



## Research Article

# Stress among Residents in a Tertiary Care Center, Riyadh, Saudi Arabia: Prevalence and Associated Risk Factors

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## Abstract

**Objectives:** To examine perceived stress among medical and surgical residents in King Fahad Medical City, Saudi Arabia and its associated risk factors.

**Methods:** A cross-sectional study of all King Fahad Medical City residents in medical and surgical departments registered at the Saudi Commission for Health Specialties, Riyadh, Saudi Arabia, was conducted between August-October 2016. We assessed the likelihood of stress using the Kessler (K6) tool.

**Results:** All residents (104) from departments of medicine and surgery were included in the study but only 87 (83.7%) responded. Mean age for the residents was  $27.83 \pm 2.9$  years with mean experience in this tertiary care center  $2.39 \pm 1.8$  years. The mean ( $\pm$  standard deviation) stress score was  $20.1 \pm 5.6$  out of 30 (67%). Mean stress score was significantly associated with female gender, non-Saudis, surgery and R5 residents. No significant mean difference was noted according to marital status or age. According to stress level the results showed that 7 (8.6%) are well with no stress, 27 (33.4%) have mild or moderate stress levels, while 47 (58%) of the residents have severe stress level. There is a significant association between severe stress level and advancing age, surgery and non-Saudi residents. The significant predictors of stress were the department and gender only. Total stress level was significantly correlated with feeling of being unable to work during the last 30 days.

**Conclusion:** Residents in Saudi Arabia are at comparable or slightly higher risk of perceived stress than that reported among residents worldwide. Stress level was significantly associated with gender, nationality and department. There is an urgent need for stress management programs during residency training.

**Keywords:** Residents; Surgery; Medical residency

## Introduction

Medical residency is a period of apprenticeship that transforms an academically qualified medical student into a competent medical practitioner. It prepares a newly graduated medical practitioner to be fully conversant and confident with the daily routines, workload, and pressures expected to be faced during clinical practice [1]. The mental health of students entering medical school is as good as, if not better than, that of other young people their age [2], while 12 % of medical students and residents suffer from stress and depression [3]. Being first line service providers in a health facility, medical residents are expected to be proficient clinicians, educators, researchers, and administrators at the end of their residency training [4]. A proper amount of work stress improves job motivation and productivity. On the contrary, excessive work stress can cause reduction in work-related desire and productivity, more accidents, and probably various health disorders [5]. Many studies have shown that stress, depression or emotional impairment among resident physicians is more common than that in the general population [3,6,7]. Something is happening to them later that is causing them to experience distress. The environment of health care facilities especially hospitals is complex, where new knowledge and skills are continually being learned and practiced. Physician work changes, in part due to career development and progression through different jobs. Physicians working in such environment of modern medical facilities respond differently to it. Some may find it stimulating and exciting, whereas others become stressed and burned out. High expectations of residents, their families and their supervisors may lead to stress. Stress among resident physicians has implications for patient care and the health and well-being of the residents themselves. Previous studies in KSA and other countries revealed that stress is significant problem among residents in different specialties and unfortunately no genuine efforts are being done to address this issue [8-16]. No study addressing these aspects was done in a tertiary care center as King Fahad Medical City (KFMC), Kingdom of Saudi Arabia (KSA) before to the best of our knowledge. There is a need for investigating stress and its associated factors among resident physicians working in KFMC. The obtained results of this study can be of help in planning and implementing strategies to prevent or reduce stress among residents. That might help in improving their professional responsibilities in assuring better patients care and safety.

The objectives of this study were to:

- Determine level of stress among medical and surgical residences
- Identify the factors associated with stress prevalence and level among residents
- Determine the possible causes of stress among residences.

## Subjects and Methods

### Type of study and setting

This is a cross sectional study conducted in KFMC which is a major tertiary care in KSA as well as a health and medical education facility.

### Study population

Residents in the department of medicine and surgery

## Sampling

All available residents enrolled in both the departments' of medicine and surgery at the time of study was included in the study.

## Study Tool

The Kessler-6 (K6) Psychological Distress Scale was used to measure distress symptoms, a standardized and validated screening tool for non-specific psychological distress, including depression and anxiety [17]. The K6 offers the advantage of being a broader screening tool and is not specific to a single disorder and has been validated to screen for common disorders in many settings [18]. The K6 uses a Likert scale to establish how often an individual has experienced psychological distress over the preceding 30 days. Scores range from 0 to 24 with higher score indicating better outcomes. A K6 score of greater than 12 has been defined as indicating high psychological distress [19]. All residents- in this department- available during the study period were included in the study, were asked to fill the study questionnaire and to read and agree about participating in the study. The study was approved by the Research Center and Institute Review Board (IRB) of KFMC.

## Statistical analysis

Questionnaires were collected, coded, entered to SPSS ver 22, by which all data management and analysis were done. Descriptive

statistics as frequency and percentages used to describe qualitative variables while mean and standard deviation (SD) was used for quantitative variables. Bivariate analysis was used as follow: t- test or Mann-Whitney test (based on the normality of the data) was used to find if there is a mean difference between two groups for a quantitative variables, while ANOVA (with LSD as a post hoc test) or Kruskal Wallas used to find if there is a difference among more than two groups, for quantitative data after checking for normality. Chi square test was used to fine any association between stress level and some qualitative predictors. Pearson product moment correlation used to find any relationship between some feeling variables and K6 total score. Multiple linear regressions used to predict stress level from some predictors. Level of significant p was set to be <0.05 throughout the study.

## Results

Residents (104) who were available at the time of the study in both departments (medicine and surgery) were included but only 87 residents participated in the study with response rate (83.7%). Males were 58 (72.5%), singles were 49 (57.6%), Saudis constitute 70 (82.4%) and majority of the participated residents 46 (54.1%) were from department of medicine. Mean age for the residents was  $27.83 \pm 2.9$  years with mean experience in the tertiary care center  $2.39 \pm 1.8$  years. The mean ( $\pm$  standard deviation) stress score was  $20.1 \pm 5.6$  out of 30 (67%) (Table 1). Mean stress level by some predictors

Characteristic	No.	%
<b>Sex</b>	58	72.5
Male	22	27.5
Female		
<b>Department</b>	46	54.1
Medicine	39	45.9
Surgery		
<b>Marital Status</b>	49	57.6
Single	36	42.4
Married		
<b>Nationality</b>	70	82.4
Saudi	15	17.6
Non- Saudi		
Age (years)	Mean	Standard deviation
Experience (years)	27.83	2.9
Stress Scores	2.39	1.8
	20.1	5.6

**Table 1:** Participated residents' characteristics\*.

P value	Mean $\pm$ Sd	n	Predictor
Sex	58	$19.2 \pm 5.5$	0.04
Male	22	$22.1 \pm 6.1$	
Female			
Department	46	$17.56 \pm 5.6$	<0.0001

Medicine	39	22.5 ± 4.2	0.68
Surgery			
Marital Status	49	19.8 ± 5.8	
Single	36	20.3 ± 5.3	0.003
Married			
Nationality	70	19.03 ± 5.5	
Saudi	15	23.7 ± 4.7	0.002
Non Saudi			
Level of Residency	27	18.48 ± 5.6	
R1	22	20.26 ± 4.3	
R2	13	20.5 ± 5.0	
R3	11	17.1 ± 7.2	
R4	14	25.0 ± 3.4	
R5			

**Table 2:** Mean Stress Level by Some Predictors.

Significantly higher mean score levels were associated with females ( $p=0.04$ ), Surgery residents ( $<0.0001$ ) and non-Saudis ( $p=0.003$ ) and R5 residents ( $p=0.002$ ). No significant mean difference was noted according to marital status ( $p=0.68$ ) as profiled in [Table 2](#). There were no significant relationship between age and stress scores ( $r=0.23$ ,  $p=0.054$ ). With respect to stress levels measured by K6; the results show that 7 (8.6%) are not stressed, 27 (33.4%) have mild and moderate stress levels, while 47 (58%) of the residents have severe stress level. Association between stress levels and some predictors are shown in [Table 3](#). Severe stress level was significantly noted in Surgery, non-

Saudi and older residents. In multivariate analysis (multiple linear regression) controlling for the effect of age, marital status, experience and nationality; only residents department and sex were independently associated with stress level measured by K6 ([Table 4](#)). The correlation between feeling of inability to work or seeking health advice during the last month and stress level is shown in [Table 5](#). Residents who were unable to do full work or half work in more days were significantly more stressed. No significant correlation between health status and stress level among residents.

Predictor		Stress Level		P-value
	Well No. %	Mild & Moderate No. %	Severe No. %	
Sex	7 10.3	24 35.3	37 54.4	0.25
Male	2 6.9	6 20.7	21 72.4	
Female				
Department	9 17.6	21 41.2	21 41.2	< 0.0001
Medicine	0 0.0	11 22.0	39 78.0	
Surgery				
Marital Status	6 11.3	20 37.7	27 50.9	0.16
Single	3 6.1	12 24.5	37 69.4	
Married				
Nationality	9 11.7	29 37.7	39 21	0.005
Saudi	0 0.0	3 12.5	21 87.5	
Non Saudi				
Age (years)	Mean ± SD 27.3 ± 1.9	Mean ± SD 26.8 ± 1.9	Mean ± SD 28.9 ± 3.3	0.031

**Table 3:** Stress Level by Some Predictors.

Predictor	B	T	P value
Constant	9.54		<0.0001
Department	4.4	0.4	0.001
Department	3.1	0.25	0.033

**Table 4:** Regression Model to Predict Stress level from Some Predictors.\*

Feeling Variable	r	P value
Totally unable to work	0.55	<0.0001
Doing half or normal work	0.514	<0.0001
Seek health advise	0.067	0.06

**Table 5:** Correlation between K6 Stress Score, feeling unable to work and seeking health advice during the last 30 days.

## Discussion

The healthcare profession needs adequate medical residency training programs to increase its members' professional qualifications and to maintain patient safety. However, residency training is a difficult and stressful stage of development in a professional career. Residents are often subject to prolonged working hours, prolonged sleep deprivation, uncontrolled schedules, high job demands, and inadequate personal time [20-22]. Worldwide, including KSA, several studies addressed stress among medical residents in different disciplines [8-16]. This is the first study using Kessler (K6) [16] tool to assess stress among residents in KSA. We preferred it because it is a validated tool including the Arabic version, short, easy to administer and well understood by respondents. The response rate (83.7%) in this study is comparable or higher than similar studies in KSA and other countries [8-16]. This may indicate that stress is a pressing issue among residents. The mean stress in this study was  $20.1 \pm 5.6$  out of 30 counts for 67% which is comparable to perceived stress reported among residents in KSA and other parts of the world which ranged from 16 to 22 [5-15]. This is higher than the stress level in the general population which was less than [3,6,7,22,23]. Most reports stated that the careers in medicine have been known to be stressful [23-25]. This may point to the stressful environment of health services and medical education. Overall stress level among residents in this study was significantly higher among females, non-Saudis, and surgery and R5 residents. A previous study in KSA agreed with our findings according to gender but not according to nationality [9]. In our study surgery residents suffered more stress compared to medical residents. This is in accordance with studies showing high stress and burnout surgery residents [25-28]. Differences in working hours, patient load, critical patients assigned, night duty, poor sleep duration, and quality, poor work environment, and process failure may explain differences in stress level [20-22,29-31]. Non Saudi residents suffered higher stress level than Saudis. This is not unexpected. Non Saudis have to take care of family matters and problems inside and outside KSA in addition to the stress of work and study. Marital status and age were not significantly associated with overall mean stress score in this study. Similarly, previous national and international studies did not observe significant differences in depression and anxiety scores among the married and unmarried medical students and physicians [32,33]. Stress levels according to demographic characteristics such as gender, marital

status and nationality can be confounded by other variables such as work environment, friends, and participation in social activities.

When subjects were categorized according to low, medium and severe stress levels, non-Saudi and surgery residents in addition to older age were significantly suffered severe stress levels. In multivariate analysis (multiple linear regression); after controlling for the effect of age, marital status, experience and nationality; only residents department ( surgery) and sex (female) were independently associated with stress level measured by K6. Correlation between K6 total stress levels was significantly related to some feeling variables such as totally unable to work during the last 30 days, and doing only half of normal.

In general residents experience high levels of stress, depression and burnout, leading to perceived medical errors, as well as to symptoms of impairment, such as chronic anger, cognitive impairment, suicidal behavior and substance abuse [34]. The importance of prolonged working hours in causing fatigue and sleep deprivation and consequently stress needs to be further studied and assessed among residents in KSA. In other countries such as USA the legal restriction of residents' weekly working hours in the USA appeared to have a positive impact on resident well-being [23,35,36]. This study revealed that residents who were not able to do full or even half work in more days during last months were significantly more stressed. Studies reported that resident trainees who had high stress scores also reported significantly more days of being unable to work and inefficiency in daytime activities [31,36]. Health status did not appear to be significantly associated with stress level among residents in this study in disagreement with other studies which showed that general health problems of residents is associated with higher stress level [32,36]. The residents at senior level (R5) in this study were significantly experiencing higher stress levels than residents at other levels of residency program. Studies reported that stress level was high among residents who are more senior probably due to the fierce in postgraduate examination, responsibility, high expectations, and suitable jobs. These factors could explain the increasing stress level in their final training year [31,36].

Residents experience severely high levels of stress, depression and burnout, leading to perceived medical errors, as well as to symptoms of impairment, such as chronic anger, cognitive impairment, suicidal behavior and substance abuse. In recent years, educational and health care institutions have been enrolling more residents in different

programs to meet the huge need of well-trained practicing physicians. Unfortunately, most of the residents were unaware of such burnout and had never received stress management, which indicates a need for stress management programs during residency [9,32,37,38]. A Systematic Review of Well-Being in Residency pointed out the major factors associated with resident well-being are autonomy, building of competence, strong social relatedness, sleep, and time away from work. Perseverance is predictive of well-being, and greater well-being is associated with increased resident empathy. These factors among other need to be considered in any intervention strategy to reduce stress among resident doctors [37].

## Conclusion

Residents in Saudi Arabia are at comparable or slightly higher risk of perceived stress than that reported among residents worldwide. Stress level was significantly associated with gender, nationality and department. These findings should be reinvestigated in further studies, especially with a longitudinal study design. This study suggests that to ensure residents wellbeing there is an urgent need for

Stress management programs during residency training.

## Study Limitations

The cross-sectional nature of the study is not a powerful tool for causes and predictors. Since data were assessed by self-report measures and no observers' data are available to cross-validate the data of participants, we can only claim limited objectivity of our results. Other factors which may have been associated with stress were not addressed in this study such as working hours, patient load, critical patients assigned, night duty, sleep duration and quality, work environment, job satisfaction, place of graduation and family affairs.

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