TO STUDY THE PRESENT LANDSCAPE OF CONGENITAL HEART DISEASE IN INDIA: EPIDEMIOLOGY, DIAGNOSTIC DEVELOPMENTS, AND POLICY DIRECTIONS

Presented by Anshu Singh
Roll no. 1464

Guided by Mr. Ashish Bandhu

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Introduction

- Congenital heart disease affects millions of children globally, requiring early detection, timely intervention, and long-term care.
- Significant emotional, financial, and social burdens on families, necessitating comprehensive support.
- 1.35 million newborns affected annually, with higher prevalence in developed countries; underreporting in LMICs.
- In India, prevalence is 8-12 per 1,000 live births, with higher rates in Kerala and Rajasthan.
- Challenges include limited prenatal care, poor maternal nutrition, socio-economic disparities, and cultural beliefs.

Review of Literature

Saxena, 2018

CHD is the most common congenital anomaly in India, with a birth prevalence of 8-12 per 1,000 live births. Highlights disparity in advanced cardiac care and calls for improved healthcare infrastructure.

Seth, 2023

Advocates for a comprehensive strategy for CHD management, emphasizing public-private collaboration, specialized pediatric cardiology departments, and regional Centres of Excellence.

Taksande & Jameel, 2021

Emphasizes routine pulse oximetry screening for early CCHD detection to reduce neonatal mortality. Highlights urgency of early diagnosis.

Sachdeva & Gupta, 2020

Discusses advancements in cardiac imaging (echocardiography, MRI, CT) improving CHD diagnosis and treatment. Highlights invasive cardiac catheterization for precise assessment.

Krishna & Kumar, 2020

Stresses early detection and multidisciplinary care for critical CHD management to improve neonatal outcomes in India.

Review of Literature

Satish & Rufus, 2024

Investigates ultrasound and deep learning techniques for early fetal CHD detection, proposing advanced technologies for improved accuracy.

Sethi et al., 2022

Explores AI's role in enhancing CHD diagnostic accuracy and prenatal prediction. Highlights challenges like algorithm availability and training.

Steele, Moore & Lang, 2021

Reviews advancements in cardiac imaging (CCT, CMR) improving CHD diagnosis and treatment. Discusses digital innovations in 3D imaging for surgical planning.

Saxena et al., 2019

Indian guidelines for CHD interventions aim to standardize care and improve outcomes, addressing unique challenges like delayed diagnosis and comorbidities.

Chowdhury et al., 2021

Examines challenges in congenital heart care, advocating for multidisciplinary approaches, transparency, and telehealth to improve access and care quality.

Research Methodology

Research Question

What are the current trends in diagnostic technologies and policy interventions for managing congenital heart disease in India?

Research Objective

To analyse the current landscape of congenital heart disease (CHD) in India.

Research Design

Secondary research using PubMed, Google Scholar, WHO reports, and the Indian Paediatric Journal to gather recent peer-reviewed articles and studies on cardiac diagnostics and CHD management in India.

Data Sources

Focus on studies meeting inclusion criteria: peer-reviewed articles, reviews, and meta-analyses from the past decade, ensuring relevance to cardiac diagnostics and CHD management.

Result

Epidemiology and Healthcare Infrastructure

- **Epidemiological Insights:** CHD prevalence in India is approximately 9 per 1,000 live births, posing significant challenges due to varied regional healthcare access [Fig. 1].

- **Healthcare Infrastructure:** Urgent need for specialized cardiac centres and enhanced rural accessibility to diagnostic and treatment facilities to address growing CHD burden [Fig. 2].

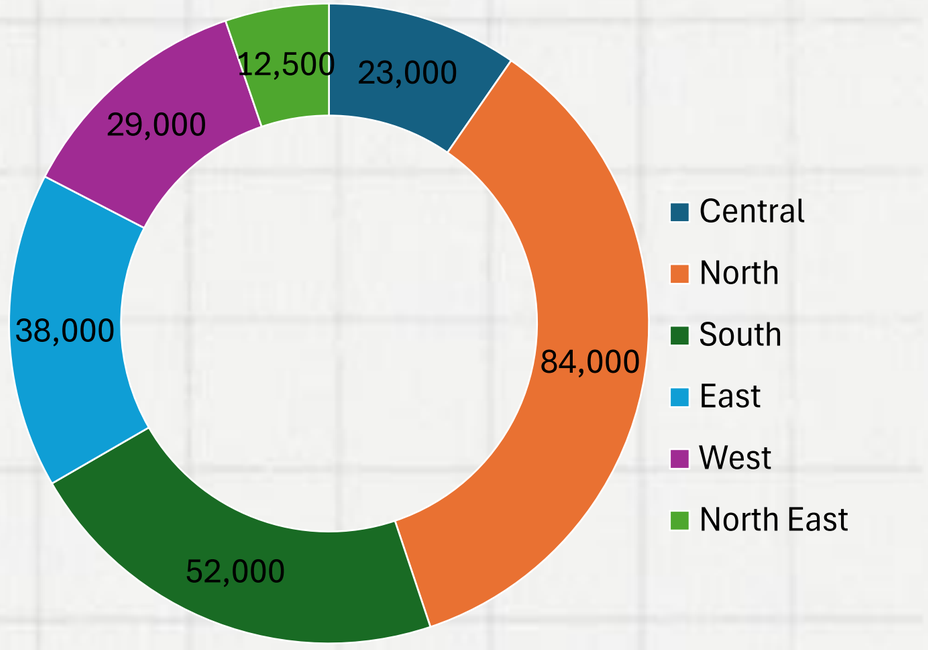

Fig. 1 Distribution of infants born with CHD in different regions of India every year.

Result

Technological Innovations

- **Advancements in Imaging:** CMR and CCT significantly enhance diagnostic accuracy and management outcomes for CHD patients.
- **AI Integration:** AI shows promise in automating diagnostic processes and improving foetal CHD detection.

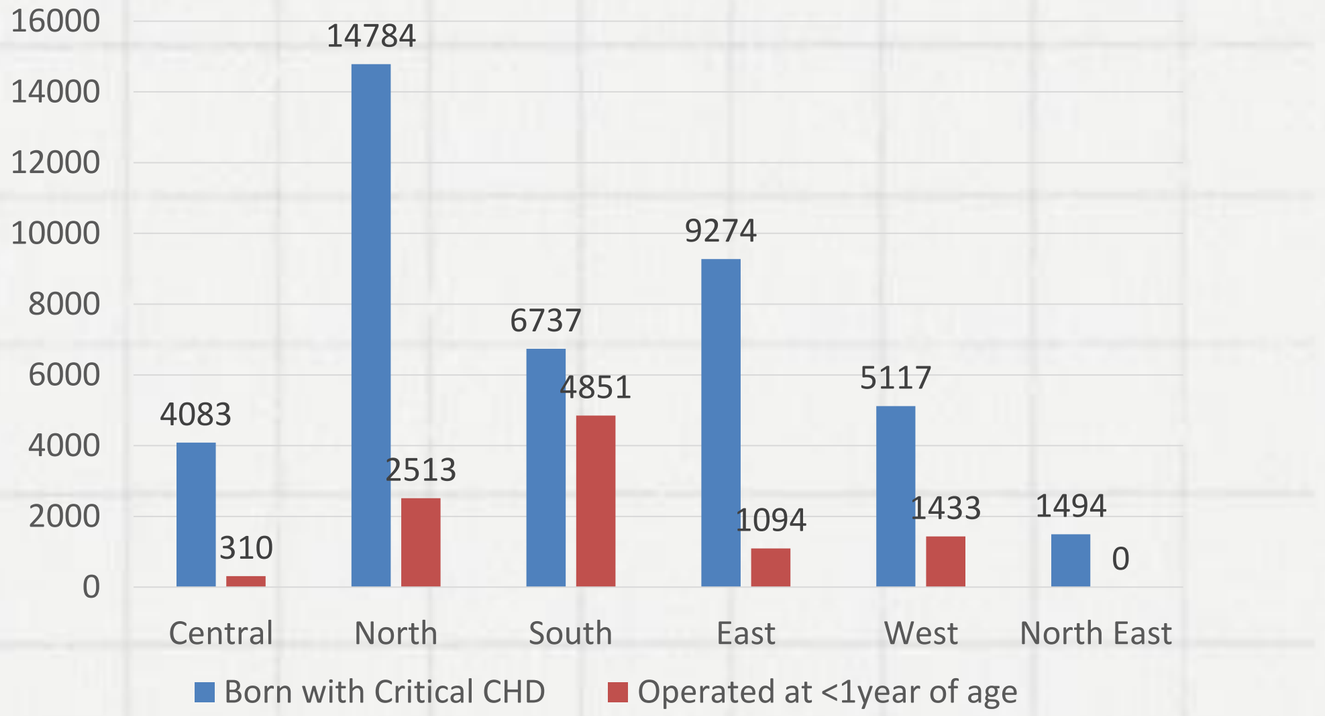

Fig. 2 Distribution of infants with critical heart disease accessing surgery as compared to total infants born with critical heart disease.

Result

Clinical Presentation and Diagnosis

- **Clinical Presentation:** Early diagnosis crucial; pulse oximetry screening identified as pivotal for neonatal CHD detection.
- **Diagnostic Technologies:** Echocardiography, CT, and MRI pivotal in accurate CHD diagnosis and surgical planning [Table 1].

Table 1: Key Imaging Modalities in CHD Diagnosis

Imaging Modality	Primary Applications
Echocardiography	Structural and functional assessment of the heart, real-time imaging, foetal heart evaluation
CT scans	Detailed anatomical imaging, vascular structures, planning of interventional procedures
MRI	Detailed anatomical and functional imaging, assessment of myocardial tissue properties

Result

Guidelines and Policy Initiatives

- **Clinical Guidelines:** Evidence-based recommendations emphasize timely interventions and structured follow-up for managing CHDs in Indian children.
- **Policy Initiatives:** Advocacy for multidisciplinary approaches and telehealth integration to enhance accessibility and quality of CHD care [Table 2].

Table 2: Policy Recommendations and Intended Impact

Policy Recommendation	Intended Impact
Strengthening rural healthcare	Improved access to CHD diagnostics and treatments in rural areas
Training programs for healthcare professionals	Enhanced skills and knowledge in CHD management
Integration of telehealth	Increased accessibility to specialized care and follow-up services

Conclusion

SUMMARY OF FINDINGS

- **Epidemiology and Healthcare Burden:** CHD prevalence in India underscores the need for enhanced healthcare infrastructure.
- **Technological Innovations:** Advanced imaging and AI have improved CHD diagnosis and treatment outcomes.
- **Guidelines and Policies:** Evidence-based approaches are critical for optimizing CHD management.

Conclusion

IMPLICATIONS AND RECOMMENDATIONS

- **Clinical Practice:** Integrate advanced technologies to revolutionize CHD care.
- **Healthcare Policy:** Implement guidelines and reforms to standardize care and enhance access.
- **Infrastructure Enhancement:** Strengthen healthcare facilities, especially in rural areas.
- **Telehealth Expansion:** Improve patient access to specialist care through telemedicine.
- **Research Investment:** Support research to advance CHD diagnostics and treatments.

Thank you very much!