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Sleep Quality Mediating the Relationship between Workload Stress and Emotional Exhaustion in Employed Females

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A B S T R A C T

This study aimed to examine the mediating role of sleep quality in the relationship between workload stress and emotional exhaustion among employed females. A descriptive correlational design was adopted, and data were collected from 390 employed women in Canada using standardized self-report instruments. Workload stress was measured by the Workload Subscale of the Occupational Stress Inventory–Revised (Osipow, 1998), sleep quality by the Pittsburgh Sleep Quality Index (Buysse et al., 1989), and emotional exhaustion by the Maslach Burnout Inventory (Maslach & Jackson, 1981). Sampling was determined using the Morgan and Krejcie (1970) table, ensuring representativeness across occupational groups. Data analysis was conducted using SPSS-27 for descriptive and correlational statistics and AMOS-21 for Structural Equation Modeling (SEM) to test the mediation model. Model fit was evaluated through multiple indices, including χ^2/df, GFI, AGFI, CFI, TLI, and RMSEA. The results indicated that workload stress significantly predicted emotional exhaustion both directly ($\beta = 0.41$, $p < .001$) and indirectly through sleep quality ($\beta = 0.16$, $p < .001$). Workload stress was positively associated with poor sleep quality ($\beta = 0.38$, $p < .001$), and poor sleep quality was strongly related to higher emotional exhaustion ($\beta = 0.44$, $p < .001$). The total effect of workload stress on emotional exhaustion was substantial ($\beta = 0.57$, $p < .001$). Model fit indices demonstrated an excellent fit ($\chi^2(54) = 87.43$, $\chi^2/df = 1.62$, GFI = 0.96, AGFI = 0.93, CFI = 0.98, TLI = 0.97, RMSEA = 0.041), confirming the adequacy of the hypothesized model. The study highlights that workload stress significantly contributes to emotional exhaustion among employed females, with sleep quality serving as a crucial mediating mechanism. These findings emphasize the importance of sleep health as a psychological and physiological buffer in occupational stress management. Organizations should prioritize interventions that regulate workload and promote restorative sleep to mitigate emotional exhaustion and enhance employee well-being.

Keywords: *Workload Stress; Sleep Quality; Emotional Exhaustion; Mediation; Female Employees; Occupational Health*

1. Introduction

In recent years, the intersection between occupational stress, sleep quality, and emotional exhaustion has become a critical focus in psychological and occupational health research. Emotional exhaustion represents the central dimension of burnout, characterized by the depletion of emotional and physical resources as a result of prolonged exposure to stressors in the work environment (Khan et al., 2025; Wu et al., 2024). It has been strongly linked to decreased job satisfaction, lower organizational commitment, and deteriorating physical and psychological health (Cai & Xiu, 2023; Tan et al., 2025). Within the broader framework of occupational well-being, understanding how sleep quality mediates the relationship between workload stress and emotional exhaustion among employed females is essential, particularly given the unique psychosocial and biological stressors women encounter in balancing professional and domestic responsibilities (Rozmann, 2025; Tello et al., 2025).

Workload stress is widely recognized as a precursor to burnout and emotional exhaustion, especially in demanding professional contexts (Bulova et al., 2025; Ma et al., 2025). Excessive workload increases physiological arousal and cognitive rumination, both of which negatively affect restorative sleep (Rajbahak et al., 2025; Tarigan et al., 2024). Sleep disturbance, in turn, impairs emotional regulation and resilience, exacerbating exhaustion and diminishing work performance (Hong, 2025; Sørengaard & Saksvik-Lehouillier, 2022). Studies have emphasized that individuals exposed to chronic work overload often experience difficulties initiating and maintaining sleep, shorter sleep duration, and reduced sleep efficiency—all of which mediate the stress–burnout pathway (Chen, 2023; Reyes-Rodriguez et al., 2025).

The relationship between workload stress and emotional exhaustion has been demonstrated across diverse occupational settings. Among healthcare professionals, constant exposure to time pressure, patient demands, and emotional labor has been shown to significantly elevate exhaustion levels (Filho et al., 2023; Karimian et al., 2025). Similarly, in the academic and service sectors, employees facing high workloads report greater fatigue, irritability, and cognitive weariness (Khan et al., 2025; Prasetyo et al., 2024). As suggested by the Job Demands–Resources (JD-R) theory, excessive job demands (such as workload) deplete energy reserves and impair recovery processes, particularly when personal or organizational resources are insufficient to compensate (Potapiuk & Tur, 2024; Wirkkala et al., 2024). The result is a vicious cycle of chronic fatigue, emotional disengagement, and diminished occupational well-being.

Sleep quality emerges as a critical mediator in this dynamic. Physiologically, poor sleep undermines the brain's ability to restore affective and cognitive balance, weakening emotional resilience (Kayumova et al., 2025; Ntumi et al., 2025). Psychologically, sleep deprivation amplifies negative affect, impairs executive functioning, and reduces coping capacity, making individuals more susceptible to exhaustion and burnout (Sørengaard & Saksvik-Lehouillier, 2022; Tello et al., 2025). For instance, research among nurses has revealed that disturbed sleep predicts higher emotional exhaustion, regardless of shift pattern or workload (Hong, 2025; Rozmann, 2025). Likewise, a study among educators found that work-life imbalance and supervisory load significantly predicted burnout through poor sleep quality (Ntumi et al., 2025). These findings highlight sleep as not merely a consequence of stress but an active mechanism linking workload to psychological fatigue.

Moreover, gender-specific vulnerabilities further complicate this relationship. Female employees often face compounded stressors stemming from gender role expectations, caregiving duties, and occupational inequities (Rajbahak et al., 2025; Sanae et al., 2025). Studies have shown that women experience higher rates of sleep disruption, stress sensitivity, and emotional exhaustion compared to their male counterparts (Kayumova et al., 2025; Wu et al., 2024). Biological factors, such as hormonal fluctuations, interact with psychosocial stress to produce cumulative fatigue and insomnia symptoms (Rozmann, 2025). These gendered dynamics underscore the importance of focusing research on employed women to better understand how workload stress translates into emotional exhaustion through the mediating influence of sleep quality.

The COVID-19 pandemic further illuminated these interconnections. Frontline professionals demonstrated an unprecedented rise in emotional exhaustion and sleep disturbances due to prolonged exposure to uncertainty, moral distress, and extended work hours (Chen, 2023; Filho et al., 2023). Technological demands and digital fatigue have also emerged as significant predictors of emotional exhaustion, with constant connectivity blurring boundaries between work and personal life (Jiang et al., 2024; Wirkkala et al., 2024). This evolving digitalized work culture intensifies workload stress and disrupts sleep hygiene through nighttime device use and reduced detachment from job-related concerns (Tello et al., 2025). Consequently,

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understanding how sleep mediates these effects remains crucial for designing targeted interventions.

Burnout theories consistently emphasize that emotional exhaustion is the first and most critical stage of the burnout process (Cai & Xiu, 2023; Tan et al., 2025). Emotional exhaustion not only affects individual well-being but also leads to adverse organizational outcomes, including reduced productivity, higher absenteeism, and increased turnover intention (Potapiuk & Tur, 2024; Sørengaard & Saksvik-Lehouillier, 2022). In the healthcare sector, exhaustion has been linked to impaired patient safety and decreased quality of care (Hong, 2025; Ma et al., 2025). In academic settings, it undermines teaching performance, motivation, and engagement (Reyes-Rodriguez et al., 2025; Sanae et al., 2025). These outcomes underscore the necessity of identifying modifiable mediators—such as sleep quality—that can interrupt the progression from workload stress to emotional exhaustion.

Cultural and contextual factors also influence how workload stress and sleep quality interact to produce exhaustion. For instance, cross-sectional research in different contexts suggests that diverse work cultures may normalize overwork, thereby increasing chronic stress exposure (Cai & Xiu, 2023; Ma et al., 2025). Conversely, studies in European contexts highlight differences in organizational support systems and gender equality policies that mitigate these effects (Bulova et al., 2025; Rozmann, 2025). In North American settings, emerging evidence points to sociocultural expectations of dual-role responsibilities as a major determinant of female burnout and sleep disturbances (Rajbahak et al., 2025; Tello et al., 2025). Taken together, these findings reveal the global scope of the issue while emphasizing the need for culturally sensitive research.

Additionally, personality and leadership factors can modulate this triadic relationship. For example, Machiavellian leadership styles intensify emotional exhaustion by undermining employees' sense of control and fairness (Cai & Xiu, 2023). In contrast, benevolent leadership has been shown to buffer the negative effects of poor sleep on work behaviors (Jiang et al., 2024). Similarly, leisure crafting and mindfulness interventions have demonstrated promise in reducing emotional exhaustion by improving sleep regulation and recovery processes (Chen, 2023; Ntumi et al., 2025). These insights suggest that both individual and organizational strategies targeting sleep hygiene may yield significant psychological and occupational benefits.

From a physiological standpoint, the interplay between stress and sleep is mediated through the hypothalamic–pituitary–adrenal (HPA) axis. Prolonged activation of this system under chronic workload stress disrupts circadian rhythms, reduces melatonin secretion, and impairs restorative sleep cycles (Kayumova et al., 2025; Ma et al., 2025). This dysregulation, in turn, perpetuates fatigue and emotional dyscontrol, forming a feedback loop that exacerbates exhaustion (Sørengaard & Saksvik-Lehouillier, 2022). The JD-R model and stress recovery frameworks converge in suggesting that quality sleep functions as a critical personal resource, enabling recovery from high job demands and preventing the depletion that characterizes emotional exhaustion (Prasetyo et al., 2024; Wirkkala et al., 2024).

Given these converging lines of evidence, the present study aims to investigate the mediating role of sleep quality in the relationship between workload stress and emotional exhaustion among employed females in Canada.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a descriptive correlational design to examine the mediating role of sleep quality in the relationship between workload stress and emotional exhaustion among employed females. The study population consisted of full-time working women from various occupational sectors in Canada. Based on the Krejcie and Morgan (1970) sample size determination table, a total of 390 participants were selected using a stratified random sampling method to ensure representation across different occupational categories such as healthcare, education, administration, and services. Participation was voluntary, and respondents provided informed consent before completing the questionnaire package, which included standardized scales for emotional exhaustion, sleep quality, and workload stress. Data collection was conducted anonymously to ensure confidentiality and authenticity of responses.

2.2. Measures

Emotional exhaustion was assessed using the Emotional Exhaustion subscale of the Maslach Burnout Inventory–Human Services Survey (MBI-HSS), developed by Maslach and Jackson (1981). This subscale consists of 9 items that measure feelings of being emotionally overextended and

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exhausted by one's work (e.g., "I feel emotionally drained from my work"). Responses are rated on a 7-point Likert scale ranging from 0 (never) to 6 (every day), with higher scores indicating greater emotional exhaustion. The MBI-HSS has three subscales—Emotional Exhaustion, Depersonalization, and Personal Accomplishment—but only the Emotional Exhaustion subscale was used in this study as the dependent variable. Extensive research has confirmed the reliability (Cronbach's α typically > .85) and construct validity of this scale across occupational and cultural groups, making it one of the most widely accepted tools for assessing burnout components.

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) developed by Buysse, Reynolds, Monk, Berman, and Kupfer (1989). The PSQI is a 19-item self-report questionnaire designed to assess sleep quality and disturbances over a one-month period. It contains seven component subscales: (1) subjective sleep quality, (2) sleep latency, (3) sleep duration, (4) habitual sleep efficiency, (5) sleep disturbances, (6) use of sleeping medication, and (7) daytime dysfunction. Each component yields a score from 0 to 3, and their sum produces a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality. The PSQI has demonstrated strong internal consistency (Cronbach's α ≈ .83) and test–retest reliability, and its criterion and construct validity have been established in multiple clinical and non-clinical populations worldwide.

Workload stress was measured using the Workload Subscale of the Occupational Stress Inventory–Revised (OSI-R) developed by Osipow (1998). This subscale is part of the Occupational Roles Questionnaire (ORQ) within the OSI-R and contains 10 items assessing perceived quantitative workload, time pressure, and role overload (e.g., "I have too many tasks to complete within my workday"). Items are rated on a 5-point Likert scale ranging from 1 (rarely or never true) to 5 (true most of the time). Higher scores indicate higher levels of perceived workload stress. The OSI-R demonstrates excellent psychometric properties, with reported Cronbach's alpha coefficients exceeding .80 and robust construct and convergent validity confirmed in occupational health and psychological research.

2.3. Data Analysis

Data were analyzed using SPSS version 27 and AMOS version 21. Descriptive statistics (mean, standard deviation, frequency, and percentage) were computed to summarize demographic characteristics and main study variables. Pearson correlation analysis was performed to determine the strength and direction of relationships between workload stress, sleep quality, and emotional exhaustion. Furthermore, a Structural Equation Modeling (SEM) approach was applied to test the hypothesized mediation model, assessing both direct and indirect paths. Model fit indices including χ^2/df, GFI, AGFI, CFI, TLI, and RMSEA were used to evaluate model adequacy. Statistical significance was determined at $p < .05$.

3. Findings and Results

Of the 390 respondents, 146 (37.44%) were aged between 25–34 years, 112 (28.72%) were between 35–44 years, and 85 (21.79%) were aged 45 and above, while 47 (12.05%) were below 25 years. In terms of educational attainment, 173 (44.36%) participants held a bachelor's degree, 124 (31.79%) a master's degree, and 61 (15.64%) a high school diploma, while 32 (8.21%) had a doctoral qualification. Regarding occupational sectors, 102 (26.15%) were employed in healthcare, 98 (25.13%) in education, 87 (22.31%) in administration, and 103 (26.41%) in service industries. The mean work experience of participants was 9.47 years (SD = 3.81), and the average weekly working hours were 41.82 (SD = 6.24).

Table 1

Descriptive Statistics for Study Variables (N = 390)

Variable	Mean (M)	Standard Deviation (SD)
Workload Stress	3.71	0.58
Sleep Quality	2.94	0.64
Emotional Exhaustion	4.08	0.72

As shown in Table 1, participants reported moderately high workload stress (M = 3.71, SD = 0.58) and emotional exhaustion (M = 4.08, SD = 0.72), while average sleep quality scores (M = 2.94, SD = 0.64) indicated generally poor sleep patterns. The relatively higher mean for emotional exhaustion suggests that sustained workload stress has manifested as emotional fatigue among employed females, supporting the theoretical expectation that

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occupational strain is accompanied by impaired restorative functioning.

Prior to conducting inferential analyses, the assumptions of normality, linearity, multicollinearity, and homoscedasticity were examined. Skewness values ranged from –0.37 to 0.46, and kurtosis values ranged from –0.59 to 0.71, indicating acceptable normality. The Durbin–Watson statistic was 1.92, suggesting no autocorrelation among residuals. Tolerance values for all predictors were greater than 0.76, and Variance Inflation Factor (VIF) values ranged between 1.12 and 1.28, confirming absence of multicollinearity. Scatterplots revealed a linear relationship between predictors and the dependent variable, while Levene's test for equality of variances was nonsignificant ($p = .216$), supporting the assumption of homoscedasticity. These findings confirmed that the data met all statistical assumptions required for Pearson correlation and SEM analyses.

Table 2

Pearson Correlations and Significance Levels Between Variables

Variables	1. Workload Stress	2. Sleep Quality	3. Emotional Exhaustion
1. Workload Stress	—		
2. Sleep Quality	.48** *(p < .001)*	—	
3. Emotional Exhaustion	.54** *(p < .001)*	.57** *(p < .001)*	—

The correlation results in Table 2 reveal significant positive associations among all variables. Workload stress was moderately correlated with sleep quality ($r = .48$, $p < .001$) and strongly correlated with emotional exhaustion ($r = .54$, $p < .001$). Additionally, poorer sleep quality was positively related to higher emotional exhaustion ($r = .57$, $p < .001$). These findings confirm that increased workload stress is associated with disrupted sleep patterns and heightened emotional fatigue, consistent with the hypothesized mediation framework.

Table 3

Model Fit Indices for the Structural Equation Model

Fit Index	χ^2	df	χ^2/df	GFI	AGFI	CFI	RMSEA	TLI
Model Fit	87.43	54	1.62	0.96	0.93	0.98	0.041	0.97

As shown in Table 3, the hypothesized structural equation model demonstrated excellent goodness-of-fit to the data ($\chi^2(54) = 87.43$, $p < .001$; $\chi^2/df = 1.62$; GFI = 0.96; AGFI = 0.93; CFI = 0.98; TLI = 0.97; RMSEA = 0.041). These fit indices fall well within the acceptable and recommended ranges, indicating that the proposed model adequately represents the relationships among workload stress, sleep quality, and emotional exhaustion in the sample.

Table 4

Total, Direct, and Indirect Path Coefficients Between Research Variables

Path	b	S.E.	β	p
Workload Stress → Emotional Exhaustion (Direct)	0.43	0.07	0.41	<.001
Workload Stress → Sleep Quality (Direct)	0.36	0.06	0.38	<.001
Sleep Quality → Emotional Exhaustion (Direct)	0.46	0.08	0.44	<.001
Workload Stress → Emotional Exhaustion (Indirect via Sleep Quality)	0.17	0.05	0.16	<.001
Total Effect: Workload Stress → Emotional Exhaustion	0.60	0.09	0.57	<.001

Table 4 displays the standardized and unstandardized path coefficients for the structural model. The direct effect of workload stress on emotional exhaustion was significant ($\beta = 0.41$, $p < .001$), confirming that higher workload stress predicts greater emotional fatigue. Additionally, workload stress significantly predicted poorer sleep quality ($\beta = 0.38$, $p < .001$), and poor sleep quality significantly predicted higher emotional exhaustion ($\beta = 0.44$, $p < .001$). The indirect effect of workload stress on emotional exhaustion through sleep quality was also significant ($\beta = 0.16$, $p < .001$), indicating a partial mediation effect. The total standardized effect ($\beta = 0.57$) underscores that both the

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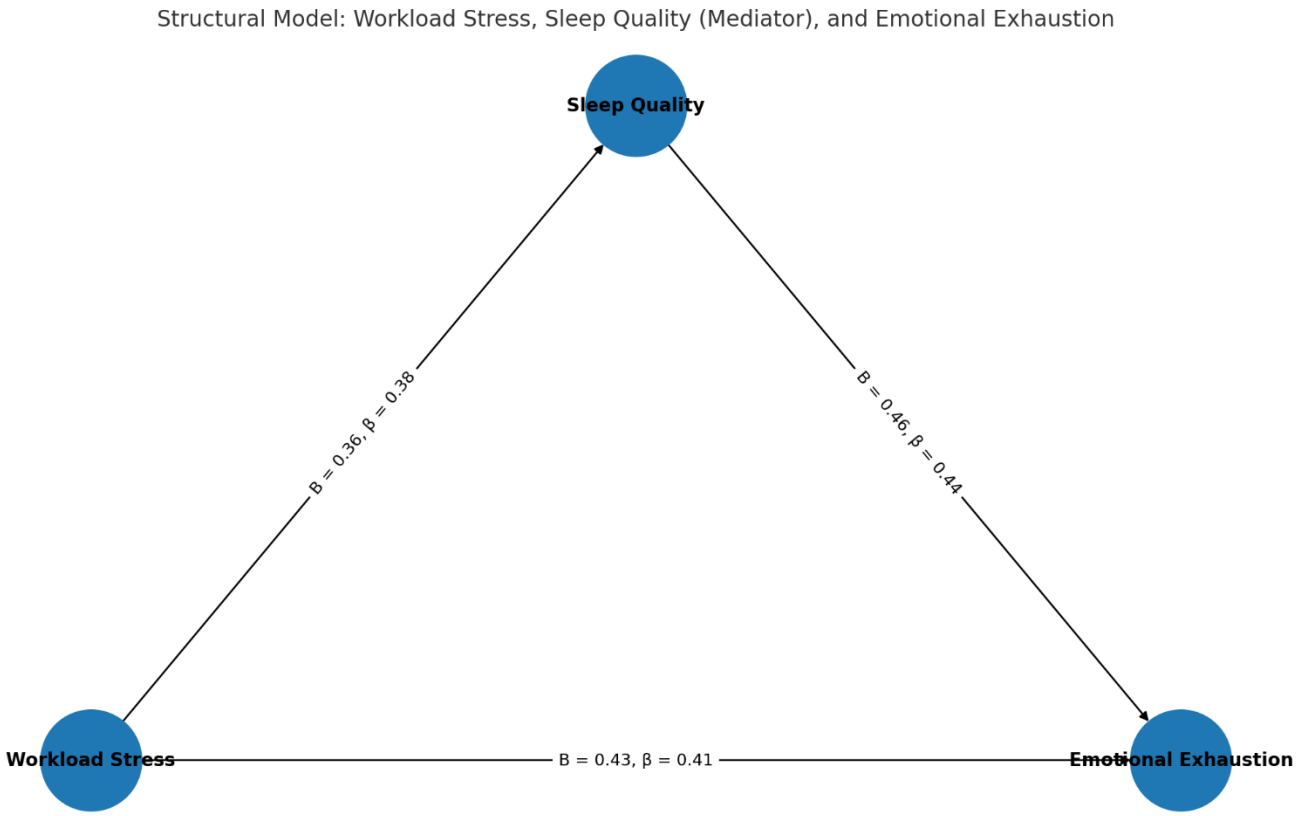
direct and indirect pathways jointly contribute to explaining emotional exhaustion among employed women. This pattern supports the hypothesized model, confirming sleep quality as a significant mediating variable in the relationship between workload stress and emotional exhaustion.

Figure 1

Model with Beta Coefficients



4. Discussion and Conclusion

The findings of this study revealed significant relationships among workload stress, sleep quality, and emotional exhaustion in employed females. Specifically, higher workload stress was found to be associated with poorer sleep quality, and both factors were significantly related to increased levels of emotional exhaustion. Moreover, the structural equation modeling analysis confirmed that sleep quality played a significant mediating role between workload stress and emotional exhaustion. These results indicate that while workload stress directly contributes to emotional exhaustion, its indirect impact through impaired sleep quality further amplifies psychological fatigue and burnout symptoms. This mediating pattern supports the conceptual framework of the Job Demands–Resources (JD-R) theory, highlighting that sleep quality acts as a vital personal resource that protects against the depletion caused by occupational demands (Tan et al., 2025; Wirkkala et al., 2024).

The significant direct association between workload stress and emotional exhaustion aligns with the extensive literature identifying workload as one of the most robust predictors of burnout (Bulova et al., 2025; Ma et al., 2025). When occupational responsibilities exceed an individual's coping capacity, emotional energy becomes depleted, resulting in fatigue, irritability, and disengagement from work. For instance, studies among healthcare and academic professionals have consistently found that prolonged workload contributes to emotional exhaustion by creating persistent strain and cognitive overload (Karimian et al., 2025; Khan et al., 2025). The present study extends these findings to a broader sample of employed women, indicating that the relationship is not profession-specific but rather a general occupational phenomenon. Additionally, the results corroborate evidence suggesting that female employees

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often experience intensified stress due to dual role responsibilities and socio-emotional demands within their personal and professional environments (Rajbahak et al., 2025; Sanae et al., 2025).

Furthermore, the mediating role of sleep quality observed in this study reinforces the growing recognition of sleep as a central mechanism linking occupational stress to emotional exhaustion (Hong, 2025; Rozmann, 2025). Employees experiencing heavy workload stress often report difficulties falling asleep, increased nocturnal awakenings, and reduced total sleep duration, which undermine the body's natural recovery processes. As shown in the current analysis, poor sleep quality significantly heightened emotional exhaustion levels, suggesting that insufficient restorative rest disrupts emotional regulation and cognitive resilience. Similar evidence was found in research on healthcare professionals, where compromised sleep quality due to long shifts and psychological demands predicted higher emotional exhaustion and reduced job performance (Filho et al., 2023; Tello et al., 2025). The consistency between the current results and prior studies emphasizes that improving sleep hygiene may serve as an effective protective factor against the detrimental psychological effects of workload stress.

The mediating pathway established in this study also resonates with previous findings in diverse cultural and occupational contexts. For instance, research among nurses in Japan and China demonstrated that emotional exhaustion arises not only from excessive work demands but also from inadequate sleep quality, which impairs concentration and emotional control (Cai & Xiu, 2023; Ma et al., 2025). Similarly, studies conducted during the COVID-19 pandemic have revealed that high stress and disrupted sleep patterns collectively contribute to burnout among healthcare workers and educators (Chen, 2023; Filho et al., 2023).

The negative relationship between sleep quality and emotional exhaustion in this research is consistent with the theoretical perspective that restorative sleep facilitates emotional recovery and cognitive functioning. Poor sleep quality leads to impaired regulation of the hypothalamic–pituitary–adrenal (HPA) axis, heightening stress reactivity and accelerating emotional depletion (Kayumova et al., 2025; Sørengaard & Saksvik-Lehouillier, 2022). This biological pathway explains why sleep-deprived individuals are more prone to exhaustion and negative affect even under moderate stress conditions. Empirical studies also confirm that interventions aimed at improving sleep hygiene—such as mindfulness training, relaxation techniques, and balanced work schedules—can effectively reduce emotional exhaustion among employees (Chen, 2023; Ntumi et al., 2025). The present findings reinforce these conclusions by demonstrating that enhancing sleep quality can serve as a mediating buffer, mitigating the impact of workload stress on emotional fatigue.

Interestingly, the magnitude of the indirect effect through sleep quality observed in this study was substantial, suggesting that restorative rest plays a greater role in moderating the effects of stress than previously assumed. Similar observations have been reported in occupational health studies highlighting that poor sleep not only exacerbates the emotional toll of workload stress but also reduces the ability to engage in adaptive coping behaviors (Rajbahak et al., 2025; Rozmann, 2025). This cumulative effect can create a self-perpetuating cycle, in which increased exhaustion leads to more disturbed sleep and consequently greater vulnerability to stress. Therefore, improving sleep quality among employed women may not only reduce emotional exhaustion but also foster long-term resilience and occupational engagement.

Additionally, the results revealed that the direct path from workload stress to emotional exhaustion remained significant even after accounting for sleep quality. This partial mediation suggests that, although sleep quality is a key mechanism, other factors such as social support, coping strategies, and work-life balance may also contribute to the relationship (Reyes-Rodriguez et al., 2025; Tello et al., 2025). Research on psychosocial predictors of burnout has demonstrated that supportive workplace environments, equitable reward structures, and job autonomy can alleviate emotional exhaustion even in high-demand settings (Tan et al., 2025; Wirkkala et al., 2024). Consequently, organizational interventions should combine workload management strategies with programs that promote psychological recovery and sleep health to achieve sustainable outcomes.

Moreover, this study's findings align with the broader literature emphasizing gender-specific stress responses. Several studies have reported that female workers exhibit higher emotional exhaustion and sleep disturbances than males, largely due to greater emotional labor expectations and caregiving burdens (Kayumova et al., 2025; Sanae et al., 2025). In addition, hormonal fluctuations and societal expectations exacerbate physiological vulnerability to fatigue and insomnia (Khan et al., 2025; Rozmann, 2025). The current results are consistent with this evidence, underscoring that women's experiences of work stress and exhaustion are shaped by the intersection of biological and

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sociocultural factors. The study thereby contributes to the literature on occupational gender psychology, highlighting the necessity of tailoring interventions to women's specific stress and sleep challenges.

Cross-disciplinary comparisons also strengthen the interpretation of the findings. Research in healthcare and education, for example, shows similar stress-sleep-exhaustion dynamics. Among teachers, marking workload and supervision demands have been found to predict burnout through sleep disturbance (Ntumi et al., 2025), while among nurses, irregular schedules and effort–reward imbalance increase both emotional exhaustion and sleep problems (Hong, 2025; Tan et al., 2025). Comparable results have been documented among medical professionals, where long hours and psychological pressure directly impair sleep and contribute to burnout (Cai & Xiu, 2023; Karimian et al., 2025). The convergence of findings across professions suggests that the mechanism identified in this study—workload stress leading to emotional exhaustion through the mediation of sleep quality—is robust across occupational contexts and cultural backgrounds.

The present findings also resonate with emerging research on technology-induced stress and its consequences for emotional health. Studies on healthcare technology users indicate that technological frustration increases perceived stress and emotional exhaustion while simultaneously disrupting sleep patterns (Jiang et al., 2024; Wirkkala et al., 2024). As workplaces increasingly adopt digital systems and remote work arrangements, employees may experience constant connectivity and reduced psychological detachment from work, impairing sleep quality. These technological pressures parallel traditional workload stress, suggesting that interventions addressing work-life boundaries and digital hygiene could play a crucial role in mitigating emotional exhaustion.

Furthermore, the study reinforces the significance of contextual and cultural factors in shaping stress–sleep–exhaustion dynamics. In collectivist societies, where overwork is often socially rewarded, the normalization of high workload intensity can mask early symptoms of exhaustion until they become chronic (Cai & Xiu, 2023; Ma et al., 2025). In contrast, settings with stronger occupational health regulations and social safety nets exhibit lower burnout rates and better sleep quality among workers (Bulova et al., 2025; Potapiuk & Tur, 2024). The Canadian sample in this study contributes to the literature by offering insights into North American occupational conditions, where economic instability and gender role pressures heighten vulnerability to stress-related fatigue. The replication of global findings within this cultural context suggests that the mechanisms linking workload stress, sleep quality, and emotional exhaustion are universal, albeit moderated by sociocultural nuances.

In summary, this study confirms that workload stress significantly predicts emotional exhaustion among employed females and that sleep quality partially mediates this relationship. The results provide empirical evidence supporting the theoretical proposition that recovery resources such as sleep play a critical role in the stress–burnout process. By demonstrating the mediating role of sleep quality, this research contributes to a more comprehensive understanding of emotional exhaustion and offers practical implications for organizational policy and employee well-being programs (Rajbahak et al., 2025; Tan et al., 2025; Tello et al., 2025).

Despite its contributions, the study is not without limitations. First, the cross-sectional design restricts the ability to draw causal inferences among workload stress, sleep quality, and emotional exhaustion. Longitudinal research is necessary to establish temporal precedence and confirm the directionality of effects. Second, the data were collected through self-report questionnaires, which may be subject to social desirability bias or inaccuracies in self-assessment of sleep and emotional states. Third, the sample included only employed females from Canada, limiting generalizability to male employees or other cultural contexts. Additionally, while the study focused on sleep quality as a mediator, other potential psychological and physiological mediators—such as coping styles, mindfulness, and social support—were not examined. Finally, environmental variables like work schedules, organizational climate, and job autonomy were not controlled, which may have influenced the results.

Future studies should employ longitudinal or experimental designs to confirm the causal relationships between workload stress, sleep quality, and emotional exhaustion. Investigating these variables across different sectors and cultural contexts would also enhance external validity. Further research should explore additional mediating and moderating variables such as resilience, emotional intelligence, and workplace flexibility. Employing objective sleep measures, including actigraphy or polysomnography, alongside self-report scales could provide more comprehensive insights into physiological recovery mechanisms. Moreover, comparative studies between male and female employees would help clarify

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gender differences in the stress–sleep–exhaustion relationship.

Organizations should implement policies that promote manageable workload distribution, adequate rest periods, and flexible scheduling to protect employees from burnout. Sleep health education programs and workplace wellness initiatives can enhance awareness of sleep's role in emotional regulation and productivity. Employers should also foster supportive work environments where stress management and mental health are prioritized. Encouraging detachment from work during non-work hours, limiting excessive digital connectivity, and offering training in relaxation and mindfulness techniques can help employees achieve better sleep and emotional balance. By recognizing sleep quality as a critical mediator, organizations can design comprehensive interventions that strengthen both psychological resilience and overall occupational well-being.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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