



Temporal Trends and Spectrum of Pediatric Surgical Conditions Operated In A Tertiary Care Teaching Hospital In Pakistan

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ABSTRACT

Introduction: Knowing the temporal trends as to when and how many pediatric surgery patients present and are operated on in a newly developed unit is crucial in the allocation of resources and policy making in health care center.

Aims & Objectives: The aim of this study is to describe the spectrum and pattern of operated pediatric surgery patients in a newly developed pediatric surgical unit of Pakistan.

Place and Duration of Study: This study was conducted at Pardiatic Surgery Unit of Holy Family hospital, Rawalpindi between January 2020 and September 2021.

Material & Methods: This was a retrospective descriptive study conducted on all patients that were operated under Pediatric surgery unit over a period of 20-months. Data regarding age, sex, diagnosis, and procedure performed were obtained. Diagnoses were categorized based on organ system. SPSS version 22 was used to perform the data analysis., a p-value of ≤ 0.05 was considered significant.

Results: 898 procedures were performed in total with a male to female ratio of 2.03:1. Most of the patients fell under 2-8 years of age. Digestive system disorders (164, 18.3%) and genitourinary (377, 42%) made most of the cases observed, with inguinal hernias making up to 15.0% of all cases. Odds ratio was calculated for different variables which showed that male patients, patients with gastrointestinal problems had greater odds of being operated.

Conclusion: The expected number of operated cases in a newly developed unit is comparable to other units that have been established for a long time. More focus research needs to be done on different aspects of pediatric surgery in our region and to try for integration of pediatric surgery into public health programs including primary and secondary health centers to meet the increasing demand of pediatric surgical patients presented to tertiary care.

Keywords: Pediatrics, health services, Hospitals, pediatrics., medical audit.

INTRODUCTION

In low- and middle-income countries (LMICs), pediatric surgery is emerging as a growing subspecialty of Surgery^{1,2,3}. Holy Family Hospital, Rawalpindi was set up in 1954 as a mission hospital and is affiliated as university teaching hospital with Holy Family Hospital since 1977. It is one of the busiest tertiary care specialized hospitals in region of Northern Punjab. However, no formal pediatric surgical facility was functional until 2016. Since then it is the only teaching hospital providing

elective and emergency services for pediatric surgical patients in this part of the country. The hospital now contains around 40 beds which also includes a Public private partnership funded Step Down Unit consisting of 4 neonatal carts and 3 beds for patients who need oxygen support and critical monitoring. Audit and appraisal of any services has been an important focal point in the quality improvement and clinical governance which include judicial distribution of sources and patient friendly policy making⁴. Although large population is targeted to establish an epidemiological co relation of disease spectrum⁵, disease patterns in pediatric age group can be better studied by studies like these^{6,7}. This department is claimed to be the only government tertiary care facility in Northern Punjab entertaining patients from other provinces as KPK and GB, AJK, The aim of this study is to describe the spectrum and pattern of operated pediatric surgery patients in a newly developed pediatric surgical unit of Pakistan.

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MATERIAL AND METHODS

This was a retrospective Institution based study conducted between January 1, 2020, and September 31, 2021 at Paediatric Surgical Unit of Holy family Hospital, Pakistan. The Ethical approval was received from Rawalpindi Medical University vide approval number MED-04-46-21. Pediatric subjects data included was from birth till the age of 12 years, managed and diagnosed for pediatric surgical conditions at Holy Family Hospital, Rawalpindi and admitted for surgical emergencies during the whole year of 2020. Pediatric surgical cases with multiple co-morbid who needed multidisciplinary management such as orthopedic, cardiac, ophthalmologic, neuro-surgical intervention, plastic, reconstructive services and were referred to proper specialized unit were excluded. Data collection procedure and instrument followed was registration records in the wards and operating rooms to pinpoint the target research populations. Following the retrieval of the patients' medical records, information was gathered from the chart using a standard, pre-structured template.

Data entry and analysis: The acquired information was verified for accuracy, coded, entered into statistical software package (SPSS version 22), and then examined. Descriptive statistics of frequency and percentage were employed during the analysis, and the results were presented in tables.

RESULTS

A total of 898 patients under the age of 12 were operated in the operation theater during the 20 month study period. Out of the total operated patients, 65.4% of the patients were males, whereas the remaining 34.5% were females with 1 (0.1%) child having ambiguous gender. Most of the children (40%) going for surgery belonged to 2 years – 8 years age group. 11.2% belonged to <28 days age group, 31.7% to 28 days to 2 years age group, whereas 17% belonged to >8 years age group. This is shown in Fig-1. 42% surgeries were done due to causes related to gastrointestinal tract (GIT). 18.3% of surgeries were of genitourinary system, 1% of respiratory system, 4.8% due to traumatic cases, 2.4% and 7.7% due to burn and head and neck causes whereas remaining 23.8% due to miscellaneous causes. (Table-1). In gastrointestinal tract, inguinal herniotomy comprised of 36.1% of all the gastrointestinal surgical procedures followed by laparotomy (21.2%) and polypectomy (16.4%). Other gastrointestinal surgical procedures included

colostomy (5.3%), colostomy reversal (1.6%), anoplasty (1.6%), anorectoplasty (6.6%), pyloromyotomy (0.8%), rectal biopsy (2.9%), ileostomy reversal (3.7%), TIP repair (1.1%), anal fissure repair (1.1%), and pyeloplasty (1.6%). In genitourinary tract, orchidopexy (36.0%) and circumcision (29.9%) were most common surgical procedures. Others included hydrocele repair (4.3%), hypospadias repair (7.9%), umbilical herniotomy (3.0%), PPV ligation (6.1%), meatotomy (1.8%), urethroplasty (3.0%), vulvasynechia repair (2.4%), bladder extropy repair (1.8%), and vesicostomy (3.7%). In respiratory tract, 9 cases of thoracotomy were done. In trauma cases, excision constituted of 39.5% cases followed by debridement (27.9%), wound suturing (16.3%) and TEF repair (16.3%). Category burn consisted of 22 cases belonging to CVP insertion. Surgeries in relation to head and neck consisted of tongue tie release (55.1%), sclerotherapy (36.2%), torticollis release (5.8%) and cleft palate repair (2.9%). Miscellaneous cases included EUA (41.1%) being the highest. Other cases included CDH repair (2.8%), lymph node biopsy (6.5%), muscle biopsy (2.3%), extra digit removal procedure (5.6%), SCT excision (2.3%), cysts removal (4.2%), POP repair (3.3%) and other small surgical procedures consisting of 31.8% of all the miscellaneous cases. Table-2 shows the overall frequency and percentage of the surgical procedures done in operation theater. The highest number of pediatric cases were operated in October 2020 (71 cases) and lowest were operated in May 2020 (12 cases) Fig-2. As compared to miscellaneous category, males have 1.47 (95% CI: 1.05, 2.06) odds of having gastrointestinal surgeries, 1.16 (95% CI: 0.77, 1.75) odds of genitourinary surgeries, 2.12 (95% CI: 0.51, 8.68) odds of respiratory surgeries, 0.57 (95% CI: 0.28, 1.12) odds of trauma related surgical procedures, 0.11 (95% CI: 0.02, 0.46) odds of burn related surgeries and 1.29 (95% CI: 0.75, 2.23) odds of head and neck related surgeries. Table-3. Compared to miscellaneous category, gastrointestinal surgical procedures were more common in 28 days – 2 years age group (Odds = 1.92 95% CI: 1.17, 3.13), genitourinary (Odds = 1.49, 95% CI: 0.85, 2.61), and respiratory (Odds = 2.40, 95% CI: 0.26, 22.10) surgical procedures were more common in 2 years – 8 years age group. Other common odds are given in Table-4.

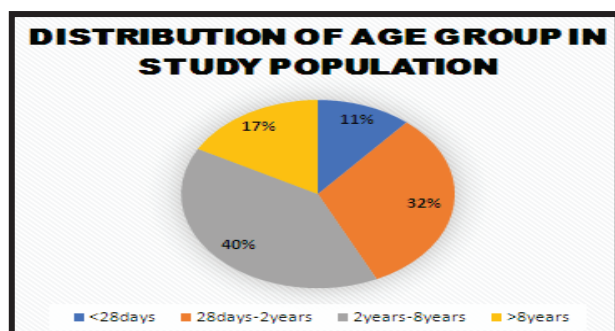


Fig-1: Distribution Of Age Group In Study Population

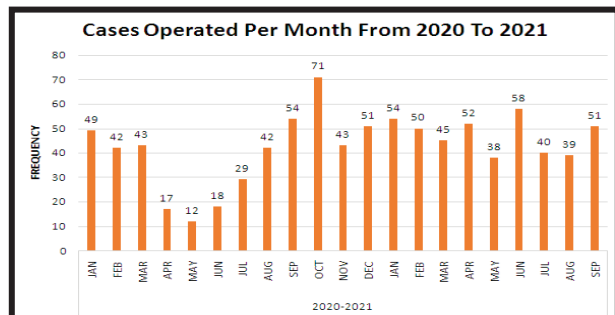


Fig-2: Month Wise Load of Patient Operated In Operation Theater

Demographic Variables	Frequency	Percentage
GENDER		
Male	587	65.4%
Female	310	34.5%
Ambiguous	1	0.1%
SYSTEM		
Gastrointestinal Tract	377	42.0
Genitourinary Tract	164	18.3
Respiratory Tract	9	1.0
Trauma	43	4.8
Burn	22	2.4
Head and Neck	69	7.7
Miscellaneous	214	23.8

Table-1: Demographic Detail Of The Study Sample

Surgical Procedure	Frequency	Percentage
Tongue Tie Release	38	4.2%
Laparotomy	80	8.9%
Orchidopexy	59	6.6%
Polypectomy	62	6.9%
Inguinal Herniotomy	136	15.1%
Colostomy	20	2.2%
Colostomy Reversal	6	0.7%
Circumcision	49	5.5%
Eua	88	9.8%
Cvp Insertion	22	2.4%
Anoplasty	6	0.7%
Anorectoplasty (PSARP)	25	2.8%
CDH Repair	6	0.7%
Hydrocele Repair	7	0.8%
Hypospadias Repair	13	1.4%
Thoracotomy	9	1.0%
Sclerotherapy	25	2.8%
Umbilical Herniotomy	5	0.6%
TEF Repair	7	0.8%
Pyloromyotomy	3	0.3%
Lymph Node Biopsy	14	1.6%
Excision	17	1.9%
Debridement	12	1.3%
Rectal Biopsy	11	1.2%

PPV Ligation	10	1.1%
Muscle Biopsy	5	0.6%
Ileostomy Reversal	14	1.6%
Meatotomy	3	0.3%
Extra Digits Remove	12	1.3%
Torticollis Release	4	0.4%
Urethroplasty	5	0.6%
TIP Repair	4	0.4%
SCT Excision	5	0.6%
Vulvovaginitis Repair	4	0.4%
Eua Anal Fissure	4	0.4%
Cleft Palate Repair	2	0.2%
Cyst Excision	9	1.0%
Bladder Extropy Repair	3	0.3%
Wound Re-Suturing	7	0.8%
Vesicostomy	6	0.7%
Pyeloplasty	6	0.7%
Ponsetti Cast Application	7	0.8%

Table-2: Frequencies Of Surgical Procedures Done In Operation Theater

System	Gender		COR (95% CI)
	Male	Female	
GIT	244	132	1.475 (1.05, 2.06) *
GENITOURINARY	147	17	1.166 (0.77, 1.75)
RESPIRATORY	5	4	2.115 (0.51, 8.68)
TRAUMA	23	20	0.567 (0.28, 1.12)
BURN	7	15	0.106 (0.02, 0.46) **
HEAD AND NECK	40	29	1.297 (0.75, 2.23)
MISC	121	93	1
Year			
	2020	2021	
GIT	220	157	1.482 (1.05, 2.07) *
GENITOURINARY	86	78	1.166 (0.77, 1.75)
RESPIRATORY	6	3	2.115 (0.52, 8.67)
TRAUMA	15	28	0.567 (0.28, 1.12)
BURN	2	20	0.106 (0.02, 0.46) **
HEAD AND NECK	38	31	1.297 (0.75, 2.23)
MISC	104	110	1

Table-3: Association Of Individual Systems With The Gender

System	Age Groups						
	<28 days	COR (95% CI)	28 days-2yrs	COR (95% CI)	2yrs-8yrs	COR (95% CI)	>8yrs
GIT	47	1.52 (0.82, 2.81)	137	1.92 (1.17, 3.13) *	136	1.43 (0.89, 2.29)	57
GENITOURINARY	15	0.95 (0.43, 2.09)	48	1.32 (0.72, 2.40)	72	1.49 (0.85, 2.61)	29
RESPIRATORY	2	3.69 (0.32, 42.67)	2	1.60 (0.14, 18.17)	4	2.40 (0.26, 22.10)	1
TRAUMA	10	2.30 (0.81, 6.56)	9	0.90 (0.32, 2.51)	16	1.20 (0.47, 3.01)	8
BURN	0	7.862E-09 (7.862E-09, 7.862E-09)	7	5.60 (0.66, 47.90)	14	8.40 (1.07, 65.91) *	1
HEAD AND NECK	1	0.20 (0.02, 1.71)	22	1.95 (0.82, 4.63)	37	2.46 (1.09, 5.55) *	9
MISC	26	1	60	1	80	1	48

Table-4: Association Of Organ Systems With Age Groups.

DISCUSSION

When global health is discussed, the field of pediatric surgery has still to set a mark as a major subject⁸. In LMIC like ours, the Department of Pediatric Surgery have not been established except some major centers. The peripheries are devoid of trained pediatric surgeons and the attendants with limited resources resort to getting their child treated by a general surgeon available at the closest primary and secondary health care facility. Many a times pediatric surgical conditions are diagnosed at a later stage because of this very reason. Our institution is the only tertiary care center catering to Northern Punjab established in 2016, 69 years after the establishment of Holy Family hospital, Rawalpindi. This article summarizes the initial patient flow and cases operated during the period when the department was under development. A total of 898 patients were operated in the initial twenty months of development of the unit keeping in view that no separate elective and emergency operation theatre facility was specified. Our retrospective review concluded that more than half of the patients operated were males which co relates with findings of other countries such as Nigeria, Ethopia, and Rwanda.⁹⁻¹³ The reason for male preponderance can't be fully elucidated. We stratified the patients into neonate <28days, then infant >28-2years of age, 2-8years of adult child. Majority of the patients 40% operated belonged to the age group 2-8years. This age group coincided with a study conducted in Nigeria where the mean age was calculated to be around 3 years of age. While other similar studies from Africa reported the main age to be around 4.9 – 6.4^{7,9-13}.

Disorders were categorized in the current study according to the main organ systems. The three main causes of paediatric surgery presentations at our facility were disorders of the gastrointestinal system, developmental anomalies, and disorders of the genitourinary system, with all three accounting for over 90% of all operations. Seconding the claim that "inguinal hernia repair is the most common operation performed by paediatric surgeons", surgery for inguinal hernias continues to be the most prevalent procedure¹⁴. 15.1% of all surgeries were for inguinal hernias, which is in line with the 15.9% rate of paediatric surgical hospitalisations found by Alagoa and Gbobo in the Niger Delta of Nigeria¹². Contrary to what some epidemiological studies claim, gastrointestinal abnormalities, both congenital and acquired diseases, appeared to be the most common cause of paediatric surgery in our centre^{7,10,13}. 4.8% of the procedures done in our institution were for trauma. The primary cause of this discrepancy could be attributed to the departments' exclusion of individuals

who require neurosurgery and orthopaedic care. According to a research from Nigeria, 6.3% of all neonatal hospitalisations had congenital abnormalities (CAs)¹⁵ and most research analysing the epidemiology of paediatric surgical hospitalisations have placed CAs in the top three¹². We were not able to stratify our data into congenital and acquired causes as it was a retrospective study. Our data showed that gastrointestinal, genitourinary and patients with abnormalities related to head and neck region were the top three causes of pediatric surgical admission in our center.

Temporal trends showed that the majority cases operated were around the month of October while the least cases operated were around the month of May and July. Reasons for decreased admission in both these months coincided with the months of Ramadan followed by Eid-ul-fitrin which the regular working hours are decreased by 1 light hour and the Hajj season, Eid-ul-Adha. Both these months have national public holidays for 4-5days approximately every year. This study has summarized the temporal trends and spectrum of pediatric surgical problems operated in a recently developed unit. This study gives an overview of the burden department of pediatric surgery faces with limited human resources for a wide area of coverage. Department of Pediatric Surgery needs to be considered an essential part of all the health facility centers to reach the Sustainable Development Goals recognized by the United Nations. In order to improve child healthcare, initiatives ought to be taken to improve aspects such as manpower, infrastructure, tools, anaesthesia, and pertinent research endeavours¹⁶.

CONCLUSION

The expected number of operated cases in a newly developed unit is comparable to other units that have been established for a long time. Therefore, in order to meet the demands of increasing number of pediatric surgical patients presenting to tertiary care hospitals, more well defined studies addressing these common ailments and the inclusion of paediatric surgery in public health initiatives covering primary and secondary health centers.

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