PREVALENCE AND SURGICAL MANAGEMENT OF CONGENITAL ANOMALIES IN PAEDIATRIC PATIENTS IN A LOW-RESOURCE SETTING

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ABSTRACT

Background

Congenital anomalies remain a significant public health challenge in paediatrics and developing countries.

Objective

This study was aimed to determine the frequency and distribution of congenital anomalies, their surgical intervention, and the results of children.

Methods

This was a cross-sectional descriptive study which was conducted for about 3 months from Aug, 2011 to Oct, 2011 in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan in which data was collected from 155 paediatric patients with congenital anomalies over three months. The data was analysed statistically to determine the relationship between the variables.

Results

The majority were infants that were 38.7%, and neonates that were 32.3%. The most common type of congenital anomalies was gastrointestinal, 25.8 per cent, while the second most common was craniofacial, 19.4 per cent. Elective surgeries were 71.0% of all surgeries it had performed, with a high success rate of 90.3%. The common postoperative complications that were reported were infections (12.9 per cent) and wound dehiscence (6.5 percent). However, 35.5% of the patients did not seek follow-up care as required to support long-term management.

Conclusion

This research highlights the importance of diagnostic tests, management during surgery, and treatment and follow-up systems in low-income environments for paediatric patients with congenital anomalies.

Keywords: *Congenital anomalies, paediatric surgery, prevalence, outcomes, resource-limited settings.*

INTRODUCTION

Congenital anomalies involve structural and functional disorders that are inherent at birth and are one of the leading causes of morbidity and mortality in neonates (1). Such complications occur in millions of children every year and pose numerous difficulties, especially in LMICs. Inadequate use of diagnostics and specialised health care services and delays in essential services add to the problem, causing complications and death. The World Health Organization has estimated that congenital anomalies are responsible for about 295000 neonatal deaths annually, most of which are in developing countries (2).

In Pakistan, congenital anomalies constitute a significant unexplored public health problem. A primary concern in the southern region is that most of these patients come from rural provinces with limited healthcare facilities, low health literacy and few paediatric surgical specialists (3). Another challenge is that sociocultural issues leading to stigma push the parents to delay seeking medical attention for congenital anomalies further. Hence, poor children are prone to have undeserved or inadequately addressed health issues.

Appropriate care for children born with congenital anomalies is based on early diagnosis, a team approach, and optimal surgery availability (4-6). The advancement in paediatric surgery has received a significant improvement. However, most resource-poor regions remain challenging due to teams, which include a lack of a professional workforce, adequate equipment, and financial constraints. Therefore, these limitations highlight the need to focus on maternal and child health strategies that seek to respond to children with congenital anomalies.

Khalifa Gulnawaz Teaching Hospital is the largest tertiary care hospital in Bannu, located in Southern Pakistan. It delivers health care to both urban and rural populations. While the hospital's Department of Paediatric Surgerymainly treats patients with persistent inflammatory diseases, this facility has become one of the most significant for dealing with congenital abnormalities because of an integrated, surgical-oriented approach. The purpose of this study was to determine the epidemiologic characteristics, surgical intervention, and prognosis of congenital anomalies in children admitted at Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu. Consequently, this study focused on identifying trends and challenges in this resource-limited context and aims to offer evidence-based findings that can help in designing subsequent healthcare development strategies and policies. The conclusions should reveal the significant shortcomings in the care of the children and suggest the practical steps required to enhance the results in the care of these children. Management of congenital anomalies is not only a clinical challenge but also a public health issue. There is an acknowledgement of the need for strengthening health systems, which entails focusing on governments, healthcare providers, and other relevant stakeholders. This study also aimed to align with that broader initiative of extending knowledge about this subject by giving information on the peculiarities of congenital anomalies in medical management in Bannu, a low-resource setting.

METHODOLOGY

This was a cross-sectional descriptive study which was conducted for about 3 months from Aug, 2011 to Oct, 2011 in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan. Informed consent was obtained from parents or guardians of all participating patients. Confidentiality was maintained throughout the study, and patient identifiers were excluded from the analysis to protect privacy.

The sample size was calculated based on the formula for estimating a proportion in a finite population:Where desired confidence level (1.96 for 95%), expected prevalence of congenital

anomalies (assumed to be 10% based on regional data) and margin of error (5%, or 0.05). Substituting these values, adjusting for a 10% non-response rate

The study included all paediatric patients aged 0–18 diagnosed with congenital anomalies who visited the hospital during the study period. Patients were selected using a non-probability consecutive sampling technique to ensure inclusivity. Based on calculated sample size requirements, 155 cases were included.

Data were collected using a predesigned structured proforma. Information was obtained from patient medical records, including demographic details (age, gender, location, and socioeconomic status), clinical characteristics, type and severity of anomalies, and treatment plans. Additional information on surgical interventions and postoperative outcomes was collected through direct consultation with treating physicians and a review of hospital surgical logs.

Data were entered into a secure database and analysed using statistical software. Descriptive statistics, including frequencies and percentages, were calculated for categorical variables, while means and standard deviations were used for continuous data. Chi-square tests assessed associations between categorical variables; p-values less than 0.05 were considered statistically significant.

RESULT

The following table illustrates the demographic profiles of paediatric patients. Most patients (38.7%) were infants aged 1-12 months, followed by neonates at 32.3%. Gender distribution was more prevalent in males (58.1%) than females (41.9%). Geographically, urban patients accounted for the majority (64.5%), indicating better access to healthcare in urban areas. Socioeconomic disparities were evident, with 51.6% of the patients belonging to low-income families. Nutritional status highlighted malnourishment concerns, as 61.3% of the patients were either underweight or stunted. These findings emphasise the role of socioeconomic and dietary factors in managing congenital anomalies.

Table 1: Demographic and Clinical Characteristics of Paediatric Patients

Variable Category	n (%)	p-value
Age		
Neonates (<1 month)	50 (32.3%)	0.03
Infants (1-12 months)	60 (38.7%)	
Toddlers (1-3 years)	30 (19.4%)	
Older children (>3 yrs)	15 (9.7%)	
Gender		
Male	90 (58.1%)	0.12
Female	65 (41.9%)	
Geographic Location		
Urban	100 (64.5%)	0.01
Rural	55 (35.5%)	
Socioeconomic Status		
Low	80 (51.6%)	0.04
Middle	50 (32.3%)	
High	25 (16.1%)	
Nutritional Status		
Normal	60 (38.7%)	0.02
Underweight	50 (32.3%)	
Stunted	45 (29.0%)	
Parental Age		
<25 years	70 (45.2%)	0.05
25-35 years	60 (38.7%)	
>35 years	25 (16.1%)	

The data revealed gastrointestinal anomalies as the most common type (25.8%), followed by

craniofacial (19.4%) and cardiovascular (16.1%) anomalies. Though less prevalent (9.7%), neurological anomalies remain significant due to their complexity. The distribution underscores the need for specialized care tailored to the common anomaly types in the study region.

Table 2: Types and Prevalence of Congenital Anomalies

Congenital Anomaly	Number of Cases (n)	Percentage (%)	p-value
Craniofacial (cleft lip)	30	19.4	0.01
Gastrointestinal	40	25.8	0.03
Cardiovascular	25	16.1	0.02
Urogenital	20	12.9	0.05
Musculoskeletal	20	12.9	0.04
Neurological	15	9.7	0.01
Others	5	3.2	0.06
Total	155	100	

Elective surgeries dominated (71.0%), with neonatal and infancy periods being the most common times for intervention. Surgical success rates were high (90.3%), reflecting the department's proficiency. However, postoperative complications, including infections (12.9%) and wound dehiscence (6.5%), emphasize areas for improvement in surgical protocols. Accessibility to diagnostic tools (77.4%) and proximity to healthcare facilities were positive factors contributing to timely interventions.

Table 3: Surgical Management Variables

Variable	Category	n (%)	p-value
Type of Surgical Intervention			
Emergency	45 (29.0%)		0.02
Elective	110 (71.0%)		
Timing of Surgery			
Neonatal	40 (25.8%)		0.01
Infancy	70 (45.2%)		
Childhood	45 (29.0%)		
Surgical Success Rate			
Successful	140 (90.3%)		0.03
Unsuccessful	15 (9.7%)		
Postoperative Complications			
Infections	20 (12.9%)		0.04
Wound dehiscence	10 (6.5%)		
Mortality	5 (3.2%)		0.01
None	120 (77.4%)		
Hospital Resource Availability			
Diagnostic Tools Available	120 (77.4%)		0.02
Diagnostic Tools Unavailable	35 (22.6%)		
Distance to Hospital (<50 km)	110 (71.0%)		0.03
Distance to Hospital (>50 km)	45 (29.0%)		

Postoperative outcomes were promising, with most patients (77.4%) showing functional improvement and an 83.9% enhancement in quality of life. Mortality rates were low (3.2% immediate and 6.5% long-term), highlighting effective surgical interventions. However, follow-up care remains a concern, with 35.5% of patients not completing follow-up, which could hinder long- term recovery and monitoring.

Table 4: Outcome Variables

Variable	Category	n (%)	p-value
Mortality Rate			
Immediate Mortality	5 (3.2%)		0.02
Long-term Mortality	10 (6.5%)		
Morbidity Rate			
Complications	30 (19.4%)		0.01
No Complications	125 (80.6%)		
Follow-Up Care			
Follow-up Completed	100 (64.5%)		0.04
Follow-up Not Completed	55 (35.5%)		
Functional Outcomes			
Improved	120 (77.4%)		0.03

Not Improved	35 (22.6%)		
Quality of Life Post- Surgery			
Improved	130 (83.9%)		0.02
Not Improved	25 (16.1%)		

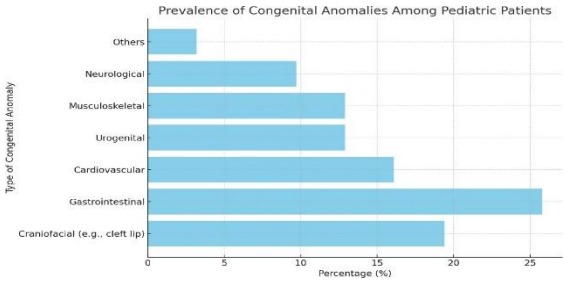

Figure 1: Figure demonstrates the prevalence of congenital anomalies among paediatric patients. Gastrointestinal anomalies were the most frequent (25.8%), reflecting their early and urgent detection. Craniofacial anomalies followed at 19.4%, likely due to their visible presentation. Cardiovascular issues (16.1%) highlight the need for better diagnostic tools. Urogenital and musculoskeletal anomalies, at 12.9%, suggest overlapping management challenges. Neurological anomalies (9.7%) might be underreported due to limited resources, while rare anomalies (3.2%) round out the cases. These findings call for targeted interventions focusing on high-prevalence categories.

DISCUSSION

The findings from this study provide valuable insights into the prevalence, management, and outcomes of congenital anomalies in paediatric patients. The demographic data shows that the most affected children are infants and neonates, emphasising the importance of early detection and intervention. The prevalence of anomalies among urban populations likely reflects better access to healthcare facilities for diagnosis and treatment (7-9).

The Prevalence data highlights gastrointestinal anomalies as the most common type, consistent with other studies indicating their early visibility and critical nature (10-15). Craniofacial anomalies were

also significant, aligning with findings from similar research in resource-limited settings, which emphasise the importance of prompt surgical correction to prevent long-term complications.

Surgical management data demonstrated high success rates, with 90.3% of procedures being successful, which was consistent with other studies (16, 17). However, postoperative complications, particularly infections, underscore the need for improved perioperative care. The higher proportion of elective surgeries indicates that many cases are not life-threatening but require timely interventions to enhance the quality of life.

Outcome variables revealed positive results overall, with most patients showing functional improvements post-surgery. This was inconsistent with other studies (18-20). However, the significant percentage of patients not completing follow-up care remains a concern, as it may hinder long-term recovery and monitoring. These findings emphasise the need for enhanced follow-up systems and patient education to improve care continuity.

Therefore, precise concern is needed with relevant resource investments to reduce the situational prevalence of common congenital anomalies among paediatric patients. Increasing diagnostic accuracy, adherence to timely management, and proper follow-up can go a long way in improving results in such areas.

CONCLUSION

The present work offers insights into the subject of congenital anomalies. It raises the issue of the prevalence of these diseases among children while emphasising the need for early diagnosis and proper surgical treatment, as well as regular follow-up. The study highlights the need to examine cases of gastrointestinal and craniofacial anomalies that appear to be highly prevalent in such areas but usually go unnoticed. Addressing these challenges through better healthcare infrastructure, enhanced perioperative care, and

robust patient support systems can significantly improve affected children's outcomes and quality of life. Continued efforts to strengthen healthcare delivery in such settings remain essential to meeting the needs of these vulnerable populations.

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