

RESEARCH ARTICLE

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# Association between personal characteristics and anxiety and burnout in orthopedic residents: a cross-sectional cross-sectional study

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## Abstract

**Objective** Burnout is becoming a major problem in medicine, and some articles have pointed to the link between burnout and anxiety. Several factors can contribute to burnout and anxiety, and recognizing each can improve medical education environments. The purpose of this study is to determine the relationship between personal characteristics, anxiety and burnout of orthopedic residents.

**Method** In this cross-sectional study, the anxiety rate, depression, and burnout were evaluated in 94 orthopedic residents above the second year and orthopedic fellowships in three hospitals. Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI), and Maslach Burnout Inventory—Human Services Survey (MBI-HSS) were used to measure the levels of depression, anxiety, and burnout, respectively. Multivariate logistic regression analysis was used to evaluate predictor variables for burnout.

**Results** Severe anxiety and depression were reported in 17% and 12.77% of residents, respectively. The rate of burnout for Emotional Exhaustion (EE), Depersonalization (DP), and low sense of Personal Accomplishment (PA) subscales was 18.09%, 28.72%, and 43.62% of people with high levels of burnout, respectively. Multivariate analysis of logistic regression showed that Works > 60 h per week, Anxiety score > 28, Time spent in the hospital > 9 h per Day, Academic year and Experience being abused by the upstream, Balance between work and life, Feeling the need for support from nurses in the hospital were significantly associated with burnout.

**Conclusion** stress and anxiety can be considered a severe factor in burnout; this issue can provide a clear perspective of the psychological cycle that ultimately leads to a decrease in the efficiency of the medical system and related services.

**Keywords** Burnout, Orthopedics, Anxiety, Internship and residency

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## Introduction

Burnout is seen in many demanding jobs and is a common syndrome among physicians with devastating personal consequences [1]. Burnout among physicians is vital because it can increase medical errors affecting their patient's health [2]. Burnout syndrome's most widely used definition has three dimensions: depersonalization of others, decreased feelings of personal accomplishment, and emotional exhaustion [3].

According to several studies, burnout among physicians is estimated at 42–56%; consequently, it can be said that almost half of the physicians suffer from burnout syndrome [4–6]. The residency is a crucial and critical period in medical education [7, 8]. The need for continuous study, excessive responsibility, and the lack of time for rest and activity are some causes of burnout among them [7–9].

Orthopedics has been recognized as a challenging specialty because it covers large trauma cases and a wide range of procedures [10]. Orthopedic residents have a heavy workload during training and usually spend long hours in hospitals [10, 11]. In today's medical setting, acquiring surgical skills has become more challenging due to decreased opportunities for independent surgical practice and exposure [12]. This has led to a steeper learning curve and increased pressure on orthopedic professionals facing high expectations and demands [11, 12].

Recently, attention in the field of burnout has turned to surgeons, especially orthopedic residents [13]. Studies have shown that the prevalence of depression, anxiety and burnout in orthopedic residents is higher than in other fields [11, 13–15].

According to the Medscape survey, the burnout rate among practicing orthopedic surgeons has been reported at 34% [13]. Based on a national survey published in 2009, the burnout rate of orthopedic residents is reported to be 56% [14]. On the other hand, anxiety has a high prevalence and incidence during medical education [15]. Based on a review of research and an empirical study, Shirom and Ezrachi found that anxiety and burnout are closely related and affect each other [16].

According to previous studies, the prevalence of anxiety, depression, and burnout among residents and medical students has been reported to be high [17, 18]. NB Pokhrel et al. [17] in 2020, showed that burnout and depression in medical assistants were almost twice that of medical students. They also showed that individual characteristics such as anxiety, job burnout, and satisfaction with academic performance were significantly associated with depression. They showed that depression and burnout in residents increase with the increase in the academic year. In another study, JT Prins et al. [19], showed that job burnout and depression were significantly related

to residents' individual characteristics. They showed that emotional exhaustion was higher in resident women than men, and depersonalization was lower in them than men. Age and marital status were significantly related to residents' depersonalization, so depression was higher in older and unmarried residents. However, the relationship between some residents' characteristics and depression and especially job burnout is still unclear [19]. In a review study, RWH Hui et al., [11] showed that although the prevalence of burnout among orthopedic surgeons was high. Still, there is not enough evidence to show that the level of burnout in orthopedic surgeons is different from that of doctors of other specialties. Most of the difference in the prevalence of burnout can be caused by environmental and individual factors. There was a significant difference in the prevalence of job burnout in different centers with different workloads and based on the demographic characteristics of the residents. The evidence of the prevalence of depression, anxiety, and burnout in primary orthopedic surgeons and based on different populations has been conflicting.

Due to the unclear relationship between individual factors and anxiety and burnout in Iranian orthopedics residents, we aim to assess the relationship between personal characteristics, anxiety, and burnout of orthopedic residents and fellowships in Tree Hospital affiliated with the Iran University of Medical Sciences.

## Materials and methods

This is a cross-sectional descriptive-analytical study. According to the Declaration of Helsinki, the Ethical Committee at the Research Center of our University of Medical Sciences approved the study, which has the ethical code IR.IUMS.REC. 1400.640. All questionnaires were filled out in the presence of the examiners.

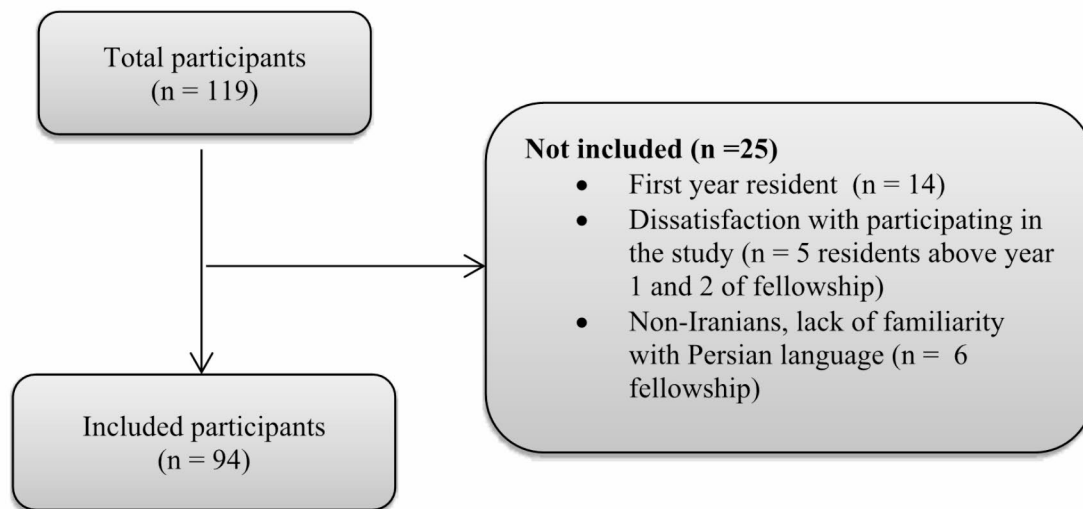
## Participants

This study was performed on the 119 orthopedic residents and fellowships in educational-medical hospitals in Tehran, Iran. After excluding 25 people incompatible with the study's objectives, 94 s-year and above orthopedic residents and fellowships in educational medical hospitals were selected.(Fig. 1).

Inclusion criteria included second-year or higher residents or orthopedic fellowships and informed consent to participate in the study. Non-Iranian orthopedic residents, residents of other specialties, unwillingness to participate in the research, and failure to respond to complete the questionnaires were defined as exclusion criteria.

## Demographic questions

The researcher collected demographic information and participants' experiences using a checklist. Twelve



**Fig. 1** Flowchart of the study

questions related to demographic characteristics included age, sex, height, weight, family income, marital status, number of children, place of residence, employment status, current income level, having debts to the government, public course status, and correspondence between residence and place of education. Other questions examined participants' experiences, including job satisfaction, worries about the future, feelings of need for support from responsible organizations, and history of abuse and verbal violence.

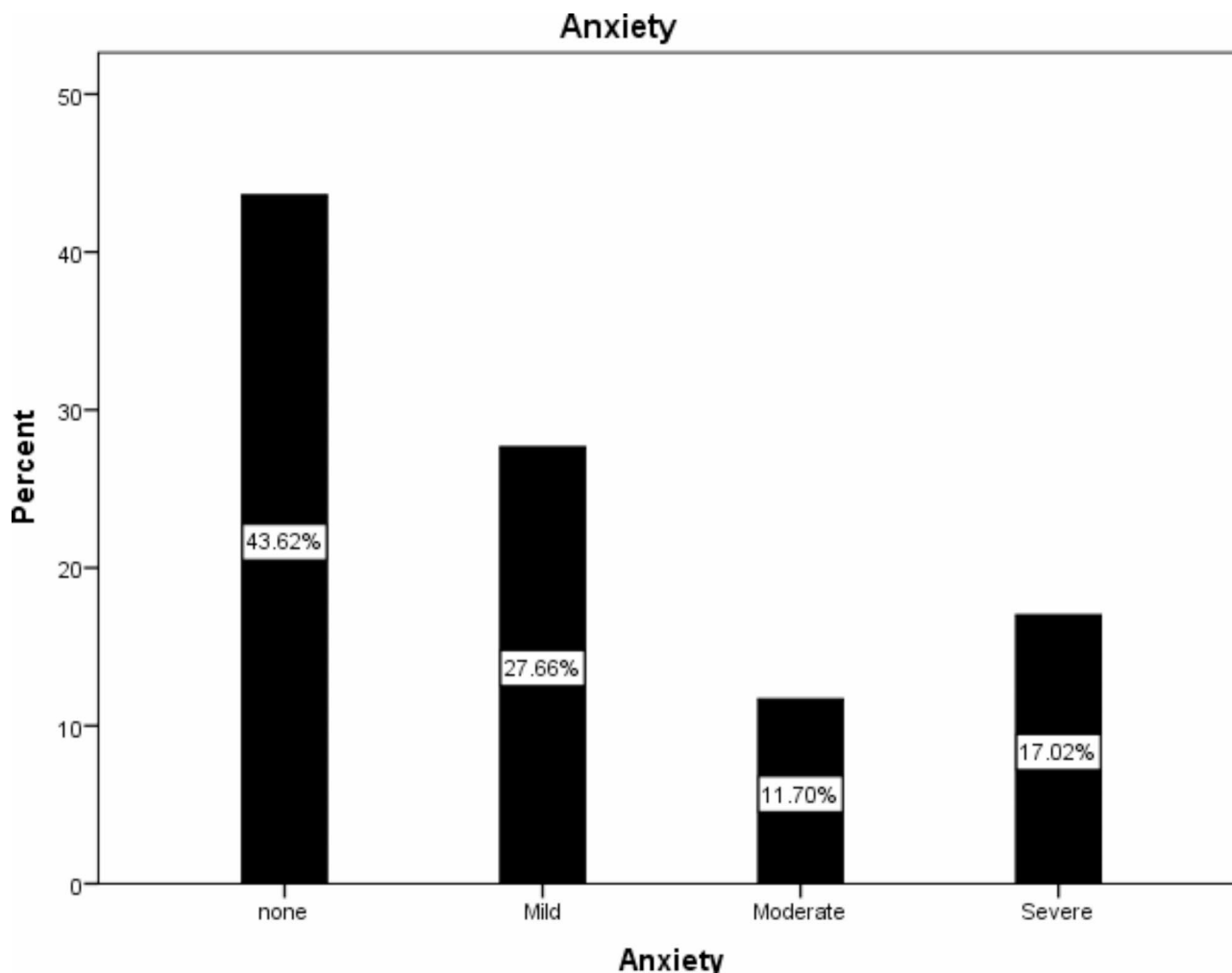
Experience questions include two quantitative parts (duration of general medical education, distance between graduates and the start of residency, duration of scientific education related to orthopedics, duration of non-scientific education, duration of hospital stay, weekly duration of work, and average daily sleep hours) and qualitative (Satisfaction with surgeries in the operating room based on the academic year, satisfaction with feedback, feeling the need for social support (insurance), feeling the need for support from nurses in the hospital, concern about the future of employment, desire to continue studying at higher levels, satisfaction From the presence of fellowship in the department, satisfaction with the choice of medical field, satisfaction with the choice of orthopedic assistant field, sufficient authority, balance between work and life, and satisfaction with the income received, the experience

of upstream abuse. Qualitative questions were answered on a Likert scale (good, moderate, and poor).

#### **Beck depression inventory II (BDI-II), Beck anxiety inventory (BAI), and stress questionnaire**

We used the Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI), and the Maslach Burnout Inventory—Human Services Survey (MBI-HSS) to measure subjects' depression, anxiety, and burnout, respectively. Three questionnaires were filled out according to the standard method described by their authors.

The BDI-II and BAI have 21 questions; the subject must score each question from zero (not at all) to three (very high). This questionnaire's lowest and highest scores are 0 and 63, respectively. Depression degrees are divided into four groups based on the questionnaire scores: None (0–10), mild (11–16), moderate (20–17) and severe (above 21) [20, 21]. Sahebi, Salari, and Asghari (2005) have prepared a Persian version of Beck in Iran and validated it [22]. The internal reliability of the Beck scales was calculated using Cronbach's alpha, and the following results were obtained: 0.77 for the Depression Scale, 0.79 for the Anxiety Scale, and 0.78 for the Stress Scale. To evaluate the validity of the Beck criterion, the Beck Depression Inventory, Zang Anxiety, and Perceived Stress questionnaires were used simultaneously. The Beck Depression Scale correlation with the Beck



**Fig. 2** Distribution of anxiety levels

Depression Inventory was 0.70, the Beck Anxiety Scale was correlated with the Zang Anxiety Test 0.67, and the Beck Stress Scale correlation with the Perceived Stress Test was 0.49. Factor analysis confirmed the three-factor structure of this questionnaire.

#### **Maslach burnout inventory- Human Services survey (MBI-HSS)**

The MBI-HSS has 22 questions and estimates burnout at three levels: Emotional Exhaustion (EE), Which contains seven questions; Depersonalization (DP), Which contains seven questions; and low sense of Personal Accomplishment (PA), which Contains eight questions. Each question should be scored between zero (never) to six (every day) in this questionnaire. The range of scores for EE and DP is between 0 and 42, and for CP between 0 and 48. The EE was divided into three levels: low (overall score of 17 or less), moderate (18–29), and high (30 or more). Level classification for DP includes an overall score of 5 or less (low), 6 to 11 (moderate), and an overall score of

12 or higher (High). The CP was divided into three levels: low (Total greater than 40), moderate (34–39), and high (total 33 or less). Cronbach's alpha coefficient for MBI-HSS was 0.81. A high score in the first two sections and a low score in the last section may indicate burnout [23]. In 2012, Ramin Akbari and colleagues examined the Persian version of the Maslach burnout questionnaire through exploratory and confirmatory factor analysis among 570 English teachers. Their findings showed that this questionnaire can be used in burnout research among Persian-speaking Iranians [23].

#### **Sample size calculation**

The appropriate sample size for conducting this study, considering the estimated effect size of 0.23 for the relationship between burnout and depression based on NB Pokhrel, et al. [17] study, with a Type 1 error ( $\alpha$  error) of 5% and a power of 80% using G Power version 3.1 statistical software [24], 71 participants were estimated, and to increase the power of the study, all residents and

fellowships who met the inclusion criteria at the time of the study were included.

### Statistical analysis

Participants' data were analyzed using SPSS software (version 16). Subjects were divided into two groups based on questionnaire scores. Subjects with high scores were in Group 1 (participants with high scores for burnout, anxiety, and depression), and those with medium and low scores for questionnaires were in Group 0 (participants with low scores for burnout, anxiety, and depression). The mean  $\pm$  SD was used to report quantitative variables. Frequency and percentage were used to report qualitative variables. The normality of the distribution of variables was determined via the Kolmogorov–Smirnov

test. An Independent t-test was used. If the distribution of variables was not normal, the Mann-Whitney test was applied to compare the variables. Multivariate logistic regression analysis was used to evaluate Burnout-predicting factors. The most important predictors of depression, anxiety, and burnout were estimated using an odds ratio with a 95% confidence interval. *P*-values less than 0.05 were considered as the significant level of statistical tests.

### Results

In total, 94 participants, including 67 orthopedic residents and 27 fellowships, entered the study. 97.9% of participants were male, and the rest were female. The mean age of participants was  $33.44 \pm 5.57$  years and ranged from 27 to 54 years. The majority of participants were married. The average current income level was 79.8% of the participants' low (Table 1).

According to the results of this study, almost half of the participants had experienced being abused by their senior year or Attending. 77.7% of participants were satisfied with the orthopedic choice. 58.5% of the participants had adequate authority. 72.3% of the cases agreed with the presence of the fellowship students in the operating room. The average duration of scientific study in orthopedics was estimated at 9.26 h per week. The average length of hospital stay was estimated at 10.8 h per day (Table 2).

### Frequency of depression, anxiety and burnout in participants

Severe anxiety and depression were reported in 17% and 12.77% of residents, respectively (Fig. 2 and Fig. 3). The burnout rate for EE, PD, and DP subscales was 18.09%, 28.72%, and 43.62% for people with high levels of burnout, respectively (Fig. 4).

### Anxiety and depression status of participants based on educational position

In general, the mean scores of anxiety and depression for the participants were  $12.67 \pm 12.27$  and  $14.3 \pm 11.3$ . In other words, the level of anxiety and depression in orthopedic fellowship residents and students was reported at a high level.

The mean level of anxiety in residents was significantly higher than in fellowships (*P*: 0.038). At the same time, there was no significant difference in the mean level of anxiety among residents of different years (*P*: 0.12). The mean level of depression score in residents was significantly higher than in fellowships (*P*: 0.016). At the same time, there was no significant difference in the mean level of depression among residents of different years (*P*: 0.25) (Table 3).

**Table 1** Demographic characteristics of the participants

Variable	94 participants
Position	
• Second-year resident	21(22.3%)
• Third-year resident	20(21.3%)
• Fourth-year resident	26(27.7%)
• fellowship	27(28.7%)
Sex	
• Male	92(97.9%)
• Female	2(2.1%)
Age (Mean $\pm$ SD)	33.44 $\pm$ 5.57
BMI (Kg/M <sup>2</sup> )	26.79 $\pm$ 3.23
Marital Status	
• Married	54(57.4%)
• Unmarried	39(41.5%)
• Divorced	1(1.1%)
number of children	
• 0	70(74.5%)
• 1	16(17%)
• 2	6(6.4%)
• 3	2(2.1%)
Monthly family income before college	
• Poor	10(10.6%)
• Moderate	47(50%)
• High	34(39.4%)
Current income level	
• Poor	75(79.8%)
• Moderate	8(8.5%)
• High	11(11.7%)
Employment status	
• Yes	9(9.6%)
• No	85(91.4%)
Debt to the government	
• Yes	2(2.98%)
• No	66(60.2%)
Complete the general course plan	
• Yes	55(58.5%)
• No	39(41.5%)
Identity of the place of residence and place of study	
• Yes	33(35.1)
• No	61(64.9%)

**Table 2** Participants' experiences

Variable	94 participants
Satisfaction rate of surgeries in the operating room based on the academic year	
• poor	9(9.6%)
• Moderate	48(51%)
• High	37(39.4%)
Duration of general medicine education (Year) (Mean ± SD)	7.36 ± 0.97
Gap between graduate to beginning residency program (Year)	3.17 ± 2.3
Duration of scientific study related to orthopedics (H per week)	9.26 ± 6.1
Duration of unscientific study(H per day)	1.6 ± 2.3
Time spent in the hospital(H per day)	10.8 ± 7.33
Duration of weekly work (H)	68.16 ± 30.15
Daily sleep duration (H)	6.23 ± 2.28
Satisfaction rate of feedback	
• None	3(3.3%)
• Poor	19(20.2%)
• Moderate	52(55.3%)
• Good	20(21.3%)
Feeling the need for social support (insurance)	
• Yes	40(42.6%)
• No	54(57.4%)
Feeling the need for support from nurses in the hospital	
• Yes	47(50%)
• No	47(50%)
Worry about career prospects	
• Yes	73(77.7%)
• No	21(22.3%)
Willingness to continue education at higher levels	
• Yes	59(62.8%)
• No	35(37.2%)
Satisfaction with the presence of the fellowship in the ward.	
• Yes	68(72.3%)
• No	26(27.7%)
Satisfaction with choosing a medical field	
• Yes	62(66%)
• No	32(34%)
Satisfaction with choosing orthopedic residency program	
• Yes	73(77.7%)
• No	21(22.3%)
Adequate authority	
• Yes	55(58.5%)
• No	39(41.5%)
Balance between work and life	
• Yes	15(16%)
• No	79(84%)
Satisfaction with income received	
• Yes	1(1.1%)
• No	93(98.9%)
Experience being abused by the upstream	
• Low	20(21.3%)
• Moderate	23(24.5%)
• High	51(54.2%)

### Burnout status of the participants based on their educational position

In general, the overall mean for the EE, DP, and PA subscales for the burnout questionnaire for participants was estimated to be  $32.88 \pm 9.26$ ,  $18.57 \pm 5.93$ , and  $20.33 \pm 8.06$ , respectively. In other words, the level of burnout was high under various comparisons. There was no significant difference in the mean level of EE, DP, and PA between residents of different years and fellowships ( $P > 0.05$ ) (Table 3).

### Factors affecting burnout

Multivariate analysis of logistic regression showed that Works > 60 h per week, Anxiety score > 28, Time spent in the hospital > 9 h per day, Academic year and Experience being abused by the upstream, Balance between work and life, Feeling the need for support from nurses in the hospital were significantly associated with burnout as a risk factor (Table 4):

### Discussion

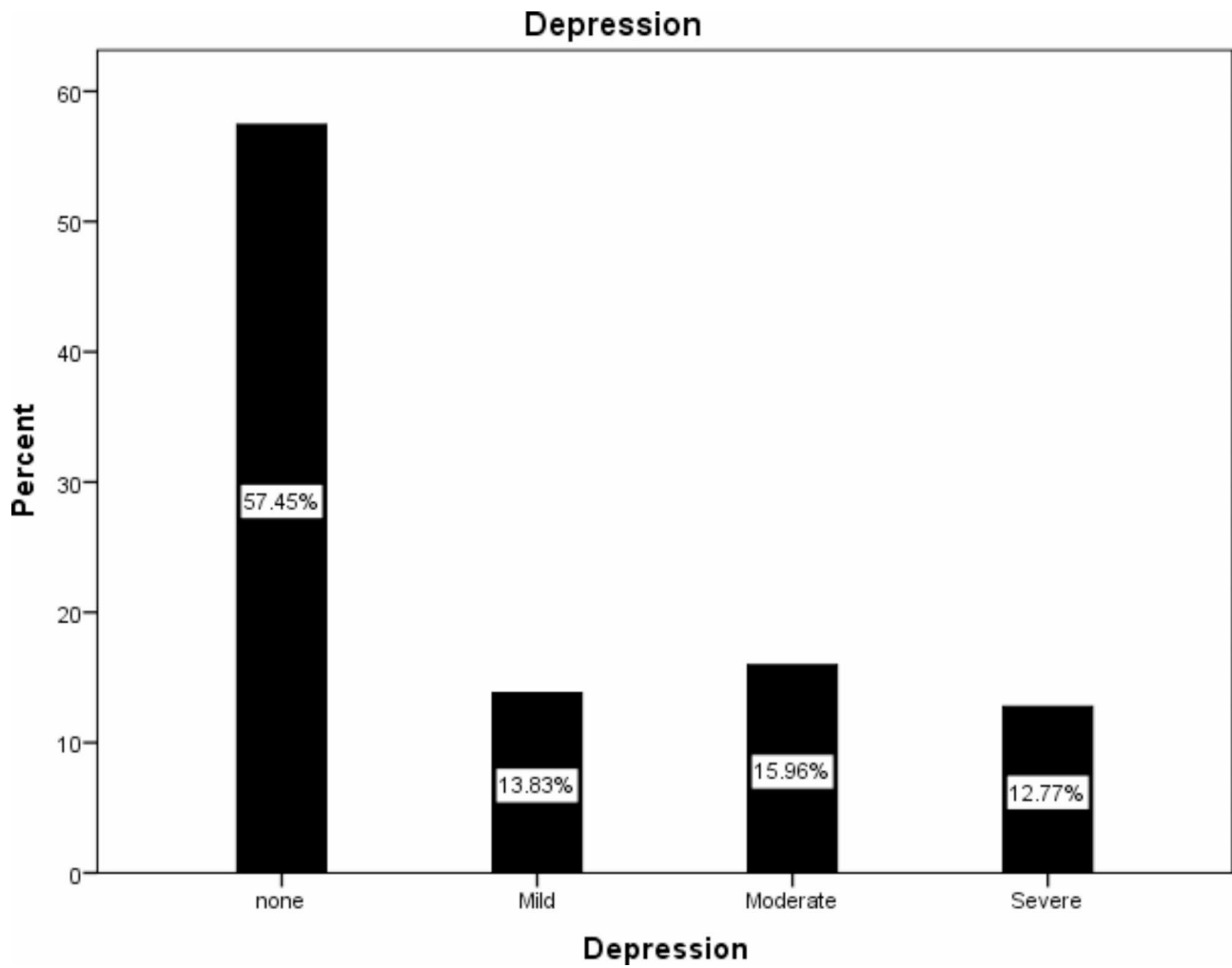
This study evaluated the effect of individual factors and anxiety on burnout. The burnout rate for EE, PD, and DP subscales was 18.09%, 28.72%, and 43.62% for people with high levels of burnout, respectively. These numbers indicate that burnout is significantly high among orthopedic residents, and attention should be paid to this issue because neglecting it may have unpleasant consequences for the healthcare system. One of these consequences could be medical errors. Compared to a similar study performed by Jeremy S. Somerson et al. in 2018 in the United States, The scoring of DP is higher, and EE is lower than our current results.

Working more than 60 h per week, spending more than 9 h per day in the hospital, having an Academic year, and experiencing abuse by the upstream were significantly associated with burnout as a risk factor. In contrast, balancing work and life and feeling the need for support from nurses in the hospital were reported as protective variables for burnout.

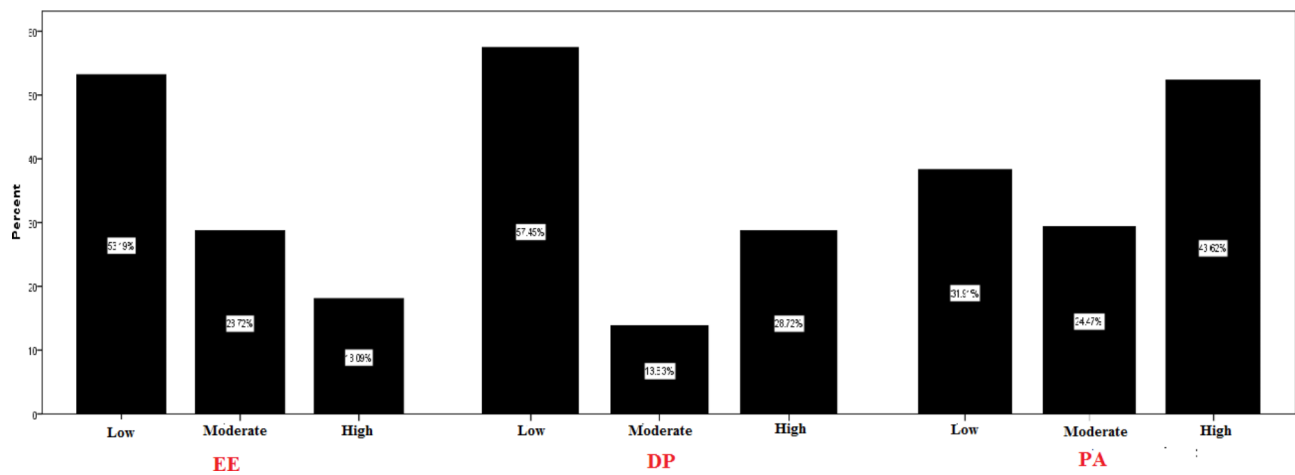
One modifiable factor significantly impacting burnout is the number of working hours per week. Since residents' burnout can affect the treatment process and patients' recovery, reducing residents' working hours can help the healthcare system. By enacting laws by responsible organizations, the share of this risk factor in this problem could be reduced [25–27].

In 2011, the Accreditation Council for Graduate Medical Education in the United States enacted a law that residents must not work more than 80 h per week. Comparing studies conducted in the United States before and after the law, it can be seen that the percentage of burnout has decreased significantly [14, 28].





**Fig. 3** Distribution of depression levels



**Fig. 4** Distribution of burnout

**Table 3** Anxiety, depression status and burnout of participants based on educational position

Variable	Position				P value
	Second year resident (N:21)	Third year resident (N:20)	Fourth year resident (N:26)	Fellowship (N:27)	
Anxiety score (Mean ± SD)	17.10 ± 15.09	14.35 ± 10.85	13.01 ± 12.82	7.67 ± 10.95	0.044
Depression score (Mean ± SD)	16.38 ± 8.24	17.20 ± 14.10	14.65 ± 11.75	9.26 ± 9.02	0.015
Sub scale Burnout					
Emotional Exhaustion score (Mean ± SD)	33.10 ± 9.8	32.10 ± 9.3	32.38 ± 10.6	33.75 ± 7.9	0.92
Depersonalization score (Mean ± SD)	16.33 ± 6.55	18.10 ± 5.66	18.54 ± 6.47	19.70 ± 4.49	0.098
low sense of Personal Accomplishment	19.43 ± 8.21	19.50 ± 6.33	22.12 ± 9.5	19.59 ± 8.11	0.59

**Table 4** Results of multivariate logistic regression analysis for burnout

Variable	OR <sub>Adj</sub>	P value	CI95%
Works > 60 h per week	2.36	0.021	1.17–5.63
Anxiety score > 28	3.55	0.001	1.54–8.32
Feeling the need for support from nurses in the hospital	0.28	0.033	0.13–0.89
Time spent in the hospital > 9 H in day	2.55	0.011	1.24–7.55
Balance between work and life	0.41	0.002	0.19–0.91
Academic year	1.58	0.034	1.08–5.33
Experience being abused by the upstream	3.22	0.001	1.54–6.87

Surprisingly, almost half of the participants experienced verbal abuse through their upstream, which is an important factor in burnout. This number is higher than a similar article that reported only 13%, possibly due to the weak laws protecting residents in the Iranian medical educational system. This issue is not just an orthopedic surgeon resident case; all medical trainees at any level worldwide are involved [29, 30]. Designing web-based applications that report such behaviors anonymously can help improve burnout among residents [31]. Another critical risk factor for burnout that we found in this study was anxiety.

56.8% of the participants had some degree of anxiety, of which 17.02% experienced severe anxiety, which is about 8% more than the amount reported in a study of 442 residents in China [32]. The mean level of fear among residents was significantly higher than fellowships, but no significant relationship was found between the levels of anxiety of residents of different years.

The results of our study showed that depression and anxiety in residents were significantly higher than in orthopedic fellowships, which can be due to the personal characteristics of the participants. Most residents are male and single, while almost all fellowships are married and have children. The comparison of anxiety and stress in the second, third, and fourth years of study in the residents showed that anxiety and depression decreased with time, which may be due to the adaptation of the residents

to the environment and also considering that some of them during this period they got married, it can be justified. JT Prins et al., by examining 2115 residents in the Netherlands, showed that depression was significantly lower in married and male residents than in single residents. They also showed that residents who had the role of parents had lower levels of depression than single residents and married residents who did not have children, which was consistent with the results of our study. They also showed in their study that depression was lower in female residents than in male residents. Unfortunately, we were not able to compare depression, anxiety, and burnout according to the gender of the residents in our study, considering that most of the residents were male.

In line with the results of our study, the study of MM Gosselin et al. [33] by evaluating the prevalence of depression and anxiety in 279 orthopedic residents in North America, showed that the prevalence of anxiety, depression, and burnout in orthopedic residents was high. The high prevalence of depression, anxiety, and burnout was related to higher average working hours, female gender, and non-permanent residence of residents. T Safiye et al., [34] showed that resilience had an inverse relationship with all three dimensions of mental health status, depression, anxiety and stress in health workers. Health indicators were also inversely related to the socioeconomic status of employees. They showed that creating and implementing health management strategies to increase resilience can help improve the psychological indicators of health workers. In another study, T Safiye et al., [35] by evaluating the relationship between resilience, mental and job burnout syndrome using the Maslach Burnout Inventory among 406 healthcare workers during the COVID-19 epidemic in Serbia, showed that resilience had an inverse relationship with the dimensions of job burnout-emotional exhaustion and depersonalization. Also, the prevalence of burnout was higher in women. At the same time, better socioeconomic status and more children were associated with a decrease in the prevalence of job burnout. In 2023, A Fresán et al., [36] investigated the prevalence of depression and anxiety among



orthopedic residents in Mexico. They reported the prevalence of depression and anxiety to be 12.5% and 18.4%, respectively. The prevalence of depression and anxiety in this study was lower than in our study, and this difference can be explained by the difference in the characteristics of the investigated participants, the location of the study, economic conditions, and also the difference in educational policies and guidelines in the two studies. In line with our study's results, this study highlighted the need for systematic monitoring of the mental health of orthopedic residents.

The literature review shows the difference in the prevalence of depression, anxiety and burnout in the population of orthopedic residents in different countries. It is recommended to design large-scale prospective studies based on the demographic and environmental characteristics of residents in different populations to understand better the determinants and effects of anxiety, depression, and burnout in orthopedic surgeons to perform appropriate interventions.

Our study had strengths and weaknesses that should be mentioned. According to the study design, at the time of conducting the study, we were unable to investigate the relationship between some of the residents' characteristics, such as the resident's gender, previous history of anxiety and depression, and their economic status with depression, anxiety, and burnout. Considering the nature and difficulty of orthopedic surgery, most residents and fellows in this field were men, and the questionnaires were completed in the form of self-reporting, which can affect the study results. Also, patient sampling was done only among orthopedic residents, and we could not compare the results with those of a control group from other specialties. Prospective study designs with control groups can help estimate the results more precisely. The most important strength of this study was the simultaneous investigation of anxiety, depression and burnout for the first time in Iran in a suitable sample size of orthopedic residents.

## Conclusion

Our study showed that stress and anxiety itself can be considered a serious factor for burnout; this issue can provide a clear perspective of the psychological cycle that ultimately leads to a decrease in the efficiency of the medical system and related services. The vacancy of tangible and intangible inspections in the medical education system is felt because, with a series of small changes in the system, a dramatic change can be made in the final result. Thus, steps can be taken to improve the medical community's trust. Reorganizing the hours of orthopedic surgeons, insurance coverage and expanding stress management programs can be important steps towards solving this problem.

## Abbreviations

EE	Emotional Exhaustion
MBI-HSS	Maslach burnout inventory- human services survey
BDI-II	Beck depression inventory II
MBI-HSS	Maslach burnout inventory - human services survey
DP	Depersonalization
PA	Personal Accomplishment (PA)

## Acknowledgements

The authors sincerely appreciate of all residents and fellowships who contributed to this research and completed the questionnaires.

## Author contributions

Conception and design: SVA, JA and MM. Analysis and interpretation of data: SVA. - Data collection: SVA, SG and TD – SVA, MM, JA and FNM edited and read the manuscript. All authors reviewed the manuscript." All authors critically revised the manuscript, approved the final version to be published, and agree to be accountable for all aspects of the work.

## Funding

We have no funding resource for this study.

## Data availability

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The ethics committee of Iran University of Medical Sciences, Tehran, Iran, approved this study. This study's research team adhered to the Helsinki Convention's ethical principles regarding clinical studies in all stages of the present study. After informing the subjects about the study's stages and results, written informed consent was obtained from all subjects and/or their legal guardian(s). Because no interventions are performed on patients, the condition for the confidentiality of patient information is not a moral restriction by the Ethics Committee. An ethics committee from the Research of Iran University of Medical Sciences approved the informed consent form.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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Received: 6 September 2024 / Accepted: 5 October 2024

Published online: 12 October 2024

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