Sleep Quality as Predictors of Fatigue Severity in Women with PCOS

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Abstract

Menstruating Indian women aged between 18 and 62, with and without a PCOS diagnosis, were the population for the present study, which examined the anticipated association between sleep quality and fatigue severity. The degree of fatigue and sleep quality was assessed with standardized self-report questionnaires with a cross-sectional design. A simple linear regression identified a significant positive relationship between higher exhaustion levels and worse sleep quality, with sleep quality accounting for a large proportion of the variation in weariness. The absence of a significant relationship between age and weariness was also supported by a multiple regression analysis. Independent of PCOS diagnosis, menstruating women usually report fatigue and sleep disturbance, as indicated by a lack of meaningful differences in sleep quality or intensity of tiredness between PCOS women and non-PCOS women, according to independent samples t-tests. These findings underscore the significant role that sleep serves in women's overall health and suggest that sleep quality enhancing therapies may have a utility for reducing tiredness. Future research should explore more psychological and physiological variables and employ longitudinal designs to better improve therapeutic methods and gain further insight.

Keywords: Sleep Quality, Fatigue Severity, PCOS, Women's health

1. INTRODUCTION

By investigating the relationship between tiredness severity and sleep quality, this quantitative study aims to guide targeted therapy to improve sleep and reduce fatigue in women with Polycystic Ovary Syndrome (PCOS). A common endocrine disorder affecting women of reproductive age, PCOS is associated with hormonal abnormalities, metabolic dysfunctions, and psychological issues. Sleep problems such as obstructive sleep apnoea (OSA), insomnia, and poor sleep quality are common in women with PCOS and greatly enhance the level of exhaustion [1,2].

The purpose of this study is to assess sleep quality and tiredness severity in women with and without PCOS, ascertain if age is a major predictor of fatigue severity, and examine the interaction between these factors in women with PCOS. Understanding these interconnected systems is essential to creating effective therapies that address the unique difficulties experienced by women with PCOS. Customised strategies that focus on lifestyle modifications and sleep hygiene have shown promise in enhancing sleep quality and decreasing tiredness in similar populations [3].

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that focus on lifestyle modifications and sleep hygiene have shown promise in enhancing sleep quality and decreasing tiredness in similar populations [3].

1.1 PCOS

About 6 to 10% of women of reproductive age suffer with PCOS, a prevalent endocrine condition [4]. Numerous physical and psychological problems are caused by hormonal imbalances, metabolic disorders, and anomalies in reproduction [5]. Hyperandrogenism, irregular or missing menstrual periods, and polycystic ovaries seen by ultrasonography are common clinical signs [6]. These underlying abnormalities are the cause of symptoms including insulin resistance, weight gain, hirsutism, acne, and infertility [4,7]. Increased anxiety, sadness, and a worse quality of life are also common in women with PCOS [8]. The disorder's complexity highlights the value of interdisciplinary and integrated methods to management.

Regardless of weight, women with PCOS are more likely to experience sleep difficulties, which are made worse by hormonal problems such as insulin resistance and high testosterone levels [1,2]. To control PCOS and enhance quality of life, it is imperative to address sleep quality in this population [9, 10].

1.2 Sleep Quality

The total experience and efficacy of sleep, including factors like latency, duration, efficiency, and disruptions, is referred to as sleep quality. It is not the same as sleep quantity, which only considers the total number of hours of sleep. Physical health, mental clarity, and emotional control all depend on getting enough good sleep. Dimensions including sleep efficiency, disruptions, and contentment are frequently evaluated using subjective instruments like the Pittsburgh Sleep Quality Index (PSQI) [11].

Sleep efficiency above 85%, minimum awakenings, continuity of sleep, and falling asleep within 20 minutes are all indicators of good sleep quality. Sleep and circadian rhythm synchronisation is also essential for performance and attentiveness throughout the day.

Polysomnography (PSG) serves as the best tool for the objective assessment of sleep but it is expensive and laborious; therefore, it does not find routine use in clinical practice. Subjective measures like PSQI might misinterpret cases of poor sleep quality that actually stem from untreated sleep disorders like OSA or insomnia [12]. Thus, there has to be an enlightened approach to the interpretation of sleep parameters if one wishes to reach accurate diagnoses and treatments.

Poor sleep quality is known to cause cardiovascular disorders, Type II diabetes, depression, and anxiety. Yet, women with PCOS are found to have shorter sleep duration with low sleep efficiency and more tendency to feel sleepy during the day as compared to those without PCOS [9]. Having good sleep hygiene can lead to considerable improvements in both subjective and objective sleep outcomes [10].

1.3 Fatigue

It is a chronic state with various facets, characterized by diminished bodily, cognitive, and emotional energy, one that greatly impinges upon overall functioning, and is not just a state resulting from sleep loss. Fatigue brings along emotional exhaustion, mental haze, and physical weariness, hence lowering the quality of life and the ability to carry on with daily activities [13,14].

In women with PCOS fatigue is made worse by imbalances of hormones, insulin resistance, and sleep disturbances linked with it [2,1]. Psychological stressors such as anxiety and depression create a feedback loop with poor sleep, thereby intensifying fatigue symptoms [12,14].

Poor lifestyle habits such as irregular sleep schedules, lack of exercise, caffeine overuse, and improper nutrition are also a cause for fatigue development [13]. Population studies suggest that people with poor sleep quality report much lower QoL scores in physical, emotional, and cognitive areas [12].

Fatigue leads to poor performance and weak satisfaction levels at the workplace due to diminished self-assessment with further negative emotions after not enough sleep. In women with PCOS, good sleep quality is one of the best predictors of severe fatigue. Interventions targeting the enhancement of sleep and regulation of hormones may suggest a marked reduction in fatigue and an increase in well-being [2,1].

2. Method

2.1 Statement of the Problem

Polycystic Ovary Syndrome is recognized to be among the most common endocrine disorders affecting women in their reproductively able phase and is usually associated with sleep disturbances and persistent fatigue. These symptoms, although greatly affecting emotional and physical functioning and social functioning, are commonly neglected in clinical settings. Despite the wide report of issues with sleep and fatigue among women with PCOS, only a narrow study has looked into the predictive relationship between the variables. A deeper understanding of the relationship between sleep quality and fatigue severity may really pave the way for more holistic and successful intervention methods. Hence, this present initiative was to explore how different aspects of sleep quality could predict the severity of fatigue in women with PCOS and to do a comparison of the results with those from women who had no PCOS.

2.2 Research Design

A quantitative, cross-sectional research design was used to investigate the correlation between sleep quality and fatigue severity in women diagnosed with PCOS. The research design permitted an analysis of predictive relationships and correlations between variables at one point in time.

2.3 Sampling

Purposive sampling technique was applied in enrolling the participants in the study. The sample consisted of Indian women aged between 18 and 62 years with or without a confirmed diagnosis of PCOS.

Inclusion Criteria

- Women between 18 and 62 years old.
- Women in their menstrual phase.
- Women with or without a confirmed diagnosis of PCOS or PCOD.

Exclusion Criteria

- Women who are pregnant or postmenopausal.
- Women with a diagnosis of chronic conditions that are not related to PCOS.
- Female patients with diagnosed sleep disorders or fatigue caused by other medical conditions.

2.4 Data Collection

After informed consent, participants filled out a demographic information form. Two standardized measures were completed through Google Forms: the Fatigue Severity Scale (FSS) to measure fatigue levels, and the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality. The online mode facilitated widespread and accessible participation while ensuring participant anonymity.

2.5 Data Analysis

Data was coded and analyzed with JAMOVI statistical software. Descriptive statistics (mean, median, and standard deviation) were utilized to describe the sample characteristics and variable distributions. Inferential statistics, such as independent t-tests and regression analysis, were utilized to analyze group differences and predictive relationships between sleep quality and fatigue severity.

2.6 Ethical Considerations

The study complied with the American Psychological Association's ethical standards. All subjects gave their informed consent, and participation was completely voluntary. Participants were guaranteed anonymity and confidentiality, and they were free to leave the research at any time without incurring any fees. To preserve participant privacy, no personally identifiable information was gathered.

3. Results

In this study, 100 menstrual Indian women between the ages of 18 and 62, both with and without a diagnosis of PCOS were asked to assess how tired they were and how well they slept. Descriptive statistics showed that the average exhaustion intensity score was 35.4 (SD = 11.4) and the average sleep quality score was 8.69 (SD = 2.74). The median scores for exhaustion intensity and sleep quality were 35 and 9.0, respectively. Both variables showed normal distributions with little skewness and kurtosis, and the Shapiro-Wilk test verified normality ($p > .05$).

Table 1: Results of Linear Regression Analysis

Variable	R	R^2	SE	p-value
Sleep Quality	.994	.998	.0458	<.001

Linear regression was used to investigate if tiredness severity was predicted by sleep quality. With R2 =.968, $F(1, 98) = 8108$, $p < .001$, the results showed a robust and statistically significant model, indicating that sleep quality explained almost 96.8% of the variance in tiredness severity. B = 4.121 (SE = 0.0458) was the unstandardised coefficient for sleep quality, and the 95% CI ranged from 4.03 to 4.12. A very strong positive link was shown by the p-value being less than.001 and the standardised beta coefficient being.994. This suggests that increased tiredness severity was strongly predicted by lower sleep quality.

Table 2: Results of Multiple Linear Regression Analysis

Variable	B	SE	β	p-value
Sleep Quality	4.12204	.0460	.9721	<.001
Age	.00494	.0136	-.0180	.717

Furthermore, age was included as an extra variable in a multiple regression analysis. While age was not statistically significant (B = 0.00494, SE = 0.0136, β = -0.0180, p =.717), sleep quality remained a significant predictor (B = 4.12204, SE = 0.0460, β =.9721, p <.001), suggesting that sleep quality alone explained the variance in fatigue severity and that age did not significantly contribute.

Table 3: Results Of Independent Sample T-test

	PCOS	PCOS	NO PCOS	NO PCOS		
	Mean	SD	Mean	SD	Sig.	t
Sleep	8.65	8.65	8.74	2.84	.865	.171

Quality						
Fatigue Severity	35.16	11.14	35.67	11.78	.823	.224

To assess the degree of exhaustion and sleep quality scores between women with and without PCOS, independent samples t-tests were used. The non-PCOS group's mean tiredness score (F scale) was 35.67 (SD = 11.78), whereas the PCOS group's was 35.16 (SD = 11.14). The PCOS group's mean score on the sleep quality (S) scale was 8.65 (SD = 2.69), whereas the non-PCOS group's score was 8.74 (SD = 2.84). There was no discernible difference between the groups, as seen by the findings for sleep quality (t(98) = 0.171, p =.865, Cohen's d = 0.0345) and tiredness severity (t(98) = 0.224, p =.823, Cohen's d = 0.0452). In both instances, the 95% CIs cross 0, and the effect sizes were quite tiny.

4. Discussion

With an emphasis on whether age is a relevant predictor and whether there are variations between women with and without Polycystic Ovary Syndrome (PCOS), the main goal of this study was to examine the predictive link between women's sleep quality and the degree of exhaustion. The results show that while age and PCOS diagnosis do not seem to have a significant impact on tiredness levels, sleep quality is a robust and significant predictor of fatigue severity. According to descriptive analysis, there was minimal difference in the moderate levels of exhaustion and poor sleep quality reported by the two groups of women with and without PCOS. These findings imply that, irrespective of their diagnostic status, menstrual women may have similar experiences. Consistent trends in the sample answers were also shown by the data's normal distribution.

Poor sleep quality and increased tiredness severity were shown to be significantly and strongly positively correlated by the linear regression analysis. This implies that tiredness severity rises as sleep quality declines. The strength of this correlation emphasises how vital sleep is for sustaining physical health and energy levels. Interestingly, the regression model did not substantially predict tiredness levels when age was added, supporting the idea that fatigue is more closely related to sleep quality than chronological age. Women with and without PCOS did not significantly vary in terms of exhaustion levels or sleep quality. This disproves the widely accepted notion that PCOS inevitably leads to increased fatigue or sleep problems because of its hormonal and metabolic abnormalities. The consistency in ratings between groups indicates that sleep-related weariness could be a common issue among women who menstruate in general. These results are in line with earlier research by, which discovered that women with PCOS who had trouble sleeping had greater body mass index, insulin resistance, and exhaustion [9]. Improvements in tiredness outcomes were linked to improved sleep, even though their intervention, which involved high-intensity interval training and continuous aerobic exercise, did not substantially alter sleep quality as determined by the Pittsburgh SleepQuality Index. In a similar vein, found that although PCOS was linked to more disruptions, the total impact size was minor, and that dietary habits had a greater association with sleep outcomes than the PCOS diagnosis itself [15].

The current results corroborate the hypothesis that lifestyle and behavioural variables may have a greater impact on tiredness in PCOS affected women than the illness itself [10]. Furthermore, sleep has long been emphasised as a key component of PCOS therapy in traditional frameworks like Iranian Traditional Medicine, which is consistent with the findings of our study [16].

Overall, the findings highlight the possibility that enhancing sleep quality might be a useful and successful

strategy for addressing women's fatigue across a range of health profiles. In order to improve women's general well-being, the study adds to the increasing amount of research that emphasises sleep hygiene in both clinical and daily contexts.

4.1 Implication

The results of the study have important ramifications for both therapeutic practice and public health. First off, sleep evaluation should be a regular part of fatigue therapy, especially for women with or without PCOS, because of the strong association between the level of exhaustion and the quality of sleep. Health care providers including psychologists, gynaecologists, and primary care doctors should consider screening for sleep disturbances when regularly seeing women who exhibit chronic fatigue or low energy. Additionally, the findings support the inclusion of sleep hygiene education in lifestyle intervention programs, particularly for those with PCOS. Because fatigue is a complex problem that affects physical, emotional, and occupational functioning, improving sleep may also benefit women's psychological well-being and daily productivity.

4.2 Limitation

The study has some shortcomings even if the findings are helpful. The sample size was limited to 100 participants and may not be representative of Indian women generally, even with the use of stratified sampling. Response biases including social desirability or incorrect recall may have been introduced by the PSQI and FSS, two self-report measures used in the study. Moreover, it is more challenging to establish a causal relationship between the level of fatigue and sleep quality due to the cross-sectional nature of the study. Stress, mental stability, physical activity, diet, and co-occurring medical conditions are examples of external factors that may have impacted the outcomes but were not considered. Additionally, the diagnosis of PCOS was based on self-report and may not have always been professionally verified.

4.3 Conclusion

This research explored the relationship between the quality of sleep and the degree of fatigue in menstruating women, particularly those diagnosed with polycystic ovary syndrome (PCOS). The study's findings were clear: poor sleep quality was a significant predictor of greater exhaustion, indicating that sleep is vital for physical and mental health. Notably, age did not appear to be a significant predictor; this suggests that weariness is conditioned solely by sleep quality. In addition, the research found no statistically detectable differences in fatigue and sleep disturbances between women with PCOS and those without, which is contrary to popular beliefs and assumptions in the literature. This suggests women may have tiredness and disturbed sleep regardless of a PCOS diagnosis.

5. Acknowledgement

References

1. Vgontzas A. N., Calhoun S., "Polycystic ovary syndrome, sleep apnea, and daytime sleepiness and fatigue", Springer eBooks, 2009, 143–154. https://doi.org/10.1007/978-0-387-09718-3_12

2. Tasali E., Van Cauter E., Hoffman L., Ehrmann D. A., "Impact of Obstructive Sleep Apnea on Insulin Resistance and Glucose Tolerance in Women with Polycystic Ovary Syndrome", The Journal of Clinical Endocrinology & Metabolism, 2008, 93(10), 3878–3884. https://doi.org/10.1210/jc.2008-0925

3. Reid K. J., Martinovich Z., Finkel S., Statsinger J., Golden R., Harter K., Zee P. C., "Sleep: a marker of physical and mental health in the elderly", American Journal of Geriatric Psychiatry, 2006, 14(10), 860–866. https://doi.org/10.1097/01.jgp.0000206164.56404.ba

4. Bozdag G., Mumusoglu S., Zengin D., Karabulut E., Yildiz B. O., "The prevalence and phenotypic features of polycystic ovary syndrome: a systematic review and meta-analysis", Human Reproduction, 2016, 31(12), 2841–2855. https://doi.org/10.1093/humrep/dew218

5. Teede H. J., Misso M. L., Costello M. F., Dokras A., Laven J., Moran L., Piltonen T., Norman R., Andersen M., Azziz R., Balen A., Baye E., Boyle J., Brennan L., Broekmans F., Dabadghao P., Devoto L., Dewailly D., Downes, L., Yildiz B. O., " Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome, Fertility and Sterility, 2018, 110(3), 364–379. https://doi.org/10.1016/j.fertnstert.2018.05.004

6. Lizneva D., Suturina L., Walker W., Brakta S., Gavrilova-Jordan L., Azziz R., "Criteria, prevalence, and phenotypes of polycystic ovary syndrome", Fertility and Sterility, 2016, 106(1), 6–15. https://doi.org/10.1016/j.fertnstert.2016.05.003

7. Moran L. J., Hutchison S. K., Norman R. J., Teede H. J., "Lifestyle changes in women with polycystic ovary syndrome", Cochrane Library. 2011. https://doi.org/10.1002/14651858.cd007506.pub3

8. Deeks A. A., Gibson-Helm M. E., Teede, H. J., "Anxiety and depression in polycystic ovary syndrome: a comprehensive investigation", Fertility and Sterility, 2010, 93(7), 2421–2423. https://doi.org/10.1016/j.fertnstert.2009.09.018

9. Benham J. L., Booth J. E., Goldfield G., Friedenreich C. M., Rabi D. M., Sigal R. J., "Self-reported sleep quality and exercise in polycystic ovary syndrome: A secondary analysis of a pilot randomized controlled trial", Clinical Endocrinology, 2023, 98(5), 700–708. https://doi.org/10.1111/cen.14900

10. Zhang J., Ye J., Tao X., Lu W., Chen X., Liu, C., "Sleep disturbances, sleep quality, and cardiovascular risk factors in women with polycystic ovary syndrome: Systematic review and meta-analysis", Frontiers in Endocrinology, 2022, 13. https://doi.org/10.3389/fendo.2022.971604

11. Fabbri M., Beracci A., Martoni M., Meneo D., Tonetti L., Natale, V., "Measuring Subjective sleep Quality: A review", International Journal of Environmental Research and Public Health, 2021, 18(3), 1082. https://doi.org/10.3390/ijerph18031082

12. Ramlee F., Sanborn A. N., Tang N. K. Y., "What sways people's judgement of sleep quality? A quantitative choice-making study with good and poor sleepers", sleep, 2017. https://doi.org/10.1093/sleep/zsx091

13. Kudrnáčová M., Kudrnáč A., "Better sleep, better life? testing the role of sleep on quality of life", PLoS One, 2023, 18(3), e0282085. https://doi.org/10.1371/journal.pone.0282085

14. Espie C. A., Kyle S. D., Hames P., Gardani M., Fleming L., Cape, J., "The Sleep Condition Indicator: a clinical screening tool to evaluate insomnia disorder", BMJ Open, 2014, 4(3), e004183. https://doi.org/10.1136/bmjopen-2013-004183

15. Bennett C. J., Mansfield D. R., Mo L., Joham A. E., Cain S. W., Blumfield M. L., Hodge A. M., Moran L. J., "Sleep disturbances may influence lifestyle behaviours in women with self-reported polycystic ovary syndrome", British Journal of Nutrition, 2021, 127(9), 1395–1403. https://doi.org/10.1017/s0007114521002361

16. Tansaz M., Bahman M., Hajimehdipoor H., Afrakhteh M., Bioos S., Hashem-Dabaghian F., "The importance of sleep hygiene in polycystic ovary syndrome from the view of Iranian traditional medicine and modern medicine", International Journal of Preventive Medicine, 2018, 9(1), 87. https://doi.org/10.4103/ijpvm.ijpvm_352_16