International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 1, January 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.1.2025.132

ORIGINAL RESEARCH

Association Between Stress and Sleep Disorders Among Working Adults

H. Veena Kanthraj[1], Riyaj Ahmad Kalaburgi[2]

[1]Assistant Professor, Department of Community Medicine, Sri Siddhartha Medical College, Tumkur, Karnataka, India
[2]Associate Professor, Department of Community Medicine,Sri Siddhartha Medical College, Tumkur, Karnataka, India

Correspondence author
Dr. H. VeenaKanthraj
Assistant Professor, Department of Community Medicine, Sri Siddhartha Medical College, Tumkur, Karnataka, India; email:veena.kanthraj@gmail.com

Received: 18 December, 2024 Accepted: 21 January, 2025

Abstract
Objective: The research aimed to identify key occupational stressors contributing to sleep impairments and explore evidence-based interventions to mitigate their detrimental effects on individual well-being and workforce productivity.
Methodology:A cross-sectional observational study was conducted utilizing a structured survey-based approach, encompassing 500 working professionals across diverse occupational sectors. The Perceived Stress Scale was employed to evaluate stress levels, while the Pittsburgh Sleep Quality Index served as a validated measure of sleep disturbances. Statistical analyses, including Pearson's correlation, multiple regression modelling, and subgroup analyses, were performed to quantify the strength and significance of associations between stress, sleep quality, and contributing factors such as job strain, work hours, and lifestyle habits.
Results: The findings unveiled a strong positive correlation ($r = 0.68$, $p < 0.001$) between occupational stress and sleep disturbances, demonstrating that individuals experiencing elevated stress levels reported significantly poorer sleep quality and reduced sleep duration. Participants classified under high stress conditions averaged only 5.4 hours of sleep, in stark contrast to 7.1 hours among those experiencing minimal stress. The prevalence of sleep impairments was disproportionately high among law enforcement (70.0%) and healthcare professionals (63.0%), underscoring the profound impact of high-pressure work environments on sleep health. Extended work hours exhibited a moderate correlation with sleep disturbances ($r = 0.52$, $p = 0.002$), while multiple regression analysis identified stress levels ($\beta = 0.45$, $p < 0.001$) as the most significant predictor of sleep disruption. Furthermore, lifestyle factors exerted a pivotal influence, with excessive caffeine consumption and prolonged screen exposure before bedtime exacerbating sleep disturbances, whereas regular physical activity and relaxation techniques served as protective factors, enhancing sleep quality and mitigating the deleterious effects of stress on sleep patterns.
Conclusion: This study provided compelling empirical evidence that occupational stress is a critical determinant of sleep disturbances among working professionals, with job strain, excessive work hours, and high-pressure occupations exacerbating sleep impairments. The findings underscored the necessity for comprehensive workplace interventions, targeted stress management programs, and structured lifestyle modifications to mitigate the adverse impact of occupational stress on sleep health. Addressing these factors is not only paramount for individual health and psychological resilience but also imperative for fostering a more productive, sustainable, and high-functioning workforce. Future research should incorporate longitudinal methodologies and objective sleep assessments to further refine intervention strategies and establish causality in the stress-sleep nexus.
Keywords: Occupational stress, sleep disturbances, job strain, work hours, sleep quality, workplace well-being, workforce productivity, mental health, lifestyle interventions, sleep hygiene.

Background

In the relentless rhythm of modern professional life, stress has emerged as an omnipresent challenge, profoundly affecting the well-being of working adults. The ever-intensifying demands of the corporate landscape, coupled with tight deadlines and mounting responsibilities, have culminated in an era where stress is no longer an exception but an inescapable reality(1). One of the most insidious repercussions of chronic stress is its profound disruption of sleep patterns, leading to a cascade of physiological and psychological consequences. Sleep, a cornerstone of human health and cognitive function, is essential for restoring the body, consolidating memory, and regulating emotional balance. However, prolonged exposure to occupational stress severely compromises

DOI: 10.69605/ijlbpr_14.1.2025.132

sleep quality, paving the way for a spectrum of sleep disorders that, in turn, perpetuate the cycle of stress, exhaustion, and diminished productivity. Understanding this intricate interplay is imperative for devising holistic interventions that safeguard both individual well-being and organizational efficiency(2).

Stress, at its core, is a multifaceted physiological and psychological response to perceived external pressures. It activates the body's autonomic nervous system, triggering the well-documented "fight-or-flight" response. While short-term stress can be an adaptive mechanism, enhancing alertness and performance in high-stakes situations, chronic stress exerts a deleterious impact on multiple biological systems(3). Prolonged exposure to stressors leads to sustained activation of the hypothalamic-pituitary-adrenal axis, resulting in excessive cortisol secretion. This hormonal dysregulation disrupts homeostasis, impairing immune function, cardiovascular health, and metabolic stability. Among the most frequently overlooked consequences of this dysregulation is the severe impairment of sleep architecture, manifesting in difficulties with sleep initiation, maintenance, and overall sleep efficiency.Sleep disorders encompass a broad spectrum of conditions, ranging from insomnia and obstructive sleep apnea to hypersomnia and parasomnias(4). Among these, insomnia is the most prevalent affliction among chronically stressed working adults. Characterized by persistent difficulty in falling asleep, staying asleep, or experiencing restorative rest, insomnia is often exacerbated by stress-induced cognitive hyperarousal. The relentless intrusion of anxious thoughts, excessive rumination over work-related concerns, and an inability to mentally disengage from occupational stressors perpetuate a state of wakefulness, further aggravating the sleep deficit. The resulting sleep deprivation not only impairs cognitive performance and emotional regulation but also increases the risk of severe health conditions, including hypertension, depression, and metabolic disorders(5).

At the physiological level, the stress-sleep nexus is mediated by complex neuroendocrine mechanisms. The sustained release of cortisolparticularly in the evening, when its levels should naturally declinedisrupts the secretion of melatonin, the hormone responsible for governing the sleep-wake cycle. This misalignment leads to prolonged sleep latency, frequent nocturnal awakenings, and overall sleep fragmentation(6). Additionally, stress-induced sympathetic nervous system activation exacerbates hypervigilance, causing increased heart rate and heightened arousal that further impedes the ability to achieve deep, restorative sleep. Over time, this chronic sleep disruption fuels a vicious cycle wherein poor sleep amplifies stress sensitivity, making individuals increasingly vulnerable to heightened stress responses even under minor provocations.Empirical evidence has consistently underscored the profound impact of occupational stress on sleep health. Workplace stressors such as job insecurity, excessive workload, shift work, and poor work-life balance contribute significantly to sleep disturbances among employees across diverse industries(7). High-pressure professionsincluding healthcare, finance, law enforcement, and corporate managementare particularly notorious for their adverse effects on sleep quality due to the relentless cognitive and emotional demands placed upon employees. The advent of remote work and digital connectivity has further exacerbated this phenomenon, dissolving the boundaries between professional and personal life, thereby inducing a state of perpetual cognitive engagement that prevents individuals from achieving psychological detachment necessary for restful sleep.Beyond the detrimental effects on individual health, the repercussions of stress-induced sleep disorders extend to organizational performance and economic productivity(8). Sleep-deprived employees exhibit diminished cognitive acuity, reduced decision-making capabilities, impaired problem-solving skills, and lower overall efficiency. Furthermore, chronic sleep deprivation has been strongly correlated with an increased propensity for workplace accidents, absenteeism, and burnoutfactors that impose substantial economic burdens on corporations and healthcare systems alike. Organizations that fail to address the stress-sleep dyad risk not only diminished workforce performance but also elevated healthcare costs, lower employee retention rates, and deteriorating workplace morale(9).

Ameliorating the adverse effects of stress-induced sleep disturbances necessitates a multidimensional approach that incorporates both individual and systemic interventions. Cognitive-behavioral therapy for insomnia has emerged as a gold-standard treatment, effectively addressing maladaptive sleep patterns and cognitive distortions that perpetuate insomnia. Mindfulness-based stress reduction, relaxation training, and structured exercise regimens have also demonstrated efficacy in mitigating stress and promoting sleep health(10). From an organizational standpoint, implementing workplace wellness programs, fostering a culture of psychological safety, and enforcing policies that encourage work-life balance can significantly alleviate stress and its cascading impact on sleep. Moreover, individuals can adopt proactive sleep hygiene practices, such as adhering to a consistent sleep schedule, minimizing screen exposure before bedtime, and engaging in relaxation techniques to improve sleep outcomes despite occupational stressors(11).

While existing literature has extensively explored the bidirectional relationship between stress and sleep disorders, significant gaps remain in understanding the differential susceptibility of individuals to stress-induced sleep impairments. Variations in personality traits, genetic predispositions, and coping mechanisms

DOI: 10.69605/ijlbpr_14.1.2025.132

likely modulate the extent to which stress affects sleep health. Furthermore, longitudinal studies investigating the cumulative effects of chronic stress on sleep and long-term health outcomes are imperative for developing targeted, evidence-based interventions(12). Future research should also explore the intersection of workplace culture, socioeconomic factors, and digitalization in shaping the stress-sleep dynamic among diverse working populations.This article endeavours to provide a comprehensive examination of the intricate association between stress and sleep disorders among working adults. By synthesizing existing research, identifying key patterns, and exploring potential solutions, this study aims to contribute to the broader discourse on occupational health and well-being. Addressing stress-induced sleep disturbances is not merely an individual concern but a societal imperativeone that holds profound implications for public health, workforce productivity, and the overall sustainability of modern professional life. Recognizing the gravity of this issue and implementing evidence-based interventions can pave the way for healthier, more resilient working populations, ultimately fostering a more balanced and productive society.

Aim of the study

To comprehensively explore the intricate relationship between occupational stress and sleep disorders among working adults, assessing its profound implications on physiological health, cognitive function, and professional productivity.

Objective f the study

To elucidate the underlying neurophysiological and psychological mechanisms that mediate the stress-induced disruption of sleep, identify predominant workplace stressors exacerbating sleep disturbances, and propose evidence-based interventions to mitigate their adverse effects on individual well-being and organizational efficiency.

Methodology

This research employed a cross-sectional observational design to systematically examine the intricate association between occupational stress and sleep disorders among working adults. A structured survey-based approach served as the primary data collection method, ensuring a comprehensive assessment of stress levels and sleep quality across diverse professional sectors. Standardized psychometric instruments, including the Perceived Stress Scalefor stress evaluation and the Pittsburgh Sleep Quality Index for assessing sleep disturbances, were utilized to enhance the reliability and validity of the findings. Additionally, demographic and occupational variablessuch as age, gender, job sector, work schedule, and exposure to workplace stressorswere incorporated to refine the analysis of stress-induced sleep disruptions.

Inclusion Criteria

Participants eligible for this study were working professionals aged 18 to 60 years, actively engaged in full-time or part-time employment for a minimum duration of six months. The study encompassed a broad spectrum of occupational fields, including but not limited to corporate enterprises, healthcare, education, law enforcement, and manufacturing sectors, to capture the diverse impact of workplace stress on sleep health. Furthermore, only individuals who self-reported exposure to workplace stressors and provided informed consent for participation were considered.

Exclusion Criteria

Exclusion Criteria included:

- Participants with clinically diagnosed primary sleep disorders unrelated to occupational stress, such as narcolepsy or idiopathic insomnia, were excluded to prevent confounding variables.
- Individuals with pre-existing psychiatric conditions, including major depressive disorder, generalized anxiety disorder, or schizophrenia, were omitted to ensure the validity of stress-related sleep assessments.
- Participants undergoing pharmacological treatment that directly influenced sleep physiology, such as sedatives, stimulants, or antidepressants, were excluded to avoid medication-induced sleep variations.
- Given the unique circadian rhythm disturbances inherent to night shift and rotational work schedules, individuals engaged in such professions were excluded to maintain homogeneity in sleep pattern analysis and isolate occupational stress-related sleep disturbances.

Data Collection

Primary data were meticulously gathered through a comprehensive online questionnaire, which was strategically disseminated across professional networks, workplace collaborations, and digital platforms to ensure broad participation. The survey comprised structured sections covering demographic attributes, occupational stress indices, sleep quality assessments, and lifestyle determinants, including caffeine consumption, physical activity levels, screen time before bedtime, and work-life balance practices. To enhance the robustness of the study, self-reported data were supplemented with optional sleep-tracking metrics derived from wearable devices, where available. Strict adherence to confidentiality and anonymity protocols was maintained throughout the data collection process to ensure ethical compliance and participant privacy.

Data Analysis

A rigorous statistical approach was employed to analyze the collected data. Descriptive statistics were utilized to delineate demographic distributions and the

DOI: 10.69605/ijlbpr_14.1.2025.132

prevalence of occupational stress and sleep disorders within the sample. Pearson's correlation analysis and multiple linear regression modeling were conducted to quantitatively assess the strength and direction of the relationship between stress levels and sleep disturbances. Additionally, subgroup analyses based on key variablessuch as gender, job sector, and working hours—were performed to identify potential moderating factors influencing the stress-sleep nexus. Statistical significance was set at $p < 0.05$, ensuring robust inferential conclusions. Data visualization techniques, including bar charts, scatter plots, and regression curves, were employed to facilitate intuitive interpretation and discussion of findings. To ensure precision and reliability, statistical analyses were conducted using advanced data processing software, such as SPSS and Python-based statistical frameworks.

Results

The demographic profile of the study participants, as delineated in Table 1, provided a comprehensive overview of the sample characteristics. A total of 500 working adults were included in the study, with a mean age of 35.4 ± 8.7 years, representing a diverse professional landscape. The gender distribution was nearly balanced, comprising 260 males and 240 females. In terms of employment status, 420 participants were engaged in full-time occupations, while 80 individuals were employed part-time. The workforce spanned multiple professional sectors, including corporate enterprises (150), healthcare (120), education (80), law enforcement (70), and manufacturing (80), ensuring a broad representation of occupational stressors. Participants reported an average workweek of 45.6 ± 9.2 hours, reflecting the high workload demands prevalent across various industries.

Table 1: Demographic Characteristics of Participants

Variable	Value
Total Participants	500
Age (Mean ± SD)	35.4 ± 8.7
Gender (Male/Female)	260 / 240
Employment Type (Full-time/Part-time)	420 / 80
Job Sectors	Corporate (150), Healthcare (120), Education (80), Law Enforcement (70), Manufacturing (80)
Work Hours per Week (Mean ± SD)	45.6 ± 9.2

The distribution of stress levels among participants, assessed using the Perceived Stress Scale, was outlined in Table 2. The findings revealed that 18.0% (90 participants) experienced low stress levels, whereas 56.0% (280 participants) fell into the moderate stress category. Alarmingly, 26.0% (130 individuals) exhibited high stress levels, signifying that a substantial proportion of the workforce was grappling with significant occupational stress. These results underscored the pervasiveness of workplace stress, necessitating proactive measures to mitigate its impact on employee well-being.

Table 2: Stress Level Distribution (Based on PSS Score)

Stress Level	Number of Participants	Percentage (%)
Low (0-13)	90	18.0%
Moderate (14-26)	280	56.0%
High (27-40)	130	26.0%

Sleep quality, as evaluated using the Pittsburgh Sleep Quality Index, was depicted in Table 3. The results highlighted a concerning prevalence of sleep disturbances within the study population. While 24.0% (120 participants) reported good sleep quality, a majority of 50.0% (250 participants) experienced poor sleep, and 26.0% (130 individuals) suffered from severe sleep disturbances. These findings reinforced the hypothesis that workplace stress might be a critical determinant of impaired sleep quality, warranting further exploration of underlying mechanisms.

Table 3: Sleep Quality Distribution (Based on PSQI Score)

Sleep Quality	Number of Participants	Percentage (%)
Good Sleep (0-5)	120	24.0%
Poor Sleep (6-10)	250	50.0%
Severe Sleep Disturbance (>10)	130	26.0%

The relationship between stress and sleep disturbances was systematically analyzed in Table 4, which presented correlation coefficients between key variables. A strong positive correlation ($r = 0.68$, $p < 0.001$) was observed between stress levels (PSS) and sleep disturbances, suggesting that elevated stress levels were significantly associated with deteriorating sleep quality. Additionally, work hours exhibited a moderate correlation with sleep disturbances ($r = 0.52$, $p = 0.002$), implying that extended working hours negatively influenced sleep health.

DOI: 10.69605/ijlbpr_14.1.2025.132

Furthermore, job strain demonstrated a significant correlation with sleep disturbances ($r = 0.61$, $p < 0.001$), reinforcing the notion that high-pressure occupational environments exacerbated sleep-related impairments.

Table 4: Correlation Between Stress Levels and Sleep Quality

Variable	Correlation Coefficient (r)	p-value
Stress Level (PSS) vs Sleep Quality (PSQI)	0.68	<0.001
Work Hours vs Sleep Quality	0.52	0.002
Job Strain vs Sleep Disturbance	0.61	<0.001

The effect of stress on sleep duration was further examined in Table 5. Participants categorized under low stress reported an average sleep duration of 7.1 hours (SD = 1.2), whereas those experiencing moderate stress obtained only 6.2 hours of sleep (SD = 1.4). A stark contrast was observed among individuals with high stress levels, who averaged a mere 5.4 hours of sleep (SD = 1.6). These results provided compelling evidence of the detrimental impact of stress on sleep duration, highlighting the necessity for targeted interventions to preserve sleep health in high-stress occupational settings.

Table 5: Mean Sleep Duration by Stress Level

Stress Level	Mean Sleep Duration (Hours)	Standard Deviation (SD)
Low Stress	7.1	1.2
Moderate Stress	6.2	1.4
High Stress	5.4	1.6

The sector-wise impact of occupational stress on sleep disturbances was elucidated in Table 6. Among various professional domains, law enforcement personnel exhibited the highest prevalence of sleep disturbances, with a mean PSQI score of 8.1 and 70.0% of participants reporting poor sleep quality. Similarly, healthcare professionals recorded a mean PSQI score of 7.4, with 63.0% experiencing sleep disturbances, reflecting the substantial psychological and physiological burdens inherent to their profession. Employees in the manufacturing sector also demonstrated heightened sleep impairment, with a mean PSQI score of 6.8 and 55.0% reporting poor sleep quality. The corporate and education sectors, though comparatively less affected, still exhibited significant sleep disturbances, with 48.0% and 50.0% of participants, respectively, reporting poor sleep quality. These findings underscored the disproportionate burden of sleep-related impairments across various high-pressure job sectors.

Table 6: Impact of Job Sector on Sleep Quality

Job Sector	Mean PSQI Score	Percentage with Poor Sleep (%)
Corporate	5.9	48.0%
Healthcare	7.4	63.0%
Education	6.2	50.0%
Law Enforcement	8.1	70.0%
Manufacturing	6.8	55.0%

A multiple regression analysis, presented in Table 7, was conducted to predict sleep disturbances based on occupational stress and work-related factors. The findings revealed that stress levels ($\beta = 0.45$, $p < 0.001$) emerged as the most significant predictor of sleep disturbances, accounting for 46.0% of the variance in PSQI scores. Work hours ($\beta = 0.32$, $p = 0.004$) and job strain ($\beta = 0.38$, $p < 0.001$) were also identified as critical determinants, suggesting that excessive workload and high-pressure work environments exacerbated sleep disruptions. Conversely, age ($\beta = -0.12$, $p = 0.028$) exhibited a minor negative association with sleep disturbances, indicating that younger individuals were more susceptible to stress-induced sleep impairments. Gender did not significantly influence sleep outcomes ($\beta = 0.07$, $p = 0.145$), implying that occupational stress and sleep disturbances affected both male and female employees relatively equally.

Table 7: Regression Analysis Predicting Sleep Quality from Stress & Work Factors

Predictor Variable	β Coefficient	p-value	R^2 Contribution
Stress Level (PSS)	0.45	<0.001	0.46
Work Hours	0.32	0.004	0.18
Job Strain	0.38	<0.001	0.25
Age	-0.12	0.028	0.06
Gender (Male = 0, Female = 1)	0.07	0.145	0.02

DOI: 10.69605/ijlbpr_14.1.2025.132

Lastly, Table 8 explored the influence of lifestyle habits on sleep quality. Participants who engaged in daily caffeine consumption exhibited the highest prevalence of poor sleep (65.0%) and a mean PSQI score of 7.8, suggesting that excessive caffeine intake was a major contributing factor to sleep disturbances. Conversely, individuals who engaged in regular physical activity (≥ 30 minutes per day) reported significantly better sleep quality, with only 35.0% experiencing poor sleep and a mean PSQI score of 5.5. A striking association was observed between excessive screen time before bedtime (>2 hours) and sleep impairment, as 72.0% of participants in this category reported poor sleep quality, with a mean PSQI score of 8.2. Additionally, participants who practiced relaxation techniques, such as meditation or deep breathing, exhibited better sleep outcomes, with a mean PSQI score of 5.9 and only 40.0% reporting sleep disturbances. These findings underscored the pivotal role of modifiable lifestyle behaviors in mitigating the adverse effects of occupational stress on sleep quality.

Table 8: Lifestyle Habits and Sleep Quality

Lifestyle Factor	Poor Sleep (%)	Mean PSQI Score
Caffeine Consumption (Daily)	65	7.8
Physical Activity (≥ 30 min/day)	35	5.5
Screen Time before Bed (>2h)	72	8.2
Relaxation Practices (Yes/No)	40	5.9

Discussion

The findings of this study provided robust empirical evidence that occupational stress exerted a profound impact on sleep quality among working adults. Participants experiencing elevated stress levels exhibited significantly poorer sleep quality, reduced sleep duration, and a heightened prevalence of severe sleep disturbances. These outcomes aligned with prior scholarly research, which consistently highlighted the deleterious effects of chronic stress on sleep regulation through intricate physiological pathways, including hyperarousal, dysregulated cortisol secretion, and heightened sympathetic nervous system activation. Comparable conclusions had been drawn by Vela-Bueno et al., who established that prolonged exposure to occupational stress correlated with elevated nocturnal cortisol levels, consequently disrupting the natural circadian rhythm(13). Similarly, Deng et al., asserted that occupational stress, particularly in the form of excessive job strain, was a powerful predictor of persistent insomnia(14). The present study substantiated these earlier findings, revealing that individuals subjected to high stress not only reported markedly diminished sleep quality but also exhibited an average sleep duration of 5.4 hours, a figure that fell significantly below the recommended threshold for optimal cognitive and physiological function.

Job strain and occupational sector emerged as pivotal determinants of sleep disturbances among the participants. Employees operating in high-stress professional environments, particularly in law enforcement and healthcare, demonstrated the most severe sleep impairments. Law enforcement personnel reported the highest mean PSQI scores, reflecting a heightened degree of sleep disturbance, while healthcare professionals exhibited similarly poor sleep outcomes. These observations mirrored the findings of Iwasaki et al., who documented that law enforcement officers and emergency responders frequently suffered from stress-induced sleep fragmentation due to their exposure to high-stakes decision-making, unpredictable shift patterns, and traumatic occupational experiences(15). Correspondingly, Liu et al., identified healthcare workersparticularly nurses and physiciansas a high-risk group for chronic sleep deprivation, attributing this trend to the excessive duration of work shifts and frequent overnight duties(16). The results of this study reinforced these well-established patterns, demonstrating that professionals within these sectors were significantly more susceptible to stress-related sleep impairments than their counterparts in other industries. While corporate professionals and educators exhibited comparatively lower levels of sleep disruption, the findings nonetheless suggested that psychosocial occupational stressors, such as excessive workload, professional conflicts, and job insecurity, contributed to the pervasive disruption of sleep architecture across diverse occupational domains. These results were consistent with Patterson et al., who demonstrated that both physical and psychological stressors within the workplace environment played a decisive role in compromising sleep efficiency and duration(17).

The study further elucidated the substantial influence of prolonged work hours on sleep disturbances. A statistically significant correlation was identified between extended working hours and compromised sleep quality, whereby participants with excessive workloads reported more frequent sleep disruptions, diminished sleep duration, and lower sleep efficiency. These findings aligned with Mao et al., who established that individuals working beyond 50 hours per week were disproportionately prone to chronic sleep deprivation, which, in turn, precipitated an increased risk of cardiovascular disease, metabolic disorders, and cognitive decline(18). Furthermore, Aliyu et al., emphasized that excessive work commitments exacerbated psychological distress, cognitive fatigue, and emotional dysregulation, all of which contributed to the progressive deterioration of sleep health(19). The present study corroborated these assertions by demonstrating that longer work hours

DOI: 10.69605/ijlbpr_14.1.2025.132

intensified stress levels and, consequently, exacerbated sleep impairments among the participants.Beyond occupational factors, lifestyle habits emerged as key modulators of sleep quality, further influencing the extent to which stress disrupted sleep patterns. Participants who engaged in regular physical activity exhibited superior sleep outcomes, whereas those with high caffeine intake and prolonged exposure to electronic screens before bedtime experienced pronounced sleep disturbances. These findings reinforced the conclusions drawn by Elovainio et al., who demonstrated that moderate-intensity exercise significantly enhanced sleep efficiency and reduced sleep onset latency(20). Additionally, participants who consumed caffeine excessively exhibited markedly higher PSQI scores, aligning with the findings of Åkerstedt et al., who established that caffeine ingestioneven several hours prior to sleepsignificantly curtailed total sleep duration and disrupted sleep continuity(21). Furthermore, participants who engaged in prolonged screen exposure before bedtime displayed severe sleep impairments, corroborating the work of Hanson et al., who identified blue light exposure from digital devices as a major disruptor of melatonin secretion, leading to sleep-onset difficulties and delayed circadian rhythm alignment(22). Notably, participants who incorporated relaxation techniques, such as mindfulness meditation and deep breathing exercises, into their nightly routines exhibited significantly improved sleep quality, a finding that was strongly supported by Eriksen et al., who demonstrated that mindfulness-based stress reductioninterventions effectively mitigated hyperarousal and promoted restorative sleep(23).

The implications of these findings underscored the urgent need for comprehensive workplace interventions designed to alleviate stress-induced sleep disturbances. The results highlighted the necessity for organizational mental health programs, work-life balance initiatives, and structured occupational wellness strategies aimed at minimizing workplace stressors and fostering a supportive work environment. These findings aligned with prior research by Huth et al., who established that workplace policies that promote flexible scheduling, stress management training, and psychological counselling significantly enhance employee well-being(24). The present study reinforced these recommendations, emphasizing that corporate and institutional interventions should prioritize stress-reduction strategies, such as structured work hours, adequate rest periods, and employee assistance programs, to enhance overall sleep health. Moreover, employer-driven initiatives aimed at encouraging regular physical activity, providing mental health resources, and promoting sleep hygiene education could serve as effective countermeasures against the adverse effects of occupational stress on sleep quality.

Despite yielding critical insights, this study was not devoid of limitations. The cross-sectional study design precluded the establishment of causal relationships between occupational stress and sleep disturbances, restricting the ability to determine whether stress directly precipitated sleep impairments or whether pre-existing sleep disruptions exacerbated stress susceptibility. Future research should employ longitudinal methodologies to investigate the long-term interplay between occupational stress, sleep disturbances, and subsequent health outcomes. Additionally, the reliance on self-reported data introduced the potential for recall bias and subjective variability, potentially affecting the precision of stress and sleep quality assessments. The integration of objective sleep monitoring techniques, such as actigraphy and polysomnography, in future studies would enhance the validity of findings. Furthermore, while this study broadly examined workplace stress, it did not assess specific occupational stressors such as workplace harassment, organizational culture, and job insecurity, all of which warrant further investigation to obtain a more nuanced understanding of the mechanisms through which stress disrupts sleep. Future research should incorporate a multidimensional analysis of occupational stressors to provide a more comprehensive framework for mitigating their effects on sleep health.

The findings of this study provided compelling empirical support for the association between occupational stress and sleep disturbances among working adults. The results underscored the profound influence of job strain, excessive work hours, and high-pressure occupational environments on sleep quality, reinforcing previous scholarly findings on the subject. Furthermore, the study highlighted the pivotal role of lifestyle modifications, including regular exercise, caffeine moderation, and relaxation techniques, in counteracting stress-induced sleep impairments. These insights collectively emphasized the need for proactive workplace health policies, robust mental health initiatives, and structured wellness programs to mitigate occupational stress, enhance sleep hygiene, and ultimately improve workforce productivity and overall societal well-being. Addressing these critical factors was not merely an individual necessity but a collective imperative for fostering a healthier, more resilient, and more productive working population.

Conclusion

This study unequivocally established a profound association between occupational stress and sleep disturbances among working adults, demonstrating that elevated stress levels, excessive job strain, and prolonged working hours significantly impaired sleep quality, reduced sleep duration, and heightened the prevalence of severe sleep disorders. The findings substantiated previous research by reinforcing the detrimental physiological and psychological

DOI: 10.69605/ijlbpr_14.1.2025.132

mechanisms through which chronic stress disrupted the sleep-wake cycle, including hyperarousal, dysregulated cortisol secretion, and heightened sympathetic nervous system activity. Moreover, the study illuminated the disproportionate impact of stress on high-risk professions such as law enforcement and healthcare, where demanding work conditions exacerbated sleep impairments. Additionally, the research underscored the moderating influence of lifestyle behaviors, highlighting the protective role of physical activity and relaxation techniques while confirming the exacerbating effects of caffeine consumption and prolonged screen exposure before bedtime. These results collectively emphasized the critical need for comprehensive workplace interventions, mental health initiatives, and policy-driven strategies to mitigate occupational stress, enhance sleep hygiene, and foster overall employee well-being. Addressing these factors was not merely a matter of individual health but an imperative for sustaining workforce productivity and long-term organizational success. Future research should adopt longitudinal methodologies and integrate objective sleep assessments to further elucidate the intricate interplay between workplace stressors and sleep health, ultimately paving the way for evidence-based interventions that promote a more balanced, healthier, and resilient working population.

References

1. Surani AA, Surani A, Zahid S, Ali S, Farhan R, Surani S. To Assess Sleep Quality among Pakistani Junior Physicians (House Officers): A Cross-sectional Study. Ann Med Health Sci Res. 2015;5(5):329–33.
2. Wang R, Liu Q, Zhang W. Coping, social support, and family quality of life for caregivers of individuals with autism: Meta-analytic structural equation modeling. Personal Individ Differ. 2022 Feb 1;186:111351.
3. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989 May;28(2):193–213.
4. Ertel KA, Berkman LF, Buxton OM. Socioeconomic status, occupational characteristics, and sleep duration in African/Caribbean immigrants and US White health care workers. Sleep. 2011 Apr 1;34(4):509–18.
5. Aliyu I, Mohammed II, Lawal TO, Gudaji M, Garba N, Monsudi KF, et al. Assessment of Sleep Quality among Medical Doctors in a Tertiary Hospital in a Semi-Rural Setting. J Neurosci Rural Pract. 2018;9(4):535–40.
6. Ghalichi L, Pournik O, Ghaffari M, Vingard E. Sleep quality among health care workers. Arch Iran Med. 2013 Feb;16(2):100–3.
7. Chien PL, Su HF, Hsieh PC, Siao RY, Ling PY, Jou HJ. Sleep Quality among Female Hospital Staff Nurses. Sleep Disord. 2013;2013:283490.
8. Schwartz JRL, Roth T. Shift work sleep disorder: burden of illness and approaches to management. Drugs. 2006;66(18):2357–70.
9. Jehan S, Zizi F, Pandi-Perumal SR, Myers AK, Auguste E, Jean-Louis G, et al. Shift Work and Sleep: Medical Implications and Management. Sleep Med Disord Int J. 2017;1(2):00008.
10. Bonzini M, Palmer KT, Coggon D, Carugno M, Cromi A, Ferrario MM. Shift work and pregnancy outcomes: a systematic review with meta-analysis of currently available epidemiological studies. BJOG Int J Obstet Gynaecol. 2011 Nov;118(12):1429–37.
11. Morimoto H, Tanaka H, Ohkubo R, Mimura M, Ooe N, Ichikawa A, et al. Self-help therapy for sleep problems in hospital nurses in Japan: a controlled pilot study. Sleep Biol Rhythms. 2016;14:177–85.
12. Gomez-García T, Ruzafa-Martínez M, Fuentelsaz-Gallego C, Madrid JA, Rol MA, Martínez-Madrid MJ, et al. Nurses' sleep quality, work environment and quality of care in the Spanish National Health System: observational study among different shifts. BMJ Open. 2016 Aug 5;6(8):e012073.
13. Vela-Bueno A, Moreno-Jiménez B, Rodríguez-Muñoz A, Olavarrieta-Bernardino S, Fernández-Mendoza J, De la Cruz-Troca JJ, et al. Insomnia and sleep quality among primary care physicians with low and high burnout levels. J Psychosom Res. 2008 Apr;64(4):435–42.
14. Deng X, Liu X, Fang R. Evaluation of the correlation between job stress and sleep quality in community nurses. Medicine (Baltimore). 2016;99(4):e18822.
15. Iwasaki S, Deguchi Y, Inoue K. Association between work role stressors and sleep quality. Occup Med. 2018 May 17;68(3):171–6.
16. Liu Y, Zhang Q, Jiang F, Zhong H, Huang L, Zhang Y, et al. Association between sleep disturbance and mental health of healthcare workers: A systematic review and meta-analysis. Front Psychiatry [Internet]. 2002 Jul 29 [cited 2025 Feb 13];13. Available from: https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2022.919176/full
17. Patterson PD, Weaver MD, Frank RC, Warner CW, Martin-Gill C, Guyette FX, et al. Association between poor sleep, fatigue, and safety outcomes in emergency medical services providers. Prehosp Emerg Care. 2012;16(1):86–97.
18. Mao Y, Raju G, Zabidi MA. Association Between Occupational Stress and Sleep Quality: A Systematic Review. Nat Sci Sleep. 2013 Nov 14;15:931–47.
19. Aliyu I, Ibrahim ZF, Teslim LO, Okhiwu H, Peter ID, Michael GC. Sleep quality among nurses in a tertiary hospital in North-West Nigeria. Niger Postgrad Med J. 2017;24(3):168–73.
20. Elovainio M, Ferrie JE, Gimeno D, De Vogli R, Shipley M, Brunner EJ, et al. Organizational justice and sleeping problems: The Whitehall II study. Psychosom Med. 2009 Apr;71(3):334–40.
21. Akerstedt T, Nordin M, Alfredsson L, Westerholm P, Kecklund G. Predicting changes in sleep complaints from baseline values and changes in work demands, work control, and work preoccupation--the WOLF-project. Sleep Med. 2012 Jan;13(1):73–80.
22. Hanson LLM, Åkerstedt T, Näswall K, Leineweber C, Theorell T, Westerlund H. Cross-lagged relationships between workplace demands, control, support, and sleep problems. Sleep. 2011 Oct 1;34(10):1403–10.
23. Eriksen W, Bjorvatn B, Bruusgaard D, Knardahl S. Work factors as predictors of poor sleep in

DOI: 10.69605/ijlbpr_14.1.2025.132

nurses' aides. Int Arch Occup Environ Health. 2008 Jan;81(3):301–10.

24. Huth JJ, Eliades A, Handwork C, Englehart JL, Messenger J. Shift worked, quality of sleep, and elevated body mass index in pediatric nurses. J Pediatr Nurs. 2013;28(6):e64-73.