

A Retrospective Study on the Management of Infectious Diarrhea among Paediatric Patients at a Tertiary Care Hospital

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Abstract

Background: Infectious diarrhea remains an important cause of morbidity among children, particularly those under six years of age. Appropriate rehydration, judicious antibiotic use, and zinc supplementation are essential components of management.

Objective: To evaluate management practices, adherence to treatment guidelines, and clinical outcomes among pediatric patients with infectious diarrhea in a hospital setting.

Methods: A retrospective chart review was conducted at Tertiary care Hospital. Medical records of 100 pediatric patients with infectious diarrhea were assessed for demographic characteristics, clinical presentation, rehydration therapy, antibiotic use, zinc supplementation, treatment adherence, and clinical outcomes. Descriptive analysis was performed using Microsoft Excel.

Results: Among 100 patients, 57% were male, and children aged 1–3 years constituted the largest age group (31%). Vomiting, fever, and dehydration were reported in 74%, 61%, and 40% of patients, respectively. ORS was administered to 89%, while 50% received intravenous fluids. Antibiotics were prescribed to 34%, but only 21% had appropriate indications. Zinc was provided to 84%. Mean recovery and hospitalization durations were 4.5 and 3.8 days, respectively. Readmission due to dehydration and secondary infections occurred in 6% and 4% of patients.

Conclusion: Rehydration and zinc practices were generally satisfactory, but inappropriate antibiotic use and gaps in zinc and rehydration practices were identified. Strengthening guideline-based prescribing and caregiver education may improve outcomes.

Keywords: Infectious diarrhea; Pediatric patients; Oral rehydration solution; Zinc supplementation; Antibiotic use; Treatment guidelines; Clinical outcomes.

1. Introduction

Diarrheal disease remains a major cause of childhood morbidity and mortality worldwide, particularly in developing countries. Although diarrhea-related deaths have declined substantially over recent decades, largely due to the widespread implementation of oral rehydration therapy (ORT), diarrheal illness continues to contribute significantly to mortality among children under five years of age, especially in South Asia and sub-Saharan Africa.

Clinically, diarrhea is classified into acute watery diarrhea, acute bloody diarrhea (dysentery), and persistent diarrhea lasting 14 days or longer, with management varying according to the clinical presentation and severity. Rehydration, through oral or intravenous fluids depending on the degree of dehydration, remains the cornerstone of treatment. World Health Organization (WHO)-recommended oral rehydration salts (ORS), along with zinc supplementation, can reduce the duration and severity of diarrheal episodes. Antibiotics are generally reserved for specific bacterial or invasive infections, while inappropriate antimicrobial use may contribute to adverse effects and antimicrobial resistance.

Despite the availability of evidence-based treatment guidelines, adherence to recommended management practices remains inconsistent in clinical settings. Inappropriate antibiotic prescribing, underuse of zinc, and inadequate rehydration may contribute to prolonged illness, increased healthcare costs, and preventable complications. Evaluating these practices is therefore important for identifying gaps in care and improving treatment quality.

This retrospective study was undertaken to evaluate the management of infectious diarrhea among pediatric patients at a tertiary care hospital in Bengaluru, with particular emphasis on rehydration practices, antibiotic use, zinc supplementation, adherence to treatment guidelines, and clinical outcomes.

2. Materials and Methods

A retrospective chart review was conducted at Tertiary care Hospital covering the period from April to September 2024. Data were abstracted using a self-designed proforma capturing demographic details, presenting complaints, history of present illness, comorbidities, and laboratory parameters, supplemented by medication charts.

Eligible subjects were identified from the general medicine department, and informed consent was obtained from participating inpatients and their caregivers prior to data extraction and documentation. The study included paediatric patients diagnosed with infectious diarrhea on the basis of clinical presentation and laboratory findings in a hospital setting. Patients with non-infectious causes of diarrhea, such as inflammatory bowel disease or medication-induced diarrhea, were excluded, as were those with underlying conditions that could confound interpretation of treatment outcomes, including immunodeficiency or chronic gastrointestinal disorders. Medical records with incomplete or missing data necessary for analysis were also excluded from the final cohort.

The sample size was estimated using the standard proportion formula $N = Z^2P(1-P)/M^2$, where $Z = 1.96$ corresponding to a 95% confidence level, $P = 0.04$ representing the estimated population proportion of patients presenting with infectious diarrhea (derived from 20 of 500 hospital attendees), and $M = 0.05$ representing the acceptable margin of error. This calculation yielded a base sample size of 59, which was subsequently inflated by 15% to account for anticipated non-response, giving a final target sample size of 68 patients. The final analytic cohort, however, comprised 100 paediatric patients whose records met the inclusion criteria within the study.

3. Results

A total of 100 paediatric patients diagnosed with infectious diarrhea were included in the final analysis.

3.1 Demographic Characteristics

Table1: Distribution of Patients by Age and Gender

Age Group	Male	Female	Total	Male %	Female %	Total %
<1 year	10	6	16	17.54	13.95	16

1-3 years	17	14	31	29.82	32.55	31
4-6 years	13	11	24	22.80	25.58	24
7-9 years	12	8	20	21.05	18.60	20
10-12 years	5	4	9	8.77	9.30	9
Total	57	43	100	100	100	100

The cohort ranged in age from under one year to twelve years, with the largest proportion (31%) aged 1-3 years and a clear predominance of children under six years overall (71%). A slight male predominance was observed (57% male versus 43% female). Chi-square analysis confirmed that the age distribution deviated significantly from a uniform distribution ($\chi^2 = 15.45$, $p = 0.004$), whereas the gender distribution did not differ significantly between male and female patients ($\chi^2 = 1.96$, $p = 0.161$).

3.2 Clinical Presentation

Table 2: Distribution of Patients by Symptoms at Admission

Symptom	Number of Patients	Percentage (%)
Diarrhea	100	100
Vomiting	74	74
Fever	61	61
Dehydration signs	40	40
Abdominal pain	29	29

Table 3: Distribution of Patients by Duration of Illness before Admission

Duration (days)	Number of Patients	Percentage (%)
<2 days	19	19
2-4 days	51	51
>4 days	30	30
Total	100	100

Diarrhea was present in all patients by definition, with vomiting (74%) and fever (61%) the next most frequent findings; dehydration was clinically evident in 40% of patients. This symptom distribution differed significantly from a uniform pattern ($\chi^2 = 149.76$, $p < 0.001$). The majority of caregivers sought medical care within 2-4 days of symptom onset (51%), suggesting relatively prompt recognition of the need for care; the duration-of-illness distribution also differed significantly from uniform ($\chi^2 = 19.2$, $p < 0.001$).

3.3 Adherence to Treatment Guidelines

Table 4: Distribution of Patients by Rehydration Therapy

Therapy Type	Number of Patients	Percentage (%)
ORS	89	89
IV fluids	50	50

Both ORS and IV fluids (overlap)	41	41
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Table 5: Distribution of Patients by Antibiotic Use

Category	Number of Patients	Percentage (%)
Indicated (per guidelines)	21	21
Administered antibiotics	34	34
Inappropriate use (not indicated)	15	15

Table 6: Distribution of Patients by Antibiotic Administered

Antibiotic	Number of Patients	Percentage (%)
Amoxicillin	9	25.7
Azithromycin	8	22.9
Ciprofloxacin	7	20.0
Metronidazole	5	14.3
Cefixime	4	11.4
Total	35	100

Table 7: Distribution of Patients by Zinc Supplementation

Zinc Supplementation	Number of Patients	Percentage (%)
Administered zinc	84	84
Not administered zinc	16	16
Total	100	100

ORS was administered to 89% of patients, reflecting generally good adherence to oral rehydration guidelines, although 50% of patients additionally required intravenous fluids and 41% received both modalities, indicating a substantial subset with severe dehydration or failure of initial oral rehydration ($\chi^2 = 40.25$, $p < 0.001$). Although only 21% of patients had antibiotics indicated per guidelines, 34% actually received antibiotics, with 15% of the total cohort receiving them inappropriately, a pattern indicating antibiotic overuse ($\chi^2 = 18.5$, $p < 0.001$). Amoxicillin (25.7%) and azithromycin (22.9%) were the most commonly administered agents. Zinc supplementation, recommended by the WHO, was administered to 84% of patients, reflecting strong adherence to this component of the treatment guidelines.

3.4 Clinical Outcomes

Table 8: Distribution of Patients by Recovery Time

Recovery Time (days)	Number of Patients	Percentage (%)
<3 days	23	23
3-5 days	51	51
>5 days	26	26
Total	100	100

Table 9: Distribution of Patients by Hospitalization Duration

Hospitalization Duration (days)	Number of Patients	Percentage (%)
<3 days	29	29
3-5 days	52	52
>5 days	19	19
Total	100	100

Table 10: Distribution of Patients by Complication Rates

Complication Type	Number of Patients	Percentage (%)
Dehydration requiring readmission	6	6
Secondary infections	4	4
No complications	90	90
Total	100	100

The mean recovery time was 4.5 days (median 4 days, SD 1.5 days), with the majority of patients (51%) recovering within 3-5 days ($\chi^2 = 16.2$, $p < 0.001$). Mean hospitalization duration was 3.8 days (median 4 days, SD 1.2 days), with 52% of patients hospitalized for 3-5 days ($\chi^2 = 19.3$, $p < 0.001$). Complications were infrequent: 6% of patients required readmission for dehydration and 4% developed secondary infections, while 90% experienced no complications ($\chi^2 = 152.4$, $p < 0.001$), suggesting that most patients received effective initial management despite the gaps described below.

3.5 Gaps in Management

Table 11: Distribution of Patients by Deviation from Guidelines

Deviation Type	Number of Patients	Percentage (%)
Inappropriate antibiotic use	15	15
Incomplete rehydration therapy	10	10
Lack of zinc supplementation	15	15

Table 12: Distribution of Patients by Reason for Non-Adherence

Reason	Number of Patients	Percentage (%)
Lack of awareness about zinc supplementation	15	15
Over-prescription of antibiotics	16	16
Inconsistent supply of ORS and zinc	10	10

Inappropriate antibiotic use (15%) was the most frequent deviation from guidelines, followed equally by insufficient zinc supplementation (15%) and incomplete rehydration therapy (10%); this distribution differed significantly from uniform ($\chi^2 = 10.6$, $p = 0.005$). Among the reasons underlying non-adherence, over-prescription of antibiotics (16%) and caregiver unawareness regarding zinc supplementation (15%) were most frequently identified, followed by inconsistent supply of ORS and zinc (10%); the distribution of reasons did not differ significantly from uniform ($\chi^2 = 4.5$, $p = 0.105$), suggesting that these three factors

contributed comparably to observed gaps in management.

4. Discussion

The Study evaluated the management of infectious diarrhea among 100 pediatric patients, with particular emphasis on treatment practices, adherence to guidelines, and clinical outcomes. Younger children, particularly those below six years, constituted the majority of patients, with a slight male predominance. Diarrhea was the most common presenting symptom, while vomiting, fever, and dehydration were also frequently observed. The presence of dehydration in 40% of patients highlights the importance of early assessment and appropriate fluid replacement. Rehydration practices showed relatively good adherence to recommended management, with ORS administered to 89% of patients. However, 50% received intravenous fluids, and 41% received both ORS and intravenous fluids, suggesting the presence of severe dehydration or inadequate response to oral therapy in a considerable proportion of patients. These findings are broadly consistent with previous evidence supporting ORS as the first-line treatment for acute infectious diarrhea.

Antibiotic prescribing represented the major area of concern. Although antibiotics were appropriately indicated in only 21% of patients, 34% received antibiotic therapy, with 15% classified as inappropriate use. This finding indicates a gap between recommended guidelines and actual prescribing practices and may contribute to unnecessary antimicrobial exposure and resistance. Zinc supplementation was provided to 84% of patients, demonstrating relatively good adherence. Previous studies cited in the project also support the beneficial role of zinc in reducing the duration and severity of diarrheal episodes.

Clinical outcomes were generally favorable, with a mean recovery time of 4.5 days and mean hospitalization duration of 3.8 days. Most patients recovered within 3–5 days, while complications were relatively uncommon, with 6% requiring readmission for dehydration and 4% developing secondary infections.

Overall, the major management gaps identified were inappropriate antibiotic use, incomplete rehydration therapy, and inadequate zinc supplementation. The project suggests that improved healthcare-provider training, caregiver education, and consistent availability of ORS and zinc could strengthen adherence to recommended management practices and potentially improve pediatric outcomes.

5. Conclusion

This retrospective study of 100 paediatric patients demonstrates generally sound adherence to WHO-aligned guidelines for infectious diarrhea, particularly oral rehydration and zinc supplementation, with low complication rates and appropriate recovery times. However, antibiotic overuse relative to guideline indication, alongside residual gaps in rehydration and zinc coverage, remain modifiable weaknesses. Addressing these gaps requires provider training in antibiotic stewardship, caregiver education on rehydration and zinc supplementation, and strengthened supply-chain reliability for essential therapies to further improve paediatric diarrheal disease outcomes.

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9. References

1. Hegde P, et al. Effectiveness of oral rehydration therapy in the management of acute infectious diarrhea in children: a systematic review and meta-analysis of randomized controlled trials.
2. Bin Mohanna MA, et al. Management and prevalence of infectious diarrhoea among children under five years.
3. Singharhai A, et al. Efficacy of antibiotic therapy in reducing the duration and severity of Shigella-induced diarrhea in pediatric populations.
4. Jabak SJ, et al. Retrospective study on the management of acute diarrhea in the emergency department of a large university medical center.
5. Berhane Y, et al. Management and duration of infectious diarrhea and severity in children.
6. Baqui AH, et al. Effect of zinc supplementation started during diarrhoea on subsequent morbidity and mortality among Bangladeshi children.
7. Bhatia V, et al. Effect of zinc supplementation on the duration and severity of acute watery diarrhea in children aged 6-60 months.
8. Jaiswal M, et al. Effectiveness of oral rehydration therapy in children under five years of age.
9. Rahman M, et al. Age and sex distribution of children with diarrhea attending a paediatric hospital.
10. World Health Organization. The treatment of diarrhoea: a manual for physicians and other senior health workers. Geneva: WHO.