



Associations Between Work Motivation and Quality of Anesthesia and Surgical Services: A National Cross-Sectional Study of Nurse Anesthetists in Indonesia

Richa Noprianty^{1*}, Wahyu Wahdana², Asriadi Prihandika Widiyanto³, Gina Sonia⁴

¹Faculty of Health Sciences, Universitas Bhakti Kencana, Bandung, Indonesia

²Rumah Sakit Umum Daerah Otista, Indonesia

³Faculty of Health Sciences, Universitas Bhakti Kencana, Bandung, Indonesia

⁴Faculty of Health Sciences, Universitas Bhakti Kencana, Bandung, Indonesia

*Corresponding Author: E-mail: richa.noprianty@bku.ac.id

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ABSTRACT

Introduction: The operating room consists of various health professionals so that they must build good teamwork to realize optimal anesthesia and surgical services. Therefore, it is necessary to have work motivation to be able to improve the quality of anesthesia and surgical services. The purpose of this study was to determine the components of work motivation in the operating room and anesthesia that can provide implications for anesthesia and surgical services.

Methods: This type of research is quantitative with cross sectional. The sample used was nurse anesthetist who worked at the hospital, using accidental sampling so that a sample of 188 nurse anesthetists was obtained. The research instrument was a Motivating Potential Score (MPS) questionnaire and a surgical anesthesia service questionnaire from the Ministry of Health Accreditation Standards Year 2022 which was provided via google form. Data analysis using Spearman rank correlation coefficient. This research has obtained permission from the IPAI professional organization and is ethically feasible No. 209/09.KEPK/UBK/VIII/2024.

Results: The results indicate that the average work motivation score was 9.86 (min 3.6; max 12), while the quality of anesthesia and surgical services averaged 14.31 (min 8.14; max 16). All components of work motivation: skill variety, task identity, job significance, autonomy, and feedback showed significant associations with service quality. Notably, autonomy demonstrated a moderate positive correlation with anesthesia and surgical service quality ($r = 0.511$, $p < 0.001$, 95% CI: 0,42-0,59), highlighting the magnitude of its effect and strengthening the analytical robustness of the findings.

Conclusion: There is an influence of motivation on anesthesia and surgical services with a p value of 0.013 and a CC value of 0.181. Increasing conducive work motivation successfully provides satisfaction for nurse anesthetists and has an important role in quality anesthesia and surgical services.

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INTRODUCTION

The operating room has environmental characteristics, a working hour system and has a high risk of occupational accidents. In addition, intra-anesthesia can cause occupational stress due to exposure to anesthetic gases, drugs, radiation, being exposed to sharp objects during surgery and can cause pain in the lumbar region due to prolonged surgery. In addition, the high side effects of post-anesthesia care seen from the type of surgery, length of hospitalization, and patient characteristics can cause increased workload. The high workload itself can cause work stress which has an impact on one's performance. This situation is the most detrimental thing in health services (1,2).

A study involving more than 50,000 American nurses found that burnout was the primary reason why 74.9% of them either left their jobs or considered resigning (3). Similarly, Iranian operating room nurses also experience burnout due to various factors, including organizational, interpersonal, occupational, and personal influences (4). Although previous studies have documented high burnout among nurses, empirical evidence focusing specifically on operating room and perioperative nurses remains limited (5). Existing findings show that 53.2% of operating room nurses experience an unfavorable work environment due to limited collegial interaction, while 20% of perioperative nurses report intentions to leave their jobs. These patterns suggest underlying motivational deficits that may impair work engagement and service quality. However, the extent to which work motivation influences anesthesia and perioperative service quality has not been clearly established, representing an important theoretical and empirical gap. Grounded in motivation theory, we hypothesize that higher levels of work motivation among anesthesia care providers will be positively associated with better perioperative service quality (6,7).

The implementation of anesthesia and surgical services in element 1 regarding pre-anesthesia assessment found that the physical examination is still not done perfectly and information about anesthesia procedures provided to patients is not optimal. All patients requiring surgery, anesthesia, or anesthesia-induced sedation must undergo a preoperative assessment prior to admission to the operating room. This assessment should include a proper physical examination, a complete medical history, as well as the patient's responsible data to make decisions if something happens on the operating table. Having preoperative assessment and optimization guidelines in place can improve individual patient outcomes and efficiency (8,9).

The implementation of anesthesia and surgery in element 7 regarding anesthesia documentation also has deficiencies in documentation. The anesthesia documentation is complete and accurate, but the documentation of policies and procedures related to risk management is still incomplete. This can make it difficult to track and evaluate the effectiveness of the risk management program as prevention of adverse events in operating room (10). There are several deficiencies in anesthesia documentation. While pre-anesthesia assessment and anesthesia planning are done well, the documentation is not always complete and accurate. This can make communication between the medical team difficult and potentially harmful to the patient. Meanwhile, during intraoperative procedures, healthcare workers often perform the surgical safety checklist; however, it is not recorded in the anesthesia record. Factors that may influence this include the high number of surgical patients, which is disproportionate to the number of healthcare personnel in the operating room (11). And at the time of postoperative pain management, patient education about pain management was still not carried out. When patients feel pain, they are only given analgesic drugs without being given education. Therefore it is important to increase work motivation in health workers (12).

METHOD

Research Type

This study employed a quantitative research design with a cross-sectional approach. The research was conducted among nurse anesthetists working in hospitals across Indonesia.

Population and Sample

The study population consisted of all nurse anesthetists working in hospitals across Indonesia. A convenience (accidental) sampling approach was employed. Recruitment was conducted by distributing an online questionnaire link through the national nurse anesthetist professional network, communication groups, and hospital anesthesia unit coordinators. A total of 188 nurse anesthetists participated and met the inclusion criteria, which required providing direct anesthesia care to patients. Inclusion criteria included active clinical practice in anesthesia care, while exclusion criteria comprised nurse anesthetists who were on leave, not involved in direct clinical service within the past month, or who submitted incomplete questionnaires. Although convenience sampling enabled rapid and broad data collection

at the national level, it carries inherent limitations, particularly the risk of selection bias due to reliance on participant availability and willingness to respond. This may limit the representativeness of the sample and restrict the generalizability of the study findings.

Research Location

This study was conducted in Indonesia, covering 27 provinces, including Bali, Bangka Belitung, Banten, Special Capital Region of Jakarta, Gorontalo, Jambi, West Java, Central Java, East Java, West Kalimantan, South Kalimantan, East Kalimantan, North Kalimantan, Lampung, North Maluku, Nangroe Aceh Darussalam, East Nusa Tenggara, Riau, South Sulawesi, Central Sulawesi, Southeast Sulawesi, Bengkulu, South Sumatra, West Sumatra, Central Papua, and Riau Islands.

Instrumentation or Tools

The quantitative component of the study used a validated questionnaire, the Ministry of Health Accreditation Standards 2022 which consists of anesthesia and surgical services elements 1 - 7 as many as 28 questions, namely pre-anesthesia assessment (1-5), anesthesia preparation (6-10), patient induction (11-14), anesthesia maintenance (15-18), anesthesia recovery (19-22), postoperative pain management (23-25) and anesthesia documentation (26-28) using a Likert scale consisting of never (1), sometimes (2), always (3) and often (4). The category of anesthesia and surgical services is said to be fully met if ($\geq 80\%$), partially met (if 20 - 80%), not met ($<20\%$) (13,14).

The questionnaire on motivation used Hackman and Oldham's Motivating Potential Score (MPS). The questionnaire used was standardized with an alpha Cronbach value of 0.8. The MPS questionnaire consists of 15 question scales with four Likert points of never (1), sometimes (2), always (3), and often (4). MPS consists of five dimensions namely Skill Variety (SV) questions 1-3. Task Identity (TI) questions 4-6. Task Significance (TS) questions 7-9. Autonomy (AU) questions 10-12 and Job Feedback (JF) questions 13-15. Then calculated using the formula:

Two standardized instruments were used in this study

The first instrument was a validated questionnaire based on the Indonesian Ministry of Health Hospital Accreditation Standards (2022), specifically anesthesia and surgical service standards elements 1–7, comprising 28 items. These items covered pre-anesthesia assessment (items 1–5), anesthesia preparation (6–10), patient induction (11–14), anesthesia maintenance (15–18), anesthesia recovery (19–22), postoperative pain management (23–25), and anesthesia documentation (26–28). Responses were measured using a four-point Likert scale: never (1), sometimes (2), often (3), and always (4). Service compliance was categorized as fully met ($\geq 80\%$), partially met (20–79%), or not met ($<20\%$).

The second instrument measured work motivation using the Motivating Potential Score (MPS) based on the Job Characteristics Model proposed by Hackman and Oldham. The MPS questionnaire consisted of 15 items representing five core job dimensions: Skill Variety (SV; items 1–3), Task Identity (TI; items 4–6), Task Significance (TS; items 7–9), Autonomy (AU; items 10–12), and Job Feedback (JF; items 13–15). Each item was rated on a four-point Likert scale: never (1), sometimes (2), often (3), and always (4). The instrument demonstrated good internal consistency, with a Cronbach's alpha of 0.80.

In accordance with the original Job Characteristics Model, negatively worded items were reverse scored by subtracting the item score from the maximum scale value plus one. Dimension scores were calculated by averaging their respective items. The Motivating Potential Score (MPS) was then computed using the original formula:

$$\text{MPS} = \frac{(\text{SV} + \text{TI} + \text{TS}) \times \text{AU} \times \text{JF}}{3}$$

This formula reflects the theoretical structure proposed by Hackman and Oldham, in which the three psychological meaningfulness components are averaged before being multiplied by autonomy and feedback. Based on this calculation, higher MPS values indicate greater motivational potential. For descriptive purposes, MPS scores were categorized into low, moderate, and high motivation levels using tertile-based cut-off points derived from the observed score distribution (15).

Data Collection Procedures

Quantitative data were collected through an online survey platform (google form) over a three-month period in July – October 2024. Respondents were provided a consent form and instructions for completing the questionnaire.

Data Analysis

Data analysis was conducted using descriptive and inferential statistical methods. Univariate analysis included frequencies, percentages, means, standard deviations, and minimum–maximum values. Data normality was assessed using the Kolmogorov–Smirnov test, which indicated that the data were not normally distributed ($p < 0.05$). Given the non-normal distribution and ordinal nature of the data, Spearman’s rank correlation coefficient was used for bivariate analysis to examine the relationships between motivational potential and anesthesia service performance variables. Correlation coefficients (ρ) and corresponding p-values were reported, along with 95% confidence intervals, to enhance analytical rigor.

Ethical Approval

This study has obtained a research permit from the Indonesian nurse anesthetist organization with Number 0048/DPP.IPAI/Rek/VII/2024. This research was also carried out a Research Ethics test and declared ethically feasible with Number 209/09.KEPK/UBK/VIII/2024. The confidentiality of all participants was strictly maintained throughout the research process.

RESULTS

This study was administered to 188 nurse anesthetists working in hospitals in Indonesia. The research univariate data can be seen in Table 1.

Table 1. Respondent’s Characteristics (n=188)

Characteristics	Frequency	%
Age		
17-25 years (late adolescence)	23	12.2
26-35 years (early adulthood)	49	26.1
36-45 years (late adulthood)	42	22.3
46-55 years (early elderly)	55	29.3
56-65 years (late elderly)	19	10.1
Unit/room		
Preoperative	12	6.4
Intra operation	169	89.8
Postoperative / PACU	7	3.8
Sex		
Male	125	66.5
Female	63	33.5
Last education		
Diploma-3	81	43
Diploma-4	85	45.2
Nurse + anesthesia training	19	10.2
Master’s degree (S2)	3	1.6
Kind of hospital		
Public Hospital	152	80.9
Private Hospital	36	19.1
Type RS		
Type A	26	13.8
Type B	97	51.6
Type C	55	29.3
Type D	10	5.3
Marital status		
Single	36	19.1

Married	149	79.3
Widow / widower	3	1.6
Period of Employment		
< 1 year	21	11.2
1 – 5 years	24	12.8
6 – 10 years	23	12.2
>10 years	120	63.8
Employment Status		
Civil servant	119	63.3
Non-civil servant	69	36.7
Work shift		
1 shift	68	36,2
2 shifts	38	20.3
3 shifts	45	23.9
24 hours	37	19.6
Nature of shift work		
Standby at the hospital	137	72.9
On call	51	27.1
Total	188	100

Source: Primary Data

Based on Table1, it can be seen that the characteristics of respondents are mostly early adulthood (26.1%) and early elderly (29.3%), almost all of whom work in the intraoperative room (89.8%). male gender of 66.5%. Education is mostly Diploma-IV as many as 85 people (45.2%), married status as many as 149 people (79.3%), working in public hospitals as many as 152 people (80.9%). Working in type B hospitals as many as 97 people (51.6%), working period > 10 years as many as 120 people (63.8%), civil servant status as many as 119 people (63.3%), the type of work shift mostly 1 shift as many as 68 people (36.2%) and the nature of the work shift is mostly stand by in the hospital as many as 137 people (72.9%).

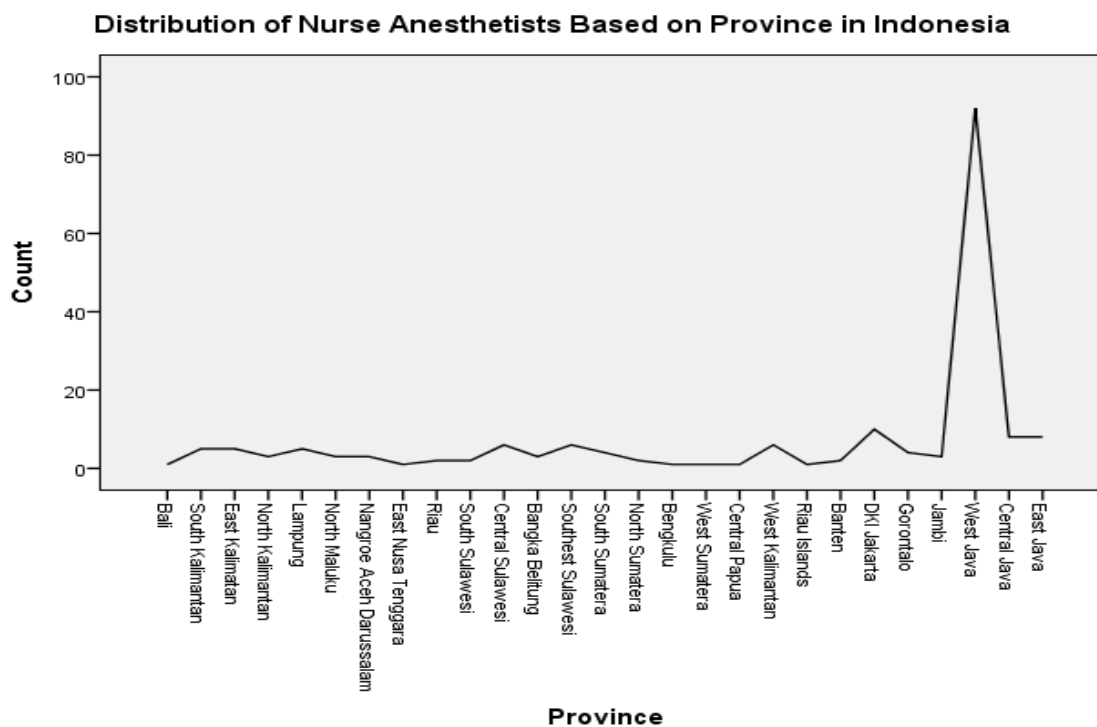


Figure 1. Distribution of Nurse Anesthetists Based on Province in Indonesia

Nurse anesthetist work motivation is seen from five dimensions, namely Skill Variety (SV) is a variety of abilities, skills, talents, which are needed to complete tasks. Task Identity (TI) is the completeness and clarity of the task, someone can do the task from start to finish with clear output. Task Significance (TS) is the importance of the task, its impact on other tasks, as well as on the Organization. Autonomy (AU) is the level of freedom in carrying out tasks, for example in determining work schedules, making decisions, determining ways of working, etc. and Job Feedback (JF) is the clear information received by workers about work results and performance. The average results of motivation can be seen in Figure 2 below:

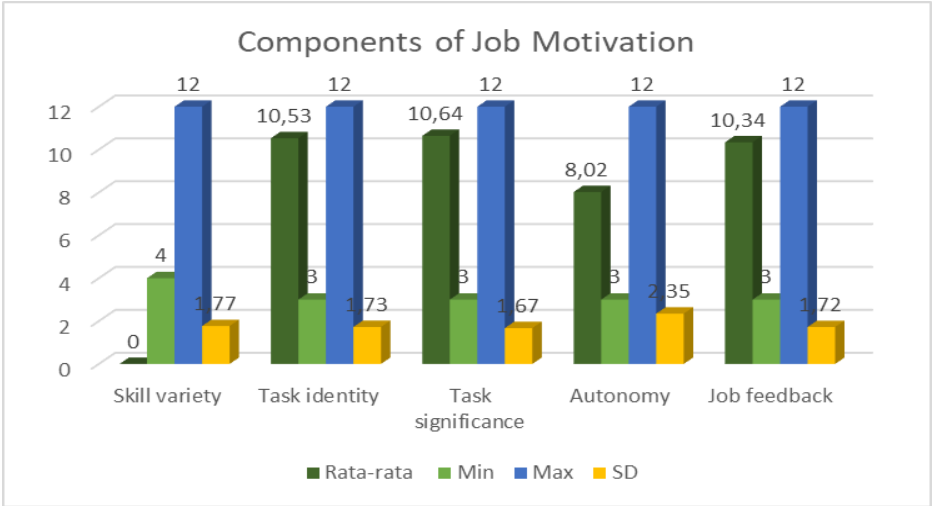


Figure 2. Components of Job Motivation

In Figure 2, it is found that the highest average work motivation (10.64) is in the Task significance item, namely the importance of the task, its impact while the motivation component with the lowest average (8.02) is in autonomy regarding the level of freedom in carrying out tasks, for example in determining work schedules, decision making and determining ways of working. The results of the calculation of the average anesthesia and surgical service components can be seen in Figure 3 below:

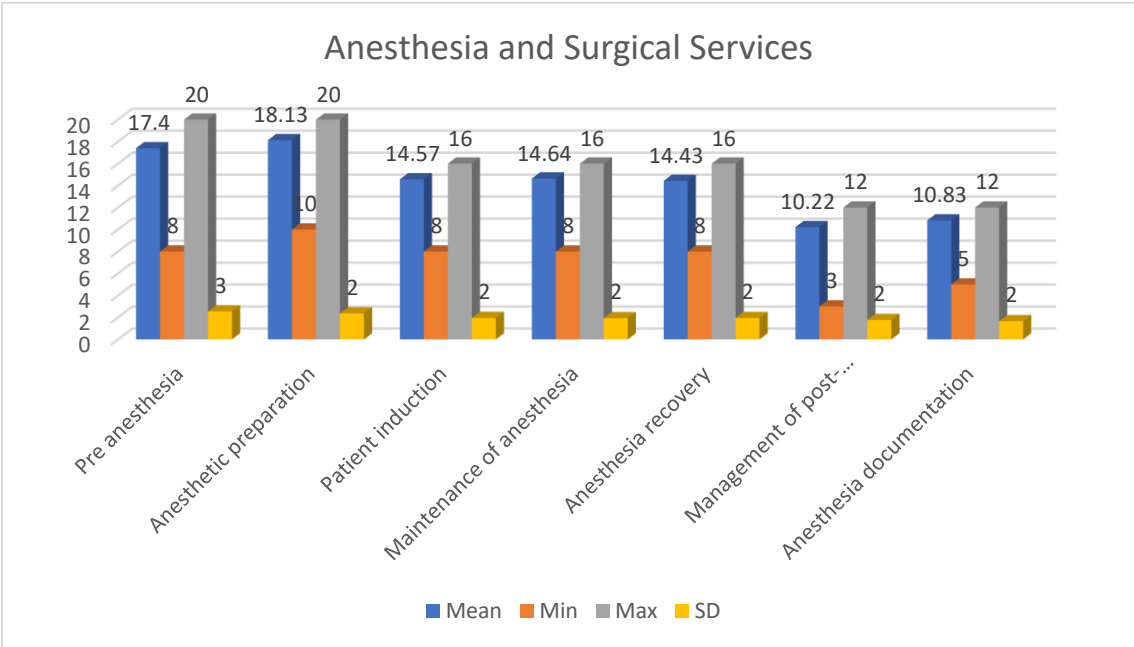


Figure 3. Anesthesia and Surgical Services

In Figure 3, it was found that the highest average anesthesia and surgical services were in anesthesia preparation (18.13) while the lowest average value was in postoperative pain management (10.22). Bivariate analysis using Spearman's rank correlation coefficient. The results can be seen in Table 2 below:

Table 2. The Effect of Work Motivation on Anesthesia and Surgical Services

Variable	Anesthesia and Surgical Services			Description
	p-value	r	95% CI for r	Results
Motivation	0,013	0,181	0.05 – 0.30	Significant association
Per component:				
a. Skill variety	0,004	0,377	0.21 – 0.51	Significant association
b. Identity	0,016	0,360	0.18 – 0.49	Significant association
c. Job significance	0,004	0,359	0.19 – 0.50	Significant association
d. Autonomy	0,000	0,511	0.42 – 0.59	Moderate - strong association
e. Feedback	0,000	0,372	0.20 – 0.50	Significant association

The results indicate that each component of work motivation demonstrates a statistically significant association with anesthesia and surgical service quality. Overall motivation shows a small but significant correlation ($r = 0.181$, $p = 0.013$; 95% CI: 0.05–0.30). Among the components, autonomy exhibits the strongest relationship ($r = 0.511$, $p < 0.001$; 95% CI: 0.42–0.59), indicating a moderate to strong influence on service quality.

This finding is both theoretically and practically significant. According to Self-Determination Theory (SDT), autonomy represents a core psychological need that fosters intrinsic motivation. When nurse anesthetists experience greater control over their clinical decisions and task execution, their intrinsic motivation increases, resulting in higher engagement, improved performance, and enhanced quality of care.

From the perspective of the Job Characteristics Theory (JCT), autonomy is a central job characteristic that heightens the sense of personal responsibility for outcomes. Recent empirical studies in healthcare support this mechanism. Job characteristics such as autonomy, task significance, and feedback enhance intrinsic motivation and adaptive performance among healthcare workers, which ultimately contributes to better work-related well-being. JCT based job characteristics significantly predict intrinsic motivation among primary healthcare practitioners. (16,17)

A reciprocal relationship between job autonomy and motivation in healthcare workers, suggesting that autonomy not only fosters motivation but is also strengthened by employees' self-leadership behaviors. Practically, these findings underscore the importance of designing anesthesia care roles that support higher levels of autonomy such as decentralized decision-making, clear task responsibility, and structured feedback processes. Enhancing autonomy may serve as a strategic pathway to reinforcing intrinsic motivation, optimizing professional performance, and improving the overall quality of anesthesia and surgical services (18,19).

DISCUSSION

Motivation of nurse anesthetist

The work as a nurse anesthetist with a scope in perioperative is a job that involves multidisciplinary professions so that in carrying out work, it cannot determine work individually. In the operating team, there will be a leader who has good intelligence, knowledge, technical skills and competencies (20,21).

Work in the operating room and surgery is complex and varied. This is because they often encounter cases with ASA III and above, patients with comorbidities that put them at high risk for surgery. The Physical Status Classification System is determined by the nurse anesthetist or anesthesia practitioner based on the patient's medical history, the type of surgery to be performed, and the associated surgical risks, making ASA classification largely subjective. To date, there is no application or system available that can provide a service to answer a series of simple yes/no questions to recommend an Physical Status classification with ASA (22,23).

Nurse anesthetists who work in type A hospitals are 13.8%, so they often encounter surgery with referral patients from other hospitals. Data states that 8% of deaths on the operating table are due to comorbidities and complications. This can be a factor of anxiety, stress at work and boredom at work (20,21). In certain situations, nurse anesthetists are sometimes delegated tasks by nurse anesthetists to perform anesthesia. Although they get legal protection and clear legal aspects, this can make their own workload and work stress. Data states that 10% of the

incidence of complications increases when anesthesia is not given by a nurse anesthetist. Therefore, the need for protection from the relevant hospital based on the law in ensuring work safety and authority when carrying out actions (22,23,24). However, nurse anesthetists know that they can work well. This can increase self-confidence so that the care provided to patients can be provided optimally.

Anesthesia and Surgical Services

Anesthesia and Surgical Services is an integrated and comprehensive service that includes the provision of anesthesia and surgery to patients. The aim is to ensure patient safety and comfort during the surgical process so as to determine the success of the surgical procedure, as well as to assist postoperative patient recovery (29) (30). Anesthesia work situations can trigger high levels of stress, which can affect work life. Poor work life can reduce the quality of anesthesia care for patients. Therefore, it is necessary to have anesthesia and surgical services that refer to hospital accreditation standards to maintain service quality (31–33).

In carrying out its role, a nurse anesthetist has functions in its duties including conducting pre-anesthesia assessments. From the time surgery is being considered until the patient is fully recovered, perioperative care begins. The areas that require improvement are highlighted in the updated preoperative assessment and optimization guidelines. It is necessary to standardize procedures and protocols, which ironically highlights regions that require individualized care.

Perioperative care begins from the consideration of surgery until the patient is in the recovery room. Although the time required for preoperative assessment and optimization is shorter in emergency surgical patients, standardized care protocols can enhance outcomes. This is crucial because delays in treatment and inconsistencies in the quality of care remain challenges despite significant improvements in processes and pathways (34)(35).

Documentation is one of the most essential aspects of anesthesia and surgical services. The completeness of anesthetic records is significantly influenced by personal and attitude-related factors, while knowledge factors do not have a substantial correlation with record completeness. A positive attitude among healthcare professionals plays a key role in improving the quality of medical records. (36,37)

Work motivation also has a considerable impact on anesthesia and surgical services.

Initially, when individuals enter a profession, they do not inherently possess a positive or negative orientation toward their work. Motivational factors particularly intrinsic drivers such as autonomy, competence, and relatedness shape job satisfaction and gradually transform initial neutrality into a positive attitude toward professional responsibilities (15). Beyond job satisfaction, individual needs also play a central role in cultivating motivation. These needs differ among healthcare personnel and tend to evolve over time, reinforcing the dynamic nature of motivation within anesthesia and surgical services (25),(38),(39).

Although this study aimed to measure the strength of work motivation among anesthesia and operating room staff, the findings should be interpreted with caution. Average scores provide preliminary insight into motivational conditions but do not capture regional variations in staffing patterns, institutional culture, or policy differences (40),(41). Nevertheless, the results suggest that supportive workplace conditions generally meet the needs of surgical and anesthesia personnel. To sustain and strengthen motivation thereby improving patient satisfaction and addressing system-level challenges it is essential to integrate staff needs and job satisfaction indicators into future workforce planning and policy development (42).

Preoperative assessment remains a critical component of anesthesia and surgical workflows. Each patient requiring surgery, anesthesia, or sedation must undergo a systematic evaluation before entering the operating room, including a physical examination, medical history review, and clarification of patient-centered considerations to support intraoperative decision-making. Evidence-based preoperative optimization guidelines improve procedural safety and efficiency, while the implementation of the surgical safety checklist continues to be recognized as a gold standard for reducing perioperative errors (10,11,43).

Importantly, the results confirmed the study's hypothesis that motivation plays a meaningful role in shaping performance and service quality among anesthesia and operating room staff. However, although the correlation between overall anesthesia service quality and motivation was statistically significant in this study, the effect size was negligible. Small correlation values ($r = 0.013$) indicate that statistical significance may largely reflect sample

size rather than substantive or practical impact. Therefore, interpretations should avoid overstating empirical conclusions and instead emphasize that additional unmeasured factors likely influence anesthesia service quality (44).

With the confirmation of the study's main hypothesis, it can be concluded that work motivation plays a vital role in driving individual motivation among anesthesia and operating room staff. Therefore, it is essential to create an environment that fosters the development of motivational components within medical personnel. By implementing work motivation standards and criteria, necessary interventions can be carried out, and their impact on motivation and attitudes can be evaluated to achieve organizational goals (40,41).

Overall, the findings reinforce the importance of cultivating work environments that support the psychological needs of anesthesia and operating room staff. Establishing clear motivational standards, routinely evaluating their implementation, and designing targeted interventions can meaningfully strengthen performance and organizational outcomes. Future longitudinal or experimental studies are recommended to validate these findings and better understand how motivation evolves over time within perioperative contexts (45).

Limitations and Cautions

While this study provides meaningful contributions to determine the components of work motivation in the operating room and anesthesia that can provide implications for anesthesia and surgical service, several limitations should be acknowledged. First, this study employs a cross-sectional design, which captures data at a single point in time. This limits the ability to understand changes in work motivation over time or establish causal relationships between factors influencing the motivation of anesthesia caregivers. Second, although this study covers 27 provinces in Indonesia, work conditions and motivation among anesthesia caregivers may be influenced by factors specific to each hospital or region, such as differences in hospital policies, work culture, and access to training and facilities. Therefore, generalizing the findings to all anesthesia caregivers in Indonesia should be done with caution. Future longitudinal or experimental studies are recommended to validate these findings and better understand how motivation develops over time.

Recommendations for Future Research

To address these limitations, future studies should adopt a longitudinal approach, expand the study population, and consider mixed-method research to explore motivational factors more comprehensively.

CONCLUSION

Work motivation is a dynamic force and an important factor in anesthesia and surgical services. The continuous evaluation of work motivation can be a benchmark for hospitals and professional organizations in determining the success of anesthesia and surgical services provided to patients. This can improve the quality of service so that all components can be achieved in accordance with hospital accreditation standards.

AUTHOR'S CONTRIBUTION STATEMENT

RN, WW: the conception and design of the review. RN, WW, APW, GS: acquisition of data. RN, APW, GS: analysis and interpretation of the data, drafting the article. RN: revising the article critically for important intellectual content. RN, WW, APW, GS: final approval of the version to be submitted.

CONFLICTS OF INTEREST

There is no conflict of interest for all the authors of this study.

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