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Qamar Riaz

Syeda Kausar Ali

Muhammad Rizwan Khan

Abdul Rehman Alvi

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## Stress and coping among surgery residents in a developing country

Qamar Riaz<sup>1</sup>, Syeda Kausar Ali<sup>2</sup>, Muhammad Rizwan Khan<sup>3</sup>, Abdul Rehman Alvi<sup>4</sup>

### Abstract

**Objective:** Stress during residency training in surgical disciplines not only hampers professional development but can also compromise patient care and personal health. The purpose of this study was to measure the stress level among the surgical residents, identify factors within the learning and work environment that cause stress, and identify different strategies that the residents use habitually to cope with these stresses.

**Methods:** This mix method study was conducted in the department of Surgery at Aga Khan University, Pakistan. Residents' stress level was measured using Perceived Stress Scale (PSS); focus group discussions (FGDs) with faculty and residents explored stressors during residency training, while Brief COPE Inventory identified the residents' preferred coping strategy.

**Results:** A total of 68 (83%) surgery residents completed the survey of which 19% had high stress scores while only one resident had perception of low stress. Females had significantly higher stress scores ( $25.7 \pm 3.0$ ;  $p=0.008$ ) as compared to male counterparts. Planning (87.8%) and Self-distraction (65%) were the most commonly used adaptive and maladaptive strategies respectively. The reliability of the PSS and BCI measured by Cronbach's alpha was 0.73 and 0.82 respectively. Work-life imbalance, workload and contradicting programme and hospital policies were identified in FGDs as major stressors during residency.

**Conclusion:** Although surgical residency programmes are very stressful, coping strategies are not formally taught during surgical training. Academia and hospital should join hands in developing interventions to enable residents cope with the situation.

**Keywords:** Stress level, Surgical Residency Training, Coping Strategies, Working hours. (JPMA 71: .16; 2021)

**DOI:** <https://doi.org/10.47391/JPMA.522>

### Introduction

Postgraduate training in surgical disciplines is considered challenging and stressful owing to the demands of the training.<sup>1,2</sup> Stress could effect residents' professional development and quality of life in many ways and therefore has been a cause of concern for the programme directors and educationists for past several years.<sup>3</sup> There are studies showing that the residents suffering from stress fail to demonstrate empathy to the patients and colleagues,<sup>4</sup> commit more medication errors<sup>5</sup> and perform poorly during surgery<sup>6</sup> thus compromising patient safety and quality of health care. Stress could also result in a variety of personal consequences ranging from physical and emotional exhaustion, poor memory, attention loss, illness, to substance abuse and suicidal ideation.<sup>7,8</sup> While specific personal traits such as endurance and perseverance help surgeons cope with stress<sup>9</sup> studies have also reported use of negative coping strategies by the surgeons and surgical residents.<sup>10</sup>

Even though stress and coping have been studied extensively, data from our country is limited. The aim of this study was to measure the stress level among the surgical

residents, identify factors within the learning and work environment that cause stress, and identify different strategies that the residents use habitually to cope with these stresses. The study also explored relationship between stress levels and continuous assessment scores during residency training.

### Methods

This mixed method study was conducted in six residency programmes (excluding dentistry) in the Department of Surgery, Aga Khan University (AKU), Pakistan. The study was approved by the institutional ethical review committee. Written informed consent was obtained from all the participants. Confidentiality of the respondents was ensured by coding the identity and maintaining the data under lock and key.

Quantitative arm: A cross sectional study design was selected and all the residents enrolled in the residency programmes in department of surgery at AKU were administered a survey in hard copy by a non-clinical faculty at the end of the academic sessions to alleviate any apprehensions and ensure maximum response. The survey comprised of three components including:

1. The 10-item Perceived Stress Scale (PSS), a valid and reliable instrument for measuring residents' self-perceived stress levels.<sup>11</sup> The instrument has a maximum

<sup>1</sup>Department of Educational Development, Aga Khan University, Karachi;

<sup>2</sup>Department of Medical Education, Jinnah Sindh Medical University, Karachi, Pakistan; <sup>3,4</sup>Department of Surgery, Aga Khan University, Karachi-Pakistan.

**Correspondence:** Qamar Riaz. e-mail: [qamar\\_riaz66@yahoo.com](mailto:qamar_riaz66@yahoo.com)

total score of 40 points where higher scores correspond to higher levels of stress.

2. A list of possible factors to know the most common and frequent stressors during residency training. This list was generated from literature review, and after discussion with three surgery faculty members. Respondents were encouraged to list any other factor that they think may cause stress.
3. The 28-item Brief COPE Inventory (BCI) to identify most commonly used coping strategies by the residents from a set of 14 situational and dispositional stress-coping strategies.<sup>12</sup> Each strategy is represented by two items in the instrument and has a maximum score of 8. The higher the score for any strategy the more commonly it is used.

The survey was piloted before initiating the study, and it did not identify any issues in understanding and relevance of the instruments in the local context.

All the residents at AKU are regularly evaluated by the faculty using specified continuous assessment (CA) forms using a 5-point Likert-like scale where 1=Unsatisfactory and 5=Outstanding. These CA scores were used to measure the effect of stress on residents' performance.

Qualitative arm: Three focus group discussions (FGD), each of 60-90 minutes' duration, were conducted to explore perceptions of surgical residents and faculty regarding factors causing stressors during residency training and strategies used to cope with them. A purposive sampling was done and voluntary participation from recent graduates and faculty members from different surgical specialties was sought through email. A standardized set of trigger questions was developed to ensure consistency across groups. The demographic information including programme and year of residency training or designation in case of faculty member was also recorded. The FGDs were audio-taped and transcribed verbatim. A note taker also recorded the discussion.

## Analysis

The scoring of the items in PSS and BCI was done according to the guidelines provided by their respective authors.<sup>11,12</sup> Statistical Package for Social Sciences (SPSS) version 20.0 was used for the statistical analysis. Frequencies were calculated as mean (median where appropriate), standard deviation (SD), and percentages. Difference in the PSS scores on the basis of gender was analyzed using independent t-test. Kruskal-Wallis, ANOVA and Mann-Whitney U test were conducted to measure significant differences between PSS scores and coping strategy used across different years of residency training and residency

programmes. Correlation between the mean PSS and CA scores was measured using Pearson's correlation and scatter plot. Significance was taken at  $p < 0.05$ .

In the qualitative arm, content analysis was used to generate codes and themes. The transcriptions were independently read by three researchers, highlighting phrases and words to develop initial codes which were later on compared to reach consensus on the coding structures, and grouping into subthemes and themes. Member checking was done to ensure correctness of the interpretation of discussion. Refinement of the themes continued during the written phase.

## Results

### Quantitative arm

#### 1. Demographics

A total of 68 out of 83(82%) residents completed the survey. Of these, 57 (83.8%) were males. The reliability of the PSS and Brief COPE Inventories as measured by Cronbach's alpha, were found to be 0.73 and 0.82 respectively.

#### 2. Perceived Stress level and Causative Factors

The female residents were found to have significantly higher perceived stress scores as ( $25.7 \pm 3.0$ ) as compared to the male residents ( $22.3 \pm 4.4$ ),  $t(66) = -2.75$ ,  $p = 0.008$ . Thirteen (19%) out of the total 68 residents perceived themselves as having high stress while only one resident had perception of low stress. There was no statistically significant difference in PSS scores on the basis of years of residency training or residency programme. Table shows the proportion of residents with different stress levels as measured by PSS scores by gender, year of residency training and residency

**Table:** Stress Levels across Residency Years and Programmes.

	Low Stress n (%)	Moderate Stress n (%)	High Stress n (%)	Total
PSS Scores range	0-13	14-26	27-40	
Males	1 (1.5)	46 (67.6)	10 (14.7)	57
Females*	0 (0)	8 (11.8)	3 (4.4)	11
<b>Residency Years</b>				
PGY 1	0 (0)	7 (10.3)	5 (7.4)	12
PGY 2	0 (0)	7 (10.3)	3 (4)	10
PGY 3	0 (0)	17 (25)	1 (2)	18
PGY 4	0 (0)	15 (22.1)	4 (6)	19
PGY 5/Chief Resident	1 (1.5)	8 (11.8)	0 (0)	9
<b>Residency Programmes</b>				
General Surgery	0 (0)	14 (20.6)	7 (10.3)	21
Neurosurgery	0 (0)	11 (16.2)	2 (2.9)	13
Ear Nose and Throat (ENT)	0 (0)	7 (10.3)	1 (1.5)	8
Orthopaedics	1 (1.5)	12 (17.6)	2 (2.9)	15
Cardiothoracic Surgery	0 (0)	3 (4.4)	1 (1.5)	4
Urology	0 (0)	7 (10.3)	0 (0)	7
Overall	1 (1.5)	54 (79.4)	13 (19.1)	68

\* $p$ -value  $< 0.001$

programmes. PSS scores and CA scores were negatively correlated ( $r=-.307, p=0.01$ ).

Long working hours 56 (82.4%), too little personal time 44 (64.7%), overwork 40(58.8%) and sleep deprivation 37(54.4%) were the most commonly identified stressors during residency. Some relatively uncommon stressors identified were suboptimal knowledge and skills 18(26.5%), interaction with patients' distressed relatives 17(25%), dealing with ethical dilemmas 16(23.5%) and death and dying 10(14.7%).

### 3. Coping with Stress

'Planning' 60(88.2%) and 'Active Coping' 59(86.8%) were the most commonly used adaptive followed by 'Positive Reframing' 54(79.4%), 'Acceptance' 53(78%) and 'Religion' 52(76.5%). The most commonly used maladaptive coping strategies included 'Self-distraction' 44(64.7%), 'Humour' 41(60.3%) and 'Venting' 34(50%) followed by 'Self-blame' 33(48.5%) and 'Denial' 32(47.1%). Fortunately 'Substance abuse' 13(19%) was the least used coping strategy among our residents. There was significant difference in the use of coping strategy among residents on the basis of residency year; residents in the more senior years used adaptive coping strategies like 'Acceptance', 'Religion', and 'Humour', while maladaptive coping strategy of 'Denial' was more common during junior years of residency ( $p\leq 0.003$ ). Residents with high stress scores were found to be using maladaptive strategies to cope with the stresses.

### Qualitative Arm

A total of eight faculty members and six recent graduates of surgical residency programmes participated in the FGDs. Three common themes that emerged in both the resident and faculty groups are described below along with verbatim quotes marked as "R" or "F" indicating a resident or faculty respectively, as evidence and example for clarification of the selected key themes.

1. Stressors during Residency Training: Multiple factors at different levels were identified as stressors for the residents.

#### 1) Institutional level

Faculty identified that the institutional policies contradicted residency programme requirements and policies. The ever increasing service and administrative demands on the faculty leaves little time for academics. The working hours generally extend beyond 100 hours/ week, with no defined allocation of time between service and education. Also lack of manpower was a problem that added to the service load on the residents.

*"Service takes importance over everything else" (F#6)*

*"Residents need protected time and yet the hospital policies also demand continuity of care, so how can you provide that if you stand up at 5:00 pm and go, especially if there is no one to give over to as they are also scrubbed"(F#4)*

#### 2) Programme level

The programmatic requirements additional to the requirements of the accrediting and certifying body, were although considered good as they facilitated in professional development of residents, were identified as a great cause of stress. All the residents and the faculty agreed that there was inconsistency and ambiguity between the faculty and resident expectations. Junior residents were used to plug in holes wherever required.

*"You may be minding your own business, maybe in the wards, and then a chief resident calls you to come and scrub. So you come in and get scrubbed but you have no clue who the patient is, what is the case; you don't know anything and then if someone asks you a question, you all of a sudden look like an idiot because you have no idea why you are there.... So not only they get stressed while they are being pulled around, they also feel powerless." (F#6)*

Unsupportive attitudes of the faculty members and /or chief residents such as providing negative feedback, using harsh or humiliating words, not providing learning opportunities to residents while expecting heavy service work, and harassing or intimidating attitude towards residents were also considered as important stressors.

*"Some faculty members have very humiliating behaviour and some senior residents humiliate very much, these are the major reasons for stress.....We could not discuss anything or ask anything from such persons". (R#6)*

#### 3) Personal level

Both residents and the faculty identified lack of quality time for self or family as the most important stressor. Those residents from outside the city felt more disadvantaged since they could not spend time with their families due to a stringent leave policy. Residents also identified lack of orientation and awareness about systems and resources at the institution as another unnecessary reason for stress.

### 2. Coping during Residency Training

Residents acknowledged that surgeons have a naturally inbuilt endurance and perseverance that helps them pass through the difficult times but also their training makes them tough and strong headed. All the residents said that they were more stressed in the beginning of the residency training but learned to manage things later on during the training. The most common strategy that study participants used to cope with stress was venting in front of a peer or a kindly senior.

*"We used to discuss and vent out among our friends; we counselled and supported each other. When we realized that situation cannot be changed, we residents got together; no one complained about each other, we helped in making presentations, searching articles etc. We even covered each other for leaves especially exam leaves for which we even lied for each other, which we regret but we were forced to do so."* (R#3)

Socializing, peer support, discussing problems with peers, seniors, or a faculty member to seek solutions and guidance, involvement in religious activities, and spending quality time with family were some other commonly used coping strategies. Only one resident disclosed initiating smoking as a means to release stresses of the workplace, which he quit after sometimes after being counselled by friends.

### 3. Suggestions for Reducing Stress and Improving Coping among Surgical Residents

Faculty guidance and support, faculty members' interest in residents' learning, taking out time to discuss problems and providing constructive feedback to individual residents were considered extremely valuable in dealing with the stresses of residency.

*"A soft spoken, understanding programme director helps to pass through difficult times; faculty members with such personality should be made the residency programme directors/coordinators."* (R#2)

The participants suggested review of hospital policies, implementation of residency programme related policies, and more structured orientation as essential for reducing

stress among residents and faculty.

*"Improving the working hours will automatically improve so many things. When in fifth year I started getting home earlier, my relationship with my family got better which in turn reduced my stress and my productivity increased."* (R#1)

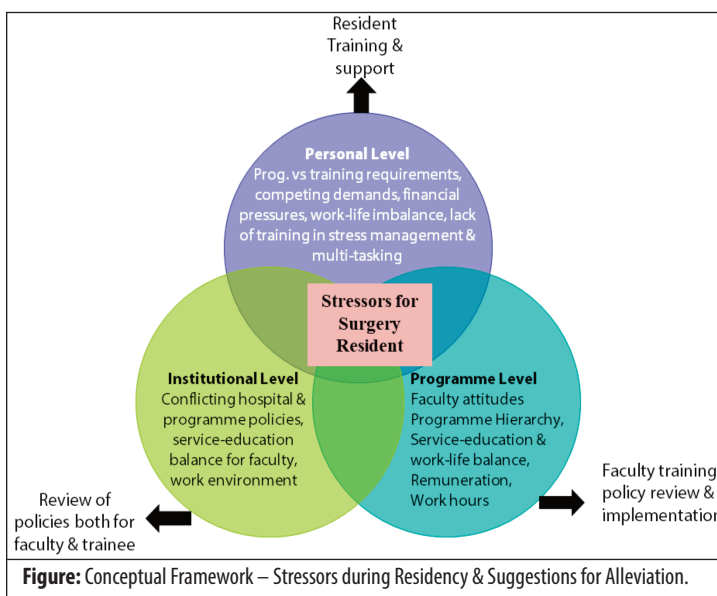
Also faculty training in giving constructive feedback, and formal trainings for residents in time management, multitasking and stress management can help them cope better with the inherent stressors of residency training. Figure gives a conceptual frame work of the stressors during residency and possible solutions for alleviating these stresses.

### Discussion

Surgery has long been accepted as a highly demanding discipline. Requirements of the residency training make surgical residency programmes even more arduous.<sup>2</sup> While surgeons characteristically enjoy the stimulating features of their work, they are also known to be effected most with stress.<sup>13</sup> This was also proved in our study where majority of our residents perceived themselves to be having moderate to high stress; a finding similar to studies conducted at various public and private sector hospitals in Pakistan.<sup>14</sup>

The professional, personal and contextual factors contributing to stress development among our residents were similar to those identified in the literature, i.e. long work hours, heavy duties, sleep deprivation, responsibilities of patient care, poor learning and work environments, relocation problems, financial issues, challenges of certification exams, limited control, uncertainty and ambiguity involving clinical decision making in complex situations and imbalance between professional, family and personal life.<sup>15,16</sup> These findings are, however, in contrast with another study from Pakistan where unsatisfactory training was the main reason for the burnout.<sup>17</sup> Literature has identified that resident in junior years are more prone to develop stress as was evident in our study also; this in turn affects their performance causing more stress thus initiating a vicious cycle.<sup>18</sup>

Bullying at workplace was also identified as an important factor causing stress in our study. This has also been reported from a general surgery programme in Australia where persistent negative behaviours of consultant surgeons was the most common form of work place bullying for residents.<sup>19</sup> Although there may be systems available for the residents for reporting grievance, the utility of such system remains questionable.



This study identified both adaptive and maladaptive strategies that residents routinely used for coping with the stress. It is important to have this information because some of the strategies like 'Behavioral disengagement', 'Denial' and 'Self-blame' have been associated with depression and suicidal ideation while strategies like 'Planning' and 'Active coping' are related to positive outcomes.<sup>20</sup> The most commonly used coping strategy in our study was venting; this supports Hu Yue-Yung's recommendation for developing peer-support system within residency programmes in which peer could be a faculty, resident or chief resident.<sup>21</sup> Fortunately in our study, substance abuse was identified as the least used coping mechanism, which is in contrast to the studies reported from the west where substance abuse as a coping strategy was reported by a significant number of residents and physicians.<sup>8</sup>

The study provided valuable insights into stress levels, and different stressors during residency training. Categorization of the stressors at institutional, programmatic and personal levels could facilitate in prioritization of areas for intervention and improvement so that the surgical residency training and clinical quality can flourish. The information related to the residents' preferred coping strategies can be used to devise mechanisms to train residents, especially those in junior years, in using strategies that are most beneficial for dealing with stress and maintaining a sound work-life balance. This would not only enable them to cope better with the stresses inherent to the discipline of surgery but is also likely to avoid attrition or catastrophe in the form of drug abuse or suicides.<sup>7,22</sup> Studies have suggested interventions at work place and individual levels to address the issues of stress among residents. Some of those that could be applied in our setting include workload diversification by increasing the number of dedicated, non-trainee human resource, mentoring, stress and time management training, emotional intelligence workshops, training for improvement of professional interpersonal and communication skills, provision of financial support, and counseling.<sup>23,24</sup> Residents should also be encouraged to spend time with family after work, and do physical exercise which is proven to be effective in alleviating stress.<sup>25</sup>

Although this was a single center study, the findings were very much similar to the already available literature, and thus the interventions identified could be adapted and implemented.

## Conclusion

In conclusion, residents in surgical residency programmes at AKU perceived themselves to be under stress. Periodic evaluation can help identify residents with high stress levels, and thus specific strategies can be adopted. Academia and hospital administration should join hands in developing interventions to enable residents cope with the situation.

**Disclaimer:** None.

**Conflict of interest:** None.

**Funding disclosure:** None.

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