

# Burnout and Job Stress of Anaesthesiologists in The Tertiary-Class A Hospital Northwest China: A Questionnaire Survey

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## Research Article

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# Abstract

## Background

Our purpose was to assess job stress and burnout among anaesthesiologists in The Tertiary-class A Hospital Northwest China.

## Objectives

Analyzes the possible causes and adverse consequences of increased job stress and burnout of anaesthesiologists in this region and puts forward suggestions in combination with the current national policies.

## Study Design:

Questionnaire survey.

## Setting:

Data were collected in the Northwest China from February 2020 until April 2020.

## Methods

We sent electronic questionnaires to all 1960–2017 practising anaesthesiologists of The Tertiary-class A Hospital Northwest China. Of those, 338 (67.6%) were returned and could be used for analysis. Burnout and job stress were assessed by using modified Maslach Burnout Inventory-Human Services Survey and Chinese Perceived Stress Scale, respectively.

## Results

First, as for emotional exhaustion, the situations of anaesthesiologists with different working years and workload are different with statistical significance ( $P < 0.05$ ); Second, as for depersonalization, the situations of anaesthesiologists with different age, professional title, working years, physical health status and workload are different ( $P < 0.05$ ); Third, as for personal accomplishment, the situations of anaesthesiologists with different physical health status are different ( $P < 0.05$ ); Finally, The regression results showed that the longer the fatigue working years and the worse the physical health of anaesthesiologists in Northwest China, the more likely these two factors were to cause burnout ( $P < 0.05$ ), as for job stress, there was a negative correlation between job stress and physical health status ( $P < 0.05$ ).

# Conclusions

Burnout and high job pressure are common among anaesthesiologists in The Tertiary-class A Hospital in Northwest China. We should focus on the allocation of labor intensity, pay attention to the physical and mental health of employees, establish targeted incentive mechanism, and improve the system of promotion and income rises for grassroots doctors. This may be not only conducive to the quality of medical care for patients, but also conducive to the development of anaesthesiology in China.

## Trial Registration:

ChiCTR2000031316. Date registered: Mar 27, 2020.

## Introduction

Burnout is a comprehensive symptom of physical and mental exhaustion and energy exhaustion, which includes emotional exhaustion, depersonalization and reduced personal accomplishment[1]. Job pressure refers to the pressure on people due to excessive workload, post change and excessive work responsibility[2].

In China, the number of anaesthesiologists per 10000 population is only 0.4, far lower than the number of anaesthesiologists per 10000 population in developed countries in Europe and America[3]. With the aging of the population in our country and the perioperative complications are more and more serious, the anesthesia risk is increasing day by day. At the same time, the shortage of anaesthesiologists and the uneven distribution of medical resources lead to the increased job stress and burnout of anaesthesiologists, which will not only affect the physical and mental health of anaesthesiologists, but also bring hidden dangers to the safety and quality of anesthesia[4].

In Northwest China, the economy is relatively backward, the distribution of medical resources is unbalanced, and the level of medical and health services lags behind other regions[5]. Therefore, to fully mobilize the enthusiasm of medical staff, improve the level of medical services, and fully understand both the advantages and disadvantages of medical resources in this region is important for promoting the development of medical services. So, in this study, 500 anaesthesiologists' job stress and burnout were investigated and analyzed in order to provide reference for instructing anaesthesiologists to relieve the pressure and improve the level of burnout.

## Methods

The Research Ethics Committee, Xi'an Honghui Hospital Affiliated to Xi'an Jiaotong University (Chairperson: Peng Xu) approved the study on 9 April, 2020 and written informed patient consent was obtained.

This article adheres to the applicable Enhancing the QUALity and Transparency Of health Research (EQUATOR) guidelines.

Using random sampling method, anonymous questionnaire survey was conducted among anaesthesiologists in The Tertiary-class A Hospital in Northwest China. For sample size estimation, a pilot study of 167 cases before the survey indicated a burnout rate of 48%. We assumed that a 5% error was acceptable and then set the confidence level at 95%. By considering the response rate, the sample size was 308. Based on this, a total of 500 questionnaires were sent out, 408 were recovered, 336 were effective. Thus, the effective rate was 82.4%.

### **First section**

The first section of the questionnaire included 11 questions designed to capture demographic, social, and work characteristics of the anaesthesiologists: gender, age, education background, professional title, working years, family economic status, physical health status, type of hospital, proportion of anaesthesiologists in your department to operating room, ratio of anaesthesiologists to surgeons, operation volume in recent two years.

### **Second section**

Burnout: the modified Maslach Burnout Inventory Human Service Survey (MBI-HSS)[6] was used to assess burnout. The 16-item MBI is a measure of burnout and is subdivided in three subscales: (a) Emotional exhaustion (6 items): This subscale refers to lack of emotional resources; that is, the feeling of having given everything and having nothing left to give. (b) Lack of personal accomplishment (6 items): This subscale assesses feelings of doubt about one's ability to perform tasks and lack of successful achievement in one's work with people. (c) Depersonalization (4 items): This subscale measures an unfeeling and impersonal response towards recipients of one's service, care, treatment, or instruction. The scoring method of four points was used, never so scored 0 points, rarely so scored 1 point, sometimes so scored 2 points, often so scored 3 points. In the subscale of 'emotional exhaustion', values  $\geq 19$  are considered to indicate burnout; in the subscale of 'personal accomplishment', values  $\leq 2.5$  are considered to indicate burnout; and in the 'depersonalization' subscale, values  $\geq 17$  are considered to indicate burnout.

### **Third section**

Job stress: the work stress of anaesthesiologists was evaluated by the Chinese Perceived Stress Scale (CPSS)[7]. There were 14 items in CPSS, which had never scored 0, rarely scored 0.5, sometimes scored 1, often scored 1.5. It was conceived to assess how many life situations are appraised as stressful; that is, how unpredictable and overloaded respondents find their lives are. Higher scores indicate higher levels of job stress. At the end of the questionnaire, an open question was included for respondents to identify the main job stress factors encountered in their daily lives. The seven most frequently referred factors were identified.

## Procedures

The electronic version of the questionnaire was built on wenjuanxing platform (<https://www.wjx.cn>). Through WeChat publishing, which is a widely used mobile social platform that attracts a broad range of users in China. As of September 2015, WeChat had more than a billion created accounts and 650 million active users.

Throughout the nation, the coverage of WeChat has more than 90% of smartphone users[8]. It is considered as a valid questionnaire if it is collected within 3 days and the time for filling in the questionnaire is not less than 15 minutes.

## Statistical Analysis

Data were analyzed using SPSS software package (Released 2017. IBM SPSS Statistics for Mac, Version 25.0. Armonk, NY: IBM Corp.). Descriptive analysis uses the number and percentage of cases to describe the general data (such as gender, age, education background, professional title, etc.), makes independent sample t-test on the scores of burnout and job stress of Anaesthesiologists of different gender, and makes one-way ANOVA on the situation of burnout and job stress of Anaesthesiologists of different age, professional title, education background, etc., among which in one-way ANOVA, the variables with  $P < 0.15$  were included in the multivariate analysis, the entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. Multiple linear regression model was used to evaluate the independent correlation between the included variables and job stress and burnout. A two-tailed  $P < 0.05$  was considered statistically significant.

## Results

Questionnaire was distributed and collected from December 1, 2019, to February 15, 2020. Of the 32 Tertiary-class A Hospital (there are 32 Tertiary-class A Hospital in three Northwest Provinces) and 500 anaesthesiologists and anesthesia residents, 32 hospitals and 336 individuals completed the survey (response rate 100% and 82.4%, respectively). The descriptive statistics are shown in Table 1.

The results of burnout analysis showed that the scores of emotion exhaustion, depersonalization and personal accomplishment were  $20.23 \pm 3.515$ ,  $17.98 \pm 2.310$  and  $2.43 \pm 0.670$ , respectively. 1. The emotional exhaustion of anaesthesiologists with different working years and workload was different, and the difference was statistically significant ( $P < 0.05$ ), 2. The depersonalization of anaesthesiologists with different ages, titles, working years, physical conditions and workload was different, the difference was statistically significant ( $P < 0.05$ ), 3. The personal accomplishment of anaesthesiologists with different physical conditions was different, the difference was statistically significant Meaning ( $P < 0.05$ ). Supplemental Table 1.

Analysis of job stress: anaesthesiologists with different physical health status and workload had different job stress, and the difference was statistically significant ( $P < 0.05$ ). Supplemental Table 2.

Correlation analysis of influencing factors of anaesthesiologists' burnout: the longer the anaesthesiologist's working life, the worse the health status, the more serious the depersonalization, and the difference was statistically significant ( $P < 0.05$ ); the better the anaesthesiologist's physical condition, the longer the working life, the higher the sense of personal accomplishment. The difference was statistically significant ( $P < 0.05$ ). Table 2, 3 and 4.

Correlation analysis of influencing factors of job stress of anaesthesiologists: the better the physical health condition of anaesthesiologists, the less the job pressure, the difference was statistically significant ( $P < 0.05$ ). Table 5.

## Discussion

Medical and health industry is a profession with high requirements and low sense of control, and a profession with high incidence of burnout[9]. At present, there are 76000 anaesthesiologists in China. The number of anaesthesiologists per 10000 people in China is about 0.4, compared with 3 in the United States and 2.8 in the United Kingdom. According to British and American standards, China should have 310000 anaesthesiologists. In fact, the total number of anaesthesiologists in China is less than 100000, and also less than 1 / 3 of the standard configuration, and the gap is 200000[10]. At the same time, China's surgery volume accounts for about 10% of the global surgery volume, and it is still growing at a rate of 10%[11]. In recent years, the doctor-patient relationship has become increasingly tense, coupled with factors such as the income, promotion and physical condition of anaesthesiologists, which make the environment of anaesthesiologists worse. so that the job stress and burnout are increasing day by day[12].

As for emotional exhaustion, the phenomenon of emotional exhaustion with working years of 5-10 years is serious. Most anaesthesiologists who have worked for 5-10 years have accumulated professional knowledge and skills and can play an independent role at work. In hospitals at all levels, they are the main force of their department. Therefore, their emotional exhaustion is severe, which is consistent with the research results of Filippo[13]. With the increase of working years, the phenomenon of emotional exhaustion began to ease. This may be explained by the fact that, with the continuous increase of working years, their medical experience continues to be accumulated, and technical literacy is more and more suitable for the needs of the post, then the burnout will reduce. The higher the annual operation volume is, the more serious the emotional exhaustion is. The increase of workload will directly lead to the excessive fatigue of anaesthesiologists. The excessive fatigue not only affects the physical and mental health of anaesthesiologists, but also causes great potential harm to patients. In the study of Gordon[14], it was found that as many as 50% of the anaesthesiologists interviewed admitted that they had medical errors when they were tired.

With the increase of age, working years and professional titles of anaesthesiologists, their depersonalization is more and more serious. With the increasing age and working years of an anaesthesiologist, the accumulated fatigue, work pressure, dissatisfaction and sub-health will reach a

peak, which makes the phenomenon of depersonalization more serious. The phenomenon is manifested in the negative work and indifference to colleagues. From the correlation analysis, it is found that the length of working years is positively related to the occurrence of the depersonalization, while the health status is negatively related to the occurrence of the depersonalization, the difference is statistically significant. Therefore, the relevant departments should pay attention to the physical and mental health of anaesthesiologists, which will help to delay the depersonalization and improve burnout[15].

In Northwest China, the better an anaesthesiologist's health is, the higher his accomplishment will be. In Northwest China, the economy is underdeveloped and the medical level is relatively backward. People are still in the dilemma of difficult and expensive medical treatment[16]. Novel coronavirus pneumonia (COVID-19) has been prevalent worldwide in 2020, which has caused millions of people to die. The number of deaths has reached 60 thousand, and the number of infections and deaths is rising[17, 18]. This makes us more convinced that nothing matters except for a healthy body. Healthy body can bring more sense of personal achievement to anaesthesiologists in Northwest China. There was a positive correlation between personal accomplishment and physical health, working years, the difference was statistically significant. With the accumulation of working years, the academic level, experience and technology, salary and income of anaesthesiologists will reach a new level, and the sense of personal accomplishment will naturally increase. Coupled with a healthy body, a great sense of personal accomplishment can often be obtained, reducing the occurrence of burnout.

88.1% of anaesthesiologists in this questionnaire had high job stress, among whom the greater the workload, the worse the physical health, the higher the job stress of anaesthesiologists, the difference was statistically significant. In the correlation analysis, job stress was negatively correlated with physical health were, the difference was statistically significant. The aforementioned shortage of anaesthesiologists in China and the increasing workload lead to the physical and mental fatigue of medical staff and the sudden rise of pressure[19]. In addition, the sudden death rate of anaesthesiologists is increasing year by year. According to the researchers such as Shan, the proportion of sudden death of anaesthesiologists in China is the highest, reaching 26%[20]. As for the reasons of excessive workload, worry about medical litigation, sleep deprivation and interpersonal relationship processing, anaesthesiologists will often be in a certain degree of physiological or psychological disease state[21], and anaesthesiologists in sick state will naturally feel the job stress increase at work. Therefore, the healthy body and mind of an anaesthesiologist are the premise and guarantee of his normal work.

In conclusion, burnout and high job pressure are common among anaesthesiologists in Northwest China. The increasing workload, unfair promotion system and long-term sub-health lead to the decline of their physical health. In terms of anaesthesiologists themselves, they should improve their psychological quality, maintain their mental health, constantly enrich and improve their professional level, and improve the communication ability between doctors and patients[22]. For the department leaders and the health administrative departments, we should first reduce the risk of occupation exposure of anaesthesiologists, then adjust the overall allocation of resources in the hospital, pay attention to the improvement and

renewal of medical equipment, and more importantly, ensure the fairness and impartiality of the salary and promotion system, strengthen the overall input and construction of the anaesthesiology department, and strive to establish contact with the international community soon[23]. Only when we pay attention to the problems of anaesthesiologists, can we guarantee the safety and service quality of patients in the northwest region and even in the whole country, and the anaesthesiology in China can make great progress[24].

## Abbreviations

EQUATOR: Enhancing the QUALity and Transparency Of health Research

MBI-HSS: Maslach Burnout Inventory Human Service Survey

MBI: Maslach Burnout Inventory

CPSS: Chinese Perceived Stress Scale

OR: operating room

## Declarations

### Acknowledgments

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### Authors' contributions

JMY, ZQ and BHD designed and conducted of the study. GY, XLF and MH collected, analyzed and interpreted the data. All authors have participated in writing the manuscript. All authors read and approved the final manuscript.

### Funding

This study was self-financed.

### Availability of data and materials

The data used to support the findings of this study are available from the corresponding author upon request.

### Ethics approval and consent to participate

The Research was approved by the Ethics Committee of Xi'an Honghui Hospital Affiliated to Xi'an Jiaotong University (Chairperson: Peng Xu) and registered at <http://www.chictr.org.cn> (27/3/2021,

ChiCTR2000031316). This article adheres to the applicable Enhancing the QUALity and Transparency Of health Research(EQUATOR) guidelines. Written informed patient consent was obtained.

### Consent for publication

Not applicable.

### Competing interests

The authors have no conflicts of interest to declare.

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## Tables

Table 1  
Descriptive Statistics of the Survey (*n* = 336)

Project	Category	Number	Proportion(%)
Gender			
	Male	157	46.73
	Female	179	53.27
Age(y)			
	< 25	6	1.79
	25–30	73	21.73
	31–35	79	23.51
	36–45	114	33.93
	> 45	64	19.05
Education			
	Junior college and below	22	6.55
	Undergraduate	262	77.98
	Master	49	14.58
	Doctor	3	0.89
Title			
	Intern	3	0.89
	Resident physician	115	34.23
	Attending doctor	131	38.99
	Deputy chief physician	77	22.92
	Chief physician	10	2.98
Working life(y)			
	< 5	74	22.03
	5–10	79	23.51
	11–20	100	29.76
	21–30	66	19.64

Data are presented as frequency and percentage.  
Abbreviation: OR, operating room.

Project	Category	Number	Proportion(%)
	> 30	17	5.06
Family financial situation			
	Rich	16	4.76
	General	227	67.56
	Income = expenditure	83	24.70
	Poor	10	2.98
Physical condition			
	Healthy	52	15.48
	Sub-health	251	74.70
	Suffer from disease	33	9.82
Type of hospital			
	Public teaching hospital	57	16.96
	Public specialized hospital	61	18.15
	Public general hospital	218	64.88
Anaesthesiologist / OR			
	> 3:1	14	4.17
	2.5-3:1	28	8.33
	2-2.5:1	53	15.77
	1-2:1	202	60.12
	< 1	39	11.61
Anaesthesiologist / surgeon			
	< 0.1	53	15.77
	0.1-0.2	161	47.92
	0.21-0.3	73	21.73
	> 0.3	49	14.58
Operation volume in recent two years	< 3000	100	29.76

Data are presented as frequency and percentage.  
Abbreviation: OR, operating room.

Project	Category	Number	Proportion(%)
	3000–6000	80	23.81
	6001–12000	86	24.70
	12001–20000	25	7.44
	> 20000	48	14.29
Data are presented as frequency and percentage. Abbreviation: OR, operating room.			

Table 2  
Results of Multiple Linear Regression of Emotional Exhaustion

Project	b	Std b	t	P Value
Constant	18.548		14.346	< 0.001
Working life	-0.157	-0.052	-0.930	0.353
Anaesthesiologist / OR	0.255	0.068	1.246	0.213
Anaesthesiologist / surgeon	-0.392	-0.102	-1.869	0.062
Operation volume in recent two years	0.249	0.097	1.718	0.087
The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.044$ , Adjusted $R^2 = 0.030$ , $F = 3.052$ , $P = 0.010$ .				
Abbreviation: OR, operating room.				
P value of < 0.05 was regarded as statistically significant.				

Table 3  
Results of Multiple Linear Regression of Depersonalization

<b>Project</b>	<b>b</b>	<b>Std b</b>	<b>t</b>	<b>PValue</b>
Constant	13.967		18.034	< 0.001
Age	0.008	0.107	0.842	0.401
Education	-0.035	-0.007	-0.135	0.893
Title	-0.124	-0.046	-0.592	0.554
Working life	0.788	0.400	3.201	0.002
Physical condition	-0.608	-0.132	-2.693	0.007
Operation volume in recent two years	0.164	0.097	1.847	0.066
The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.240$ , Adjusted $R^2 = 0.227$ , $F = 17.354$ , $P < 0.010$ .				
<i>P</i> value of < 0.05 was regarded as statistically significant.				

Table 4  
Results of Multiple Linear Regression of Personal Accomplishment

<b>Project</b>	<b>b</b>	<b>Std b</b>	<b>t</b>	<b>PValue</b>
Constant	1.883		10.362	< 0.001
Gender	0.132	0.098	1.817	0.070
Physical condition	0.180	0.134	2.488	0.013
Working life	0.778	0.400	3,201	0.002
The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.028$ , Adjusted $R^2 = 0.022$ , $F = 4.807$ , $P = 0.009$ .				
<i>P</i> value of < 0.05 was regarded as statistically significant.				

Table 5  
Results of Multiple Linear Regression of Personal Accomplishment Job Stress

Project	b	Std b	t	P Value
Constant	5.008		7.943	< 0.001
Age	0.280	0.171	1.294	0.196
Working life	-0.150	-0.099	-0.742	0.459
Physical condition	-0.477	-0.135	-2.471	0.014
Anaesthesiologist / OR	0.180	0.095	1.749	0.081
Operation volume in recent two years	0.133	0.102	1.843	0.066
The entry and removal criteria of multiple linear regression were 0.10 and 0.15, respectively. For this model, $R^2 = 0.049$ , Adjusted $R^2 = 0.034$ , $F = 3.379$ , $P = 0.005$ .				
Abbreviation: OR, operating room.				
<i>P</i> value of < 0.05 was regarded as statistically significant.				

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementalTable1.docx](#)
- [SupplementalTable2.docx](#)