

## Management of Acute Gastroenteritis among Children with Emphasis on Severity Assessment Using Vesikari Score

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**ABSTRACT:** Gastroenteritis in childhood account for a large proportion (9%) of childhood deaths, with an estimated 0.71 million death per year globally, making it the second most common cause of child deaths world wide. GE is a infections of the gastrointestinal tract caused by bacterial viral, or parasitic pathogens. The main aim of study was to evaluate management of AGE in pediatric population & to assess severity of AGE using vesikari score and to evaluate the prescribing patterns of drugs among paediatrics in AGE. A prospective observational study was carried out in paediatric department of a tertiary care hospital for a period of 10 months. A total of 100 prescription were collected for analysis. The result of the study suggest that male patient of age 2- 12 years had maximum incidence of AGE. The study populations were grouped according to Vesikari scoring parameters. Management of dehydration was mainly through oral dehydration therapy in 39% patients and through IV rehydration therapy in the rest 61% patients. There was significant association between the type of management of dehydration and Vesikari score.

For management of symptoms various class of drugs was prescribed, antipyretics was given to (22.22%) followed by antiemetic given to (21.36%), and then followed by antidiarrheals (5.98%). Treatment should be started with ORS or IV fluids. This study suggest that Vesikari scoring system is a simple and rapid method to determine the severity of AGE and thus based on severity, proper management can be initiated as soon as possible. Hospitalisation is essential in patients having score 7-10 (moderate) and  $\geq 11$  (severe). Based on results, AGE is best managed using a few, well defined medical interventions. Ceftriaxone were the most frequently prescribed antimicrobial agent in AGE. Effective interventions

includes administration of specific probiotics, Racecadotril, elemental Zinc. Ondansetron is effective against vomiting.

**KEYWORDS:** Acute gastroenteritis, Pediatrics, Vesikari clinical severity score, management of AGE

### I. INTRODUCTION

The term GE denotes infections of the gastrointestinal tract caused by bacterial, viral, or parasitic pathogens. The most common manifestations are diarrhea and vomiting which can also be associated with systemic features such as abdominal pain and fever. The incidence of diarrhoea ranges from 0.5 to 2 episodes per child per year in children less than 3 years in Europe. GE is a major reason for hospitalisation in this range of age. Gastroenteritis is the result of infection acquired through the fecal-oral route or by ingestion of contaminated food or water. Rotavirus is the most common cause of AGE in children. The second leading cause of AGE is Norovirus. Norovirus represent 10-15% causes of hospitalizations for AGE and are often associated with more patterns of diarrhea. The less common causes of AGE are Bacterial (mainly campylobacter and salmonella) and protozoan organisms. In addition clostridium difficile infection has been related to community acquired acute diarrhea. Pathogenesis and seriousness of bacterial disease depend on whether organisms have preformed toxins (S. aureus, Bacillus cereus), produce secretory (cholera, E. coli, Salmonella, Shigella) or cytotoxic (Shigella, S. aureus, C. difficile, E. coli) toxins. The two primary mechanisms

1. Damage to the villous brush border of the intestine lead to malabsorption of intestinal contents-osmotic diarrhea.

2. Release of toxins that may bind to specific enterocyte receptors release chloride ions into the intestinal lumen –secretory diarrhea.

Environmental contamination and increased exposure to enteropathogens are utmost risks. Young age, immunodeficiency, measles, malnutrition, and lack of exclusive or predominant breastfeeding are extra risks. Malnutrition enlarges the risk of diarrhea and associated mortality.

Most of the clinical manifestations and clinical syndromes of GE depends on infecting pathogens. Further development of manifestations depend on the complications (e.g., dehydration and electrolyte imbalance)and the nature of the

infecting pathogen. The rapid onset of nausea and vomiting within 6 hours, with fever, diarrhea and abdominal cramps after ingestion of preformed toxins (e.g., those of *S. aureus*)

The broad principles of management of acute gastroenteritis in children include rehydration therapy, enteral feeding and zinc supplementation, and additional therapies including probiotics, antidiarrhoeals, antiemetics and antimicrobials. Risks associated with severe dehydration that might essentiate intravenous resuscitation include: bloody diarrhea; persistent emesis; poor urine output; sunken eyes; and depressed level of consciousness. The WHO ORS containing 75 mEq of sodium, 64 mEq of chloride, 20 mEq of potassium, and 75 mmol of glucose per liter, is now the global standard of care and is also effective.

PARAMETER	SCORE		
	1	2	3
Diarrhea			
Maximum Number Stools per Day	1-3	4-5	≥6
Diarrhea Duration(Days)	1-4	5	≥6
Vomiting			
Maximum Number Vomiting Episodes per Day	1	2-4	≥5
Vomiting Durations(Days)	1	2	≥3
Temperature	37.1-38.4	38.5-38.9	≥39.0
Dehydration	N/A	1-5%	≥6%
Treatment	Rehydration	Hospitalization	N/A

All children greater than 6 month of age with acute diarrhea should receive oral zinc (20 mg/day) for 10-14 days during and continued after diarrhea. Racecadotril, an enkephalins inhibitor, has been shown to bring down stool output in patients with diarrhea. The number of episodes of vomiting and hospital admissions are reduced by usage of antiemetics such as ondansetron and metoclopramide Antimicrobial treatment should be considered in seriously ill children, Empiric therapy may be initiated with oral metronidazole or co-trimoxazole, apart from severe conditions parenteral treatment with ceftriaxone or ciprofloxacin might be considered.

### VESIKARI SCORE

The vesikari score is a composite measure initially utilised in 1987 RIT 4237 vaccine trial.Vesikari scoring system can be considered as

useful and reliable infectious marker for pediatric gastroenteritis.The scoring parameters in the Vesikari Clinical Severity Scoring System take into account each of the symptoms which includes: diarrhea ,vomiting, fever, dehydration, and the duration of diarrhea and vomiting. An additional parameter considered is treatment status. Each of the seven parameters is equally divided into three categories according to severity distribution (i.e,bottom=1, middle third=2, top third=3) as initially identified by Ruuska and Vesikari (1990).The scores for each parameter within the clinical severity scoring system are added to get a severity score between 0 and 20 points.

Severity scores above 10 points (i.e, ≥11 points) are considered severe, scores between 7 and 10 are moderate, and scores less than 7, mild .

SEVERITY CATEGORY			
Mild	Moderate	Severe	Maximum score
<7	7-10	≥11	20

## II. AIM AND OBJECTIVE

### Aim

- To evaluate management of AGE in paediatric population & to assess severity of AGE using Vesikari score.

### Objective

- To determine effectiveness of rehydration therapy in children
- To assess role of vesikari score in the management of AGE
- To evaluate the prescribing patterns of drugs among paediatrics in AGE

## III. METHODOLOGY

### Study design :

A prospective study will be conducted by collecting data from patient case sheet from pediatric department of a 450 bedded tertiary care hospital.

### Study location:

Study will be conducted in pediatric department of a 450 bedded tertiary care hospital.

### Study duration:

Study will be carried out for a period of 6 months from October 2019 to March 2020 .

### Study approval:

The protocol of the study was approved by the institution human ethics committee of the hospital.

### Study population:

Not less than 100 patients admitted in pediatric department with AGE will be expected to included in the study

### Study criteria

#### Inclusion criteria

- All patient of either gender with confirmed diagnosis of AGE in the pediatric department.
- Children admitted to pediatric department with symptoms of AGE

#### Exclusion criteria

- Children admitted to pediatric department with complaints of fever, diarrhoea vomiting associated with conditions other than AGE

### Study method :

1.Literature survey

A computerized literature and manual search was conducted to identify relevant studies for the management of acute gastroenteritis among children with emphasis on severity assessment using vesikari score. Literatures which support the study were collected and they were properly reviewed for the study

### 2. Data collection

Data entry form was specially designed for collecting patient details, relevant to the study purpose. During the ward rounds patient data including age, sex, current diagnosis, drug therapy, vesikari scoring parameters were recorded in data entry form.

### 3. Vesikary scoring system

Patient were categorised in to mild moderate and severe conditions based up on their severity and duration of symptoms.

### 4. Evaluation of prescription

All the prescription for AGE were evaluated for patient demographic and treatment details.

### 5. Submission

Details about the result obtained from the study were evaluated and made as a report.

## IV. RESULTS & DISCUSSION

The study entitled “Management of acute gastroenteritis among children with emphasis on severity assessment using Vesikari score” was a prospective study carried out for a period of six months in paediatric departments of a 450 bedded tertiary care hospital. The present study aimed to evaluate management of AGE in paediatric population & to assess severity of AGE using Vesikari score. A total number of 100 patients were included in this study and medical records of the patients were evaluated and relevant data was recorded in a self designed data entry form. Their demographic data, length of hospital stay, Vesikari score parameters & severity category, degree of dehydration, management of dehydration & symptoms, commonly prescribed drug & antimicrobials, dosage forms, category of drugs, were analysed.

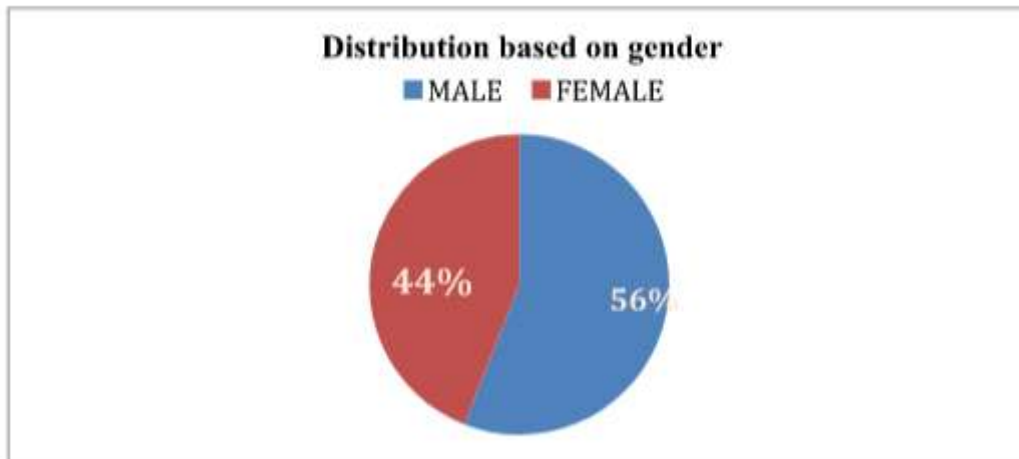


Figure 1: distribution based on gender

The demographic analysis suggested that acute gastroenteritis was seen more in males (56%) as compared to females (44%)

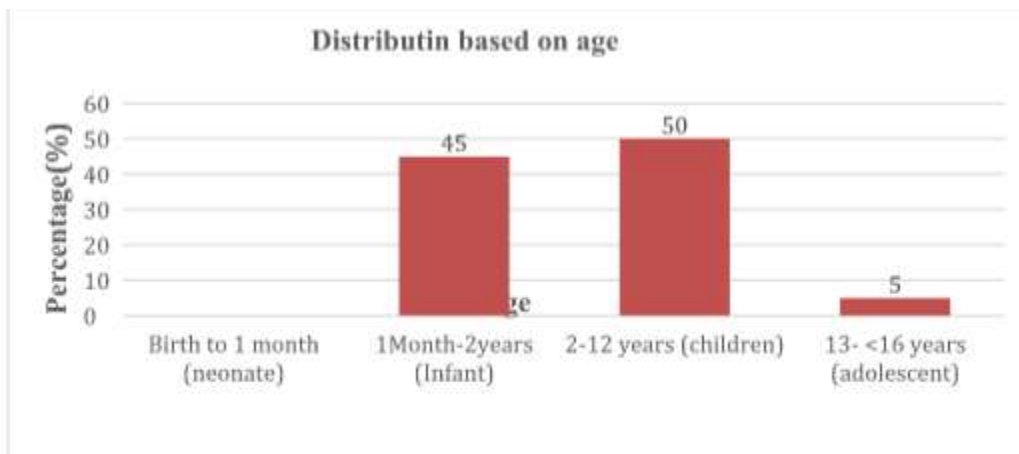


Figure 2: distribution based on age

The age group of 2-12 years was found to be presented with more incidence of acute gastroenteritis (50%).

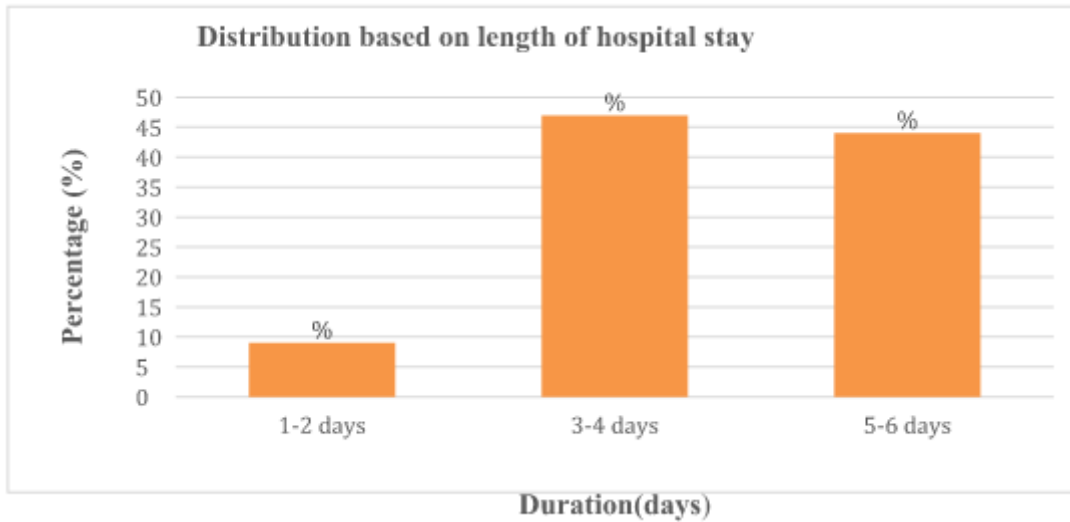


Figure 3: Distribution based on length of hospital stay

47 patients (47%) stayed in the hospital for 3- 4 days, about (44%) for 5-6days and only 9 patients (9%) of them stayed for 1-2 days

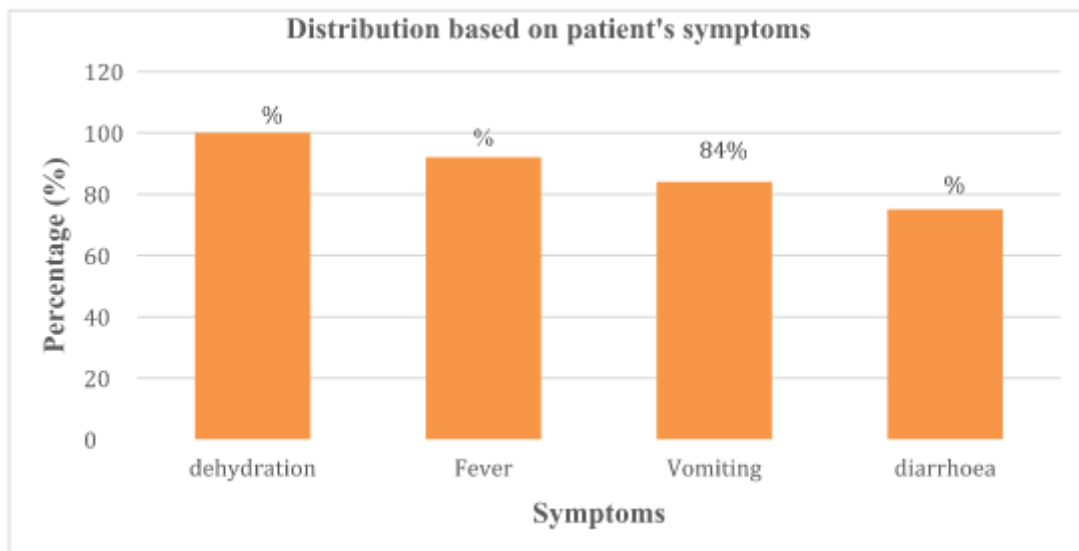


Figure 4: Percentage distribution based on patient's symptoms

Dehydration and hospitalisation was found in about all patients (100%), fever was present in 92%, vomiting was present in 84 patients and diarrhoea in 75% of patients.

**Table 1:** Distribution based on Vesikari score parameter

Parameters	Frequency	Percentage (%)
<b><u>DIARRHEA(n=75)</u></b>		
Maximum number stools per day		
1-3	55	73.33
4-5	10	13.33
>6	10	13.33
Diarrhoea Duration (days)		
1-4	70	93.33
5	5	6.66
>6	0	0
<b><u>VOMITING(n=84)</u></b>		
Maximum number vomiting episodes/day		
1		
2-4	11	13.09
.>5	63	75
Vomiting Durations (days)		
1	10	11.90
2	47	55.95
>3	17	20.23
	20	23.81
<b><u>TEMPERATURE(Celsius)(n=92)</u></b>		
37.1-38.4	81	88.04
38.5-38.9	7	7.60
>39.0	4	4.34
<b><u>DEHYDRATION(n=100)</u></b>		
N/A	39	39
1-5%	61	61
>6%		
<b><u>TREATMENT(n=100)</u></b>		
Rehydration	0	0
Hospitalisation	100	100

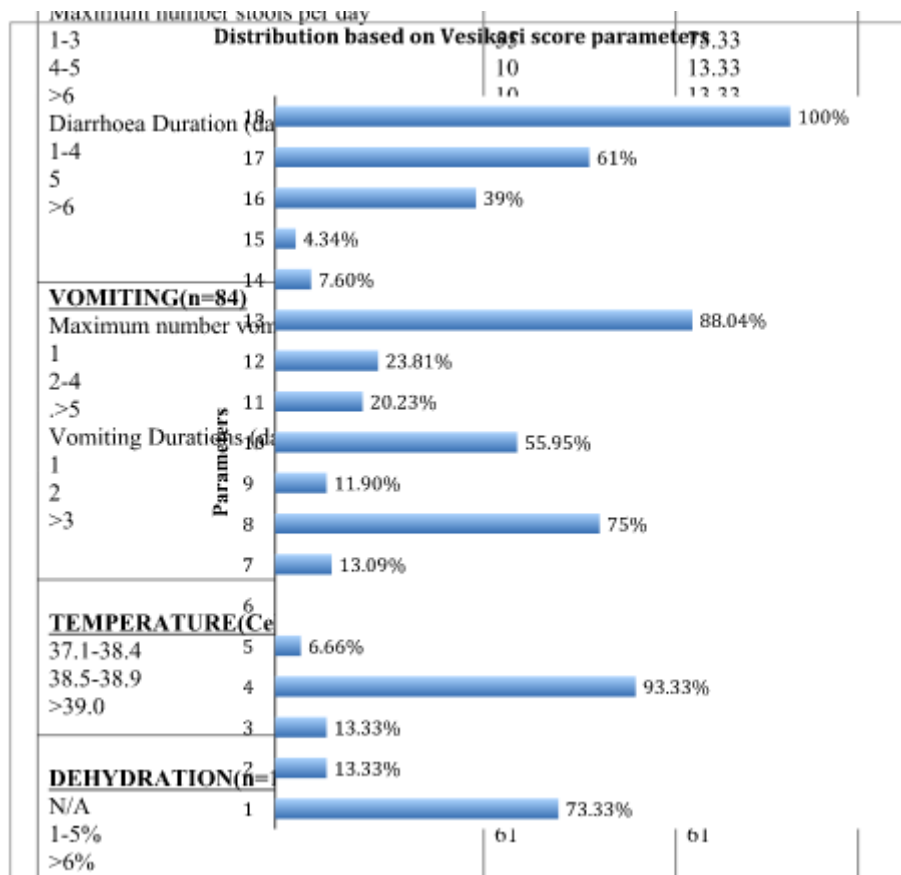


Figure 5: Percentage distribution based on Vesikari score parameters

The study populations were grouped according to Vesikari scoring parameters, dehydration and hospitalisation was found in about all patients (100%), vomiting was present in 84

patients ,diarrhoea was seen in 75 patients, severe fever  $\geq 39$  Celsius was seen 4 patients (4.34%) and most had a temperature between 37.1-38.4 Celsius.

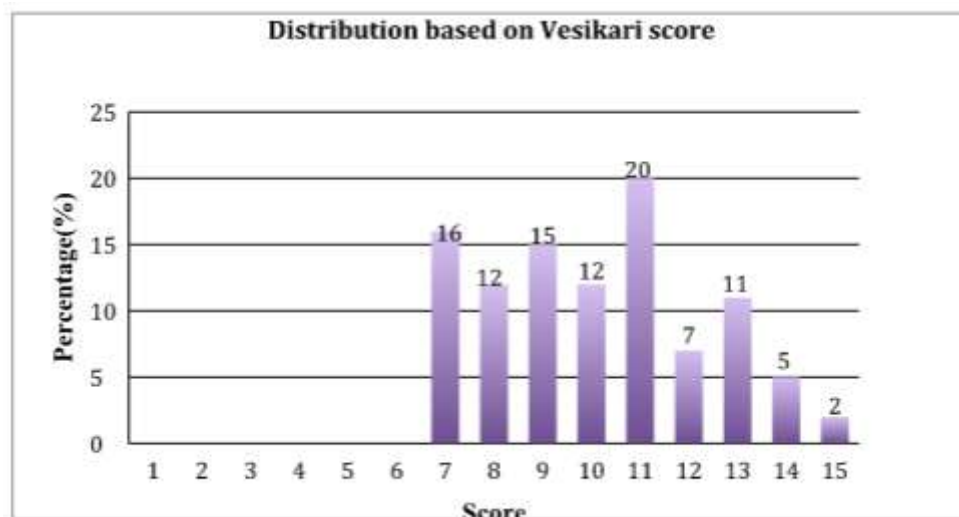


Figure 6: Percentage distribution based on Vesikari score

The study population were scored based on Vesikari scoring system and found that 20% patients had a score of 11, followed by 16% with 7 and only 2% with score 15.

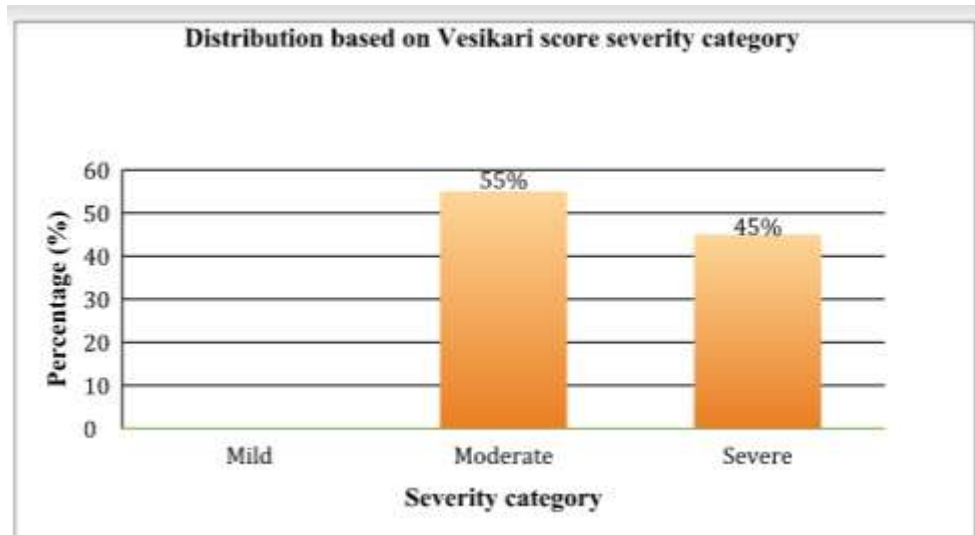


Figure 7: Percentage distribution based on Vesikari score severity category

Based on Vesikari score severity category 55% patients were in moderate category and 45% patients in severe category

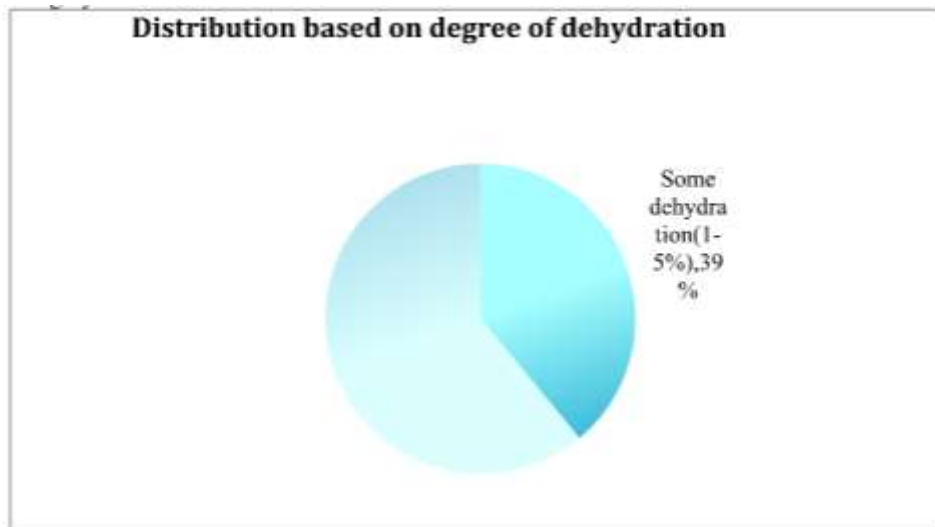


Figure 11: Percentage distribution based on degree of dehydration

Among the 100 patients enrolled in study 1-5% dehydration was seen in 39 patients(39%) and severe dehydration was seen in 61 patients(61%).

Table 2: Distribution based on different pharmacological classes of drugs commonly prescribed in AGE

Pharmacological classes	Number of drugs(n=643)	Percentage (%)



Antimicrobials	154	23.95
Electrolytes	100	15.55
Antiemetics	75	11.66
H2 blocker	58	9.02
Antisecretory/Antidiarrheal	21	3.26
Probiotics/prebiotics	55	8.55
Antiprotozoal	27	4.19
Analgesic/antipyretic	78	12.13
Trace element/nutritional supplement	64	9.95
NSAID	11	1.71

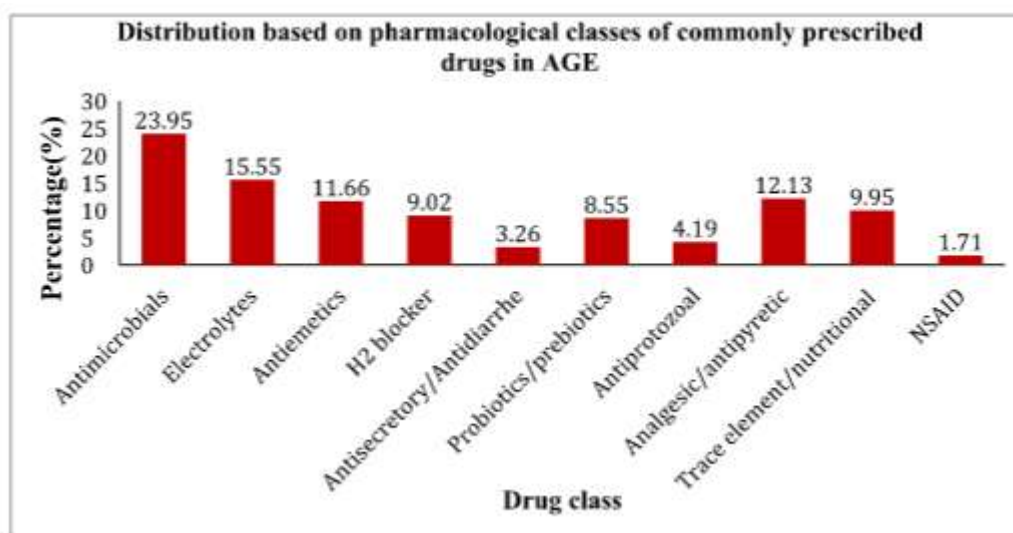


Figure 12: Percentage distribution based on different classes of drugs commonly prescribed in AGE

When 100 prescription was analysed based on the drugs prescribed on the basis of their pharmacological classification, majority of the drugs were prescribed was found to be

antimicrobials 154 (23.95%), followed by 100 (15.55%) electrolytes and least with 11 (1.71%) NSAID.

Table 3 : Distribution based on commonly prescribed drugs in AGE

Drugs	Number of drugs(n=643)	Percentage (%)
DNS	30	4.66
Ringer lactate	31	4.82
Ceftriaxone	86	13.37

Ondansetron	75	11.66
Amikacin	68	10.57
Acetaminophen	78	12.13
Ranitidine	58	9.02
Zinc	64	9.95
Metronidazole	27	4.19
Bacillus clausii	55	8.55
Racecadotril	21	3.26
ORS	39	6.06
Mefenamic acid	11	1.71

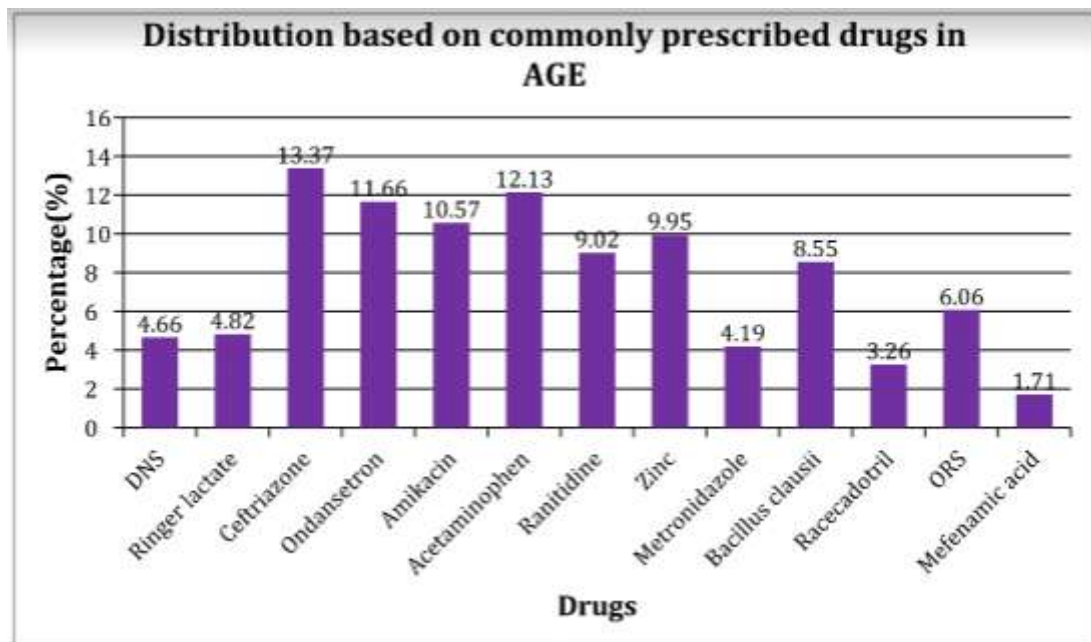


Figure 13: Percentage distribution based on commonly prescribed drugs in AGE

Ceftriaxone was most commonly prescribed drug in most patients (13.37%) followed by acetaminophen given to 78 patients (12.13%),

Mefenamic acid was found to be the least prescribed drug given to 11 patients (1.71%).

Table 3: Distribution based on various antimicrobials prescribed in AGE

Antimicrobials	Number Of Drugs(n=166)	Percentage(%)
Ceftriaxone	86	51.80
Cefixime	4	2.40
Piperacillin+Tazobactam	1	0.60

Ampicillin	4	2.40
Amikacin	68	40.96
Cefotaxime	1	0.60
Amoxicillin	2	1.20

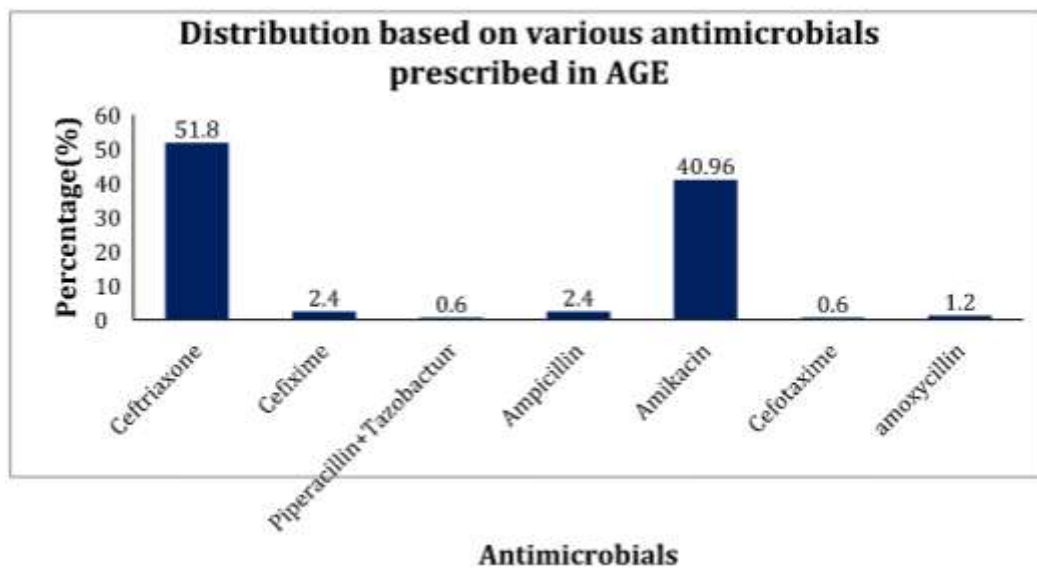


Figure 14: Percentage distribution based on various Antimicrobials prescribed in AGE

It was evident from the study that among 100 prescriptions, 166 antimicrobials were prescribed. It was found that Ceftriaxone was most

given drug(51.80%), followed by Amikacin (40.96%), least given one was Piperacillin +Tazobactam&Cefotaxim(0.60%).

Table 4: Distribution based on different classes of drugs commonly prescribed in AGE

Dosage Forms	Number of drugs (n=710)	Percentage(%)
Injection	321	45.21
Syrup	184	25.91
Tablets	19	2.67
Oral drops	6	0.84
Powder	62	8.73
IV infusion	61	8.59

Suspension	55	7.74
Suppository	2	0.28

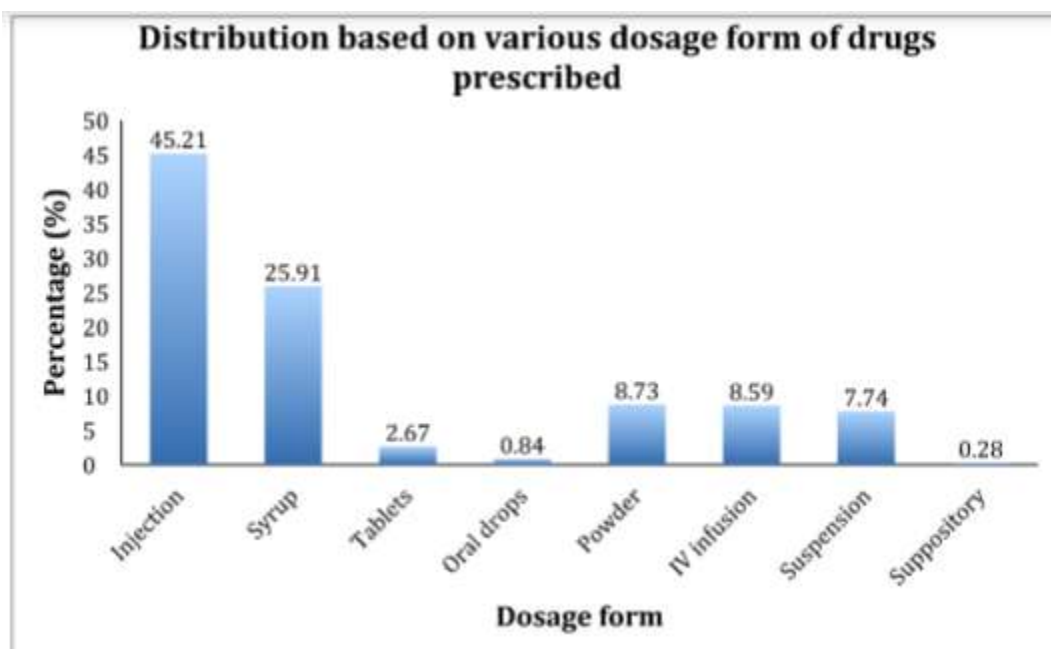


Figure 15: Percentage distribution based on various dosage forms of drugs prescribed

When the prescription was analysed based on dosage form of drugs prescribed, among the 710 drugs prescribed most was given as injectables (45.21%), followed by syrups (25.91%) and only 2 patient (0.28%) received drug in form of suppository.

## V. CONCLUSION

Acute Gastroenteritis is one of the major cause of morbidity and it is associated with major cause of hospitalisation. Dehydration reflects severity of AGE hospitalization and generally is essential for children requiring parental rehydration. Treatment should be started with ORS or IV fluids. Delay in management results in complications. This study suggest that Vesikari scoring system is a simple and rapid method to determine the severity of AGE and thus based on severity, proper management can be initiated as soon as possible. Hospitalisation is essential in patients having score 7-10 (moderate) and  $\geq 11$  (severe).

Based on results, AGE is best managed using a few, well defined medical interventions. Ceftriaxone were the most frequently

prescribed antimicrobial agent in AGE. Duration and severity of diarrhoea can be decreased by active therapy. Effective interventions includes administration of specific probiotics, Racecadotril, elemental Zinc. Ondansetron is effective against vomiting. The involvement of clinical pharmacist is preferred to evolve treatment strategies based on severity of AGE, with help of Vesikari scoring system.

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