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CLINICAL PROFILE AND OUTCOMES OF ACUTE GASTROENTERITIS IN CHILDREN UNDER FIVE YEARS IN A RESOURCE-LIMITED SETTING

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ABSTRACT

Background: Acute gastroenteritis remains to be one of the primary causes of morbidity and mortality in children under the age of five, especially in low- and middle-income countries with limited access to clean water, sanitation, and healthcare facilities. Early detection of clinical severity and adequate care are critical to avoiding complications and lowering mortality. **Objectives:** To evaluate the clinical profile, laboratory findings, management practices, and outcomes of acute gastroenteritis among children under five years of age in a resource-limited setting. **Methods:** A hospital-based observational study was conducted at Al-Khansaa Teaching Hospital in Mosul, Iraq, between January and December 2025. The study included 200 children aged 1–59 months presenting with symptoms of acute gastroenteritis lasting less than 14 days. Data collected included demographic characteristics, clinical manifestations, duration of symptoms, dehydration status, nutritional status, laboratory findings, treatment modalities, and patient outcomes. Statistical analysis was performed using SPSS version 30, and results were presented as frequencies and percentages. **Results:** The mean age of the patients was 24.6 ± 13.2 months, with males representing 55% of cases. Rural residence was reported in 60% of children. Diarrhea was present in all patients, followed by vomiting (80.5%) and fever (59%). Most patients had symptoms lasting 1–7 days (90%). Some dehydration was observed in 50.5% of patients, while severe dehydration occurred in 23.5%. Mild-to-moderate malnutrition was present in 30% and severe malnutrition in 9% of children. Among those investigated, leukocytosis was detected in 42.5%, while hyponatremia and hypokalemia were found in 34.4% and 30% respectively. Regarding management, antibiotics were administered to 79% of patients, intravenous fluids to 68%, zinc supplementation to 61.5%, and oral rehydration solution to 35.5%. Most patients recovered without complications (91%), while 8.5% developed complications and mortality occurred in one patient (0.5%). **Conclusion:** Acute gastroenteritis is a severe health burden for children under the age of five, especially in rural areas. Dehydration and electrolyte imbalance are still common problems. Early detection, proper rehydration therapy, nutritional assistance, and rational antibiotic usage are critical to improving outcomes. To lower illness burden, it is advised that preventive techniques be strengthened, such as health education and improved sanitation.

KEYWORDS: Acute gastroenteritis, Dehydration, Diarrhea, Children under five, Clinical outcomes, Malnutrition.

1-INTRODUCTION

Acute gastroenteritis (AGE) continues to be one of the primary causes of morbidity and mortality among children under the age of five worldwide.[1] It is distinguished by the abrupt onset of diarrhea, with or without vomiting, fever, and dehydration.[2] Despite great global progress in reducing childhood mortality, AGE remains an important problem for public health, particularly in low- and middle-income countries.[3]

Diarrheal infections kill roughly half a million children under the age of five each year worldwide, with the greatest burden falling on communities with insufficient access to clean water, sanitation, and healthcare facilities.[4]

Acute gastroenteritis can be caused by a variety of infections, including viruses (such as rotavirus and norovirus), bacteria (e.g., Escherichia coli, Salmonella, Shigella), or parasites. Viral etiologies are frequently underdiagnosed in limited resources due to a lack of effective diagnostic techniques.[5]

The disease process is characterized by gastrointestinal mucosal inflammation, which results in decreased absorption and increased fluid and electrolyte secretion. This causes diarrhea and can quickly lead to dehydration, especially in young infants due to their increased body water content and metabolic rate.[6]

The clinical manifestation of AGE varies from mild, self-limiting disease to severe dehydration and life-threatening complications. The frequency and consistency of stool, vomiting, fever, and symptoms of dehydration such as lethargy, sunken eyes, and decreased skin turgor are all important clinical features.[7] In low-resource settings, delayed presentation (malnutrition) and insufficient management can considerably impair results. Early detection of severity and proper rehydration therapy are critical in lowering morbidity and mortality.[8]

The aim of this study is to provide a comprehensive assessment of the clinical profile and outcomes of AGE in children under the age of five, which may aid in the early detection of severe cases and the optimization of management procedures in resource-limited environments.

2-PATIENTS AND METHODS

This is a hospital-based observational study, carried out in Al-Khansaa Teaching Hospital in Mosul, Iraq, from January 2025 to December 2025. All children aged 1 month to 59 months presenting with symptoms of acute gastroenteritis for less than 14 days were eligible to participate in the study. Whereas, children with chronic diarrhea (more than 14 days), or those with well-known gastro-intestinal diseases and children with severe comorbid conditions (e.g., congenital anomalies, malignancy) were excluded from the study.

The data collecting form included demographic information such as gender, age, residence and nutritional status. Clinical presentation such as duration of diarrhea, frequency of stool, presence of vomiting, fever, dehydration. Laboratory tests such as complete blood count, stool examination and serum electrolytes. Medication used such as oral rehydration therapy (ORT), intravenous fluids, antibiotic use and zinc supplementation. Lastly, patients' outcomes, which are recovery without complications, development of complications (e.g., severe dehydration, electrolyte imbalance), length of hospital stay and mortality.

The statistical analysis was carried out using SPSS software (Statistical Packages for Social Sciences, version 30). The data were presented as frequencies and percentages.

3- RESULTS

The study includes a total of 200 children. The mean age was 24.6 ± 13.2 months. Moreover, 110 (55%) were males and 90 (45%) were females. With male to female ratio of 1.22:1. As shown in figure 1.

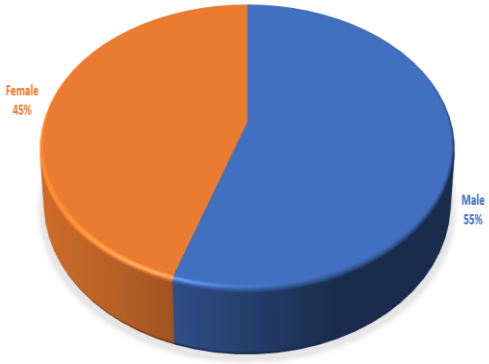

Figure 1: Distribution of the study patients according to their gender.

Rural residence was reported among 120 (60%) children, while urban residence was reported among 80 (40%) Children. As shown in figure 2.

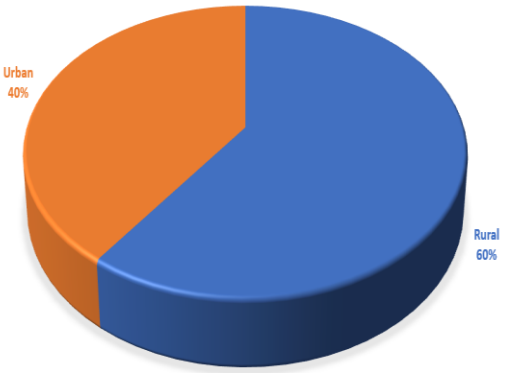

Figure 2: Distribution of the study patients according to their residency.

Table 1 shows clinical presentation of the study patients. Diarrhea was prevalent among 200 (100%) patients, followed by vomiting among 161 (80.5%) patients and fever among 118 (59%). While abdominal pain was prevalent among 71 (35.5%) patients and poor feeding among 101 (50.5%).

Table 1: Clinical presentation of the study patients (number =200).

Variable	Number	Percent
Diarrhea	200	100%
Vomiting	161	80.5%
Fever	118	59%
Abdominal pain	71	35.5%
Poor feeding	101	50.5%

Table 2 shows distribution of the study patients according to their symptoms. The majority of patients had symptoms of 4-7 days and 1-3 days among 92 (46%) patients and 88 (44%) respectively. Only 20 (10%) patients had symptoms of more than 7 days.

Table 2: Duration of the patients' symptoms (number =200).

Variable	Number	Percent
1–3 days	88	44
4-7 days	92	46%
7-14 days	20	10%

Figure 3 shows distribution of patients according to their dehydration status. It's evident that some dehydration was prevalent among 101 (50.5%) patients and severe dehydration was prevalent among 47 (23.5%) patients.

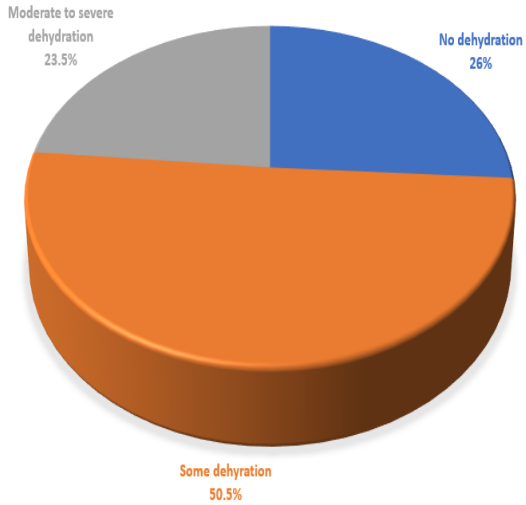

Figure 3: Distribution of the study patients according to their dehydration status.

Figure 4 shows distribution of the study patients according to their nutritional state. Mild-moderate malnutrition was prevalent among 60 (30%) patients and severe malnutrition was prevalent among 18 (9%) patients.

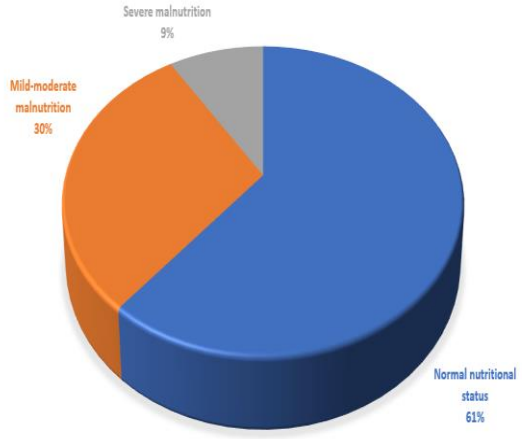

Figure 4: Distribution of the study patients according to their nutritional status.

Among 120 patients did complete blood count, 51 (42.5%) had leukocytosis. Moreover, serum electrolytes were done for 90 patients, hyponatremia was present among 31 (34.4%) patients and hypokalemia was present among 27 (30%).

Table 3 shows treatment options received but the patients. The majority of patients received antibiotic (79%) and intravenous fluid (68%), to less extend zinc (61.5%) and ORS (35.5%).

Table 3: Treatment options (number =200).

Treatment option	Number	Percent
Oral rehydration solution	71	35.5%
Intravenous fluid	136	68%
Antibiotics	178	79%
Zinc	123	61.5%

Table 4 shows patients' outcomes. Complications were developed among 17 (8.5%) and 1 (0.5%) patient was died.

Table 4: Patients' outcomes (number =200).

Outcomes	Number	Percent
Recovery	182	91%
Complications*	17	8.5%
Mortality**	1	0.5%

***** Complications included severe dehydration 8 (47.1%), electrolyte imbalance 5 (29.4%), acute kidney injury 3 (17.6%), seizures 1 (5.9%).

** The patient who was died was male, rural residency, diarrhea for more than 7 days, had severe dehydration and moderate severe malnutrition.

4. DISCUSSION

The current study assessed the clinical features, investigation findings, therapy, and outcomes of acute diarrhea in 200 pediatric patients. The findings shed light on the epidemiological and clinical patterns of diarrheal disease in children, particularly in low-resource settings.

The study patients had a mean age of 24.6 ± 13.2 months, demonstrating diarrheal disease primarily affects children under three years old. This age group is known to be more vulnerable due to undeveloped immune systems, poor hygiene habits, and increased exposure to contaminated food and water during the weaning period. The World Health Organization confirmed similar findings, stating that the bulk of diarrheal morbidity and mortality occurred in children under the age of five, particularly in the first two years of life.[9] Recent pediatric gastroenteritis investigations have found comparable demographic distributions, with the highest frequency seen in children under the age of three.[10-11]

In terms of gender distribution, males accounted for 55% of cases, with a male-to-female ratio of 1.22:1. Several epidemiological studies on childhood diarrhea have indicated a small male predominance.[12-13] The rationale is unclear; however, it could be related to societal variables that influence healthcare-seeking behavior or biological susceptibility.

In the current study, 60% of patients were from rural areas, which could reflect disparities in sanitation, access to clean water, and healthcare services. Rural people are frequently more vulnerable to environmental pathogens, with less access to preventive measures like safe drinking water and adequate sanitation systems. According to recent global health studies, diarrheal illnesses continue to be more prevalent in rural and low-resource populations due to inadequate hygienic infrastructure.[14]

Clinically, diarrhea was present in 100% of cases, followed by vomiting (80.5%) and fever (59%), with abdominal pain (35.5%) and poor feeding (50.5%) being less common. These findings are consistent with the normal clinical presentation of acute gastroenteritis in children, which frequently includes diarrhea, vomiting, and systemic symptoms such as fever.[15] Multicenter pediatric gastroenteritis research revealed similar symptom patterns, with vomiting and fever present in around 70-80% and 50-60% of patients, respectively.[16]

The majority of patients' symptoms lasted 1-7 days (90%), which is consistent with the natural course of acute infectious diarrhea, which typically resolves within a week in most pediatric cases. Only 10% of children experienced symptoms that lasted more than seven days, indicating a prolonged infection, complications, or underlying nutritional deficiencies. Previous investigations found that the majority of pediatric diarrheal episodes resolved within 3-7 days.[17]

Dehydration is one of the most serious consequences of diarrheal diseases. In the current study, 50.5% of patients showed signs of dehydration, while 23.5% experienced severe dehydration. These data emphasize the considerable burden of fluid loss caused by pediatric diarrhea. According to global pediatric guidelines, dehydration is the primary cause of morbidity and mortality in acute diarrhea, particularly in low- and middle-income countries.[18] Comparable studies found that dehydration rates among hospitalized pediatric gastroenteritis patients ranged between 40% and 60% (11).[19]

Nutritional status also influences susceptibility and outcome of diarrheal diseases. In the current study, 30% of the children had mild-to-moderate malnutrition, and 9% had severe malnutrition. Malnutrition has been shown to decrease immunological responses and intestinal barrier integrity, resulting in more severe and prolonged diarrheal episodes. Furthermore, a vicious cycle arises in which diarrhea exacerbates malnutrition by decreasing nutritional absorption and increasing metabolic needs.[20] Recent study has revealed that malnourished children have much greater rates of complications and longer recovery times from diarrheal diseases.[21]

Laboratory investigations revealed leukocytosis in 42.5% of patients did complete blood count, indicating an inflammatory or viral etiology. Electrolyte abnormalities were also prevalent, with hyponatremia in 34.4% and hypokalemia in 30% of patients who did serum electrolytes. Electrolyte abnormalities are common in diarrheal disorders due to excessive fluid and electrolyte loss through stool and vomiting. If not treated promptly, these anomalies might cause significant consequences such as cardiac arrhythmias, neurological symptoms, and renal impairment.[22]

Regarding treatment, 79% of patients received antibiotics, 68% received intravenous fluids, 61.5% received zinc supplements, and 35.5% received oral rehydration solution (ORS). Current worldwide guidelines advocate ORS and zinc supplementation as the primary treatment for acute childhood diarrhea, whereas antibiotics are typically reserved for particular bacterial illnesses such as dysentery or cholera.[9, 23] The high prevalence of antibiotic use seen in this study may be due to empirical treatment procedures in clinical settings where test confirmation of bacterial infection is limited.

Finally, the clinical outcomes were mainly favorable, with 91% of patients recovering well, 8.5% suffering complications, and a 0.5% mortality rate. Severe dehydration, electrolyte imbalance, acute renal injury, and convulsions were some of the reported complications. Although mortality was low, the child died from a combination of risk factors, including prolonged diarrhea, severe dehydration, rural residency, and malnutrition, all of which are well-known predictors of poor outcomes in pediatric diarrheal diseases.[24]

Despite giving important clinical insights, this study has numerous limitations. First, the study was done in a single healthcare center, which may limit the findings'

applicability to other locations or healthcare settings. Second, not all patients had complete laboratory investigations, as complete blood count and electrolyte measurements were only done on a sample of patients, potentially leading to underestimate of laboratory abnormalities such as electrolyte disorders. Third, the study relied mostly on clinical diagnosis rather than microbiological identification of the causative bacteria, making it impossible to identify the exact etiological agents responsible for diarrhea. Furthermore, the cross-sectional design made research difficult to determine causal links between risk factors such malnutrition, dehydration, and clinical outcomes. Finally, socioeconomic status, sanitary conditions, and vaccination status (for example, a rotavirus vaccine) were not investigated, despite the fact that these factors have been shown to influence the frequency and severity of pediatric diarrheal illnesses.

5- CONCLUSION

Acute diarrheal disease remains a major health concern for young children, particularly those under the age of three and those living in rural areas. The majority of patients reported diarrhea, vomiting, and fever, with dehydration and electrolyte imbalance being typical complication. Although most children recovered with appropriate care, just a small percentage experienced serious problems, underlining the significance of early detection and treatment. Early diagnosis, adequate rehydration therapy, and nutritional assistance are critical for reducing morbidity and mortality. In addition, it is recommended to increase the use of oral rehydration solution and zinc supplementation, improve public health education on hygiene and sanitation, and promote sensible antibiotic usage. Future multicenter studies with greater sample sizes, as well as microbiological investigations, are recommended to help identify etiological agents and guide targeted prevention and treatment measures.

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Conflict of intertest

About this study, the authors disclose no conflicts of interest.

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