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

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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% CI3.62-7.69). 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% CI1.24-2.66) and depressive symptoms (OR = 2.15, 95% CI1.48-3.14) 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[1, 2]. 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[3–5]. Due to the heavy workload and heavy work pressure, medical students may have some psychological problems. Doctor burnout has become a global problem[7, 8]. 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[9], 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\textsuperscript{[10]}. The prevalence of depression among medical students in China is 29\%\textsuperscript{[11]}. 

Burnout is characterized by “various levels of emotional exhaustion, depersonalization, and a low sense of personal accomplishment”\textsuperscript{[12]}. Burnout can negatively affect the mental and physical health of doctors, and more seriously, it can lead to poor patient care\textsuperscript{[13]}. 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\textsuperscript{[14, 15]}. Burnout and career choice regret may be related to personal and social factors, such as excessive work pressure, discordant medical environment and uncooperative patients\textsuperscript{[16], [17]}. 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.

| 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).
| 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
| Characteristics                        | n/mean | %/SD |
|---------------------------------------|--------|------|
| 6–8                                   | 439    | 78.7 |
| > 8                                   | 28     | 5.0  |
| Marital status                        |        |      |
| Signal                                | 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

| variate                        | Burnout       | Depress symptom | Career choice regret |
|--------------------------------|---------------|-----------------|----------------------|
| 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

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% IC 0.20–1.10) 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   |                  |                 |                      |
| < 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         | 0.004                |
| | 0.51(0.32-0.80) | 0.04           | 0.37(0.23-0.60) | < 0.001              |
| > 8                                       | 0.40(0.17-0.96)  | 0.41            | 0.46(0.20-1.10)      |
| | 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                   |                                 |                  |                  |                                        |                  |                  |                     |                  |                  |
| < 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\textsuperscript{[18]}, 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\textsuperscript{[19]}. Among dental graduate students, the job burnout rate was 41.0%. Long hours of work and little sleep time also cause burnout\textsuperscript{[20]}. 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\textsuperscript{[10]}. 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\textsuperscript{[17, 21]}, 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\textsuperscript{[22]}. 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\textsuperscript{[10]}. For students, this kind of long-term training and learning will inevitably produce pressure\textsuperscript{[23]}. According to repeated studies, approximately
50% of students are physically exposed to significant stress in the form of anxiety and/or depression\cite{24}, 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 commit suicide and 0.5% attempted suicide in the past year\cite{25}. Studies have shown that 11% of Chinese medical students are generally suicidal\cite{11}. 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\cite{26}. 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\cite{27–29}. The current medical practice is a high-risk job, and there are frequent incidents of doctors being beaten by patients\cite{30}. 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\cite{31}. 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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