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Assessment of Risk Factors of Acute Gastroenteritis and its Management in a Tertiary Care Hospital

Debaditya Dutta[1*], A. Monali Rao[1], Sananda Chakraborty[1], Sayantan Sarkar[1], Dr. Geetha Jayaprakash[2], Dr. Vinay J[3]

[1]Department of Clinical Practice, Acharya & BM Reddy College of Pharmacy, Bengaluru-560090, Karnataka, India
[2]Associate Professor and Head Department of Pharmacy Practice Acharya and BM Reddy College of Pharmacy, Bengaluru-560090, Karnataka, India
[3]Associate Professor Department of General Medicine ESIC MC PGIMSR & Model Hospital, Bengaluru560090, Karnataka, India

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***Corresponding author:** Debaditya Dutta
Department of Clinical Practice, Acharya & BM Reddy College of Pharmacy, Bengaluru-560090, Karnataka, India

Abstract **Original Research Article**

ACUTE GASTROENTERITIS is an inflammation of stomach, small intestine, or large intestine, resulting in symptoms such as abdominal pain, nausea, vomiting and diarrhea this study assess the risk factor related to acute gastroenteritis. It mainly aims to decrease the risk factor and improve its management hence improving Quality of life of patients. The objective of the study was to assess the risk factor of Acute Gastroenteritis. The study also aimed to assess the management of Acute gastroenteritis in tertiary care hospital. An Observational study was carried out among 100 samples in the General Medicine department of ESIC PGIMSR Model Hospital Bengaluru to assess the risk factors of AGE. The data was collected by using self- designed validated data collection form. The collected data were entered in Microsoft excel and appropriate descriptive and statistical analysis was performed**.** Out of the 100 subjects included in the study, majority where the female (76%) and male (24%) Using the case definition for Acute Gastroenteritis 48 females and 9 males were considered as AGE patients. Chi square test showed association between Gender and AGE (p=0.026) and for Risk factors & AGE (p=0.000014). This study helped in analyzing the prevalence of acute gastroenteritis based on various demographic factors of subjects enrolled in the study. The risk factors that cause the disease was also analyzed and the major risk factors that causes AGE was found to be Travelling. The Vesikari score used to check the severity of the disease showed that most of the cases were of Mild Severity. Proper education regarding consumption of food will help in prevention of AGE.

Keywords: Acute Gastroenteritis, Risk Factors, Dehydration, Diarrhea, Hospital-Based Study, Tertiary Care.

INTRODUCTION

Acute gastroenteritis is the inflammation of the stomach, small intestine, or large intestine, resulting in symptoms such as abdominal pain, cramping, nausea, vomiting, and diarrhea. This condition typically resolves within 14 days. In contrast, persistent gastroenteritis persists for 14 to 30 days, while chronic gastroenteritis lasts beyond 30 days. Gastrointestinal issues are a frequent reason for visits to both emergency rooms and outpatient clinics, with the majority of gastroenteritis cases being caused by infections [1]. In India, rotavirus is responsible for an estimated 11.37 million cases of acute gastroenteritis (AGE) in children under 5 years old each year. This results in 3.27 million outpatient visits and 872,000 inpatient admissions, with total direct costs amounting to INR 10.37 billion annually. In 2011, it was estimated that rotavirus-associated AGE caused approximately 78,000 deaths in India. The climate in northern India differs significantly from that in southern India, with the north experiencing a more temperate climate and a notable drop in temperature during winter months. In contrast, southern India has a tropical climate. Several surveillance studies in India have reported variations in the seasonal trends of Rotavirus associated diarrhea between northern and southern regions [2]. Infectious causes of Acute Gastroenteritis [2].

Viral (50-70%)	**Bacterial** (15-20%)	**Parasitic** (10-15%)
Norovirus	Shigella	Giardia
Rotavirus	Salmonella	Amebiasis
Enteric adenovirus types 40 and 41	Campylobacter	Cryptosporidium
Astrovirus	E coli.	Isospora
Coronavirus	Vibrio	Cyclospora
Some picornavirus	Yersinia	Microsporidium

An excessive amount of alcohol is one of the many possible causes of gastritis. Upper abdominal pain, stomach bleeding, nausea, vomiting, bad mouth, diarrhea, loss of appetite, unexplained weight loss, and other symptoms are among those associated with gastritis. Alcohol is a toxin that irritates and inflames the lining of the stomach. If the person consistently misuses alcohol, the likelihood of it happening is higher. Regular consumption prevents the stomach from healing from the lining irritation. NSAIDs may worsen the development of acute gastric lesions brought on by alcohol, which can result in haemorrhages that split the mucosa. Long-term alcohol consumption, however, disrupts microcirculation and damages the mucosa's structure gradually. Alcohol-induced mucosal damage is largely caused by decreased production of hormone molecules and prostaglandins. Research has demonstrated that a 10% or higher alcohol content increases the permeability of the mucosa and interferes with gastric mucosal secretion. Long-term alcohol misuse can haemorrhage the stomach lining, which can result in the development of ulcers and other stomach issues [3]. The most typical signs of gastroenteritis are watery diarrhea, abdominal pain or cramping, throwbacks, high temperature, severe thirst and tongue dryness, less than typical urination, experiencing fatigue, urine with dark hue, sunken cheeks or eyes, dizziness or fainting, frequent vomiting, loose stool, dehydration [4]. The purpose of this study is to explore the contributing factors and potential causes linked to acute gastroenteritis among patients admitted to a tertiary care hospital. The scope includes a detailed investigation of both individual and environmental risk elements that may influence the onset and severity of the condition. Furthermore, the study evaluates current pharmacological practices used in managing acute gastroenteritis, focusing on patterns of drug use and treatment efficacy. The novelty of this research lies in its dual approach—integrating the analysis of risk determinants with the assessment of clinical management strategies— providing a holistic understanding of the condition. By aligning epidemiological insights with therapeutic interventions, this study offers valuable data that can enhance prevention, diagnosis, and patient care within hospital settings.

MATERIAL AND METHODS

This study was a prospective observational investigation aimed at evaluating the risk factors and management of acute gastroenteritis in a hospital-based population. The research study conducted in the Inpatient Department of General Medicine at ESIC Medical College, PGIMSR & Model Hospital, Rajajinagar, Bengaluru. The subjects for the study were identified by the investigator during ward rounds based on the inclusion and exclusion criteria. Relevant data (Demographic details, Clinical presentation and symptomatology, past medical history and comorbidities, Relevant laboratory investigations, Therapeutic interventions and medications administered) were collected and recorded on Self-developed and validated case report form. A total 100 samples were included in the study. The study was approved by Institutional Ethics Committee of the tertiary care teaching hospital, Bengaluru in accordance with the guidelines issued by ICMR (No.532/11/12/Ethics/ESICMC&PGIMSR/Estt. Vol. IV /99-B/2024).

Inclusion Criteria:

Participants were included if they:

1. Were 18 years of age or older
2. Belonged to either gender
3. Were admitted with a diagnosis of acute gastroenteritis
4. Provided written informed consent Exclusion Criteria:

Subjects Were Excluded If They:

1. Had chronic gastroenteritis
2. Were diagnosed with mental health disorders
3. Were pregnant or lactating women.

Statistical Analysis:

Data were entered and managed using Microsoft Excel. Descriptive statistics such as frequencies and percentages were used for categorical variables. The Chi-square test was applied to determine associations between categorical factors such as age, gender, comorbidities, and potential risk variables. Odds ratios (ORs**)** were calculated to assess the strength of associations. Univariate and multivariate logistic regression analysis were conducted to identify independent predictors associated with acute gastroenteritis. A p-value < 0.05 was considered statistically significant.

Case Definition:

According to the World Health Organization (WHO), a case of acute gastroenteritis (AGE) is defined as: “The passage of three or more loose stools and/or any episode of vomiting within a 24-hour period, excluding

cases due to chronic conditions, medications, alcohol consumption, or pregnancy."

RESULTS

The study was conducted in the Inpatient Department of General Medicine at ESIC Medical College, PGIMSR & Model Hospital, Rajajinagar, Bengaluru. The study was carried out over a period of six months and a total number of 100 samples were collected.

Distribution of Patients Based on Gender

Out of 100 patients in the study 24 were male (24%) and 76 were female (76%) as shown in *Figure* 1.

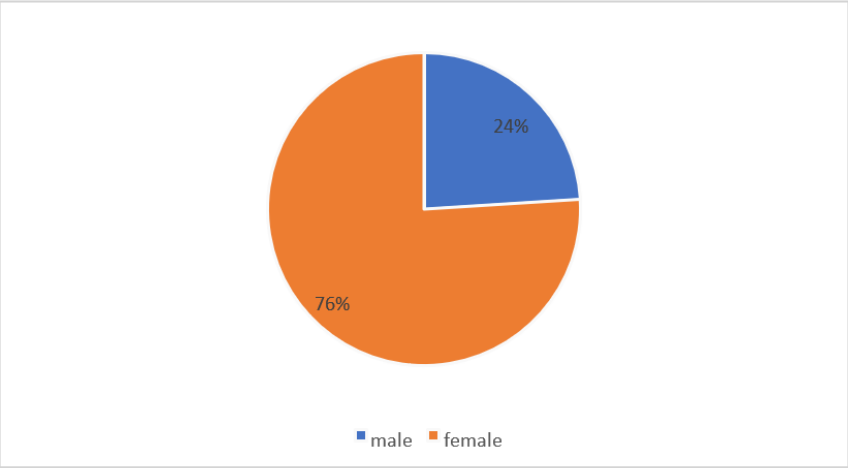

Figure 1: Distribution of patients based on gender

Distribution of Patients Based on Age

The mean age of the study population was found to be 14.28 years. Majority of the patients belonged to the age group 42-53 (26%) followed by the 30-41years age group (21%). The youngest patient included in the study was 19 years old, while the oldest patient was 94 years old, as shown in *Table 1.*

Table 1: Distribution of patients based on Age

S. No	Age interval	Number(N)	Percentage (%)
1	18-29	20	20%
2	30-41	21	21%
3	42-53	26	26%
4	54-65	20	20%
5	66-77	10	10%
6	78-89	02	2%
7	90-101	01	1%

Distribution of Patients Based on Comorbidities

Out of the 100 patients involved in the study 23 patients have Single comorbidities, 52 patients have multiple comorbidities and 25 patients have No comorbidities showed in *Figure 2.*

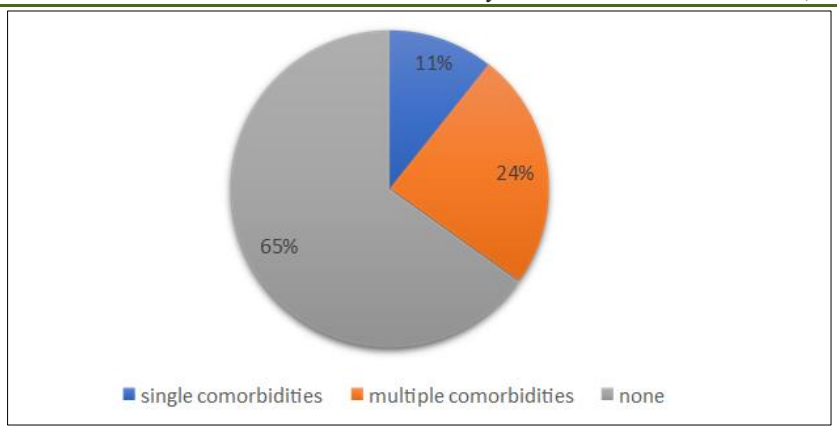

Figure 2: Distribution of patients based on comorbidities

Distribution of Patients Based on Risk Factors

Out of the 100 subject's majority of the patient were with Outside food mainly (33%) followed by Poor Hygiene in 15 patients (15%) and stale food in 12 patients (12%). The below table shows the Distribution of patients based on Risk factors.

Table 2: Distribution of patients based on Risk factors

S. No	Risk factors	No of Patients	Percentage (%)
1	Outside food	33	33%
2	Travelling	7	7%
3	Poor Hygiene	15	15%
4	Stale food	12	12%
5	Social Habit	11	11%
6	Drug induced	14	14%
7	Hospital Acquire	8	8%

Distribution of Patients Based on Occupation

Out of the 100 patients included in the study 63 patients were homemaker (63%) followed by 24 patients were technical worker (24%) and only 13 patients were competent worker (13%).

Table 3: Distribution of patients based on Occupation

S. No	Occupation	No of patients	Percentage (%)
1	Technical worker	43	43%
2	Competent worker	8	8%
3	Homemaker	49	49%

Distribution of Patients According to Vesikari Score

Out of 100 patients Majority were female 76 (48 diseased and 28 non-diseased) and male 24 (9 diseased and 15 non-diseased)

Table 4: Distribution of patients based on Vesikari score

S. No	Gender	Total	Diseased	Non-Diseased
1	Female	76	48	28
2	Male	24	9	15

Distribution of Patients According to Age Based on Diseased and Non-Diseased as Per Case Per Case Definition

Out of 100 patients, Majority of patients belong to 42-53 age group followed by 30-41.

Table 5: Distribution of patients according to age

S. No	Age	Total	Diseased	Non Diseased
1	18-29	20	10	10
2	30-41	21	13	8
3	42-53	26	14	12
4	54-65	20	12	8
5	66-77	10	4	6

6	78-89	2	2	0
7	90-101	1	0	1

Distribution Based on Occupation According to Diseased and Non-Diseased

Homemaker were 49 (28 diseased,15 non-diseased) followed by technical worker 43(diseased 28, nondiseased) followed by competent worker 8 (2 diseased,6 non-diseased)

Table 6: Distribution of patients based on Occupation

S. No	Occupation	Total	Diseased	Non Diseased
1	Technical Worker	43	28	15
2	Competent worker	8	2	6
3	Homemaker	49	30	19

Distribution of Patients Based on Comorbidities According to Diseased and Non-Diseased

Out of 100 patients, majority is multiple 52(26 diseased,26 non- diseased) followed by no comorbidities.

Table 7: Distribution of patients based on comorbidities

S. No	Comorbidities	Total	Diseased	Non Diseased
1	Single	21	12	9
2	Multiple	52	26	26
3	None	27	15	12

Distribution of Patients Based on Risk Factors According to Diseased and Non- Diseased

Table 8: Distribution of patients based on risk factors

S. No	Risk factors	Total	Diseased	Non-Diseased
1	Outside food	33	17	16
2	Travelling	7	05	02
3	Poor Hygiene	15	09	06
4	Stale food	12	08	04
5	Social Habit	11	06	05
6	Drug induced	14	09	05
7	Hospital Acquired	8	05	03

Prescribing Pattern of Drugs in Age

Table 9: Prescribing pattern of drugs in AGE disease

S. No	Class of Drugs	Dose
1	Oral Rehydration Solution (ORS)	21gm
2	Proton pump inhibitor (PPI) - Tab Pantoprazole - Tab Rabeprazole	 40 mg 40 mg
3	Antiemetic - Tab Emeset	4 mg
4	Antidiarrheal - Cap Racecadotril	100 mg
5	Probiotic - Cap Bifilac	2-2-2
6	Antibiotic Tab Doxycycline Tab Ciprofloxacin	 100 mg 500 mg
7	Antispasmodic - Tab Hyoscine Butyl bromide (Buscopan)	 10 mg
8	Analgesic Tab Tramadol Tab Paracetamol	 100 mg 500 mg 650 mg

	Tab Dolo	

Most prescribed drugs used in acute gastroenteritis are Proton pump inhibitor (Tab Pantoprazole, Tab.

Rabeprazole), Antiemetic (Tab Emeset), Antidiarrheal (Cap Racecadotril), Probiotic (Cap bifilac), Antibiotic (Tab Doxycycline, Tab Ciprofloxacin), Antispasmodic (Tab Buscopan), Analgesics (Tab Tramadol, Tab Paracetamol, Tab Dolo).

Demographics	Total Number	AGE (no. of cases)	No. of no AGE cases
GENDER			
Male	24	09	15
Female	76	48	28
Total	100		

Chi-Square test ($\chi 2$) was done to test the association between Gender & Acute Gastroenteritis, the test statistic value was 4.89, the p-value was found to be 0.026 ($p<0.05$) which was statistically significant.

Demographics	Total Number	AGE (no. of cases)	No. of no AGE cases
AGE			
18-29	20	10	10
30-41	21	13	08
42-53	26	14	12
54-65	20	12	08
66-77	10	04	06
78-89	02	02	00
90-101	01	00	01
Total	100		

Chi-Square test ($\chi 2$) was done to test the association between Age & Acute Gastroenteritis, the test statistic value was 4.59, the p-value was found to be 0.5 ($p>0.05$) which was not significant.

Demographics	Total Number	AGE (no. of cases)	No. of no AGE cases
OCCUPATION			
Technical Workers	43	28	15
Competent Workers	08	02	06
Housemakers/ retired	49	30	19
Total	100		

Chi-Square test ($\chi 2$) was done to test the association between Occupation & Acute Gastroenteritis, the test statistic value was 4.58, the p-value was found to be 0.101 ($p>0.05$) which was not significant.

Demographics	Total Number	AGE (no. of cases)	No. of no AGE cases
COMORBIDITIES			
Single	21	12	09
Multiple	52	26	26
No Comorbidities	27	15	12
Total	100		

Chi-Square test ($\chi 2$) was done to test the association between Comorbidities & Acute Gastroenteritis, the test statistic value was 0.403, the p-value was found to be 0.817 ($p>0.05$) which was not significant.

Demographic data		Total no.	Disease	No Disease	P value
Risk factor	Outside food	33	17	16	0.000014
	Travelling	07	05	02	
	Poor hygiene	15	09	06	
	Stale food	12	08	04	

	Social habit	11	06	05	
	Drug induced	14	09	05	
	Hospital acquired	08	05	03	

Chi-Square test ($\chi 2$) was done to test the association between Risk factors & Acute Gastroenteritis, the test statistic value was 34.52, the p-value was found to be 0.000014 ($p<0.05$) which was statistically significant.

Odds ratio analysis for various Demographic Parameters

Variable	Odds ratio	95% CI
Age	1.0067	0.9818 to 1.0322
Gender	2.1520	0.8070 to 5.7390
Occupation	0.8755	0.5270 to 1.4543
Comorbidities	1.0516	0.5774 to 1.9153
Risk factor	1.0769	0.8838 to 1.3122

OR >1 indicates that the Age is associated with the higher odds of AGE disease

OR > 1 indicates that the Gender is associated with the higher odds of AGE disease. OR < 1 indicates that the Occupation is associated with the lower odds of AGE disease.

OR >1 indicates that the Comorbidities is associated with the higher odds of AGE disease. OR >1 indicates that the Risk factors is associated with the higher odds of AGE disease.

Odds Ratio Analysis for Individual Risk Factors Assosciated with Age

Variable	Odds ratio	95% CI
Drug induced	0.9437	0.8050 to 1.1063
Hospital acquired	0.9802	0.8336 to 1.1525
Outside food	0.8740	0.7009 to 1.0898
Poor hygiene	0.9576	0.7880 to 1.1638
Social habit	0.9591	0.8185 to 1.1237
stale food	0.9646	0.8283 to 1.1234
Travelling	1.1110	0.8534 to 1.4464

Further analysis was done by performing Logistic regression for various risk factors related to Acute Gastroenteritis which shows that OR <1 indicates that the Travelling is associated with the higher odds of AGE disease.

DISCUSSION

Out of 100 patients in the study there were 24 (24%) male participants and 76 (76%) female participants, where female participants were higher. These were compared with the study conducted by *Gentian P. stroni et al.,*[5] where females (58%) were more than male.

Out of 100 patients included in the study most belong to the age group of 42-53 (26%) followed by 30-41 years (21%) and the mean age of the study population was 14.28 years. This result is similar to the study conducted by *Maroon Thabane et al,*[6] where the majority of patients age is 44 years age group.

According to this study, 52 subjects (52%) with multiple comorbidities are more likely to have acute gastroenteritis followed by 23 subjects (23%) with single comorbidities and (25%) with no comorbidities which is nearly equivalent to the result of study conducted by *Mira M Wouters et al.,* [7].

Out of 100 subjects in the study majority of the patients were Homemaker (49) followed by technical worker (43) and competent worker (8) where homemakers are more likely to have acute gastroenteritis which is divergent from the study conducted by *Mihir Prafulbhai Rupani et al.,* [8].

Out of 100 subjects the majority of the patients have acute gastroenteritis with Outside food (33%), followed by poor hygiene (15%) and stale food (12%). The result of the study is relevant to the study conducted by *Teresa Zinova Mitakakis et al*., [9]. According to the study out of 100 subjects the majority of the patients had severity of mild (47%) followed by moderate (30%) and severe (23%) which is contrast with the study conducted by *Noga Givon – Lavi et al.,* [10].

This study aimed to assess the risk factors of Acute Gastroenteritis, where Chi square test was

performed and showed there was significant association between Gender and Acute gastroenteritis, and also risk factor & Acute gastroenteritis. However, there was no significant association between Age, occupation, and comorbidities.

CONCLUSION

In conclusion, this study provides valuable insights into the distribution of gender, age, comorbidities, occupation, and risk factors in relation to acute gastroenteritis. A chi-square test was conducted to assess the associations between these variables and acute gastroenteritis. The analysis revealed statistically significant associations between gender and acute gastroenteritis, as well as between risk factors and the occurrence of the disease.

Further analysis using odds ratios was performed to evaluate the relationship between various parameters—age, gender, occupation, comorbidities, and risk factors—and the likelihood of developing acute gastroenteritis. The odds ratio for age, gender, comorbidities, and risk factors was greater than 1, indicating that these variables are associated with a higher likelihood of the disease. In contrast, the odds ratio for occupation was less than 1, suggesting that occupation is linked to a reduced likelihood of contracting acute gastroenteritis.

Additionally, a more detailed odds ratio analysis was conducted for specific risk factors related to acute gastroenteritis. The results showed that traveling significantly increases the risk of developing acute gastroenteritis, likely due to exposure to contaminated food, poor hygiene practices, unsafe water sources, and certain social habits that elevate the risk of infection.

This conclusion highlights the need for specific public health measures aimed at reducing the risk of acute gastroenteritis among travellers. Suggested interventions may include raising awareness about safe practices regarding food and water consumption, encouraging the use of bottled or purified water, and emphasizing the importance of maintaining proper hand hygiene while traveling.

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