

Assessment of Risk Factors of Gastroenteritis in Children**Pottella Chandra Mohan¹, Pasupuleti Sudheer², Maram Padmavathi³, R Chandra Sekhara Rao⁴**¹Associate Professor, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh^{2,3,4}Assistant Professor, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh

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Conflict of interest: Nil

Abstract:**Aim:** To assess risk factors of Gastroenteritis in children.**Methodology:** Eighty-four patients of acute gastroenteritis of both genders were enrolled and the biochemical parameters and risk factors were recorded.**Results:** Age group 2-4 years had 41, 4-6 years had 25, 6-8 years had 13 and 8-10 years had 5 patients. The difference was significant ($P < 0.05$). Symptoms were lethargy in 28 survived and 13 died, oliguria in 38 survived and 8 died children, poor oral intake in 15 survived and 11 died children, dysentery was seen 31 survived and 9 died children. Signs of pallor in 34 survived and 12 died children, tachycardia was seen in 12 survived and 11 died, hypotension in 29 survived and 14 died children. The difference was significant ($P < 0.05$). RC transfusion in the first 24 hours was seen in 34 and 18, duration of PICU stay was 5.1 days and 4.6 days. The mean inotropes in first 24 hours was needed in 37 and 15, ventilation in the first 24 hours seen in 36 and 12, albumin was 3.3 mg/dl and 2.1 mg/dl, blood glucose was 98.2 mg/dl and 95.2 mg/dl, blood urea was 66.2 mg/dl and 56.4 mg/dl, creatinine was 0.9 mg/dl and 0.8 mg/dl and in survived and died children respectively. The difference was non-significant ($P > 0.05$). Among survived and died patients, family was joint in 36 and 12 and nuclear in 30 and 6 patients respectively. SES was upper in 12 and 4, middle in 26 and 5, and lower in 28 and 7 patients. Education was school going in 45 and 13 and none in 21 and 5, sewage was underground in 59 and 8 and open drain in 7 and 10, child washes hand before meal 61 and 7, child washes hand after washroom 65 and 6 and 57 and 5 uses soap.**Conclusion:** Risk factors of acute gastroenteritis in children found to be low socio-economic status, lack of education, poor sewage system, insufficient hand wash after washroom and non- usage of soaps.**Keywords:** Acute Gastroenteritis, Children, Diarrhoea.

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Introduction

Acute gastroenteritis- diarrhoea or vomiting (or both) of more than seven days duration—may be accompanied by fever, abdominal pain, and anorexia. [1] Diarrhoea is the passage of excessively liquid or frequent stools with increased water content. It is frequently brought on by bacterial, viral, or parasite infections and is usually self-limiting, meaning that no special medical care is required because it usually goes away on its own. [2] Diarrhea can be the first sign of several non-gastrointestinal tract infections, including meningitis, bacterial sepsis, pneumonia, otitis media, and urinary tract infections. The first sign of metabolic issues, congestive heart failure, poisoning, or injury can all include vomiting. [3] Since rotavirus is the most frequent cause of acute gastroenteritis in the globe, immunization will significantly reduce the incidence, morbidity, and death of the illness. Most kids may be treated at

home and are not dehydrated. [4] Fluid therapy is a treatment option for metabolic acidosis, electrolyte imbalance, and dehydration. Low osmolality oral rehydration solutions can be used for enteral or oral treatment of mild-to-moderate dehydration in most children. [5] Children who are extremely dehydrated or startled typically require intravenous fluids and hospitalization. Generally speaking, drugs are harmful and unnecessary. Through promoting breastfeeding, advocating for free rotavirus vaccination, and teaching caregivers about food and personal hygiene, general practitioners can play a significant role in prevention. [6] We performed this study to assess risk factors of Gastroenteritis in children.

Methodology

After considering the utility of the study and obtaining approval from the ethical review

committee, we selected eighty- four patients of acute gastroenteritis of both genders. Patients' consent was obtained before starting the study.

Data such as name, age, etc. was recorded. According to WHO guidelines, two of the following symptoms—floppy, sunken eyes, thirst—that occur when a person drinks poorly or is unable to drink, and skin pinching that goes back very slowly—signify severe dehydration. Three or more loose stools in a 24-hour period was considered diarrhea. Records were kept of parameters like the length of

the illness, the signs and symptoms at admission, the vital signs, the anthropometry, the degree of dehydration, the biochemical parameters, the fluid therapy, the antimicrobial therapy, the complications, the reason of death, and the treatments administered. The results were compiled and subjected to statistical analysis using the Mann-Whitney U test. P value less than 0.05 was regarded as significant.

Results

Table 1: Patients distribution

Age group (years)	Number	P value
2-4	41	0.05
4-6	25	
6-8	13	
8-10	5	

Age group 2-4 years had 41, 4-6 years had 25, 6-8 years had 13 and 8-10 years had 5 patients. The difference was significant ($P < 0.05$) (Table 1).

Table 2: Comparison of parameters

Parameters	Variables	Survived (66)	Died (18)	P value
Symptoms	Lethargy	28	13	0.01
	Oliguria	38	8	0.02
	Poor oral intake	15	11	0.94
	Dysentery	31	9	0.01
Signs	Pallor	34	12	0.02
	Tachycardia	12	11	0.98
	Hypotension	29	14	0.05

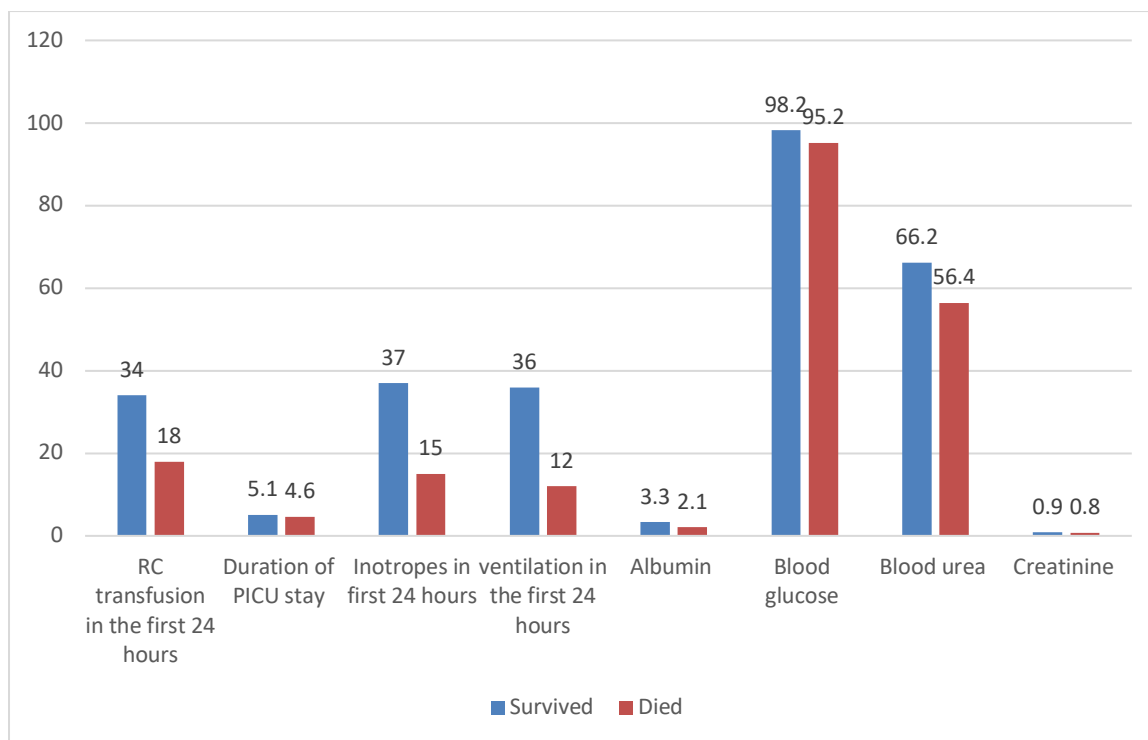
Symptoms were lethargy in 28 survived and 13 died, oliguria in 38 survived and 8 died children, poor oral intake in 15 survived and 11 died children, dysentery was seen 31 survived and 9 died children. Signs of pallor in 34 survived and 12 died children, tachycardia was seen in 12 survived and 11 died, hypotension in 29 survived and 14 died children. The difference was significant ($P < 0.05$) (Table 2).

Table 3: Comparison of laboratory parameters

Parameters	Survived	Died	P value
RC transfusion in the first 24 hours	34	18	0.02
Duration of PICU stay	5.1	4.6	0.97
Inotropes in first 24 hours	37	15	0.05
ventilation in the first 24 hours	36	12	0.61
Albumin	3.3	2.1	0.04
Blood glucose	98.2	95.2	0.92
Blood urea	66.2	56.4	0.05
Creatinine	0.9	0.8	0.83

RC transfusion in the first 24 hours was seen in 34 and 18, duration of PICU stay was 5.1 days and 4.6 days. The mean inotropes in first 24 hours was needed in 37 and 15, ventilation in the first 24 hours seen in 36 and 12, albumin was 3.3 mg/dl and 2.1

mg/dl, blood glucose was 98.2 mg/dl and 95.2 mg/dl, blood urea was 66.2 mg/dl and 56.4 mg/dl, creatinine was 0.9 mg/dl and 0.8 mg/dl and in survived and died children respectively. The difference was significant ($P < 0.05$) (Table 3).



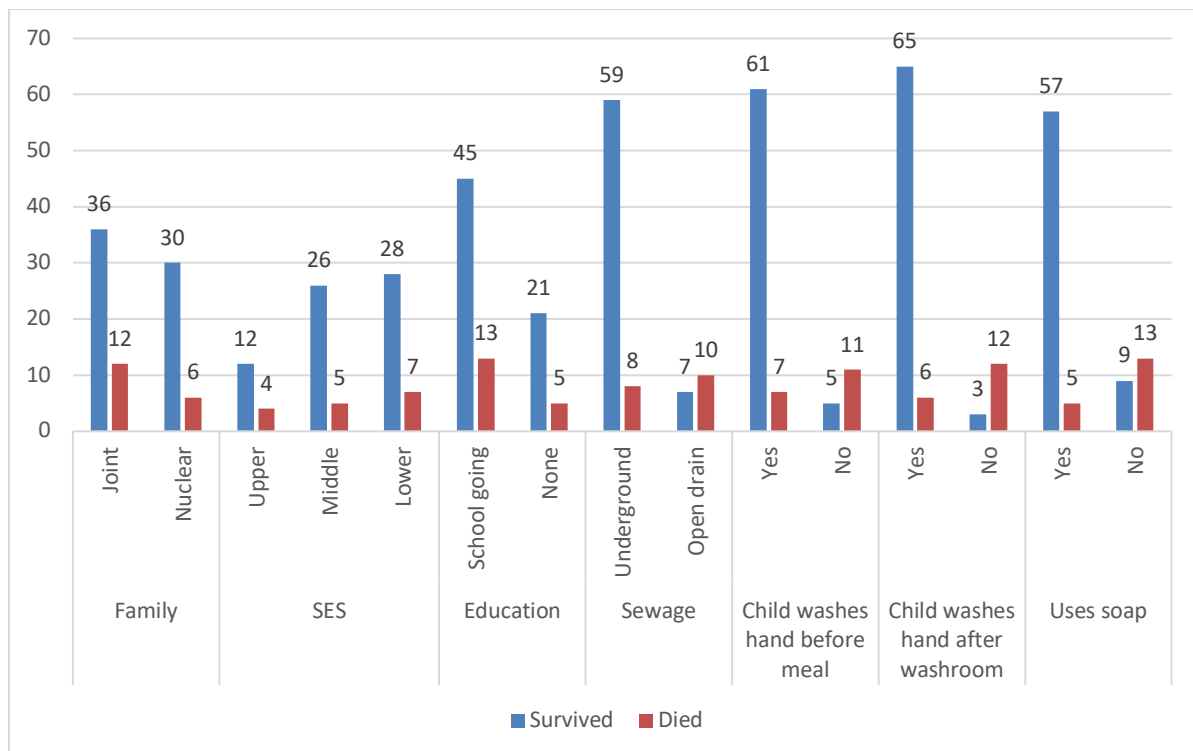
Graph 1: Comparison of laboratory parameters

Table 4: Risk factors

Parameters	Variables	Survived	Died	OR	P value
Family	Joint	36	12	0.35	0.02
	Nuclear	30	6		
SES	Upper	12	4	3.2	0.01
	Middle	26	5		
	Lower	28	7		
Education	School going	45	13	0.46	0.05
	None	21	5		
Sewage	Underground	59	8	1.8	0.04
	Open drain	7	10		
Child washes hand before meal	Yes	61	7	2.9	0.03
	No	5	11		
Child washes hand after washroom	Yes	65	6	0.45	0.05
	No	3	12		
Uses soap	Yes	57	5	0.72	0.04
	No	9	13		

Among survived and died patients, family was joint in 36 and 12 and nuclear in 30 and 6 patients respectively. SES was upper in 12 and 4, middle in 26 and 5, and lower in 28 and 7 patients. Education was school going in 45 and 13 and none in 21 and 5,

sewage was underground in 59 and 8 and open drain in 7 and 10, child washes hand before meal 61 and 7, child washes hand after washroom 65 and 6 and 57 and 5 uses soap. The difference was significant ($P < 0.05$) (Table IV).



Graph 2: Risk factors

Discussion

The defining feature of diarrhea is the passage of loose or watery stools; more than three of these stools per day is commonly used to define severe diarrhea. The amount of fluid lost by feces can range from generally normal (5 mL/kg body weight/day) to more than 200 mL/kg body weight/day. The main cause of acute gastroenteritis is dehydration and electrolyte deficits brought on by untreated diarrhea. [7] Meningitis, bacterial sepsis, pneumonia, otitis media, and urinary tract infections are among the nongastrointestinal tract diseases for which diarrhea may be one of the first symptoms. In cases of metabolic diseases, congestive heart failure, toxic chemical intake, or trauma, vomiting may present as the initial symptom. A thorough history and physical examination should be conducted as part of the evaluation of all children with acute gastroenteritis. [8] We performed this study to assess risk factors of Gastroenteritis in children.

In our study, Age group 2-4 years had 41, 4-6 years had 25, 6-8 years had 13 and 8-10 years had 5 patients. Children with diarrhea who died (n = 29) and those who survived (n = 229) were compared and their factors analyzed by Chisti et al. [9] After controlling for potential confounders such as immature PMN and intravenous fluid infusion, logistic regression analysis revealed that the following factors were independently associated with deaths among diarrheal children admitted to SCW: severe malnutrition (OR 7.9, 95% CI 1.8-34.8; p < 0.01), radiological lobar pneumonia (OR 17.8, 95% CI 3.7-84.5; p < 0.01), hypoxaemia (OR

8.5, 95% CI 1.0-75.0; p = 0.05), and hypernatraemia (OR 15.8, 95% CI 3.0-81.8; p < 0.01).

Symptoms were lethargy in 28 survived and 13 died, oliguria in 38 survived and 8 died children, poor oral intake in 15 survived and 11 died children, dysentery was seen 31 survived and 9 died children. Signs of pallor in 34 survived and 12 died children, tachycardia was seen in 12 survived and 11 died, hypotension in 29 survived and 14 died children. When children with acute gastroenteritis (AGE), severe dehydration, and shock are admitted to the Pediatric Intensive Care Unit (PICU), Singh et al [10] have identified risk factors for mortality at admission. During this time, 62 children were admitted to the PICU with AGE. A total of twenty-four (39%) perished. On univariate analysis, the following variables were shown to be substantially linked with death: hypoalbuminemia (p = 0.02), thrombocytopenia (p = 0.018), clinical pallor (p = 0.01), increased leucocyte count (p = 0.02), and severe acute malnutrition (SAM) (p = 0.04). Only SAM and hypoalbuminemia were shown to be statistically significant after multivariate analysis. The fatality rate was significant for children who were admitted with severe dehydration and shock. This group of kids was sicker and most likely had sepsis. Hypoalbuminemia and severe acute malnutrition were linked to a higher risk of death in these patients.

It was observed that RC transfusion in the first 24 hours was seen in 34 and 18, duration of PICU stay was 5.1 days and 4.6 days. The mean inotropes in first 24 hours was needed in 37 and 15, ventilation

in the first 24 hours seen in 36 and 12, albumin was 3.3 mg/dl and 2.1 mg/dl, blood glucose was 98.2 mg/dl and 95.2 mg/dl, blood urea was 66.2 mg/dl and 56.4 mg/dl, creatinine was 0.9 mg/dl and 0.8 mg/dl and in survived and died children respectively. Mushtaq et al [11] determined the risk factors associated with gastroenteritis in children 2-5 years of age. The results showed that 44% of children with gastroenteritis had low socioeconomic status, 25% children had family income <12000 rupees. Nutritional status of children showed that 10% controls and 27% cases were severely malnourished. Wasting was recorded 3% in controls and 10% in cases. The percentage of underweight was 27% and 35% in controls and cases respectively. Stunting was found lower in controls (26%) and higher in cases (46%). Significant difference was found in height for age, mid upper arm circumference and weight for height z-score. Odds ratio (OR) for the association of gastroenteritis with joint family structure was 3.11, weight for height z-score was 3.593, weight for age z-score was 1.456, age of complementary feeding <6 months was 2.405, child eating picked stuff 3.977 child admitted in hospital 1.860, child who does not washed hand before meal was 0.288 and child who does not washed hand after attending washing were 0.288.

Among survived and died patients, family was joint in 36 and 12 and nuclear in 30 and 6 patients respectively. SES was upper in 12 and 4, middle in 26 and 5, and lower in 28 and 7 patients. Education was school going in 45 and 13 and none in 21 and 5, sewage was underground in 59 and 8 and open drain in 7 and 10, child washes hand before meal 61 and 7, child washes hand after washroom 65 and 6 and 57 and 5 uses soap. Sai et al [12] determined the incidence of rotavirus and norovirus associated acute gastroenteritis in Ji'nan among children, to characterize rotavirus and norovirus strains circulating during this period; and to provide useful epidemiological and clinical data. Fecal specimens and clinical data were collected from 767 children (502 outpatients and 265 inpatients) under 5 years of age with acute diarrhea. Of the 767 specimens 263 (34.3%) were positive for rotavirus and 80 (10.4%) were positive for norovirus. Among 263 rotavirus positive cases, G3 (40.7%) was the most prevalent serotype, P[8] (46.8%) was the dominant genotype and G3P[8] (31.9%) was the most common combination.

All of the norovirus strains belonged to GII genogroup including GII.3, GII.4 and GII.6, of which GII.4 (61.2%) was the predominant genotype. Phylogenetic analysis of the GII.4 sequences showed that 18 GII.4 strains belonged to GII.4 2004-2006 cluster and 31 GII.4 strains were divided into GII.4 2006b cluster. A peak number of rotavirus infections were observed during the cold season

from November to next January. Higher rates of norovirus infections were detected from September to November. Most patients with rotavirus and norovirus associated diarrhea experienced vomiting (88.2% and 67.5%, respectively) and fever (79.1% and 46.3%, respectively).

Conclusion

Risk factors of acute gastroenteritis in children found to be low socio-economic status, lack of education, poor sewage system, insufficient hand wash after washroom and non-usage of soaps.

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