RESEARCH ARTICLE

Challenges in practice and training structure of residents in obstetric anaesthesia: A perspective from teaching hospitals in Sindh province of Pakistan

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Abstract

Objective: To document information on the available obstetric anaesthesia services and structure of resident training in a Pakistani setting.

Method: The survey was conducted from June to September 2018 across the Sindh province of Pakitan after approval from the ethics reiew committee of the Pakistan Society of Anaesthesiology, and covered all teaching hospitals in both public and private sectors recognised for residents' training for fellowship in Anaesthesiology by the College of Physician and Surgeons of Pakistan. A standardised questionnaire was filled by either the department chairperson or a senior designated faculty member in each institution regarding obstetric anaesthesia services and structure of resident training. Data was analyse using SPSS 22.

Results: The results reflect the obstetric anaesthesia practice in 12 teaching institutions of Sindh province, seven government-run, and five private. Only 2 (17%) hospitals had dedicated preoperative assessment clinics for obstetric patients. Epidural service for pain free labour was available in 8(67 %) of the hospitals. Eleven (91.6%) hospitals had dedicated operating rooms and nine (75%) had separate recovery facilities. Onsite laboratory and blood banks were available in only 3(42%) of government and 3(60%) of private institutions. In 9(75%) hospitals staffing of these units were by Senior Medical Officers. Regarding training of residents, a shortage of trainers was observed in two government and one private hospital leading to unsupervised work by the trainees. There was wide variation in training in spite of a standardised curriculum provided by the national training body.

Conclusion: Gaps were identified in the practice of obstetric anaesthesia and structure of residents' training. It is important to improve both service and training to improve patient safety.

Keywords: Pregnancy, Blood, Anesthesia, Obstetrical, Surgeons, Obstetric. (JPMA 75: 31; 2025)

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Introduction

Good and safe anaesthesia care needs adequate number of trained and qualified personnel, equipment, essential drugs, and minimum standards.[1] Lack of these resources may lead to an increase in maternal mortality.[2] The global maternal mortality rate (MMR) in 2020 was 223 per 100,000 livebirths, and 95% of these deaths occurred in low-income contries (LICs) and low- and middle-income countries LMICs).[3] In a systematic review of 44 studies, about one in seven maternal deaths during or after caesarean section (CS) was due to anaesthesia.[4]

Pakistan has a population of 241.49 million, according to the census done in 2023,[5] and 60% of the population comprises females, with the fertility rate being 3.5 births per woman.[6] MMR in Pakistan was 186 deaths per 100,000 live, according to the Pakistan Maternal Mortality Survey (PMMS) conducted in 2019 by the National Institute of Population Studies (NIPS), funded by the United States Agency for International Development (USAID).[7]

Published data related to obstetric anaesthesia services from Pakistan is deficient. One survey looked at obstetric anaesthesia practices in district and teaching hospitals in Punjab, the largest province of Pakistan, and showed huge deficiencies as far as safety was concerned.[8] No published data is available from the Sindh province, which in 2023 had a population of 55.69 million[5]. Its provincial capital is Karachi, which is the largest city in Pakistan. The other major cities in the province are Hyderabad and Sukkhar.[9] The MMR in Sindh is 345 per 100,000 live births, which is much higher than the national figure.[10]

The current survey was planned to document the available obstetric anaesthesia facilities, and to review the structure of training opportunities available for anaesthesia residents in the province.

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Materials and Methods

The survey was conducted from June to September 2018 across the Sindh province of Pakitan after approval from the ethics reiew committee of the Pakistan Society of Anaesthesiology (PSA), and covered all teaching hospitals in both public and private sectors recognised for residents' training for fellowship in Anaesthesiology by the College of Physician and Surgeons of Pakistan (CPSP). Permission was obtained from either chief medical officer or the head of the Anaesthesia department of each institution.

The self-designed survey questionnaire covered different aspects of obstetric anaesthesia service, and was pre-tested at 2 of the hospitals. The survey tool consisted of two parts. The first part recorded general institutional information, while the second part recorded the information related to the availability of obstetric anaesthesia service as well as a review of the training structure of residents in obstetrics. Each subsection had a comments section for free text insertion and suggestions at the end.

The survey form was filled by the department head, or a senior consultant designated by the departmental chair who had access to all departmental data. A written consent from each respondent was also obtained, and data confidentiality was assured. The names of the institutions were kept confidential, and data was stored as institution A, B, C etc.

Data was transferred to Excel sheets, and was analysed using SPSS 22. Categorical data was expressed as frequencies and percentages, while quantitative data was reported as mean +/- standard deviation or as median with interquartile range (IQR).

Results

Of the 13 institutions approached, 8(61.5%) were in the public sector and 5(38.5%) were in the private sector. Of them, 1(12.5%) public-sector institution refused to participate, and the final sample, as such, stood at 12(92.3%); 7(58.3%) government-run, and 5(41.6%) under private control.

While all the 12(100%) hospitals had an obstetric unit, dedicated antenatal clinics were run in 11(91.6%). Data relating to bed strength of units, deliveries peryear, epidural analgesia per year, rates of elective and emergency Csections per year was noted (Table 1).

There were 2(16.6%) hospitals, 1(50%) each in public private sectors, with dedicated clinics for obstetric patients. In the rest, obstetric patients were being seen in the general clinics. In 7(58.3%) hospitals, the clinics were being attended by consultants.

The median bed strength of the labour room suites was 10 (interquartile range 9-20) in government hospitals and median 7.5 (interquartile range 4-11) in the private hospitals. Data regarding the availability of resuscitation equipment, monitoring, and presence of anaesthesiologist was noted (Table 2).

Dedicated operating rooms (ORs) for obstetric surgery were available in 11(91.6%) hospitals. In 1(8.33%) private-sector hospital, such cases were brought to the general OR.

A dedicated recovery area adjacent to the OR suite was present in 4(33.3%)government and 5(41.7%) private institutions. Dedicated nurses in the recovery were present in 2(16.6%) private institutions, while in the rest of the hospitals, the services were shared with the general patients.

In 4(33.3%) private hospitals, a paediatrician was always present for all elective Csections procedures. For emergencies, this service was shared between anaesthesiologists and paediatricians, depending on availability. In 7(58.3%) government institutions, resuscitation was being done by anaesthesiologists for elective procedures, and by whosoever was available in emergency. Onsite laboratory and blood banks were available in only 3(42%) of government and 3(60%) private institutions.

General intensive care unit (ICU) facilities were present in all 12(100%) hospitals. A dedicated high dependency unit (HDU) for obstetric services was present in 2(16.6%) government and 3(25%) private institutions. In the remaining 7(58.3%) institutions, such patients were accommodated in general HDU/ICU units, if needed.

Dedicated consultant staff with higher professional qualifications were present in the obstetric unit in 1(8.3%) government and 2(16.6%) private institutions. In 5(38.5%) government and 4(33.3%) private hospitals, middle-grade non-faculty anaesthesiologists with experience and diploma in Anaesthesiology, designated as senior medical officer (SMO), were present and available. They did not directly supervise the trainees, but were available to manage any emergency situation. Residents rotated around these units for both elective and emergency exposure. The level of residents assigned to obstetric units varied. Non-physician staff, like nurses/technicians were present to assist anaesthesiologists in 9(75%) units during working hours, while such cover was not uniform during emergency hours.

Intravenous (IV) analgesia was provided to all women in labour in 7(58.3%) government institutions and 2(16.6%) private institutions. The two most commonly used

parenteral drugs were tramadol and nalbuphine. Ketorolac was used in 2(16.6%) institutions and IV paracetamol was used as an adjuvant in 1(8.3%). Entonox for labour analgesia was only available in 2(16.6%) private institutions.

Table-1: Bed strength and workload in the hospitals surveyed.

Variable	Government Institutions n =7 Interquartile Range [25-75]	Median	Private Institutions n=5 Interquartile Range [25-75]	Median
Bed strength of obstetrics units	110- 170	150	23- 70	70
Deliveries/ year	3983- 13000	7200	1670-3000	2027
Epidurals for labour analgesia/ year	12-20	15	100-200	150
Elective C- sections/year	625- 4700	1250	500- 861	520
Emergency C – sections /year	2550 – 5500	4440	456-900	561

Interquartile Range [25-75] and Median

Table-2: Equipment and availability of anaesthesiologists in the obstetric unit.

Equipment	Government Hospitals (7) n (%)	Private Hospitals (5) n (%)
Resuscitation Equipment		
Crash cart	6 (85.7)	5 (100)
Defibrillator	2 (28.5)	4(80.0)
Difficult airway trolley	6 (85.7)	5(100)
Neonatal resuscitation trolley	6 (85.7)	5(100)
Special equipment polio blade, short handle laryngoscope blade	3 (42.8)	3(60.0)
Monitoring Equipment		
NIBP	7 (100)	5(100)
Pulse oximeter	6 (85.7)	5(100)
CTG facility	4 (57.1)	5(100)
Consultant anaesthesiologist availability on site	1 (14.2)	4(80.0)

Interquartile Range [25-75] and Median

Table-3: Approach to routine laboratory testing in the obstetric units surveyed

EHospital	Hb only	CBC	Urine DR	ESR	Electrolytes	X-Ray chest	Coagulation	Additional tests
G		ü	ü					
G		ü	ü					
G		ü		ü				
G		ü			ü		ü	
G		ü			ü	-		ü
G		ü	ü			-		
G		ü			ü	-		ü
P	ü						*Open Access*	
P								
P								ü
P		ü						
P		ü	ü				ü	

G : Government institution, P : Private institution, Hb: Haemoglobin, CBC: Complete blood count, DR: Detailed report, ESR: Erhthrocyte sedimentation rate, ü: Tests conducted routinely.

Epidural service for painless labour was available in 5(41.6%) private hospitals, and on request in 3(25%) government institutions.

Aspiration prophylaxis was routinely provided in all 12(100%) institutions to those patients who were to undergo general anaesthesia (GA). This practice varied for CS performed under spinal anaesthesia, where 1(8.3%) government and 1(8.3%) private hospital did not follow the routine. Histamine 2 blockers and metoclopramide were used in all 12(100%) institutions, but the practice of sodium citrate administration was followed at (33.3%) hospitals.

With respct to spinal anaesthesia, the practice of preload versus co-load varied from consultant to consultant even in the same institution, with crystalloid solutions being used in 10(83.3%) institutions for preload/co-load, and in 4(33.3%) hospitals in combination with colloids.

Syntocinon or methergine was routinely used for uterine contraction after delivery. Syntocinon IV bolus was the most common method used in 10(83.3%) hospitals. Methergine was the drug of choice in 3 (25%) institutions.

High-risk pregnancy patients were admitted in all 12(100%) institutions. High-risk pregnancies in government institutions ranged 10-30% while it ranged 3-16% in private institutions. These cases were pre-eclamptic toxaemia of pregnancy, eclampsia and placenta previa. Not all such high-risk cases were assessed by anaesthesiologists preoperatively. There were 4 (33.3%) government and 3(25%) private instituions that practiced referral of such cases to anaesthesia services preoperatively, in other institutions these patients presented as emergency cases. Not all these high-risk patients were taken to to HDU/ICU routinely. This practice was present in 7(58.3%) institutions.

Routine approach to laboratory testing in obstetrical patients ws noted (Table 3).

Data related to obstetric anaesthesia training structure was collected from 10(83.3%) institutions imparting fellowship training in Anaesthesia at the time, because 2(16.6%) government institutions which had been approved for fellowship training from the accrediting body were yet to initiate the programme. However, these institutions were imparting training for a 2-year membership programme. Residents in 10(83.3%) teaching hospitals underwent an obstetric training module of 3-month duration. In 5(41.6%) government and 2(16.6%) private institutions, first-year trainees were also posted on Anaesthesia units, and worked with minimal direct supervision.

The residents training in 5(41.6%) government institutions got to manage a higher number of cases, but had very little exposure to labour epidural analgesia because of the low number of epidurals performed. In 2(116.6%) government hspitals and 1(8.3%) private hospital, there was no direct supervision of trainees due to faculty shortage. However, SMOs were present on the premises to provide services in addition to the residents, and were available for help in emergency cases.

Discussion

Obstetric burden in Sindh Pakistan was found to be high, especially in government setups where 15-16% of the total bed strength in major, multidisciplinary hospitals was dedicated to obstetrics. The current results showed a wide variation of workload between government and private institutions with 3.5 to 8 times higher number of deliveries and CS in government hospitals.

The problems identified from the free text section of the form included a lack of seniors' involvement in complicated cases, inefficient multi-disciplinary team communication, poor postoperative care, reluctance to use invasive monitoring, and high incidence of sepsis. These needed to be specifically addressed in the provision of safe obstetric services.

Lack of involvement of anaesthesiologists in antenatal care (ANC) and in preoperative assessment of high-risk obstetric patients was identified as an issue. Anaesthetic involvement in the care of high-risk cases was delayed till the time of delivery. Partly, it could be due to a lack of human resources since Anaesthesia is still a shortage specialty in Pakistan. One of the solutions that has been discussed to overcome the human resource shortage is "task shifting". Sri Lanka in South Asia has been successful in decreasing its MMR with this type of a programme. However, it needs several steps to implement and sustain.[11]

Majority of institutions in the public sector did not have an epidural service and inadequate facilities to train for epidural for pain relief in labour. This probably reflected the demand of private patients rather than an offer of epidural service by the obstetrician and anaesthesiologists. In addition, it may also reflect the limited budget and/or lack of resources in government setups. Obstetrical pain relief service is a requirement for not only humanitarian reasons, but also for the medical management of certain obstetrical conditions. Rates of epidural service in high-income countries (HICs) varies from >60% in the United States to 30% in the United Kingdon,[12] and its availability is recommended for all obstetric units in the UK.

Regarding intraoperative management, there was a lack of basic resuscitation equipment, specialised airway equipment for obstetric patients, and variable practices in aspiration prophylaxis, use of preload and co-load, etc. There is still no agreement on national practice guideline or protocol in this regard.

There was a lack of dedicated HDU facilities in majority of government institutions. HDU care on delivery suites has been shown to decrease morbidity and mortality (M&M), resulting from transfer delays.[13]

Only 42% government and 60% private hospitals had onsite laboratory and blood transfusion services available. There was no data on whether these services caused a delay in patient management or contributed to M&M.

Published local literature on the subject is deficient. A 2017 cross-sectional survey of 17 teaching and 24 district headquearter (DHQ) hospitals in the Punjab province[8] looked at the availability of guidelines, airway adjuncts, spinal and epidural needles, blood and blood products, and treatment of maternal hypotension. The survey observed that guidelines were available in only 10% of the institutions. Peripheral hospitals lagged behind their teaching counterparts in availability of equipment and blood products. A scoping review in 2022 relevant to surgical anaesthesia and obstetric care in Pakistan identified barriers like workforce, infrastructure, service delivery and financing. It also identified that no comprehensive registry of health workforce existed in the country.[14]

Obstetric anaesthesia training varies greatly across countries. A recent study analysed the curricula and training in obstetric anaesthesia in the US, France, the UK, Belgium and Singapore, and noted that practices differed with respect to general curricula and educational methods in obstetrical anaesthesia.[15] The study made a case for competency based education. Another recent study highlighted the teaching and learning of obstetric anaesthesia in LICs and LMICs. It mentioned the success of educational and training programmes that have proved effective and have shown positive outcomes.[16] In Pakistan, obstetric anaesthesia training recommendations come from the CPSP.[17] The current CPSP guidelines rely on the training supervisor to sign off the resident after a set of competencies is achieved. However, the supervisor does not directly work with the trainee, but has an overseeing role. Currently additional learning strategies, like e-learning, team training and simulation-based training, are being recommended.[18,19] Simulation-based training in obstetrics offers benefits, like enhancing team work and communication. Neonatal resuscitation also needs to be taught in a formal manner.

Good training needs adequate number of trainers, a good trainer-trainee ratio, and a reasonable number of cases. The current survey shows that although the number of cases appeared to be adequate for learning opportunities, but the trainee-trainer ratio was not ideal. In some government institutions, there was only remote supervision of the trainee, and the consultant was not physically present in the labour room suite. There was also workload variation, with higher workload present in public hospitals. This additional pressure on workforce may lead to a higher burnout rate.[20]

There is no national fellowship training programme in obstetric anaesthesia in the country. [21] Only 1 institution offers a one-year certification fellowship.[22]

Although MMR in Pakistan has decreased from 276 deaths per 100,000 livebirths as per the Pakistan Demographic and Health Survey (PDHS) 2006-7 to 186 in 2019, it is still quite high. Contribution of anaesthesia to MMR in the country is unknown.[7]

The strength of the current study is that the survey adds to the deficient literature on obstetric anaesthesia in the country. However, the study has its limitations as the survey tool only offered two options for some variables. This was done to keep the form relatively simple and easy to fill. To overcome this, a comments section was provided after each subsection for additional information. The current study did not interview the trainees individually, and, hence, could not comment on the quality of training owing to financial constraints. Though the information presented in the survey is more than four years old, no substantial change has occurred during this period. However, this needs to be substantiated by a follow-up survey. Another limitation of the study is that it only covered the institutions where training of Anaesthesia residents was taking place, and did not cover the whole spectrum of practice of obstetric anaesthesia in the province.

Conclusion

Several gaps were identified in the practice of and training for obstetric anaesthesia in the Sindh province. Foremost among these were the lack of epidural service, communication gap between anaesthesiologists and obstetricians, unavailability of onsite laboratory and blood banks, a wide variation in perioperative practice, and shortage of trainers and unsupervised work by the trainees. Patient load was much greater in government institutions, but they lacked some facilities required for higher professional training.

Disclaimer: A report based on the findings was submitted to the World Federation of the Societies of Anaesthesiologists (WFSA) in December 2019. Besides, two surveys were conducted simultaneously; one for obstetric anaesthesia, and the other for paediatric anaesthesia. Apart from the general institutional information, the questionnaire was specific to the subspecialty, and did not overlap. The two surveys were presented for publication separately. The paediatric anaesthesia survey was published in 2022 .Citation as follows ._Khan FA, Haider S, Abbas N, et al. Challenges of Pediatric Anesthesia Services and Training Infrastructure in Tertiary Care Teaching Institutions in Pakistan: A Perspective from the Province of Sindh. Anesth Analg. 2022;134(3):653-660.

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Author Contribution:
FAK: Conceived study design, survey tool, data collection and analyzing, writing, editing and approval.
SH: Reviewed and edited protocol, constructing survey tool, data collection, analyzing, editing and approval.
NA, AUS, SK and SZS: Reviewed survey tool and protocol, data collection, reviewed and approval final draft.
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