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Original Article

Study on the mental health status of anesthesiologists and its influencing factors

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Abstract: Objective: This study is on mental health status of anesthesiologists and its influencing factors. Methods: Electronic questionnaires were given out to anesthesiologists through online platforms such as WeChat for information sharing among anesthesiologists. The included anesthesiologists were encouraged to distribute this platform to other anesthesiologists. Psychological survey was carried out using the Huaxi Emotional-distress Index (HEI). A total of 480 valid questionnaires were collected. Results: Anesthesiologists had different degrees of bad moods, 37.9% of whom had poor mental health. Ordinal logistic regression analysis suggested that there were statistically significant differences in gender, marital status, job title, position, hospital type, and the amount of overtime work per week in relation to mood (all $P < 0.05$). Age, nationality, number of children, number of anesthesiologists and the daily amount of anesthesia operations on average in the hospital was not significantly different in regard to mental health (all $P > 0.05$). Conclusion: The mental state of anesthesiologists is often at a poor level, and measures should be taken to improve the mental health of anesthesiologists and improve their quality of life.

Keywords: Anesthesiologists, mental state, Huaxi Emotional-distress Index, influencing factors

Introduction

Being a doctor is a great profession with a lot of responsibility. Doctors are under a great deal of pressure. With the increase of work intensity and pressure, their psychological burden is growing, and they can show depression, anxiety and other negative emotions [1, 2]. A study has shown that about 40% of medical staff in China are in a bad mental state such as having depression and anxiety, among which, anesthesiologists are under a great deal of work pressure [3-6]. Anesthesiologists not only put themselves under pressure during the entire perioperative period to assume an important responsibility for ensuring the perioperative safety of patients, but also trace whether patients have sequelae of anesthesia after discharge [7, 8]. Thus, it can be seen that anesthesiologists are under high-risk and high-stress working conditions for a long time, and they are more likely to have bad psychological moods which affects their normal work [9, 10]. In recent years, research from China on the mental health of doctors has mainly focused on surgeons, and obstetricians, etc. [11, 12]. There are few studies on the mental state of anesthesiologists, but the relevant research is highly needed.

The Huaxi Emotional-distress Index (HEI), created by the Mental Health Center of West China Hospital of Sichuan University, is used to screen the emotional and psychological state of the research subjects [13, 14]. The creators of the HEI scale have conducted a study on the mental health status of oncology nurses with the HEI scale and the Kessler-10 scale. The results suggested that the HEI and Kessler-10 scale were inherently consistent with good feasibility, reliability and validity [14]. There is no need to consider cultural elements when HEI is applied. It can be directly used to evaluate the Chinese population with ease. Therefore, this study

Table 1. General data (n = 480)

Variable	Grouping	n (%)
Education	Bachelor	243 (50.6)
	Master	172 (35.8)
	Doctor	65 (13.6)
Age (years)	≤ 29	163 (34.0)
	30-39	182 (37.9)
	40-49	96 (20.0)
	≥ 50	39 (8.1)
Gender	Male	278 (57.9)
	Female	202 (42.1)
Nationality	Han	420 (87.5)
	Others	60 (12.5)
Marital status	Married	242 (50.4)
	Others[a]	238 (49.6)
Number of kids (n)	0	311 (64.8)
	≥ 1	169 (35.2)
Job title	Physician	137 (28.5)
	Attending physician	199 (41.5)
	Deputy chief physician and advanced	144 (30.0)
Position	Operating room anesthesia	339 (70.6)
	Others[b]	141 (29.4)
Type of hospital	Tertiary A hospitals	362 (75.4)
	Others	118 (24.6)
Working overtime (time)	≤ 2	370 (77.1)
	> 2	110 (22.9)
Number of anesthesiologists (n)	≤ 20	87 (18.1)
	21-40	153 (31.9)
	≥ 41	240 (50.0)
Daily amount of anesthesia operations on average (n)	≤ 100	94 (19.6)
	101-150	200 (41.7)
	> 200	186 (38.7)
Total		480

Note: a: Others refer to unmarried, divorced, cohabiting, etc; b: Others refer to anesthesia outside the operating room, full-time teaching posts, full-time scientific research posts, medical team leaders, section directors, etc.

Table 2. Scores of each item in the Huaxi Emotional-distress Index (Sorted by the highest score)

Item	$\bar{x}$	S
3. How often do you feel too nervous?	2.78	0.824
5. How often do you feel upset and difficult to calm down?	2.61	0.868
8. How often do you feel hopeless?	2.43	0.893
10. How much does your bad mood affect your life?	2.01	0.855
7. How often do you want to blame yourself?	1.98	0.921
4. How often do you feel worried?	1.92	0.831
2. How often do you feel that you are not interested in anything?	1.91	0.857
1. How often do you feel down that you can't be happy anymore?	1.81	0.901
9. How often do you have nothing to live for?	1.78	0.877
6. How often do you feel afraid that severe fear or panic suddenly appears again?	1.70	0.822

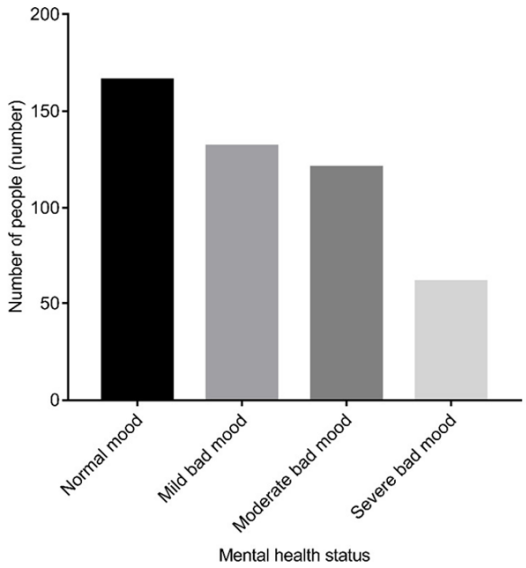

Figure 1. Mental health status of anesthesiologists.

intended to adopt the HEI questionnaire to investigate the mental state of anesthesiologists and explore the factors that affect their mental state.

Materials and methods

Subjects

Anesthesiologists with a physician license were selected as the subjects. This study was approved by the Medical Ethics Committee of West China Hospital, Sichuan University. Written informed consent form was obtained from all participants.

Methods

This cross-sectional study was carried out from June 2019 to April 2020, among which, the questionnaire survey time was from July 2019 to December 2019. Electronic questionnaires were given out to anesthesiologists through online platforms such as WeChat for information sharing among anesthesiologists. These anesthesiologists were encouraged to distribute the questionnaire to other anesthesiologists to achieve a greater sampling population. In order to avoid repeated responses and improve the authenticity and accuracy of the survey, the electronic questionnaire was set as only one response for each IP address. If the same option was selected for all questions in the questionnaire, it was considered as an unqualified questionnaire and was eliminated.

The survey includes demographic characteristics and the HEI scale. The questionnaire was designed with 16 questions on demographic characteristics and 11 questions about HEI.

Outcome measures

HEI was used to investigate the frequency of bad emotions within the past month [13]. The scale has a total of 11 items, except for question 11 (multiple choice questions, each option is assigned with 1 point), each question has 5 answers, and the points are assigned as follows: no impact = 0, occasional/a little impact = 1, part of the time/some impact = 2, most of the time/large impact = 3, all time/large impact = 4. If the scores of the first 9 questions are less than 8 points, then they were instructed to stop answering. The maximum score is 36 points. According to the score, the mental state is divided into four levels: ≤ 8 is normal; 8-12 is mildly unhealthy; 13-15 is moderately unhealthy; ≥ 16 is severely unhealthy [14]. These four levels are assigned to 1, 2, 3, and 4 respectively. The latter three levels are collectively classified as having negative emotions.

Statistical analysis

SPSS 22.0 statistical software was used for statistical processing after the electronic questionnaires were exported. Normally distributed measurement data were described by mean ± standard deviation ($\bar{x} \pm sd$), unordered multi-classification data were described by rate and composition ratio, count data were all statistically inferred by single factor Logistic regression; multi-factor analysis was conducted by ordinal Logistic regression. A stepwise backward method was used to screen variables, and the risk of outcome was expressed by odds ratio value. $P < 0.05$ was considered statistically significant.

Results

General data

A total of 480 questionnaires were collected. The average age of the survey respondents was 35.9±12.2 years; 86.5% had bachelor's and master's degrees; 70.0% were physicians and attending physicians; 70.6% were mainly engaged in operating room anesthesia; anesthesiologists working in tertiary A hospitals accounted for 75.4%; 22.9% of them worked

Table 3. Variables and assignments

Variable	Assignment
Education	Bachelor; education 1 (Master = 1, otherwise = 0); education 2 (Doctor = 1, otherwise = 0)
Age (years)	Continuous variables were considered as the model based on every year as a portion
Gender	Male = 1, female = 2
Nationality	Han = 1, others = 2
Marital status	Married = 1, others = 2
Number of kids (n)	0 = 1; ≥ 1 = 2
Job title	Physician; job title 1 (attending physician = 1, others = 0); job title 2 (deputy chief physician and advanced = 1, others = 0)
Position	Operating room anesthesia = 1, others = 2
Type of hospital	Tertiary A hospitals = 1, others = 2
Number of working overtime (day)	< 2 = 1, ≥ 2 = 2
Number of anesthesiologists (n)	< 20 = 1, 21-40 = 2, ≥ 41 = 3
Daily amount of anesthesia operations on average (n)	≤ 100 = 1, 101-200 = 2, ≥ 200 = 3

Table 4. Single factor and multi-factor Logistic analysis on the influence of general conditions on Huaxi Emotional-distress Index

Variable OR (95% CI)		Single factor analysis		Multi-factor analysis	
		OR (95% CI)	P	OR (95% CI)	P
Education	Bachelor	1		1	
	Education 1	1.240 (0.742-2.074)	0.412	1.409 (0.807-2.460)	0.228
	Education 2	1.002 (0.704-1.426)	0.991	1.127 (0.761-1.667)	0.551
Age (Year)	Every year	0.866 (0.449-1.672)	0.668	1.456 (0.349-2.682)	0.407
Gender	Male	1		1	
	Female	0.320 (0.227-0.451)	< 0.001	0.368 (1.422-4.948)	0.001
Nationality	Han	1		1	
	Others	1.150 (0.706-1.872)	0.574	1.228 (0.729-2.068)	0.440
Marital status	Married	1		1	
	Others	0.459 (0.330-0.638)	< 0.001	0.446 (0.295-0.674)	< 0.001
Number of children (n)	0	1		1	
	≥ 1	0.293 (2.375-4.889)	< 0.001	1.201 (0.732-1.971)	0.468

Note: OR, odds ratio; CI, confidence interval.

overtime more than twice a week. See **Table 1** for details.

Mental health status

Among all the investigators, 166 persons had normal mental health status (accounting for 34.6%); moderately unhealthy emotions and severely unhealthy emotions were regarded as poor mental health status, and 182 people had poor mental health status (accounting for 37.9%). According to the principle of "the lower the score, the better the mental health", item X6 has the lowest score, indicating the lowest mental health threat to the anesthesiologists; X3 has the highest score, indicating the highest mental health threat to the anesthesiologists. See **Table 2** and **Figure 1**.

Analysis of influencing factors of mental state

With mental state as the dependent variable and other factors as independent variables, the stepwise method was used to conduct single-factor and ordinal Logistic regression analysis on the influencing factors. Variables and assignments are shown in **Table 3**.

The results of the ordinal logistic regression analysis suggested that the mental health status of the survey respondents who were male, married, attending physicians, working in tertiary A hospitals, engaged in operating room anesthesia, and working overtime twice or more per week, was worse than other survey subjects ($P < 0.05$). See **Tables 3-5**.

Discussion

Anesthesiologists are prone to poor psychological moods because of the exposure to high-risk and high-stress working conditions. Since anesthesia is a vital part of operations, the working status of anesthesiologists is related to the success of the operation. Therefore, caring about the mental health status of anesthesiologists, finding out the influencing factors, and making adjustments to these factors can show significant and positive effects on maintaining the high medical level of the hospital and protecting the health of patients.

In this study, 65.4% of anesthesiologists had bad mental moods, and 37.9% of them suffered from poor mental health. The rate of negative emotions was much higher than that of the research of Jia et al. regarding doctors in general hospitals reporting 46.5% with anxiety, and 46.9% with depression [15]. The proportion of moderate to severe negative emotions (37.9%) was lower than that from the study of Zhen et al. on oncology nurses with 81.1% of doctors having moderate to severe negative emotions [14]. Recently, the contradictions between doctors and patients in China has been gradually intensified, which not only affects patients' medical treatment, but also seriously affects doctors' enthusiasm for their work, and even worsen doctors' working environment and psychology. Psychological problems, are not conducive to the good treatment of patients, and patient satisfaction with their

Table 5. Single factor and multi-factor logistic analysis on the influence of occupational status general conditions on Huaxi Emotional-distress Index

Variable OR (95% CI)		Single factor analysis		Multi-factor analysis	
		OR (95% CI)	P	OR (95% CI)	P
Job title	Physician	1		1	
	Job title 1	2.308 (1.545-3.445)	< 0.001	1.978 (1.281-3.053)	0.002
	Job title 2	0.283 (0.839-1.976)	0.247	1.337 (0.837-2.136)	0.225
Position	Operating room anesthesia	1		1	
	Others	0.438 (0.304-0.632)	< 0.001	0.446 (0.295-0.674)	< 0.001
Type of hospital	Tertiary A hospitals	1		1	
	Others	0.106 (0.067-0.169)	< 0.001	0.049 (0.013-0.184)	< 0.001
Working overtime (day)	< 2	1		1	
	≥ 2	0.725 (0.492-1.068)	0.104	2.178 (1.156-4.101)	0.016
Number of anesthesiologists (n)	< 20	0.107 (0.062-0.183)	< 0.001	1.030 (0.349-3.039)	0.958
	21-40	0.616 (0.427-0.890)	0.010	0.816 (0.540-1.234)	0.336
	≥ 41	1		1	
Daily amount of anesthesia operations on average (n)	≤ 100	0.182 (0.111-0.299)	< 0.001	3.659 (0.832-9.758)	0.082
	101-200	0.706 (0.492-1.012)	0.058	1.065 (0.725-1.564)	0.749
	≥ 200	1		1	

Note: OR, odds ratio; CI, confidence interval.

care will decrease. There is a vicious circle if the psychological problems of doctors become adverse enough factors to deter the treatment of patients and in turn patients have negative responses to their care. Anesthesiologists with poor mental health account for a high proportion of doctors, which shows that anesthesiologists are under great work pressure and this issue needs to be paid attention to [16].

The ordinal logistic regression analysis in this study indicated that the mental health status of anesthesiologists working in tertiary A hospitals was worse, which was similar to the research results of Chen et al. [17]. Working in Tertiary A hospital is an important risk factor for severe emotions of anesthesiologists. There are more patients with complicated diseases in large hospitals, especially in tertiary A hospitals. Anesthesiologists are in a state of high-tension and high pressure for a long time when they perform anesthesia for these patients, not to mention follow-up after patients are discharged from hospital. As a result, anesthesiologists in large hospitals have poorer mental health status. This study suggested that there were no differences in the influence of educational background and the number of anesthesiologists on the mental health of anesthesiologists. The reason may be that when the large hospitals (tertiary A hospitals) recruit doctors, they have already screened and controlled their academic qualifications, and number of people, etc. Therefore, the variables were similar, and a more representative variable (hospital level) was selected. The doctors who were married and males had more poor mental health, which was similar to the report of Zhu et al. on anxiety and depression of medical staff (unmarried as a protective factor for depression), indicating that married anesthesiologists faced the pressure from both work, the family, resulting in a poor mental state [18, 19]. Besides, being driven by a widespread recognition that men need to support their families, male doctors tend to put more pressure on themselves [20-23]. At the same time, the mental health of the survey respondents who were engaged in operating room anesthesia, attending physicians, and working overtime greater than or equal to 2 times a week are under higher work pressure, which was similar to the results of Xu et al. [24]. Studies have shown that this will increase the psychological pressure if anesthesiologists keep working in a highly stressful surgical atmosphere for a long time, indicating that the attending physicians were a mainstay in the department and have undertaken a large workload as well as various risks in the operating room [25]. Thus, this type of survey respondent has taken on greater pressure, and showed a poor psychological state.

There are some limitations in this study. Because this study collects information through electronic questionnaires, it may be that some respondents failed to complete the answers due to busy work or other sudden tasks when preparing to fill in the questionnaire, which may lead to a certain selection bias. In the future, multiple offline medical institutions can jointly conduct paper questionnaire surveys to supplement the data and improve the quality of this type of investigation. At the same time, critical factors such as sudden accidents, chronic or acute diseases were not included. These two variables will be covered in the subsequent research.

To sum up, the mental state of anesthesiologists is often at a poor level, thus relative improvement plans should be formulated according to the influencing factors in the article, and be put into practice. This will not only improve the mental health of the anesthesiologists, and their quality of life, but it may also improve patients' satisfaction with treatment and establish a more harmonious doctor-patient relationship.

Disclosure of conflict of interest

None.

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