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Abstract

Background: Very little is known about the state of surgical, anaesthesia and obstetric care in Pakistan.

Aims: This study aimed to assess the literature available on surgical, anaesthesia and obstetric care in Pakistan to understand the strengths and weaknesses of this care based on the domains of the framework of national surgical obstetric anaesthesia plans, namely: infrastructure, workforce, service delivery, information management, governance and service delivery.

Methods: Relevant studies in English published between 2003 and 2018 were identified by searching electronic databases including PubMed/MEDLINE, EMBASE and Scopus. Searches of the grey literature were also done for documents of various organizations. Thematic content analysis was conducted to collate, summarize and analyse the data.

Results: A total of 2347 studies were identified and screened, of which 57 articles met the inclusion criteria. While national-level surveys, reviews and policy documents provided an

understanding of the existing surgical, anaesthesia and obstetric care services in the country, most of the studies were limited in their scope and therefore were not representative of the situation at the national level. In terms of surgical, anaesthesia and obstetric care, the health care infrastructure, availability of services, workforce, financial protection, information management and governance frameworks have failed to develop at the same pace as the needs of the ever-growing population in Pakistan.

Conclusions: Our findings can be used to guide future research activities as part of efforts to strengthen the surgical system in Pakistan. Recent government initiatives hold promise for future improvement in access to surgical care.

Keywords: surgery, anaesthesia, obstetrics, health services accessibility, Pakistan

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Introduction

The Lancet Commission on Global Surgery in 2015 estimated that 5 billion people lack access to safe, timely and affordable surgical and anaesthesia care worldwide (1), including over 95% of the population in South Asia compared with only 5% of the population in Australia, North America and Western Europe (2). If this unmet need is not addressed urgently, low- and middle-income countries face a US$ 12.3 trillion loss in economic growth by 2030 (1). The Lancet Commission recommended that all countries evaluate their surgical, anaesthesia and obstetric infrastructure, workforce, service delivery, information management, governance and financing through the collection of six indicators measuring the strength of their surgical care

system (1). Shortly after the Lancet Commission, the World Health Assembly unanimously adopted Resolution 68.15 in May 2015 that commits to “strengthening emergency and essential surgical care and anaesthesia as a component of universal health coverage”. The third edition of the Disease Control Priorities (DCP-3) published its first volume on essential surgery in the same year, corroborating the need to invest in cost-effective, emergency and essential surgical services as part of universal health coverage (3,4).

The updated six-domain national surgical, obstetric, and anaesthesia care plan and framework, a modification of the original five-domain framework recommended by the Lancet Commission, is being widely used to analyse and strengthen surgical care systems within a country. The framework includes domains for infrastructure, workforce, service delivery, information systems, governance and financing, which comprehensively captures all inputs, processes, outputs and outcomes of the delivery of surgical services. Based on data from the Lancet Commission, low- and middle-income countries had wider gaps in the five original domains and poorer availability of timely surgical care.

Pakistan is the sixth most populous country in the world with a population of 207.8 million. The country ranks 152 out of 189 countries according to the Human Poverty Index with two thirds of its population living in rural areas (5,6). The country is divided into four provinces (Balochistan, Khyber Pakhtunkhwa, Punjab and Sindh), two autonomous territories (Azad Kashmir and Gilgit Baltistan) and a Federal Capital Territory (Islamabad). Similar to other low- and middle-income countries, Pakistan faces a large burden of communicable diseases, road traffic injuries, and maternal, neonatal and child health issues (7). In addition, Pakistan has one of the lowest per capita health care budgets in the world (8).

Based on data from other low- and middle-income countries and poor national health indicators, the availability of surgical, anaesthesia and obstetric care in Pakistan is likely to be suboptimal. As a result, in a national stakeholder’s meeting for Pakistan’s National Vision for Surgical Care in November 2018, public and private stakeholders committed to improve surgical, anaesthesia and obstetric care in Pakistan. To inform future policy and strategy development around surgical, anaesthesia and obstetric care, we conducted a 16-year scoping review of the literature from 2003 to 2018 relevant to surgical, anaesthesia and obstetric care in Pakistan. Our aims were to understand the nature and extent of the literature available, and identify the status of surgical, anaesthesia and obstetric care in Pakistan according to the domains of the national surgical obstetric and anaesthesia plan and framework: infrastructure, workforce, service delivery, information management, governance and service delivery.

Methods

Given the wide breadth of the topic and to include different study designs, research and literature, we used a scoping review approach as opposed to a systematic review approach. This scoping review was based on the Arksey and O'Malley methodological framework (9), which has been widely used for reviews that aim to capture literature regardless of their study design and quality. This methodological framework includes six stages: i) identifying the research question; ii) identifying relevant studies; iii) selecting studies; iv) charting the data; v) collating, summarizing and reporting the results; and vi) consulting with relevant stakeholders, although this last stage was not applied in our scoping review. We chose a time span of 16 years because very little literature on gaps in surgical care delivery in Pakistan is available before 2003. Extending the time to earlier years would have provided very little additional value to this review.

Identifying the question

After thorough discussions between the research teams at the authors' institutes and becoming familiar with the literature, the following research question was identified: What is the status of surgical, anaesthesia and obstetric care in Pakistan across health system domains of infrastructure, workforce, service delivery, information management, governance and financing?

Identifying relevant studies

Relevant studies to evaluate the current state of access to surgical, anaesthesia and obstetric care in Pakistan were identified by searching electronic databases of published literature including PubMed/MEDLINE, EMBASE and Scopus. To ensure that the maximum amount of relevant information was captured, grey literature searches were conducted across various organizations (e.g. World Health Organization, and federal and provincial health departments) and Google Scholar to include unpublished reports and policy documents. The search strategy was limited to articles published in English only. Reference lists of the articles selected were manually reviewed for other relevant sources.

The search terms "Pakistan"' and "surgical procedures" were combined with appropriate MeSH terms and wildcards of the following terms: operative, surgeon, surgery, surgical, anaesthesia, anaesthesia, obstetric, obstetrics, caesarean, caesarean, urology, urological, neurosurgery, neurosurgical, orthopaedic, orthopaedics, orthopaedic, orthopaedics and trauma.

Studies were included in the final synthesis if they covered any of the six domains of the national surgical obstetric and anaesthesia plan. Studies that primarily focused on other related concepts (e.g. articles unrelated to the six domains) and focused on clinical interventions were excluded. Primary and secondary studies using qualitative, quantitative or mixed-method designs were included. Single-centre studies, case reports, clinical reports, abstracts and

editorials were excluded.

Selection of studies

Two independent reviewers screened the title and abstract of all retrieved articles for inclusion against the set criteria. Disagreements were independently screened and resolved by the research lead. This was followed by a full-text review by the two independent reviewers who assessed the eligibility of all articles against the selection criteria. Any discordance was resolved by discussion between the three members of the review team until full consensus was reached (Figure 1).

Data collection

Information was charted on a standardized data extraction sheet on Microsoft Excel for Microsoft 365 (version 2111) for study details including title, authors' names, journal, publication year, country of origin, study setting, study design, main findings and health care domain.

Data summary and synthesis of results

We conducted a thematic content analysis to collate, summarize and analyse the data using the six domains of the national surgical obstetric and anaesthesia plan. Each article was read by two reviewers and any concepts identified relevant to the theoretical framework were listed in our data extraction sheet. We then translated the concepts into themes and subthemes under headings of any of the six domains. The themes generated were analysed and synthesized.

Bias

Our team included senior and junior researchers, surgeons and medical trainees working in global and local delivery of and research on surgical care services. All authors are strong advocates for surgery on high-level national and international platforms. The authors' collective experiences as researchers on health disparities and their striving for excellence as clinicians and advocates may have influenced the analysis; authors may have had a higher likelihood of identifying and documenting health system weaknesses as compared to strengths. However, aware of this bias from the start, the team searched the literature to find encouraging examples; thus, the team specifically searched and highlighted previous successful interventions and methodologically strong research outputs. The team's aim has been to ensure that the results and discussion highlight not only the weaknesses but also the strengths in Pakistan's surgical care system.

Results

Articles retrieved

The search strategy identified 3050 records overall, of which 2340 remained after removing duplicates. An additional seven records were identified from the grey literature. Abstracts of all 2347 articles were reviewed, of which 2206 did not meet the inclusion criteria. The full texts of the remaining 141 articles were reviewed and 84 were excluded because they did not meet the defined criteria. Thus, 57 articles were included in the study (Figure 1). Twenty-one publications had a national focus (10–27). Among the regional literature, 19 articles provided data from Sindh (28–46), eight provided data from Punjab (47–55) and one provided data from Khyber Pakhtunkhwa (56), while three studies provided combined data for Punjab and Khyber Pakhtunkhwa provinces (57–59). Four records provided data from Islamabad (60,61), Gilgit/Baltistan (62) and Azad Jammu Kashmir (63) regions, while no records were found for Balochistan.

Type and focus of articles

Twelve of the retrieved articles were based on facility assessment surveys, which included an evaluation of the relevant workforce, equipment, supplies, infrastructure, information management system and governance at the surveyed facilities (21,34,45,49,50,52,53,57–59,64,65) (Table 1). Nine of these articles evaluated the capacity of services for emergency obstetric and neonatal care (21,49,50,53,57–59,64,65) while three articles evaluated the capacity of services for trauma and emergency care.

Eleven articles were literature reviews (10,11,13,14,26,27) or institutional experiences (28,32,35,62,66). These included comprehensive literature reviews on: the state of the surgical care system in Pakistan (11); barriers to surgical care access in the country (13); a national overview of surgical training programmes (26); considerations and performance of health policy in the devolved health system of Pakistan (10); the success of the National Eye Health Programme (14); and country-wide burden of injuries (27). Furthermore, the institutional experience of surgical care delivery included: the Aga Khan Health Services surgical care provision in the remote mountains of Gilgit Baltistan (62); the Indus Hospital provision of free-of-cost surgeries with a financial model supported by philanthropic and religious donations (35); Sindh Institute of Urology and Transplant provision of free transplant and urology surgery through a public–private partnership model (28,66); and Aga Khan University’s establishment of a trauma registry in five hospitals in Karachi (32).

The four policy documents found in the literature review were the National Health Vision 2025 (19), Human Resource for Health 2018–2030 (18), National Health Accounts 2015–2016 (67) and Minimum Service Delivery Standards (55) highlighting the federal and provincial government’s commitments and priorities in health care strategy development and health care service delivery.

Furthermore, we found a mix of patient- and community-based qualitative and quantitative studies exploring the financial, logistical and quality aspects of surgical, anaesthesia, obstetric and trauma care in Pakistan (13,15,16,23,24,29,36–39,42,43,46,51,56,60,61,63,68,69). Some of the studies explored the competencies and work-related challenges of the current workforce providing surgical, anaesthesia and obstetric care, in addition to factors that influence the choice of Pakistan's medical students in choosing specialties related to surgical, anaesthesia and obstetric care (12,20,22,25,30,33,40,44,47,70).

Key themes and findings

The themes identified in the literature reviewed included: poor functioning of secondary-care hospitals; poor indicators for physical accessibility to surgical, anaesthesia and obstetric care facilities; lack of equipment at hospitals; varying quality of prehospital ambulance services; estimates for physician/surgical care workforce; training programmes on surgical, anaesthesia and obstetric care; specific shortages in the workforce; medical competency and professional conduct; burnout or job dissatisfaction among professionals working in surgical, anaesthesia and obstetric care; estimates for volume of surgery; rates of caesarean section; service delivery at secondary-care hospitals; dependence on tertiary-care hospitals; use of private care; safety practices related to surgical, anaesthesia and obstetric care; issues with the district health information system; management of maternal health-related data; national health examination and mortality surveys; health care financing in Pakistan; out-of-pocket expenditure; innovative financing models; national and provincial health care policy mandates; health care policy documents; and facility-level administrative monitoring and evaluation. Key findings related to these themes were categorized across the six domains of the national surgical obstetric and anaesthesia plan (Table 2).

Discussion

This comprehensive review spanning 16 years shows that a considerable amount of information on surgical care services in Pakistan is available. While national-level surveys, reviews and policy documents provided an understanding of the existing services for in the country, most of the studies were limited in their scope and therefore were not representative of the national situation. Overall, we determined that many gaps exist in the health care infrastructure, service availability, workforce, financial protection, information management and governance frameworks.

It is clear that the development of public sector hospitals has failed to keep pace with the rate at which the country's population and its needs have grown (5). As a result, many districts failed to meet the recommended target of one comprehensive facility for emergency obstetric and neonatal care per 500 000 population (49,53,64). Multiple reviews and facility assessments noted different deficiencies in infrastructure, workforce and financing at the secondary-level district headquarters hospitals and tehsil (subdistrict) headquarters hospitals in the rural areas,

where 60% of Pakistan's population lives (21,34,52,64). The lack of trust in rural health care facilities owing to poor quality of services results in patients travelling long distances to urban tertiary referral hospitals and selected urban district headquarters hospitals. (38,52). Consequently, many patients present to these facilities late and in a more complicated state; delays in decision-making and unavailability of transport funds compound the problem (29,71). This situation inevitably results in preventable mortality and morbidity (43).

The private sector has contributed to improving the availability of affordable or free-of-cost surgical, anaesthesia and obstetric care through independent and public–private partnership models. Prime examples are the service delivery model of the Aga Khan Health Service, Pakistan in Gilgit, various hospitals run by the Indus Hospital and Health Network and the Sindh Institute of Urology and Transplant free-of-cost renal transplant arrangement (28,35,62,66). Thus, the private sector has the potential to play a crucial role in improving universal accessibility to surgical care and hence health care. Moreover, the government can engage the private sector by supporting it in those areas where public sector service delivery is deficient. This support requires population-based mapping of surgical needs and a thorough understanding of the existing surgical infrastructure, workforce and services (72).

No comprehensive registry of the health workforce exists that provides accurate estimates of the volume and distribution of the workforce providing surgical, anaesthesia and obstetric care in Pakistan (18,26). The existing registries, which include those at the College of Physicians and Surgeons Pakistan and the Pakistan Medical and Dental Council, are not updated to reflect migration or professionals who have stopped working; as a first step, these registries need to be updated with facility-level details to allow a better understanding of workforce distribution (1,18,26). An overall figure of 0.96 physicians per 100 000 population quoted by the Ministry of National Health Services Regulation and Coordination clearly shows that Pakistan falls short of the workforce density target of 20 surgical, anaesthesia and obstetric specialists per 100 000 as recommended by the Lancet Commission (1). The need for professionals in surgical, anaesthesia and obstetric care, particularly female providers, at the secondary level needs to be specifically addressed (13,21,29,58).

Universal financial risk protection against surgical care expenditure in the population has not been achieved. With high dependence on the private sector and urban hospitals, patients from rural areas and poorer backgrounds are unable to access health care due to the high cost of travelling and high out-of-pocket expenditure on private health services (10,42). Even in the supposedly free-of-cost public sector facilities, patients pay up to 40 000 Pakistani rupees (PKR; equivalent to US$ 1066, at the current purchasing power exchange rate) for supplies, equipment or services that the government is unable to provide (60,68). Improving services at the facility level by ensuring efficient supply chain systems and the availability of standardized care would help address this barrier to timely and good-quality care.

The Prime Minister social health insurance scheme (Sehat Sahulat Programme Pakistan) has been adopted by Azad Kashmir, Gilgit Baltistan, Khyber Pakhtunkhwa and most of Punjab (73). More than 7 000 000 families nationally are now covered for up to PKR 600 000 for inpatient expenses for all surgical procedures, maternity care, local transportation cost and provision of transport to tertiary care hospitals (74). This scheme has led to much needed relief from out-of-pocket expenditure. In addition, the ministry is working on the essential universal health benefits package using the DCP3 framework (75) with the aim of making fund allocations more equitable. Lastly, the Ehsaas cash transfer programme continues to grow and support persistently excluded and deprived families and has potential to decrease cases where health care is limited due to financial barriers (76).

Systematic health care monitoring and evaluation mechanisms are lacking in the country (10,21,55,57,65). Moreover, multiple gaps exist in the mechanism of information collection from facilities (10,21,55,57,65), and practically no system is in place to provide feedback to the end-providers. As a result, it is impossible to gauge the evolving status of health care resources and delivery of health care services in Pakistan (10,57,65), accountability is affected and well planned governance structures do not translate into practical reality (10,11). Facility-based administrative incompetence, incidents of medical neglect and unethical practices go unchecked and, not surprisingly, health outcomes deteriorate (10,21,55).

Similar to systems in place in high-income countries, Pakistan needs a robust information management system where data on health care facility resources, services and performance are collected and uploaded on online open-access public portals promoting transparency and accountability (77,78). Such a system will allow all levels of government and society to monitor the efficiency and effectiveness of health services and resource utilization as per defined minimum standards.

It is indeed encouraging that the government passed the Pakistan Medical Commission Act 2020 which represents the government’s commitment to regulate minimum standards within the medical profession (79). In addition, by enlisting both the public sector and private facilities to provide care to beneficiaries, the Social Health Insurance scheme has the potential to improve the monitoring of services for quality and improvement. This may eventually lead to a reduction in inefficiencies within the private and public sector by introducing market competition (73).

Overall, much more work is required to comprehensively fill the gaps in surgical care services in Pakistan. The governments of Balochistan and Sindh have yet to adopt the Prime Minister

Social Health Insurance scheme (80). The question also remains as to whether the steps taken by the present government will survive the current financial crises and political changes in the future. Regardless, strong advocacy and research are needed at the national and provincial levels to ensure surgery and surgical service reforms are not overlooked during prioritization. In addition, with projected limitations in financial capacity over the next few years, international donor support may help boost progress in improving surgical care services in the country (81). It is essential to continue the momentum of strengthening the surgical care system given the cross-cutting nature of surgical services and their potential to help control the burden of communicable and non-communicable diseases, maternal and child health care, and injuries.

In our efforts to improve surgical care services, we have worked closely with the federal and provincial governments to develop the policy dialogue around surgical care improvement (82). At the National Stakeholders' Conference for the National Vision for Surgical Care in 2018, the federal and provincial governments, along with private sector representatives, committed to improving equity in access to surgical care services in Pakistan (82) (Box 1). The importance of surgical care within the broader scope of global health has been recognized, with organizers of local medical conferences and meetings now dedicating sessions to global surgery. A dedicated journal supplement on global surgery – a first for Pakistan – is indicative of the increasing focus (83). It is hoped that this interest will translate into an increased body of high-quality research that will in turn guide interventions on strengthening the surgical care system. The timing of the Ehsaas and Sehat Sahulat Programme (76,84) initiatives, as well as the DCP-3 Essential Universal Health Benefits Package for the Islamabad Capital Territory (75), provide a unique opportunity to restructure surgical services as an essential component of health care across the country.

Our review has some limitations. Since only literature from 2003 to 2018 was included, information from earlier studies may have been missed, although we believe that the study period provides better insight into the actual state of surgical, anaesthesia and obstetric care in Pakistan. Moreover, only articles in English were included in the review because English is the language for all medical school education, training and research and therefore no journals or articles written in the national language, Urdu, are available. While some grey literature may be published in Urdu, we believe that this literature would not substantially alter our results. Lastly, some documents quoted in this article are non-peer-reviewed local journal articles or government reports for which assumptions of validity had to be made on inclusion.

A national household and patient survey is currently in progress to estimate the proportion of Pakistan's population that has access to surgery within 2 hours and to document the financial and logistical challenges faced by patients in accessing care for basic surgical care procedures at the public sector hospitals of Pakistan. The survey is being conducted by Indus Hospital Network in collaboration with the Ministry of National Health Services, Regulation &

Coordination and with technical support from the Program in Global Surgery and Social Change. This survey will provide the first national-level data set on surgical services in Pakistan. Furthermore, we plan to conduct a follow-up scoping review to explore changes in the nature, extent and findings of the literature on global surgery in a 5-year period after 2018.

Conclusion

Access to surgical, anaesthesia and obstetric care remains limited in Pakistan, with particular barriers in workforce, infrastructure, service delivery and financing across the country, especially in poorer provinces and territories, and rural areas. Continued political commitment and primary data are needed to better understand and address these gaps in Pakistan. The new initiatives from the Ministry of National Health Services, Regulation & Coordination have potential to fill in the gaps identified.

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Competing interests: None declared.

Accès à des soins chirurgicaux, anesthésiques et obstétricaux sûrs, opportuns et ayant un bon rapport coût-efficacité au Pakistan : étude exploratoire sur 16 ans

Résumé

Contexte : La situation des soins chirurgicaux, anesthésiques et obstétricaux au Pakistan est très peu connue.

Objectifs : La présente étude visait à évaluer la littérature disponible sur les soins chirurgicaux, anesthésiques et obstétricaux au Pakistan afin de comprendre les forces et les faiblesses de ces soins en fonction des domaines du cadre des plans nationaux de chirurgie, d'obstétrique et d'anesthésie, à savoir infrastructures, personnels, prestation de services, gestion de l'information et gouvernance.

Méthodes : Les études pertinentes en anglais publiées entre 2003 et 2018 ont été identifiées par une recherche dans les bases de données électroniques, y compris PubMed/MEDLINE, EMBASE et Scopus. Des recherches dans la littérature grise ont également été effectuées pour

obtenir des documents de diverses organisations. Une analyse de contenu thématique a été menée pour rassembler, résumer et analyser les données.

Résultats : Au total, 2347 études ont été identifiées et examinées, parmi lesquelles 57 articles répondaient aux critères d'inclusion. Si les enquêtes, examens et documents de politique générale réalisés au niveau national ont permis de comprendre les services de chirurgie, d'anesthésie et de soins obstétricaux existant dans le pays, la plupart des études avaient une portée limitée et n'étaient donc pas représentatives de la situation au niveau national. En matière de chirurgie, d'anesthésie et de soins obstétricaux, l'infrastructure des soins de santé, la disponibilité des services, le personnel, la protection financière, la gestion de l'information et les cadres de gouvernance n'ont pas évolué au même rythme que les besoins d'une population pakistanaise toujours croissante.

Conclusions : Nos résultats peuvent servir à orienter les futures activités de recherche dans le cadre des efforts visant à renforcer le système chirurgical au Pakistan. Les récentes initiatives gouvernementales sont prometteuses pour l'amélioration future de l'accès aux soins chirurgicaux.

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