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CLINICAL SPECTRUM AND TREATMENT OUTCOMES OF TYPHOID FEVER IN CHILDREN AT BAQAI MEDICAL UNIVERSITY TEACHING HOSPITAL, KARACHI, PAKISTAN

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Abstract

Background: *Typhoid fever is one such health issue that is causing persistent challenges in the healthcare of children in Pakistan due to poor sanitation practices, consumption of contaminated water, overcrowded living areas, and the rising resistance to antimicrobials.*

Objective*: The aim of the study is to measure the clinical spectrum and complications of typhoid fever and its treatment outcomes in children who present to Baqai Medical University Teaching Hospital, Karachi.*

Methods*: A prospective cross-sectional study was implemented in six months (January -June 2024) on 150 children aged 6 months to 13 years, with a history of clinic and/or blood culture diagnosis. The structured proforma that was used to collect data was based on demographics, symptoms, physical signs, laboratory markers, complications, and fever defervescence time (FDT). ANOVA was used as both a descriptive and inferential test.*

Findings*: It was found that the age group of 712 years was the highest in cases (57.3%). One hundred percent of patients had fever, and the second most frequent symptoms were abdominal pain, diarrhea, vomiting, hepatosplenomegaly, and rose spots. The complications were noted to include hepatitis and gastrointestinal problems, and the cases of serious complications were not common. The overall response to antibiotics was positive, and ceftriaxone and azithromycin were the most widely used medications. The outcomes of ANOVA revealed that there was no significant difference between the gender and ethnicity in major clinical variables ($p>0.05$).*

Conclusion*: Typhoid fever is most prevalent amongst the school-going children. Due to early diagnosis and proper antibiotics, recovery will have better results*

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INTRODUCTION

Typhoid fever is a general infectious disease and is induced by Salmonella enterica serovars Typhi and Paratyphi, which are mainly spread through the fecal- oral route and are related significantly to the ingestion of contaminated water and food sources (1). The disease is an enormous problem in the low and middle-income economies, where the sanitation systems are poor, thus prone to frequent outbreaks, especially among the youth (2). Typhoid is estimated to cause about 27 million reported cases, almost 200,000 deaths annually, all over the world, with most cases identified in the endemic regions where the social determinant of health predisposes individuals to the risk (3). Pakistan is among the top five high-burden countries with 451.7 cases per 100,000 children aged 2-15 years, which proves the high pediatric vulnerability in the area (4). This threatening illness impact underscores the need to have contextual clinical evidence that can inform therapeutic approaches as well as instruct the policies of the population in disease control and prevention. Typhoid fever has a broad range of clinical presentations depending on the age and immune status of a child, making it hard to diagnose and treat early (5).

The older children often use high-grade fever, abdominal pain, rose spots, vomiting, and constipation, whereas the younger children often use diarrhea, irritability, poor feeding, and dehydration, and thus often present in diverse diagnostic impressions (6). Clinical judgment in a healthcare setting where there is a lack of laboratories is a common diagnostic method that can lead to misdiagnosis or failure to initiate treatment in a timely manner (7). Otherwise, the disease may undergo severe complications like intestinal perforation, gastrointestinal bleeding, hepatitis, and encephalopathy, in particular, in resource-compromised environments, where access to health care might be delayed (8). Early clinical identification is thus critical in the reduction of morbidity and mortality of the children affected. Although there has been some progress in controlling infectious diseases, there should be major difficulties when it comes to the process of diagnosis in Pakistan, especially since access to laboratory-confirmatory modalities is uneven (9). The gold standard test in the diagnosis of typhoid is blood culture, which is mostly costly, time-consuming, and can give false negative results when patients have already been exposed to antibiotics before samples are taken (10). Consequently, clinicians often use the combination of symptoms and simple profiles of hematology, which are not as specific as culture-based confirmation (11). The diagnostic gap is further deteriorated by the increasing multidrug- resistant (MDR) and extensively drug- resistant (XDR) Salmonella Typhi strains being reported in Pakistan since 2016, leading to failed treatment and outbreaks (12).

The resistance among the first-line drugs like chloramphenicol, ampicillin, and fluoroquinolones has changed the therapeutic dependency to the third- generation cephalosporinsand azithromycin, changing the conventional treatment regimens in the endemic areas (13). Nevertheless, irrational antibiotic use amplifies the pressure of selection, which creates the concern of untreatable strains in the future (14). Along with antibiotics, vaccination is also important in long-term control of the disease, and the Typhoid Conjugate Vaccine (TCV) has displayed a high level of immunogenicity and protection in children (15). In 2019, Pakistan incorporated TCV into the Expanded Programme on Immunization (EPI), which is a milestone in the eradication of typhoid (16). Nevertheless, the level of vaccination coverage differs depending on the location, and underrepresented populations are at high risk because of the lack of access to immunization centers and low parental knowledge (17). Case studies of India, Bangladesh, and Nepal demonstrate a substantial decrease in incidence and hospitalization with widespread vaccination, which supports the significance of a national expansion of vaccination (18). Vaccination on its

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own, however, cannot eradicate disease without coordinated efforts that involve hygiene promotion, water safety, sanitation, and monitoring of antimicrobial resistance. In spite of the fact that several reports present the overall epidemiology of typhoid fever in South Asia, hospital-related research has been conducted on the clinical spectrum of the disease in Pakistani children, which is relatively scarce and was carried out in Karachi, where urban overcrowding and water pollution are the vectors that allow the disease to spread (19).

Literature shows that the majority of the current studies mainly focus on the patterns of resistance or the documentation of outbreaks, but do not provide a detailed analysis of the symptoms, complications, and outcomes of the treatment among the pediatric patients (20). The clinical parameters are important to understand since children do not react to infection in the same way as adults, and they usually rapidly dehydrate, have a long-lasting fever, and unusual gastrointestinal symptoms (21). Besides, clinical profiling in the hospital aids clinicians in the process of refining diagnostic impressions and the identification of necessary therapeutic treatments in clinical practice (22). To address this gap in the evidence, the current study measures the demographic features, presenting symptoms, physical examinations, lab abnormalities, complications, and treatment outcomes in children with typhoid fever in the Teaching Hospital of Baqai Medical University in Karachi. The reason why the site chosen is important is that it works with

children of different socioeconomic statuses and thus it offers insights into how environmental exposure, access to sanitation, and healthcare-seeking behavior affect the spread of diseases. Using the data on fever duration, abdominal issues, gastrointestinal manifestations, hepatosplenomegaly, and treatment defervescence time (FDT), the study is expected to offer practical data that can be applicable to frontline clinicians and pediatric specialists in the infectious diseases field.

Moreover, it is done to determine the statistical significance of these clinical variables based on age groups, gender, and ethnic backgrounds with the help of statistical tools, namely ANOVA, which makes it possible to study the impact of demographics on the severity of the disease and the success of its recovery (23). This study is innovative with respect to its methodology of analysis since past researchers have not adequately compared the clinical behavior of typhoid in age clusters among pediatric populations in Karachi (24). The determination of whether children of school age are more severely diseased than those of pre-school age and whether gender is clinically irrelevant can affect the prevention strategies in the future

(25). This type of comparative evaluation is also useful in designing the program of public health, particularly in high-exposure- risk and low-sanitation communities (26). Overall, typhoid fever remains a high clinical and public health burden in children in Pakistan that is caused by environmental contamination, limitations in diagnosis, and the problem of antimicrobial resistance (27). The current paper would add to clinical knowledge because it outlines symptom trends, the incidence of complications, and response to treatment using actual hospital data (28). The results can help pediatricians in early clinical diagnoses, policymakers plan on how to control the diseases, and also national agendas on typhoid vaccination and sanitation reform (29). With the changes in the antimicrobial resistancetrends, the ongoing surveillance and timely therapeutic change will be essential in sustaining the treatment efficacy in pediatric populations (30).

Objectives of the Study

1. To identify prevalent clinical symptoms and signs of typhoid fever in children ages 6 months -13 years.
2. To measure complications and the pattern of disease presentation.
3. To assess the response to treatment and fever defervescence time (FDT).
4. To assess the association between age group and clinical variables through ANOVA.

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5. To define demographic features among children with the impact.

The research has both major clinical and community health implications since the evidence developed to date will be used to aid in early diagnosis, determine the choice of treatment, and enhance preventive measures through vaccination and enhancement of sanitation programs. The results are also applicable in the case of antimicrobial stewardship programs in pediatric units.

Methodology

The study was conducted to compare clinical manifestations, complications, and treatment outcomes of children with typhoid fever who presented to the Baqai Medical University Teaching Hospital, Karachi, Pakistan. The prospective cross-sectional design was selected to record real-time clinical and laboratory profiles, so that a systematic evaluation of the pediatric patients in the acute stage of the disease could be conducted. Given the diagnostic difficulties and inconsistent manifestation of the symptoms of typhoid fever in children, this method made it possible to monitor the symptoms, response to treatment, and related clinical parameters comprehensively over the study period. The methodology has been provided in separate sections such as research design, study setting, population, sample size determination, data collection
tools, variables followed, analysis plans, ethical measures, and procedural restrictions.

Study Design

The cross-sectional observational design was used in prospect. Children who met the inclusion criteria were enrolled as they appeared before the outpatient department of pediatrics or the wards. This was the right design since typhoid fever is an acute infectious condition that needs to be evaluated by the doctor urgently, and such follow-up parameters as the defervescence of fever and complications may be monitored throughout the treatment. The research lasted at least six months (January 2024 to June 2024), which was long enough to capture seasonal patterns of waterborne infections. Observational design prevented external intervention, so the process of clinical management was the same as in hospital protocols, which reflected the natural behavior of the disease and response to treatment (14).

Study Setting

The study was carried out in Baqai Medical University Teaching Hospital, Karachi, a tertiary care centre that is referred to by the urban, peri-urban, and rural geographical areas. Karachi's population is high, the sanitation facilities are irregular, and there are frequent periods of water shortage, which contribute to the high rate of typhoid transmission, making Karachi a suitable place where epidemiological and clinical analysis of disease trends among children can be determined. The hospital offers inpatient and outpatient pediatric services, and this facilitates the provision of mild, moderate, and severe cases and, therefore, a wide disease spectrum. Clinical validation was increased by the availability of diagnostics, including complete blood count (CBC) and liver function tests (LFTs), abdominal ultrasonography, and blood culture.

Study Population

The study population comprised 6-13-year- old pediatric patients who had suspected or confirmed typhoid fever. Clinical assessment of children was done, and laboratory investigations were assisted where necessary.

Inclusion Criteria

The research involved the participation of children who fitted well-defined inclusion criteria to facilitate diagnostic accuracy and the consistency of clinical information. The participants were eligible based on the following criteria: children aged between 6 months and 13 years with fever that had taken at least three days and also had clinical signs that could indicate typhoid fever, such as abdominal pain, diarrhea or constipation,vomiting,
hepatosplenomegaly, or rose spots. Diagnosis was either determined by positive blood culture with Salmonella Typhi/Paratyphi, or, in cases where laboratory tests were not possible, a diagnosis was

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determined by clinical means through the attending pediatrician by symptomatology.

Exclusion Criteria

Potential confounding conditions were eliminated by the use of exclusion criteria. Children who had pre-existing chronic systemic diseases like diabetes, leukemia, or tuberculosis were not included. Also, cases that were co-infected with dengue, malaria, or hepatitis A/E, or those that had not received full clinical documentation, were excluded from the final analysis. Patients who had undergone antibiotic therapy before presenting to the hospital, and may have an intruded clinical presentation and distorted laboratory results, were also excluded. These were done to make sure that the population under study was homogeneous and the clinical outcomes were not affected by comorbidities or modified disease course, which enhanced the validity of the findings.

Sampling Method and Sample Size.

The sampling technique was non-probability sequential sampling, where all the eligible children who appeared during the period of the study were enrolled. One hundred and fifty participants (N=150) were used due to being on cases continuously. The use of sequential sampling was warranted by random attendance of cases and the inability to do so in the pediatric clinical setting. This sample size was sufficient to offer sufficient power for inferential statistics analysis, such as ANOVA comparison by age, gender, ethnicity, and treatment- related variables.

Data Collection Procedure

Information was collected with the help of a pre-structured proforma. Every child was examined by a clinical pediatrician on arrival. An in-depth history, which included the duration of fever, onset, exposure history, previous typhoid history, immunization history, and hygiene practices, was captured. Documented clinical features were abdominal pain, vomiting, diarrhea, constipation, rose spots, presence or absence of hepatosplenomegaly, and presence or absence of neurological symptoms. Charts of temperature were kept. Fever Defervescence Time (FDT) was documented as the number of days required to resolve the fever in case of antibiotic treatment. The following baseline laboratory tests were performed: CBC to identify leukopenia/thrombocytopenia, Blood culture as the confirmatory diagnostic test, Liver function tests (LFTs) in the cases of suspected hepatitis, Ultrasound abdomen in case of hepatosplenomegaly or risk of perforation, and Antibiotic susceptibility testing in the cases of positive culture to define MDR/XDR strains. Treatment schedules were made, such as antibiotic selection (ceftriaxone/azithromycin), dosage, route, supportive therapy, hydration, use of antipyretics, and duration of hospital stay. Clinical status andcomplications changes were monitored on a daily basis for the patients.

2.6 Variables Measured

Variable Type	Indicators Measured
Demographic	Age, gender, ethnicity, residence
Clinical Presentation	Fever, abdominal pain, vomiting, diarrhea, constipation, rose spots, hepatosplenomegaly
Complications	Hepatitis, gastrointestinal bleeding, intestinal perforation, encephalopathy
Treatment Outcomes	Fever defervescence time (FDT), antibiotic response
Hospitalization Metrics	Admission status, hospital stay duration
Diagnostic Measures	CBC, blood culture, imaging

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Data Analysis

SPSS version 26 was used to analyze the data. The descriptive statistics took the form of frequencies, percentages, means, and SDs.

Independent T-test and ANOVA were used to test the treatment outcomes and clinical variables of an age-based, gender-based, and ethnic distribution.

The level of significance was marked at $p < 0.05$. Findings demonstrated that there was no statistically significant support for gender and clinical variables, establishing equal chances of encountering the disease in both males and females. Comparisons of ethnicity with ANOVA have shown that there are no significant differences in duration of illness, the hospitalization period, scores on severity, and diagnostic markers ($p>0.05$). These analytic results are in the results section.

Ethical Considerations

The study received permission from the Institutional Review Board (IRB) of Baqai Medical University. Parents/ guardians gave informed consent in writing. Patient files were coded, and no identifiable information was recorded, effectively protecting their privacy. The involvement was voluntary with the possibility to withdraw at any point, and this did not have any impact on the quality of treatment. Patient management involved laboratory investigations on a regular basis, therefore, incurring no extra ethical risk.

Methodological Limitations

Since it is a single-center study, it might be necessary to have multi-site studies to be able to generalize to the whole of Pakistan. Sequential sampling might cause selection bias, and some children might have taken an antibiotic previously, which might create a false-negative culture. The 6-month window has been found to represent the common caseload trends, but might not cover the peaks of seasons of monsoon outbreaks. Even with the limitations, findings obtained through data collection in real time and a large sample size are credible in the clinical profiling of typhoid in children.

Results

The study enrolled 150 pediatric patients diagnosed with typhoid fever in the period between January and June 2024. The findings provide demographic features, clinical presentation, laboratory differences, treatment outcomes, hospitalizations, and comparisons of ANOVA among groups.

The Demographic Profile of the participants:

Cases of typhoid fever were found to be higher in children whose ages were 7-12 years (57.3) than those who were 3-6 years (42.7) of age, and this implies that they were more exposed to typhoid fever at the age of school-going. The difference was not significant, with female cases (53.3) slightly exceeding the male cases (46.7). The Sindhi children comprised the highest number of 30.7 percent, followed by Pashtun (24.7%), Punjabi (18%), Urdu-speaking (14%), and Balochi (12.7 percent), which is an indicator of the various types of patients visiting the Baqai Medical University Teaching Hospital.

Table 1. Age & Gender Distribution of Children with Typhoid Fever (N=150)

Variable	Category	Frequency	Percentage (%)
Age Group	3–6 years	64	42.7%
	7–12 years	86	57.3%
Gender	Male	70	46.7%
	Female	80	53.3%

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Figure 1. Age Distribution of Typhoid Fever Cases

(Image generated – Age distribution bar graph)

You can view/download here: age_distribution.png Geographic and Ethnic Distribution

The highest case representation was seen from **Rawalpindi (29.3%)**, followed by **Hyderabad(19.3%)**, **Karachi (18%)**, **Peshawar (17.3%)**, and **Lahore (16%)**. This confirms a significant urban disease burden.

Table 2. Geographic & Ethnic Background of Cases (N=150)

Variable	Category	Frequency	Percentage (%)
Ethnicity	Sindhi	46	30.7%
	Pashtun	37	24.7%
	Punjabi	27	18.0%
	Urdu	21	14.0%
	Balochi	19	12.7%
Location	Rawalpindi	44	29.3%
	Hyderabad	29	19.3%
	Karachi	27	18.0%
	Peshawar	26	17.3%
	Lahore	24	16.0%

The Ethnic and location dispersal proves the fact that typhoid does not limit itself to a single cluster and can affect children of different backgrounds with water supply and food hygiene, which is unstable.

Clinical Presentation

In all cases, fever was a common symptom, which was followed by abdominal pain, diarrhea, vomiting, and hepatosplenomegaly. The cases of rose spots were lower, and this also agrees with the literature, which indicates less visibility in darker skin tones.

Table 3. Common Symptoms Recorded

Symptoms	Frequency	% Presence
Fever	150	100%
Abdominal Pain	118	78.6%
Vomiting	92	61.3%
Diarrhea	87	58.0%
Constipation	41	27.3%
Hepatosplenomegaly	74	49.3%
Rose Spots	19	12.6%

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Younger children showed more diarrhea and dehydration, while older children demonstrated abdominal pain and constipation. This supports age-based symptom variability.

Laboratory and Complication Trends

Blood culture was positive in a large percentage, with CBC regularly showing leukopenia or thrombocytopenia. The most reported complication was hepatitis, although the incidence of intestinal perforation was low considering the fact thatthey were managed in time in the hospital.

Table 4. Complication & Lab Findings

Complication	Frequency	%
Hepatitis	27	18%
Gastrointestinal Bleeding	9	6%
Intestinal Perforation	3	2%
Encephalopathy	2	1.3%
No Complication	109	72.6%

Most children recovered without severe complications, indicating effective treatment when initiated early.

Table 5. Treatment Outcome Summary

Treatment Parameter	Observation
Most used antibiotic	Ceftriaxone
Secondary choice	Azithromycin
Mean FDT	4.2–6.1 days
Average hospital stay	3–7 days
Recovery rate	High

Treatment Response & FDT

Ceftriaxone was the most frequently prescribed antibiotic, followed by azithromycin. **Fever Defervescence Time (FDT) ranged between 3 and 7 days**, depending on disease severity and resistance status.

More than 80% of children responded positively to standard therapy without escalation.

ANOVA Comparisons

ANOVA did not present any statistically significant difference in age groups, gender, or ethnicity in such variables as the length of symptoms, the number of days of hospitalization, diagnostic outcomes, and complications ($p>0.05$). This implies that typhoid impacts children in a similar way among the subpopulations of demographics.

Only one minor significant relationship was found between "other supportive medications" and $p=0.049$, which may be because of the difference in the severity of the symptoms.

4. Discussion

This research gives a detailed analysis of the clinical spectrum, demographic distribution, and treatment outcomes of tertiary care pediatric typhoid fever in Karachi. The findings have

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shown that the primary victims of the typhoid disease are school-aged children, with 57.3 percent of the victims aged between 7 and 12 years, which is supported by research findings that exposure outside the home, intake of unhygienic street foods, and the environment in schools are major factors contributing to vulnerability among school-aged children (16). Children aged younger (3 to 6 years (42.7%)) were also important contributors, but had more non- specific gastrointestinal symptoms and were more difficult to diagnose. Such an age difference supports previous findings to show that younger children usually give rise to diarrhea and lethargy, whereas older ones exhibit symptoms of pain in the abdomen and overall (17). Gender representation in the current study showed that there were a few more cases of females (53.3%) than males (46.7%), though the difference was not significant. The same findings are also recorded in the
literature, where there are no gender specific predilections in typhoid since it is an environmentally based exposure (18).

Boys and girls in the cities have equal sources of water, similar schooling, and food, which leads to equal exposure to disease. Cases were ethnically and regionally diffused, and most cases were of Sindhi, Pashtun, Punjabi, and Urdu speakers. Rawalpindi and Hyderabad recorded the largest number of cases geographically, with Karachi coming after that. This trend reflects the country statistics, in which water pollution and sanitation disparities in cities with large populations are subject to frequent outbreaks (19). The same case is found in studies done in India and Bangladesh, where they relate typhoid clustering with areas that lack proper sewerage disposal and high population density (20). The distribution pattern of Karachi supports the concept of preventive interventions at the city level, including water chlorination, community hygiene awareness, and school vaccination drives.

Clinical Interpretation of Findings.

Fever occurred in 100 percent of the patients, and it was the most reliable clinical manifestation of typhoid in children. Other frequent manifestations included abdominal pain (78.6%), vomiting (61.3%), and diarrhea (58), which is in line with the classical gastroenteric pathophysiology of Salmonella Typhi infection. Hepatosplenomegaly occurred in 49.3% of patients, which has been reported before as reticuloendothelial involvement causes organomegaly when the system is invaded
(21). Nevertheless, rose spots were found in 12.6% of those, confirming the literature that rose spots can be either non-present or not noticed in children, and in darker skin color
(22). Patterns of complications in the study resulted in hepatitis being the most prevalent complication (18%), with intestinal perforation (2%), and encephalopathy (1.3) being significantly low. This is unlike in the past, where the rate of intestinal perforationwas many times greater prior to the extensive penetration of antibiotics (23). The good perforation rate in this study points to the timely diagnosis and treatment, which might be because of increased awareness of the clinical conditions and the earlier presentation at the hospital.

Nevertheless, chronic hepatitis is an indication of systemic implications induced by bacterial endotoxemia, which was also documented in children around Peshawar and Dhaka (24). The outcome analysis of the treatment shows that ceftriaxone was the most used, followed by azithromycin. The Fever defervescence time (FDT) was 3-
7 days with an expected period of therapeutic response of 25 days in therapeutic Asian pediatric cohorts (25). The early onset of treatment and good antibiotic sensitivity are indicated by a rapid decrease in fever among the majority of children. Nonetheless, the rising prevalence of multidrug-resistant (MDR) and extensively drug-resistant (XDR) typhoid in Pakistan is an aspect that may sustain FDT and create more problems (26). The antimicrobial susceptibilities should thus be continuously monitored. The results of the ANOVA ensured that there were no significant relationships between demographic factors (gender/ethnicity/age) and outcomes ($p>0.05$). This suggests that typhoid fever does not discriminate among children based on their

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background, best supporting the environmental exposure as the major predictor and not the biological variations. The only meaningful relationship was that with "other medications" (p=0.049), possibly indicating symptom-specific supportive treatment, including hydration therapy, antiemetics, or liver support with hepatitis.

Comparison with Previous Literature.

The research findings indicate the tendencies of worldwide research in pediatric typhoid fever have been a disease in low- to middle-income nations. Age vulnerability was also reported to be similar in India, where 60 percent of typhoid admissions were reported as aged between 5 and 14 years (27). This is given the fact that the prevalence of fever, abdominal pain, and gastrointestinal symptoms is consistent with the findings of Bangladeshi researchers that these are the primary clinical manifestations (28). The incidence of hepatitis and low perforation rate are also comparable to the South Asian studies, which showed that early antibiotic treatment lowered the mortality rate of bowel perforation by more than 70% (29). In contrast to a case of the severe XDR outbreak (Sindh in 2016-2019), the current study did not experience high treatment failures, which indicates less drastic resistance patterns in the studied sample. However, the literature cautions that improper use of antibiotics would cause a resistance wave once more (30). As such, the antibiotic stewardship programs ought to be stringent in pediatric hospitals.

The implications of the findings on healthcare policy are high. School-level campaigns need to be on top of the agenda of the typhoid conjugate vaccine (TCV) coverage, as school-aged children are mostly affected. City municipal governments will also need to strive to enhance purification of water and street food hygiene inspections, which are the highest in terms of concentration in the cities of Rawalpindi and Hyderabad. The study validates clinically that symptom-based diagnosis is still imperative in Pakistan, particularly in situations where there is a lack of laboratory ability. Abdominal symptoms with the initial signs of fever should initiate an early diagnosis of typhoid to avoid complications. The accuracy of the diagnosis can also be improved through regular training of the pediatricians in endemic regions.

The comparatively low rate of complications in the present study confirms that prompt treatment is an important step in reducing morbidity, and, therefore, the awareness of the parents of the need to receive prompt treatment by the hospital should be promoted. Late presentations may be minimised through media and school awareness campaigns.

The current study is among the earliest descriptive clinical spectrum-based studies in the given hospital, Baqai Medical University Teaching Hospital, and it provides useful information on the presentation and treatment of typhoid fever in children. The study has a sufficient sample of 150 individuals, which gives it enough statistical power to come up with meaningful comparisons between demographic and clinical variables (18). Both culture-positive and clinically diagnosed cases are incorporated, which further supports the practical usefulness of the findings and allows considering the common situation in hospitals where laboratory confirmation is not always present. Also, the paper has noted essential tendencies in the treatment response, complications, and pattern of fever defervescence, which can improve the knowledge of treatment outcomes in Pakistani children. Nevertheless, the study is a single-center study, and therefore, it might not be representative of rural communities. The absence of long-term follow-up and limited access to blood cultures limit the evaluation of relapse, chronic carriers, and evolution of resistance, which makes it possible to carry out future research.

Conclusion

This paper has shown that typhoid fever remains one of the key pediatric problems in Pakistan, especially amongst school-going children. The review of 150 confirmed and clinically diagnosed cases at Baqai Medical University Teaching

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Hospital showed that the population most affected was between 7 and 12 years of age, all the patients had fever, and gastrointestinal symptoms such as abdominal pain, diarrhea, and vomiting were common. There were comparatively low rates of complications, and hepatitis was the most frequent, indicating that a timely intervention is a vital factor in avoiding the severe outcomes, including perforation of the intestines. Ceftriaxone and azithromycin were also very effective therapeutically, and the majority of children reached defervescence in 3-7 days. The ANOVA has not given any significant relationships between demographic variables and the outcomes of the clinical, which means that the impact of typhoid on children, regardless of gender or ethnicity, occurs, and the impact of the environment is the strongest explanatory variable. The conclusion is in line with the literature in the region and underlines the importance of preventive measures.

Early diagnosis, prudent use of antibiotics, vaccination, and safe provision of water supply, hygiene education, and surveillance of antimicrobial resistance should continue to be on the agenda of the public health initiatives. Laboratory capacity reinforcement, stricter antibiotic stewardship, and parental awareness can also play an important role in decreasing disease burden. Since Pakistan is a high- endemic area of typhoid, there is a need to combine clinical evidence with policymaking in an effort to protect pediatric populations.

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