RESEARCH ARTICLE

# Prevalence and correlates of burnout among surgery residents in Lahore, Pakistan: a cross-sectional study

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## Abstract

**Aim:** To determine the prevalence of burnout in surgical residents of Mayo Hospital Lahore and the contribution of demographical, occupational, psychological and social factors in this regard. Burnout syndrome comprises of exhaustion, depersonalization and diminished sense of personal achievement. This occupational phenomenon is the major cause of subpar healthcare worker performance, which presents in reality as a risk to patient care and recovery. **Methods:** This cross-sectional study was conducted across four surgical units from June to December 2025 among surgical residents at Mayo hospital, Lahore. The eligibility criteria consisted of residents who were currently rotating and those who had completed their residency within the last six months in one of these four units. The data was collected using MBI-HSS tool with the help of a self-administered questionnaire based on the aforementioned. It included demographic, occupational and psychosocial variables. Descriptive statistics concluded participant characteristics and prevalence of burnout. Bivariate analysis and multivariable logistics were performed to identify independent factors. We considered $p<0.05$ statistically significant. **Results:** The overall burnout prevalence was 80.3% among 117 surgical residents and the criteria for tri-dimensional burnout was met by 44.1%. The independent factors associated with higher burnout risk were younger age (adjusted OR 0.49 per year, 95% CI 0.29–0.81, p=0.006) and lack of perceived collegial support (adjusted OR 9.00, 95% CI 1.07–75.44, p=0.043). Exercise trends and financial strain did not reach the statistical significance but also played a part in contributing to burnout. **Conclusion:** Our study confirmed higher burnout prevalence than documented in international studies. The greatest risk factors were junior residency status and lack of collegial support. Strategies must be developed to support the well-being of residents by these institutions and address the substantial burnout rates.

**Keywords:** Burnout • Surgical residents • Prevalence • Maslach Burnout Inventory • Pakistan

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## Introduction

Maslach and Jackson define burnout as a syndrome characterized by a triad of emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment, particularly among individuals working in human service professions such as medicine[1]. It is not recognized as a medical condition, but an occupational phenomenon which occurs as a result of chronic workplace stress which has not been managed successfully, by the WHO[2].

Physician burnout is a well-recognized issue globally. Recent studies report prevalence of approximately 25% in the US and 33% in UK[3,4]. Career stage, pre-existing mental health conditions, and demographic and social factors all influence these rates[5,6]. Long working hours, poor work-life balance, and financial instability are the main contributors of prevalent burnout among physicians in surgical specialties and junior doctors[7]. A national survey among general surgery residents in the United States reported a shockingly high burnout rate of 69%[8].

Health care system and physicians both are substantially affected by these burnout rates[9]. On an individual level, diminished working memory, impaired attention regulation,

and poor decision-making are the most common effects of chronic stress that induces neurobiological changes in the prefrontal cortex due to physician burnout[10]. A meta-analysis examining the effects of burnout on patient care demonstrated a two-fold increased risk of unsafe care, unprofessional behavior, and lower patient satisfaction, particularly among early-career physicians such as residents[11].

The prevalence and contributing factors of burnout have been documented by several studies worldwide. However, there still is a major lacking of such studies in tertiary care hospital settings of lower middle income countries like Pakistan. Mayo Hospital, the largest tertiary care hospital in the province, presents unique challenges, including high

patient influx, limited resources, poor working environments, lack of workplace safety, and inadequate systemic support for physicians, especially residents.

Comprising of four units, the General Surgery department at Mayo Hospital, faces a high inpatient and outpatient load. These units accommodate general surgical residents as well as rotating residents from allied specialties such as orthopaedics, plastics, paediatrics, neurosurgery, and cardiothoracic surgery. General surgery training duration spans 4 years while it is 5 years for allied specialties. During this time period, residents undergo arduous training and work 60-80 hours per week on average in an institute which lacks resources and has a very high patient load. A related study conducted at Mayo Hospital, Lahore, in 2020 reported the high prevalence of burnout among general surgery and gynecology residents but did not investigate the contributing factors behind this issue[12].

The aim of this study is to gauge the prevalence of burnout in physicians working at a tertiary care hospital in a developing country with limited resources and high patient influx rates and to identify the factors contributing to it. Identifying these factors will enable local healthcare authorities to address this issue and improve working conditions for resident surgeons, ultimately promoting safer patient care and greater job satisfaction among physicians

## Materials & methods

Our study was done in accordance with the STROBE CHECKLIST (from the Bulletin of the World Health Organization) for observational studies[13].

### Study design and setting

This cross-sectional study was conducted in the General Surgery Department at Mayo Hospital, Lahore, a large tertiary care teaching hospital allied with King Edward Medical University. The department consists of four units that accommodate general surgery residents as well as rotational trainees from allied specialties, including neurosurgery, orthopedics, plastic surgery and urology. This study was conducted from June to December 2025.

### Study participants

#### *Eligibility criteria*

The study included:

All postgraduate residents working in all General Surgery units.

Rotational trainees from allied specialties currently rotating in General Surgery.

Residents who provided informed consent.

#### *Exclusion criteria*

Residents on rotations outside the hospital or on long leave during data collection.

Residents who submitted incomplete questionnaires or refused participation.

### Sample size and sampling

Using the WHO sample size calculator[14] while assuming a burnout prevalence of 69% (Elmore et al., 2016)[8], a minimum sample size of 85–90 participants was estimated. Consecutive sampling was used to recruit participants until the target sample was achieved.

### Data collection

Approval to conduct the study was obtained from the Institutional Review Board (IRB) of King Edward Medical University. Participants were briefed about the study, and written informed consent was taken. Data were collected using a structured self-administered questionnaire with three sections:

**Demographic data:** Age, sex, marital status, year of training, weekly work hours, on-call frequency, number of patients under direct care, duration of sleep, and satisfaction with salary.

**Psychosocial variables:** Perceived stress, coping strategies, social/family support, work-life balance, and perception of appreciation by peers.

**Burnout assessment:** Using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS), a validated 22-item instrument measuring emotional exhaustion (EE, 9 items), depersonalization (DP, 5 items), and personal accomplishment (PA, 8 items), each item rated on a 7-point scale (0 = never, 6 = every day).

### Operational definitions

**High EE (Emotional exhaustion):** ≥27

**High DP (depersonalization):** ≥13

**Low PA (personal accomplishment):** ≤31, higher cutoff >39

**Overall burnout:** High EE and/or high DP

**Tri-dimensional burnout:** High EE + high DP + low PA

### Bias

Our study population included all residents currently rotating across all surgical and allied units. Consecutive sampling was done. The residents were encouraged to participate fully in order to ensure maximum reach. To mitigate social desirability bias, data were collected via an anonymous form, while a valid and standardized questionnaire was utilized to prevent measurement bias. To protect against observer bias, data analysis was conducted by an independent researcher blinded to the study's primary hypotheses. Moreover, to minimize temporal bias and capture chronic burnout rather than temporary distress, data collection was strategically scheduled during a neutral period, avoiding scheduling immediately following major institutional policy changes.

### Statistical analysis

Data were entered into and analyzed using SPSS version 26.0.

**Descriptive statistics:** Means ± SD for normally distributed continuous variables, medians (IQR) for skewed variables, and frequencies (%) for categorical variables.

**Bivariate analyses:** Chi-square or Fisher's exact test for categorical variables; independent t-tests or ANOVA for continuous variables.

**Multivariable logistic regression:** Variables with p <0.20 in bivariate analysis and clinically relevant factors (age, workload, exercise, perceived support) were included to identify independent predictors of burnout. Adjusted odds ratios (OR) with 95% confidence intervals (CI) were reported.

**Significance level:** p <0.05 was considered statistically significant.

## Results

A total of 117 surgical residents completed the survey. The mean age of participants was 28 years (IQR 27-30). Most residents belonged to the 25–29 years age group (65%), while 35% were aged 30 years or above. Most participants were male (69.2%), and 60.7% were single, whereas 39.3% were married. Distribution across residency years was: Year 1 (40.2%), Year 2 (22.2%), Year 3 (16.2%), and Year 4 (21.4%).

In terms of specialty, general surgery was the most common discipline (59.8%), while the remaining 40.2% belonged to allied surgical specialties. The median duration of training in general surgery was 24 months (IQR: 13.5–48).

Workload patterns showed a median of 80 hours/week (IQR 70–90), median sleep of 6 hours/day (IQR 5–6), median 10 night calls/month (IQR 8.5-12), and median 14 patients/day (IQR 8.5–20). Commuting times were relatively short, median 20 minutes/day (IQR 10–40). Most residents (95.7%) did not engage in private practice alongside residency.

Regarding lifestyle and personal factors, 42.7% of residents had taken official leave during the past six months, whereas 73.5% reported no regular physical activity. A minority (12%) reported having a chronic illness or regular medication use. Despite demanding work schedules, most residents expressed satisfaction with their specialty choice (78.6%), and 72.6% stated they would choose surgery again if given the opportunity.

Burnout was measured using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS). Cut-offs were:

**High Emotional Exhaustion (EE):** ≥27

**High Depersonalization (DP):** ≥10

**Low Personal Accomplishment (PA):** ≤33

The residents exhibited a mean EE score of 34.05 ± 13.35, indicating a generally high level of emotional fatigue. The mean DP score was 14.57 ± 7.82, with 60.7% of residents scoring in the high burnout range (>13), 17.1% in the moderate range (7–12), and 22.2% in the low range (<6). The residents reported a mean PA score of 29.41 ± 9.08. Low personal accomplishment (<31) was reported by 59.8% of residents, while 25.6% were in the moderate range (32–38), and only 14.5% demonstrated high personal accomplishment (>39). The findings are presented in the following tables and figures below:

**Table 1.** Maslach Burnout Inventory – Human Services Survey (MBI-HSS)

| Item | Frequency (%) and mean ± SD |
|---|---|
| **High emotional exhaustion (EE)** | **34.05 ± 13.35** |
| Low <16 | 15 (12.8) |
| Moderate 17–26 | 16 (13.7) |
| High burnout >27 | 86 (73.5) |
| **High depersonalization (DP)** | **14.57 ± 7.82** |
| Low <6 | 26 (22.2) |
| Moderate 7–12 | 20 (17.1) |
| High burnout >13 | 71 (60.7) |
| **Low personal accomplishment (PA)** | **29.41 ± 9.08** |
| Low <31 | 70 (59.8) |
| Moderate 32–38 | 30 (25.6) |
| High burnout >39 | 17 (14.5) |

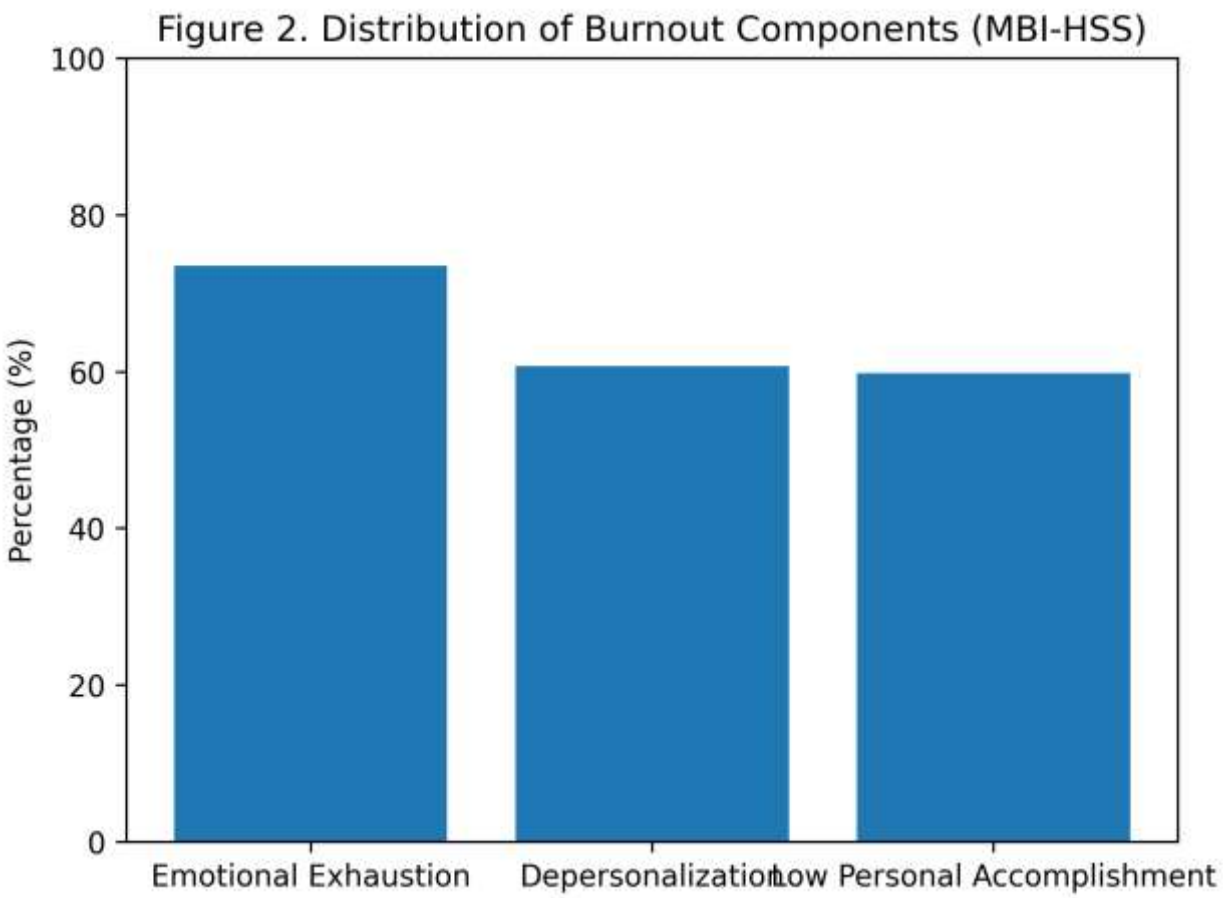



**Figure 2.** Distribution of burnout components (MBI-HSS).

**Table 2.** Overall burnout

| Specialty | General surgery | Allied surgery | P value |
|---|---|---|---|
| Burnout | 53 (56.4) | 41 (43.6) | 0.157 |
| Non-burnout | 17 (73.9) | 6 (26.1) | 0.157 |

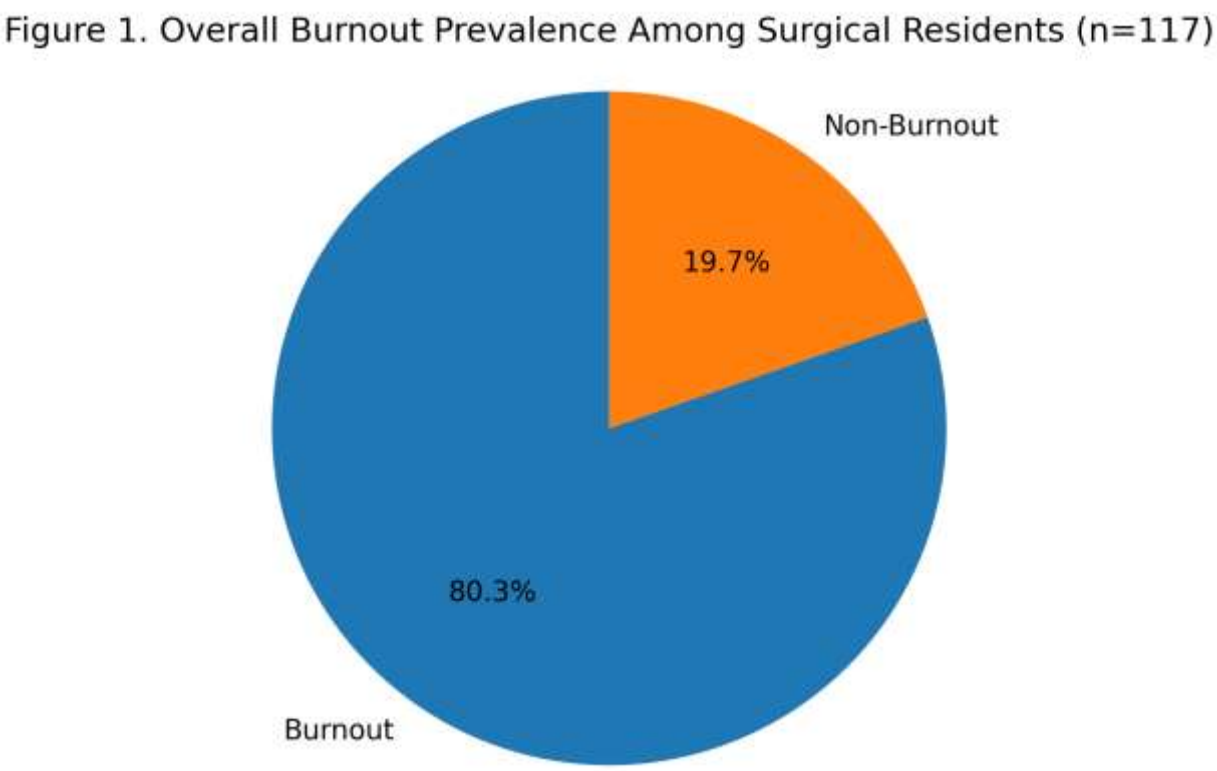



**Figure 1.** Overall burnout prevalence among surgical residents (n = 117).

Overall, 80.3% of residents experienced burnout, specifically 75.7% of general surgery residents while only 19.7% were non-burnout. This indicates a high prevalence of occupational stress and highlights the need for strategies to support resident well-being.

Burnout among general surgery residents was (75.7%) compared to allied surgery (87.2%), though the difference was not statistically significant ($p = 0.157$). Non-burnout rates were higher in general surgery (24.2%) than allied surgery (12.7%).

Among demographic factors, age was significantly associated with burnout ($p < 0.001$). Younger residents (25–29 years) had a higher prevalence of burnout (89.5%). Burnout was more frequent among female residents (88.9%) than males (76.5%) and in those in their first year of residency (85.1%), although the association was not found to be statistically significant.

Among all occupational factors, the only statistically significant association was observed between burnout and engagement in regular physical activity ($p = 0.003$), with residents who did not exercise being more likely to experience burnout. Additionally, satisfaction with specialty choice ($p = 0.003$) and willingness to choose surgery again ($p < 0.001$) were significantly associated with burnout, indicating that dissatisfaction with career choice was more common among residents experiencing burnout.

Psychosocial factors were analyzed using the Chi-square test. A significant association was found between burnout and poor perceived support from colleagues ($p < 0.001$). Work-life balance stress was also significantly associated with burnout ($p = 0.015$). Feeling unappreciated by seniors showed a strong association with burnout ($p < 0.001$). Residents who had considered leaving residency due to stress were significantly more likely to experience burnout ($p < 0.001$). Limited access to counseling or mental health support was significantly associated with burnout ($p = 0.039$), as was financial strain ($p = 0.047$).

In univariate binary logistic regression analysis, increasing age was significantly associated with lower odds of burnout (OR = 0.694, 95% CI: 0.559–0.861, $p < 0.001$). Among psychosocial factors, regular physical activity was significantly protective against burnout (OR = 0.232, 95% CI: 0.089–0.607, $p = 0.003$). Stress of work-life balance showed significant associations for mild ($p = 0.025$) and moderate stress levels ($p = 0.017$) compared to no work-life balance stress. Residents who felt appreciated by seniors had significantly reduced odds of burnout (OR = 0.131, 95% CI: 0.041–0.415, $p < 0.001$). Those who had considered leaving residency due to stress (55.6%) had significantly higher odds of burnout (OR = 12.92, 95% CI: 3.57–46.75, $p < 0.001$). Access to counseling services (18.8%) was associated with lower odds of burnout (OR = 0.328, 95% CI: 0.117–0.918, $p = 0.034$), while financial strain significantly raised the odds of burnout (OR = 2.71, 95% CI: 1.066–6.876, $p = 0.036$).

**Table 3.** Statistically significant factors from univariate regression analysis

| Variable | Category | Crude OR (95% CI) | P-value |
|---|---|---|---|
| Age (years) | Continuous | 0.69 (0.56–0.86) | <0.001 |
| Exercise / Physical Activity | Yes vs No | 0.23 (0.09–0.61) | 0.003 |
| Work–Life Balance Stress | Mild vs None | 0.09 (0.01–0.74) | 0.025 |
| Work–Life Balance Stress | Moderate vs None | 0.08 (0.01–0.63) | 0.017 |
| Appreciated by Seniors | Yes vs No | 0.13 (0.04–0.41) | <0.001 |
| Considered Leaving Residency | Yes vs No | 12.92 (3.57–46.75) | <0.001 |
| Access to Mental Health Support | Yes vs No | 0.33 (0.12–0.92) | 0.034 |
| Financial Strain | Yes vs No | 2.71 (1.07–6.88) | 0.036 |

**Note:** *Only statistically significant variables ($p < 0.05^*$) from Univariate Logistic Regression Analysis.*

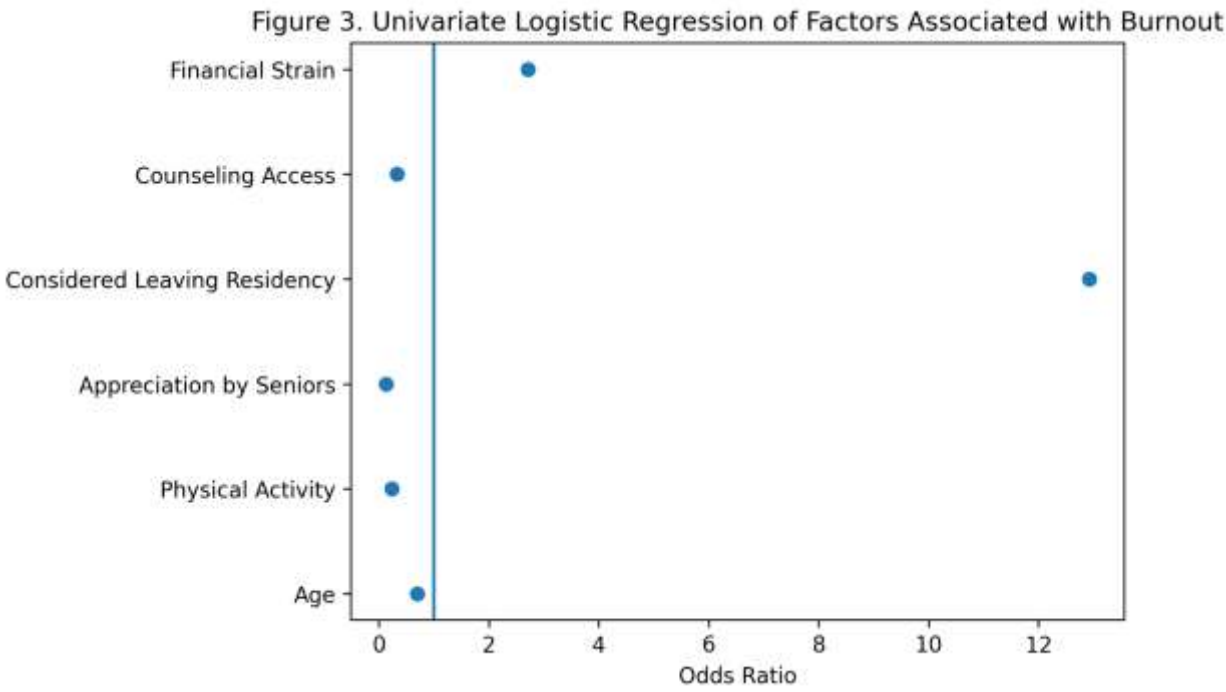



**Figure 3.** Univariate logistic regression of factors associated with burnout.

In multivariate logistic regression analysis, age remained a significant protective factor, with increasing age linked with reduced odds of burnout (Adjusted OR = 0.709, 95% CI: 0.533–0.944, p = 0.018). Considering leaving residency due to stress was the only significant risk factor, significantly increasing the odds of burnout (Adjusted OR = 10.754, 95% CI: 2.295–50.393, p = 0.003).

Other variables, including sex, specialty, average sleep duration, regular exercise, access to counseling, feeling appreciated by seniors and financial strain, were not

statistically significant in the multivariate model ($p > 0.05$), although regular exercise demonstrated a trend toward protection against burnout (Adjusted OR = 0.297, p = 0.057).

These findings suggest that among all examined factors, age and consideration of leaving residency due to stress are independent predictors of burnout in general surgery residents, while other psychosocial and occupational factors did not retain significance after adjustment.

**Table 4.** Statistically significant variables from multivariate regression analysis

| Variable | Adjusted OR (95% CI) | P-value |
|---|---|---|
| Age (years) | 0.71 (0.53–0.94) | 0.018 |
| Gender (Male vs Female) | 1.92 | 0.420 |
| Specialty | 0.49 (0.13–1.86) | 0.297 |
| Allied | 0.49 (0.13–1.86) | 0.297 |
| Considered Leaving Residency Yes vs No) | 10.75 (2.30–50.39) | <0.003† |
| Regular Exercise/Physical Activity Yes vs No) | 0.30 (0.09–1.04) | 0.057† |
| Appreciated by Seniors Yes vs No) | 0.37 (0.09–1.52) | 0.166 |
| Considered Leaving Residency Yes vs No† | 10.75 (2.30–50.39) | <0.003 |
| Appreciated by Seniors Yes vs No† | 0.37 (0.09–1.52)† | 0.166 |

**Note:** *Only statistically significant variables ($p < 0.05^{*}$) from multivariate Logistic Regression Analysis.*

## Discussion

The leading cause of suboptimal healthcare worker performance and diminished patient care is mainly underlying high burnout rates in physicians. This study helped to assess the prevalence of burnout and its associated factors among general surgery residents at Mayo Hospital, Lahore having high patient influx rates. Our findings reveal an exceedingly high rate of burnout: 80.3% of residents experienced overall burnout, and 44.1% met the criteria for tri-dimensional burnout. These figures emphasized that the rates are considerably higher than reported in high-income countries, such as the United States (69%)[8] and the United Kingdom (~33%)[4], but streamlined with studies indicating increased vulnerability among surgical residents due to massive patient load volumes and workload extremely demanding in nature[7]. Unique challenges such as working in a large, resource-deprived tertiary care center with high patient burden, prolonged working hours, and inadequate support are reflected in high prevalence rates of burnout in our cohort. Working in one of the largest public tertiary healthcare settings in the country, residents are often met with problems such as chronic short staffing. Residents are trained to be responsible for a large number of inpatients while simultaneously managing emergency admissions while already being short staffed. Emotional and physical exhaustion among residents is further aggravated by frequent on-call duties and lengthy surgeries, both elective and emergency.

The predominant component, affecting 73.5% of residents was Emotional exhaustion (EE), while depersonalization (DP) and low personal accomplishment (PA) were also highly prevalent (60.7% and 59.8%, respectively). The idea that burnout in surgical training originates mainly from long-standing, unaddressed, occupational stress diminishes both empathy and professional efficacy is supported by these findings[1,2]. Chronic mental and physical strain of long shifts, high patient loads, and frequent night calls is reflected in the predominance of emotional exhaustion. Low PA further suggests that residents may perceive their efforts as undermined and undervalued. Poorer learning and working environments among residents also play a role in reducing their sense of achievement[15].

Age emerged as an independent factor, with younger residents at significantly increased risk (adjusted OR 0.49 per year) of burnout. This supports prior literature showing that junior physicians aged 25-29 years are more susceptible compared with older ones aged 30 plus years (89.5% vs. 63.4%; $p = 0.001$. Concluding, age overall was found to be significantly associated with burnout ($p < 0.001$), reflecting less experience of younger residents to cope with clinical life stress and deal with complex patient care responsibilities[5,6]. Although our bivariate analysis suggested a trend toward higher burnout in early residency years, it did not reach statistical significance ($p = 0.333$), possibly due to the modest sample size. Sex and marital status were not significantly associated with burnout ($p = 0.139$ and $p = 0.354$, respectively), in line with previous studies in surgical residents[8].

In contrast to some studies correlating longer working hours and heavier patient loads with burnout[16], factors such as weekly duty hours, and patient load and number of night calls were not independently predictive after multivariable adjustment ($p = 0.248$, $p = 0.225$, and $p = 0.246$, respectively). Similarly, median weekly working hours, number of patients under direct care, and night calls per month did not differ significantly between residents with and without burnout ($p = 0.887$, $p = 0.728$, and $p = 0.584$, respectively). This may point towards ceiling effect in our cohort, where almost all residents work long hours leaving little variability for statistical discrimination.

Perceived collegial support plays a crucial role in managing burnout. Residents reporting low peer support were more likely to experience burnout ($p < 0.001$). Similarly, lack of appreciation from seniors undermined efforts, lack of work-life balance, limitations in counseling or mental health support and financial strain were additional factors significantly associated with increased burnout ($p = 0.015$, $p = 0.039$ and $p = 0.047$ respectively). In contrast, perceived support from family and friends was not significantly associated with burnout ($p = 0.262$). These findings align with global evidence that healthy professional environment and recognition of efforts help against developing burnout[9,11]. The unwanted effect of burnout on career satisfaction is reflected by high ratio of residents considering leaving residency (55.6%) and those dissatisfied with their specialty (21.4%), aligning with prior studies linking burnout with lack of enthusiasm in workplace environment and premature turnover[9].

The effect of regular exercise was found to be protective (OR = 0.232, 95% CI: 0.089–0.607; $p = 0.003$) highlighting the importance of physical activity in promoting resilience among residents. Access to counseling was limited (18.8%), and those with access had significantly lower odds of burnout (OR = 0.328, 95% CI: 0.117–0.918; $p = 0.034$), suggesting that availability of basic mental health support may be an important pillar for intervention in reducing burnout rates.

Burnout rates in our study exceed international figures. For instance, Elmore et al. found 69% prevalence among U.S. general surgery residents[8], while a global meta-analysis by Low et al. estimated a pooled prevalence of 51.0% among medical and surgical residents[9]. The heightened rates in our study may reflect national challenges, including high patient volumes, resource limitations, and insufficient workplace support framework. Similar findings have been reported in other low and middle income countries, highlighting the influence of institutional support on resident well-being[12].

Our findings carry important implications. Proper support, including mentorship and professional counseling to cope with clinical stress are basic requirements for junior residents. Creating a healthy environment with supportive peers and encouraging appreciation by senior faculty members can minimize burnout risk. Making counseling services, establishing proper mental health care centers with trained professionals, and steps to promote wellness more accessible such as exercise and work life balance programs may further reduce the prevalence of burnout. These steps not only improve resident wellness but may also improve patient care quality and satisfaction, following the established connection between physician burnout and compromised patient care[10,11].

Our study is consistent with results from other studies performed in Pakistan but has reported higher prevalence of burnout in comparison. Zaman et al. also identified the adverse effects of limited resources, lack of institutional support and demanding workloads to be contributing factors to higher prevalence of burnout in surgical residents[12]. Ahmed et al. performed a burnout survey at another tertiary care setting highlighting a burnout prevalence of 51% as compared to the 80.3% shown in our cohort[17]. Similar to our study, emotional exhaustion was the most prominent component of burnout in the aforementioned studies. However, the higher prevalence of burnout in our cohort is likely due to challenges faced by residents working in one of the largest tertiary care healthcare settings. These factors include statistically high patient influx, chronic lack of staff and resource hungry environment coupled with lack of institutional support.

A similar study by Bashir et al. demonstrated the effects of higher workloads, unfavorable working condition and constant bullying from seniors as factors affecting burnout prevalence[18]. In contrast to our study, which found these factors statistically significant, their study did not.

Being based in a large tertiary care hospital in a lower middle country, it is a key strength of our study distinguishing it from other similar studies and providing valuable and relevant data on burnout prevalence and

associated risk factors among surgical residents. These findings may be generally relevant to other resource-limited tertiary care settings in Pakistan and South Asia, though multi-center studies are needed to confirm generalizability[17,18]. The use of the validated, standardized MBI-HSS instrument allows for comparison with international literature.

Limitations include the cross-sectional study design, which reports a snapshot in time, and does not allow for long term follow up, and possible response bias from the residents who may have shared opinions that align with majority. Additionally, small sample sizes for some subgroup analyses may have limited statistical power.

## Conclusion

Burnout is highly prevalent among surgical residents at Mayo Hospital, particularly among junior residents and those residents who have lack of peer support. Institutions should be proactive in developing organized mentorship, proper peer support, encouragement and recognition, and access to mental health facilities to alleviate burnout and promote both patient care and resident well-being. These findings underscore the importance of considering local factors when developing interventions in resource-deprived, population-dense tertiary care settings.

## Funding statement

No funding was provided for this study.

## Data availability statement

Data will be provided on reasonable request from the corresponding author.

## Ethics statement

We confirm that we have read the journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

## Conflicts of interest

The authors declare no conflicts of interest.

## Acknowledgements

N/A

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