Asian Journal of Clinical Pediatrics and Neonatology Original Article

Comparative Efficacy Evaluation of Regular and Probiotic Yoghurts for the Treatment of Acute Watery Diarrhoea in Children at a Tertiary Care Hospital

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Abstract

Background: Acute diarrhea (AD) represents the most prevalent gastroenterological condition and is a leading cause of dehydration among children. This condition predominantly affects children under the age of five. Hence; the present study was conducted for comparative efficacy evaluation of regular and probiotic yoghurts for the treatment of acute watery diarrhoea in children at a tertiary care hospital. **Materials & Methods:** A total of 40 pediatric subjects were enrolled. Only those subjects were enrolled which had history of acute watery diarrhea from the past three days. All the subjects were randomized into two study groups as follows: Regular yogurt group (n=20) and probiotic yogurt group (n=20). The participants were provided with a nutritional diet alongside a low osmolality oral rehydration solution (ORS). Furthermore, those in the regular yogurt group were administered 15 mg/kg of regular yogurt every four to six hours for a duration of five days. Similarly, participants in the probiotic yogurt group received 15 mg/kg of commercially available probiotic yogurt at the same intervals over the five-day period, in addition to the nutritional diet and low osmolality ORS. Outcome was evaluated. All the results were summarized in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** Mean age of the subjects of regular yogurt group and probiotic yogurt group was 10.8 years and 9.7 years respectively. Majority proportion of subjects were boys among these two study groups. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 8.2, 7.5, 4.9, 2.9 and 1.8 respectively. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 7.8, 7.1, 5.3, 2.5 and 2.1 respectively. Significant improvement was seen in both the study groups. However, while making inter-group comparisons at different time intervals, non-significant results were obtained. **Conclusion:** The findings of our study indicate that both probiotic and conventional yogurts exert beneficial effects on the management of acute diarrhea in children. Our results suggest that conventional yogurt may offer similar therapeutic benefits as probiotic yogurt in the treatment of diarrhea.

Key Words: Acute diarrhea, Yogurts.

INTRODUCTION

Acute diarrhea (AD) represents the most prevalent gastroenterological condition and is a leading cause of dehydration among children. It is characterized by the abrupt onset of three or more watery or loose stools per day, persisting for a duration of seven to ten days, with a maximum of fourteen days. This condition predominantly affects children under the age of five, particularly neonates during the latter half of their first year and children up to three years old. The primary etiological factors include gastrointestinal infections, both viral and bacterial, while alimentary intoxications and other causes are less common.[1]

The fundamental clinical features of acute infective diarrhea include a relatively brief incubation period, a sudden onset characterized by frequent episodes of watery or loose stools, and a complete resolution typically occurring within 14 days. Enteritis is marked by the presence of watery stools, particularly after meals, while colitis is associated with stools that may contain mucus or exhibit mucous-hemorrhagic characteristics. Generally, the initial stage of the illness is succeeded by a rise in fever lasting 1-3 days, accompanied by symptoms such as vomiting, decreased appetite, abdominal discomfort and in cases of colitis, a sensation of urgency to defecate and tenesmus. Due to the natural passive immunity obtained prenatally, infants aged six to nine months, especially those who are breastfed, often experience gastrointestinal infections, particularly viral ones, in an asymptomatic manner or with only mild clinical manifestations.[2-4] Given that dehydration and negative nutritional balance are the principal complications associated with AD, it is essential to restore lost body fluids and ensure an appropriate diet as the cornerstone of treatment for affected children.[1,2] Other therapeutic interventions, aside from antipyretics for high fever, antiparasitic medications for intestinal lambliasis, anti-amebic agents, and probiotics, are seldom required. This caution extends to the indiscriminate use of antibiotics and intestinal antiseptics in the management of bacterial diarrhea. The administration of antiemetics, antidiarrheals, and spasmolytics is deemed unnecessary and potentially hazardous, thus not recommended for children experiencing AD.[3-5] Hence; the present study was conducted for comparative efficacy evaluation of regular and probiotic yoghurts for the treatment of acute watery diarrhoea in children at a tertiary care hospital.

METHODS

A total of 40 pediatric subjects were enrolled. Only those subjects were enrolled which had a history of acute watery diarrhea from the past three days. Complete demographic and clinical details of all the subjects were obtained. All the subjects were randomized into two study groups as follows: Regular yogurt group (n=20) and probiotic yogurt group

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(n=20). The participants were provided with a nutritional diet alongside a low osmolality oral rehydration solution (ORS). Furthermore, those in the regular yogurt group were administered 15 mg/kg of regular yogurt every four to six hours for a duration of five days. Similarly, participants in the probiotic yogurt group received 15 mg/kg of commercially available probiotic yogurt at the same intervals over the five-day period, in addition to the nutritional diet and low osmolality ORS. Outcome was evaluated. All the results were summarized in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Chi-square test and student t test was used for evaluation of level of significance.

RESULTS

The mean age of the subjects of regular yogurt group and probiotic yogurt group was 10.8 years and 9.7 year respectively. Majority proportion of subjects were boys among these two study groups. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 8.2, 7.5, 4.9, 2.9 and 1.8 respectively. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 7.8, 7.1, 5.3, 2.5 and 2.1 respectively. Significant improvement was seen in both the study groups. However, while making inter-group comparisons at different time intervals, non-significant results were obtained.

Table 1: Demographic data

Variable	Regular yogurt group	Probiotic yogurt group
Mean age	10.8 years	9.7 years
Boys	12	11
Girls	8	9

Table 2: Frequency of acute diarrhea at different time intervals

Time interval	Regular yogurt group	Probiotic yogurt group	p-value
First day	8.2	7.8	0.230
Second day	7.5	7.1	0.245
Third day	4.9	5.3	0.881
Fourth day	2.9	2.5	0.612
Fifth day	1.8	2.1	0.348
p-value	0.001*	0.001*	-

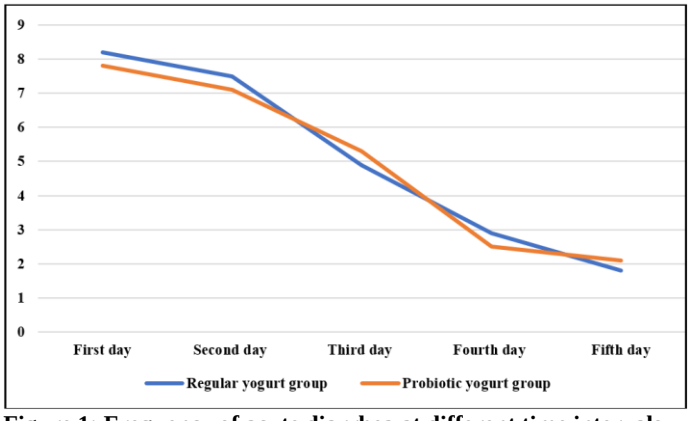

Figure 1: Frequency of acute diarrhea at different time intervals

DISCUSSION

Despite significant declines in diarrhea-related mortality in recent decades, diarrhea and its interconnectedness with undernutrition continue to be prominent contributors to global disability-adjusted life years (DALYs). Annually, diarrhea is responsible for between 1 and 2.5 billion cases of illness and results in approximately 1.5 to 2.5 million fatalities among children under five years of age in developing nations. Additionally, the substantial prevalence of diarrhea and undernutrition during early childhood severely hinders both growth and developmental progress. While most diarrheal episodes are acute, lasting less than 14 days, there exists a specific category known as persistent diarrhea (PD), which begins acutely but lasts for 14 days or more. This condition accounts for a significant portion of diarrhea-related morbidity and mortality. Furthermore, PD is linked to growth delays, deficiencies in micronutrients, impaired neurodevelopment, and heightened morbidity and mortality associated with other childhood illnesses.[6- 9]

Strict adherence to basic hygienic and sanitary measures related to food and water represents the basis in the prevention of alimentary infections and intoxications, and in regard to infections, avoiding contact with the diseased is just as important. Apart from contact with the diseased, rotavirus vaccine is practically the only efficient measure in the prevention of rotavirus gastroenteritis. There is no doubt that breastfeeding is the essential component in the prevention of the development and alleviation of infective diarrhea, particularly viral. Also, probiotics and symbiotics have a significant role in the prevention of Clostridium difficile enterocolitis, and partially in the prevention of rotavirus gastroenteritis.[10] Hence; the present study was conducted for comparative efficacy evaluation of regular and probiotic yoghurts for the treatment of acute watery diarrhoea in children at a tertiary care hospital.

The mean age of the subjects of regular yogurt group and probiotic yogurt group was 10.8 years and 9.7 years respectively. Majority proportion of subjects were boys among these two study groups. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 8.2, 7.5, 4.9, 2.9 and 1.8 respectively. Among regular yogurt groups, frequency of acute diarrhea on the first day, second day, third day, fourth day and fifth day were 7.8, 7.1, 5.3, 2.5 and 2.1 respectively. Significant improvement was seen in both the study groups. However, while making inter-group comparisons at different time intervals, non-significant results were obtained. Canani RB et al compared the efficacy of five probiotic preparations recommended to parents in the treatment of acute diarrhoea in children. Children's parents were randomly assigned to receive written instructions to purchase a specific probiotic product: oral rehydration solution (control group); Lactobacillus rhamnosus strain GG; Saccharomyces boulardii; Bacillus clausii; mix of L delbrueckii var bulgaricus, Streptococcus thermophilus, L acidophilus, and Bifidobacterium bifidum; or Enterococcus faecium SF68. 571 children were allocated to intervention. Median duration of diarrhoea was significantly shorter (P<0.001) in children who received L rhamnosus strain GG (78.5 hours) and the mix of four bacterial strains (70.0 hours) than in children who received oral rehydration solution alone (115.0 hours). One day after the first probiotic administration, the daily number of stools was significantly

lower (P<0.001) in children who received L rhamnosus strain GG and in those who received the probiotic mix than in the other groups. The remaining preparations did not affect primary outcomes. Secondary outcomes were similar in all groups. Not all commercially available probiotic preparations are effective in children with acute diarrhoea. Paediatricians should choose bacterial preparations based on effectiveness data.[11] Fox MJ et al estimated the efficacy of a probiotic yogurt compared to a pasteurized yogurt for the prevention of antibiotic-associated diarrhoea in children. Children (aged 1-12 years) prescribed antibiotics, were randomised to receive 200 g/day of either yogurt (probiotic) containing Lactobacillus rhamnosus GG (LGG), Bifidobacterium lactis (Bb-12) and Lactobacillus acidophilus (La-5) or pasteurized yogurt (placebo) for the same duration as their antibiotic treatment. Stool frequency and consistency were recorded for the duration of treatment plus 1 week. 72 children commenced and 70 children (36 placebo and 34 probiotic) completed the trial. There were no incidents of severe diarrhoea (stool consistency ≥6, ≥3 stools/day for ≥2 consecutive days) in the probiotic group and six in the placebo group (Fisher's exact p=0.025). There was also only one episode of minor diarrhoea (stool consistency ≥5, ≥2 stools/day for ≥2 days in the probiotic group compared to 21 in the placebo group (Fisher's exact p<0.001). The probiotic group reported fewer adverse events (1 had abdominal pain, 1 vomited and 1 had headache) than the placebo group (6 had abdominal pain, 4 had loss of appetite and 1 had nausea). A yogurt combination of LGG, La-5 and Bb-12 is an effective method for reducing the incidence of antibiotic-associated diarrhoea in children.[12]

CONCLUSION

The findings of our study indicate that both probiotic and conventional yogurts exert beneficial effects on the management of acute diarrhea in children. Our results suggest that conventional yogurt may offer similar therapeutic benefits as probiotic yogurt in the treatment of diarrhea.

REFERENCES

1. Guandalini S, Kahn SA. Acute diarrhea. In: Kleinman RE, Sanderson IR, Goulet O, Sherman PM, Mieli-Vergani G, Shneider B, editors. Walker's Pediatric Gastrointestinal Disease. 5th ed. Hamilton: BC Decker Inc; 2008. p.253-64.
2. Koletzko S, Osterrieder S. Acute infectious diarrhea in children. Dtsch Arztebl Int. 2009; 106(33):539-47.
3. Farthing M, Salam MA, Lindberg G, Dite P, Khalif I, Salazar-Lindo E, et al.; WGO. Acute diarrhea in adults and children: a global perspective. J Clin Gastroenterol. 2013; 47(1):12-20
4. Bhutta ZA. Gastroenteritis in children. In: Kliegman RM, Stanton BF, Schol NF, St Geme III JW, Behrman RE, editors. Nelson Textbook of Pediatrics. 19th ed. Philadelphia: Elsevier; 2011. p.1323-39.
5. Guarino A, Albano F, Ashkenazi S, Gendrel D, Hoekstra JH, Shamir R, et al; European Society for Paediatric Gastroenterology, Hepatology; Nutrition/European Society for Paediatric Infectious Diseases. European Society for Paediatric Gastroenterology, Hepatology, and Nutrition/European Society for Paediatric Infectious Diseases evidence-based guidelines for the management of acute gastroenteritis in children in Europe. J Pediatr Gastroenterol Nutr. 2008; 46(Suppl 2):S81-122
6. WHO. The global burden of disease: 2004 update. 2008.
7. UNICEF/WHO. Diarrhoea: Why children are still dying and what can be done. 2009.
8. Kosek M, Bern C, Guerrant RL. The global burden of diarrheal disease, as estimated from studies published between 1992 and 2000. Bull World Health Organ. 2003;81:197–204.
9. Petri WA, Jr, Miller M, Binder HJ, Levine MM, Dillingham R, Guerrant RL. Enteric infections, diarrhea, and their impact on function and development. J Clin Invest. 2008;118:1277–90.
10. Guarner F, Khan AG, Garisch J, Eliakim R, Gangl A, Thomson A, et al; World Gastroenterology Organization. World Gastroenterology Organisation Global Guidelines: probiotics and prebiotics October 2011. J Clin Gastroenterol. 2012; 46(6):468-81
11. Canani RB, Cirillo P, Terrin G, Cesarano L, Spagnuolo MI, De Vincenzo A, Albano F, Passariello A, De Marco G, Manguso F, Guarino A. Probiotics for treatment of acute diarrhoea in children: randomised clinical trial of five different preparations. BMJ. 2007 Aug 18;335(7615):340
12. Fox MJ, Ahuja KD, Robertson IK, Ball MJ, Eri RD. Can probiotic yogurt prevent diarrhoea in children on antibiotics? A double-blind, randomised, placebo-controlled study. BMJ Open. 2015 Jan 14;5(1):e006474.