Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

A Cross-Sectional Pilot Study of Occupational Burnout, Perceived Sleep Quality, and Mental Health Symptoms Among U.S. Healthcare Workers

Tourna N. Khan
University of Illinois Urbana-Champaign
Sylvia A. Okon
University of Illinois Urbana-Champaign
Benjamin M. Combs
University of Illinois Urbana-Champaign
Alex Kim
University of Illinois Urbana-Champaign
Rachel A. Hoopsick
hoopsick@illinois.edu
University of Illinois Urbana-Champaign

Research Article

Keywords: burnout, depression, anxiety, posttraumatic stress, sleep

Posted Date: July 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9995138/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Purpose

Occupational burnout is a persistent stressor among healthcare workers and is associated with adverse mental health outcomes. Sleep quality may play an important role in recovery from work-related stress, yet less is known about whether perceived sleep quality modifies the association between burnout and mental health symptomatology. This study examined associations between occupational burnout and symptoms of anxiety, depression, and post-traumatic stress disorder (PTSD), and tested whether perceived sleep quality moderated these associations.

Methods

Cross-sectional pilot survey data were collected from a diverse sample of U.S. healthcare workers in March 2022 (N = 200). Participants completed the Oldenburg Burnout Inventory, the Pittsburgh Sleep Quality Index perceived sleep quality component, and validated measures of anxiety, depression, and PTSD symptomatology. Negative binomial regression models estimated associations between burnout and each outcome. Adjusted models controlled for gender identity and occupational level.

Results

Mental health symptomatology was common: 59.5% of participants reported moderate or worse anxiety, 29.5% reported moderate or worse depressive symptoms, and 22.5% met criteria for probable PTSD. Greater burnout was associated with higher anxiety, depression, and PTSD symptomatology. Perceived sleep quality significantly moderated the association between burnout and depressive symptoms, but not anxiety or PTSD. Predicted depressive symptoms were higher among participants reporting poorer sleep at low to moderate levels of burnout, but symptoms converged at high levels of burnout.

Conclusions

Burnout was associated with elevated mental health symptomatology among healthcare workers. Findings suggest that perceived sleep quality may shape the relationship between burnout and depressive symptoms, particularly at low to moderate levels of burnout. Workplace approaches to healthcare worker mental health should address both occupational stress and opportunities for sleep-related recovery.

INTRODUCTION

Occupational stress among healthcare workers has become a major public health concern, particularly in the wake of the COVID-19 pandemic. Healthcare workers routinely face high job demands, emotional

labor, exposure to suffering and trauma, time pressure, staffing shortages, and limited recovery opportunities. When these demands are chronic and exceed available resources, they may contribute to occupational burnout, a stress-related syndrome characterized by exhaustion and disengagement from work (Demerouti et al., 2001; Demerouti & Bakker, 2008; Maslach & Leiter, 2016). The U.S. Surgeon General has identified healthcare worker burnout as an urgent problem requiring immediate action because of its widespread prevalence and consequences for individual well-being, workforce stability, patient care, and healthcare systems (U.S. Department of Health and Human Services, 2022).

Burnout is not only an occupational problem but also a stress and health concern. Chronic exposure to work-related stressors may affect psychological functioning through sustained emotional and physiological activation, impaired recovery, and diminished capacity to regulate affective responses. Among healthcare workers, burnout has been associated with depression, anxiety, post-traumatic stress disorder (PTSD), substance use, and other indicators of psychological distress (Hoopsick et al., 2024; Maslach & Leiter, 2016; Okon et al., 2025). Although burnout has been studied extensively among physicians and other prescriber roles, it also affects a broader range of healthcare workers, including nursing assistants, medical assistants, dietary aides, housekeeping staff, and other healthcare support workers. These workers may face high demands, low autonomy, lower wages, and limited institutional power, all of which may shape their exposure and vulnerability to occupational stress. Therefore, research on burnout and mental health should include diverse occupational roles across the healthcare workforce.

Sleep quality may be a particularly important pathway linking occupational stress to mental health. Sleep is central to psychological recovery, emotion regulation, cognitive functioning, and adaptation to stress. Poor sleep quality may intensify the effects of stress exposure by limiting opportunities for recovery and increasing susceptibility to mood and anxiety symptoms (Baglioni et al., 2011; Gregory et al., 2011; Kalmbach et al., 2016). Healthcare work may be especially disruptive to sleep because of irregular schedules, extended shifts, overnight work, high emotional demands, and difficulty disengaging from work-related stressors. These conditions can contribute to accumulated sleep debt and reduced recovery time, potentially compounding the psychological effects of burnout (João et al., 2018; Söderström et al., 2012).

A stress and recovery perspective suggests that burnout and poor sleep quality may jointly shape mental health. The effort-recovery model posits that work demands produce short-term psychological and physiological load reactions that are typically reversible when adequate recovery occurs; however, continued exposure to work demands in the context of insufficient recovery may contribute to longer-term negative effects on well-being and health (Meijman & Mulder, 1998). Burnout reflects chronic occupational strain, whereas poor sleep quality may indicate inadequate recovery from that strain. When sleep quality is poor, workers may have fewer opportunities to restore emotional and physiological resources, making them more vulnerable to depressive, anxious, or trauma-related symptoms. Conversely, better perceived sleep quality may help buffer the mental health effects of burnout, at least when burnout is not severe. This possibility is especially important in healthcare settings, where sleep

disruption and burnout may be treated as individual problems despite being shaped by organizational structures such as staffing, scheduling, workload, and job control.

Existing research has examined associations between burnout, sleep, and mental health, but fewer studies have tested whether perceived sleep quality modifies the relationship between occupational burnout and mental health symptomatology among healthcare workers. This gap is important because burnout and sleep problems may not operate independently. Instead, their interaction may help explain why some healthcare workers experience more severe psychological symptoms than others despite similar levels of occupational stress exposure. In addition, most studies of healthcare worker burnout have focused on physicians and nurses, with less known about how these processes unfold across a broader and more diverse healthcare workforce.

To address this gap, the current study examined associations between occupational burnout and symptoms of anxiety, depression, and PTSD in a diverse sample of healthcare workers in the United States. We also tested whether perceived sleep quality moderated the associations between burnout and mental health symptomatology. We hypothesized that higher levels of occupational burnout would be associated with more severe anxiety, depression, and PTSD symptoms. We further hypothesized that perceived sleep quality would moderate these associations, such that the relationship between burnout and mental health symptomatology would vary by sleep quality.

METHODS

Study Design and Participants

This cross-sectional pilot study examined associations among occupational burnout, perceived sleep quality, and mental health symptomatology among healthcare workers in the United States. In March 2022, a diverse sample of U.S. healthcare workers was recruited via targeted social media advertisements. To be eligible, participants had to be at least 18 years of age and currently employed in one or more healthcare settings in the United States, including hospitals, ambulatory or outpatient clinics, nursing or residential facilities, social assistance programs, and/or home healthcare. Participants also had to be able to read and comprehend English sufficiently to provide informed consent and complete the survey.

All participants were informed that their involvement was entirely voluntary and that they could withdraw at any time without penalty or disadvantage. They received clear information about the study, including its purpose, procedures, duration, and potential risks and benefits. After providing informed consent (including consent to publish data from participants in the aggregate), participants completed an online survey at a location of their choosing. The survey took approximately 60 minutes to complete, and participants were compensated with a $50 electronic gift card. A total of 284 healthcare workers were eligible for inclusion; of these, 200 agreed to participate and completed the survey, yielding a participation rate of 70.4%. Sensitivity analyses indicated no statistically significant differences in age,

gender identity, or work setting between eligible participants who completed the survey and eligible individuals who did not participate. Study procedures were approved by the Institutional Review Board of the University of Illinois Urbana-Champaign in accordance with the Declaration of Helsinki.

The sample included healthcare workers across a range of occupational levels, including healthcare support roles such as nursing assistants, dietary aides, and administrative support staff; licensed practical nurses; registered nurses; social workers; physical therapists; healthcare administrators; and prescribers, including physicians, nurse practitioners, and physician assistants. This inclusive sampling approach was intended to generate preliminary evidence on burnout, sleep quality, and mental health symptomatology across a broader healthcare workforce than is often represented in studies focused primarily on physicians or nurses. Additional details about the sample are shown in Table 1.

Measures

Occupational Burnout. We assessed burnout using the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2001; Halbesleben & Demerouti, 2005), a 16-item measure of occupational burnout severity. The OLBI assesses two core dimensions of burnout: exhaustion and disengagement from work. Respondents rate their level of agreement with statements about their work experience using a 4-point Likert scale ranging from strongly disagree to strongly agree. Total scores range from 16 to 64, with higher scores indicating greater burnout. Example items include “Lately, I tend to think less at work and do my job almost mechanically,” “During my work, I often feel emotionally drained,” and “After my work, I usually feel worn out and weary.” The OLBI has been shown to be a valid and reliable measure of burnout across a diverse range of occupations and populations (Demerouti & Bakker, 2008; Halbesleben & Demerouti, 2005) and had good internal consistency in our sample ($\alpha = 0.86$).

Perceived Sleep Quality. Perceived sleep quality was measured using the perceived sleep quality component of the Pittsburgh Sleep Quality Index (PSQI), a well-validated instrument that assesses sleep quality and disturbances over a one-month period (Buysse et al., 1989). Although the full PSQI global score ranges from 0 to 21, the current study used the perceived sleep quality component, which ranges from 0 to 3. Higher scores indicate poorer perceived sleep quality, with responses coded as 0 = very good, 1 = fairly good, 2 = fairly bad, and 3 = very bad.

Anxiety. We assessed anxiety symptomatology using the 10-item Severity Measure for Generalized Anxiety Disorder - Adult (Craske et al., 2013), which maps onto DSM-5 criteria. Items assess symptoms over the past 7 days using a 5-point scale ranging from 0 = never to 4 = all of the time. Total scores range from 0 to 40, with higher scores indicating greater anxiety symptom severity. Moderate or worse anxiety was defined as an average item score of 2 or higher, corresponding to a raw total score of 20 or higher. Example items include “felt anxious, worried, or nervous,” “felt a racing heart, sweaty, trouble breathing, faint, or shaky,” and “had thoughts of bad things happening, such as family tragedy, ill health, loss of a job, or accidents.” This measure had high internal consistency in our sample ($\alpha = 0.93$).

Depression. Participants' depression symptomatology was examined using the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001), a brief measure of depression severity over the past 2 weeks. Item responses range from 0 = not at all to 3 = nearly every day, with total scores ranging from 0 to 27. Higher scores indicate greater depressive symptom severity. Scores of 5–9 indicate mild depression, 10–14 indicate moderate depression, 15–19 indicate moderately severe depression, and 20–27 indicate severe depression. Moderate or worse depressive symptoms were defined as PHQ-9 scores of 10 or higher. Example items include "feeling down, depressed, or hopeless," "little interest or pleasure in doing things," and "feeling bad about yourself—or that you are a failure or have let yourself or your family down." This measure had high internal consistency in our sample ($\alpha = 0.90$).

PTSD. We used the PTSD Checklist for DSM-5 (PCL-5; Bovin et al., 2016) to assess self-reported PTSD symptoms over the past month. This 20-item measure maps onto DSM-5 criteria for PTSD. Each response is rated on a 5-point Likert scale ranging from 0 = not at all to 4 = extremely, with total scores ranging from 0 to 80. Higher scores indicate greater PTSD symptomatology. Probable PTSD was defined as a PCL-5 score of ≥ 33. Example items include having "repeated, disturbing, and unwanted memories of the stressful experience," "blaming yourself or someone else for the stressful experience or what happened after it," and being "super alert" or watchful or on guard. This measure had high internal consistency in our sample ($\alpha = 0.96$).

Covariates. Gender identity and occupational level were included as covariates due to their potential influence on the relationship between burnout and mental health outcomes. Women frequently report higher levels of anxiety and depression than men, likely due to differences in social roles, stress exposure, and psychological well-being (Kuehner, 2017; Matud et al., 2019). Occupational level was also included because job demands, autonomy, social support, and exposure to workplace stressors may vary across healthcare roles. Occupational level was coded as prescriber/administrator vs. other healthcare worker.

Statistical Analysis

We used descriptive statistics to summarize participant demographic, occupational, and clinical characteristics. Because this was a pilot study, analyses were intended to estimate preliminary associations and moderation patterns that could inform future longitudinal research. Negative binomial regression models were used to examine associations between occupational burnout and each mental health outcome (i.e., anxiety, depression, and PTSD symptomatology) modeled separately. Negative binomial models were selected because the outcome variables were non-negative integer symptom scores and showed evidence of overdispersion. Model estimates are presented as rate ratios (RRs) and adjusted rate ratios (aRRs) with 95% confidence intervals. First, unadjusted models estimated the association between occupational burnout and each mental health outcome. Next, adjusted models controlled for gender identity and occupational level. Finally, an interaction term between occupational burnout and perceived sleep quality was added to each adjusted model to examine whether perceived sleep quality moderated the association between burnout and mental health symptomatology. For

statistically significant interactions, we estimated predictive margins and plotted predicted symptom scores across levels of burnout and perceived sleep quality to aid interpretation. Given the pilot nature of the study, findings were interpreted with attention to effect estimates, confidence intervals, and the pattern of predicted values rather than statistical significance alone.

RESULTS

Descriptive Results

Occupational burnout and mental health symptomatology were common in this pilot sample of healthcare workers. The mean OLBI score was 41.4 (SD = 7.0). More than half of participants reported moderate or worse anxiety symptoms (59.5%), 29.5% reported moderate or worse depressive symptoms, and 22.5% met criteria for probable PTSD. The mean perceived sleep quality score was 1.1 (SD = 0.8), and 24.0% of participants reported their sleep quality as fairly bad or very bad.

Main Effects of Burnout on Mental Health

Greater levels of occupational burnout were associated with increased anxiety, depression, and PTSD symptomatology (Table 2). In unadjusted models, each one-point increase in burnout was associated with higher anxiety symptoms (RR = 1.06, 95% CI: 1.03, 1.08), depressive symptoms (RR = 1.06, 95% CI: 1.04, 1.08), and PTSD symptoms (RR = 1.05, 95% CI: 1.02, 1.08; Table 2). After adjusting for gender identity and occupational level, these associations persisted for anxiety symptoms (aRR = 1.05, 95% CI: 1.03, 1.07), depressive symptoms (aRR = 1.06, 95% CI: 1.04, 1.08), and PTSD symptoms (aRR = 1.05, 95% CI: 1.02, 1.08).

Interaction Effects of Burnout and Perceived Sleep Quality on Mental Health

Perceived sleep quality significantly moderated the association between occupational burnout and depressive symptoms (aRR = 0.98, 95% CI: 0.96, 0.99; Table 3). Perceived sleep quality did not significantly moderate the associations between burnout and anxiety symptoms (aRR = 0.98, 95% CI: 0.97, 1.01) or PTSD symptoms (aRR = 0.98, 95% CI: 0.96, 1.01). As shown in Fig. 1, predicted depressive symptoms were higher among participants reporting poorer perceived sleep quality at low to moderate levels of burnout. However, predicted depressive symptoms converged at higher levels of burnout, suggesting that severe burnout was associated with elevated depressive symptoms across perceived sleep-quality groups.

DISCUSSION

In this cross-sectional pilot study of U.S. healthcare workers, occupational burnout was associated with higher anxiety, depression, and PTSD symptomatology. Perceived sleep quality moderated the

association between burnout and depressive symptoms, but not anxiety or PTSD symptoms. Specifically, poorer perceived sleep quality was associated with higher predicted depressive symptoms at low to moderate levels of burnout, whereas depressive symptoms converged across sleep-quality groups at higher levels of burnout. These findings support a stress-and-recovery framing in which burnout reflects chronic occupational strain and sleep quality represents an important recovery process that may shape vulnerability to stress-related mental health symptoms.

The prevalence of mental health symptomatology in this sample underscores the psychological burden experienced by healthcare workers. More than half of participants reported moderate or worse anxiety symptoms, nearly one-third reported moderate or worse depressive symptoms, and more than one-fifth met criteria for probable PTSD. These findings are consistent with prior research documenting high levels of burnout and psychological distress among healthcare workers, particularly during and after the COVID-19 pandemic (Shanafelt et al., 2020; U.S. Department of Health and Human Services, 2022). Importantly, this study included healthcare workers across a range of occupational roles, including support staff, nurses, allied health professionals, administrators, and prescribers. This broad occupational inclusion is important because burnout and stress-related mental health concerns are not limited to physicians and nurses; rather, they may affect workers across the healthcare system, including those with lower autonomy, fewer resources, and less institutional power.

Consistent with our first hypothesis, higher occupational burnout was associated with greater anxiety, depression, and PTSD symptomatology. These findings align with prior evidence that burnout is associated with psychiatric morbidity and functional impairment among healthcare workers (Aronsson et al., 2017; Kachadourian et al., 2022; Maslach & Leiter, 2016). From a stress-and-health perspective, burnout may reflect the cumulative psychological consequences of sustained exposure to high job demands, emotional labor, and insufficient recovery. Although depression and burnout are distinct constructs, their association is clinically and occupationally important because both may affect workers' well-being, functioning, and ability to remain engaged in the workforce (de Amorim Macedo et al., 2023). The association between burnout and PTSD symptoms is also noteworthy, as trauma-related symptoms among healthcare workers may be overlooked despite repeated exposure to suffering, death, moral distress, and potentially traumatic workplace events (Dean et al., 2019).

The most novel contribution of this pilot study is the observed interaction between occupational burnout and perceived sleep quality in relation to depressive symptoms. Our moderation hypothesis was partially supported: perceived sleep quality moderated the association between burnout and depressive symptoms, but not anxiety or PTSD symptoms. Sleep quality may be especially relevant to depression because sleep is central to emotional regulation, cognitive recovery, and restoration following stress exposure. Poor sleep may reduce workers' ability to recover from occupational demands, thereby contributing to depressive symptom burden (Baglioni et al., 2011; Kalmbach et al., 2016; Söderström et al., 2012). In the present study, workers reporting poorer perceived sleep quality had higher predicted depressive symptoms at lower and moderate levels of burnout. However, at higher levels of burnout, predicted depressive symptoms were elevated across sleep-quality groups. This pattern suggests that

better perceived sleep quality may be protective up to a point, but that severe burnout may overwhelm the potential protective effects of good sleep.

This result should be regarded with caution even if subjective sleep quality did not significantly attenuate the relationships between burnout and anxiety or PTSD symptomatology. Previous studies have repeatedly shown links between anxiety and PTSD symptoms and sleep abnormalities, indicating that sleep is still a significant predictor of psychological well-being (Baglioni et al., 2011). People with PTSD are more likely to experience sleep difficulties, which can lead to hyperarousal, emotional dysregulation, and poor recovery from stress exposure (Babson & Feldner, 2010). Anxiety and PTSD symptomatology may be impacted by variables other than occupational strain and perceived sleep quality, such as trauma history, acute stress exposure, moral distress, and perceived safety, which could account for the lack of significant moderation effects in the current study. Furthermore, our capacity to identify more subtle interaction effects may have been hampered by the use of a single perceived sleep-quality component and the small pilot sample. Future research with bigger sample sizes and more thorough sleep evaluations could shed light on whether sleep-related recovery mechanisms affect depression, anxiety, and PTSD symptomatology differently among healthcare professionals.

This interpretation is consistent with a stress-and-recovery framework. When occupational strain is moderate, adequate sleep may help restore emotional and physiological resources, reducing vulnerability to depressive symptoms. When burnout becomes severe, however, the cumulative effects of chronic occupational stress may be sufficiently high that depressive symptoms remain elevated regardless of perceived sleep quality. This finding should be interpreted cautiously given the cross-sectional design and pilot sample size, but it suggests that sleep-focused interventions may be most effective when paired with upstream efforts to reduce burnout and occupational strain. In other words, improving sleep quality may be beneficial, but it should not be treated as a substitute for addressing the organizational conditions that contribute to burnout.

The absence of significant moderation by perceived sleep quality for anxiety and PTSD symptoms may indicate that the role of sleep differs across mental health outcomes. Depression may be especially sensitive to perceived sleep quality and recovery processes, whereas anxiety and PTSD symptoms may be shaped by additional factors such as acute threat exposure, hyperarousal, trauma history, perceived safety, or moral distress (Babson & Feldner, 2010; Dean et al., 2019). Alternatively, the pilot sample may have limited power to detect moderation for these outcomes. Future research should examine whether more detailed sleep measures, including sleep duration, insomnia symptoms, circadian disruption, shift work, and objective sleep indicators, clarify how sleep interacts with burnout across different domains of mental health.

Practical Implications

These findings have implications for workplace policy and intervention. First, healthcare organizations should recognize burnout and poor sleep as interconnected stress-and-recovery concerns rather than

solely individual-level wellness issues. Sleep hygiene education and individual-level sleep interventions may be helpful, but they are unlikely to be sufficient if workers continue to experience excessive workload, understaffing, irregular schedules, low autonomy, and limited recovery time. Second, organizational strategies that reduce chronic occupational strain (e.g., safer staffing models, shift scheduling practices that protect recovery time, workload management, and increased job control) may be necessary to reduce burnout-related mental health burden. Third, mental health supports for healthcare workers should consider both occupational stress exposure and recovery conditions, particularly for workers in lower-wage or support roles who may have fewer workplace resources.

Limitations and Future Directions

This study has several limitations. First, the cross-sectional design precludes causal inference and does not allow us to determine the temporal ordering of burnout, sleep quality, and mental health symptomatology. It is possible that burnout contributes to poor sleep and depressive symptoms, that poor sleep increases vulnerability to burnout and depression, or that these processes are reciprocal. Second, all measures were self-reported, which may introduce shared-method bias. Third, perceived sleep quality was measured using a single PSQI subscale rather than a comprehensive assessment of sleep health, shift work, or circadian disruption. Fourth, although the sample included a diverse range of healthcare workers, the pilot sample size limited the ability to examine differences across occupational roles, healthcare settings, and work schedules.

Future research should use longitudinal designs to clarify the temporal and potentially reciprocal associations among occupational burnout, sleep quality, and mental health symptomatology. These pilot findings are being extended through an ongoing larger longitudinal study designed to examine how burnout and sleep-related recovery processes shape mental health trajectories among healthcare workers over time. Future studies should also examine additional moderators and mediators, including social support, job control, staffing adequacy, shift work, moral distress, coping, resilience, and organizational support. Mixed-methods approaches may be especially useful for understanding how healthcare workers experience burnout, sleep disruption, and recovery within specific organizational contexts.

Conclusion

This pilot study contributes to the literature on occupational stress and health by showing that burnout is associated with anxiety, depression, and PTSD symptomatology among healthcare workers, and that perceived sleep quality may shape the association between burnout and depressive symptoms. Findings suggest that sleep quality may be an important recovery-related factor, particularly at low to moderate levels of burnout, but that severe burnout is associated with elevated depressive symptoms regardless of perceived sleep quality. Interventions to improve healthcare worker mental health should address both recovery processes, including sleep, and the organizational conditions that produce chronic occupational strain.

Declarations

Conflict of Interest:

None to declare.

Data Accessibility

Data available upon request to the corresponding author.

Clinical Trial Number

Not applicable.

Ethics and Consent to Publish Declarations

Study procedures were approved by the Institutional Review Board of the University of Illinois Urbana-Champaign in accordance with the Declaration of Helsinki. All participants provided informed consent, including consent to publish results.

Funding

Declaration: This research was supported by the Mary Jane Neer Fund of the University of Illinois Urbana-Champaign.

Author Contribution

R.A.H. conceived of and designed the study. T.N.H. conducted the analysis with R.A.H. and wrote the main manuscript text with sections contributed by S.A.O., R.A.H., B.M.C., and A.K. All authors reviewed the final manuscript.

Acknowledgement

We would like to thank our research participants for their contributions, without whom this work would not be possible.

Data Availability

Data can be provided upon reasonable request to the corresponding author.

References

1. Aronsson G, Theorell T, Grape T, Hammarström A, Hogstedt C, Marteinsdottir I, Skoog I, Träskman-Bendz L, Hall C. A systematic review including meta-analysis of work environment and burnout symptoms. BMC Public Health. 2017;17:1–13. https://doi.org/10.1186/s12889-017-4153-7.
2. Babson KA, Feldner MT. (2010). Temporal relations between sleep problems and both traumatic.
3. event exposure and PTSD. A critical review of the empirical literature. J Anxiety.
4. Disorders. *24*(1), 1–15. https://doi.org/10.1016/j.janxdis.2009.08.002
5. Baglioni C, Battagliese G, Feige B, Spiegelhalder K, Nissen C, Voderholzer U, Lombardo C, Riemann D. Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal epidemiological studies. J Affect Disord. 2011;135(1–3):10–9. https://doi.org/10.1016/j.jad.2011.01.011.
6. Bovin MJ, Marx BP, Weathers FW, Gallagher MW, Rodriguez P, Schnurr PP, Keane TM. Psychometric properties of the PTSD Checklist for *Diagnostic and Statistical Manual of Mental Disorders*–Fifth Edition (PCL-5) in veterans. Psychol Assess. 2016;28(11):1379–91. https://doi.org/10.1037/pas0000254.
7. Buysse DJ, Reynolds CF, Monk III, Berman TH, S. R., Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193–213. https://doi.org/10.1016/0165-1781(89)90047-4.
8. Craske M, Wittchen U, Bogels S, Stein M, Andrews G, Lebeu R. Severity Measure for Generalized Anxiety Disorder—Adult. (Ed.), Diagnostic and statistical manual of mental disorders. 5th ed. American Psychiatric Publishing; 2013. American Psychiatric Association.
9. de Amorim Macedo MJ, de Freitas CPP, Bermudez MB, Vazquez S, Salum AC, G. A., Dreher CB. The shared and dissociable aspects of burnout, depression, anxiety, and irritability in health professionals during COVID-19 pandemic: A latent and network analysis. J Psychiatr Res. 2023;166:40–8.
10. Dean W, Talbot S, Dean A. Reframing clinician distress: Moral injury not burnout. Fed Practitioner. 2019;36(9):400–2.
11. Demerouti E, Bakker AB. The Oldenburg Burnout Inventory: A good alternative to measure burnout and engagement. In: Halbesleben JRB, editor. Handbook of stress and burnout in health care. Nova Science; 2008. pp. 65–78.
12. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. J Appl Psychol. 2001;86(3):499–512.
13. Gregory AM, Buysse DJ, Willis TA, Rijsdijk FV, Maughan B, Rowe R, Cartwright S, Barclay NL, Eley TC. Associations between sleep quality and anxiety and depression symptoms in a sample of young adult twins and siblings. J Psychosom Res. 2011;71(4):250–5. https://doi.org/10.1016/j.jpsychores.2011.03.011.
14. Halbesleben JR, Demerouti E. The construct validity of an alternative measure of burnout: Investigating the English translation of the Oldenburg Burnout Inventory. Work Stress.

2005;19(3):208–20. https://doi.org/10.1080/02678370500340728.

15. Hoopsick RA, Las S, Sun R. Differential effects of healthcare worker burnout on psychotropic medication use and misuse by occupational level. Soc Psychiatry Psychiatr Epidemiol. 2024. https://doi.org/10.1007/s00127-023-02496-y.
16. João KADR, De Jesus SN, Carmo C, Pinto P. The impact of sleep quality on the mental health of a non-clinical population. Sleep Med. 2018;46:69–73. https://doi.org/10.1016/j.sleep.2018.02.010.
17. Kachadourian LK, Murrough JW, Kaplan C, Kaplan S, Feingold J, Feder A, Charney D, Southwick S, Peccoralo L, DePierro J, Ripp J, Pietrzak RH. A prospective study of transdiagnostic psychiatric symptoms associated with burnout and functional difficulties in COVID-19 frontline healthcare workers. J Psychiatr Res. 2022;152:219–24. 10.1016/j.jpsychires.2022.05.034.
18. Kalmbach DA, Pillai V, Arnedt JT, Anderson JR, Drake CL. Sleep system sensitization: Evidence for changing roles of etiological factors in insomnia. Sleep Med. 2016;21:63–9. https://doi.org/10.1016/j.sleep.2016.02.005.
19. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606–13. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.
20. Kuehner C. Why is depression more common among women than among men? Lancet Psychiatry. 2017;4(2):146–58. https://doi.org/10.1016/S2215-0366(16)30263-2.
21. Maslach C, Leiter MP. Understanding the burnout experience: Recent research and its implications for psychiatry. World Psychiatry. 2016;15(2):103–11.
22. Matud MP, López-Curbelo M, Fortes D. Gender and psychological well-being. Int J Environ Res Public Health. 2019;16(19):3531. https://doi.org/10.3390/ijerph16193531.
23. Meijman TF, Mulder G. Psychological aspects of workload. In: Drenth PJD, Thierry H, de Wolff CJ, editors. Handbook of work and organizational psychology: Vol. 2. Work psychology. 2nd ed. Psychology; 1998. pp. 5–33.
24. Okon SA, Khan TN, Duffy NJ, Roan CC, Hoopsick RA. Effects of compassion satisfaction, burnout, and secondary traumatic stress on current drug use among healthcare workers: Differences by occupational level. Addict Behav Rep. 2025;21., Article 100584. 10.1016/j.abrep.2025.100584.
25. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. JAMA. 2020;323(21):2133–4. https://doi.org/10.1001/jama.2020.5893.
26. Söderström M, Jeding K, Ekstedt M, Perski A, Åkerstedt T. Insufficient sleep predicts clinical burnout. J Occup Health Psychol. 2012;17(2):175–83. https://doi.org/10.1037/a0027518.
27. U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General. (2022). *Addressing health worker burnout: The U.S. Surgeon General's advisory on building a thriving health workforce*. https://www.surgeongeneral.gov/burnout

Tables

Table 1

Sample Characteristics (N = 200 healthcare workers)

Age, years	**% (*n*) or mean (± SD)**
	30.8 (± 7.3)
Gender Identity	--
Man	32.5% (65)
Woman	66.5% (133)
Non-binary/genderqueer	1.0% (2)
Race/Ethnicity	--
Non-Hispanic white	54.5% (109)
Non-Hispanic Black	17.5% (35)
Non-Hispanic Asian	14.0% (28)
Non-Hispanic American Indian or Alaska Native	1.0% (2)
Hispanic or Latinx	10.0% (20)
Other	3.0% (6)
Education	--
High school diploma or equivalent (GED)	3.0% (6)
Some college (no degree)	5.0% (10)
Associate's/Other Technical 2-year degree	14.0% (28)
Bachelor's/Other 4-year degree	35.5% (71)
Graduate or Professional degree	42.5% (85)
Family Income	--
Less than $10,000	0.5% (1)
$10,000 - $19,999	3.5% (7)
$20,000 - $29,999	2.5% (5)
$30,000 - $39,999	4.5% (9)
$40,000 - $49,999	10.0% (20)
$50,000 - $74,999	19.5% (39)
$75,000 - $99,999	20.0% (40)
$100,000 - $149,999	24.0% (48)
SD = standard deviation	

Age, years	**% (*n*) or mean (± SD)**
	30.8 (± 7.3)
$150,000 or more	15.5% (31)
Years in Job	--
Less than 1 year	14.5% (29)
1–5 years	61.0% (122)
6–10 years	17.5% (35)
11–20 years	6.0% (12)
More than 20 years	1.0% (2)
Hospital Setting	--
No	46.0% (92)
Yes	54.0% (108)
Occupational Level	--
Prescriber/healthcare administrator	24.5% (49)
Other healthcare worker	75.5% (151)
SD = standard deviation	

Table 2
Main Effects of Burnout on Mental Health Symptomatology

	Anxiety		**Depression**		**PTSD**	
	RR (95% CI)	**aRR (95% CI)**	**RR (95% CI)**	**aRR (95% CI)**	**RR (95% CI)**	**aRR (95% CI)**
Burnout	1.06*** (1.03, 1.08)	1.05*** (1.03, 1.07)	1.06*** (1.04, 1.08)	1.06*** (1.04, 1.08)	1.05*** (1.02, 1.08)	1.05** (1.02, 1.08)
RR = rate ratio; aRR = adjusted rate ratio; CI = confidence interval; ***p < 0.001; **p < 0.01						
Note. Adjusted models control for main effects of gender and occupational level						

Table 3

Interaction Effects of Burnout and Perceived Sleep Quality on Mental Health Symptomatology

	Anxiety	**Depression**	**PTSD**
	aRR (95% CI)	**aRR (95% CI)**	**aRR (95% CI)**
Burnout X Perceived Sleep Quality	0.98 (0.97, 1.01)	0.98* (0.96, 0.99)	0.98 (0.96, 1.01)

aRR = adjusted rate ratio; CI = confidence interval; *p < 0.05

Note. Adjusted models control for main effects of burnout, perceived sleep quality, gender, and occupational level

Figures

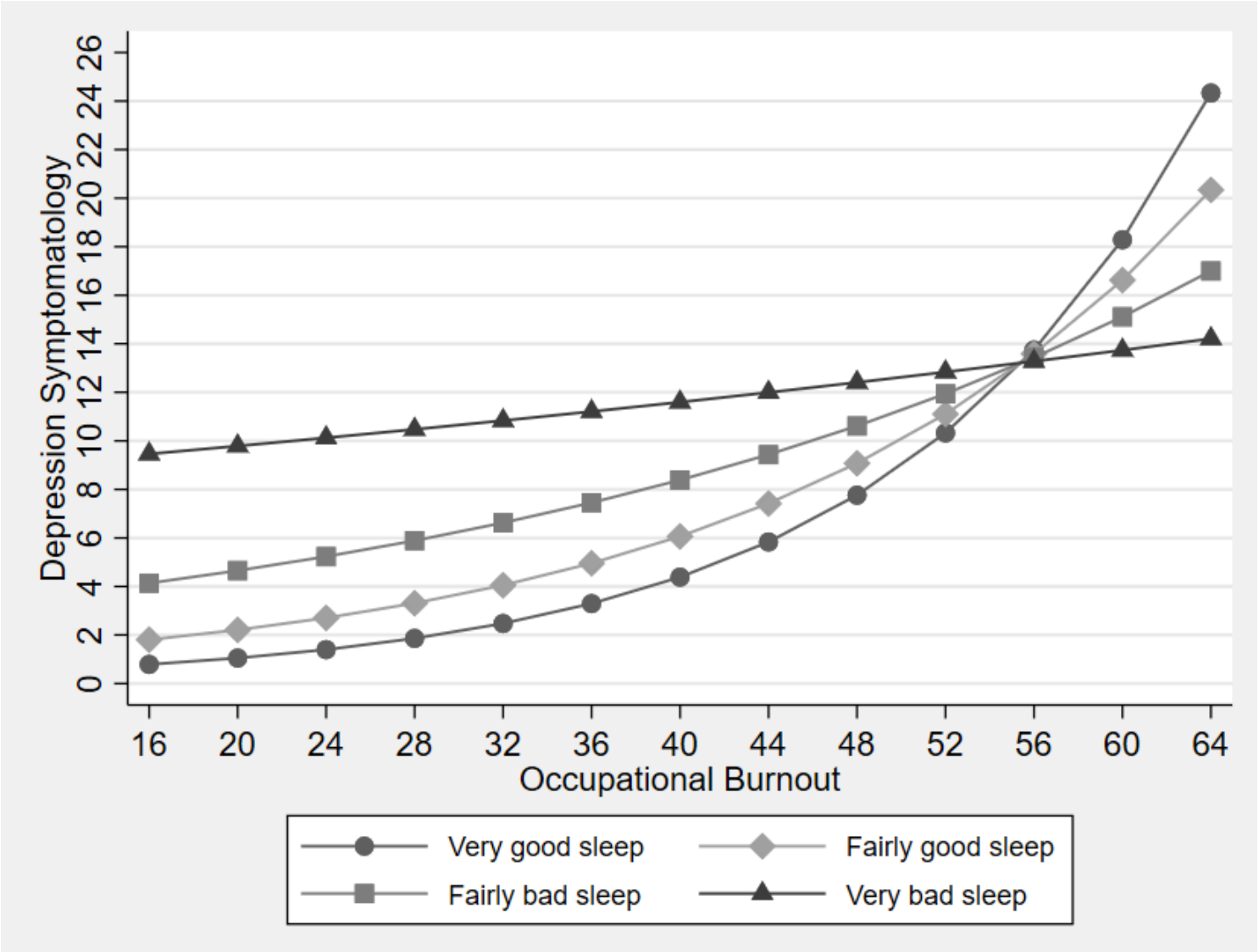


Figure 1

Predicted Depression Symptomatology by Burnout and Perceived Sleep Quality