamic-pituitary-ovarian axis, and melatonin levels that are critical for ovulation/conception.[5] Recent studies have linked sleep disturbances with reproductive irregularities including polycystic ovarian syndrome, endometriosis, and suboptimal assisted reproductive technology results.[5, 6] Overweight and obesity have been linked to sleep disturbances, in particular obstructive sleep apnoea and reproductive problems.[6] Women with overweight suffer from more sleep disturbances, thus aggravating metabolic disarray, stress, and hormonal alterations which make it difficult for them to conceive.[7] Long-term infertility can have serious effects on mental health, including anxiety, despair, and emotional upheaval. These can make it hard to sleep, which can make it harder to get pregnant naturally and make fertility treatments less successful.[7] Age is a big factor; younger women may sleep better because they are less stressed or have less health problems, while older women may have more emotional stress and sleep problems since their fertility is declining with age.[7] The amount of time spent attempting to get pregnant may also affect how well you sleep. Women who are trying to get pregnant for a long time may feel more anxious, depressed, and tired, all of which are linked to not getting enough sleep.[8]

While there is an increasing evidence on the importance of sleep quality in reproductive health, little is known about how clinical and demographic factors interact with and influence sleep quality among women with infertility, especially in a Middle Eastern country. Previous studies had focused on psychosocial dimensions or specific sex.[9, 10] Moreover, the possibility that women with infertility in Iraq face unique cultural, social, and health-related stressors that might be associated with the fertility, sleep outcomes cannot be ruled out.[11] Therefore, it is important to investigate these association in this specific population in order to fill the existing knowledge gap and provide data for population-specific clinical and psychosocial efforts. This study aimed to look at the association between some demographic and fertility-related factors and sleep quality in women with infertility.

Materials and Methods

This cross-sectional study was conducted in Al-Kadhomiya teaching hospital period from January 2024 to December 2024. A total of 273 women with infertility attending fertility clinics were recruited through convenience sampling.

The sample size was calculated for the primary outcome, which was the prevalence of poor sleep quality defined as Pittsburgh Sleep Quality Index (PSQI)>5. The formula used was $n=Z^2p(1-p)/d^2$, with Z=1.96 for 95% confidence, an expected prevalence of P=0.50 (chosen conservatively, within the reported range of 24–57%),[12] and a margin of error of d=0.06. This calculation yielded n≈267. The study actually enrolled 273 women. Inclusion criteria were Iraqi women aged 20–49 years with infertility, defined as failure to achieve a clinical pregnancy after 12 months of regular unprotected sexual intercourse. A fertility specialist confirmed the diagnosis from clinical assessment and medical records. The duration of trying to conceive was recorded and categorized as up to 12 months, 1–2 years, and >2 years, no previous history of psychiatric disorders by patient record, chronic illnesses by patient record, or those

on sleep medication. The self-reported sleep duration category of "more than 7 hours" was also excluded.

Some demographic and basic characteristics were considered, including: age, number of children, duration of trying to conceive (up to 12 months, 1–2 years, and more than 2 years), and body mass index (BMI). BMI was split into three groups: normal (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obese (≥30.0 kg/m²).

The Arabic version of the Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. PSQI is a widely used and validated tool for assessing the quality of subjective sleep over the last month. The PSQI consists of 19 self-reported items categorized into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction.[13] Component scores range from 0 to 3 and the global score from 0 to 21, with scores >5 indicating poor sleep quality. The Arabic PSQI has demonstrated good validity and reliability. It has demonstrated satisfactory internal consistency and construct validity in Arabic-speaking populations. Thus, it is considered a suitable tool for evaluating sleep quality in clinical and research settings. Poor sleepers were defined as those with a PSQI global score >5.[14]

Data were analyzed using SPSS version 25. Descriptive statistics were expressed in frequencies and percentages. The chi-square test was performed to evaluate the association between the categorical variables and sleep quality. Variables that showed potential association were entered into a binary logistic regression model. The results of the regression analysis were presented as odds ratios (OR) with 95% confidence intervals (CI). The model was tested for goodness of fit, and then the results were interpreted. Statistical significance was defined as P value<0.05.

The study protocol was reviewed and approved by the local Ethics Committee of Al-Kadhimiya Teaching Hospital, Baghdad, Iraq, with the code of 255. Written informed consent was obtained from all participants before enrolment. Anonymized data collection was used to ensure confidentiality. Participants were told they could withdraw from the study at any time without any effect on their medical care. The study was performed in accordance with the ethical principles of the Declaration of Helsinki.

Results

Most of the participants were aged 20–29 years, 119 (43.59%). The mean age of the participants was 31.6±7.7 years. Slightly more than half had no children, 139 (50.89%). Regarding sleep duration, 132(48.39%) patients slept <4 hours. Nearly half of the participants (130, 47.69%) had been attempting to conceive for up to 12 months. In terms of BMI, most women were obese 128 (46.92%) (Table 1). In this study, 193 (70.70%) and 80 (29.30%) individuals reported poor and good sleep quality, respectively.

Table 1: Distribution of the participants' basic characteristics

Variable	N (%)
Age (years)	
20–29	119 (43.59)
30–39	99 (36.29)
40–49	55 (20.12)
Have children	
No	139 (50.89)
Yes	134 (49.11)
Sleep duration (hours)	
<4	132 (48.39)
4–5	65 (23.79)
6–7	76 (27.82)
Duration trying to conceive	
Up to 12 months	130 (47.69)
1–2 years	76 (27.79)
>2 years	67 (24.52)
Body mass index (kg/m²)	
Normal	84 (30.79)
Overweight	61 (22.29)
Obese	128 (46.92)

A significant association was observed between the age group and sleep quality (P=0.04), where poor sleep quality was most common among women aged 40–49 years.

Table 2: Association between some demographic/fertility-related variables and sleep quality

Variable	Sleep quality		
	Good N (%)	Poor N (%)	P value*
Age (years)			
20–29	43 (36.11)	76 (63.89)	
30–39	27 (27.29)	72 (72.71)	0.04
40–49	10 (18.19)	45 (81.81)	
Duration try to conceive			
up to 12 months	38 (29.19)	92 (70.81)	
1–2 years	25 (32.89)	51 (67.11)	0.60
>2 years	17 (25.39)	50 (74.61)	
Have children			
No	44 (31.69)	95 (68.31)	0.40
Yes	36 (26.89)	98 (73.11)	
Body Mass Index (kg/m^2)			
Normal	24 (28.59)	60 (71.41)	
Overweight	17 (27.89)	44 (72.11)	0.90
Obese	39 (30.49)	89 (69.51)	
Sleep duration (Hours)			
<4	27 (20.49)	105 (79.51)	
4–5	16 (24.59)	49 (75.41)	<0.001
6–7	37 (48.69)	39 (51.31)	

*Chi-square test

Table 3: Binary Logistic Regression Analysis of the Factors Associated with Poor Sleep Quality among Women with Infertility

Variable	B	OR (95% CI)	P value
Age group (years)			
20–29 (Ref)	-	-	-
30–39	0.48	1.62 (0.87–3.00)	0.126
40–49	0.92	2.53 (1.13–5.67)	0.024
Duration try to conceive			
up to 12 months (Ref)	-	-	-
1–2 years	-0.08	0.92 (0.48–1.78)	0.811
>2 years	0.44	1.56 (0.76–3.17)	0.224
Sleep duration (hours)			
<4 (Ref)	-	-	-
4–5	-0.31	0.73 (0.35–1.50)	0.390
6–7	-1.41	0.24 (0.13–0.46)	<0.001
Body mass index (kg/m^2)			
Normal (Ref)	-	-	-
Obese	-0.13	0.87 (0.46–1.66)	0.677
Overweight	-0.20	0.81 (0.37–1.78)	0.604

No significant association was observed between duration of trying to conceive and sleep quality (P=0.60). Having children and BMI showed no association with sleep quality (P>0.05). There was an association between self-reported sleep duration and sleep quality (P<0.001). Women sleeping fewer than 4 hours had a poor sleep quality (Table 2).

Binary logistic regression analysis showed that women aged 40–49 years were significantly more likely to have poor sleep quality (OR=2.53, 95% CI=1.13–5.67, P=0.024). Duration of trying to conceive and BMI were not significantly associated with sleep quality (P>0.05). Compared with women sleeping <4 h per night, those sleeping

6–7 hours had significantly lower odds of poor sleep quality (OR=0.24, 95% CI=0.13–0.46, P<0.001), suggesting a protective effect of longer sleep duration (Table 3).

Discussion

Our results reveal how the vast majority of individuals in this population reported poor sleep quality. Age was identified as a predictor of poor sleep quality in the present study. The present result agrees with previous studies which have shown that sleep quality decreases with age due to hormonal changes, psychological stress, and age-related changes in sleep architecture. Infertility in older women can lead to more emotional distress about their decreased ability to reproduce, and this can exacerbate sleep problems.[15-17]

However, there was no significant association between duration of trying to conceive and poor sleep quality. Women with a trying duration >2 years had a numerically higher prevalence of poor sleep quality. This finding indicates that the time alone may not be an independent determinant of sleep quality and that other psychosocial and clinical factors may have a more important role in sleep disturbances in women with infertility. Similar findings have been reported in studies where it has been found that psychological burden rather than the duration of infertility itself may be more closely associated with sleep quality.[9, 18, 19]

In this study, we did not find an association between sleep quality and BMI. Although almost half of the participants were obese, no difference in sleep quality was observed between the BMI groups. This contrasts with other studies linking obesity to poor sleep due to comorbidities like obstructive sleep apnea.[7] However, our findings are consistent with the studies which suggested that among women with infertility, emotional and lifestyle factors might overshadow BMI's direct influence on sleep.[16] Also, another study concluded that sleep disruption among women seeking fertility care was more closely tied to psychological than physical factors.[19]

The present study found a relationship between sleep duration and sleep quality. Women with a sleep duration of 6-7 hours per night had better sleep quality than those with a shorter sleep duration. Previous studies have shown that women with infertility have impaired reproductive health, emotional disturbance, and increased psychological tension because of insufficient sleep. These findings suggest that sufficient sleep duration is essential for psychological well-being and better sleep quality.[20] In addition, the importance of sleep continuity and duration on hormonal and reproductive functions has been highlighted.[21] A related study demonstrated the association of proper sleep with mental resilience in patients with infertility.[22]

This study has some limitations. Sleep quality was assessed using self-report rather than objective measures such as actigraphy or polysomnography, thus possibly leading to reporting bias. The study was performed at a single center, which may limit the applicability to other populations. Finally, some demographic factors were considered, and psychological factors such as anxiety or sadness, and stress level were not assessed. Some potentially relevant clinical and socioeconomic variables such as the type of infertility (primary or secondary), education level, and socioeconomic status were not collected and, therefore, could not be assessed in the present study.

Conclusion

Poor sleep quality was very common among women with infertility. Older age and shorter sleep duration were associated with poor sleep quality. Attention to these variables may help identify women with infertility at risk for sleep quality disturbances and design a program to management of their problem.

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Authors' Contribution

The conceptualization and methodology were performed by AM. SA and AR. SA did the investigation and data collection. SR did formal analysis. All authors participated in the manuscript preparation, critically revised the final version of the manuscript, and approved it for submission. All authors are responsible for the integrity of the data and the accuracy of the analysis. The corresponding author confirms that all authors listed meet the criteria for authorship and that no eligible contributors have been omitted.

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Conflicts of Interest

None declared.

Declaration on the use if AI

Artificial intelligence: not used.

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