



Job satisfaction and its influencing factors among anesthesia graduates: Evidence from a cross-sectional study in China

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Acknowledgement: This work was supported by the Basic Medical Research Foundation of Naval Medical University (2022SK029 and 2023QN035).

Declaration of conflict of interest: None.

Received September 9, 2024; Accepted January 7, 2025; Published April 1, 2025

Highlights

- There is a shortage of anesthesiologists in China, and the occupation is not attractive enough.
- The respondents were distributed in 30 provinces of China, and the overall satisfaction rate was 75.85 ± 12.57 .
- Work stress and work hours influence on job satisfaction is not the lower the better.
- Expanding the pathway and providing effective training for anesthesiologists will help to improve job satisfaction.

Abstract

Objectives: To assess job satisfaction among anesthesia graduates working in various medical institutions across China. **Methods:** A cross-sectional survey was conducted, collecting demographic information, Minnesota Satisfaction Questionnaire scores, work pressure, and turnover intentions. Multiple linear regression analysis was used to examine factors influencing job satisfaction. The electronic survey was distributed to Chinese anesthesia graduates from December 2021 to January 2022. **Results:** A total of 595 questionnaires were distributed, with 318 valid responses, resulting in a response rate of 53.4%. The participants' overall job satisfaction score on the Minnesota Satisfaction Questionnaire was 75.85 ± 12.57 . Multiple linear regression analysis identified the following variables as significantly associated with job satisfaction: age, daily working hours, income, current position, and work pressure. **Conclusions:** Anesthesia graduates in China reported slightly higher-than-average overall job satisfaction. However, several issues remain. Attention should be given to the impact of factors such as youth, long working hours, low income, current position, and high work pressure on job satisfaction. The government should support anesthesiologists with improved training, job security, and benefits to enhance job satisfaction.

Keywords: Job satisfaction, anesthesia graduates, work pressure, turnover intentions, influencing factors, China

Introduction

Job satisfaction refers to the level of contentment an individual feels with their work. According to Robbins, job satisfaction is "an individual's general attitude towards the work in which

he or she is engaged," and high job satisfaction fosters a positive work attitude [1]. The healthcare system is increasingly focused on anesthesiologists' job satisfaction [2]. In Finland, Canada, and Poland, more than 70% of anesthesiologists report high job satisfaction [3-5]. Conversely,

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anesthetists in economically underdeveloped regions show lower satisfaction levels. For example, job satisfaction among anesthetists in Nigeria and Ethiopia is 58.7% and 42.5%, respectively [6, 7]. Low job satisfaction risks both physician well-being and patient safety, leading to higher resignation rates, substance abuse, slower responses to changes in patient status, and more medical decision-making errors [8-11].

Evaluating the factors influencing job satisfaction is crucial, as these may vary by country and development level. In the United States, relationships with colleagues and job responsibility are the most satisfying aspects of work, while promotion opportunities are the least satisfying [12]. A study on nurses in Korea found that job satisfaction correlates directly with job stress, burnout, and turnover intentions [13]. In Ethiopia, factors such as gender, work environment, professional growth opportunities, relationships with colleagues, and supportive supervision affect job satisfaction [14]. In China, rural doctors' dissatisfaction is primarily attributed to low financial rewards, followed by low job security and high work stress [15]. Additionally, orthopedic and neurosurgical trainees report differing satisfaction levels regarding supervision and promotion, respectively [16].

However, research on anesthetists is relatively outdated. Over the past decade, the number of anesthesiologists in China has grown, yet a significant gap remains between supply and demand for anesthesia services. Given the dramatic changes in the healthcare environment, it is essential to reassess anesthetists' job satisfaction. By the end of 2018, China had approximately 92,726 anesthesiologists and 28,200 anesthesia nurses [17]. With the expansion of anesthesia services, the total number of anesthetic procedures has gradually increased each year [14, 15]. Owing to the shortage of anesthesiologists and their increasing workload, understanding their job satisfaction is crucial. Graduates from different medical institutions in various cities provide valuable insights into this topic [18]. This study explores the key factors influencing their job satisfaction and proposes practical solutions for improvement. The findings can inform policies aimed at retaining skilled anesthesiologists and support stable human resource management in healthcare.

Methods

Samples

We surveyed all graduates of the School of

Anesthesiology at Naval Medical University who graduated between 1995 and 2021. This cross-sectional questionnaire study included graduates currently working across 71 cities in 30 provinces in China, employed in various levels of medical institutions. The study was conducted from December 2021 to January 2022. Before commencing the questionnaire, all respondents voluntarily agreed to participate and provided informed consent. Their privacy was strictly protected throughout the study.

Assessment tools

The questionnaire consisted of 17 items, focusing on three main aspects: (1) basic social and demographic information, including gender, age, educational level, city classification, and years since graduation; (2) occupational characteristics, such as daily working hours, income, current position, level of medical institution, years of employment at the current workplace, and professional title; (3) turnover intentions, assessing work pressure and three factors related to turnover intentions: opinions on the future development of the anesthesia specialty, willingness to leave the current unit, and willingness to leave the specialty. Turnover intentions were measured on a 5-point scale, ranging from 1 (extremely likely to leave) to 5 (extremely unlikely to leave).

After completing the main questionnaire, respondents' job satisfaction was assessed using the short version of the Minnesota Satisfaction Questionnaire (MSQ). The Chinese version of the MSQ has been widely used and demonstrates satisfactory reliability and validity [19, 20]. In this study, the modified MSQ version showed a Cronbach's alpha coefficient of 0.933, indicating strong internal consistency. Job satisfaction was measured using a 5-point Likert scale, ranging from 1 (extremely dissatisfied) to 5 (extremely satisfied), with a total score of 100 points; higher scores reflect greater satisfaction.

The MSQ comprises 20 items and three subscales: general satisfaction, intrinsic satisfaction, and extrinsic satisfaction. The general satisfaction score is the average of all 20 items. The intrinsic satisfaction score, reflecting satisfaction with factors related to the internal quality of the job, is calculated by averaging scores from 12 specific items: #1, #2, #3, #4, #7, #8, #9, #10, #11, #15, #16, and #20. The extrinsic satisfaction score, representing satisfaction with the external work environment, is calculated by averaging scores from 8 items: #5, #6, #12, #13, #14, #17, and #18 [21].

Table 1. Participants' sociodemographic characteristics in relation to their job satisfaction

Variables	Overall (n=318)		Total		Intrinsic satisfaction		Extrinsic satisfaction	
	n	%	Mean (SD)	p value	Mean (SD)	p value	Mean (SD)	p value
Gender								
Male	261	82.1%	75.66 (12.57)		47.51 (6.95)		20.40 (4.83)	
Female	57	17.9%	76.74 (12.62)	0.558	48.09 (7.09)	0.571	20.81 (4.70)	0.561
Age (years)								
20-30	93	29.2%	73.09 (13.13)		46.13 (7.04)		19.63 (4.97)	
31-40	127	39.9%	75.71 (12.34)		47.77 (7.07)		20.13 (4.69)	
>40	98	30.8%	78.66 (11.82)	0.009	48.82 (6.56)	0.027	21.71 (4.56)	0.006
Educational level								
Bachelor	147	46.2%	73.76 (12.55)		44.62 (7.07)		19.64 (4.73)	
Graduate	171	53.8%	77.65 (12.34)	0.006	48.47 (6.79)	0.018	21.19 (4.76)	0.004
City level								
Developed	216	67.9%	77.78 (12.09)		48.59 (6.72)		21.17 (4.65)	
Underdeveloped	102	32.1%	71.77 (12.64)	<0.001	45.55 (7.07)	<0.001	19.00 (4.79)	<0.001
Length of graduation (years)								
1-10	115	36.2%	73.08 (13.33)		46.07 (7.20)		19.65 (5.03)	
11-20	152	47.8%	76.89 (11.64)		48.39 (6.63)		20.53 (4.52)	
>20	51	16.0%	79.00 (12.64)	0.007	48.76 (6.95)	0.011	22.14 (4.71)	0.008

Note: The 2022 Ranking of Commercial Cities classifies first-tier and new first-tier cities as developed, and second-tier, third-tier, fourth-tier, and fifth-tier cities as underdeveloped.

The electronic survey was created using the Questionnaire Star platform and distributed via WeChat. Initially, 15 graduates participated in a pre-survey, and based on their feedback, the questionnaire was revised. Once finalized, the survey was sent to all remaining graduates for completion. Invalid questionnaires were excluded based on three criteria: incomplete sociodemographic data, more than five missing responses, and patterns indicating systematic measurement errors (e.g., fluctuating response curves or an excessive concentration of identical answers), which could undermine the study's validity.

Data analysis

Data were analyzed using IBM SPSS Statistics version 26.0. A two-tailed $p < 0.05$ was considered statistically significant. Gender (male/female), educational level (bachelor/graduate), and city classification (developed/underdeveloped cities) were treated as dichotomous variables. Other variables were treated as categorical. To compare job satisfaction scores, the Student's t-test was employed for categorical variables with two categories, and one-way analysis of variance with Tukey post hoc analysis was used for those with three or more categories. Categorical variables are presented as frequencies and percentages, and continuous variables are presented as means and standard deviations. The means (standard

deviations) of the MSQ's 20 items across the intrinsic, extrinsic, and general satisfaction subscales are reported. Additionally, job satisfaction scores were re-categorized into three groups: "satisfied" (scores of 4 and 5), "neutral" (score of 3), and "dissatisfied" (scores of 1 and 2). Multiple linear regression was performed to identify potential risk factors for intrinsic, extrinsic, and overall job satisfaction.

Results

In total, 595 questionnaires were distributed, with 326 returned, yielding a response rate of 54.79%. Of these, 318 were valid, representing an effective response rate of 53.45%.

Overall sociodemographic characteristics and their relation to MSQ scores

Table 1 presents the sociodemographic characteristics of the sample. Respondents were predominantly male (82.1%) with a mean age of 36.2 ± 14.8 years. A clear pattern of increasing job satisfaction with age was observed. Younger respondents reported the lowest overall, intrinsic, and extrinsic job satisfaction levels. Further analysis of MSQ scores identified the top three contributing factors to this dissatisfaction as limited opportunities for further education, inadequate compensation and benefits, and insufficient utilization of personal talents. In terms of geographic location, 67.9% of respondents worked in developed cities, while 32.1%

Table 2. Participants' occupational characteristics in relation to their job satisfaction

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Variables	Overall (n=318)		Total		Intrinsic satisfaction		Extrinsic satisfaction	
	n	%	Mean (SD)	p value	Mean (SD)	p value	Mean (SD)	p value
Working hours per day								
<8	74	23.3%	72.78 (11.70)	0.013	46.09 (6.54)	0.012	19.23 (4.51)	0.02
8–10	168	52.8%	77.71 (11.72)		48.69 (6.46)		21.09 (4.58)	
>10	76	23.9%	74.74 (14.49)		46.71 (8.06)		20.32 (5.34)	
Income								
Low	52	16.4%	62.29 (8.72)	<0.001	41.60 (5.41)	<0.001	14.69 (3.09)	<0.001
Moderate	151	47.5%	72.93 (9.36)		46.13 (5.91)		19.32 (3.23)	
High	115	36.2%	85.83 (9.71)		52.29 (5.88)		24.60 (3.45)	
Current position								
Anesthesia-related	227	71.4%	77.18 (11.03)	<0.001	48.22 (6.32)	<0.001	20.93 (4.30)	<0.001
Other departments	19	6.0%	79.53 (13.78)		48.89 (8.01)		22.58 (4.41)	
Primary care position	40	12.6%	62.00 (10.15)		41.23 (6.00)		15.10 (3.64)	
Others	32	10.1%	81.56 (13.66)		50.53 (7.59)		22.69 (5.14)	
Hospital category								
Tertiary hospital	221	69.5%	77.92 (11.19)	<0.001	48.51 (6.44)	<0.001	21.28 (4.31)	<0.001
Secondary hospital	18	5.7%	71.56 (10.77)		45.22 (6.18)		19.06 (4.15)	
Primary healthcare institution	51	16.0%	65.37 (11.85)		43.08 (6.80)		16.22 (4.11)	
Non-medical institution	28	8.8%	81.36 (14.66)		50.32 (8.07)		22.75 (5.51)	
Years of working in current workplace								
<3	60	18.9%	77.03 (14.13)	0.356	47.70 (7.74)	0.627	21.55 (4.95)	0.139
3-5	89	28.0%	74.19 (11.04)		46.96 (6.08)		19.78 (4.41)	
6-10	44	13.8%	74.73 (16.00)		47.23 (8.58)		19.98 (6.01)	
>10	125	39.3%	76.86 (11.37)		48.18 (6.57)		20.62 (4.45)	
Professional status								
Primary	92	28.9%	73.33 (13.72)	<0.001	46.29 (7.37)	0.001	19.67 (5.27)	0.001
Intermediate	90	28.3%	73.40 (11.71)		46.39 (6.74)		19.51 (4.41)	
Senior	136	42.8%	79.18 (11.58)		49.32 (6.51)		21.65 (4.48)	

worked in underdeveloped cities [22]. Those in developed cities reported significantly higher job satisfaction levels than those in underdeveloped cities ($p<0.001$).

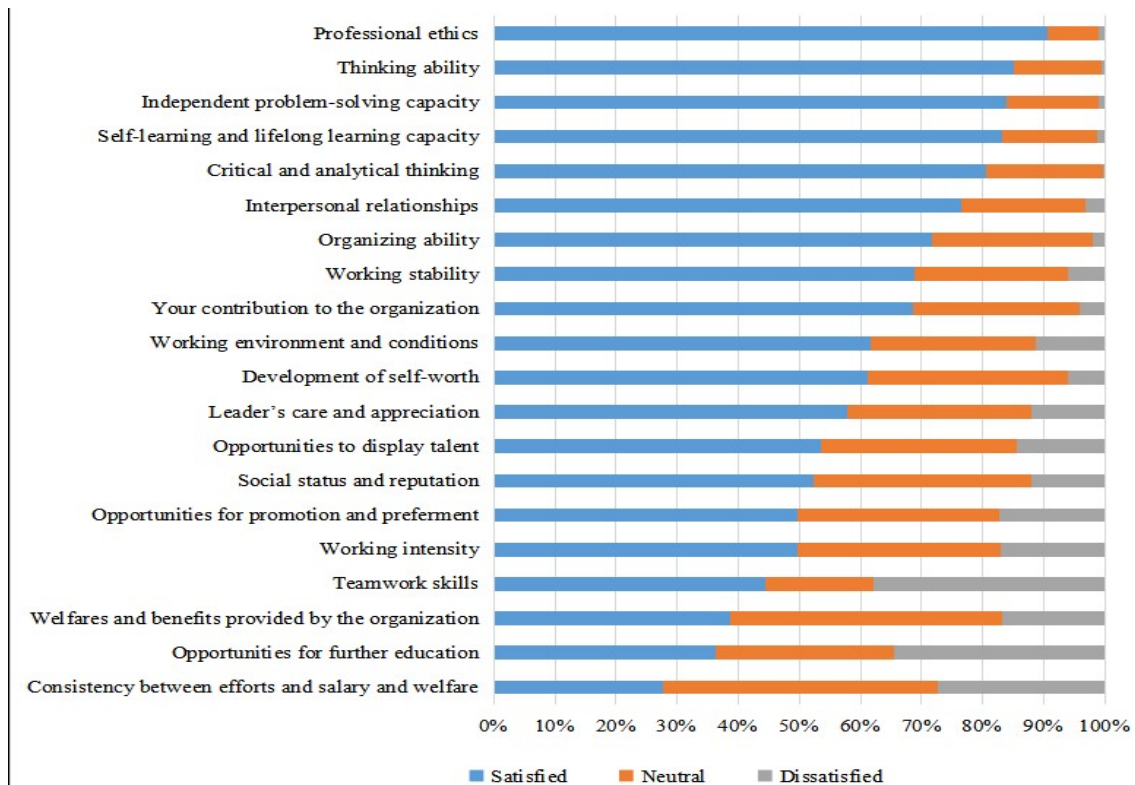
Overall occupational characteristics and their relation to MSQ scores

Table 2 outlines the occupational characteris-

tics of participants. Among respondents, 52.8% worked 8–10 hours per day and reported the highest job satisfaction levels, followed by those who worked over 10 hours. Those working fewer than 8 hours reported the lowest job satisfaction levels. More than 70% of respondents were employed in anesthesia-related positions, and those in primary care roles reported the lowest job satisfaction due to limited opportu-

Table 3. Scores and internal reliability of job satisfaction items and scales

	Mean (SD)	Intrinsic	Extrinsic
Working intensity	3.43 (1.07)	√	
Independent problem-solving capacity	4.25 (0.74)	√	
Self-learning and lifelong learning capacity	4.23 (0.76)	√	
Your contribution to the organization	3.92 (0.91)	√	
Professional ethics	4.37 (0.68)	√	
Working stability	3.88 (0.92)	√	
Development of self-worth	3.78 (0.94)	√	
Teamwork skills	4.18 (0.74)	√	
Opportunities to display talent	3.57 (1.14)	√	
Critical and analytical thinking	4.14 (0.74)	√	
Thinking ability	4.29 (0.73)	√	
Social status and reputation	3.58 (1.03)	√	
Leader's care and appreciation	3.70 (1.08)		√
Organizing ability	4.03 (0.82)		√
Welfares and benefits provided by the organization	3.31 (1.02)		√
Consistency between efforts and salary and welfare	2.99 (0.99)		√
Opportunities for promotion and preferment	3.46 (1.12)		√
Opportunities for further education	2.98 (1.32)		√
Working environment and conditions	3.71 (1.07)		
Interpersonal relationships	4.06 (0.88)		
Average score, mean (SD)	3.79 (1.03)	3.97 (0.93)	3.41 (1.13)
Total score, mean (SD)	75.85 (12.57)	47.61 (6.97)	20.47 (4.80)
Cronbach's alpha	0.933	0.883	0.887

**Figure 1. Levels for satisfaction related to the 20 items of the Minnesota Satisfaction Questionnaire.**

nities for further education, poor utilization of their talents, and lack of promotion prospects. Additionally, high personal income was positively correlated with job satisfaction ($p < 0.001$). Respondents with low incomes were the most dissatisfied, citing insufficient benefits, educa-

tional opportunities, and compensation.

Analysis of participants' MSQ scores

Table 3 presents the general job satisfaction scores as well as the intrinsic and extrinsic

Table 4. Participants' work pressure, anesthesia prospects, and turnover intentions

	Frequency (n)	Percentage (%)
Work pressure		
Overload	26	8.2
Frequently high	120	37.6
Occasionally high	131	41.1
Less pressure	30	9.4
Easy without pressure	11	3.4
Anesthesia development prospects		
Extremely poor	5	1.6
Poor	20	6.3
General	95	29.8
Comparatively good	103	32.3
Extremely good	95	29.8
Willingness to leave the field you are currently working in		
Desperately want to leave	21	6.6
Want to leave	31	9.7
General	72	22.6
Do not want to leave	72	22.6
Extremely reluctant to leave	122	38.2
Willingness to leave current unit		
Desperately want to leave	38	11.9
Want to leave	36	11.3
General	102	32
Do not want to leave	76	23.8
Extremely reluctant to leave	66	20.8

satisfaction scores for the 318 participants. The total MSQ score was 75.85 ± 12.57 , with intrinsic and extrinsic satisfaction scores of 47.61 ± 6.97 and 20.47 ± 4.80 , respectively. The highest scoring item was question 7 (professional ethics, 4.37 ± 0.68), while the lowest scoring item was question 19 (further education, 2.98 ± 1.32). Cronbach's alpha coefficients for the total, intrinsic, and extrinsic satisfaction scales were 0.933, 0.883 and 0.887, respectively.

Additionally, the MSQ scores for the 20 items varied across different participant groups. Responses were categorized based on a five-point Likert scale into three groups: satisfied (satisfied and extremely satisfied), neutral, and dissatisfied (dissatisfied and extremely dissatisfied). Participants rated professional ethics, thinking ability, independent problem-solving skills, self-learning, lifelong learning skills, and critical and analytical thinking as the most satisfying aspects, with overall satisfaction scores above 80. In contrast, payment and return on salary and benefits, further education opportunities, and organizational welfare and benefits were the least satisfying factors, with overall satisfaction scores below 40 (Figure 1).

Turnover intentions, work pressure, and related factors

Job stress, professional development prospects in anesthesia, and intentions to leave the current organization and profession were assessed (Table 4). The majority of participants ($n = 277$, 86.9%) reported experiencing job stress, while 12.8% reported feeling little to no stress in their work environment. The most commonly cited sources of work pressure were promotion (55.7%), scientific research demands (52.5%), and work hours/intensity (39.9%). Other reported stress factors included occupational risk (36.2%), job prospects (27.4%), and academic or further education opportunities (24.8%); 12.3% reported miscellaneous reasons. Additionally, 5.7% of respondents found communication with patients and their families to be psychologically stressful (Figure 2).

Moreover, over 60% of participants expressed a positive outlook on the future of the anesthesia profession and reported satisfaction with their current positions, indicating no desire to leave. However, 74 (23.2%) participants showed a high intent to leave, 102 (32.0%) had a mod-

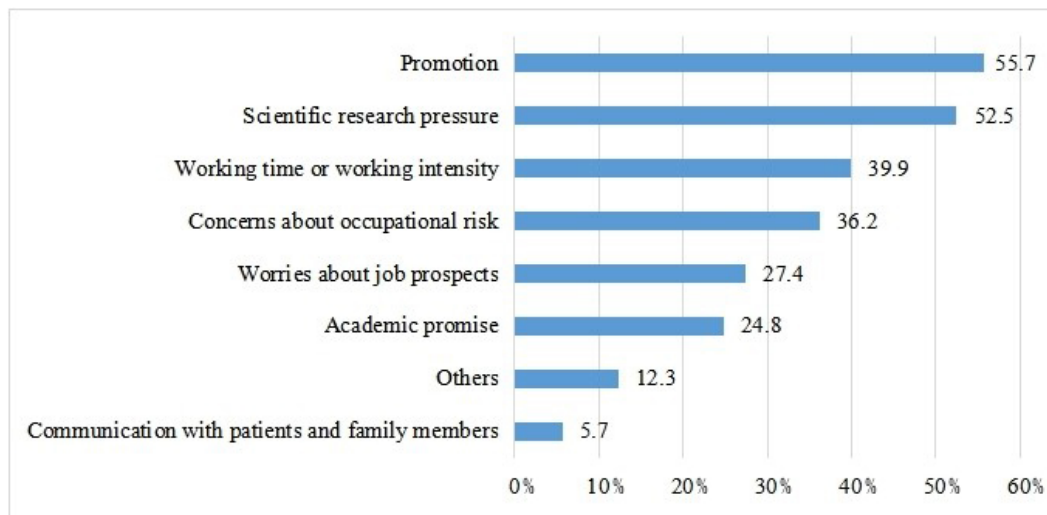


Figure 2. Main reasons for work pressure.

erate intent, and 142 (44.6%) had a low intent to leave. Further analysis revealed that participants who perceived the anesthesia profession as having poor prospects were more likely to consider leaving their current profession or organization and reported lower satisfaction levels. The primary reasons for this included limited educational opportunities, underutilization of personal talents, inadequate pay and benefits, and lack of promotion prospects.

Multiple linear regression analysis of job satisfaction and associated factors

Multiple linear regression was conducted to identify factors influencing job satisfaction. The analysis revealed that age, hours worked per day, income, current position, and work pressure were significantly associated with job satisfaction. However, other demographic factors—including gender, city level, length of graduation, hospital category, years working in the current workplace, and professional status—were not significantly associated.

The multivariate model showed that age was negatively associated with job satisfaction (-1.94 , $p < 0.05$, for participants aged 31–40 years, compared to the 20–30 age group). Participants working 8–10 hours per day had higher job satisfaction scores than those working 8 hours or less (4.102, 2.364, and 1.507, $p < 0.05$ for general, intrinsic, and extrinsic satisfaction, respectively). Income was positively correlated with job satisfaction (8.868, 3.828, and 3.909, $p < 0.05$, for moderate income compared to low income, for general, intrinsic, and extrinsic satisfaction). Participants in anesthesia-related positions reported higher job satisfaction than those in primary care positions (-8.151 , -4.66 ,

and -2.288 , $p < 0.05$, for general, intrinsic, and extrinsic satisfaction, respectively). The extrinsic job satisfaction of participants with lower work pressure was 2.056 points higher than those experiencing higher job stress ($p < 0.05$). See Table 5.

Discussion

This study evaluated 318 anesthesia graduates across 30 provinces in China, focusing on job satisfaction, its determinants, work pressure, and turnover intentions. The results indicated that job satisfaction was associated with age, working hours, income, job position, and work pressure. Further analysis explored why certain independent variables were linked to job satisfaction. For instance, respondents working less than 8 hours per day and expressing dissatisfaction were further analyzed based on their MSQ scores to identify underlying causes. This analysis is crucial for developing targeted and effective interventions.

The general job satisfaction score of the surveyed anesthesiologists was 75.85 ± 12.57 (of 100), with an average item score of 3.79 ± 1.03 (of 5), indicating moderate to suboptimal satisfaction [2]. This score was lower than that of Chinese primary care providers (80.6 of 100) in 2020 and hospital staff in second-grade comprehensive hospitals (3.931 ± 0.693 of 5) in 2021, but closer to that of radiologic technologists in Saudi Arabia (3.77 of 5) in 2022 [23–25]. In contrast, it was higher than scores from Chinese physicians in tertiary public hospitals (70.31 ± 12.67) in 2019, anesthesiologists in the Beijing-Tianjin-Hebei region (65.3 ± 11.5), and Chinese psychiatrists and psychiatric nurses (71.6 ± 14.3 and 73.7 , respectively) in 2017

Table 5. Multiple linear regression analysis of factors associated with general, intrinsic, and extrinsic job satisfaction

Variables	General Unstandardized Coefficients	Intrinsic Unstandardized Coefficients	Extrinsic Unstandardized Coefficients
Women (ref. women)	1.113	0.684	0.148
Age (ref. 20–30)			
31–40	-4.414	-1.944	-1.94*
>40	-6.214*	-3.183	-2.268*
Graduate (ref. bachelor)	0.204	0.206	0.024
Underdeveloped cities (ref. Developed cities)	1.408	0.897	0.375
Length of graduation (ref. 1–10)			
11–20	1.058	1.059	-0.047
>20	-0.994	-0.584	-0.143
Working hours per day (ref. <8)			
8–10	4.102*	2.364*	1.507*
>10	3.638*	1.404	1.837*
Income (ref. Low)			
Moderate	8.868*	3.828*	3.909*
High	21.018*	9.672*	8.828*
Current position (ref. Anesthesia-related)			
Other departments	1.59	0.405	1.197
Primary care position	-8.151*	-4.66*	-2.288*
Others	1.086	1.269	-0.319
Hospital category (ref. Tertiary hospitals)			
Secondary hospitals	-3.456	-1.873	-1.145
Primary healthcare institutions	-1.777	0.37	-1.568
Non-medical institutions	2.059	0.476	1.466
Working years in current workplace (ref. <3)			
3–5	2.598	1.749	0.49
6–10	2.838	1.601	0.743
>10	2.774	1.533	0.55
Professional status (ref. Primary)			
Intermediate	-0.064	-0.391	0.327
Senior	2.832	1.428	1.091
Work pressure (ref. Overload)			
Frequently high	-1.39	-2.018	0.613
Occasionally high	-0.697	-1.403	0.729
Less pressure	2.622	0.042	2.056*
Easy without pressure	1.915	0.29	1.984

Note: *p < 0.05.

[2, 19, 21, 26]. Since 2015, no new literature has emerged regarding job satisfaction among Chinese anesthesiologists. However, during this period, the Chinese government has introduced several policies aimed at strengthening anesthesiologists' training, which has led to increased attention to their professional development and, consequently, improved job satisfaction. Given the anticipated shortage of anesthesiologists by 2030 and ongoing challenges in their career development, our study offers targeted insights into the factors influencing current job satisfaction and proposes action-

able strategies for continued improvement.

Per the results of this study, individuals aged 20–30 years exhibited the highest levels of job dissatisfaction, with job satisfaction increasing with age. Younger respondents reported the lowest levels of overall, intrinsic, and extrinsic job satisfaction. Further analysis of the MSQ scores revealed that the top three reasons for dissatisfaction were limited opportunities for further education, insufficient payoffs and compensation benefits, and underutilization of personal talents. A similar survey of French

anesthesiologists found that junior anesthesiologists reported higher job dissatisfaction than their senior counterparts [27]. Our study also found that respondents aged 20–30 years, with limited educational opportunities, were the least satisfied, scoring an average of only 2.73. This suggests that additional educational opportunities are particularly significant for individuals in this age group.

In China, postgraduate training for medical undergraduates primarily involves residency training, continuing education, advanced studies, and higher degrees [28]. Young doctors—especially those in primary healthcare positions or as junior hospital staff—are highly motivated to continue professional learning and skills development. Over the past decade, China has made significant progress in training primary care physicians [29]. However, many primary healthcare workers express dissatisfaction with certain aspects of the training, especially the limited opportunities and the relevance of training materials to their work [30]. A survey conducted between 2013 and 2016 on anesthesiology residency training highlighted that clinical expertise, skills training, and residency experiences were viewed by most respondents as crucial for developing independent practitioners [31].

In 2020, the National Health Commission issued a notice outlining objectives, goals, methods, content, and requirements for anesthesiologists' training. In 2021, military departments released residency training guidelines to enhance first aid, diagnosis, and treatment capabilities for newly graduated medical students. Currently, academic groups are actively promoting diverse professional training programs, and in the future, anesthesiologists will have the opportunity to select relevant programs suited to their roles. Training options, including online, offline, and virtual reality alternatives, allow doctors to receive direct training without leaving their work environments.

Notably, daily working hours is an important factor. Our survey revealed that respondents working <8 hours per day reported the lowest job satisfaction, which contrasts with findings from previous studies [32–34]. Additional analysis indicated that for participants working <8 hours, the main reasons for dissatisfaction were limited educational opportunities, payoffs and compensation benefits, and underutilization of personal talents. In contrast, for participants working >10 hours, the primary factors influencing dissatisfaction were work intensity, effort-to-reward ratio, pay, and limited opportu-

nities for further education.

To enhance job satisfaction among those working less than 8 hours, it is essential to offer more opportunities for personal growth and incentives. For those working more than 10 hours, special attention is required. Historically, doctors in China have had a heavier workload compared to their international counterparts, with reports of sudden deaths due to overwork. Anesthesiologists often experience unpredictable and irregular working hours, limiting their control over personal lives [35]. Additionally, according to data from the 2015–2020 China Statistical Yearbook, hospital admissions increased by 22.65 million across all levels, with an annual growth rate of 11.32% for anesthesia cases between 2015 and 2017 [36]. In contrast, the number of anesthesiologists increased by only 5.97% [37]. As the number of patients and operating tables rises annually, anesthesiologists are facing an increasing workload. This, coupled with long-term overwork, weekend shifts, and high-risk patients, puts them under significant pressure [38].

Future efforts should focus on reducing working hours for anesthesiologists. One potential solution is expanding the undergraduate anesthesiology program to attract more clinical graduates into the field. However, low career attractiveness has limited the effectiveness of this approach. Therefore, efforts should focus on enhancing the appeal of anesthesiology as a career. Government departments recognize the high work intensity and long overtime hours of Chinese anesthesiologists, which further underlines the need for strategic solutions. Training anesthesia assistants is a crucial strategy to alleviate clinical pressures. In countries such as the United States, the United Kingdom, Germany, Australia, and Belgium, a significant number of anesthesia assistants work under the supervision of anesthesiologists [39]. These assistants play an essential role in supporting anesthesiologists. In 2019, the Guidelines for the Capacity Building of Anesthesiology Medical Services were established, recommending that medical institutions improve teamwork within the anesthesia department by ensuring an adequate number of nurses, technicians, and anesthesiologists [40]. Collaboration with assistants helps anesthesiologists reduce their workload, mitigate work-related stress, prevent burnout, and improve the quality of their work.

Work pressure is another key factor influencing job satisfaction. Respondents identified promotion prospects, research pressure, and work intensity as the primary stressors. Government

departments must continue to focus on maintaining anesthesiologists' engagement and improving the attractiveness of anesthesiology. A 2021 guideline on the reform of professional titles for health professionals indicated that papers, scientific research projects, awards, and overseas experience would no longer be required for applications. It was recommended that the specific nature of anesthesiologists' work and the value of technical services be fully considered in performance evaluations, job assignments, and income distribution. Although the standard has improved, it has not undergone fundamental changes.

Respondents working in tertiary hospitals face both scientific research and clinical pressures. They are motivated to conduct research not only out of interest but also due to promotional pressures. The survey revealed that 26 respondents were overworked and stressed, 16 (61.5%) of whom worked in tertiary hospitals. In these hospitals, anesthesiologists often conduct most of their scientific research and teaching work during personal rest time, making their actual working hours significantly higher than what is reported in the questionnaire.

Income is another important factor. In this study, high personal income was positively associated with high job satisfaction; low-income respondents expressed the highest levels of dissatisfaction, primarily due to inadequate benefits, limited further education opportunities, and insufficient payoffs and compensation. A survey of anesthesiologists in the United States, Austria, and Switzerland found income to be one of the most important factors influencing job satisfaction [41, 42]. According to Forbes magazine, anesthesiologists were ranked first among the top 25 highest-paying occupations worldwide in 2021, earning an average of \$184,340 [43]. In contrast, anesthesiologists in the Beijing-Tianjin-Hebei region of China earn less than \$1,500 per month or under \$18,000 per year [2]. Additionally, anesthesiologists in China earn less than their counterparts in oncology, general internal medicine, cardiology, endocrinology, and neurosurgery [44]. During the perioperative period, anesthesiologists must monitor and diagnose changes in patients' vital signs to ensure the latter's safety. However, the technical value of anesthesiologists' in the medical work processes is not reflected in the current income distribution mode. Notably, in 2021, the guiding opinions on deepening the reform of the salary system in public hospitals emphasized that, knowledge, technology, management, and other elements should be included in the distribution model according to medical professionals'

contributions. Future salary reforms should aim to better reflect the technical value of medical personnel.

Anesthesiology graduates work in various roles and report differing levels of job satisfaction. However, compared to physicians in other departments, anesthesiologists generally report lower job satisfaction, which contributes to anesthesiology's relatively low career attractiveness. Efforts should be directed toward improving the appeal of the anesthesiology career and enhancing job satisfaction among anesthesiologists. Positions related to anesthesia exhibit the highest job satisfaction levels. On the other hand, low job satisfaction among primary care physicians in China is primarily due to limited opportunities for training, promotion, and utilization of their personal talents, compared to their counterparts in large public hospitals. Most primary care physicians are unable to showcase their professional abilities in their work environments. In daily practice, they encounter few complex cases, mostly mild diseases, outdated medical equipment, and limited opportunities for clinical operations or further education in higher-level hospitals. Respondents working in primary healthcare institutions reported dissatisfaction with their career advancement, development, and promotion prospects. This could be due to an inflated ratio of professional titles within the organization. Currently, China is promoting the establishment of medical consortiums to integrate medical resources within regions [45]. A medical consortium typically includes tertiary and secondary hospitals, as well as community and rural healthcare facilities [46]. By fostering a sense of belonging and promoting community among physicians, medical consortiums can enhance business exchanges, clinical collaboration, and technical communication between senior and junior staff [22].

This study has several limitations. First, although the participants represented 53.4% of all anesthesiology graduates, the absolute number of respondents was insufficient. Future studies should recruit a larger sample of anesthesiology graduates. Additionally, the cross-sectional design of this study limited the scope of the data collected. China is currently undergoing policy reforms that will likely improve anesthesiologists' job satisfaction. Therefore, future research should continue to monitor changes in job satisfaction, burnout, stress, professional commitment, and quality of patient care.

Conclusion

In conclusion, this large-scale survey of anesthesia graduates across 30 provinces and cities in China found that they exhibit high levels of job satisfaction, as measured by the MSQ. Improving job satisfaction among medical personnel requires the collaborative efforts of the government, society, medical institutions, and other stakeholders. The long-term development of healthcare can only be achieved through the collective concern and support of society.

Author contributions: Fengyan Yang and An Jiang developed this study and wrote the main manuscript; Bing Xu, Kai Wei, Zhengyu Jiang, and Jian Yu analyzed and interpreted the results; Tianying Xu provided research guidance. Yuming Sun and Mi Li proofread and revised the manuscript. All authors approved the manuscript's final version.

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