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Sleep quality, cognitive performance and pro-social behavior among IT employees: A correlational study

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Abstract

Sleep quality is the presence of positive aspects of sleep and its effects on daily life. Cognitive performance is the ability to retain memory and reduce forgetfulness. Prosocial behavior is being empathetic, helping others and sharing knowledge. IT employees face demanding workloads that may affect these domains. This study explores the relationship between sleep quality, cognitive performance and pro-social behavior among 144 IT employees aged 22–35 participated, with data collected via Google Forms using purposive sampling. Analysis using Jamovi version 2.5.6 and results showed no significant relationship between sleep quality and cognitive performance, nor between sleep quality and prosocial behavior. However, a moderate negative correlation was found between cognitive performance and prosocial behavior, suggesting that lower cognitive performance is associated with reduced prosocial behavior and vice versa. These findings highlight the complex interplay between these domains.

Keywords: Sleep Quality; Cognitive Performance; Prosocial Behavior; IT Employee

1. Introduction

Sleep quality should be measured of as a person's self-satisfaction with each part of their night's sleep as well as with the following effect on functioning during the day. In contrast to sleep duration, which is simply an approximation of the hours one sleeps, sleep quality pursues to enter into the quality and restorative importance of sleep. (1) stress that quality of sleep is not a homogenous, measurable phenomenon but instead an idea defined by four central characteristics: sleep effectiveness, sleep dormancy, sleep duration, and also the wake after sleep onset (WASO). In total, these characteristics together present evidence for determining if sleep is actually restorative and adequate in order to endure health. A significant observation by (1)(2) is that the sleep quality is not only a product of objective factors like polysomnography or actigraphy. Rather, it is highly subjective, determined by one's own experience of sleep and its impact on daily functioning. Did you ever notice that on some days you can almost recall locking your front door in the morning before leaving for work, whereas on other days you can't remember at all? Likely, you've had both types of days. Such inconsistency is a classic illustration of how cognitive function varies and affects our memory, focus, and general mental sharpness. Cognitive performance is defined as the capacity of an individual to think, learn, remember, solve problems, and maintain focus. Cognitive performance includes various mental functions which make it possible for people to gather information, decide, and carry out actions. core components of cognitive function include memory, which allows information to be stored and retrieved; attention, which helps to maintain focus on tasks; executive function, which facilitates planning, organization, and task management; and other cognitive process which indicates how fast an individual comprehends and responds to information. Given the rapid pace of technological change and the high cognitive demands of IT roles, maintaining optimal cognitive performance is essential for both individual and organizational productivity (3). In recent studies on sleep deprivation indicated that good quality sleep makes

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individuals to display more prosocial behavior, according to (4) findings suggest not only the sleep duration but also the sleep depth is positively related to exhibit prosocial behavior(4). According to (5), prosocial behavior refers to any action taken by individuals with the purpose of helping another person. Prosocial behavior is defined as voluntary actions aimed at benefiting others or society at large, including various activities such as helping, sharing, comforting, cooperating, and giving (6). Essentially, prosocial behavior is marked by a true regard for others' rights, feelings, and well-being, and is considered one of the most esteemed components of human nature by a wide consensus(7). Such behaviors can be as mundane as opening a door for a stranger or as substantial as donating time for community service, and they are important in creating and sustaining healthy social relationships and harmonious communities. In this fast-moving world and ever-evolving world of Information Technology (IT), employees are expected to have not only technical expertise but also exceptional mental capabilities, adaptability, and collaborative skills. The needs and demands of the IT profession-that ranges from long hours being exposed to screen and heavy project deadlines to the need for quick learning and effective teamwork-place too much pressures on cognitive and social functioning. Among all these challenges, often overlooked are the foundational factors that underpin sustained professional success and personal well-being: sleep quality, cognitive performance, and prosocial behavior(8). In a field defined by rapid change and relentless demands, the true competitive advantage lies not only in technical prowess but in the holistic well-being of its people. By investing in sleep, cognitive health, and prosocial behavior, IT professionals can unlock their full potential, drive organizational excellence, and build a more sustainable and fulfilling career.

Aim

The aim of the study is to understand the relationship between sleep quality, cognitive performance and pro-social behavior among IT employees.

Objectives

- To study Sleep quality among IT employees.
- To study Cognitive performance among IT employees.
- To study Prosocial behavior among IT employees.

Research questions

- How does sleep quality and cognitive performance relate to each other among IT employees?
- How does sleep quality and pro social behavior relate to each other among IT employees?
- How does cognitive performance and pro social behavior relate to each other among IT employees?

Hypotheses

- H01: There is no significant relationship between sleep quality and cognitive performance among IT employees.
- H02: There is no significant relationship between sleep quality and prosocial behavior among IT employees.
- H03: There is no significant relationship between cognitive performance and prosocial behavior among IT employees.

2. Method

2.1. Research design

A quantitative, correlational research design was used to explore the relationship between sleep quality, cognitive performance, and prosocial behavior among IT employees in Bengaluru, one of India's premier technology hubs

2.1.1. Operational definition of the variables

- Sleep quality: In this study sleep quality refers to a multidimensional construct that reflects not just the absence of sleep problems, but also the presence of positive aspects of sleep and its effects on daily life.
- Cognitive performance: In this study Cognitive performance refers to the ability to retain memory and reduce forgetfulness, as in the tendency to let go things from one's own mind of something that is already known or planned.
- Prosocial behavior: In this study prosocial behavior refers to helping colleagues in their activities, being empathetic to who are in need, responding immediately to help others, making one's own knowledge and abilities to available for others etc.

- IT employees: In this the study IT employees refers to individuals aged between 22 to 35 years, working in Bengaluru-based IT companies with at least one year of experience in the current organization and usually these employees characterized by long working hours, cognitive strain, and social demands.

2.1.2. Sample size

A total of 144 IT employees were chosen for this study using purposive sampling. Data collection was conducted via Google Forms, facilitating participation from a diverse range of organizations, including start-ups, mid-sized firms, and multinational corporations.

2.1.3. Inclusion Criteria

- Individuals aged between 22-35 years.
- Individuals working in IT in Bengaluru companies with minimum 1 year experience in the current organization.
- Only individuals who were identified with no potential mental health issues.

2.1.4. Exclusion Criteria

- Employees who are interns and in and above managerial position.
- Individuals taking psychiatric medications.

2.2. Material / tools used

Sleep Quality Scale (SQS) Yi, H., Shin, and Shin C in 2006 is a 28-item scale rated on a 4-point Likert scale, ranging from "Rarely" to "Almost always," with scores assigned from 0 to 3. items 2 and 5 are reverse-scored. The SQS assesses six key areas, such as daytime sleepiness, challenges with falling and staying asleep, difficulty waking up, and overall sleep satisfaction, the SQS demonstrates scale internal consistency (Cronbach's alpha = 0.92), robust test-retest reliability (r = 0.81 over two weeks), and high content validity (Aiken's V = 0.976)(9).

The Cognitive Assessment Questionnaire (CFQ) is a 25-item assessment rate each item on a 5-point Likert scale, from "Never" to "Very often," that are scored 0 to 4. The questionnaire total scores ranging from 0 to 100; higher scores reflect greater cognitive difficulties and lower score reflect lower cognitive difficulties indicating better cognitive performance and exhibits strong internal consistency (Cronbach's alpha = 0.85) and robust construct validity, as supported by factor analysis(10).

The Pro-socialness Scale for Adults (PSA) is a 16-item. Each item is assessed using a 5-point Likert scale, ranging from "Never/almost never" to "Always/almost always," with scores assigned from 1 to 5. Total scores range from 0 to 80, the higher scores the cores indicating a higher prosocial behavior and demonstrated high reliability (Cronbach's alpha = 0.89), strong test-retest reliability (r = 0.801 over four weeks), and robust cross-cultural validation, making it suitable for diverse adult populations and particularly relevant for examining social behavior in workplace settings(11).

2.2.1. Procedure

The data collection process for this study was conducted using a Google Form, which included standardized psychological tools relevant to assessing sleep quality, cognitive performance, and prosocial behavior. To ensure access to eligible IT employees, the researcher contacted human resource department, team leaders and employees across various IT companies in Bengaluru. Permission was sought from company management before distributing the survey. In cases where approval was granted, the management either shared the contact details of eligible employees or distributed a QR code or direct survey link to staff members. The Google Form included a clear consent statement, informing participants of the voluntary nature of their participation and their right to withdraw at any time. Additionally, a brief confidentiality statement. After providing informed consent, participants completed the demographic questions, GHQ, and the three standardized scales. The responses from individuals who scored high on the GQH scale were eliminated, leading to the elimination of two responses. Responses to each scale were scored according to standardized norms given in the respective manuals. Data were consolidated in a secure, password-protected database accessible only to the research team.

2.3. Statistical analysis

Data Analysis The data collected from the participants was analysed using Jamovi software through inferential statistical techniques. This approach provided a comprehensive understanding of the relationships between sleep, cognitive performance, and prosocial behavior among IT employees in Bengaluru. Normality was formally tested using

the Shapiro-Wilk test. Inferential statistics were applied to test the research hypotheses and determine whether the observed patterns in the sample could be generalized to the broader population of IT employees. Spearman's correlation coefficient was chosen to examine the strength and direction of relationships between sleep quality, cognitive performance, and prosocial behavior, as this non-parametric method is robust to deviations from normality.

3. Results

Table 1 Tests for normality for IT employees on Sleep quality, Cognitive performance and Prosocial behavior by Gender

	Gender	**Sleep quality**	**Cognitive performance**	**Prosocial behavior**
N	Male	85	85	85
	Female	59	59	59
Shapiro-Wilk W	Male	0.97	0.98	0.97
	Female	0.98	0.97	0.95
Shapiro-Wilk p	Male	0.19	0.61	0.11
	Female	0.50	0.39	0.01

Table1 shows the shapiro-Wilk test was used to assess the normality of the distributions for sleep quality, cognitive performance, and prosocial behavior among IT employees by gender. For sleep quality the p-values for both groups male and female are greater than 0.05 the null hypothesis of normality cannot be rejected. This indicates that the distribution of sleep quality scores is approximately normal for both male and female IT employees. For cognitive performance, the p-values for both groups are well above 0.05, suggesting that the cognitive performance scores are also normally distributed for both genders. For prosocial behavior, the p value is above the 0.05 threshold, indicating normality in the male group. However, prosocial behavior scores among female IT employees significantly deviates from normality. Overall, these results indicate that sleep quality and cognitive performance are normally distributed for both male and female IT employees, as supported by non-significant Shapiro-Wilk p-values. In contrast, prosocial behavior scores are normally distributed for males but not for females, where the distribution shows a significant deviation from normality.

Table 2 Correlational analysis between Sleep quality and Cognitive performance among IT employees

Spearman's rho		**Sleep quality**	**Cognitive performance**
	Sleep quality		
	Spearman Correlation	1	-0.004
	Sig. (2-tailed)		0.96
	Cognitive performance		
	Spearman Correlation	-0.004	1
	Sig. (2-tailed)	0.96	
	N	144	

*p < 0.05 level, NS = Not Significant

Table 2 shows the correlation analysis aimed to explore the relationship between sleep quality and cognitive performance. The correlation coefficient indicates a weak negative relationship between sleep quality and cognitive performance. While statistically significant relationships are typically associated with lower p-values (usually less than 0.05), it is important to note that the p-value in this case far exceeds the conventional threshold for statistical significance. Given that higher sleep quality scores reflect more severe sleep problems and higher cognitive performance scores indicate poorer cognitive functioning, the near-zero correlation suggests that variations in sleep problems do not correspond with changes in cognitive performance in this sample. In other words, there is virtually no association between sleep quality and cognitive performance in this sample. Therefore, the null hypothesis is accepted,

indicating that "There is no significant relationship between sleep quality and cognitive performance among IT employees" in the data analysed.

Table 3 Correlational analysis between Sleep quality and Prosocial behavior among IT employees

Spearman's rho		Sleep quality	Prosocial behavior
	Sleep quality		
	Spearman Correlation	1	0.05
	Sig. (2-tailed)		0.52
	Prosocial behavior		
	Spearman Correlation	0.05	1
	Sig. (2-tailed)	0.52	
	N	144	

*p < 0.05 level, NS = Not Significant

Table 3 shows the correlation analysis aimed to explore the relationship between sleep quality and prosocial behavior. The positive correlation coefficient of 0.05 indicates a very weak positive relationship between sleep quality and prosocial behavior. While statistically significant relationships are typically associated with lower p-values (usually less than 0.05), it is important to note that the p-value in this case far exceeds the conventional threshold for statistical significance. Given that higher sleep quality scores reflect more acute sleep problems and higher prosocial behavior scores indicate greater prosocial tendencies. The very weak positive correlation suggests that, on average, individuals reporting higher or lower levels of sleep quality do not tend to report systematically higher or lower levels of prosocial behavior. In other words, there is essentially no meaningful association between sleep quality and prosocial behavior in this sample. Therefore, the null hypothesis is accepted, indicating that "There is no significant relationship between sleep quality and prosocial behavior among IT employees" in the data analysed.

Table 4 Correlational analysis between Cognitive performance and Prosocial behavior among IT employees

Spearman's rho		Cognitive performance	Prosocial behavior
	Cognitive performance		
	Spearman Correlation	1	-0.42
	Sig. (2-tailed)		0.01**
	Prosocial behavior		
	Spearman Correlation	-0.42	1
	Sig. (2-tailed)	0.01**	
	N	144	

**p < 0.01 level,

Table 4 shows the correlation analysis aimed to explore the relationship between cognitive performance and prosocial behavior. The negative correlation coefficient indicates a moderate negative relationship between cognitive performance and prosocial behavior. Statistically significant relationships are typically associated with lower p-values (usually less than 0.05). In this case, the p-value is less than .001, which is well below the conventional threshold, indicating that the observed correlation is statistically significant. It is important to note that higher cognitive performance scores indicate poorer cognitive performance, while higher prosocial behavior scores reflect greater prosocial tendencies. Therefore, the negative correlation suggests that employees with poorer cognitive performance (higher scores) tend to exhibit lower levels of prosocial behavior, and conversely, those with better cognitive performance (lower scores) are likely to show higher prosocial behavior. This inverse association is both meaningful and statistically robust within the sample studied. Therefore, the null hypothesis is not accepted, indicating a significant negative relationship between cognitive performance and prosocial behavior in the data analysed.

4. Discussion

Correlation discussion Table 2 examines the relationship between sleep quality and cognitive performance among IT employees, using Spearman's rho correlation. The results revealed no significant relationship between sleep quality and cognitive performance in this sample. Given that higher sleep quality scores reflect more severe sleep problems and higher cognitive performance scores indicate poorer cognitive functioning, the near-zero correlation suggests that variations in sleep problems do not correspond with changes in cognitive performance in this sample. This result aligns with several recent studies investigating similar relationships in healthy young adult populations. A study by,(12) concluded that subjective sleep quality was not significantly associated with a range of cognitive functions in healthy young adults. Contrastingly, studies in other populations have found stronger links between sleep quality and cognitive performance, particularly in groups exposed to acute or chronic sleep deprivation or those with health vulnerabilities. (13) found that sleep deprivation led to significant impairments in sensorimotor performance and attention among medical students. These differences highlight the importance of sample characteristics, such as age, occupation, and health status, in moderating the relationship between sleep and cognition. It is also important to consider the role of workplace and lifestyle factors in the IT sector. (14) found that workplace behaviors, such as the expression of promotive or prohibitive voice, influenced sleep quality and next-day workplace engagement. In the current study, if most participants had relatively stable work routines and moderate sleep quality, the range of both sleep and cognitive performance scores may have been too narrow to detect significant associations. Even though the null finding, sleep is still a very important part of overall wellbeing. Subjective sleep quality in healthy young IT employees might not be sufficient to predict cognitive performance, according to this study.

Table 3 examines the relationship between sleep quality and prosocial behavior among IT employees, using Spearman's rho correlation. The results no significant relationship between sleep quality and prosocial behavior in this sample. Indicate that higher scores on sleep quality show sleep problems to be more acute and higher prosocial behavior scores indicate greater level of prosocial behavior. This result is consistent with some prior research indicating that, in healthy and relatively high-functioning populations, the direct association between sleep quality and social or prosocial outcomes may be limited or difficult to detect. A study by, (15) concluded that mean sleep quality was not significantly related to prosocial or antisocial behaviors in children, emphasizing that variability in sleep timing may be more predictive of behavioral outcomes. Similarly, (16) found that poor sleep quality was more closely linked to internalizing behaviors, such as anxiety and depression, than to prosocial behaviors. Similarly, (17) reported that excessive daytime sleepiness, rather than general sleep quality, influenced prosocial behaviors, with interpersonal relationships acting as a mediator.(14) highlighted the influence of workplace behaviors on sleep quality and engagement, but did not establish a direct link between sleep quality and prosocial behavior. The current null finding may reflect the relatively homogeneous and resilient nature of the IT workforce in Bangalore. While there is no significant association, sleep is still essential for health and social functioning. For healthy young IT employees, subjective sleep quality might not necessarily predict prosocial behavior.

Table 4 examines the relationship between cognitive performance and prosocial behavior among IT employees using Spearman's rho correlation. The results revealed a moderate negative correlation, indicating a significant relationship between cognitive performance and prosocial behavior where higher cognitive performance scores indicate poorer cognitive performance, while higher prosocial behavior scores reflect greater prosocial tendencies and vice versa. IT employees who showed better cognitive performance (lower cognitive performance scores) are more likely to also show higher levels of prosocial behavior (higher prosocial behavior scores). On the other hand, those with poorer cognitive performance (higher cognitive performance scores) tend to show lower levels of prosocial behavior (lower prosocial behavior scores) This finding is consistent with some of prior research suggesting that, even in healthy and high-functioning populations, the relationship between cognitive abilities and prosocial outcomes is complex and can be influenced by various mediating factors. A study by,(16) found that cognitive and behavioral factors are often interrelated, but the direct association with prosocial behavior is frequently mediated by emotional regulation and environmental context. Similarly, (17) reported that factors such as sleep quality and interpersonal relationships can mediate the impact of cognitive or attentional difficulties on prosocial behaviors. In organizational settings factors such as workplace stress, team dynamics, and emotional well-being can play significant roles in how cognitive skills translate into social and prosocial actions. In the context of IT sector, existing studies are somewhat limited but provide important perspective. While this study found a significant negative association, it is important to recognize that cognitive and prosocial functioning are both essential for workplace and social success. For healthy young IT employees, better cognitive performance is associated with greater prosocial tendencies, but this relationship is likely shaped by a combination of individual, interpersonal, and organizational factors.

5. Conclusion

This study explored the relationship between sleep quality, cognitive performance, and prosocial behavior among IT employees in a demanding and active urban work environment. The findings reveal that sleep quality alone does not significantly influence cognitive performance or prosocial behavior among young IT employees. However, a moderate, statistically significant relationship was identified between better cognitive performance and increased prosocial behavior, underscoring the cognitive foundation of interpersonal engagement in the workplace. These findings are significant because they suggest that cognitive clearness is an opening to social competence in professional settings. While sleep remains essential for long-term health and efficiency, its impact may not always be directly measurable through subjective self-assessments. Instead, attention should be given to enhancing executive functions through organizational support, workplace training, and individual cognitive fitness programs. In conclusion, the present study adds a meaningful contribution to the understanding of psychological health in occupational settings and opens several paths for deeper investigation into how cognitive and behavioral processes interact to shape the modern work experience.

Implications

- Existing theoretical behavioral models often treat cognitive and social/emotional functions as distinct, whereas emerging frameworks emphasize cognitive functioning as essential for appropriate social engagement.
- The observed strong relationship between cognitive performance and prosocial behavior indicates that individuals must be mentally alert and attentive to interact meaningfully with others.
- The lack of relationship between sleep and both cognition and behavior add to the growing body of research suggesting that subjective sleep assessments may not sufficiently capture the nuances of how sleep affects workplace functioning, especially in young, high-functioning populations.
- For employers and team leaders, this study suggests that improving cognitive performance through programs for memory training, attention enrichment, or reducing digital distractions could positively impact team collaboration and prosocial behavior in the workplace.
- While sleep remains a basis of well-being, interventions may need to be more targeted or supported by objective measurements to demonstrate real behavioral impact.
- IT sector Human Resource departments can use this study's findings to design employee development programs that focus on executive functions, including planning, task management, and emotional regulation.
- In practical terms, this research provides a valuable reference point for organizations seeking to improve employee engagement and cooperation. A workforce that is not only mentally sharp but also socially responsible can yield significant advantages in terms of productivity, innovation, and morale.
- These improvements may contribute to a more empathetic and cohesive work environment.

Limitations

- The cross-sectional design restricts the ability to establish causal relationships between variables, as data was collected at a single point in time.
- Certain influential factors, such as emotional intelligence, stress levels, burnout, and work culture, were not measured, though they may play a significant role in shaping the observed relationships.
- The study did not incorporate objective physiological or performance-based assessments—such as actigraphy or neuropsychological tests—that could offer a more precise evaluation of sleep quality and cognitive performance.
- The research design did not account for potential confounding variables, including lifestyle, family responsibilities, and organizational support systems, which may have influenced the results.
- Recognizing these limitations can help guide future research toward a more comprehensive understanding of the complex interactions between sleep, cognition, and workplace behavior.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Statement of Ethical approval

Ethical approval was obtained from the Yenepoya Institutional Ethical Committee.

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