

Prevalence and determinants of occupational stress among healthcare workers at Bo Government Hospital, Sierra Leone: a cross-sectional study

Daniel Kamara

kamaradaniel328@gmail.com

NJALA University

Kargbo Sallieu Abdul

NJALA University

Research Article

Keywords: Occupational stress, healthcare workers, Perceived Stress Scale, determinants, Sierra Leone, human resources for health, Demand Control Support model

Posted Date: September 28th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10777149/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

Background

Occupational stress is a major determinant of healthcare worker wellbeing and health-system performance, yet empirical data from Sierra Leone's provincial referral hospitals are almost entirely absent. This study determined the prevalence of occupational stress, identified the predominant stressors, and examined the individual and occupational factors independently associated with high occupational stress among healthcare workers at Bo Government Hospital, Southern Province, Sierra Leone.

Methods

A descriptive cross-sectional study was conducted among 260 healthcare workers recruited by stratified proportionate random sampling from nursing, medical, laboratory, pharmacy, allied health, and administrative cadres. Occupational stress was measured using the validated 10-item Perceived Stress Scale (PSS-10) and organisational stressors using the Health and Safety Executive (HSE) Management Standards Indicator Tool. Data were analysed in SPSS v26 using descriptive statistics, Pearson's chi-square tests, and binary logistic regression; adjusted odds ratios (AOR) with 95% confidence intervals (CI) were reported, with statistical significance set at $p < 0.05$.

Results

The prevalence of high occupational stress ($\text{PSS-10} \geq 27$) was 38.5% (95% CI: 32.6–44.7), with a further 47.3% reporting moderate stress; the mean PSS-10 score was 21.4 (SD 6.8). Nurses recorded the highest prevalence of high stress (42.0%). The most frequently reported stressors were understaffing and high workload (87.3%), inadequate equipment and supplies (82.1%), and long or irregular working hours (79.6%). In the adjusted model, working more than 48 hours per week (AOR 3.05, 95% CI 1.89–4.91), low perceived job control (AOR 2.78, 95% CI 1.65–4.68), low-salary satisfaction (AOR 2.60, 95% CI 1.55–4.37), and nursing cadre (AOR 2.31, 95% CI 1.42–3.76) were the strongest independent predictors of high occupational stress.

Conclusions

Occupational stress is highly prevalent and structurally driven among healthcare workers at Bo Government Hospital. Modifiable, system-level determinants excessive working hours, low job control, poor remuneration and understaffing should be prioritised through enforced working-hour limits, participatory management, improved remuneration and adequate staffing to protect workforce wellbeing.

Background

Occupational stress the harmful physical and emotional responses that occur when job demands exceed a worker's capacities, resources or needs is among the most pervasive and costly public health challenges of the twenty-first century(Organization, 2022). It is a major driver of morbidity, absenteeism, reduced productivity and premature workforce attrition(Health, 2020). Healthcare workers, including nurses, physicians, laboratory technicians, pharmacists and allied health professionals, are disproportionately exposed to occupational stressors relative to workers in most other sectors(Sarafis et al., 2016; Twigg et al., 2021).

Reported prevalence of occupational stress among healthcare workers ranges from about 30% to over 70% depending on setting, instrument and cadre(Giorgi et al., 2020; Johnson et al., 2020). In sub-Saharan Africa, the burden is amplified by critical shortfalls in workforce density, inadequate infrastructure and medical supplies, low salaries and systemic organisational dysfunction(Ezenwaji et al., 2019; Ofei-Dodoo et al., 2021; Patel et al., 2018). Sierra Leone ranks among the countries with the lowest health-worker-to-population ratios globally(Organization, 2023), and its workforce frequently manages patient loads several times the recommended caseload without adequate institutional support.

Bo Government Hospital is the principal public referral facility for Bo District and the wider Southern Province, serving a catchment population exceeding one million people. It operates amid persistent challenges including critical nursing shortages, intermittent electricity, unreliable laboratory reagents, and patient-initiated violence against staff(Jalloh et al., 2018). These conditions were further strained by the residual fragility of a health system that lost a substantial part of its workforce during the 2014–2016 Ebola Virus Disease outbreak, which left an enduring background burden of psychological morbidity among survivors(Jalloh et al., 2018). Despite the hospital's central role, empirical documentation of occupational stress in this workforce remains largely absent from peer-reviewed literature.

This study is anchored in the Demand Control Support (DCS) model, which posits that occupational stress arises from the interaction of job demands, decision latitude (control) and social support, with high-strain jobs high demand, low control, low support carrying the greatest health risk(Karasek, 1979, 1990). The model complements the transactional appraisal framework in which stress reflects the perceived imbalance between demands and coping resources(Lazarus & Folkman, 1984), and has been widely validated across African healthcare settings(Giorgi et al., 2020; Johnson et al., 2020). Consistent workforce-level determinants of stress include high patient-to-staff ratios and excessive hours(Aiken et al., 2014), low supervisory support and organisational injustice(Giorgi et al., 2020; Johnson et al., 2020), and profession-specific emotional demands, particularly in nursing(Ofei-Dodoo et al., 2021; Sarafis et al., 2016).

Against this background, the present study addresses a clear evidence gap by determining, at a single provincial referral hospital, (i) the prevalence of occupational stress, (ii) the predominant occupational stressors, and (iii) the individual and occupational factors independently associated with high

occupational stress. Its companion paper examines the health, organisational and patient-safety consequences of occupational stress in the same workforce[29].

Methods

Study design and setting

A descriptive cross-sectional design was employed, enabling simultaneous measurement of exposure and outcome variables at a single time point and supporting prevalence estimation and hypothesis-generating analyses in occupational health research(Bowling, 1997; Creswell & Creswell, 2010). The study was conducted at Bo Government Hospital, established in 1955 as the primary public referral facility for Bo District and the Southern Province. The hospital operates approximately 350 inpatient beds, records over 85,000 outpatient visits annually, and employed approximately 412 healthcare workers across clinical, technical, and administrative categories at the time of the 2023 facility assessment(Health, 2023).

Study population and sampling

Eligible participants were healthcare workers employed at the hospital for at least three consecutive months who provided written informed consent. Casual or contract staff with fewer than three months' tenure, workers on extended sick or maternity leave, and those unable to complete the questionnaire independently were excluded. The sample size was calculated using the Cochran formula for proportions(Cochran, 1977), assuming an expected proportion of 0.47(Ezenwaji et al., 2019), a 95% confidence level, and a 6% margin of error, yielding 266. After adjustment for 10% non-response the target was 300. The final analytical sample after exclusion of incomplete responses was 260.

Stratified proportionate random sampling was used to ensure representation across cadres. Strata were defined by professional cadre, and within each stratum participants were selected by simple random sampling using computer-generated random numbers. The resulting distribution is shown in Table 1.

Table 1
Sample size distribution by professional cadre (n = 260).

Cadre	Total staff (N)	Proportion (%)	Sample (n)
Nursing	185	44.9	117
Medical officers/doctors	48	11.7	30
Laboratory technicians	52	12.6	33
Pharmacists & pharmacy technicians	34	8.3	22
Allied health professionals	56	13.6	35
Administrative staff	37	9.0	23
Total	412	100.0	260

Data-collection instruments

Occupational stress was measured with the 10-item Perceived Stress Scale (PSS-10), a validated self-report instrument scored on a 5-point Likert scale (0–Never to 4–Very often; total range 0–40), with established cut-offs of 0–13 (low), 14–26 (moderate) and 27–40 (high) stress (Cohen et al., 1983; Lee, 2012). Organisational stressors were assessed with the HSE Management Standards Indicator Tool, a 35-item validated questionnaire covering seven domains: demands, control, managerial support, peer support, relationships, role and change (Executive, 2021). Content validity was established through review by three occupational health specialists, and a pilot with 30 workers from a separate facility yielded a PSS-10 Cronbach's α of 0.82, indicating good internal consistency.

Data management and analysis

Data were entered and cleaned in Microsoft Excel and analysed in SPSS v26.0. Descriptive statistics summarised socio-demographic and stress variables. Bivariate associations between categorical predictors and occupational stress category were assessed using Pearson's chi-square test. Variables significant at $p < 0.25$ in bivariate analysis were entered into a binary logistic regression model to identify independent predictors of high occupational stress. Results are presented as adjusted odds ratios (AOR) with 95% CIs; model fit was assessed with the Hosmer–Lemeshow test and Nagelkerke R^2 . Statistical significance was set at $p < 0.05$ (two-tailed).

Ethical considerations

The study adhered to the Declaration of Helsinki (“World Medical Association Declaration of Helsinki,” 2013) and Sierra Leone national research ethics guidelines. Ethical approval was obtained from the School of Public Health, Njala University. Participation was voluntary with the right to withdraw at any

time; all data were anonymised and stored on password-protected devices accessible only to the investigators.

Results

Response rate and respondent characteristics

Of 300 questionnaires distributed, 274 were returned (91.3%), of which 260 (94.9%) were complete and eligible. Most respondents were female (61.9%), aged 30–39 years (39.6%), married (50.8%) and held a diploma or certificate (54.6%); nursing was the largest cadre (45.0%). More than a third worked over 48 hours per week (36.9%). Full characteristics are shown in Table 2.

Table 2
Socio-demographic and occupational characteristics of respondents (n = 260)

Variable	Frequency (n)	Percentage (%)
Sex		
Female	161	61.9
Male	99	38.1
Age group (years)		
20–29	82	31.5
30–39	103	39.6
40–49	55	21.2
≥ 50	20	7.7
Marital status		
Single	108	41.5
Married	132	50.8
Other	20	7.7
Education		
Diploma / certificate	142	54.6
Degree and above	118	45.4
Professional cadre		
Nursing	117	45.0
Medical officers	30	11.5
Laboratory technicians	33	12.7
Pharmacists / Pharmacy technicians	22	8.5
Allied health	35	13.5
Administration	23	8.8
Years of experience		
< 5 years	98	37.7
5–9 years	95	36.5
≥ 10 years	67	25.8

Variable	Frequency (n)	Percentage (%)
Sex		
Average working hours/week		
≤ 40 hours	62	23.8
41–48 hours	102	39.2
> 48 hours	96	36.9

Prevalence of occupational stress

The prevalence of high occupational stress (PSS-10 $\geq$ 27) was 38.5% (n = 100; 95% CI 32.6–44.7), while 47.3% (n = 123) reported moderate and 14.2% (n = 37) low stress; thus 85.8% experienced at least moderate stress. The mean PSS-10 score was 21.4 (SD 6.8). Nurses recorded the highest prevalence of high stress (42.0%), followed by allied health professionals (40.0%) and laboratory technicians (38.0%) (Fig. 1).

Predominant occupational stressors

The most frequently reported stressor was understaffing and high workload (87.3%), followed by inadequate equipment and supplies (82.1%), long or irregular working hours (79.6%) and patient or visitor violence (71.4%). Low-salary satisfaction (68.8%), lack of supervisory support (63.5%) and the emotional burden of caregiving (62.3%) were also widely reported (Table 3, Fig. 2).

Table 3
Frequency distribution of reported occupational stressors (n = 260).

Occupational stressors	Frequency (n)	Percentage (%)
Understaffing / high workload	227	87.3
Inadequate equipment and supplies	214	82.1
Long working hours / irregular shifts	207	79.6
Violence / aggression from patients	186	71.4
Low salary and poor incentives	179	68.8
Lack of supervisory support	165	63.5
Emotional burden of caregiving	162	62.3
Role conflict and ambiguity	153	58.7
Poor physical work environment	144	55.2
Lack of career development opportunities	132	50.9

Independent predictors of high occupational stress

In the binary logistic regression model (model $\chi^2 = 81.4$, $df = 9$, $p < 0.001$; Nagelkerke $R^2 = 0.38$; Hosmer–Lemeshow $\chi^2 = 7.42$, $p = 0.49$; 74.6% correctly classified), working more than 48 hours per week was the strongest independent predictor of high occupational stress (AOR 3.05, 95% CI 1.89–4.91), followed by low perceived job control (AOR 2.78, 95% CI 1.65–4.68), low salary satisfaction (AOR 2.60, 95% CI 1.55–4.37), lack of supervisory support (AOR 2.42, 95% CI 1.48–3.96), and nursing cadre (AOR 2.31, 95% CI 1.42–3.76). Violence exposure and inadequate equipment were also significant, whereas female sex and longer experience were not (Table 4, Fig. 3).

Table 4
Binary logistic regression: adjusted odds ratios for predictors of high occupational stress.

Predictor	β	SE	Wald χ^2	AOR (95% CI)	p
Working > 48 hours/week	1.115	0.243	21.05	3.05 (1.89–4.91)	< 0.001
Low perceived job control	1.022	0.266	14.76	2.78 (1.65–4.68)	< 0.001
Low salary satisfaction	0.955	0.264	13.08	2.60 (1.55–4.37)	< 0.001
Lack of supervisory support	0.883	0.251	12.38	2.42 (1.48–3.96)	< 0.001
Nursing cadre (vs. doctors)	0.838	0.247	11.49	2.31 (1.42–3.76)	0.001
Violence exposure (past 6 months)	0.765	0.264	8.39	2.15 (1.28–3.61)	0.004
Inadequate equipment	0.667	0.254	6.89	1.95 (1.18–3.22)	0.009
Female sex	0.372	0.231	2.59	1.45 (0.92–2.28)	0.107
Work experience $\geq$ 10 years	-0.386	0.247	2.44	0.68 (0.42–1.10)	0.118

Discussion

This study provides one of the first institution-level estimates of occupational stress among healthcare workers in a Sierra Leonean provincial referral hospital. A high-stress prevalence of 38.5%, with 85.8% experiencing at least moderate stress, is epidemiologically significant and broadly consistent with, though somewhat lower than, prevalences reported in comparable sub-Saharan African settings (Ezenwaji et al., 2019; Patel et al., 2018). The elevated mean PSS-10 score exceeds normative West African benchmarks (Lee, 2012), indicating a genuine pathological burden rather than routine work pressure, and echoes the persistent psychological morbidity documented among Sierra Leonean health workers after the Ebola epidemic (Jalloh et al., 2018).

The dominance of understaffing and workload (87.3%), inadequate equipment (82.1%), and long hours (79.6%) locates the drivers of stress firmly in structural, resource-related deficiencies rather than individual vulnerability. This pattern aligns with evidence from Nigeria, Ghana, and global meta-analyses (Ezenwaji et al., 2019; Ofei-Dodoo et al., 2021) and reflects a nurse-to-patient ratio at the hospital far in excess of safe-care thresholds (Health, 2023). The prominence of the material-resource dimension is characteristic of low-income health systems and less salient in high-income settings (Giorgi et al., 2020), while the high burden of patient and visitor violence (Ssewanyana et al., 2020) signals a need for dedicated violence-prevention and security protocols.

The strongest independent predictor working more than 48 hours per week is consistent with the established dose–response relationship between workload and burnout (Aiken et al., 2014), and low perceived job control directly validates the core DCS prediction that decision latitude buffers occupational stress (Karasek, 1990). The independent association of nursing cadre, after adjustment for

workload and hours, suggests profession-specific emotional demands beyond quantifiable workload (Maslach et al., 2001). The non-significant protective direction of longer experience is compatible with stress-inoculation, whereby seasoned clinicians develop more effective coping over time (Hart & Cooper, 2001), with implications for mentorship and peer-support design.

These findings carry direct policy implications: enforced working-hour limits, participatory management to enhance job control, improved remuneration and adequate staffing are modifiable, system-level levers that could reduce occupational stress at scale. Because these determinants are structural, individual-level interventions alone are unlikely to be sufficient.

Limitations

The cross-sectional design precludes causal inference, and self-report instruments are susceptible to social-desirability bias, which may underestimate stress where psychological vulnerability is stigmatised. Single-site recruitment may limit transferability to facilities with different organisational profiles. Longitudinal, multi-site studies are needed to establish causal pathways and national representativeness.

Conclusions

Occupational stress is highly prevalent among healthcare workers at Bo Government Hospital and is driven predominantly by structural, modifiable determinants excessive working hours, low job control, poor remuneration, understaffing and inadequate supplies. Prioritising enforced working-hour limits, participatory management, improved remuneration and adequate staffing is essential to safeguard workforce wellbeing and, by extension, the quality and safety of care.

Declarations

Ethics approval and consent to participate

Ethical approval was granted by the Njala University Ethics Review Committee, and all procedures were performed in accordance with the Declaration of Helsinki. Written informed consent to participate was obtained from all participants prior to data collection.

Consent for publication

Not applicable.

Trial registration

Clinical trial number: not applicable.

Availability of data and materials

The datasets analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Authors' contributions

DK conceived and designed the study, supervised data collection and analysis, interpreted the results and drafted the manuscript as corresponding author. SAK contributed to study design, data collection, data analysis and critical revision of the manuscript. Both authors read and approved the final manuscript.

Acknowledgements

The authors thank the management and staff of Bo Government Hospital for their cooperation, and the School of Public Health, Njala University, for institutional support.

Companion paper

This article is one of two papers reporting distinct analyses of a single study of occupational stress at Bo Government Hospital; the companion paper examines the health, organisational and patient-safety consequences of occupational stress in the same cohort. Editors and reviewers are referred to that manuscript in the interest of full transparency.

References

1. Aiken LH, Sloane DM, Bruyneel L, Heede KV, den, Griffiths P, Busse R, Diomidous M, Kinnunen J, Kózka M, Lesaffre E, McHugh MD, Moreno-Casbas T, Rafferty AM, Schwendimann R, Scott PA, Tishelman C, van Achterberg T, Sermeus W. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *Lancet*. 2014;383(9931):1824–30. [https://doi.org/10.1016/s0140-6736\(13\)62631-8](https://doi.org/10.1016/s0140-6736(13)62631-8).
2. Bowling A. (1997). *Research Methods in Health: Investigating Health and Health Services*. *Research Repository (Kingston University London)*. <http://eprints.kingston.ac.uk/id/eprint/17232/>
3. Cochran WG. (1977). *Sampling Techniques*. 3rd Edition. *Zenodo (CERN European Organization for Nuclear Research)*. <https://doi.org/10.5281/zenodo.15338807>

4. Cohen S, Kamarck T, Mermelstein R. A Global Measure of Perceived Stress. *J Health Soc Behav.* 1983;24(4):385–385. <https://doi.org/10.2307/2136404>.
5. Creswell JW, Creswell JD. (2010). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches – 3/E*. <https://openlibrary.telkomuniversity.ac.id/home/catalog/id/9492/slug/research-design-qualitative-quantitative-and-mixed-methods-approaches-3-e.html>
6. Executive H and S. Work-related stress and how to tackle it: the Management Standards approach. HSE; 2021.
7. Ezenwaji IO, Eseadi C, Okide CC, Nwosu N, Ugwoke SC, Ololo KO, Oforka TO, Oboegbulem AI. Work-related stress, burnout, and related sociodemographic factors among nurses. *Medicine.* 2019;98(3). <https://doi.org/10.1097/md.00000000000013889>.
8. Giorgi G, Lecca LI, Alessio F, Finstad GL, Bondanini G, Lulli LG, Arcangeli G, Mucci N. COVID-19-Related Mental Health Effects in the Workplace: A Narrative Review. *Int J Environ Res Public Health.* 2020;17(21):7857–7857. <https://doi.org/10.3390/ijerph17217857>.
9. Hart PM, Cooper CL. (2001). *Occupational Stress: Toward a More Integrated Framework* (pp. 93–114). <https://doi.org/10.4135/9781848608368.n6>
10. Health NI. for O. S. and. (2020). *Stress at work*. US Department of Health and Human Services.
11. Health SLM. of. (2023). *Sierra Leone human resources for health country profile 2023*. Government of Sierra Leone.
12. Jalloh MF, Jalloh MF, Li W, Bunnell R, Ethier KA, O’Leary A, Hageman K, Sengeh P, Jalloh MB, Jalloh MB, Morgan O, Hersey S, Marston BJ, Dafae F, Redd JT. Impact of Ebola experiences and risk perceptions on mental health in Sierra Leone, July 2015. *BMJ Global Health.* 2018;3(2). <https://doi.org/10.1136/bmjgh-2017-000471>.
13. Johnson J, Simms-Ellis R, Janes G, Mills T, Budworth L, Atkinson L, Harrison R. Can we prepare healthcare professionals and students for involvement in stressful healthcare events? A mixed-methods evaluation of a resilience training intervention. *BMC Health Serv Res.* 2020;20(1):1094–1094. <https://doi.org/10.1186/s12913-020-05948-2>.
14. Karasek R. Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. *Adm Sci Q.* 1979;24(2):285–285. <https://doi.org/10.2307/2392498>.
15. Karasek R. (1990). stress, productivity, and the reconstruction of working life. *Med Entomol Zool.* <https://ci.nii.ac.jp/naid/10013239388>
16. Lazarus R, Folkman S. (1984). *Stress, Appraisal, and Coping*. New York, NY: Springer; *Medical Entomology and Zoology.* <https://ci.nii.ac.jp/naid/10015183136/>
17. Lee E. Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nurs Res.* 2012;6(4):121–7. <https://doi.org/10.1016/j.anr.2012.08.004>.
18. Maslach C, Schaufeli WB, Leiter MP. Job Burnout. *Ann Rev Psychol.* 2001;52(1):397–422. <https://doi.org/10.1146/annurev.psych.52.1.397>.

19. Ofei-Dodoo S, Spaulding A, O’Brien K, Frazier R. (2021). Burnout and satisfaction with work–life balance among physicians in Ghana. *BJGP Open*, 5(1).
20. Organization WH. World health statistics 2022: monitoring health for the SDGs. WHO; 2022.
21. Organization WH. Health workforce: density and distribution of health workers. WHO; 2023.
22. Patel V, Saxena S, Lund C, Thornicroft G, Baingana F, Bolton P, Chisholm D, Collins PY, Cooper JL, Eaton J, Herrman H, Herzallah MM, Huang Y, Jordans MJD, Kleinman A, Medina-Mora ME, Morgan E, Niaz U, Omigbodun O, Unützer J. The Lancet Commission on global mental health and sustainable development. *Lancet*. 2018;392(10157):1553–98. [https://doi.org/10.1016/s0140-6736\(18\)31612-x](https://doi.org/10.1016/s0140-6736(18)31612-x).
23. Sarafis P, Rousaki E, Tsounis A, Μαλλιαρού M, Lahana L, Bamidis PD, Niakas D, Papastavrou E. The impact of occupational stress on nurses’ caring behaviors and their health-related quality of life. *BMC Nurs*. 2016;15(1):56–56. <https://doi.org/10.1186/s12912-016-0178-y>.
24. Ssewanyana D, Abubakar A, Vries PD, Baar AV, Obiero E, Koot H. Health-worker exposure to workplace violence in sub-Saharan Africa: a systematic review. *Global Health*. 2020;16:11.
25. Twigg D, Whitehead L, Doleman G, El-Zaemey S. The impact of nurse staffing methodologies on nurse and patient outcomes: A systematic review. *J Adv Nurs*. 2021;77(12):4599–611. <https://doi.org/10.1111/jan.14909>.
26. World Medical Association Declaration of Helsinki. *JAMA*. 2013;310(20):2191–2191. <https://doi.org/10.1001/jama.2013.281053>.

Figures

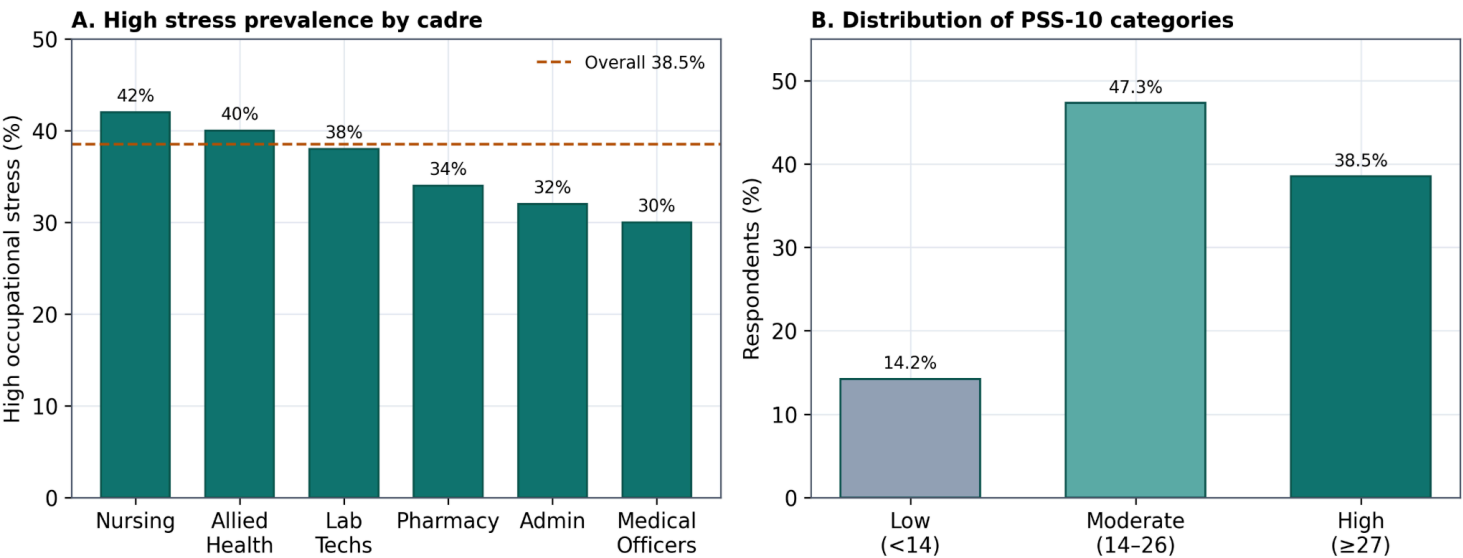


Figure 1

Prevalence of occupational stress at Bo Government Hospital (n = 260): (A) high-stress prevalence by professional cadre against the overall prevalence; (B) distribution of PSS-10 stress categories.

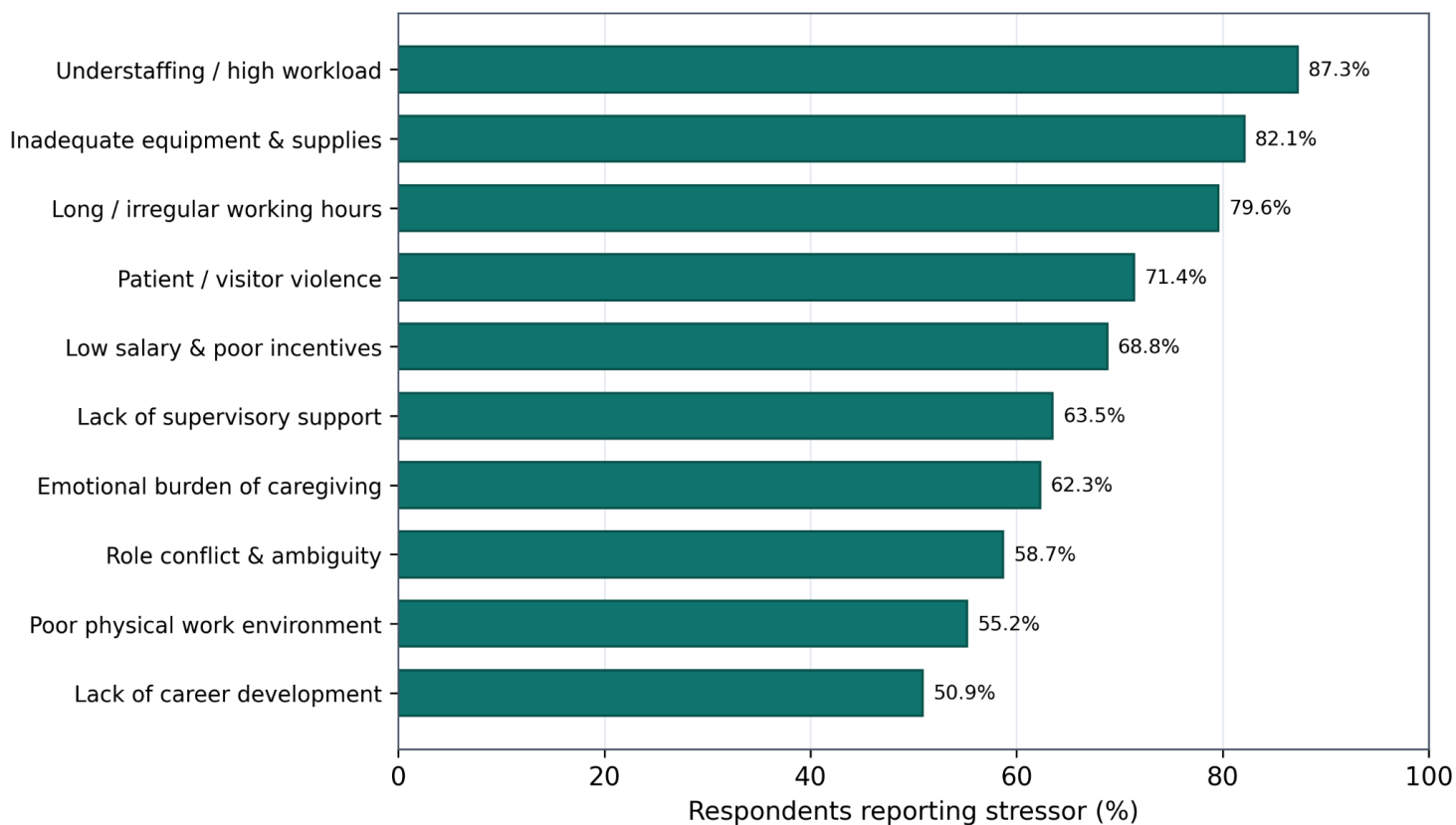


Figure 2

Occupational stressors ranked by frequency of reporting among healthcare workers, Bo Government Hospital (n = 260).

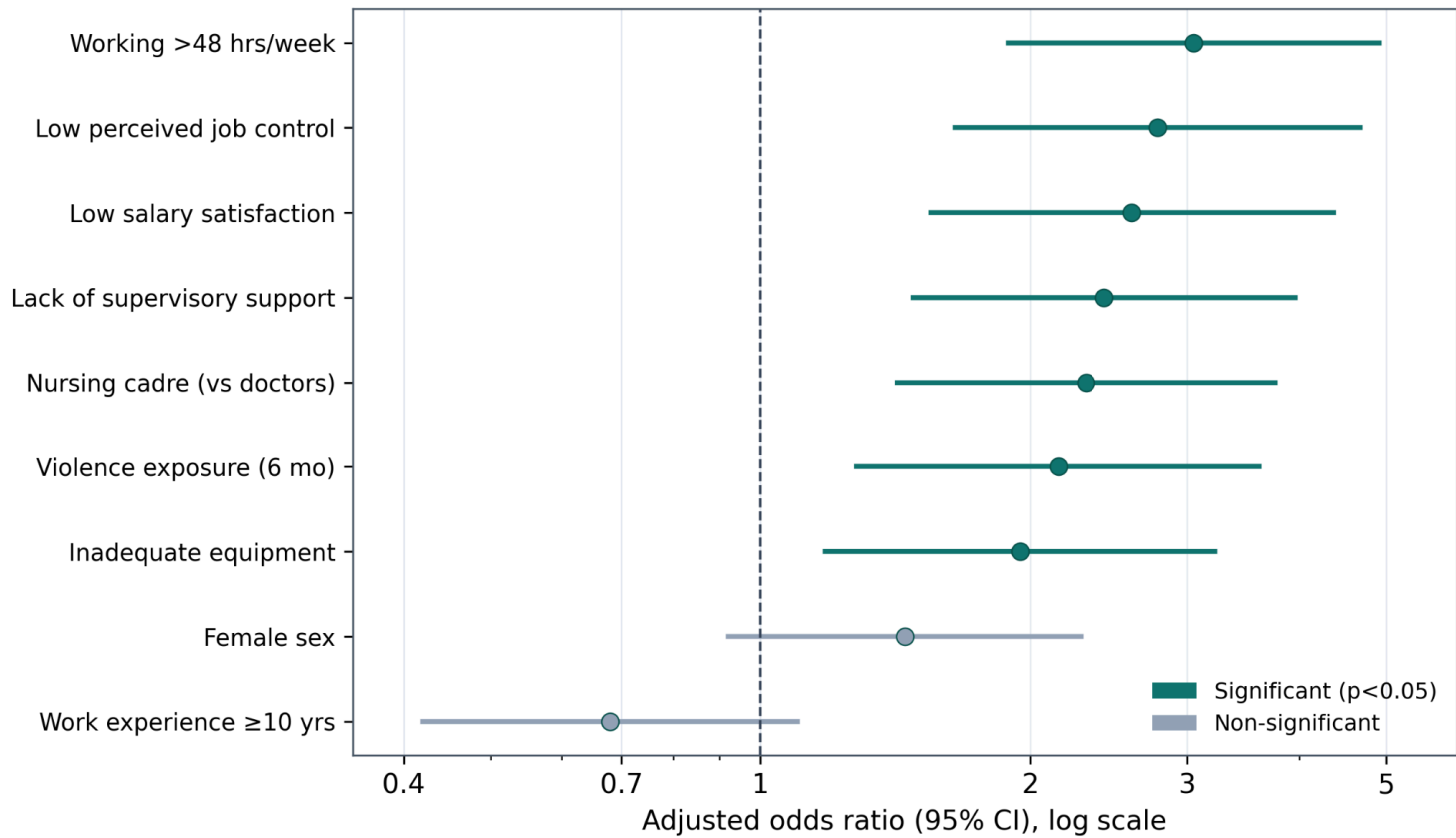


Figure 3

Adjusted odds ratios (95% CI) for predictors of high occupational stress, Bo Government Hospital. The dashed line marks the null value (AOR = 1).