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A Study on Prophylaxis and Postoperative Antibiotic Utilization Pattern Among the Surgical Children in a Rural Teaching Hospital

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Abstract:

- ***Background:***

Antibiotics play a crucial role in preventing and treating infections among pediatric surgical patients. Appropriate prophylactic and postoperative antibiotic use can reduce surgical site infections (SSI), antimicrobial resistance, and healthcare costs. This study evaluated antibiotic utilization patterns, therapeutic outcomes, and patient medication adherence in children undergoing surgical procedures in a rural teaching hospital.

- ***Methods:***

A prospective observational study was conducted over six months among 90 pediatric patients admitted in the Department of Pediatric Surgery. Data regarding demographics, surgical diagnosis, antibiotic prophylaxis, postoperative antibiotic use, SSI occurrence, and medication adherence were collected using a structured proforma and analyzed statistically.

- ***Results:***

Among 90 patients, 62.2% received prophylactic antibiotics, predominantly via the intravenous route. Cefotaxime, Gentamicin, and Metronidazole were the most commonly prescribed antibiotics. Surgical site infection developed in only 5.6% of patients, and no adverse drug reactions were reported. Most patients received short-term antibiotic therapy and had hospital stays of 1–5 days. Medication adherence improved after counselling, with 97.8% of patients demonstrating good to very good compliance.

- ***Conclusion:***

Intravenous antibiotics were the primary mode of prophylactic and postoperative management, with Cefotaxime and Gentamicin being the most frequently utilized agents. The low SSI rate, absence of adverse drug reactions, and improved medication adherence indicate effective antibiotic utilization and favorable clinical outcomes among pediatric surgical patients.

Keywords: *Surgical Site Infection, Antibiotics, Prophylaxis, Patient Compliance, Medication Adherence.*

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I. INTRODUCTION

Surgical conditions are defined as disease states requiring the expertise of and intervention of a trained general surgeon. There is a wide spectrum of surgical diseases for which patients seek admission to a surgical unit. The pattern of diseases varies from place to place and according to age, race and socioeconomic class in different populations. Antibiotics are one of the pillars of modern medical care and plays major role both in prophylaxis and treatment of infectious diseases. The issues of their availability, selection and proper use are of critical importance to the global community. Antibiotics are so commonly prescribed in surgical wards for prophylactic use

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or post operatively to control the Infections. Pediatric population is prone to suffer from recurrent infections in the various system of the body. Preoperative antibiotic prophylaxis is defined as the administration of antibiotics prior to performing surgery to help decrease the risk of postoperative infections. The circumstance of anti-microbial administration may vary, but the objective of managing preoperative systemic prophylactic anti-microbial is to have the concentration in tissue at highest at the site of surgery and during surgery. The aim of surgical prophylaxis is to reduce rates of surgical site and healthcareassociated infections and so reduce surgical morbidity and mortality. Irrational use of antimicrobials are associated with increase in the prevalence of antimicrobial resistance, adverse drug reaction and increased risk of surgical site infections and contribute to the rising cost of medical care and increase the economic burden to patients' family and society. Thus, the judicious use of antibiotic is therefore an important way to reduce the problem of antimicrobial resistance. Rational use of drugs forms the corner stone of successful implementation of rational use of medicine. This study aims to analyse the drug utilization pattern of antibiotics used in prophylactic and post operative management for children those who have undergone a surgical procedure or treated for surgical infections. The study additionally focused on assessing patient medication adherence by designing a questionnaire.

II. MATERIALS AND METHODS

➢ *Study Site*

This study was done at one center. It took place in the inpatient ward of the Pediatric Surgery Department at Government Medical College and Hospital Cuddalore District, located in Annamalai Nagar, Chidambaram, Tamil Nadu, with the postal code 608002.

➢ *Study Design*

Prospective Observational study.

➢ *Study Period*

The study was conducted for a period of 6 months (November 2024-April 2025).

➢ *Sample Size*

As it was Preliminary Research, there was no sample size calculation. The number of participants were decided based on the patient's availability and those who met the inclusion and exclusion criteria.

➢ *Study Recruitment:*

- Target population: Patients who were admitted in Pediatric Surgery Ward in the Department of Pediatric Surgery, at Government Medical College and Hospital Cuddalore District, Annamalai Nagar. Study population: The patients enrolled for the study were selected based on inclusion and exclusion criteria.

➢ *Inclusion Criteria*

- All ages of pediatric population i.e. 0 - 12 years.
- Patients who have undergone a surgical procedure (elective or emergency) during the study period or those who were treated for Surgical Infections.

➢ *Exclusion Criteria*

- Patients whose guardian are unwilling to participate in the study.
- Patients who are not followed post-operatively or lost to follow-up before data collection is completed.

➢ *Data Collection*

Informed consent form was obtained from patient representative prior to starting the study. Study Proforma (Data collection form) is designed to collect all the details like Inpatients number, name, age, chief complaints, history of present illness, patient past medical and medication history, drug chart details, prescribed dosage, frequency, Route of administration and clinical diagnosis. Patient medication adherence was assessed using a designed Questionnaire. The questionnaire contains a 5-point Likert scale to assess adherence based on taste, smell, ease of administration, dosage, form of the drug, schedule, unpleasant side effects, refusal and missed doses.

➢ *Data Analysis*

The data gathered were recorded using Microsoft Excel and statistical analysis was done using JASP (Jeffreys's Amazing Statistics Program) software.

III. OBSERVATIONS AND RESULTS

A. Descriptive Statistics

➢ *Gender-Wise Distribution*

The demographic data shows that among these patients a high prevalence occurred in Male at about 70%.

Table 1 Gender-Wise Distribution of Patients

Gender	Number of patients	Percentage (%)
Male	63	70
Female	27	30
Total	90	100

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➢ *Age Group Distribution*

Table 2 Age Group Distribution of Patients

Categorization of Age	Number of patients	Percentage (%)
Neonates (0-27 days)	6	6.7
Infants (28-12 months)	3	3.3
Toddlers (13-24 months)	0	0
Early Childhood (1-5 yrs)	30	33.3
Middle Childhood(6- 10 yrs)	38	42.2
Early Adolescence(11- 13 yrs)	10	11.1
Late Adolescence(14 - 18 yrs)	3	3.3

The majority of patients (75.5%) are in the Early Childhood (1-5 yrs) and Middle Childhood (6-10 yrs) age groups. The age distribution shows a peak in the Middle Childhood age group (42.2%), followed by the Early Childhood age group (33.3%).

➢ *Surgical Prophylaxis*

Table 3 Surgical Prophylaxis

Prophylaxis	No. of Patients	Percentage (%)
Given	56	62.2
Not given	34	37.8

Out of the 90 patients observed, prophylactic treatment was given to 56 individuals, accounting for 62.2% of the group. In contrast, 34 patients (37.8%), did not receive any prophylactic treatment. This indicates a higher rate of Prophylactic Intervention among the study population.

➢ *Route of Administration of Surgical Prophylaxis*

Table 4 Route of Administration of Surgical prophylaxis

Prophylaxis	No. of Patients	Percentage (%)
Oral	7	11.1
Intravenous	51	90
External administration	5	7.9

A total of 56 patients received Prophylactic treatment through various routes of administration. Among these, the majority (90%, n=51) received the medication via the intravenous route. Oral administration was utilized in 11.1% patients (n=7), while 7.9%(n=5) received prophylaxis through external administration.

- *Enteral Administration of Surgical Prophylaxis*

Table 5 Enteral Administration of Surgical prophylaxis

Medication	No. of Patients	Percentage (%)
OXAZOLIDINONE		
Linezolid	2	20
CEPHALOSPORIN		
Cephalexin	2	20
MACROLIDE		
Erythromycin	1	10
FLUOROQUINOLONE		
Norfloxacin	3	30
NITROIMIDAZOLE		
Metronidazole	2	20

Among the different medications administered orally for surgical prophylaxis, Norfloxacin, classified under quinolones, was the most commonly administered, accounting for 30% of the total usage. Linezolid (oxazolidinone), Cephalexin (cephalosporin), and Metronidazole (nitroimidazole) each represented 20% of the usage. Erythromycin, a macrolide, had the lowest administration rate at 10%.

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- *Parenteral Administration of Surgical Prophylaxis*

Table 6 Parenteral Administration of Surgical Prophylaxis

Medication	No. of Patients	Percentage (%)
OXAZOLIDINONE		
Linezolid	2	1.7
CEPHALOSPORIN		
Cefotaxime	40	33.6
Ceftriaxone	3	2.5
PENICILLIN		
Ampicillin	2	1.7
NITROIMIDAZOLE		
Metronidazole	25	21
AMINOGLYCOSIDE		
Amikacin	7	5.8
Gentamicin	33	27.7
COMBINATION		
PENICILLIN+BETA-LACTAMASE INHIBITOR		
Amoxicillin+ Clavulanate	3	2.5
Piperacillin+ Tazobactam	1	0.8
CEPHALOSPORIN +BETA-LACTAMASE INHIBITOR		
Cefoperazone+Sulbactam	1	0.8
PENICILLINS		
Ampicillin+ Cloxacillin	2	1.7

Among the parenteral antibiotics administered for surgical prophylaxis, Cefotaxime was the most frequently used agent (33.6%), followed by Gentamicin (27.7%) and Metronidazole (21%). Other antibiotics such as Amikacin (5.8%), Ceftriaxone (2.5%), and combination therapies (5.8%) were used to a lesser extent. Linezolid and Ampicillin were the least utilized, each accounting for 1.7% of the total.

- *Topical Administration of Surgical Prophylaxis*

Table 7 Enteral Administration of Surgical Prophylaxis

Medication	No. of Patients	Percentage (%)
FLUOROQUINOLONE		
Gatifloxacin eye drops	1	20
TOPICAL (Monocarboxylic Acid)		
Mupirocin	1	20
SULFONAMIDE		
Silver sulphadiazine	3	60

In this study, among thetopical antibiotics used for surgical prophylaxis, Silver sulphadiazine was the most commonly used (60%), followed by Gatifloxacin eye drops (20%) and Mupirocin (20%).

➢ *Route of Administration of Postoperative Treatment*

Table 8 Route of Administration of Postoperative Treatment

Route of Administration	No. of Patients	Percentage (%)
Enteral	3	5.2
Parenteral	55	94.8

In this study, the majority (94.8%) received parenteral postoperative treatment, while a smaller proportion (5.2%) received enteral medications.

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- *Enteral Administration of Postoperative Treatment*

Table 9 Enteral Administration of Postoperative Treatment

Medication	No. of Patients	Percentage (%)
CEPHALOSPORIN		
Cephalexin	2	67
MACROLIDE		
Erythromycin	1	33

In this study, Among the enteral antibiotics administered for postoperative management, Cephalexin, a cephalosporin antibiotic, was used in 67% of cases, while Erythromycin, a macrolide antibiotic, was used in 33% of cases.

- *Parenteral Administration of Postoperative Treatment*

Table 10 Parenteral Administration of Postoperative Treatment

Medication	No. of Patients	Percentage (%)
OXAZOLIDINONE		
Linezolid	5	4.7
CEPHALOSPORIN		
Cefotaxime	46	43.4
Ceftriaxone	1	0.9
PENICILLIN		
Ampicillin	1	0.9
NITROIMIDAZOLE		
Metronidazole	13	12.3
AMINOGLYCOSIDE		
Amikacin	7	6.6
Gentamicin	26	24.5
COMBINATION		
PENICILLIN+BETA-LACTAMASE INHIBITOR		
Amoxicillin + Clavulanate	3	2.8
CEPHALOSPORIN +BETA-LACTAMASE INHIBITOR		
Cefoperazone +	1	0.9
Sulbactam		
PENICILLINS		
Ampicillin+ Cloxacillin	3	2.8

In this study, among the various parenteral antibiotics administered postoperatively, Cefotaxime was the most commonly used, accounting for 43.4% of the cases, followed by Gentamicin (24.5%) and Metronidazole (12.3%). Other antibiotics, including Linezolid, Amikacin, and various combination therapies, were used less frequently.

➢ *Medications Other than Antibiotics*

Table 11 Medications Other than Antibiotics

Medication	No. of Patients(n=90)	Percentage (%)
ANALGESICS		
Acetaminophen	81	42.2
Diclofenac	2	1
Pentazocine	8	4.1
ANTACIDS/ANTIULCER AGENTS		
Ranitidine	39	20.3
Pantoprazole	1	0.5
Antacid	2	1
ANTIEMETICS		
Ondansetron	5	2.6
Domperidone	1	0.5
LAXATIVES		
PEG(Polyethylene Glycol)	1	0.5
Liquid Paraffin	4	2

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Disodium Hydrogen Citrate	1	0.5
NUTRITIONAL SUPPLEMENT		
Vitamin B Complex	3	1.5
Vitamin D3	1	0.5
Calcium	1	0.5
Calcium+ Vitamin D3	1	0.5
MVI (Multivitamin Injection)	2	1
Zinc	3	1.5
Amino acids	1	0.5
Vitamin K	3	1.5
Trypsin+ Chymotrypsin	1	0.5
RESPIRATORY AGENTS		
Salbutamol	2	1
Budesonide	1	0.5
Xylometazoline	1	0.5
Saline Nasal Drops	2	1
Dextromethorphan Hydrobromide	1	0.5
Acetylcysteine	1	0.5
ANTIHISTAMINE		
Chlorpheniramine	6	3.1
CNS DRUGS		
Clobazam	1	0.5
Oxybutynin	1	0.5
Triclofos	2	1
HEPATOPROTECTIVE		
LIV 52	1	0.5
UDCA(Ursodeoxycholic acid)	1	0.5
ANTISEPTIC		
Chlorhexidine	3	1.5
Povidone-Iodine	2	1
ANTIFIBRINOLYTIC AGENT		
Tranexamic Acid	1	0.5
PROBIOTICS		
Bifilac	3	1.5
ANTICHOLINESTERASE		
Pyridostigmine	1	0.5
THYROID HORMONE		
Levothyroxine	1	0.5

In this Study, Among the medications other than Antibiotics,Analgesics were the most frequently administered, accounting for 47.3% of the total, followed by antiulcer agents (21.8%) and nutritional supplements (8%). Other notable categories included respiratory agents (4%), antihistamines and antiemetics (3.1% each), and laxatives (3%). Drug classes such as antiseptics, CNS drugs, probiotics, and hepatoprotective agents were used less commonly, while thyroid hormones, anticholinesterase agents, and antifibrinolytic agents were the least used, each at 0.5%.

- *Surgical Site Infection (SSI)*

Table 12 Surgical Site Infection

Surgical Site Infection	**No. of Patients(n=90)**	**Percentage (%)**
Developed	5	5.6
Not Developed	85	94.4

In this study, Out of 90 patients, 5 (5.6%) developed SSI, while 85 (94.4%) did not developed. This highlights a relatively low incidence of SSI in the observed population.

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➢ *Number of Antibiotics Per Prescription*

Table 13 Number of Antibiotics Per Prescription

Number of Antibiotic per Prescription	No. of Patients(n=90)	Percentage (%)
1	13	28.9
2	9	20
3	17	37.8
>4	6	13.3

In this study, the majority of prescriptions included 3 antibiotics (37.8%), followed by prescriptions with 1 antibiotic (28.9%), 2 antibiotics (20%), and more than 4 antibiotics (13.3%).

➢ *Duration of Antibiotic Treatment (Days)*

Table 14 Duration of Antibiotic Treatment (Days)

Duration of Antibiotic Treatment (Days)	No.of Patients (n=90)	Percentage (%)
1 - 5	55	61.1
5 - 10	21	23.3
10 - 20	11	12.2
>20	3	3.3

In this study, A majority (61.1%) underwent antibiotic treatment for 1–5 days, followed by 23.3% for 5–10 days, 12.2% for 10–20 days, and a small proportion (3.3%) receiving antibiotic treatment for more than 20 days. This indicates that short-term antibiotic therapy was most common among the participants.

➢ *Surgical Diagnosis*

Table 15 Surgical Diagnosis

Surgical Diagnosis	No. of Patients(n=90)	Percentage (%)
Acute Appendicitis	9	10
Acute Urinary Retention	1	1.1
Amoebic colitis	1	1.1
Amoebic typhlitis	1	1.1
Bacillary Dysentery with Rectal prolapse grade 2 / Simple febrile seizure	1	1.1
Bilateral earlobe keloid	1	1.1
Catarrhal Appendicitis	2	2.2
Cervical lymphadenopathy (Right/Left)	2	2.2
Chronic Adenotonsillitis	1	1.1
Cleft Palate	3	3.3
Cutaneous horn left ear	1	1.1
Cystitis	2	2.2
Dysfunctional voiding	1	1.1
Enteritis	2	2.2
Enterocolitis	1	1.1
Facial injury with wound gaping	1	1.1
Fistula in Ano	1	1.1
Gluteal myositis	1	1.1
Grade 2 Necrotizing Enterocolitis	1	1.1
Hirschsprung Disease	1	1.1
Internal Angular Dermoid Root of Nose/Midline	1	1.1
Left foot chronic sinus	1	1.1
Hydrocele	5	5.6
Left scapular abscess	1	1.1
Undescended testis	2	2.2
Liver abscess	1	1.1
Meconium ileus	1	1.1
Mucous cyst Left Lower lip	2	2.2
Neonatal sepsis (Septic ileus)	1	1.1
Non-fixation of Right Colon (Mobile caecum)	1	1.1

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Papillary Carcinoma of Thyroid	1	1.1
Pedunculated tonsillar mass	1	1.1
Pelvic with Rupture Urethra (Urethroplasty)	1	1.1
Penoscrotal Hypospadias	2	2.2
Perianal Hemangioma (ulcerated) on diversion loop colostomy (sigmoid)	1	1.1
Phimosis	5	5.6
Pierre Robin Anomaly (Incomplete cleft palate)	1	1.1
Post Myositis / Fixed Flexion deformity Left Knee / Synovitis left knee with effusion	1	1.1
Post traumatic Raw Area Left Elbow	1	1.1
Recurrent chronic intestinal obstruction / Post Hartmann's procedure	1	1.1
Recurrent right parotiditis	1	1.1
Right Hydronephrosis with PUJ obstruction	1	1.1
Right Inguinal Hernia	1	1.1
Right PUJ obstruction	1	1.1
Right side recurrent neck abscess	1	1.1
Right testicular torsion	1	1.1
RTA with multiple injuries	2	2.2
Sacral lipoma	1	1.1
Scalp Hematoma	1	1.1
Sealed Appendicular Perforation	1	1.1
Stitch abscess Left Parietotemporal region	1	1.1
Subacute Appendicitis	1	1.1
Subacute small bowel obstruction (Dolichosigmoid)	1	1.1
Subcoronal hypospadias corrected (urethroplasty done) with fistula	1	1.1
Surgical site infection	2	2.2
Thermal burns 3%	5	5.6
Thyroglossal cyst	1	1.1
Tongue tie	1	1.1
Umbilical hernia with left inguinal hernia	1	1.1

In this study, the most commonly reported conditions were Acute Appendicitis(10%), Hydrocele(5.6%), Phimosis(5.6%), Thermal burns(5.6%) and Cleft Palate(3.3%). Other conditions each accounted for 1.1% to 2.2% of the cases, reflecting a wide spectrum of both common and rare surgical conditions.

➢ *Surgical Procedure*

Table 16 Surgical Procedure

Surgical Procedure	No. of Patients (90)	Percentage (%)
Re do pull through procedure	1	1.1
Adenotonsillectomy under GA	1	1.1
Anderson Hynes pyeloplasty	1	1.1
Catheter Change + Urethral dilatation	1	1.1
Circumcision	5	5.6
Colostomy reversal	1	1.1
Conservative	31	34.4
Diagnostic cystoscopy	1	1.1
Diagnostic laparotomy with fixation of mobile caecum	1	1.1
Emergency Open Appendicectomy	6	6.7
Enterotomy with evacuation of meconium	1	1.1
Excision	3	3.3
Excision and Biopsy	8	8.9
Exploratory Laparotomy	1	1.1
Fistula closure	1	1.1
Fistulectomy	1	1.1
Incision and Drainage	3	3.3
Langenbeck's Push-back Palatoplasty	4	4.4
Left Completion Hemi Thyroidectomy	1	1.1
Herniotomy	4	4.4
Left Inguinal Herniotomy with Umbilical Herniotomy with Umbilicoplasty	1	1.1

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Orchidopexy	2	2.2
Ostomy	1	1.1
Resuturing done under LA	1	1.1
Right Orchidectomy with Left Orchidopexy	1	1.1
Right Pyeloplasty	1	1.1
Secondary suturing	1	1.1
Sistrunk Procedure	1	1.1
Split skin graft	1	1.1
Thiersch-Duplay urethroplasty	2	2.2
Tongue tie release(Mikulicz's frenuloplasty)	1	1.1
Wound exploration followed by delayed primary suturing	1	1.1

In this study, the most common procedure observed was conservative management (34.4%), followed by excision and biopsy (8.9%) and emergency open appendicectomy (6.7%). Circumcision accounted for 5.6% of the cases, while other procedures such as Langenbeck's Push-back palatoplasty, incision and drainage, and excision were less frequent.

- *Type of Surgical Procedure*

Table 17 Type of Surgical Procedure

Type of Surgical Procedure	No. of Patients (n=90)	Percentage (%)
Elective	42	46.7
Emergency	13	14.4
Conservative	35	38.9

In this study, Elective procedures were the most commonly performed, accounting for 46.7% (n=42) of the cases. Conservative procedures were carried out in 38.9% (n=35) of the patients, while emergency procedures constituted the remaining 14.4% (n=13).

- *Total Stay in the Hospital (Days)*

Table 18 Total Stay in the Hospital (Days)

Total Stay in the Hospital (Days)	No. of Patients(n=90)	Percentage (%)
1 - 5	53	58.9
5 - 10	20	22.2
10 - 20	12	13.3
>20	5	5.6

In this study, the majority (58.9%) of patients had a short stay of 1–5 days. A smaller proportion stayed for 5–10 days (22.2%), followed by 10–20 days (13.3%), and a minority (5.6%) required hospitalization for more than 20 days.

- *Patient Medication Adherence*

Table 19 Patient Medication Adherence before Counselling

Patient Compliance	No. of Patients (n=90)	Percentage (%)
Very Poor Compliance (9 - 0)	0	0
Poor Compliance (18 - 10)	0	0
Moderate Compliance (27 - 19)	11	12.2
Good Compliance (36 - 28)	38	42.2
Very Good Compliance (45 - 37)	41	45.6

Table 20 Patient Medication Adherence after Counselling

Patient Compliance	No. of Patients (n=90)	Percentage (%)
Very Poor Compliance (9 - 0)	0	0
Poor Compliance (18 - 10)	0	0
Moderate Compliance (27 - 19)	2	2.2
Good Compliance (36 - 28)	41	45.6
Very Good Compliance (45 - 37)	47	52.2

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Patient Medication Adherence is assessed using the designed patient medication adherence questionnaire. Before counselling, 45.6% of the pediatric surgical patients demonstrated very good compliance, 42.2% had good compliance, and 12.2% showed moderate compliance. Notably, no patients fell into the poor or very poor compliance categories. After counselling, there was a marked improvement: 52.2% of the patients achieved very good compliance, and 45.6% achieved good compliance. Only 2.2% remained in the moderate category, and none in the lower compliance groups.

➢ *Chi-square Test*

Table 21 Distribution of Antibiotic Prophylaxis across Different Types of Surgical Procedure

Type of Procedure	Antibiotic Prophylaxis		Total
	Given	Not Given	
Conservative	35	0	35
Elective	11	31	42
Emergency	10	3	13
Total	56	34	90

Among the 90 patients included, all patients underwent conservative procedures (n = 35) received antibiotic prophylaxis, whereas only a subset of patients underwent elective procedures (11 out of 42) received prophylaxis, and 10 out of 13 emergency cases were given prophylaxis.

Table 22 Chi-squared Tests

Test Statistic	Value	Df	P
X^2	45.643	2	<.001
N	90		

The chi-square test revealed a statistically significant association between procedure type and administration of antibiotic prophylaxis (χ^2 = 45.643, df = 2, p < 0.001), indicating that the likelihood of receiving antibiotic prophylaxis varied significantly among conservative, elective, and emergency procedures.

➢ *Kruskal-Wallis Test*

Table 23 ANOVA-Effect of Age Categorization on the Patient Compliance

Cases	Sum of squares	df	Mean square	F	p
Categorization of age	734.247	5	146.849	3.835	0.004
Residuals	3216.209	84	38.288		

One-way ANOVA (Effect of age categorization on the patient compliance) results indicate a statistically significant difference among the age groups (F = 3.835, p = 0.004), suggesting that age categories are associated with variations in the patient compliance.

Table 24 Kruskal-Wallis Test

Factor	Statistic	df	P
Categorizaton of age	16.211	5	0.006

Kruskal-wallis test (comparison of age categorization on the patient compliance), the non-parametric analysis confirms a statistically significant difference between the age groups (χ^2 = 16.211, df = 5, p = 0.006), supporting the findings of the ANOVA.

➢ *Logistic Regression*

Table 25 Model Summary-Surgical Site Infection

Model	Deviance	AIC	BIC	df	ΔX^2	p	McFadden R^2	Nagelkerke R2	Tjur R^2	Cox & Snell R^2
M_0	38.621	40.621	43.120	89			0.000		0.000	
M_1	35.116	41.116	48.615	87	3.505	0.173	0.091	0.109	0.053	0.038

M_1 Includes Type of Procedure, Antibiotic Prophylaxis

Table 26 Coefficients (Logistic Regression)

Model		Estimate	Standard Error	Odds Ratio	z	Wald Test		
						Wald Statistic	df	p
M_0	(intercept)	2.833	0.460	17.000	6.157	37.907	1	<0.001
M_1	(intercept)	4.613	1.245	100.760	3.706	13.732	1	<0.001

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	Type of Procedure	-0.983	0.602	0.374	-1.635	2.672	1	0.102
	Antibiotic Prophylaxis	-1.225	1.150	0.294	-1.066	1.136	1	0.287

The logistic regression analysis on surgical site infections (SSI) and Model M_1, which includes type of procedure and antibiotic prophylaxis, showed improved fit over the null model ($\Delta\chi^2 = 3.505$, $p = 0.173$), though not statistically significant. Neither predictor was a significant factor, with odds ratios of 0.374 ($p = 0.102$) for type of procedure and 0.294 ($p = 0.287$) for antibiotic prophylaxis. The model demonstrated high overall accuracy (94.44%) but failed to predict any developed SSI cases, indicating possible class imbalance.

IV. DISCUSSION

Pediatric surgical conditions cross a broad range of disease categories, namely infections, injuries, cancer, and congenital anomalies.The primary goal of preoperative prophylactic and postsurgical antibiotic use is to reduce risk of surgical site infections, antibiotic resistance decrease, less hospital stay and thereby less expensive for the patients.Adherence to therapies is a primary determinant of treatment success. In this study, we analyzed the therapeutic effectiveness, Adverse Drug Reactions, prophylaxis, postsurgical uses of antibiotics and patient medication adherence using a specially designed patient medication adherence questionnaire.

➢ *Demographic Profile*

90 patients were selected in this study based on inclusion and exclusion criteria.In this study, the majority of patients (75.5%) were in the early childhood (1-5 yrs) and middle childhood (6-10 yrs) age groups. The age distribution shows a peak in the middle childhood age group (42.2%), followed by the early childhood age group (33.3%). Similarly, in a study conducted by Pathak et al (2022), Largestnumber 45 (35.43%) of patients were in the age group 1-5 years followed by 5-10 years age group 30 (23.62%). This implies that early and middle childhood are common periods for pediatric surgical interventions. The demographic data shows that among these patients a high prevalence occurred in male at about 70%.This may be due to the large number of patients admitted with male genitourinary problems, similar findings were reported by Doumi et al.(2010).

➢ *Antibiotic Prophylaxis Practice*

Out of 90 patients, 62.2% received prophylactic antibiotics, primarily via intravenous route (90%). Oral (11.1%) and external (7.9%) routes were less common. In a study conducted by Thomas J. Sandora et al. (2021), it is observed that for the 671 255 operations evaluated, AP was administered for348 119 (52%) of procedures. Intrahospital variation in AP use by procedure ranged from11.5% to 100% (median, 78.1%). Overall, AP use was considered appropriate for 64.6% ofcases. Appropriate use of AP by hospital varied from 47.3% to 84.4% with large variability byprocedure within each hospital. In our study, among the different medications administered orally for surgical prophylaxis, Norfloxacin, accounted for 30% of the total usage. Linezolid (oxazolidinone), Cephalexin (cephalosporin), and Metronidazole (nitroimidazole) each represented 20% of the usage. Erythromycin, a macrolide, had the lowest administration rate at 10%. Among the intravenous antibiotics administered for surgical prophylaxis, Cefotaxime was the most frequently used agent (33.6%), followed by Gentamicin (27.7%) and Metronidazole (21%). Linezolid and Ampicillin were the least utilized, each accounting for 1.7% of the total. Among the external antibiotics used for surgical prophylaxis, silver sulphadiazine was the most commonly used (60%), utilized for burns cases.

➢ *Postoperative Antibiotic Use*

In this study, the majority (94.8%) received postoperative treatment intravenously, while a smaller proportion (5.2%) received oral medications. Among the oral antibiotics administered for Postoperative management, Cephalexin, a cephalosporin antibiotic, was used in 67% of cases, while Erythromycin, a macrolide antibiotic, was used in 33% of cases. Among the various intravenous antibiotics administered postoperatively, Cefotaxime was the most commonly used, accounting for 43.4% of the cases, followed by Gentamicin (24.5%) and Metronidazole (12.3%). Other antibiotics, including Linezolid, Amikacin, and various combination therapies, were used less frequently.

➢ *Therapeutic Effectiveness*

In this study, the most commonly reported conditions were Acute Appendicitis (10%), Hydrocele (5.6%), Phimosis (5.6%), Thermal burns (5.6%) and Cleft Palate (3.3%). Other conditions each accounted for 1.1% to 2.2% of the cases, reflecting a wide spectrum of both common and rare surgical conditions. Elective procedures were the most commonly performed, accounting for 46.7% (n=42) of the cases. Conservative procedures were carried out in 38.9% (n=35) of the patients, while emergency procedures constituted the remaining 14.4% (n=13). Out of 90 patients, 5 (5.6%) developed SSI, while 85 (94.4%) did not. This highlights a relatively low incidence of SSI in the observed population. Duque-Estrada et al. (2016)had reported that Wound Infectionsoccurred in 39 cases (6.7%) andoverall rate of 6.6% was medium compared to thosereported in previous series of pediatric patients,except that of Bhattacharya and Koloske which was 2.5%and generally accepted as comparable to rates in the United States. Among the medications other than Antibiotics, Analgesics were the most frequently administered, accounting for 47.3% of the total. Timely administration of appropriate analgesic doses can lead to favorable Patient-related Outcomes. Similarly, in a study conducted by Bernhart et al. (2023)Comparative analysis revealed that inhospitals with better PROs, children received more non-opioidanalgesics, moredexamethasone, and fewer opioids, independent of type of surgery. The majority of prescriptions included 3 antibiotics (37.8%), followed by prescriptions with 1 antibiotic (28.9%), 2 antibiotics (20%), and more than 4 antibiotics (13.3%). The

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short-term antibiotic therapy was most common among the participants and had a short stay of 1–5 days. A smaller proportion stayed for 5–10 days (22.2%), followed by 10–20 days (13.3%), and a minority (5.6%) required hospitalization for more than 20 days.

No Adverse Drug Reactions(ADR) were reported in this study.

Patient Medication Adherence was assessed using the designed Patient Medication Adherence Questionnaire.After counseling, there was a marked improvement: 52.2% of the patients achieved very good compliance, and 45.6% achieved good compliance. Only 2.2% remained in the moderate category, and none in the lower compliance groups. In a studyconducted by Saengow et al. (2018)assessing medication adherence employing the 8-item Morisky Medication Adherence Scale(MMAS-8) found a significantly improved adherence at the three-month follow-up in the intervention (videoanimation) group (42.9%) versus the usual treatment group (15.9%) ($p < 0.05$)].Also, in astudyconducted by Ma M, Peng Q, Gu X, et al. (2019)assessing medication adherence by the Simplified Medication Adherence Questionnaire (SMAQ), adherencewas found to improve from a minimum of 56.0% to a maximum of 73.9% and stabilized thereafter during thelast six months of follow-up.

- *Inferential Statistical Analysis*

The chi-square test revealed a statistically significant association between procedure type and administration of antibiotic prophylaxis ($\chi^2 = 45.643$, $df = 2$, $p < 0.001$),indicating that the likelihood of receiving antibiotic prophylaxis varied significantly among conservative, elective, and emergency procedures. One-way ANOVA (Effect of age categorization on the Patient Compliance) results indicate a statistically significant difference among the age groups ($F = 3.835$, $p = 0.004$), suggesting that age categories are associated with variations in the Patient Compliance. Kruskal-Wallis test (comparison of age categorization on the Patient Compliance), the non-parametric analysis confirms a statistically significant difference between the age groups ($\chi^2 = 16.211$, $df = 5$, $p = 0.006$), supporting the findings of the ANOVA. The logistic regression analysis on Surgical Site Infections (SSI) and Model M_1, which includes type of procedure and antibiotic prophylaxis, showed improved fit over the null model ($\Delta\chi^2 = 3.505$, $p = 0.173$), though not statistically significant. Neither predictor was a significant factor, with odds ratios of 0.374 ($p = 0.102$) for type of procedure and 0.294 ($p = 0.287$) for antibiotic prophylaxis. The model demonstrated high overall accuracy (94.44%) but failed to predict any developed SSI cases, indicating possible class imbalance. Similarly, in a study conducted by Nthumba PM et al. (2022) it has been observed that the pooled odds ratio of SSI was 1.20; (95% confidence interval [CI], 0.91–1.58) comparing those receiving SAP with those not receiving SAP, with moderate heterogeneity in effect size between studies ($\tau 2 = 0.246$; $\chi 2 = 69.75$; $p < 0.001$; $I2 = 57.0\%$). There was insufficient data on many factors known to be associated with SSI, such as cost, length of stay, re-admission, and re-operation; it was therefore not possible to perform sub analyses on these.

V. CONCLUSION

In this study, most patients received prophylactic and postoperative antibiotics intravenously, with Cefotaxime and Gentamicin being the most commonly used. Oral antibiotics such as Norfloxacin, Metronidazole and Linezolid were utilized for Surgical Prophylaxis. whereas Cephalexin and Erythromycin were utilized for both Prophylaxis and Postoperative management. Among the external antibiotics used for surgical prophylaxis, Silver sulphadiazine (SSD) was the most commonly used (60%), utilized for Thermal Burns. Surgical site infection (SSI) incidence was low, at 5.6%, reflecting effective prophylactic measures. The short-term antibiotic therapy was most common among the participants and had a short stay of 1–5 days. No Adverse Drug Reactions (ADRs) were reported, indicating a favorable safety profile. Patient adherence improved notably after counselling, with 97.8% achieving good to very good compliance.

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