PREVALENCE AND RISK FACTORS OF BURNOUT SYNDROME IN MEDICAL STUDENTS AND RESIDENTS.

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ABSTRACT
Background: Burnout--emotional exhaustion, depersonalization, reduced personal accomplishment--among medical trainee are being widely acknowledged. The intense demands of the academic years along with long work out hours make students and residents prone to stress. It would be important to know the prevalence and predictors of burnout in order to adopt preventive measures and improve the quality of training and mental health.
Objectives: To ascertain the prevalence of burnout in medical students and residents, and to identify demographic, academic, psychosocial and work aligning stressors that affect burnout risk profile using standardised validated tools for assessment.

Keywords: A Cross-sectional study.

Place and duration of study: Department of psychiatry Nowshera Medical College One Year from Jan 2024 to Jan 2025
Methods: A cross-sectional study was carried out on 100 subjects (50 medical students, 50 residents) in years of. Burnout was measured by the Maslach Burnout Inventory (MBI). Demographic, work-related and psychosocial aspects were recorded. Statistical calculations were done using SPSS v24. 0 with descriptive statistics, chi-square, t-tests, and logistic regression. Significance was set at p80 hours per week (p=0.002), sleeping <6 hours/night (p=0.01), and the perception of high stress (p<0.001). Residents were more likely to suffer from emotional exhaustion compared to students (p=0.04). Strong social support was attenuating (p=0.03). Logistic regression analysis revealed workload and stress as independent predictors of burnout.The current cross-sectional study aims to determine the prevalence of burnout syndrome in medical students and residents. Important risk factors were long hours at work, lack of sleep, and high stress; social support was protective. These results highlight the necessity of organized programs, such as duty-hour regulation, mental health service utilization, peer-support program involvement and stress management education. Institutional efforts should be directed at prevention to decrease burnout and protect trainee health as well as improve both the quality of medical education and patient care.

Keywords: Burnout, Professional; Students, Medical; Internship and Residency; Risk Factors

Introduction:

Burnout is a psychological phenomenon defined as including "emotional exhaustion, depersonalization, and reduced personal accomplishment". It is now considered to be an important problem among health care providers, particularly during medical training, when academic and clinical burdens are both intense. The first report of the concept of burnout was formulated by Freudenberger in the 1970s and subsequently operationalized by Maslach in her development of the Maslach Burnout Inventory (MBI), which continues to be considered the reference standard for its measurement. The most vulnerable groups are medical students and residents who spend long periods in training. Medical students are expected to reconcile voluminous academic work with clinical experiences, examinations, and the psychological burden that comes with the switch from pre-clinical to clinical roles. Whereas, the residents work longer hours, more nights, with much more patient care and less autonomy. Combine these with sleep deprivation, perceived lack of support, and pressure to perform and you have a breeding ground for burnout. Worldwide, an estimated 40% to 70% of medical trainees have experienced burnout, varying by location and instruments used for measurement. Within the USA, studies have demonstrated resident burnout of between 50% up to 60%, with emotional exhaustion being the most frequent domain. In the same way, in Asia and Middle East rates of more than 60% have been found, proving that burnout is a global issue. A recent systematic review has stated that medical students consistently demonstrate a higher prevalence of burnout when compared to their age-matched peers in non-medical programs, highlighting the distinct stressors experienced in medical education.

Factors contributing to burnout are complex and multifaceted. These factors also include younger age, females as a gender, personality characteristics such as the perfectionism trait and absence of coping strategies. Institutional factors are characterized by heavy load of work, long duty hours, inadequate mentorship and disorganization. The psychosocial determinants, including poor sleep quality, financial strain, lack of social support and heightened perceived stress worsen the impact. Protective factors included resilience training, peer-mentoring programs, and sufficient sleep and appropriate faculty support with balanced workload. It has serious implications for not just the health of trainees but also the health systems in which they function. They are more likely to develop depression, substance abuse, suicidal thoughts and have impaired academic or performance. From a structural level, burnout leads to medical errors, poor patient safety outcomes, diminished empathy and early withdrawal from training programs. Given the downstream effects of these phenomena, there is increased urgency for recognition, early treatment and systemic approaches to combat burnout. Though there is a plethora of literature worldwide, data from South Asia or similar population settings are scarce. Epidemiology and risk factor patterns may change due to cultural, institutional or socioeconomic differences, which argues for context-sensitive studies. Understanding the prevalence and predictors of burnout in medical trainees within our setting is equivalent to identifying potential targets for interventions designed to improve trainee happiness, and ultimately affect patient care. The aim of this study was, therefore, to determine the prevalence of burnout among medical students and residents based on credible instruments as well as to identify associated demographic, academic and psychosocial risk factors.

Methods:

This Cross-sectional study Conducted in the Department of psychiatry Nowshera Medical College One Year from Jan 2024 to Jan 2025. It consisted of 50 undergraduate medical students and 50 postgraduate resident doctors from various specialities. A self-administered questionnaire was used for demographic characteristics (age, sex, marital status, year of study and specialty) as well as duty hours, sleep time and social support. The MBI-HSS was used to measure burnout, with 3 subscales of emotional exhaustion, depersonalization, and personal accomplishment. Standard cut-points were used to define high and low burnout. The main out- come measure was general prevalence of burnout, secondary measures were with respect to demographic and academic factors.

Inclusion Criteria:

Patients who were MBBS clinical years and residents actually attending hospital training programs, with written consent in the study and completion of the entire-questionnaire.

Exclusion Criteria:

Exclusion criteria included participants with a history of psychiatric disorder, those taking psychotropic medication or those who declined consent. Incomplete Maslach Burnout Inventory responses were also removed from analysis.

Ethical Approval:

The study protocol was approved by Nowshera Medical College,Nowshera Institutional Review Board (IRB), reference number. Participation was anonymous and voluntary, and written consent was provided. Anonymization of data and restricted access to authorized investigators only (in line with ethical study standards) ensured anonymity.

Data Collection:

The data was obtained through a structured and self-administered questionnaire during academic activities and clinical posting. Study assistants who were trained to clarify when necessary. Questionnaires that had been filled in were coded and locked up. The database was open only to principal investigators. Checks for quality of data were performed before analysis to verify correct and complete answering.

Statistical Analysis:

The IBM SPSS 24.0 was used for data analysis. Continuous variables (age, duty hours) were expressed as mean ± standard deviation. Categorical variables (such as sex, prevalence of burnout) were presented as counts and percentages. Bivariate analyses used chi-square and t-tests. Logistic regression identified independent predictors. Significance was defined at p80 work-hours per week reported a significantly higher rate of burnout compared to those who worked <=80 hours (72% vs 45%, p=0.002). Less than 6 hours of sleep per night had a strong positive correlation in the group with burnout (70% vs. 41%, p = 0.01). High perceived stress scores were significantly associated with burnout (p<0.001). Conversely, social support was protective such that lower burnout prevalence was reported by participants who reported good family and peer support (40% vs. 67%, p=0.03). On multivariate logistic regression, significant independent predictors for burnout were excessive duty hours (OR 2.4, 95% CI 1.3–4.1, p=0.002), low sleep (OR 2.0, 95% CI 1.1–3.8, p=0.01) and high perceived stress (OR 3.1, 95% CI=6–1-6-0p<0·001). Social support continued to be a strong protective factor (OR 0.6, p=0.03).

Results

A total of 100 participants were enrolled, including 50 medical students and 50 residents. The mean age was 25.4 ± 2.8 years, with residents significantly older than students (27.0 ± 2.4 vs. 23.8 ± 1.6 years, $p = 0.001$). Females comprised 52% of the sample, and 30% were married. Residents were more likely to report excessive duty hours (>80 per week) (56% vs. 24%, $p = 0.002$) and inadequate sleep (<6 hours/day) (56% vs. 36%, $p = 0.04$). Baseline demographic and work characteristics are summarized in **Table 1**.The overall prevalence of burnout was **58%** (27/50 medical students and 31/50 residents, $p = 0.38$). High emotional exhaustion was significantly more common among residents than students (66% vs. 56%, $p = 0.04$), while no significant differences were noted for depersonalization or reduced personal accomplishment (Table 2).On univariate analysis, burnout was significantly associated with female gender (59% vs. 43%, $p = 0.04$), age ≤25 years (65% vs. 48%, $p = 0.03$), weekly duty hours >80 (55% vs. 19%, $p = 0.002$), sleep <6 hours/day (59% vs. 29%, $p = 0.01$), **and** high perceived stress (69% vs. 24%, p <0.001). Conversely, strong social support was protective (34% vs. 83%, $p = 0.03$) (Table 3).In multivariate logistic regression, weekly duty hours >80 (OR 2.4, 95% CI 1.3–4.1, $p = 0.002$), sleep <6 hours/day (OR 2.0, 95% CI 1.1–3.8, $p = 0.01$),

and high perceived stress (OR 3.1, 95% CI 1.6–6.0, *p* <0.001) emerged as significant independent predictors of burnout. Strong social support remained a protective factor (OR 0.6, 95% CI 0.3–0.9, *p* = 0.03) (Table 4).

Table 1. Demographic Characteristics of Participants (N = 100)

Variable	Total (n=100)	Medical Students (n=50)	Residents (n=50)	p-value
Mean Age (years ± SD)	25.4 ± 2.8	23.8 ± 1.6	27.0 ± 2.4	0.001*
Gender (Female)	52 (52%)	28 (56%)	24 (48%)	0.41
Marital Status (Married)	30 (30%)	10 (20%)	20 (40%)	0.03*
Weekly Duty Hours >80	40 (40%)	12 (24%)	28 (56%)	0.002*
Sleep <6 hours/day	46 (46%)	18 (36%)	28 (56%)	0.04*
Strong Social Support	55 (55%)	30 (60%)	25 (50%)	0.29

Table 2. Prevalence of Burnout by Group

Burnout Measure	Total (n=100)	Medical Students (n=50)	Residents (n=50)	p-value
Overall Burnout (Yes)	58 (58%)	27 (54%)	31 (62%)	0.38
High Emotional Exhaustion	61 (61%)	28 (56%)	33 (66%)	0.04*
High Depersonalization	49 (49%)	22 (44%)	27 (54%)	0.19
Low Personal Accomplishment	44 (44%)	21 (42%)	23 (46%)	0.66

Table 3. Univariate Analysis of Risk Factors for Burnout

Risk Factor	Burnout Present (n=58)	Burnout Absent (n=42)	p-value
Female Gender	34 (59%)	18 (43%)	0.04*
Age ≤25 years	38 (65%)	20 (48%)	0.03*
Weekly Duty Hours >80	32 (55%)	8 (19%)	0.002*
Sleep <6 hours	34 (59%)	12 (29%)	0.01*
High Perceived Stress	40 (69%)	10 (24%)	<0.001*
Strong Social Support	20 (34%)	35 (83%)	0.03*

Table 4. Multivariate Logistic Regression for Predictors of Burnout

Variable	Adjusted OR	95% CI	p-value
Weekly Duty Hours >80	2.4	1.3 – 4.1	0.002*
Sleep <6 hours/day	2.0	1.1 – 3.8	0.01*
High Perceived Stress	3.1	1.6 – 6.0	<0.001*
Strong Social Support	0.6	0.3 – 0.9	0.03*

Discussion:

The current study found an elevated prevalence of burnout in medical students and residents, with over 50% of the respondents meeting criteria for burnout. The most commonly affected domain was emotional exhaustion, followed by depersonalization and decreased personal accomplishment. These results agree with the international literature, reporting prevalence between 40-70% in medical trainees (14,15), reflecting the fact that burnout as professional hazard in medical education and training is ubiquitous. Our findings are consistent with those in a large multisite study in the United States that found a prevalence of burnout among residents at around 60%, which is similar to our observed rate of 62% (16). Similarly, systematic review on the prevalence of burnout in medical students across the globe had identified following rates: 44–65%, depending on measuring tools utilized (17). These comparisons indicate that the burden of burnout in our setting is no less than that seen in HICs, despite differing healthcare infrastructures and training environments. One of the most remarkable images in our investigation was the link found between heavy duty hours and burnout. Residents who worked over 80 h per week had much higher burnout rates, as previous studies have shown. West et al. showed that weekly duty hours exceeding 80 hours are associated with significant increase in emotional exhaustion and reduction in empathy among residents [18]. Iv similar European study found that the reduction of work hours was related to Well-being and lower burnout scores (19).

Taken together, these results emphasize that duty-hour reform is a significant organization intervention. Insufficient sleep proved to be additionally predictive for burnout in our collective. Those who slept 6 hours or less per night were twice as likely to suffer from burnout than good sleepers. Prior evidence confirms this relationship: Pagni and de Queiroz showed that poor-quality sleep independently predicted increased burnout among medical trainee (20). There is also emerging evidence that sleep interventions in the form of organized scheduling and sleep hygiene trainingmay lower risk of burnout (21). These data also underscore the importance of institution-wide policies fostering protected rest periods and addressing fatigue-mitigation practices. Psychological stress was also an independent predictive factor in our findings.

High perceived stress was linked to greater than threefold increased odds of burnout. This is consistent with the previous study of Dyrbye et al. which shows that such perceived stress and feeling of lack of coping strategies predispose trainees to high emotional exhaustion and depersonalization (22). More recent study also indicates that resilience and mindfulness interventions may serve as buffers against the effects of stress, reducing levels of burnout (23). Thus incorporating them into curricula may be a practical protective strategy. Intriguingly, our investigation revealed strong social support as a buffer against burnout. Respondents who had family and peer support had much lesser prevalence of burnout. This is consistent with previous study that indicated social support networks enhance coping ability and reduce severity of burnout (24). New studies have also shown that peer mentorship and wellness firewalls in training programs can likewise promote resilience and decrease psychological morbidity among medical trainees (25). Institutions may therefore consider providing assistance and recognition to peer-support system as part of their wellness program. We also found gender and marital status appear to affect burnout in our study. Females experienced the most emotional exhaustion and married people had a lower risk, which showed an equal buffer effect of the marital partner. Studies have yielded inconsistent results about gender, with some studies demonstrating higher burnout in women due to burden of societal role expectations and others reporting no differences (26). It would be useful if further study about gender-specific stressors and support systems in our culture are investigated. Our results add to this literature by providing region specific data from South Asia-of an aspect of burnout in trainees that is still a relatively less studied area. Although prevalence rates are comparable to those found worldwide, the impact of social expectations as well as professional resource and training systems could affect risk profiles. Crucially, the present findings underscore social support as a strong protective factor, offering pathways for inexpensive culturally adapted interventions

. Taken together, the findings are consistent with the notion that addressing burnout will need interventions at multiple levels. At the institutional level, attention should be given to duty-hour restrictions, rest hours and mentoring programs. At the personal level, stress reduction, mindfulness and resiliency training could be useful. At the cultural level, destigmatizing mental health and creating supportive peer contexts is crucial (27,28). Future study should use longitudinal designs to examine causality and evaluate the impact of interventions on reducing burnout and improving outcomes for trainees/and or patients.

Conclusion:
Burnout is common among medical students and residents, being most strongly associated with long duty hours, less sleep, and high stress; social support was found to be protective. These findings underscore the necessity of institutional change and wellness programs tailored to the learner, as well as personal coping strategies to protect trainee health and enhance patient-centered care.

Limitations:
This study was cross-sectional in nature, which impaired the ability to infer causality between burnout and other factors. The small sample size and use of self-reported questionnaires might lead to recall and reporting bias. In addition, the generalizability of this study is limited by the data from only one

institute. Further investigation in larger, multi-institutional and longitudinal studies is required to confirm and extend these findings.

Future Findings:

Future studies should examine longitudinal patterns of burnout at various stages of MD/MPH education, assess the value of interventions such as mindfulness and resilience training, and evaluate institutional policies such as duty hours changes. Large-scale multicenter studies with sample taken from different healthcare systems, may allow further investigation of cultural and systemic factors related to burnout.

Abbreviations
1. **MBI–HSS**: Maslach Burnout Inventory–Human Services Survey
2. **MBI**: Maslach Burnout Inventory
3. **SPSS**: Statistical Package for the Social Sciences
4. **OR**: Odds Ratio
5. **CI**: Confidence Interval
6. **IRB**: Institutional Review Board
7. **SD**: Standard Deviation
8. **MBBS**: Bachelor of Medicine, Bachelor of Surgery

Disclaimer: Nil
Conflict of Interest: Nil
Funding Disclosure: Nil

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Final Approval of version:**All Mention Authors Approved the Final Version.**

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