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ORIGINAL ARTICLE

Comparison of Glucose ORS with and without Rice Based ORS in Treatment of Acute Gastroenteritis from 6 Month to 5 Years

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ABSTRACT

Introduction: Acute gastroenteritis-related diarrhea is a major contributor to pediatric morbidity and mortality. Although the success of various oral rehydration formulations varies and the treatment of choice ultimately depends on the underlying reason, oral rehydration remains crucial for efficient early therapies.

Objective: To compare outcome of Glucose ORS with and without rice based ORS in treatment of acute gastroenteritis from 6 month to 5 years in terms of mean stool frequency.

Study Design: Randomized clinical trial

Settings: The study will be done at department of Peads Ittifaq Hospital Lahore from 9 December 2018 to 19 June 2019.

Sample Technique: Non probability consecutive sampling

Methodology: Children of both sexes were included in this analysis of gastroenteritis cases between the ages of 6 months and 5 years. They divided into two separate groups. For 48 hours, group A was given G-ORS, whereas group B was given rice soup. Over the course of 48 hours, the typical individual needs to use the washroom.

Results: Eighty people took part in the study (forty in each group). There were 25 males in Group A (40.02%), and 26 in Group B (50.98%). The average ages of those in Group A and Group B were very comparable (3.30±1.18 vs. 2.07±1.03 years, p=0.29). The baseline stool frequency of Group A was 4.11±2.33, while that of Group B was 5.01±2.81 (p= 0.51). Group A also had a higher mean weight, at 6.87±1.97, than Group B, at 6.28±2.01. Group A had an average of 2.15±0.77 bowel movements in 48 hours, while Group B had an average of 2.08±0.73 (p=0.91). The mean frequency was 2.170.78 for males, 2.14±0.69 for females, and 2.11±0.72 for both sexes combined (p=0.91). There were no statistically significant differences in age, BMI over 10, or baseline frequency.

Practical implication: The purpose of this research was to more exactly explain the authentic benefit of rice-based ORS in comparison to glucose ORS and to evaluate whether or not there is significant differences.

Conclusion: Both groups reduced the number of incidences of the confounding variable roughly at the same rate, and there was no statistically significant difference between them either in terms of that reduction or in terms of stratification of any of the study's other confounding variables.

Keywords: G-ORS, Gastroenteritis, Stool frequency, Rice soup

INTRODUCTION

Despite its benign reputation, acute gastroenteritis kills 1.34 million children under the age of 5 every year, accounting for around 15% of all child deaths.[1] Determining whether a person is dehydrated is a critical step in minimizing mortality, as the severity of the condition is proportional to the amount of fluid lost. Fortunately, dehydration in children may be consistently diagnosed with a thorough clinical examination, and the majority of cases can be properly treated with modest, easy treatments.[2,3] Although "dehydration" technically refers to pure water loss, which is linked to euvolemic as well as possibly hypervolemic states in certain pediatric illnesses, throughout this article the term is used in its more general sense to denote total fluid or as volume loss due to diarrhea.[4]

Diarrhea happens when intestinal fluid output exceeds the absorption rate of the gastrointestinal tract, which is why intestinal secretion as well as reabsorption of electrolytes and fluids are so important to human health.[5] Damage to the villous brush borders of the intestine, leading to malabsorption of intestinal contents or osmotic diarrhea, and the absorption of toxins that attach to specific enterocyte receptors, leading to secretory diarrhea, are the two primary processes responsible for acute gastroenteritis.[6,7]

Abdominal discomfort, nausea, tenesmus, vomiting, watery diarrhoea, dehydration (in the event of bacterial aetiology fever), and bloody diarrhoea are some of the clinical symptoms associated with acute gastroenteritis. Pathogens of various kinds, such as bacteria, viruses, and protozoa, can cause acute gastroenteritis.[6,8] Seventy percent to eighty percent of cases of acute gastroenteritis are caused by viruses, with rotavirus and norovirus being the most frequent. After the rotavirus vaccine became widely available, the rates of infection in developed and developing countries were identical. In contrast, in the developing world, due to poor sanitation and unhygienic conditions, there was a higher rate of infection with bacterial and parasitic diseases such as cryptosporidium spp., Entamoeba histolytica, worm infestation, campylobacter spp., shigella, salmonella, and Escherichia coli spp. Dehydration, electrolyte imbalance, hypovolemic shock, and even mortality can result from prolonged diarrhoea. In order to regain hydration and normal physiology, the World Health Organisation (WHO) defines three management strategies, designated as A, B, and C, depending on the severity of the dehydration. Oral rehydration solution (ORS) with a low osmolarity and zinc supplementation are the main topics of these recommendations.[9,25,26]

In any case, acute gastroenteritis is a worldwide health problem that can be mitigated through measures like improved sanitation and increased vaccination rates against AGE-causing viruses and bacteria, water purification, and increased support for breastfeeding and other forms of healthy infant feeding.[27]

There are an estimated 1.7 billion cases of diarrhea annually in children under the age of five. This results in 124 million doctor visits, nine million hospital stays, and 1.34 million deaths. More than 98% of these deaths occur in low- and middle-income countries.[8,9]

In poor countries, rates of death and illness due to digestive issues are disproportionately high. Prompt therapy and management, such as glucose and rice-based ORS, can help decrease this. Probiotics have been found to be useful in the treatment of acute gastroenteritis in the scientific literature from developed countries. The purpose of this study was to evaluate the efficacy of glucose ORS in the treatment of acute gastroenteritis compared to ORS made from rice, as there is a dearth of such information for Pakistan.

Operational Definitions: Acute gastroenteritis: An increase in the number of evacuations (usually three in 24 hours), a change in the form of the stools (loose or liquid), and/or the presence of fever or vomiting within the previous 14 days were all considered symptoms.
Outcome: After 48 hours of treatment, the frequency of stools was assessed

MATERIAL AND METHODS

Study Design: Randomized clinical trial
Settings& Duration: The study will be done at department of Peads Ittifaq Hospital Lahore from 9 December 2018 to 19 June 2019.
Sample Technique: Non probability consecutive sampling will be used
Sample Size:. The frequency of stools at 48 hours is used to estimate a total of 80 cases (40 in each group), with rice-based G-ORS = 2.80±0.76 and 2.18±0.60 in the glucose ORS group keeping 95% confidence interval, 80% power of study.[9]
Inclusion Criteria: Acute gastroenteritis in children 3 months to 5 years of age, of either gender.
Exclusion Criteria: Admitted children who received IV fluids within the last 24 hours. Children with third-degree malnutrition according to the Z-score system, and children with severe dehydration as measured by the WHO categorization of degree of dehydration. Children who have a documented systemic illness with blood in their stools.[23,24]
Data Collection Procedure: Eighty participants were included in the study (forty in each group) after receiving ethics committee approval. After receiving CPSP's permission of the synopsis, the cases were enrolled from the Peads Ittifaq Hospital's Lahore department. All information was collected with the parents' or guardian's express permission. After a thorough medical evaluation, basic information like name, address, and phone number will be collected. Each case was then randomly assigned to either Group-A or Group-B via a lottery system.

Group-A kids received G-ORS, while group-B kids got the same G-ORS procedure plus rice soup (25 mL for kids under 1 and 50 mL for kids over 1) based on per stool output or vomiting. The volume of G-ORS was reduced in relation to the amount of rice soup added so as to not exceed the acceptable amounts for fluid intake. The hospital cook made the rice soup every day for the kids in the hospital. The frequency of bowel movements was quantified using the operational definition. All medication administration and data collection occurred under the watchful eyes of instructors and students. All patients were closely watched for the emergence of any diarrhea complications or worsening, and were effectively managed in accordance with established protocols.
Data Analysis Procedure: SPSS version 22 was used for data entry and analysis. Quantitative data such as age, weight, and the amount of loose stools at 48 hours were expressed as a mean S.D. Categorical information, such as the cases' gender, was expressed as a frequency (in percent). The frequency of bowel movements after 48 hours was compared between the two groups using an independent samples t-test. Data was stratified by age, gender, weight, and baseline stool frequency to exclude any confounding variables. The t-test for independent samples was used after the data was stratified. The cutoff for statistical significance was set at P 0.05.

RESULTS

There were a total of 80 participants in this study (40 in each group). Figure 1 shows that there were 25 males (40.98%) in group A and 26 guys (50.92%) in group B. Group A and B had a mean age of 3.30± 1.18 against 2.07±1.03, respectively (table 6; p= 0.29). Tables 7-8 show that between groups A and B, the average body mass index was 6.87±1.97 kg (p= 0.73) and the average baseline stool frequency was 4.11±2.33 vs 5.01±2.81 per day (p= 0.51).

Table 2 shows that there was no significant difference between groups A and B in terms of stool frequency after 48 hours (2.15±0.77 vs 2.08±0.73). Tables 10 and 11 show that the mean frequency was 2.17±0.78 for men and 2.10±0.71 for women, both with a p=0.91 significance level. Tables 3 and 4 show that there was no statistically significant difference between the two age groups (p= 0.78 and p= 0.88, respectively). Table 5 shows that in cases when the patient's weight was between 1 and 10 kg, group A had a higher frequency of bowel movements than group B (p= 0.34). As can be seen in tables 15–17, there was no statistically significant difference between people who weighed more than 10 kg at baseline and those who weighed less.

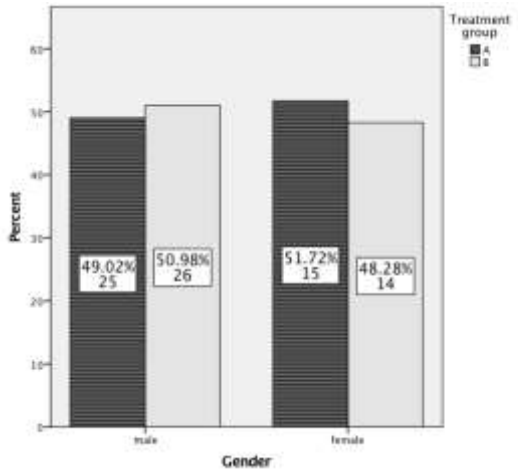

Figure 1: Gender in study subjects, n= 40 in each group

Table 1: age in study subjects, n= 80 (40 in each group)

Variables	Characterstics	Group A	Group B
Age	mean ±SD	3.30±1.18	3.30±1.03
Weight	mean ±SD	6.87±1.97	6.28±2.01
Number of stools at baseline	mean ±SD	4.11±2.33	5.01±2.81
Number of stools at 48 hour	mean ±SD	2.15±0.77	2.08±0.73

Table 2: number of stools at 48 hour with respect to male gender, n= 80 (40 in each group)

Gender	Treatment Group		p-value
	A	B	
Male	2.17±0.78	2.10±0.71	0.91
Female	2.14±0.69	2.11±0.72	0.91

Table 3: Number of stools at 48 hour with respect to age group upto 3 years, n= 80 (40 in each group)

Age	Treatment Group		P-Value
	A	B	
Upto 3 years	2.34±0.81	2.45±0.83	0.78
>3 years	1.97±0.61	2.01±0.68	0.88

Table 4: numer of stools at 48 hour with respect to weight upto 10 kg, n= 80 (40 in each group)

Weight	Treatment Group		p-value
	A	B	
Up to 10 kg	2.98±1.38	2.67±1.11	0.34
>10 kg	1.67±0.97	1.67±0.91	1.0

Table 5: number of stools at 48 hour with respect to baseline stool frequency up to 3, n= 80 (40 in each group)

Baseline stool frequency	Treatment Group		P-Value
	A	B	
Upto 3	1.12±0.56	1.03±0.61	0.88
>3	2.91±2.45	2.87±2.87	0.93

DISCUSSION

Acute gastroenteritis (AGE) is defined by the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition as diarrhea, vomiting, and/or loose or liquid stools with or without fever and/or abdominal pain. AGE is a widespread problem in children that leads to serious complications and morbidity and places a heavy financial burden on our society.Among children younger than 5 years old, AGE ranks as the fourth leading cause of death and the second leading source of morbidity worldwide.[10]

These frequent illnesses have been treated with a wide variety of techniques, including antibiotic and non-antibiotic therapy. Emerging data on acute diarrhea infection treatment, prevention, diagnosis, and outcomes aids in clinical management.[11]

To treat and avoid dehydration, an electrolyte maintenance solution should be used. Its usefulness in mildly dehydrated kids is questionable. Diarrhea may be less of a factor in mortality rates than the availability of oral rehydration salts (ORS) and other nutritional enhancements. Improved sanitation and other preventative measures, like exclusive breastfeeding (which reduces the risk of diarrhea), extended nursing up to 24 months of age, and fortified supplemental feeding are all projected to reduce mortality and illness.[12] Diarrhea and dehydration can be effectively treated with oral rehydration solutions made from either glucose (G-ORS) or rice (R-ORS).[13]

Group A, treated with G-ORS alone, had a mean of 2.15±0.77 stools at 48 hours, while group B, treated with G-ORS and rice soup, had 2.08±0.73 stools per day (p= 0.91 for both). This disparity did not reach statistical significance. These results jive with previous research showing that rice soup, both on its own and in combination with ORS, is effective in reducing the severity and frequency of diarrhea. Stool output frequency was reported to be 4.20 ±0.95 in the G-ROS + rice based therapy group and 8.00±1.37 in the G-ROS only group (P 0.001) within the first 24 hours of treatment, and 2.18±0.60 in the G-ORS + rice based therapy group and 2.80±0.76 in the G-ORS group (P = 0.03) within the second 24 hours of treatment.[13]

R-ORS is effective in the treatment of all forms of gastroenteritis, including cholera, according to results from a randomized clinical trial, but its efficacy does not exceed that of G-ORS.[14] Previous investigations using animal models confirmed these findings; it was seen that gruel- and rice-starch-based groups experienced significantly shorter bouts of diarrhea compared to the control group.[66]

Consistent with these results, another study found no statistically significant difference between two groups who were given either G-ORS or enriched glucose with amylase-resistant starch, despite the fact that G-ORS resulted in a higher frequency of stools.[16] Another study likewise failed to discover a statistically significant difference in diarrhea outcomes between the G-ORS and R-ORS groups.[17] Results were marginally better in the previous trial, but this difference was not statistically significant, suggesting that the type of rice or the amount utilized varied across investigations.

Prior to recent research, such threshold values were not implemented. It's better in cases with higher weight and furthermore, they found that intravenous fluid needed during rehydration was significantly less in the R-ORS group than that in the G-ORS group, probably due to the difference in amount and the procedure followed by the two groups.[18]

There was no statistically significant difference between the sexes in terms of mean frequency (2.17±0.78 for men against 2.10±0.71 for women, p= 0.91 for both) or age ranges (2.1±0.69 for women versus 2.1±0.72 for men). The results were consistent with those of other studies that compared R-ORS and G-ORS in terms of their effects.[19] Another study, however, found no statistically significant difference in the frequency of bowel movements between the two groups.[20] The glucose in rice is digested slowly but absorbed rapidly by the body. The increased water and electrolyte absorption then decreases stool output, shortens the time spent in a diarrheal state, and reduces the need for intravenous fluid replacement. Since all of the glucose in ORS components is already in the small intestine, it doesn't play a significant role in hydration or electrolyte absorption. However, the pectin found in rice absorbs a lot of water in the colon, leading to relatively firm feces.[21] In addition, the children who were given rice soup had shorter hospital stays than the control group. Hospitalization times for the control group decreased as diarrhea episodes became less frequent.[22]

This study has some limitations, such as not assessing the length of hospital stays or the consistent influence of diarrhea or nutrition on the need for fluid resuscitation. Although it was outside the scope of the study, comparing the frequency of stools before and after treatment would have been a crucial factor in drawing conclusions about the effects of the intervention.

There were however many encouraging aspects, as the research brought attention to the importance of rehydration in cases of diarrhea and contrasted commercially available and homemade rice water soup.

CONCLUSION

No statistically significant difference was detected between the two groups or upon stratification of any of the confounding variables of the study, and both groups performed similarly in terms of reducing the frequency of occurrences.

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