Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

PROFESSIONAL OBSTACLES TO ANESTHESIA PERSONALE PRACTICE IN PUBLIC SECTORS HOSPITAL OF PESHAWAR

Haider Ali khan[1]
[1]Anesthesia Lecturer City University of Science and Information Technology, Peshawar
Haideralikhan87558@gmail.com
Sana Ashfaq[2]
[2]Anesthesia Demonstrator Iqra National University, Swat Campus
[2]somethingishfaq@gmail.com
Zain Ul Abideen[3]
[3]Anesthesia Lecturer City University of Science and Information Technology, Peshawar
[3]Zainulabideen12831@gmail.com
Bilal ahmad [4]
[4]Operating Department Practitioner Musgrove park hospital UK
[4]bilalafridi219@gmail.com
Baz Meer Afridi[*5]
[*5]Lecturer and Research Coordinator Department of Allied Health Science (Physical Therapy), City University of Science and Information Technology, Peshawar
[*5]baz.meer@cusit,edu,pk/bazmeer.afridi786@gmail.com
Muhammad Shehzad[6]
[6]Department of Environmental science University of Peshawar
[6]muhammadshehzadkhan93@gmail.com
Muhammad Awais Khan[7]
[7]Lecturer Anesthesia Department of Allied health sciences (Anesthesia Technologist) City University of Science and Information Technology Peshawar
[7]studentoftheyear3344@gmail.com
Rehan Ali Khan[8]
[8]Registered Nurse, Department of Nursing Khyber Teaching Hospital (MTI), Pehawar
[8]rehanalikhan404@gmail.com
Muhammad Ishaq[9]
[9]Lecturer Radiology Department of Allied health Science (Radiology Technologist) City University of Science and Information Technology, Peshawar
[9]muhammad01ishaq@gmail.com

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

Muhammad Irshad[10]

[10]Student at Hayatabad Institute of Medical science, Peshawar

[10]mirshadafridi5@gmail.com

Author Details

Keywords:

Anesthesia Personale Practice, Professional Obstacles, Public Sectors Hospital

Received on 22 February, 2026

Accepted on 03 April, 2026

Published on 21 April, 2026

Corresponding E-mails & Authors*:

Baz Meer Afridi

baz.meer@cusit,edu,pk/

bazmeer.afridi786@gmail.com

Abstract

Background: Since its introduction in 1846, anesthesia has transformed modern medicine by enabling, the pain-free surgical procedures through controlled unconsciousness and amnesia. Despite its critical role, anesthesiology faces multiple challenges, including limited collaboration with surgeons, workforce shortages, gender disparities, and insufficient institutional support particularly in low-resource settings. Factors such as limited recognition, resource constraints, and reduced patient interaction further influence career choices in this field. **Objective:** This study aimed to identify the key challenges faced by anesthesia personnel in clinical practice, explore reasons for the low interest of medical students in anesthesiology as a career, and examine factors contributing to the underrepresentation of female professionals in public sector hospitals. **Methods:** A cross-sectional study was conducted in operating theaters of two major hospitals in Peshawar, Khyber Pakhtunkhwa. A total of 96 participants including anesthesia technicians, technologists, medical officers, training medical officers, and assistant professors were recruited using purposive sampling. Data were collected through a semi-structured questionnaire developed with expert input, capturing demographic characteristics and perceived professional barriers. Verbal consent was obtained from all participants. **Results:** Most participants were aged 20–30 years, with a predominance of males (71.9%).

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

Anesthesia technicians constituted 36.5% of the sample, and over half (51%) had less than five years of experience. Key challenges included long working hours (58.3%), stress and burnout, and financial concerns (43.8%). Fear while managing high-risk patients was reported by 51% of participants. More than half (57.3%) perceived anesthesiologists as underpaid compared to surgeons, while 53.1% identified inadequate training opportunities in the region. Limited patient interaction (51%) and dependence on surgeons (43.8%) were also noted. Satisfaction with public sector resources was mixed, with only 40.6% reporting satisfaction. **Conclusion:** Anesthesia personnel in Peshawar face significant professional, institutional, and societal challenges that impact job satisfaction and career interest. Addressing issues such as training gaps, gender disparity, workload, and resource limitations is essential to strengthen the anesthesiology workforce and improve healthcare outcomes.

INTRODUCTION

Eliminating pain through anesthesia was a significant medical breakthrough that transformed surgeries beginning on October 16, 1846. This landmark event marked the shift from intense agony during operations to painless procedures, leading to various anesthetic methods and tools developed thereafter (1).

One definition of anesthesia is "drug-induced unconsciousness," characterized by the patient's unawareness and inability to recall unpleasant stimuli. According to Prys-Roberts' functional definition, it involves a lack of conscious awareness and memory formation. Anesthesiology is the medical specialty that addresses the clinical, pharmacological, and physiological aspects of anesthesia, pain management, resuscitation, and intensive respiratory care (2). Anesthesia safeguards patients during

Vol. 5 No. 2 (2026)
Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379
khan et al - 2026
DOI: http://doi.org/10.5281/zenodo.19675678

surgery by maintaining hemodynamic stability and providing optimal conditions for surgeons. Anesthesiologists induce hypnosis and manage sympathetic and parasympathetic autonomic responses to preserve cardiorespiratory regulation under surgical stress, often using opioid medications for analgesia (3).

The purpose of anesthesia includes protecting the patient during surgery, ensuring optimal conditions for the surgeon, and maintaining homeostasis and hemodynamic stability (4).

The purpose of anesthesia is to protect patients during surgery while ensuring stable conditions for the surgeon, homeostasis, and hemodynamics. Accurate dosing of medications is critical to avoid under dosing, which may lead to anxiety or post-traumatic stress, and overdosing, which can have serious or fatal consequences (5).

Anesthesia personnel collaborate with surgeons to treat healthy individuals, though differing priorities and communication issues can obstruct cooperation. Effective teamwork and communication are crucial for improving surgical conditions and patient outcomes, particularly when anesthesiologists comprehend the surgeons' challenges (6).

Young medical students are increasingly hesitant to specialize in anesthesia, primarily due to low job satisfaction and inadequate recognition from patients and colleagues. Gender plays a significant role in the specialty selection process, with female students experiencing higher levels of discrimination and harassment, which contributes to their underrepresentation in the field, as indicated by a recent survey from the European Society of Anesthesiology (7).

Being a woman in anesthesiology while navigating motherhood and lactation introduces considerable challenges. An ASA survey indicates that 10% of female anesthesiologists discourage others from the profession due to its impact on family planning. Many

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

institutions lack appropriate parental leave and lactation facilities and confront stigma related to pregnancy, particularly during residency. Despite an increase in diversity within medicine, women are still underrepresented in anesthesiology. The AAMC reported that over one-third of physicians were women in 2015, yet challenges such as workplace isolation and insufficient support continue, emphasizing the necessity for community and role models (8).

Concerns regarding diminished patient interaction, lower status, and lack of recognition lead to medical students' aversion to anesthesiology. Enhancing the image of anesthetists is essential for achieving parity with surgeons. Additionally, high burnout rates attributed to work overload, strained relationships, and administrative burdens negatively affect job satisfaction. Despite generally strong professional ties between anesthesiologists and surgeons, conflicts of interest can exacerbate stress and dissuade interest in the specialty (9).

The healthcare system in Pakistan comprises three tiers, with increased provincial control following health-sector devolution. The country faces a critical shortage of anesthesiologists, with recent estimates indicating approximately 1–1.5 anesthetists per 100,000 population (around 3,500–4,000 nationwide), which is far below international requirements. This shortage is further worsened by the migration of skilled professionals abroad for better opportunities, leading to major challenges in surgical, anesthetic, and critical care services and highlighting the urgent need to strengthen and retain the healthcare workforce (10).

Anesthesiologists face significant stress from poor workplace ergonomics, including challenging equipment and confusing alarms, which can delay critical responses. The introduction of new equipment often lacks justification and training. Additionally, a WHO

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

study highlights that wages are a major factor driving health professionals to migrate from developing countries (11).

Many anesthesiology departments have developed or are investigating incentive systems to address productivity challenges. Factors such as surgical duration, operating room scheduling, and staffing ratios affect the productivity of anesthesiologists compared to other specialties (12).With a population of 230 to 240 million, Pakistan is classified as a low- to middle-income country (13).

In South Asia, anesthesiology is a neglected specialty, grappling with issues like poor recognition, reliance on surgeons, high professional stress, and funding deficiencies. The WHO highlights a notable lack of anesthesiologists in six out of seven South Asian countries, primarily due to emigration and insufficient training. In Pakistan, anesthesiology data is scarce, and there are no studies examining the specific challenges faced by anesthesiologists, many of whom are forced to work in both public and private sectors due to financial constraints and a shortage of skilled personnel (14).

Numerous factors can influence a person's career choice, with students' opinions about anesthesiology differing across the globe (15).

Materials and Methods:

The study is an observational cross sectional study which is carried out in different operation theaters in two major hospital of district Peshawar with extensive coverage of population in the province of Khyber Pakhtunkhwa.

The 96 samples were collected from both hospitals that include anesthesia technicians, technologists, training medical officers, medical officers and assistant professors. We used WHO sample size calculator for population size of 700 according to pilot study. Pilot study

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

shows that there are about 700 anesthesia staff in lady reading hospital and Khyber teaching hospital Peshawar Khyber Pakhtunkhwa.

Semi structured interview based set of self-made written questions was developed based on a literature review, with the help of a Khyber Medical University anesthesia demonstrator who was involved as a supervisor. This questionnaire has both demographic questions (gender, age, position, and working in a hospital) and a spectrum of barriers (technological, financial, etc.), but these are also organized in a very natural manner making them easy to respond to. We additionally go over to explain the questions that some participants found challenging. All of the participants provided his or her verbal consent prior to being provided with a chance to voice his or her interests. In the collection of data, we used purposive sampling.

The data collected from responded were analyzed thoroughly while putting in SPSS version 29.

Results:

A total of 96 participants were included in the study. The age ranged from 20 to 59 years, with a mean of 32 years (SD = 7.63) and a mode of 27. Participants were categorized into four age groups: 20–30 years (n=48), 31–40 years (n=34), 41–50 years (n=14), and above 50 years (n=2).

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

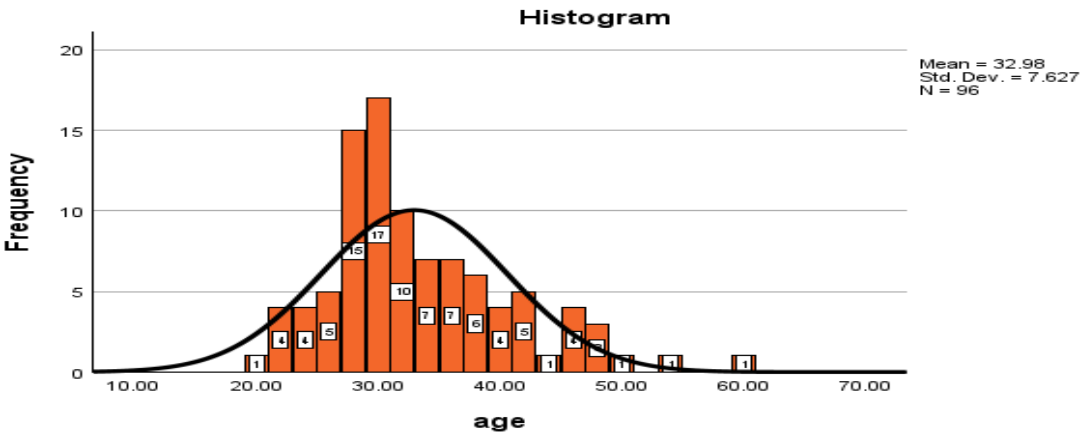

Figure 1: Age Distribution of Participants

In terms of gender distribution, 69 (71.9) were male and 27 (28.1) were female. The sample comprised of anesthesia staff of technician level to assistant professor in the public sector hospitals of Peshawar. Designation 35 (36.5%) were anesthesia technicians, 34 (35.4) training medical officers, 12 (12.5) medical officers, 9 (9.4) assistant professors, 6 (6.3) anesthesia technologists.

Based on professional experience, 49 (51.0%) participants had less than 5 years of experience, 30 (31.3%) had 5–10 years, 8 (8.3%) had 10–15 years, and 9 (9.4%) had more than 15 years of experience. In terms of work issues, 56 (58.3) participants affirmed that long working hours in operation theaters are difficult, with 35 (36.5) disagreeing. Stress and burnout were reported as rare by 35 (36.5%), occasional by 35 (36.5%), frequent by 20 (20.8%), and almost always by 6 (6.3%) participants. In terms of patient consent, 44 (45.8%) participants reported occasional difficulty, 41 (42.7%) rare difficulty, 9 (9.4%) frequent difficulty, and only 2 participants reported consistent difficulty. The 42 (43.8) reported financial constraints and 49 (51.0) did not. The 49 (51.0) participants reported

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

fear during the administration of the anesthesia in high-risk patients, and 47 (49.0) participants did not report fear. Also, 55 (57.3) respondents thought that anesthesiologists receive lower payments than surgeons. Fifty one (53.1) participants reported lack of training opportunities whereas 45 (46.9) participants disagreed. Reliance on surgeons was deemed a problem by 42 (43.8) participants and 44 did not see it as a problem. The 49 (51.0%) participants reported limited interaction with patients. In terms of institutional resources, 39 (40.6) were satisfied, 43 (44.8) were moderately satisfied and 14 (14.6) were not satisfied.

Table 1: Work-Related Challenges among Anesthesia Personnel

S. No	Variable	Response	Frequency (n)	Percentage (%)
1	Work hours	Yes	56	58.3
		No	35	36.5
		Often	5	5.2
2	Stress and burnout	Rarely	35	36.5
		Occasionally	35	36.5
		Frequently	20	20.8
		Almost always	6	6.3
3	Difficulty in obtaining consent	Rarely	41	42.7
		Occasionally	44	45.8
		Frequently	9	9.4

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

		Almost always	2	2.1
4	Financial constraints	Yes	42	43.8
		No	49	51.0
		Often	5	5.2
5	Fear of anesthetizing patients	Yes	49	51.0
		No	47	49.0
6	Low income of staff	Yes	55	57.3
		No	41	42.7
7	Lack of training opportunities	Yes	51	53.1
		No	45	46.9
8	Dependency on surgeons	Yes	42	43.8
		No	44	45.8
		Often	10	10.4
9	Lack of patient interaction	Yes	49	51.0
		No	46	47.9
10	Hospital resources satisfaction	Satisfied	39	40.6
		To some extent	43	44.8
		Not much satisfied	14	14.6

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

Regarding any gender-related issues, 41 (42.7) respondents felt that anesthesia responsibilities were challenging to women, whereas 55 (57.3) did not. Female anesthetists expressed security concerns when 41 (42.7) participants reported this. Moreover, 61 (63.5) participants admitted that working mothers have great challenges, 21 (21.9) did not agree and 14 (14.6) said they have difficulties occasionally.

Table 2: Gender-Related Challenges in Anesthesia Practice

S. No	Variable	Response	Frequency (n)	Percentage (%)
1	Tough field for women	Yes	41	42.7
		No	55	57.3
2	Security concerns for women	Yes	41	42.7
		No	55	57.3
3	Motherhood vs. anesthesia	Yes	61	63.5
		No	21	21.9
		Often	14	14.6

Discussion

This paper is an exploration of the job issues of the anesthesia personnel in the government hospitals in Peshawar, Khyber Pakhtunkhwa. The results indicate that there is a complicated overlap of systematic forces, such as high patient numbers, financial insecurity, and cultural obstacles that greatly influence the professional experiences of these healthcare professionals. One of the main issues detected is occupational stress due

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

to long hours of work and workloads. The 96 respondents, half of them (58%), found long hours as one of the primary stressors, and the situation was made worse by the unrelenting workload of tertiary care hospitals. This is in line with the international statistics, including results conducted by the American Society of Anesthesiologists, which show that the stressful nature of the profession has been a source of tension between work and personal life. The need to make decisions fast that would save lives only heightens these pressures in the local context of Peshawar (16).

The paper also indicates that there are major challenges to informed consent, which are usually based on socio-cultural dynamics of the area. The barriers include language barriers, family conservative values which prefer female practitioners and difficulties in obtaining consent in emergency cases. These problems underline the importance of effective communication practices and cultural sensitivity to ensure efficient communication between patients and providers. The anesthesia anaesthetic finances seem to be polarized. Although 46 percent of the respondents indicated that they had financial constraints, 54 percent never had this and this may be one of the differences that are usually associated with the availability of dual practice in the private sector (17).

This is not a new observation by other studies, including that by Sumbal Shahbaz, who found that although private healthcare organizations could have greater pay opportunities, these were inaccessible to a very limited group, leaving many public providers with limited financial opportunities. As to training, there is a divided opinion. Although almost half of the respondents said they were satisfied with the existing training, some of them pointed lack of variety in training opportunities as one of the biggest discouragements to professional development. This brings out the urgency of standardized and accessible training programs to promote uniform healthcare quality (18).

Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

Moreover, the research indicates the lack of consensus in the perceptions of patient-anesthesiologist relations, which highlights the invisibility or rather indirectness of the anesthesia services provided by the hospital system. The resource management is also a crucial area that needs improvement; very few respondents expressed their high satisfaction with the hospital resources, with most of the respondents expressing moderate or dissatisfaction (19).

Lastly, the views on gender-related obstacles in the profession are divided as 41 participants admitted that there are still serious obstacles to female participation, which indicates that although the situation is improving, there remain systemic and cultural obstacles. Healthcare institutions need to implement supportive policies to enhance the quality of care and well-being among providers. This involves the introduction of shifts that help to reduce exhaustion, standardization of training programs as well as the improvement of communication protocols (20). Furthermore, the provision of adequate support systems, regular resource reviews, and proactive measures to promote gender equity are critical measures in ensuring a more sustainable and supportive environment among anesthesia professionals.

Conclusion:

As this paper highlights, the issues that anesthesia staff in government hospitals in Peshawar have to deal with are multifaceted. The main problems observed are work-related stress, safety, and problems with informed consent, limited finances, lack of training, ineffective communication between patients and anesthesiologists, and gender differences. All these aspects have an overall effect on professional satisfaction, performance, and overall healthcare delivery quality. The results highlight the significance

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.19675678

of a continuous assessment, institutional support, and specific interventions to establish a more supportive and effective working environment. The need to tackle these challenges is critical in fortifying the workforce in anesthesiology and enhancing patient care outcomes irrespective of gender or profession.

REFERENCES:

1. Andrew JK, Gitlin JA, Desai MS. Surgical operations at Massachusetts General Hospital in 1846 and 1847: Early impact of the discovery of anaesthesia. Anaesthesia and Intensive Care. 2022;50(2_suppl):16-22.
2. Brown EN, Pavone KJ, Naranjo M. Multimodal general anesthesia: theory and practice. Anesthesia & analgesia. 2018;127(5):1246-58.
3. Çekmen N, Oba Ş, Haka D. "Ten Optimal Physiological Parameters" to keep the patient safe perioperatively: A narrative review. Saudi Journal of Anaesthesia. 2026;20(2):405-17.
4. Sessler DI. How three linked clinical observations led to an understanding of perioperative heat balance: a personal reflection on the scientific process. Journal of Clinical Anesthesia. 2024;96:111496.
5. Mashour G, Avidan M. Intraoperative awareness: controversies and non-controversies. British journal of anaesthesia. 2015;115(suppl_1):i20-i6.
6. Gillespie BM, Gillespie J, Boorman RJ, Granqvist K, Stranne J, Erichsen-Andersson A. The impact of robotic-assisted surgery on team performance: a systematic mixed studies review. Human factors. 2021;63(8):1352-79.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.19675678

7. Methangkool E, Faloye A, Kolarczyk L, Deshpande S, Belani K, Trzcinka A, et al. The women in cardiothoracic anesthesiology special interest group: what can the lessons of one anesthesiology affinity group tell us about how to build impactful professional communities? Anesthesia & Analgesia. 2023;137(4):763-71.
8. Black-Schaffer WS, Gross DJ, Nouri Z, DeLisle A, Dill M, Park JY, et al. Re-evaluation of the methodology for estimating the US specialty physician workforce. Health Affairs Scholar. 2024;2(4):qxae033.
9. Raveendran L, McGuire CS, Gazmin S, Beiko D, Martin LJ. The who, what, and how of teamwork research in medical operating rooms: a scoping review. Journal of Interprofessional Care. 2023;37(3):504-14.
10. Gardner WM, Razo C, McHugh TA, Hagins H, Vilchis-Tella VM, Hennessy C, et al. Prevalence, years lived with disability, and trends in anaemia burden by severity and cause, 1990–2021: findings from the Global Burden of Disease Study 2021. The Lancet Haematology. 2023;10(9):e713-e34.
11. Nelson O, Greenwood E, Simpao AF, Matava CT. Refocusing on work-based hazards for the anaesthesiologist in a post-pandemic era. BJA open. 2023;8:100234.
12. Titler SS, Dexter F, Epstein RH. Impact of anesthesia resident staff assignment decisions on nurse anesthetist and anesthesia resident staff scheduling and productivity: tutorial using data from a pediatric hospital. Perioperative care and operating room management. 2021;24:100182.
13. Economic Do. World Population Prospects 2024: Summary of Results: Stylus Publishing, LLC; 2024.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387
Print ISSN 3007-2379

khan et al - 2026

DOI: http://doi.org/10.5281/zenodo.19675678

14. Bould MD, Cousins JB, Hoang J, Zha Y, Yilma L, Gacii VM, et al. An evaluation of the transfer of skills and knowledge from two world federation of societies of anaesthesiologists fellowship programs. Anesthesia & Analgesia. 2024;139(6):1259-66.
15. Law TJ, Lipnick MS, Morriss W, Gelb AW, Mellin-Olsen J, Filipescu D, et al. The global anesthesia workforce survey: updates and trends in the anesthesia workforce. Anesthesia & Analgesia. 2024;139(1):15-24.
16. Sanfilippo F, Noto A, Foresta G, Santonocito C, Palumbo GJ, Arcadipane A, et al. Incidence and factors associated with burnout in anesthesiology: a systematic review. BioMed research international. 2017;2017(1):8648925.
17. Kumar R, Garg S, Kaur R, Johar M, Singh S, Menon SV, et al. A comprehensive review of machine learning for heart disease prediction: challenges, trends, ethical considerations, and future directions. Frontiers in artificial intelligence. 2025;8:1583459.
18. Mizzi L, Marshall P. Inequitable barriers and opportunities for leadership and professional development, identified by early-career to mid-career allied health professionals. BMJ leader. 2024:leader-2023-000880.
19. Flexman AM, Ke J, Hallet J. Innovating for Value-Based Surgical Care in Canada: A Post-Pandemic Necessity. Healthcare Policy. 2023;18(4):43.
20. Matejic B, Nelson BD, Collins L, Milenovic MS. The glass ceiling in global health: perspectives of female and male anesthesiologists. Anesthesia & Analgesia. 2025;141(2):403-11.