Using Big Data Analysis to Explore the Causes of Anxiety and Depression in Medical Students’ Sleep Quality

Miao Gao\textsuperscript{1,*}

\textsuperscript{1}Xi’an Medical University, Shaanxi, China, 710000

*Corresponding author e-mail: pacifics@126.com

Abstract. There are many medical courses, heavy tasks and heavy academic pressure, so medical students are often faced with higher learning and life pressure. In addition, medical students with anxiety and depression tend to reflect their poor sleep quality. In order to clarify the relationship between sleep quality, anxiety and depression of medical students, this paper first introduces the data and methods used in this study. And then uses computer technology to analyze the results of this investigation, and finally studies the correlation between anxiety and depression of medical students on their sleep quality.

Keywords: Anxiety and Depression, Medical Students, Sleep Quality, Big Data Analysis

1. Introduction

With the accelerated pace of study, work and life, people are facing more and more pressure, which makes many people have problems in sleep. As a special group, there are many courses, many contents, heavy tasks and heavy academic pressure for medical students, so the pressure of study and life for medical students is often higher\textsuperscript{[3]}. The mental state of medical students is in a tense state, which will have a negative impact on their psychological emotions. Different medical students have great differences in their ability to regulate their own emotions, and the efficacy of emotional regulation is closely related to their personal emotional management, living conditions and other factors. It can be seen that high academic pressure will inevitably affect the sleep quality of medical students. In order to clarify the relationship between the sleep quality and anxiety & depression of medical students, it is necessary to analyze the relationship between the self-efficacy of emotion regulation and anxiety, depression, sleep quality and other factors of medical students from the aspects of their behavior habits, emotion regulation and other factors. Therefore, it is of great practical significance to study the causes of anxiety and depression in medical students’ sleep quality\textsuperscript{[2]}.

2. Research materials and methods

2.1. Research objects and methods
The subjects were medical students in school. The sampling method is stratified sampling according to grade and proportion. Before the investigation, the participants should first make clear the contents,
methods and problems related to the investigation project, and master the basic methods and related technologies of the investigation. The questionnaire survey was conducted on the spot. The investigator explained the purpose, significance and relevant guidelines of the survey to the medical students, and then distributed the questionnaire. The respondents completed the questionnaire independently[3]. In addition, the medical students to be investigated should have no physical defects, such as heart and psychological diseases, and based on the physical examination report.

2.2. The research tool
The self-efficacy scale of emotion regulation, anxiety and depression evaluation scale and sleep quality survey scale were used to evaluate emotion, anxiety level, and depression level and sleep quality. Among them, the emotion regulation self-efficacy scale is used to express several emotions as shown in Figure 1. Based on the time of anxiety and depression, the anxiety and depression levels of medical students were divided into different grades, and the scores of different grades were linked with the anxiety and depression levels of medical students. In addition, the sleep quality questionnaire contains sleep related evaluation factors. The sleep quality score obtained by adding the scores of each factor is related to the sleep quality.

![Figure 1. The emotion regulation self-efficacy scale is used to express several emotions](image)

2.3. Investigation and research process
The research of this paper is based on the class of medical students and assisted by grade counsellors and class members. First of all, it should unify the research methods and process for the participants to reduce the interference of human factors in the process. Secondly, before the investigation, make the medical students understand the purpose and significance of the research, as well as the filling method of the questionnaire, and fully answer the questions of the trainees, so as to obtain the full trust of the investigated objects[4]. In addition, in order to ensure the objective and effective results of the survey, anonymous survey is needed to eliminate the psychological concerns of medical students about personal privacy protection.

2.4. Investigation process quality control
First of all, in the design stage of the survey, the reverse questions and lie detection questions are used to prevent the medical students' inertia in answering, and to correct the problems and irrationalities in the survey. Secondly, in the implementation stage of the survey, it is necessary to organize and publicize in advance to answer the difficulties and problems encountered by medical students in the process of filling in the form. In addition, in the data processing stage, we need to double input the data, check the data, check the logic error, so as to ensure the data quality.

2.5. Data processing of investigation and research
The score of medical students was analyzed by variance of complete random design, and the scores were grouped according to the score results, and the threshold value of score was set in the sleep quality scale. Medical students who scored above the threshold indicated that they had sleep disorders,
while the rest did not. Take the sleep disorder as the variable, take the statistically significant variable in the results of sample t test and complete random design ANOVA as the independent variable, carry out regression analysis, and then analyze the factors that affect the overall sleep quality.

3. Analysis of investigation results

3.1. Basic situation of sleep quality of medical students
According to this investigation, the sleep quality scores of the investigated medical students are generally in a normal distribution, as shown in Figure 2 below, in which the proportion of the medical students close to the threshold of sleep quality is the largest, accounting for 19.3% of the total number; the medical students exceeding the threshold, that is, the medical students with sleep disorders account for 30.1% of the total number of the investigated[5].

![Figure 2. The sleep quality scores distribution of the investigated medical students](image)

3.2. Correlation analysis between anxiety, depression and sleep quality of medical students
The results showed that there was a negative correlation between the self-efficacy of emotion regulation and anxiety, depression and sleep quality scores, which means the stronger the self-efficacy of emotion regulation, the less the anxiety and depression, the higher the sleep quality, which indicated that the anxiety and depression of medical students would significantly affect their sleep quality. In order to quantitatively study and analyze the relationship between anxiety, depression and sleep quality of medical students, multiple linear regression analysis was carried out with the sleep quality of medical students as the dependent variable and the total score of anxiety and depression as the independent variable. The results showed that anxiety, depression and sleep quality of medical students can significantly predict emotional regulation, which indicated that anxiety, and depression and sleep quality of medical students were significant predictors of emotional regulation[6].

4. Analysis of the influencing factors of sleep quality of medical students

4.1. The relationship between anxiety and sleep quality
The investigation shows that the anxiety of medical students is one of the important factors that affect their overall sleep quality. In terms of various dimensions of sleep quality, it is found that anxiety of medical students is the key factor affecting sleep quality in several aspects as shown in Figure 3 below. This shows that the more anxious the medical students, the worse their sleep quality, which is in line with people's common sense, which also shows that anxiety and sleep disorders have some relationship in physiological mechanism.
Figure 3. Sleep quality aspects affected by anxiety of medical students

4.2. *The relationship between depression and sleep quality*

The results of this study show that the depression of medical students is also an important factor affecting their overall sleep quality. Specifically, for each dimension of sleep quality, depression of medical students is also a key factor affecting sleep quality in several aspects as shown in Figure 3. The depression of medical students reflects their self-feeling of depression. The physiological mechanism of the interaction between depression and sleep disorder shows that the depression symptoms of medical students have the same neurotransmitter with their sleep disorders. This shows that the medical students with high depression have poor sleep quality, which also shows that there is a certain relationship between depressions and sleep disorders.

5. Conclusion

The medical students with anxiety and depression are easy to reflect their poor sleep quality, but few studies have defined the relationship and interaction between them in detail. This paper combines computer big data technology to analyze the factors and causes of anxiety and depression of medical students' sleep quality by setting a specific investigation method. The results confirm the correlation between the three factors, that is, the anxiety and depression of medical students are important factors affecting their overall sleep quality. Besides, the physiological mechanism of the interaction of anxiety, depression and sleep disorders shows that the depression symptoms of medical students have the same neurotransmitter with their sleep disorders.

Acknowledgements

This work was supported by Study on the relationship between mental resilience and sleep quality in medical students.

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