

# Relationship Between Depressive Symptoms, Job Burnout And Career Choice Regret of Postgraduates In Stomatology

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## Research Article

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# Abstract

**Background:** In China, the shortage of doctors leads to an increase in workload. Especially after the new crown epidemic—COVID-19, excessive workload may lead to both physical and mental fatigue of doctors. Students' choices and opinions about the doctoral "health care" industry are particularly important. However, we don't know much about the work and living conditions of postgraduates in Stomatology. The purpose of this research is to investigate the depressive symptoms, job burnout and job satisfaction of individual dental graduate students and their personal professional characteristics after the outbreak of coronavirus disease-2019.

**Methods:** The study directed to the correlations between depressive symptoms, burnout and career choice regret and their factors. The questionnaire covers demographic information, Maslach Burnout Inventory, and added programs to evaluate career choice regret.

**Results:** There are 580 dental graduate students who will return to complete the questionnaire in 2021. After excluding partial questionnaires, the data of 558 participants were analyzed. In total, 44.1% of the participants had symptoms of depression. 41.0% of the participants experienced symptoms of burnout and 41.6% of the participants had regrets about their career choices. Binary logistic regression analysis showed that the average daily sleep time was associated to depressive symptoms ( $P < 0.05$ ). At the same time, job burnout (OR = 5.38, 95% CI 3.67–7.88) and career choice regret (OR = 2.07, 95% CI 1.41–3.05) were risk factors for depressive symptoms. There was a relationship between job burnout, average study time per week and average daily sleep time (all  $P < 0.05$ ). Depressive symptoms were the biggest risk factor for burnout (OR = 5.28, 95% CI 3.62–7.69). There was a relationship between career choice regret, postgraduate entrance examination score and average daily sleep time (all  $P < 0.05$ ). Job burnout (OR = 1.82, 95% CI 1.24–2.66) and depressive symptoms (OR = 2.15, 95% CI 1.48–3.14) were both risk factors for career choice regret.

**Conclusions:** Depressive symptoms, job burnout, and career choice regrets are common in postgraduates majoring in Stomatology. An in-depth understanding of relevant factors is essential to determine the reduction and prevention of burnout and career choice regrets in this group.

## Background

In China, due to the lack of social respect and the deterioration of the doctor-patient relationship, doctor positions are rarely selected<sup>[1, 2]</sup>. The perspectives of graduate students who will become dentists on the profession are particularly important. Many studies have shown that medical students have a high prevalence of burnout, depression and other mental health problems<sup>[3–5]</sup>.<sup>[6]</sup> Due to the heavy workload and heavy work pressure, medical students may have some psychological problems. Doctor burnout has become a global problem<sup>[7, 8]</sup>. For example, 36% of doctors and 43% of medical students in the UK feel burnout. A Malaysian medical school survey found anxiety (33%) and depression (11%) exist in medical survival<sup>[9]</sup>, and a mental health survey of British doctors and medical students found that 40% of the

respondents indicated that they have mental and emotional illnesses. Doctors who have worked the longest and just started working are more likely to fall in mental disorders<sup>[10]</sup>. The prevalence of depression among medical students in China is 29%<sup>[11]</sup>.

Burnout is characterized by "various levels of emotional exhaustion, depersonalization, and a low sense of personal accomplishment"<sup>[12]</sup>. Burnout can negatively affect the mental and physical health of doctors, and more seriously, it can lead to poor patient care<sup>[13]</sup>. The cause of burnout may be the very long period of time required to become an independent doctor in China, and the excessive work pressure cannot be relieved early in the career. Long study time in medical majors and high academic pressure may lead to job burnout and career choice regrets. A survey in the United States shows that career choice regret may be significantly related to job burnout<sup>[14, 15]</sup>. Burnout and career choice regret may be related to personal and social factors, such as excessive work pressure, discordant medical environment and uncooperative patients<sup>[16]</sup>.<sup>[17]</sup>The future career choices of medical graduate students play a decisive role in dealing with the shortage of doctors, and at the same time, doctor's mental health has an impact on the degree of motivation at work. These are worthy of our attention.

Nowadays, doctors' depression, job burnout, and career choice regrets are common, but the relationship among these three aspects in dental graduate students has not yet been discussed. In this study, we studied the status quo and influencing factors of depression symptoms, job burnout, and career choice regret in dental graduate students. Based on our survey results, we have put forward some views and opinions.

## Methods

Participants: This data comes from the five provinces of China, namely Chongqing, Sichuan, Guizhou, Yunnan, and Gansu(Table 1). The questionnaire was required to be filled by the first to the third grade of dental students. It described the purpose of the survey and participation was voluntary and anonymous, and would not infringe on personal privacy during the research process. The study is approved by the Ethics Committee of Chongqing Medical University.

Table 1  
Sample Source

province and city	Frequency(n)	%
Chongqing	268	48.0
Sichuan	134	24.0
Guizhou	117	21.0
Gansu	26	4.7
Yunnan	13	2.3

Data collection: From December 2020 to February 2021, we invited dental graduate students from five provinces to participate in an anonymous online survey, with a total of 580 questionnaires being collected. Due to missing or invalid data, 22 questionnaires were excluded, leaving 558 questionnaires for subsequent analysis.

Survey questionnaire: This is a study based on a cross-sectional and questionnaire survey of graduate students in Chinese Medical College. The survey collects participants' genders, study years, degree types, monthly family income, graduate entrance examination results, weekly work or study time, daily sleep time, emotional status, family and child status, whether the participants have engaged in part-time work, etc(Table 2). Through the Maslach Burnout Inventory to score, we use three different types of questions to measure the three dimensions of job burnout, namely emotional exhaustion, work indifference, and lack of work accomplishment. All items are scored from 0–6 points, and the scores of each dimension are calculated by accumulation. Then we evaluate whether there is job burnout by answers to some questions in the scale. For example, "Will you become a doctor after graduation?" "If you could come back, would you still choose to study medicine?" "Have you ever thought about dropping out?" "What do you think of the current medical environment?". The answers are "yes, neutral, no". In the last part, the psychological changes brought by the epidemic to graduate students are assessed, such as "Have you experienced anxiety during the entire epidemic?", with answers being "none, mild, moderate, severe". With regard to "Does the epidemic have any impact on future practice attitudes?", the answers are "large impact, small impact, no impact" and other aspects(Table 3).

Table 2  
 Characteristics of the sample participants.

Characteristics	n/mean	%/SD
Gender		
Male	172	30.8
Female	386	69.2
Age	25.72	4.21
Year of study		
One of master	215	38.5
Two of master	146	26.2
Three of master	163	29.2
Doctor	34	6.1
Degree type		
Professional	395	70.8
Academic	163	29.2
Monthly household income (RMB)		
< 5000	202	36.2
5000–10000	218	39.1
> 10000	138	24.7
Postgraduate entrance examination score		
< 330	168	30.1
330–360	221	39.6
> 360 or postgraduate recommendation	169	30.3
Worked or studied time per week(hours)		
< 45	188	33.7
45–55	170	30.5
> 55	200	35.8
Daily hours of sleep		
< 6	91	16.3
n = number of participants; % = proportion of participants		

<b>Characteristics</b>	<b>n/mean</b>	<b>%/SD</b>
6–8	439	78.7
> 8	28	5.0
Marital status		
Single	287	51.4
Partnered	227	40.7
Married	44	7.9
Presence of children in the household		
No	527	94.4
Yes	31	5.6
Who had ever undertaken part-time work		
No	483	86.6
Yes	75	13.4
n = number of participants; % = proportion of participants		

Table 3  
 Characteristics of the sample participants.

Item	n/mean	%/SD
Depress symptom		
Yes	246	44.1
No	312	55.9
Burnout		
Yes	229	41.0
No	329	59.0
Thoughts of ending life		
Yes	85	15.2
No	473	84.8
Thoughts of ending life( in Past year)		
Yes	64	11.5
No	494	88.5
Tried to end life		
Yes	27	4.8
No	531	95.2
Wished to be a doctor when graduate		
No	11	2.0
Neutral	59	10.6
Yes	488	87.5
Choose another department when graduate		
No	381	68.3
Neutral	127	22.8
Yes	50	9.0
View on current medical environment		
Good	61	10.9
Neutral	407	72.9
n = number of participants; % = proportion of participants		

Item	n/mean	%/SD
Poor	90	16.1
Re-selection will also choose medicine		
No	232	41.6
Neutral	105	18.8
Yes	221	39.6
Considered dropping out once		
Yes	139	24.9
No	419	75.1
Scientific research pressure		
No	3	0.5
Mild	97	17.4
Moderate	270	48.4
Heavy	188	33.7
Clinical work pressure		
No	41	7.3
Mild	285	51.1
Moderate	188	33.7
Heavy	44	7.9
The work unit you want to go to		
Public oral hospitals	462	82.8
Private oral hospitals	58	10.4
other	38	6.8
n = number of participants; % = proportion of participants		

### Statistical analysis

All statistical analyses are carried out using SPSS21.0 version (IBM Corp, Armonk, NY, USA). Single-variable analysis and square testing of classified variables are used to evaluate the associations between variables. Binary Logistic regression analysis are used to verify the factors affecting burnout. When the tolerance is  $\leq 0.1$  or the variance inflation factor is  $\geq 10$ , the multilinear analysis method is used to test the collinearity between the variables. We use input methods, backward elimination and forward selection

to select covariates into the fully adjusted model, and select important independent variables in the logical model. Furthermore, we use the binary results of logistic regression to determine which variables are independently associated with depressive symptoms. The factors related to career choice regret are determined by multiple logistic regression analysis. P value below 0.05 is considered statistically significant.

## Results

### 1 Demographic characteristics

Table 2 shows the personal characteristics of the dental graduate students who participated in the study. Overall, 69.2% of the participants were women. 70.8% were engaged in clinical practice, and the rest held academic positions, 93.9% had a master's degree, and the rest had doctoral degrees. 87.7% slept for 6–8 hours, and 35.8% worked for more than 55 hours a week. Most of the participants were unmarried (92.1%). 94.4% had no children, and 86.6% had not participated in part-time jobs.

Table 3 summarizes the incidence of job burnout, career choice regret, and psychological conditions. Generally speaking, 41.0% of participants had symptoms of burnout (high emotional exhaustion or depersonalization score). Regarding the regret of career choice, 41.6% said they would no longer choose to be a doctor, and 18.8% were not sure. In addition, 2.0% of the participants said that they did not want to be a doctor when they graduated. 24.9% had considered dropping out of school at least once, and only 10.9% were in good condition throughout the current medical environment. In univariate analysis (Table 4), job burnout is related to average weekly study time and average daily sleep time (all < 0.05). Occupational regret is related to postgraduate entrance examination scores. Average daily sleep time (both < 0.05), and depression symptoms are related to average daily sleep (both < 0.05).

Table 4  
univariate analysis

<b>variate</b>	<b>Burnout</b>	<b>Depress symptom</b>	<b>Career choice regret</b>
Gender	P = 0.298	P = 0.282	P = 0.007
Male	65(37.8%)	70(40.7%)	57(33.1%)
Female	164(42.5%)	176(45.6%)	175(45.3%)
Year of study	P = 0.863	P = 0.233	P = 0.367
One of master	85(35.9%)	83(38.6%)	82(38.1%)
Two of master	61(41.8%)	70(47.9%)	64(43.8%)
Three of master	67(41.1%)	77(47.2%)	68(41.7%)
Doctor	16(47.1%)	16(47.1%)	18(52.9%)
Degree type	P = 0.584	P = 0.556	P = 0.542
Professiona	165(41.8%)	171(43.3%)	161(40.8%)
Academic	64(39.3%)	75(46.0%)	71(43.6%)
Monthly household income (RMB)	P = 0.311	P = 0.156	P = 0.273
< 5000	79(39.1%)	87(43.1%)	93(46.0%)
5000–10000	98(45.0%)	106(48.6%)	85(39.0%)
> 10000	52(37.7%)	53(38.4%)	54(39.1%)
Postgraduate entrance examination score	P = 0.923	P = 0.482	P = 0.017
< 330	71(42.3%)	77(45.8%)	67(39.9%)
330–360	89(40.3%)	101(45.7%)	107(48.4%)
> 360 or postgraduate recommendation	69(40.8%)	68(40.2%)	58(34.3%)
Worked or studied time per week(hours)	P = 0.011	P = 0.831	P = 0.946
< 45	82(43.6%)	83(44.1%)	77(41.0%)
45–55	54(31.8%)	72(42.4%)	70(41.2%)
> 55	93(46.5%)	91(45.5%)	85(42.5%)
Daily hours of sleep	P < 0.001	P = 0.012	P < 0.001
< 6	55(60.4%)	53(58.2%)	54(59.3%)
6–8	163(37.1%)	182(41.5%)	164(37.4%)
> 8	11(39.3%)	11(39.3%)	14(50.0%)

variate	Burnout	Depress symptom	Career choice regret
Marital status	P = 0.762	P = 0.492	P = 0.848
Signal	122(42.5%)	133(46.3%)	116(40.4%)
Partnered	90(39.6%)	96(42.3%)	97(42.7%)
Married	17(38.6%)	17(38.6%)	19(43.2%)
Presence of children in the household	P = 0.076	P = 0.321	P = 0.739
No	221(41.9%)	235(44.6%)	220(41.7%)
Yes	8(25.8%)	11(35.5%)	12(38.7%)
Who had ever undertaken part-time work	P = 0.287	P = 0.815	P = 0.647
No	194(40.2%)	212(43.9%)	199(41.2%)
Yes	35(46.7%)	34(45.3%)	33(44.0%)

## 2. Psychological condition of graduate students during the epidemic

During the epidemic, 42.7% of the participants had mild anxiety. 37.3% of the participants had mild depression. 79.2% of the participants said that the epidemic would not affect their professional attitudes. 70.8% of the participants said that the epidemic had an impact on the progress of the project and graduation influences.(Table 5)

Table 5  
 Characteristics of the sample participants during the COVID-19 period.

Item	n	%
Anxiety symptom		
No	162	29.0
Mild	238	42.7
Moderate	127	22.8
Heavy	31	5.6
Depress symptom		
No	259	46.4
Mild	208	37.3
Moderate	69	12.4
Heavy	22	3.9
Sleep quality compared to the past		
Better	107	19.5
Neutral	375	67.2
Worse	74	13.3
Attitudes to professional attitudes influence		
Heavy	13	2.3
Moderate	103	18.5
No	442	79.2
progress of the subject or the impact of graduation		
Yes	395	70.8
No	163	29.2
n = number of participants; % = proportion of participants		

### 3 Factors associated with burnout and career choice regret in the multivariate analysis

Model one: The independent variables are only included in the basic information. Job burnout is related to the average daily sleep time and whether there are children. Depressive symptoms are correlated with the average daily (what) time. Occupation regret is correlated with gender, postgraduate entrance

examination scores and average daily sleep time. Among the factors related to job burnout, participants who slept for 6–8 hours (OR = 0.37,95% IC 0.23–0.59) had a strong correlation with job burnout. Among the factors related to depressive symptoms, participants who sleep for 6–8 hours (OR = 0.51, 95% IC0.20-1.10) have a strong correlation with depressive symptoms.

Model two: The factors related to job burnout, depressive symptoms and career choice regret are summarized. Model 2 inputs basic information, including job burnout, depressive symptoms, and job regret. Factors showing independence related to burnout include average weekly learning time. Participants who study for 44–45 hours have obvious burnout (OR = 0.55, 95%IC 0.35–0.89). Factors related to occupational regret include postgraduate entrance examination scores and average daily sleep time (both < 0.05). Obvious occupational regret can be seen at 330–350 points in the postgraduate entrance examination (OR = 1.56, 95% IC 1.01–2.40). Participants who sleep 6–8 hours a day on average show obvious professional regrets(OR = 0.45,95% IC 0.28–0.74).

Model one:Independent variables include only basic information

variate	Burnout		Depress symptom		Career choice regret	
	OR(95%CI)	P	OR(95%CI)	P	OR(95%CI)	P
Gender					1.76(1.20–2.59)	0.004
Postgraduate entrance examination score						0.008
< 330					1 (Reference)	
330–360					1.53(1.00-2.32)	0.048
> 360 or postgraduate recommendation					0.80(0.50–1.25)	0.323
Daily hours of sleep		< 0.001		0.013		< 0.001
< 6	1 (Reference)		1 (Reference)		1 (Reference)	
6–8	0.37(0.23–0.59)	< 0.001	0.51(0.32–0.80)	0.004	0.37(0.23–0.60)	< 0.001
> 8	0.40(0.17–0.96)	0.41	0.46(0.20–1.10)	0.082	0.66(0.28–1.59)	0.357
Presence of children in the household(yes)	0.42(0.18–0.98)	0.044				

Model two: Independent variables include basic information, burnout, depressive symptoms, and career regret

variate	Burnout		Depress symptom		Career choice regret	
	OR(95%CI)	P	OR(95%CI)	P	OR(95%CI)	P
Gender					1.69(1.14–2.52)	0.009
Postgraduate entrance examination score						0.011
< 330					1 (Reference)	
330–360					1.56(1.01–2.40)	0.045
> 360 or postgraduate recommendation					0.82(0.52–1.31)	0.414
Daily hours of sleep						0.003
< 6					1 (Reference)	
6–8					0.45(0.28–0.74)	0.002
> 8					0.84(0.34–2.04)	0.694
Worked or studied time per week(hours)		0.009				
< 45	1 (Reference)					
45–55	0.55(0.34–0.89)	0.015				
> 55	1.11(0.71–1.73)	0.637				
Burnout			5.28(3.62–7.69)	< 0.001	1.69(1.14–2.50)	0.009
Depress symptom	5.38(3.67–7.88)	< 0.001			2.07(1.41–3.05)	< 0.001
Career choice regret	1.82(1.24–2.66)	0.002	2.15(1.48–3.14)	< 0.001		

At the same time, the appearance of depressive symptoms is correlated with job burnout (OR = 5.28, 95% IC 3.62–7.69) and job regret (OR = 2.15, 95% IC 1.48–3.14). The occurrence of job burnout is correlated with depressive symptoms (OR = 5.38, 95% IC 3.67–7.88) and professional regret (OR = 1.82, 95% IC 1.24–2.66). The appearance of career choice regret is correlated with depressive symptoms (OR = 2.07, 95% IC 1.41–3.05).

## Discussion

This study used online questionnaires to investigate the psychological status of dental graduate students during the epidemic, and the job burnout and professional regret of dental graduate students after the outbreak. The new crown virus will last for several years, and we all know that the infection routes of the virus includes airborne transmission<sup>[18]</sup>, which puts a lot of pressure on dental graduate student in the future career, so this research is necessary.

### 1. Psychological status of graduate students and regret of career choice during the epidemic

In the table, mild anxiety during the epidemic reached 42.7%. Mild depression reached 34.3%, and 70.8% of the participants believed that the epidemic had affected the progress and graduation of the project. 79.2% of the participants believed that the epidemic did not change their attitudes towards careers during the epidemic. It can be seen that the biggest factor for anxiety and depression during the epidemic may be related to the progress of the subject and the impact on graduation. The epidemic is not the decisive reason of the career choice of dental graduate students.

### 2. prevalence and factors of job burnout

The occurrence of burnout is related to the characteristics of the job itself. Different medical workers face different work pressure, and the degree of burnout is different<sup>[19]</sup>. Among dental graduate students, the job burnout rate was 41.0%. Long hours of work and little sleep time also cause burnout<sup>[20]</sup>. In our research, we found that the burnout of participants who studied for more than 55 hours per week on average reached 46.5%, and the burnout of participants who slept for less than 6 hours a day on average reached 60.4%. This is similar to a study in the UK, which showed more than 50% of students often felt mental stress, and one-third suffered from insomnia<sup>[10]</sup>. This may be related to the large amount of arduous course training and long-term clinical practice faced by medical students.

Multi-factor analysis found that depressive symptoms are an important factor affecting job burnout<sup>[17, 21]</sup>, and burnout graduate students have a high risk of career choice regret. Therefore, it is particularly important to understand and evaluate the psychological status of postgraduates majoring in dentistry.

### 3. prevalence and factors of depressive symptoms

It can be seen from this survey that the incidence of depressive symptoms among postgraduates majoring in dentistry is 44.1%. According to reports, the rate of medical students' mental health problems continue to increase, and the problems are more common among medical students than among students in other majors<sup>[22]</sup>. The total time required for medical students to acquire the necessary professional knowledge and skills is more than that of students in other majors. The environment in which doctors work, be trained, and doing researches affects their mental health<sup>[10]</sup>. For students, this kind of long-term training and learning will inevitably produce pressure<sup>[23]</sup>. According to repeated studies, approximately

50% of students are physically exposed to significant stress in the form of anxiety and/or depression<sup>[24]</sup>, and depression may lead to a higher risk of suicide injury and suicide. In a random sample of 8155 students from 15 universities in the United States, 6.75% were reported to have committed suicide and 0.5% attempted suicide in the past year<sup>[25]</sup>. Studies have shown that 11% of Chinese medical students are generally suicidal<sup>[11]</sup>. 11.5% of students in our survey thought about ending their lives, and we found that too little sleep time can also cause depressive symptoms<sup>[26]</sup>. Poor sleep quality at night and the accompanying daytime sleepiness will affect the physical and cognitive health of students. It deteriorates the daily performance of students and negatively affects their emotional health. We can see through multi-factor analysis that job burnout and job regret are both important factors that cause depression.

## **4. prevalence and factors of regret for career choice**

In this survey, nearly half of the participating graduate students will not choose to be doctors anymore, which shows that many dental graduate students are dissatisfied with their career choices. About a quarter of students have thought about dropping out. 41.6% of graduate students regret their career choice. Studies have shown that 87% of women have experienced work stress. It is difficult for women to balance family and heavy work at the same time. Gender and occupational characteristics indicate that they are more stressed than men in similar situations and are at higher risk of work fatigue<sup>[27-29]</sup>. The current medical practice is a high-risk job, and there are frequent incidents of doctors being beaten by patients<sup>[30]</sup>. The emergence of these events will inevitably affect the working environment of doctors, and students in this environment will think twice about the profession of doctors.

We found that sleep deprivation and gender factors are important factors in career choice regret. Excessive work pressure and work fatigue may cause women to experience career choice regret. Academic pressure and its related pressure are the cause of the disturbance of the students' circadian rhythm. Compared with basic science students, clinical science students are more severely affected by sleep disorders<sup>[31]</sup>. Possibly include longer study time, harder test pressure, and emotional challenges related to witnessing human suffering.

## **Discussion**

This study has many limitations. First of all, the survey area only includes five provinces in China. The distribution is uneven and the sample size is relatively small. Secondly, the survey is cross-sectional. We cannot examine the dynamic changes of depression, job burnout, and career choice regret. These factors may be affected by geography, professional factors, local practice environment and practice types. Further studies with more rigorous design are needed to confirm these findings.

## **Conclusion**

Generally speaking, Chinese graduate students majoring in dentistry generally suffer from depression, burnout, and regrets about career choices. Our findings provide a high-level overview to support

interventions in depression to prevent burnout and improve career choice regret. To change these negative emotions requires the joint efforts of society and schools.

## **Declarations**

### **Ethics approval and consent to participate**

Ethics approval was granted by the ethics committee of Stomatological Hospital affiliated to Chongqing Medical University. Informed consent was obtained from all participant. All study procedures, protocols and methods involving human participants were in accordance with the ethical standards of the 1964 Helsinki declaration.

### **Consent for publication**

Permissions were also obtained from the participants to publish their data anonymously.

### **Availability of data and materials**

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

### **Competing interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### **Authors' contributions**

Lu Yang and Huiqing Long reviewed and edited the original draft, and finally jointly approved the draft. Xiaogang Zhong performed the statistical analysis. Fangchun Chen collected and entered the data. Xin Jin gave guidance on the content of the article, approved the final draft. All authors read and approved the final manuscript.

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## References

- [1] Zeng J, Zeng XX, Tu Q. A gloomy future for medical students in China. *Lancet*. 2013. 382(9908): 1878.
- [2] Jie L. New generations of Chinese doctors face crisis. *Lancet*. 2012. 379(9829): 1878.
- [3] Dyrbye LN, West CP, Satele D, et al. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. *Acad Med*. 2014. 89(3): 443-51.
- [4] Guille C, Clark S, Amstadter AB, Sen S. Trajectories of depressive symptoms in response to prolonged stress in medical interns. *Acta Psychiatr Scand*. 2014. 129(2): 109-15.
- [5] Oppong Asante K, Andoh-Arthur J. Prevalence and determinants of depressive symptoms among university students in Ghana. *J Affect Disord*. 2015. 171: 161-6.
- [6] Li Q, Xie P. Outpatient workload in China. *Lancet*. 2013. 381(9882): 1983-4.
- [7] Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol*. 2001. 52: 397-422.
- [8] Shanafelt TD, Noseworthy JH. Executive Leadership and Physician Well-being: Nine Organizational Strategies to Promote Engagement and Reduce Burnout. *Mayo Clin Proc*. 2017. 92(1): 129-146.
- [9] Gan GG, Yuen Ling H. Anxiety, depression and quality of life of medical students in Malaysia. *Med J Malaysia*. 2019. 74(1): 57-61.
- [10] Bhugra D, Sauerteig SO, Bland D, et al. A descriptive study of mental health and wellbeing of doctors and medical students in the UK. *Int Rev Psychiatry*. 2019. 31(7-8): 563-568.
- [11] Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China: A meta-analysis. *Medicine (Baltimore)*. 2019. 98(18): e15337.
- [12] Maslach C, Leiter MP. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry*. 2016. 15(2): 103-11.
- [13] Dyrbye LN, Massie FS Jr, Eacker A, et al. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA*. 2010. 304(11): 1173-80.
- [14] Dyrbye LN, Burke SE, Hardeman RR, et al. Association of Clinical Specialty With Symptoms of Burnout and Career Choice Regret Among US Resident Physicians. *JAMA*. 2018. 320(11): 1114-1130.

- [15] Felton JS. Burnout as a clinical entity—its importance in health care workers. *Occup Med (Lond)*. 1998. 48(4): 237-50.
- [16] Broome KM, Knight DK, Edwards JR, Flynn PM. Leadership, burnout, and job satisfaction in outpatient drug-free treatment programs. *J Subst Abuse Treat*. 2009. 37(2): 160-70.
- [17] Ishak W, Nikraves R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. *Clin Teach*. 2013. 10(4): 242-5.
- [18] Cook TM. Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic - a narrative review. *Anaesthesia*. 2020. 75(7): 920-927.
- [19] Paiva CE, Martins BP, Paiva B. Doctor, are you healthy? A cross-sectional investigation of oncologist burnout, depression, and anxiety and an investigation of their associated factors. *BMC Cancer*. 2018. 18(1): 1044.
- [20] Hu NC, Chen JD, Cheng TJ. The Associations Between Long Working Hours, Physical Inactivity, and Burnout. *J Occup Environ Med*. 2016. 58(5): 514-8.
- [21] Howe A, Smajdor A, Stöckl A. Towards an understanding of resilience and its relevance to medical training. *Med Educ*. 2012. 46(4): 349-56.
- [22] Bayram N, Bilgel N. The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Soc Psychiatry Psychiatr Epidemiol*. 2008. 43(8): 667-72.
- [23] Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006. 81(4): 354-73.
- [24] Regehr C, Glancy D, Pitts A. Interventions to reduce stress in university students: a review and meta-analysis. *J Affect Disord*. 2013. 148(1): 1-11.
- [25] Downs MF, Eisenberg D. Help seeking and treatment use among suicidal college students. *J Am Coll Health*. 2012. 60(2): 104-14.
- [26] Zhou Y, Cartmel B, Gottlieb L, et al. Randomized Trial of Exercise on Quality of Life in Women With Ovarian Cancer: Women's Activity and Lifestyle Study in Connecticut (WALC). *J Natl Cancer Inst*. 2017. 109(12).
- [27] Wang L, Wang H, Shao S, Jia G, Xiang J. Job Burnout on Subjective Well-Being Among Chinese Female Doctors: The Moderating Role of Perceived Social Support. *Front Psychol*. 2020. 11: 435.
- [28] Kobza J, Syrkiewicz-Świtłała M. Job satisfaction and its related factors among dentists: A cross-sectional study. *Work*. 2018. 60(3): 357-363.

- [29] Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ.* 2005. 39(6): 594-604.
- [30] Liu CY, Wang XY, Hua-Jiang. Which future for doctors in China. *Lancet.* 2013. 382(9896): 937.
- [31] Khero M, Fatima M, Shah M, Tahir A. Comparison of the Status of Sleep Quality in Basic and Clinical Medical Students. *Cureus.* 2019. 11(3): e4326.