

1 **Occupational Stress among Emergency Department (ED)**  
2 **staff and the need for investment in health care; a view**  
3 **from Pakistan**

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12 **ABSTRACT**  
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**Aims:** To identify the frequency of occupational stress and its contributing factors (stressors) existing among healthcare providers working in the Emergency Department (ED) of tertiary care hospitals of Karachi.

**Study design:** This is a descriptive cross sectional study.

**Place and Duration of Study:** Emergency Department of public and private tertiary care hospitals located in Karachi. The study was conducted for a period of five months from February to June 2013.

**Methodology:** A sample of 120 health care providers in Emergency Departments including doctors and nurses were included in the study (60 doctors, 60 nurses 30 each from public and private tertiary care hospitals). Self administered questionnaire with three parts was used to collect data. The first part pertained to demographics, the second part was adopted from Workplace Stress Scale (WSS) while the third part contained an inventory of Emergency Worker Stress. Statistical Package for the Social Sciences 16 (SPSS) and MS excel software 2010 were used for data analysis and presentation.

**Results:** Of the 120 participants including doctors and nurses, 35.8% had 'Moderate' level of occupational stress as per Work Stress Scale (WSS). 28.3% were found to have 'Severe' level of occupational stress. Significant association was found between levels of stress & hospital status (P- value

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0.002) & Work hours in ER (P- value 0.0001). Among the association between occupational stress and ER related stressors, significant moderate association was found with overall stress score and work responsibility category ( $r=0.697$  &  $r=0.675$  respectively)

**Conclusion:** Health care providers from Emergency Department are under immense stress and workload. This level of stress is likely to lead to more mistakes by the ED staff and general dissatisfaction at workplace. It is important to reassess the system's flaws and minimize workload and stress among Emergency care providers for a better health care experience.

*Keywords: Occupational Stress, Emergency Department, Healthcare providers, Public and Private Hospitals*

## 1. INTRODUCTION

Doctors bear the responsibility of affecting their patients' life, health and well being with their decisions and judgments. In this respect the profession of medicine carries a high level of physical as well as psychological stress. A number of factors like long working hours, exhaustion, unpredictable workload and critical decision making take a considerable toll on the well being of doctors.<sup>1</sup> Medical staff has been documented to suffer from much higher levels of stress and anxiety than comparable populations<sup>2,3</sup>. Increased patient load is cited as one of the biggest factors contributing to stress of doctors.<sup>4</sup> According to a study conducted by **United Nations International Children's Emergency Fund (UNICEF)**, doctors in underdeveloped countries can spend just 54 seconds/ patient at district hospitals due to the enormous patient burden.<sup>4</sup> Among healthcare providers those who work in intensive care units, emergency and pre-emergency departments demonstrate higher level of occupational stress than other specialties<sup>5</sup>. Work in emergency departments has the added stress of dealing with unpredictable workload, shift work, lack of proper rest, critical patients and difficult attendants.<sup>6</sup> The burden of patient visits to the ED is on the rise globally,<sup>7,8</sup> in the U.S the annual number of ED visits was shown to have increased over 32% in a period of 10 years.<sup>9</sup> Developing countries in particular are susceptible to this increased load on ED since there is a lack of an effective primary health care set up.<sup>10</sup> In such circumstances of high pressure there is a greater likelihood of fatal errors by doctors<sup>11</sup> and dissatisfaction among patients.<sup>12</sup> In Pakistan, where the doctor to patient ratio is significantly below the required level, the patient influx at the emergency departments is very high<sup>13</sup>. In a metropolitan city like Karachi with an ever increasing population, traffic accidents, gunshot and bomb blast victims; there are very few hospitals equipped to handle this high burden of emergency. Hence the workload on health care providers is staggering<sup>13</sup>. More over recently due to poor safety measures in hospitals, emergency medical professionals are facing threats and violence from attendants, political and media pressures that add

38 to other work-related stress.<sup>14</sup> It has been documented that stressed and burnt out doctors are more likely to give sub  
39 optimal patient care<sup>15, 16</sup>. Hence it is in the benefit of both medical staff and patients that the stress on doctors be reduced.  
40 In a country such as ours where the investment in health sector has never been sufficient it is widely accepted that this  
41 sector is under performing,<sup>17</sup> and there is considerable dissatisfaction with work environment among health care  
42 workers.<sup>18</sup> The human resource development departments play an integral role in these circumstances to formulate  
43 policies to better distribute the workload among ED staff and create a stress free environment for the workers to perform  
44 most efficiently.<sup>10</sup>

45 Karachi is the largest city of Pakistan and our study was conducted in two of its Public and Private sector tertiary care  
46 hospitals' in order to determine the level of occupational stress among ED doctors and identify the contributing factors in  
47 this setting. This data will be important for Human resource departments to better understand the sources of strain on the  
48 medical staff and improve their working conditions.

## 49 **2. MATERIAL AND METHODS**

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52 This descriptive cross sectional study was carried out among doctors and nurses working in the emergency departments  
53 of public and private tertiary care hospitals of Karachi for a period of five months from February to June 2013. **On the**  
54 **basis of 46% prevalence of psychological illness among health care professionals and at 95% confidence level, the**  
55 **sample size was calculated to be 96; however adding wastage it was taken as 120.**<sup>11</sup> Precision was taken as 0.1 due to  
56 maximum available number of healthcare providers in two hospital settings. **Both public and private hospitals were**  
57 **selected through non probability convenience sampling technique however, purposive sampling technique was used for**  
58 **sample selection and only those doctors and nurses who were working in emergency departments** and had work  
59 experience of more than 1 year were included in the study. Those doctors and nurses who were working in any  
60 department other than emergency and those who had less than one year work experience or refused to give consent  
61 were excluded. Out of the 120 respondents 60 were taken from Public and 60 from Private sector hospitals. Similarly the  
62 samples was equally divided among ED physicians and nurses i.e. out of total of 120, 60 respondents were of doctors and  
63 60 were of nurses, 30 of each selected from public and private hospital respectively.

64 Data collection tool was a self administered questionnaire formulated by consulting recent relevant literature. The  
65 questionnaire consisted of three parts; the first part was to ascertain demographics and personal information. The second  
66 part consisted of 8 items rated on a five point scale adopted from **Workplace Stress Scale (WSS)**<sup>12</sup> used to diagnose  
67 presence and intensity of occupational stress. The scoring is on a likert scale for the first 5 questions and for the next 3 it  
68 is reverse scored. The interpretation of WSS score is predetermined with 5 interpretation categories constructed as;

- 69 • 'No stress or Calm' with total score of 'less than 15'
- 70 • 'Fairly Low Stress' with total score of '16 to 20'
- 71 • 'Moderate Stress' with total score of '21 to 25'
- 72 • 'Sever Stress' with total score of '26 to 30'
- 73 • 'Dangerous Stress' with total score of '31 to 40'

74 The third part of the questionnaire consisted of 45 items (identified emergency department stressors) scored on presence  
75 of stressors as adopted from Emergency Worker Stress Inventory (EWSI) questionnaire utilized in similar studies.<sup>1</sup> Score  
76 ranged between a maximum of 45 to minimum 0. The stressors were further grouped into 6 different categories for the  
77 purpose of isolating the areas of highest prevalent stressors. These categories are:

- 78 1. 'Responsibilities at Work' comprising of 9 stressors with possible 9 maximum score
- 79 2. 'Intrinsic work pressure' comprising of 7 stressors with possible 7 maximum score
- 80 3. 'Support and motivation' comprising of 13 stressors with possible 13 maximum score
- 81 4. 'External pressures' comprising of 4 stressors with possible 4 maximum score
- 82 5. 'Availability of resources' comprising of 7 stressors with possible 7 maximum score
- 83 6. 'Threats at work' comprising of 5 stressors with possible 5 maximum score

84 The data was analyzed using SPSS version 16. Frequencies and percentages were calculated for qualitative while mean  
85 and standard deviation for quantitative variables. Chi-square test and linear regression were used to determine the  
86 association of occupational stress with the stressors; however ANOVA was used to compare mean stressors scores for  
87 different categories of stress. P-value < 0.05 was taken as significant.

### 88 **3. RESULTS AND DISCUSSION**

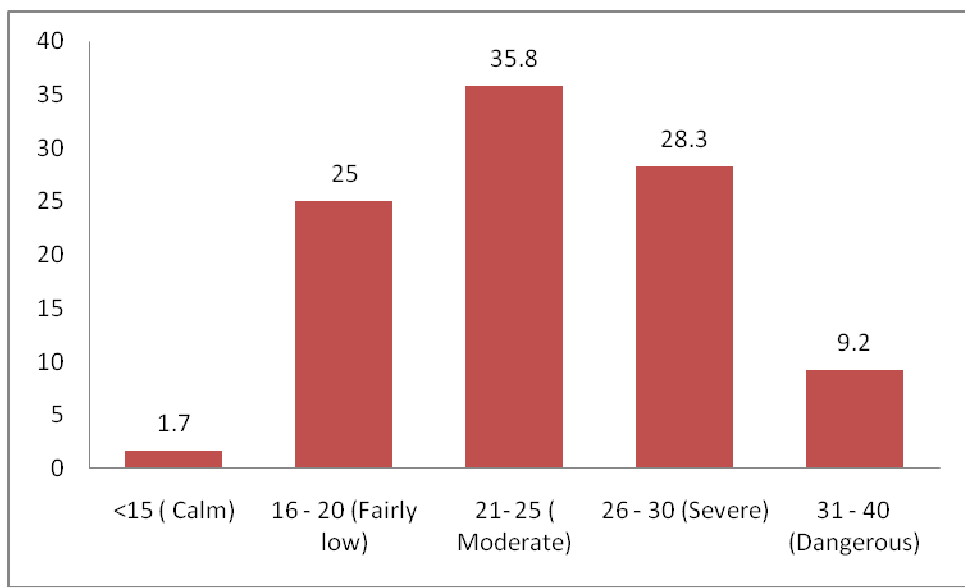
89 Total 120 participants were taken in this study with the proportion of 50% each from public and private hospital settings.  
90 Similarly 50% of each was doctors and nurses. Of them 44.2% (n=53) were males and 55.8% (n=67) were females.  
91 Maximum number of participants 70% (n=84) were between 25 -35 years of age and 66.7% (n=80) of the total participants  
92 were married. Only 1.7% (n=2) respondents had any pre-existing medical condition (co-morbidity) at the time when the  
93 survey was conducted. Among the doctors 32.5% (n=39) were registered medical officers while 10.8% (n=13) were  
94 postgraduate trainees and 6.7% (n=8) were house officers. Only 10% (n=12) of the nurse respondents were critical care  
95 nurses, while 37.5% (n=45) were BSC nurses and 2.5% (n=3) were student nurses. Majority of the respondents had  
96 experience of emergency department (ED) between 1-5 years as 84.2%(n=101), while the rest had more than 6 years of  
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98

99 experience in ED. Of all 63.3% (n=76) of the participants worked in ED in shifts while only 36.7% (n=44) had fixed working  
100 hours in the ED.

101 **Stress levels according to WSS Score:**

102 The Stress level of the participants was calculated by their WSS score and assigned into the respective categories  
103 ranging between “Calm” to “Dangerous” levels of stress. On the basis of WSS items, majority of participants were found to  
104 have “Moderate” levels of occupational stress, however there was a noteworthy proportion of respondents who were  
105 found to have “Severe” or “Dangerous” levels of occupational stress as shown in (Figure 1). Occupational stress as  
106 measured by using WSS was further analyzed according to various demographic variables and significant association  
107 was found with type of hospital ( $P=0.002$ ) and work hour in ER ( $P= 0.001$ ). (Table. 1)

108 **Figure 1: Proportion of Occupational Stress among study participants on the basis of WSS (%)**



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**Table 1. Association of Occupational stress based on WSS with different demographic variables**

		Occupational stress based on Work Stress Scale					P- value
		n(%)					
		Calm (n=2)	Fairly Low (n=30)	Moderate (n=43)	Severe (n=34)	Dangerous (n=11)	
Hospital status	Private (n=60)	2 (3.3%)	23 (38.3%)	18 (30%)	15 (25%)	2 (3.3%)	0.002
	Public (n=60)	0 (0%)	7 (11.7%)	25 (41.7%)	19(31.7%)	9 (15%)	
Work hours in ED	Fixed (n=44)	2 (4.5%)	19 (43.2%)	17 (38.6%)	6 (13.6%)	0 (0%)	0.0001
	Shift (n=76)	0 (0%)	11 (14.5%)	26 (34.2%)	28(36.8%)	11(14.5%)	
Gender	Male (n=53)	1 (1.9%)	13 (24.5%)	21 (39.6%)	13(24.5%)	5 (9.4%)	0.923
	Female (n=67)	1 (1.5%)	17 (25.4%)	22 (32.8%)	21(31.3%)	6 (9%)	
Age in years	25 – 35 (n=84)	1 (1.2%)	21 (25%)	30 (35.7%)	25(29.8%)	7 (8.3%)	0.802
	36 – 45 (n=31)	1 (3.2%)	7 (22.6%)	10 (32.3%)	9 (29%)	4 (12.9%)	
	>45 (n= 5)	0 (0%)	2 (40%)	3 (60%)	0 (0%)	0 (0%)	
Marital status	Single (n=40)	0 (0%)	8 (20%)	16 (40%)	10 (25%)	6 (15%)	0.360
	Married (n=80)	2	22 (27.5%)	27 (33.8%)	24 (30%)	5 (6.2%)	

		(2.5%)					
<b>Profession</b>	<b>Doctor (n=60)</b>	1 (1.7%)	15 (25%)	16 (26.7%)	21 (35%)	7 (11.7%)	0.238
	<b>Nurse (n=60)</b>	1 (1.7%)	15 (25%)	27 (45%)	13(21.7%)	4 (6.7%)	
<b>Designation</b>	<b>BSc Nurse (n=45)</b>	1 (2.2%)	11 (24.4%)	21 ( 46.7%)	8 (17.8%)	4 (8.9%)	0.824
	<b>Critical care Nurse (n=12)</b>	0 (0%)	4 (33.3%)	5 (41.7%)	3 (25%)	0 (0%)	
	<b>Student Nurse (n=3)</b>	0 (0%)	0 (0%)	1 (33.3%)	2 (66.7%)	0 (0%)	
	<b>House officer (n=8)</b>	0 (0%)	2 (25%)	2 (25%)	2 (25%)	2 (25%)	
	<b>Medical Officer (n=39)</b>	1 (2.6%)	10 (25.6%)	9 (23.1%)	15(38.5%)	4 (30.8%)	
	<b>PG Trainee (n=13)</b>	0 (0%)	3 (23.1%)	5 (38.5%)	4 (30.8%)	1 (7.7%)	
<b>Experience in Emergency Department</b>	<b>1 - 5 yrs (n=101)</b>	2 (2%)	27 (26.7%)	37 (36.6%)	27(26.7%)	8 (7.9%)	0.572
	<b>6 -10 yrs (n=19)</b>	0 (0%)	3 (15.8%)	6 (31.6%)	7 (36.8%)	3 (15.8%)	

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111 **Inventory of Emergency Worker Stress:**

112 Third part of the survey comprised of 45 stressors to investigate possible sources of stress in ER. These stressors were  
113 further classified into six categories. Total 14 out of 45 stressors were analyzed by applying chi square test, showed  
114 significant ( $p$  value < 0.05) with occupational stress as shown in (Table 2). The mean score of ER related stressors (both

115 Overall and Subcategories) compared according to different categories of occupational stress and presented in (Table 3).  
 116 Regression analysis was performed to analyze association of occupational stress with ER related stressors and significant  
 117 moderate association was found with the Overall stress score and work responsibility category with  $r = 0.697$  and  $r = 0.675$   
 118 respectively (Table 4).  
 119

**Table 2. Association of Occupational stress based on WSS with different ER related Stressors**

	Occupational stress based on Work Stress Scale					P- value
	n(%)					
	<15 (Calm)	16 – 20 (Fairly low)	21 – 25 (Moderate)	26 – 30 (Severe)	31 – 40 (Dangerous)	
Conflicts with other departments	0	10 (12.3%)	29 (35.8%)	31 (38.3%)	11 (13,6%)	0.001
Lengthy working hours	0	15 (16%)	37 (39.4%)	33 (35.1%)	9 (9.6%)	0.001
High patient volume	1 (0.9%)	21 (19.8%)	39 (36.8%)	34 (32.1%)	11 (10.4%)	0.001
Poor Physical Environment	0	10 (13.5%)	27 (36.5%)	26 (35.1%)	11 (14.9%)	0.001
High workload	0	22 (20.2%)	42 (38.5%)	34 (31.2%)	11 (10.1%)	0.001
Difficult/Critical patients	2 (2.7%)	11 (15.1%)	23 (31.5%)	27 (37%)	10 (13.7%)	0.001
Availability of resources	0	10 (13.9%)	29 (40.3%)	24 (33.3%)	9 (12.5%)	0.002
Insufficient personnel to handle workload	1 (0.9%)	20 (19.2%)	38 (36.5%)	34 (32.7%)	11 (10.6%)	0.001
Threats of violence	0 (0%)	16 (17%)	37 (39.4%)	30 (31.9%)	11 (11.7%)	0.001



Inadequate salary	1 (0.9%)	22 (20%)	42 (38.2%)	34 (30.9%)	11 (11.7%)	0.001
Effects of working hours on personal life	0	21 (20.2%)	38 (36.5%)	34 (32.7%)	11 (11.7%)	0.001
Effect of stress on personal life	0	16 (17%)	36 (38.3%)	31 (33%)	11 (11.7%)	0.001
Performing tasks not in job description	0	3 (4.1%)	26 (35.1%)	34 (45.9%)	11 (11.7%)	0.001
Performing duties in dangerous situations	0	18 (18.6%)	37 (38.1%)	31 (32%)	11 (11.7%)	0.001

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**Table 3. ER Overall and Subcategory Stressors Score in different categories of Occupational Stress (WSS)**

Stressors Categories	Total Score (Mean ± Sd.)	Occupational stress based on Work Stress Scale (Mean ± Sd.)					P- Value
		Calm	Fairly Low	Moderate	Severe	Dangerous	
		Responsibilities at Work	5.3 ± 1.7	3.0 ± 0.0	3.9 ± 1.2	5.0 ± 1.4	
Intrinsic Work Pressure	2.5 ± 1.4	2.0 ± 1.4	2.1 ± 1.3	2.6 ± 1.4	2.8 ± 1.3	2.6 ± 1.4	0.272
Support and Motivation	6.6 ± 1.9	1.5 ± 0.7	5.8 ± 1.9	6.6 ± 1.8	7.1 ± 1.7	7.6 ± 1.0	0.0001
Internal Pressure	1.7 ± 0.9	2.0 ± 0.0	1.3 ± 0.7	1.5 ± 0.9	2.2 ± 0.9	2.3 ± 1.2	0.0001
Availability of Resources	3.9 ± 1.5	2.0 ± 1.4	3.1 ± 1.2	4.0 ± 1.4	4.4 ± 1.5	5.3 ± 1.2	0.0001
Treats at Work	2.9 ± 1.2	1.5 ± 0.7	2.1 ± 1.3	3.0 ± 0.9	3.4 ± 1.1	3.5 ± 0.8	0.0001
<b>OVERALL SCORE</b>	<b>22.2 ± 5.1</b>	<b>10.5 ± 0.7</b>	<b>17.9 ± 4.3</b>	<b>22.1 ± 3.7</b>	<b>25.1 ± 4.1</b>	<b>27.2 ± 2.9</b>	<b>0.0001</b>

KOVA was applied and less than 0.05 p-value was taken as significant

<b>Table 4. Association of ER related Stressors Score with Occupational Stress Score based on WSS</b>			
<b>Stressors</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>P-value</b>
Responsibilities at Work	0.675	0.456	0.0001
Intrinsic Work Pressure	0.180	0.032	0.0001
Support and Motivation	0.437	0.191	0.0001
External Pressure	0.388	0.151	0.0001
Availability of Resources	0.461	0.212	0.0001
Threats at Work	0.443	0.197	0.0001
OVERALL SCORE	0.697	0.481	0.0001

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125 **DISCUSSION:**

126 The objective of the study was to determine the presence of occupational stress and the factors contributing to  
 127 occupational stress among emergency department (ED) healthcare providers in tertiary care hospitals in Karachi. The  
 128 crucial findings of this study were high prevalence of occupational stress among emergency healthcare providers.  
 129 Occupational stress was found in almost 100% of the population, with various degrees of severity. Highest percentage of  
 130 ED healthcare providers' were found to be moderately (35.8%) or severely (28.3%) stressed. The most concerning finding  
 131 was that almost 10% of ED healthcare providers were found having occupational stress level in dangerous zone. Similar  
 132 results were seen in another study in Peshawar, Pakistan where the level of stress among nurses in tertiary care hospitals  
 133 was assessed.<sup>20</sup> Milan et al also found comparable levels of stress in their study in the field of acute medicine.<sup>7</sup> Panagiotis  
 134 Z et al also reported more than half the residents of their study having high levels of stress leading to burnout.<sup>20</sup> Emotional  
 135 stress and burnout among nurses of ICU has also been documented in various other studies.<sup>22,23,24</sup>  
 136 In our study we found a significant association between the operational status of hospital, whether it was a public set up or  
 137 private, and the level of stress. Public hospitals are recognized for overcrowding, short staffing and meager funds<sup>4</sup>, in this  
 138 respect it is not surprising that the stress on the doctors of public sector is much higher than private sector staff as  
 139 similarly stated in other studies.<sup>7</sup> We found no significant association between socio-demographic characteristics and

140 stress scores, similar findings were reported from a study conducted in Brazil.<sup>24,1</sup> There was, however, a highly significant  
141 association between working in shifts in the ED and level of stress as noted in a study in Canada.<sup>25</sup> Ann E et al in their  
142 study on working hours at the hospital and patient safety highlighted that almost 80% nurses had to stay overtime after  
143 their shifts had ended, and that it had a significant effect on the likelihood of making an error due to increased stress.<sup>26</sup>  
144 The same was reported during assessing potential stressors as most our respondents declared lengthy working hours as  
145 a very important contributor to stress.<sup>2</sup> Research identified 14 stressors contributing to occupational stress among ED  
146 healthcare providers. For the sake of understanding the stressors better they were divided in to six sub-categories. The  
147 areas where most stressors were found were considered most affected with possibility to affect the health and wellbeing  
148 of ED healthcare providers.

149 Responsibilities at work was one such sub-category that showed highest number of stressors which showed strong  
150 association with stress like; lengthy working hours, dealing with high patient volume, dealing with critical patients,  
151 demanding nature of job, performing tasks not part of job description. High workload was one of the key factors leading to  
152 psychological distress among residents noted by Anagnostopoulos F et al, in their study conducted in Greece.<sup>27</sup>  
153 Panagiotis Z et al also cited factors such as high workload, home-work demand and emotional demands as the main  
154 reasons behind occupational stress among medical professionals.<sup>21</sup> The second area was availability of resources like;  
155 working in poor physical environment, inadequate availability of resources and facilities, insufficient personnel to handle  
156 work that showed strong association with occupational stress. Aslam H et al similarly found workload and work  
157 environment/hospital conditions to be the greatest contributors to stress among healthcare providers.<sup>29</sup> In the area of  
158 support and motivation result indicated that ED healthcare providers are overall motivated but factors like; inadequate  
159 salary, effect of working hours on family and personal life, effect of stress on personal or/and family life, conflict with other  
160 departments/healthcare providers were contributing to their occupational stress. Greater emotional exhaustion and  
161 interference in the work-home dynamic are noted in other studies as known causes for psychological distress likely to  
162 impact the quality of health care.<sup>28</sup> Other major stressors were in the area of threats at work which showed performing  
163 duties under dangerous situation, and threat of violence as contributing to ED healthcare providers stress. Heyworth J et  
164 al reported threats of malpractice and acquired infections as major potential sources of stress however in our study these  
165 were found as minor stressors.<sup>30</sup>

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167 The findings of this study revealed a number of implications for emergency department healthcare providers, which have  
168 serious consequences on the health and wellbeing of healthcare providers. As many of the factors highlighted are  
169 administrative issues it will particularly help ED managers in better planning. This study was conducted at student level  
170 without any funding so certain limitations were observed like small sample size and sampling technique. However, the

171 identification of occupational stress and stressors will assists hospitals to understand the flaws in their organizational  
172 structure, and take actions to improve their work facilities, physical environment and eliminate the factors contributing to  
173 stress. It has been proposed that active errors at work place occur as a result of latent failures by the administration i.e.  
174 failure to provide the optimal work conditions.<sup>30</sup> in this regard Human Resources (HR) play an imperative role in optimizing  
175 work conditions and enhancing productivity of the employees.

#### 177 **4. CONCLUSION**

178 The results of this study have supported the conclusion of previous studies that health care providers in ED suffer from  
179 great levels of stress leading to physician burnout and more likelihood of committing errors. High patient volume, work  
180 load and dissatisfaction with work environment are the important sources of stress highlighted. In this regard the onus lies  
181 on the hospital administration and HR to ensure the well being of the ED staff by minimizing their stress, which in turn will  
182 maximize patient satisfaction as well.

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#### 190 **COMPETING INTERESTS**

191 We declare that we have no competing interest.

#### 192 **AUTHORS' CONTRIBUTIONS**

193 Author NZ participated in the design of the study and performed the statistical analysis. Author ZA participated in the  
194 design and conception of the study and its coordination, acquisition of data, carried out statistical analysis and drafted the  
195 manuscript. Author HY participated in the conception of the study and participated in the design of the study, acquisition of  
196 data and manuscript revision. Author AF participated in reviewing of article. All authors read and approved the final  
197 manuscript.

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208 **ETHICAL APPROVAL (WHERE EVER APPLICABLE)**  
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210 Approved by the University ethical board.  
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