

SHORTAGE OF PEDIATRIC CARDIAC SURGEONS: CAUSES AND CONSEQUENCES

Abdulaxatov Abduvoxid Sanjar o'g'li

Supervisor: Nortojiyev Muhammad Anvar óg'li

Abstract

The global shortage of pediatric cardiac surgeons represents a critical challenge in modern healthcare systems, with far-reaching implications for child mortality rates and the accessibility of life-saving interventions. The results indicate that the shortage stems from a convergence of prolonged training requirements, inadequate institutional investment, geographic maldistribution of specialists, and the high-complexity nature of the specialty.

Keywords: Pediatric cardiac surgery, surgeon shortage, congenital heart disease, healthcare workforce, surgical training, health policy, global health equity.

Introduction

CHD stands as the most common type of birth defects which affects around 1 percent of all live births worldwide resulting in almost 1.35 million affected newborns each year according to record [1]. The medical system requires immediate access to skilled pediatric cardiac surgeons because a large portion of these patients needs surgical treatment during their first year. The pediatric cardiac surgeon workforce crisis reached its current state because trained surgeons could not meet the increasing demand for surgical services which created serious problems for low- and middle-income countries (LMICs) and high-income nations. The medical field has documented how CHD creates surgical expertise shortages across different continents yet current systems to address this issue remain ineffective and uncoordinated [2].

Methodology and Literature Review

The current research utilizes systematic review methods to analyze peer-reviewed studies, health policy assessments, and international health organization reports which include materials from the World Health Organization and the World Heart Federation and various national health departments. The literature consistently identifies several intersecting causes of the pediatric cardiac surgeon shortage. The educational path to become a pediatric cardiac surgeon requires fifteen to twenty years which includes medical school and general surgery residency and cardiothoracic surgery fellowship and subspecialty pediatric cardiac surgery fellowship training [3]. The financial and institutional systems that support surgical education in most nations fail to meet essential requirements. LMICs lack training centers which present a complete range of congenital cardiac procedures and face international training limitations because of immigration requirements and funding shortages and language obstacles [4]. The post-Soviet academic researchers have observed how Soviet-era medical institution closures led to decreased access for specialized surgical training, which created significant



deficiencies in pediatric surgical subspecialty capacities throughout Central Asian and Eastern European healthcare systems [5]. The literature establishes that existing specialists face a severe problem because their distribution across various regions shows significant imbalances. The concentration of pediatric cardiac surgeons in major urban academic centers results in rural and peripheral areas lacking access to emergency medical treatment despite sufficient national surgeon numbers [6].

Results and Discussion

The pediatric cardiac surgeon shortage causes three types of severe measurable consequences. The most immediate and quantifiable consequence is increased mortality among children with CHD who do not receive timely surgical intervention. Studies have demonstrated that in sub-Saharan Africa, where the ratio of cardiac surgeons to population is among the lowest in the world, CHD mortality in the first year of life exceeds 90% for conditions that are routinely corrected with low mortality rates in high-income countries [4]. Middle-income countries experience surgical scheduling delays because surgical teams have excessive workloads and hospitals lack enough operating rooms which results in higher perioperative complication rates and longer hospital stays and additional expenses [7]. The existing surgical teams experience severe operational pressure which leads to burnout while decreasing surgical output for each doctor and harming educational experiences of future medical doctors which creates a continuous loop of doctor shortages. The broader systemic consequence is a deepening of health inequity. Families with access to financial resources seek surgical care abroad, while those without such resources face either prolonged waiting periods or no intervention at all. The current healthcare system creates an unseen burden which affects child health outcomes according to socioeconomic status and the system fails to document these effects through clinical data [8].

Furthermore, the shortage creates a cascade effect within the healthcare system: the lack of pediatric cardiac surgery capacity limits investment in supporting infrastructure such as pediatric cardiac anesthesia, perfusion technology, and intensive care, since these disciplines are interdependent and their development is constrained by the absence of a functioning surgical program. The analysis of available literature also reveals an underappreciated dimension of the problem related to gender and diversity in surgical training. Women and individuals from underrepresented backgrounds face structural barriers to entry into cardiothoracic surgery subspecialties, further narrowing the potential talent pool from which the future workforce might be drawn [3]. Addressing these barriers through targeted mentorship, scholarship programs, and institutional policy reform represents an underutilized lever for workforce expansion. At the policy level, the literature suggests that national governments and international health bodies have been slow to recognize pediatric cardiac surgery as a public health priority. Unlike infectious disease programs or maternal health initiatives, surgical capacity development receives comparatively limited funding and institutional attention in global health agendas, despite the well-documented burden of CHD [1, 6].

Conclusion

The shortage of pediatric cardiac surgeons is a complex, multifactorial problem with profound consequences for child health outcomes globally. The evidence reviewed in this article demonstrates



that the deficit arises from the intersection of excessive training duration, inadequate institutional investment, geographic maldistribution, and systemic neglect within global health policy frameworks. The consequences range from preventable mortality and increased surgical risk to entrenched health inequity and workforce burnout. Resolving this crisis requires a coordinated, multi-level response that includes the reform of training pathways to reduce unnecessary barriers to entry, targeted investment in surgical training infrastructure in LMICs, the development of regional centers of excellence capable of building local capacity, and the integration of pediatric cardiac surgery into global surgical development agendas. International partnerships between academic medical centers, professional associations, and governments offer a viable mechanism for accelerating knowledge transfer and surgeon training across underserved regions.

References

1. Hoffman J. I., Kaplan S. The incidence of congenital heart disease // *Journal of the American College of Cardiology*. — 2002. — Vol. 39, No. 12. — P. 1890–1900.
2. Yacoub M., Yacoub M. H. Establishing pediatric cardiovascular services in the developing world: a wake-up call // *Circulation*. — 2007. — Vol. 116, No. 17. — P. 1876–1878.
3. Preventza O., Oderich G. S., Coselli J. S. Women in cardiothoracic surgery: current status and strategies to promote inclusion // *The Annals of Thoracic Surgery*. — 2021. — Vol. 111, No. 4. — P. 1118–1124.
4. Zühlke L., Mirabel M., Marijon E. Congenital heart disease and rheumatic heart disease in Africa: recent advances and current priorities // *Heart*. — 2013. — Vol. 99, No. 21. — P. 1554–1561.
5. Бокерия Л. А., Гудкова Р. Г. Сердечно-сосудистая хирургия в России: состояние и перспективы развития // *Бюллетень НЦССХ им. А. Н. Бакулева РАМН*. — 2018. — Т. 19, № 2. — С. 83–92.
6. Vervoort D., Meuris B., Meyns B., Verbrugge P. Global cardiac surgery: access to cardiac surgical care around the world // *The Journal of Thoracic and Cardiovascular Surgery*. — 2020. — Vol. 159, No. 3. — P. 987–996.
7. Saxena A. Congenital heart disease in India: a status report // *Indian Pediatrics*. — 2018. — Vol. 55, No. 12. — P. 1075–1082.
8. Nguyen N., Jacobs J. P., Dearani J. A. Survey of congenital heart surgery practice in low- and middle-income countries // *World Journal for Pediatric and Congenital Heart Surgery*. — 2020. — Vol. 11, No. 5. — P. 554–565.

