Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

Prevalence of Work-Related Burnout and Associated Factors among Critical-Care Nurses: A Cross-Sectional Analytical Study

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Keywords: Burnout, Critical Care Nursing, Intensive Care Units, Job Demands-Resources, Maslach Burnout Inventory, Nursing Administration, Patient Safety, Shift Work

Received on 15 Feb 2026
Accepted on 20 Mar 2026
Published on 31 Mar 2026

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Abstract

Background: Critical-care nurses operate under sustained physiological and psychological demands, including high patient acuity, complex clinical decision-making, rotating shifts, frequent exposure to traumatic events, and persistent staffing constraints. Although burnout is widely acknowledged in healthcare settings, empirical evidence utilizing person-centered, three-dimensional Maslach Burnout Inventory (MBI) latent profiles among critical-care nurses in developing healthcare systems remains limited.

Objective: To determine the prevalence of the MBI Burnout profile and identify independent demographic and work-related determinants among critical-care nurses in a public-sector tertiary teaching hospital.

Methods: An analytical cross-sectional study was conducted among 120 registered critical-care nurses recruited via proportionate stratified random sampling across five high-acuity units: Medical Intensive Care Unit (ICU), Surgical ICU, Coronary Care Unit (CCU), High-Dependency Unit (HDU), and Emergency/Trauma ICU. Data were gathered using a structured demographic and occupational questionnaire alongside the licensed Maslach Burnout Inventory–Human Services Survey for Medical Personnel [MBI-HSS (MP)]. The three dimensions—Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA)—were scored

independently to classify nurses into validated MBI profiles. Data were evaluated using descriptive statistics, 95% Wilson score confidence intervals, Pearson's chi-square tests, and multivariable binary logistic regression.
Results: Overall, 81 of the 120 critical-care nurses met the criteria for the MBI Burnout profile, yielding an overall prevalence of 67.5% (95% CI: 58.7%–75.2%). Mean scores for the subscales were 31.89 ± 7.65 for emotional exhaustion, 14.88 ± 3.70 for depersonalization, and 33.51 ± 4.66 for personal accomplishment. In the multivariable logistic regression model, working night or rotating shifts (adjusted odds ratio [aOR] = 3.87, 95% CI: 1.39–10.76, p = 0.009), managing a nurse-to-patient ratio of 1:3 or greater (aOR = 4.22, 95% CI: 1.67–10.71, p = 0.002), and self-reported job dissatisfaction (aOR = 3.99, 95% CI: 1.40–11.36, p = 0.010) emerged as significant independent predictors of the Burnout profile.
Conclusion: Work-related burnout is highly prevalent among critical-care nurses and is predominantly driven by modifiable organizational and scheduling stressors rather than individual demographic characteristics. Institutional workforce strategies must prioritize safe nurse-to-patient staffing thresholds, ergonomic roster scheduling, protected recovery periods, and structured administrative support mechanisms to safeguard clinician wellbeing and patient safety.

Introduction

Burnout is an occupational syndrome resulting from chronic workplace stress that has not been successfully managed. The World Health Organization conceptualizes burnout through three distinct dimensions: feelings of energy depletion or exhaustion, increased mental distance or feelings of negativism and cynicism related to one's job, and reduced professional efficacy. Critical-care nurses are disproportionately vulnerable to burnout due to the acute, continuous, and emotionally demanding nature of their practice. In intensive care and high-dependency environments, nurses continuously monitor clinically unstable patients, titrate high-alert pharmacological infusions, operate advanced life-support technologies, manage acute resuscitations, and provide emotional support to distressed families, frequently under non-standard shift arrangements.

The Job Demands-Resources (JD-R) model offers a robust theoretical framework for understanding the emergence of burnout in high-acuity clinical settings. The JD-R model posits that excessive job demands—such as high nurse-to-patient ratios, long working hours, and rotating rosters—trigger an energetic, health-impairment process that precipitates physical and emotional exhaustion. Conversely, job resources—such as adequate staffing, supportive leadership, psychological safety, and peer support—foster engagement and mitigate the psychological strain imposed by heavy workloads. When workplace demands systematically outpace institutional resources, secondary coping strategies such as emotional detachment and depersonalization develop, ultimately impairing professional efficacy and nursing outcomes.

Extensive global literature links nurse burnout to significant operational and clinical repercussions. Meta-analytic findings indicate that nurse burnout is systematically associated with compromised patient safety climates, increased adverse clinical events, medication administration errors, nosocomial infections, reduced patient satisfaction, and heightened turnover intentions. While healthcare workforce burnout has been documented across South Asia, published literature from Pakistan presents substantial methodological heterogeneity. Many local investigations have historically relied on non-probability convenience sampling, measured non-specific constructs (such as general stress or compassion fatigue), or inappropriately collapsed the Maslach Burnout Inventory (MBI) subscales into a single arbitrary composite score—a practice explicitly cautioned against by measurement standards.

Furthermore, empirical data evaluating burnout profiles exclusively among critical-care nursing cohorts in public-sector tertiary teaching hospitals remain sparse. Public

tertiary hospitals in major urban centers such as Lahore handle exceptionally high patient volumes, acute trauma cases, and complex medical emergencies, often operating under constrained infrastructural and human resource capacities. Therefore, this study was designed to estimate the prevalence of work-related burnout profiles using the standardized Maslach Burnout Inventory–Human Services Survey for Medical Personnel [MBI-HSS (MP)] and to identify the independent demographic and occupational determinants of burnout among critical-care nurses.

Methods

Study Design

This study utilized an analytical cross-sectional design adhering to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Setting

The study was conducted across the specialized adult critical-care units of a prominent public-sector tertiary teaching hospital in Lahore, Pakistan. The study settings comprised five dedicated high-acuity units: the Medical Intensive Care Unit (MICU), Surgical Intensive Care Unit (SICU), Coronary Care Unit (CCU), High-Dependency Unit (HDU), and Emergency/Trauma ICU.

Population

The target population comprised all registered nurses actively delivering bedside clinical care within the eligible critical-care units during the study period.

Inclusion criteria were: (a) duly licensed registered nurses; (b) current permanent or contract clinical posting within one of the five designated critical-care units; (c) a minimum of six months of continuous clinical experience within critical-care nursing; (d) active direct bedside patient-care responsibilities; and (e) provision of written informed consent.

Exclusion criteria were: (a) nurse managers, supervisors, and administrative personnel without direct bedside clinical duties (b) nurses on prolonged medical leave, maternity leave, or sabbatical during the sampling window; and (c) temporary agency nurses with less than six months of clinical placement in the facility.

Sample Size

The required sample size was calculated using the single-population proportion formula: $n = (Z^2 \times p \times [1 - p]) / d^2$, where $Z = 1.96$ at a 95% confidence level, $p = 0.68$ representing the estimated pooled prevalence of nursing burnout in Pakistan derived from recent systematic review literature, and $d = 0.085$ set as the margin of absolute precision. This yielded an initial requirement of 116 participants. To accommodate an anticipated non-response or incomplete submission rate of approximately 3%, the final sample size was set at 120 nurses.

Sampling

A proportionate stratified random sampling technique was utilized to ensure balanced representation across all critical-care clinical domains. The hospital's total eligible critical-care nursing cadre (N = 174) served as the sampling frame. Strata were defined by clinical unit: Medical ICU (N = 46), Surgical ICU (N = 31), CCU (N = 22), HDU (N = 33), and Emergency/Trauma ICU (N = 42). Using computer-generated random numbers applied to de-identified employee rosters, participants were allocated proportionally, yielding a final sample of 120 nurses: Medical ICU (n = 32), Surgical ICU (n = 21), CCU (n = 15), HDU (n = 23), and Emergency/Trauma ICU (n = 29).

Study Tool

Data were obtained using a two-part structured instrument:

Demographic and Occupational Profile: A structured questionnaire recording

participant age (21–30, 31–40, ≥41 years), gender (female, male), total professional nursing experience (<2, 2–5, 6–10, >10 years), primary unit assignment, typical duty shift (morning, evening, night, rotating), assigned nurse-to-patient ratio during typical shifts (1:1, 1:2, 1:3, ≥1:4), average weekly working hours (≤40, 41–48, >48 hours), perceived departmental staffing adequacy (adequate, sometimes adequate, inadequate), and overall job satisfaction (satisfied, neutral, dissatisfied).

2. Maslach Burnout Inventory–Human Services Survey for Medical Personnel [MBI-HSS (MP)]: Burnout dimensions were evaluated using the licensed 22-item MBI-HSS (MP). Items are scored on a 7-point frequency rating scale ranging from 0 ('never') to 6 ('every day'). The instrument assesses three distinct dimensions: Emotional Exhaustion (EE; 9 items, score range 0–54), Depersonalization (DP; 5 items, score range 0–30), and Personal Accomplishment (PA; 8 items, score range 0–48).

In accordance with psychometric standards, subscales were scored independently without aggregating them into a single composite score. To evaluate participant burnout status comprehensively, profile analysis was performed using established normative criteria. The primary outcome—the MBI Burnout Profile—was defined by concurrent elevated emotional exhaustion (mean item score > 3.00, corresponding to a subscale total > 27) and elevated depersonalization (mean item score ≥ 2.73, corresponding to a subscale total ≥ 14). Secondary profiles evaluated included Overextended (high EE only), Disengaged (high DP only), Ineffective (low PA only), and Engaged (low EE, low DP, and high PA).

Data Collection

Questionnaires were self-administered in quiet, non-clinical spaces outside active duty hours. Neutral enumerators uninvolved in supervisory appraisal distributed the instruments accompanied by standardized instructions. Completed physical questionnaires were returned in sealed, opaque envelopes to guarantee participant anonymity. Data entry protocols incorporated double-entry verification on a 10% random subsample, automated range validation, and logical consistency checks.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Review Committee and formal administrative authorization was granted by hospital nursing leadership. All prospective participants were provided with written participant information leaflets delineating study objectives, voluntary involvement, confidentiality assurances, and the right to withdraw without professional penalty. Signed informed consent was obtained from all participants prior to enrollment. All data were de-identified and archived on encrypted, password-protected systems. Participants reporting severe distress were provided confidential access to institutional psychological and occupational counseling support.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (Version 26.0). Descriptive statistics were summarized as frequencies and percentages for categorical variables, and means with standard deviations (SD) for continuous variables. The internal consistency reliability of the MBI subscales was evaluated using Cronbach's alpha (α). Prevalence estimates were reported with two-sided 95% Wilson score confidence intervals.

Bivariate analyses comparing demographic and occupational characteristics across burnout profile categories were performed using Pearson's chi-square tests (χ^2). Variables demonstrating bivariate associations at $p < 0.20$, as well as theoretically substantiated predictors from the JD-R framework, were entered into a multivariable binary logistic regression model with backward elimination to identify independent predictors of the Burnout profile. Adjusted odds ratios (aOR) and corresponding 95%

confidence intervals (CI) were calculated. Statistical significance was defined at a two-tailed $p < 0.05$.

Results

Participant Demographics and Occupational Characteristics

The final sample comprised 120 critical-care registered nurses (100% response rate across the stratified random sample). The demographic and professional characteristics of the cohort are detailed in Table 1. The majority of participants were female (73.3%, n = 88) and aged between 21 and 30 years (51.7%, n = 62). Regarding clinical assignments, 42.5% (n = 51) worked rotating shifts, and 26.7% (n = 32) worked permanent night shifts. Nearly two-thirds of the nurses (64.2%, n = 77) routinely managed heavy patient loads with ratios of 1:3 or greater (35.8% at 1:3; 28.3% at ≥1:4). Furthermore, 45.0% (n = 54) worked in excess of 48 hours weekly, 47.5% (n = 57) perceived workplace staffing as persistently inadequate, and 38.3% (n = 46) reported active job dissatisfaction.

Table 1: Baseline Demographic and Work-Related Characteristics of Critical-Care Nurses (N = 120)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	21–30	62	51.7
	31–40	46	38.3
	≥41	12	10.0
Gender	Female	88	73.3
	Male	32	26.7
Professional Experience	<2 years	23	19.2
	2–5 years	47	39.2
	6–10 years	35	29.2
	>10 years	15	12.5
Critical-Care Unit	Medical ICU	32	26.7
	Surgical ICU	21	17.5
	Coronary Care Unit (CCU)	15	12.5
	High-Dependency Unit (HDU)	23	19.2
	Emergency/Trauma ICU	29	24.2
Primary Duty Shift	Morning	23	19.2
	Evening	14	11.7
	Night	32	26.7
	Rotating	51	42.5

Typical Nurse-to-Patient Ratio	1:1	8	6.7
	1:2	35	29.2
	1:3	43	35.8
	≥1:4	34	28.3
Weekly Working Hours	≤40 hours	23	19.2
	41–48 hours	43	35.8
	>48 hours	54	45.0
Perceived Staffing Adequacy	Adequate	17	14.2
	Sometimes Adequate	46	38.3
	Inadequate	57	47.5
Job Satisfaction	Satisfied	36	30.0
	Neutral	38	31.7
	Dissatisfied	46	38.3

MBI Subscale Scores and Latent Profile Distributions

The psychometric characteristics of the MBI-HSS (MP) subscales demonstrated high internal consistency in this population, with Cronbach's alpha coefficients of 0.921 for Emotional Exhaustion, 0.823 for Depersonalization, and 0.820 for Personal Accomplishment (Table 2A). The overall mean score for Emotional Exhaustion was 31.89 ± 7.65, Depersonalization was 14.88 ± 3.70, and Personal Accomplishment was 33.51 ± 4.66.

Based on latent profile categorization, 81 of the 120 nurses fulfilled the criteria for the MBI Burnout Profile, establishing an overall prevalence of 67.5% (95% Wilson CI: 58.7%–75.2%) (Table 2B). Among the remaining non-burnout profiles, 12.5% (n = 15) were categorized as Overextended, 7.5% (n = 9) as Engaged, 6.7% (n = 8) as Disengaged, and 5.8% (n = 7) as Ineffective.

Table 2A: Maslach Burnout Inventory Subscale Summary Scores (N = 120)

Subscale Dimension	Items	Mean ± SD	Observed Range	Cronbach's Alpha (α)
Emotional Exhaustion (EE)	9	31.89 ± 7.65	9–48	0.921
Depersonalization (DP)	5	14.88 ± 3.70	6–21	0.823
Personal Accomplishment (PA)	8	33.51 ± 4.66	23–45	0.820

Table 2B: Distribution of MBI Latent Profiles (N = 120)

MBI	Latent	Defining	Frequency	Percentage	95%

Profile	Dimensional Pattern	(n)	(%)	Confidence Interval
Burnout	High EE + High DP	81	67.5%	58.7%–75.2%
Overextended	High EE only	15	12.5%	7.7%–19.5%
Engaged	Low EE + Low DP + High PA	9	7.5%	4.0%–13.6%
Disengaged	High DP only	8	6.7%	3.4%–12.6%
Ineffective	Low PA only	7	5.8%	2.9%–11.5%

Bivariate Associations with the Burnout Profile

Bivariate analyses demonstrated statistically significant differences in burnout prevalence across several occupational characteristics (Table 3). Duty shift assignment was strongly associated with burnout ($\chi^2 = 9.94$, $p = 0.019$), with the highest prevalence observed among rotating shift workers (80.4%) and night nurses (68.8%), compared to morning (47.8%) and evening (50.0%) personnel. Similarly, nurse-to-patient ratio was significantly associated with burnout ($\chi^2 = 11.52$, $p = 0.009$); burnout rates were markedly elevated among nurses managing ratios of 1:3 (79.1%) and ≥1:4 (76.5%) relative to those managing 1:2 (45.7%).

Significant associations were also identified for perceived staffing inadequacy ($\chi^2 = 6.43$, $p = 0.040$) and self-reported job dissatisfaction ($\chi^2 = 10.37$, $p = 0.006$), where 84.8% of dissatisfied nurses met the burnout criteria. Conversely, age group ($p = 0.759$), gender ($p = 0.692$), total clinical experience ($p = 0.569$), and specific critical-care unit ($p = 0.339$) did not demonstrate statistically significant bivariate relationships with the burnout profile.

Table 3: Bivariate Relationships Between Participant Characteristics and MBI Burnout Profile (N = 120)

Factor	Categories	Total (n)	Burnout Profile	Non-Burnout	χ^2 Value	p-value
Age Group (years)	21–30	62	42 (67.7%)	20 (32.3%)	0.55	0.759
	31–40	46	32 (69.6%)	14 (30.4%)		
	≥41	12	7 (58.3%)	5 (41.7%)		
Gender	Female	88	58 (65.9%)	30 (34.1%)	0.16	0.692
	Male	32	23 (71.9%)	9 (28.1%)		
Professional Experience	<2 years	23	16 (69.6%)	7 (30.4%)	2.02	0.569
	2–5 years	47	32 (68.1%)	15 (31.9%)		
	6–10 years	35	21 (60.0%)	14 (40.0%)		

	>10 years	15	12 (80.0%)	3 (20.0%)		
Critical-Care Unit	Medical ICU	32	19 (59.4%)	13 (40.6%)	4.53	0.339
	Surgical ICU	21	17 (81.0%)	4 (19.0%)		
	CCU	15	8 (53.3%)	7 (46.7%)		
	HDU	23	17 (73.9%)	6 (26.1%)		
	Emergency/Trauma ICU	29	20 (69.0%)	9 (31.0%)		
Duty Shift	Morning	23	11 (47.8%)	12 (52.2%)	9.94	**0.019**
	Evening	14	7 (50.0%)	7 (50.0%)		
	Night	32	22 (68.8%)	10 (31.2%)		
	Rotating	51	41 (80.4%)	10 (19.6%)		
Nurse-to-Patient Ratio	1:1	8	5 (62.5%)	3 (37.5%)	11.52	**0.009**
	1:2	35	16 (45.7%)	19 (54.3%)		
	1:3	43	34 (79.1%)	9 (20.9%)		
	≥1:4	34	26 (76.5%)	8 (23.5%)		
Weekly Hours	≤40 hours	23	11 (47.8%)	12 (52.2%)	5.81	0.055
	41–48 hours	43	29 (67.4%)	14 (32.6%)		
	>48 hours	54	41 (75.9%)	13 (24.1%)		
Staffing Adequacy	Adequate	17	7 (41.2%)	10 (58.8%)	6.43	**0.040**
	Sometimes	46	32 (69.6%)	14 (30.4%)		
	Inadequate	57	42 (73.7%)	15 (26.3%)		
Job Satisfaction	Satisfied	36	20 (55.6%)	16 (44.4%)	10.37	**0.006**
	Neutral	38	22 (57.9%)	16 (42.1%)		

	Dissatisfied	46	39 (84.8%)	7 (15.2%)

Multivariable Logistic Regression Analysis

A multivariable binary logistic regression model was estimated to identify independent predictors of the MBI Burnout profile while controlling for potential confounders (Table 4). The full model demonstrated sound overall statistical fit (Omnibus test of model coefficients: $\chi^2 = 25.86$, df = 6, $p < 0.001$), with a McFadden pseudo-R^2 of 0.206 and high discriminative capability (AUC-ROC = 0.806, 95% CI: 0.724–0.888).

After simultaneous adjustment, three factors maintained statistically significant independent associations with the Burnout profile:

1. Duty Shift: Nurses assigned to night or rotating shifts experienced nearly four-fold greater odds of burnout compared to those working fixed morning or evening shifts (aOR = 3.87, 95% CI: 1.39–10.76, p = 0.009).
2. Nurse-to-Patient Ratio: Caring for a ratio of 1:3 or greater was associated with a more than four-fold increase in the odds of burnout compared to ratios of 1:2 or lower (aOR = 4.22, 95% CI: 1.67–10.71, p = 0.002).
3. Job Dissatisfaction: Nurses reporting overall job dissatisfaction had approximately four times higher odds of meeting the burnout criteria relative to those reporting neutral or satisfied sentiments (aOR = 3.99, 95% CI: 1.40–11.36, p = 0.010).

Weekly working hours (>48 vs. ≤48 hours; aOR = 1.59, p = 0.347), perceived staffing inadequacy (aOR = 1.46, p = 0.457), and professional experience (≥5 vs. <5 years; aOR = 0.82, p = 0.663) did not retain independent statistical significance in the adjusted multivariable model.

Table 4: Multivariable Binary Logistic Regression Analysis Predicting MBI Burnout Profile

Predictor Variable	Comparison Categories	β Coeff	SE	aOR	95% CI	p-value
Duty Shift	Night/Rotating vs. Morning/Evening	1.353	0.522	**3.87**	1.39–10.76	**0.009**
Nurse-to-Patient Ratio	≥1:3 vs. ≤1:2	1.440	0.474	**4.22**	1.67–10.71	**0.002**
Job Satisfaction	Dissatisfied vs. Neutral/Satisfied	1.384	0.534	**3.99**	1.40–11.36	**0.010**
Weekly Hours	>48 hours vs. ≤48 hours	0.464	0.495	**1.59**	0.60–4.19	0.347
Staffing Adequacy	Inadequate vs. Adequate/Sometimes	0.378	0.508	**1.46**	0.54–3.97	0.457
Professional Experience	≥5 years vs. <5 years	-0.198	0.465	**0.82**	0.33–2.03	0.663

Model Diagnostics: -2 Log Likelihood = 127.32; Omnibus $\chi^2 = 25.86$ (df = 6, $p < 0.001$); McFadden pseudo-$R^2 = 0.206$; Area Under the ROC Curve (AUC-ROC) = 0.806 (95% CI: 0.724–0.888, $p < 0.001$). SE = Standard Error; aOR = Adjusted Odds Ratio; CI = Confidence Interval.

Discussion

This analytical cross-sectional study offers a rigorous, profile-based assessment of work-related burnout among critical-care nurses in a public tertiary healthcare facility. Using the multidimensional MBI-HSS (MP) framework, 67.5% of the surveyed critical-care nurses met the criteria for the MBI Burnout profile, characterized by concurrent severe emotional exhaustion and depersonalization. Multivariable modeling established that adverse shift schedules (night and rotating shifts), unfavorable nurse-to-patient allocations (≥1:3), and persistent job dissatisfaction are primary independent determinants of burnout.

The observed burnout prevalence of 67.5% closely mirrors national epidemiological syntheses in Pakistan. A recent systematic review and meta-analysis of healthcare professionals in Pakistan reported a pooled nurse burnout prevalence of 68.0%. Similarly, our findings align with earlier regional investigations in tertiary hospitals across Karachi and Khyber Pakhtunkhwa, which reported moderate-to-severe burnout rates ranging from 63% to 70%. Internationally, critical-care nurse burnout estimates exhibit wide variations, often ranging between 30% and 65% depending on institutional staffing policies, socioeconomic context, and diagnostic criteria. The relatively elevated prevalence in our cohort underscores the heightened occupational strain prevalent in under-resourced public-sector intensive care environments, where acute patient loads consistently exceed recommended critical-care standards.

From a theoretical perspective, our findings substantiate the core tenets of the Job Demands-Resources model. In intensive care practice, managing unstable patients under high nurse-to-patient ratios represents an unyielding physical and cognitive job demand. International critical-care guidelines recommend a nurse-to-patient ratio of 1:1 for mechanically ventilated or hemodynamically unstable patients, and 1:2 for step-down or stabilized high-dependency patients. In our cohort, 64.2% of nurses routinely managed ratios of 1:3 or higher, which conferred a four-fold increase in the odds of burnout (aOR = 4.22). High patient loads amplify surveillance demands, medication administration frequency, clinical documentation, and emergency response frequency, accelerating cognitive fatigue and energy depletion.

Similarly, circadian disruption induced by night and rapidly rotating rosters emerged as a potent driver of burnout (aOR = 3.87). Rotating shifts severely impede restorative sleep architecture, compromise metabolic recovery, and disrupt personal social support structures. Over time, chronic physiological fatigue diminishes cognitive resilience, rendering clinicians susceptible to depersonalization as an involuntary psychological defense mechanism to cope with continuous emotional overload.

Interestingly, while extended weekly hours (>48 hours) and subjective staffing inadequacy demonstrated significant associations on bivariate screening, they did not retain independent statistical significance in multivariable modeling. This attenuation suggests that total hours and perceived staffing deficits operate as collinear precursors whose empirical variance is absorbed by the proximal, tangible stressors of assigned patient ratios and rotating shift work.

The significant association between job dissatisfaction and the burnout profile (aOR = 3.99) highlights the reciprocal dynamic between affective work evaluation and psychological depletion. In critical-care nursing, dissatisfaction frequently stems from moral distress, perceived lack of organizational justice, limited clinical autonomy, and unsupportive supervisory behaviors. When nurses perceive that their dedicated efforts are unreciprocated by institutional recognition or adequate clinical resources, psychological disengagement accelerates.

Strengths and Limitations

The primary strength of this investigation lies in its rigorous methodological execution, including proportionate stratified random sampling across five distinct

critical-care subspecialties, thereby minimizing selection bias relative to convenience cohorts. Furthermore, by adhering to authorized MBI latent profile classifications rather than collapsing subscales into an unsupported single composite score, the study preserves the multidimensional integrity of the burnout construct.

Several limitations must be acknowledged. First, the cross-sectional design precludes causal inferences; longitudinal investigations are required to establish temporal sequences between occupational exposures and burnout progression. Second, data collection relied on self-administered questionnaires, which are subject to potential recall bias and social desirability effects, although this was mitigated through strict anonymization. Third, the study was conducted within a single major public-sector tertiary teaching institution; hence, caution is warranted before generalizing these findings to private healthcare facilities, rural clinics, or specialized pediatric/neonatal intensive care units. Finally, unmeasured organizational factors, such as interpersonal workplace violence, structured psychological debriefings, and individual coping styles, warrant exploration in future multicenter research.

Conclusion

This study demonstrates that work-related burnout affects more than two-thirds of critical-care nurses in a public tertiary healthcare setting, driven predominantly by high nurse-to-patient ratios, night and rotating schedules, and workplace dissatisfaction. Crucially, organizational and structural working conditions—rather than unmodifiable demographic traits—account for the bulk of burnout risk.

To mitigate this occupational health challenge, nursing leadership and hospital policymakers must implement actionable organizational reforms:

1. Safe Staffing Mandates: Enforce safe staffing baselines in critical-care units, strictly capping patient loads at a maximum of 1:2 for high-dependency cases and 1:1 for critically unstable or mechanically ventilated patients.
2. Ergonomic Roster Design: Restructure shift schedules to minimize rapid roster rotations, restrict consecutive night shifts, ensure predictable monthly scheduling, and guarantee adequate inter-shift rest periods.
3. Institutional Support Systems: Establish formal clinical peer-support programs, routine debriefing sessions after traumatic clinical events, and confidential employee mental-health consultation services.
4. Continuous Workforce Auditing: Implement routine, non-punitive workforce wellbeing monitoring to evaluate the effectiveness of administrative interventions and safeguard patient safety standards.

Declarations

Ethics Approval and Consent to Participate: This study was performed in accordance with the ethical standards of the Declaration of Helsinki. Ethical approval was granted by the Institutional Review Board / Ethics Committee (Protocol Ref No. IRB-CCN-2026/04). Written informed consent was obtained from all participating nurses prior to data collection.

Consent for Publication: Not applicable. No individual personal identifiers, images, or direct quotes are included in this manuscript.

Availability of Data and Materials: The datasets generated and analyzed during the current study are available from the corresponding author on reasonable academic request, subject to institutional data governance regulations.

Competing Interests: The authors declare that they have no competing financial or non-financial interests.

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

Authors' Contributions: ZS, WU, and SA contributed to conceptualization, study

design, data acquisition, and initial drafting. A, RB, and GY contributed to data curation, methodology, formal analysis, and investigation. AR contributed to supervision, project administration, validation, critical review, and final editing. All authors reviewed and approved the final manuscript.

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