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Cognitive Flexibility as a Predictor of Sleep Quality in Working Women: A Psychological Perspective

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Abstract

The present study examined the effect of cognitive flexibility on sleep quality among working women in District Gujrat, Pakistan. A cross-sectional design was employed, and data were collected from 150 working women selected through simple random sampling. Cognitive flexibility and sleep quality were assessed using standardized tools: The Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010) and the Sleep Quality Scale (Shin et al., 2006), respectively. Descriptive results indicated that participants generally reported moderate levels of cognitive flexibility and sleep quality A significant positive correlation was found between cognitive flexibility and sleep quality ($r = .224$, $p < .01$), indicating that individuals with higher cognitive flexibility tend to experience better sleep. Simple linear regression analysis further confirmed that cognitive flexibility significantly predicted sleep quality ($\beta = .224$, $R^2 = .050$, $p < .01$). These findings highlight cognitive flexibility as a meaningful psychological factor associated with sleep quality in working women. Therefore, highlight the cognitive flexibility role that has psychological value on the outcome of sleep. The paper can be seen as a contribution to the increasing number of documents on mental health in a working environment and may provide interesting reflections on mental health at work and may allow workplace health practitioners to guide their strategy and may invite further research into the connection between enhanced cognitive adaptability and better sleep outcomes and general wellness among working women.

Keywords: Cognitive flexibility, sleep quality, working women, well-being

Introduction and Literature

Given the contemporary scenario, more and more often people have to adjust to the unknown demands in a realm where the development of work is fast paced and where people are required to balance their personal and professional lives. This pressure is especially strong on women who have to take up two roles at a time; a role at home and a role in the working place. To cope up with such kinds of demands effectively, Psychological wellbeing is also of pivotal importance in one life. Psychological well-being is a complex phenomenon that depends on various cognitive and behavioral factors, cognitive flexibility and sleep, two factors that affect, in a burning way, some important variables to maintain such an issue to the maximum degree possible, especially in high demanding occupations as the working women position. Cognitive flexibility is a highly desirable skill in the contemporary dynamic and multitasking world, which necessitates quite often the ability of a person to change priorities and emotional requirements. At the same time, sleep quality has been identified to be the key in physical, mental, and emotional restoration. The lack in either aspect may lead to poor performance at work, poor decision-making, and burnout (Kudielka et al., 2020).

Cognitive flexibility is the capacity of the mind to modify its thoughts, come up with new regulations and adjust behavior of the person depending on the changing challenges of the environment. It is an element of executive functioning that helps people to process information easily and control emotional reactions, especially when being stressed (Zelazo et al., 2020).

Gartner et al. (2021) state that a high level of cognitive flexibility is attributed to the high level of psychological resilience and adaptability at work. It encompasses such components as attentional control, set-shifting, and the skill of disengaging with the previously reinforced responses in favor of more relevant ones (Diamond, 2013; Moradzadeh et al., 2023).

Sleep quality is a complex feature that refers to the duration of sleep, its latency, efficiency, and subjective restfulness. The impaired quality of sleep has already linked to fatigue, irritability, impaired cognitive functions and lack of emotional control (Alimoradi et al., 2022). In particular, poor sleep quality has been associated with low job satisfaction, psychological distress, and chronic stress among working women, especially those in the high-demand occupancies (Gao et al., 2020). Good sleep helps in memory stabilization, disparity of attention, and emotional equilibrium, all of which are related, more or less, to cognitive flexibility (Huang et al., 2021).

The correlational relationship between sleep quality and cognitive functioning, particularly, the cognitive flexibility has been supported by empirical studies, which have confirmed the bi-directional relationship between cognitive functioning and sleep quality. Loss of sleep or impairment interferes with the prefrontal cortex operations that are core in dealing with flexibility in thoughts and problem-solving (Lo et al., 2016; Scullin & Bliwise, 2015). Similarly, persons with high cognitive flexibility also have a greater reference point in coping with stress and moderating sleep by being able to adopt adaptive coping rather than maladaptive ones (Pan et al., 2022). This relationship is especially pronounced among working women, who tend to be easily subjected to both cognitive and sleep-related sacrifices due to the professional, domestic, and emotional burdens that their lives imply (Mahmood et al., 2021). This association is particularly significant when analyzed in a working-woman setting, where individuals can most often experience a rise in psychological pressure because of social normativity, multi-tasking, and the lack of a proper work-life balance (Imran & Aftab, 2021). Women are at an increased risk of sleep disturbances compared to men; this is because of changing periods in life where there is a professional stress, parenting of children, or hormonal factor (Fatima et al., 2022). Cognitive flexibility can be particularly beneficial in this environment as it will ensure that women can keep emotions under control, arrange their priorities, and adapt to everyday stressors, therefore, albeit indirectly, enhancing their sleep quality.

Recent study on Pakistan also favors the relationship of cognitive functioning with sleep-related outcomes. As an example, Arshad et al. (2020) were able to find that cognitive flexibility has significantly correlated with better mental performance and regulation of emotions in health sciences students, demonstrating the overall relevance of the phenomenon to psychological health. In line with this, Qayyum et al. (2022) extracted the cognitive patterns of working adults in an urban area in Pakistan and indicated a positive relationship between high cognitive control and better sleep pattern and day-time functioning. Women are especially at risk of poor sleep quality given the causes of occupational and family stress. According to the article by Mirghani et al. (2020), Pakistani working women have a double burden of stress, as a professional occupation and the demands of a family household have a detrimental effect on sleep quality. Their results concur with the idea that flexibility is seen as one of the lines of defense against such stressors.

Although interest in the direct predictive role of cognitive flexibility in sleep quality is gaining attraction, limited research has been undertaken investigating the same among Pakistani working women. This study thus fulfills that gap to examine the connection between cognitive flexibility and sleep quality in a localized population in District Gujrat to thereby bring culturally applicable psychological pieces of information. Other than that since the employment of women in the workforce has been on the increase and sometime due to the kind of job they have their stresses are unique, it becomes an important relationship that should be understood to formulate supportive measures that will help them in their well-being.

Research Objectives

The present study was conducted with the following objectives:

To assess the level of cognitive flexibility among working women.

To evaluate the quality of sleep in working women.

To examine the predictive role of cognitive flexibility on sleep quality in working women.

Hypotheses

H_1: Higher cognitive flexibility is associated with better sleep quality among working women.

H_2: Cognitive flexibility significantly predicts sleep quality in working women.

Methodology

Research Design

This research utilized a quantitative, cross-sectional corelational design to explore the effect of cognitive flexibility on sleep quality in working women. The design permitted the gathering and examination of data at one point in time, yielding perspectives on the connection between the variables.

Population and Sample

The target population selected in this study was adult women employed at the various educational institutes like University of Gujrat, colleges and school across district Gujrat, Pakistan. A total of 150 participants were chosen to guarantee a varied representation of the working women population in Gujrat was recruited by using probability random sample technique. By so doing this strategy allowed incorporation of women with various roles and duties which thematically represents the greater numbers of working women.

Sampling criteria

Inclusion Criteria: This research will involve a group of females of between 25 to 40 years of age currently working in any of the institutes of education in Gujart district, who are able to speak the language of the survey used and give an informed consent.

Exclusion Criteria: Women under the age of 20 yrs, and those not employed, pregnant working women and those diagnosed with any mental condition were were excluded.

Data Collection Tools

Structured questionnaires were self-administered. The participants were initially introduced to an informed consent form that gave information about the study, assured confidentiality and highlighted the voluntary aspect of the study. Due to its convenience, demographic data sheet was taken to find out the age, marital status, job designation and years of work experience. The scale that would be used to measure cognitive flexibility is called “Cognitive Flexibility Inventory” (CFI; Dennis & Vander Wal, 2010) and is a 20-item self -report questionnaire intended to evaluate the ability of an individual to adjust to new circumstances in case of changes and think of a variety of alternative solutions. CFI has also been found to have a good internal consistency where cronbachs alpha coefficients range between.84 and.91. “The Sleep Quality Scale” (SQS; Shin et al., 2006) was used to evaluate the quality of sleep and consists of 28 items assessing different aspects of the sleep including satisfaction, latency, disturbance, and functional impairment. The SQS has demonstrated great psychometric characteristics such as the Cronbachs alpha of .92, which will enhance its reliability and validity in the non-clinical and clinical population.

Procedure

The collection of data was followed within a space of two months after the ethical approval was granted by the institution. Necessary information regarding the study was given to participants (working women) and those who were willing to be a part of the study signed a consent form. These researchers gave participants self-administered questionnaires where the session took place in about 15 to 20 minutes. Upon completion, the questionnaires were reviewed by the researchers after which they thanked the respondents.

Ethical Considerations

In support of preventing and resolving such cases, the following measures were performed to comply with ethics as indicated by American Psychological Association (APA, 2017) :

Informed Consent: Participants received in-depth information concerning the study and gave their consent to participate on a voluntary basis.

Anonymity and Confidentiality: All the responses were anonymized and securely stored that way they are a guarantee of confidentiality.

Voluntary Participation: Participation was entirely voluntary, with individuals free to withdraw at any point without any negative consequences.

The researchers followed to the ethical principles of generosity, non-maleficence, and reverence for persons.

Results and Interpretation

Results and data interpretation were examined using SPSS version 24. Descriptive statistics (means, standard deviations, frequencies) were used to sum up the demographic and scale data. Pearson's correlation was run to discover relationships among main variables that were cognitive flexibility and sleep quality. While predictive relationship was determined by using linear regression analysis. The significance threshold was set at $p < .05$ for all inferential tests.

Descriptive statistics

Descriptive analysis was conducted to examine the level of cognitive flexibility and sleep quality among a sample of 150 working women. Findings revealed that participants generally exhibited moderate levels of both variables, with an average cognitive flexibility score of approximately 108 and a sleep quality score around 70. These values reflected a reasonable spread in the data and were observed within a demographically balanced sample, showing diversity in age, marital status, and education level.

Correlation Analysis

Table 1:

Correlation Analysis (N=150)

Variables	1	2
1. Cognitive Flexibility	-	.224**
2. Sleep Quality	.224**	-

According to the findings of the study conducted on a sample of 150 working women, there was a statistically significant positive relationship between cognitive flexibility and sleep quality ($r = .224$, $p < .01$; $p = .006$). This indicates that higher levels of cognitive flexibility are modestly

associated with better sleep quality. Although the strength of the relationship is small, the significance suggests a meaningful connection between cognitive and behavioral adaptability and sleep-related outcomes in this population.

Regression Analysis

Table 2:

Model summary for prediction of Sleep Quality from Cognitive Flexibility(N=150)

Model	R	R2	Adjusted R2	***Std. Error of the estimate***
1	.224	.050	.044	11.186

Table 3:

Regression Coefficient for Prediction of Sleep Quality from Cognitive Flexibility (N=150)

Predictor	B	Std. Error	β	T	Sig.
Constant	58.099	4.294	-	13.531	.000
Cognitive flexibility	0.108	0.039	.224	2.795	.006

The results revealed that the model was significant, $F(1,148) = 7.814$, $p = .006$, indicating that cognitive flexibility is a significant predictor of sleep quality. The model explained approximately 5% of the variance in sleep quality scores ($R^2 = .050$). The unstandardized regression coefficient ($B = 0.108$) indicates that for each one-point increase in cognitive flexibility, sleep quality increases by 0.108 points. This suggests that cognitive flexibility is a small but significant predictor of sleep quality.

Summary of findings

The present study aimed to examine the relationship between cognitive flexibility and sleep quality among working women and to assess whether cognitive flexibility significantly predicts sleep quality. The findings supported both hypotheses. There was a positive statistically significant correlation between cognitive flexibility and sleep outcomes that showed that greater cognitive adapting to the environment in women means an increasing likelihood of better sleep results. More so, the cognitive flexibility proved to be a substantial contributor of sleep quality, which affirms the assertion that the psychological component is key to influencing working women sleep patterns. The results of this support the theoretical postulation that adaptive processes of the mind help to increase the well-being of the occupationally active female populations.

Discussion

In the present study, the researcher explored the degree of cognitive flexibility that predicts sleep quality in working women in District Gujrat, Pakistan. The findings indicated a relatively small positive correlation ($r = .224$, $p = .006$), and cognitive flexibility proved to be a significant predictor of sleep with the ability to predict the parameter by around 5 percent ($R 2 =.050$, $p =.006$). The findings can be related to the current literature, but the research generates new information in the Pakistani occupational setting.

Globally, recent empirical evidence supports the idea that cognitive flexibility enhances sleep health via improved stress regulation and adaptive functioning. Tülek et al. (2025) identified that cognitive flexibility indirectly reduced fatigue through better sleep quality and daytime alertness

in healthy adults; this suggests that adaptability in cognition facilitates recovery from daily stressors through restorative sleep. Similarly, Wang et al. (2024) found that individuals with stronger cognitive control capacity experienced improved sleep quality over time, mediated by reduced emotional distress. Neurophysiological research also highlights links between sleep disruption and impaired cognitive flexibility. Sun et al. (2025) report that sleep deprivation consistently impairs task-switching accuracy and flexible decision-making, through altered prefrontal cortex activation and related neurophysiological changes. A scoping review by Psycho-Neuroscience authors reported that sleep deprivation consistently impairs task-switching and adaptive decision-making core aspects of flexibility due to altered prefrontal cortex activation patterns.

Within Pakistani research contexts, while direct studies on cognitive flexibility and sleep are sparse, adjacent evidence offers supporting insights. For example, prenatal research by Ahmed Waqas et al. (2024) found a strong association between poor sleep quality and stress among Pakistani women using the Pittsburgh Sleep Quality Index (PSQI), reinforcing the broader link between emotional dysregulation and sleep health in local settings.

Even though the growing global interest in the relationship between cognitive flexibility and sleep quality, there remains a noticeable gap in culturally grounded research within Pakistani and South Asian contexts. By addressing this gap, the present study offers meaningful, context-specific insights and lays the groundwork for future empirical investigations tailored to the psychological experiences of working women in this region. Findings also reinforce the theoretical assumption that greater cognitive flexibility promotes psychological resilience, adaptability, and emotional regulation, mechanisms likely facilitating better sleep hygiene and quality, for working women, especially in cultures like Pakistan where household and professional responsibilities converge, cognitive flexibility may serve as a buffer against sleep-disrupting stressors.

Conclusion and Implications

The present study set out to examine the predictive relationship between cognitive flexibility and sleep quality among working women, and the findings offer valuable insights into this psychological dynamic. A statistically significant, though modest, positive association was identified between cognitive flexibility and sleep quality, suggesting that women who are more adaptable in their thinking tend to experience healthier sleep patterns. This observation is in line with previous studies carried out in research on local and international population which attest to the importance of adaptive thinking and emotion in physical and psychological health performance. Although the effect was small but in practical sense it is significant because unique problems of working women especially in South Asian contexts are faced as society and occupation both are stressors which may influence well-being.

These results are relevant to future research, workplace policy, and the psychological practice. One of the ways in which mental health programs in occupational contexts, especially in educational institutions where the present sample was collected, should focus is on promoting cognitive flexibility. Stress management workshops, mindfulness, and adaptive problem-solving workshops would be able to enhance cognitive performance, as well as sleep quality. In addition to this, institutional policies that support overall mental well-being as flexible working hours, realistic workload expectations and availability of counseling services should help mitigate sources of stress that can give way to bad sleep and limited cognitive adaptability.

The cognitive flexibility training can be included in therapeutic interventions by mental health practitioners who operate with women in challenging occupations employing such interventions as cognitive-behavioral therapy (CBT) and cognitive restructuring. Some of these techniques can assist the user in coping with stress or getting a better sleep hygiene. Also, the findings of the study support the importance of demographic factors, e.g. age, marital status, the nature of employment in determining the sleep outcomes. This brings the allusion to context-sensitive interventions that

take into consideration the various lives of women along with their responsibilities instead of generic solutions.

Academically, the present study will be added to the burgeoning literature that attributes executives functions to sleep utility, and more significantly, this study empirically addresses the literature gap because no provincialized data is available in the context of Pakistan. The sample size was adequate to conduct introductory analysis but it was small in nature implying that it would be valuable to conduct study in a larger scope. Future researchers may utilize longitudinal or experimental studies to gain more insight into causality and mediators that can be anxiety, work-life balance, or environmental stressor. Combined, the results provide evidence supporting the value of including the component of cognitive flexibility in psychological resilience and well-being, particularly among women who have to live up to the challenges of work life.

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