

Acute Watery Diarrhoea in Children Aged 2 Months to 5 Years: The Role of *Saccharomyces Boularii*

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Abstract

Background: Globally, acute diarrhoea is the second most common cause of mortality in children under the age of five, killing more than 1.5 million of them each year. The objective of the current study was to evaluate the contribution of *Saccharomyces boularii* to acute watery diarrhoea in children between the ages of 2 months and 5 years.

Methods: 140 children between the ages of 2 months and 5 years who had acute watery diarrhoea were split into two groups. Oral rehydration solution (ORS), zinc, and the active ingredient (*S. boulardii*) were given to group I twice daily for five days, while group II only received ORS and zinc. The length of the diarrhoea, as well as the nature and frequency of the faeces, were noted.

Results: 40 males and 30 females made up Group I, while 36 males and 34 females made up Group II. Stool frequency >3 was seen in group I in 70 individuals on day 1, 60 individuals on day 2, 50 individuals on day 3, and 20 individuals on day 4, as well as in 70, 64, 56, 48, and 12 individuals in group II, respectively. The distinction was appreciable ($P < 0.05$). In group I and II, respectively, 70 people had liquid-like stools on day 1, 64 on day 2, 8 on day 4, and 70 on day 1, 66 on day 2, 40 on day 3, 24 on day 4, 16 on day 5, and 2 on day 6. The distinction was appreciable ($P < 0.05$).

Conclusion: The bacteria *Saccharomyces boulardii* reduces the length of diarrhoea and restores normal bowel movements.

Keywords: Diarrhea, Stool, *Saccharomyces Boulardii*

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Introduction

Globally, acute diarrhoea is the second most common cause of mortality in children under the age of five, killing more than 1.5 million of them each year. Around the world, rotavirus is the most prevalent agent and causes the majority of acute diarrhoea in children [1]. Regardless of socioeconomic

level, epidemiological studies have revealed that almost all children under the age of five get at least one rotavirus infection. Around 80% of the 600,000 child deaths caused by rotavirus each year around the world take place in developing nations [2].

Oral rehydration therapy (ORT) and zinc are the cornerstones of treatment for an acute rotavirus diarrhoea episode. ORT has little impact on the length of diarrhoea or the volume of stool produced; instead, it tries to prevent or reverse dehydration. Zinc has been utilised mostly in developing nation settings and is not always successful in treating acute diarrhoea [3].

A probiotic yeast called *Saccharomyces boulardii* directly opposes a variety of diseases [4]. *S. boulardii*'s effectiveness is credited with having a direct inhibitory effect on the growth of pathogenic strains, an anti-secretory effect by specifically binding toxins to intestinal receptors, and a trophic effect on enterocytes with stimulation of enzymatic activity and non-specific anti-infectious mechanisms, such as anti-inflammatory activity. Brush border disaccharidases and enzymes (lactase, sucrase, maltase, and aminopeptidase) are secreted in greater amounts as a result of the polyamine rise caused by *S. boulardii* in humans [5]. Enterocyte maturation is accelerated by the increased release of polyamines. To obtain maximum glucose absorption, polyamines improve the glucose carrier activity on the membrane of enterocytes [6]. The objective of the current study was to evaluate the

contribution of *Saccharomyces boulardii* to acute watery diarrhoea in children between the ages of 2 months and 5 years.

Materials and Methods

The present study was conducted at Pediatrics department of Jannayak Karpuri Thakur Medical College and Hospital, Madhepura, Bihar from July 2022 to January 2023.

It included 140 children with acute watery diarrhoea between the ages of 2 months and 5 years, both genders. Parents were told about the study and given the option to give their written agreement.

Names, ages, genders, and other information were recorded. There were two groups of patients. Oral rehydration solution (ORS), zinc, and the active ingredient (*S. boulardii*) were given to group I twice daily for five days, while group II only received ORS and zinc. Beginning on day 1, the length of the diarrhoea and the nature and frequency of the faeces were noted based on the details provided by the mother or attendant each morning via telephone. Three or more loose stools per day were considered to be a diagnosis of diarrhoea. Thusly obtained results were statistically analysed. P value < 0.05 was regarded as significant.

Results

Table 1: Distribution of patients in both group

Groups	Group I	Group II
Method	<i>S. boulardii</i> +zinc+ ORS	ORS+zinc
M: F	40:30	36:34

Group I contained 40 males and 30 females, whereas group II had 36 males and 34 females, according to Table 1.

Table 2: Regularity of stools in both groups

Day	Group I		Group II		P value
	<3	>3	<3	>3	
1	0	70	0	70	0.88
2	10	60	6	64	0.07
3	20	50	14	56	0.021
4	50	20	42	28	0.21

5	70	0	58	12	0.32
6	70	0	70	0	0.29
7	70	0	70	0	0.51

Table 2 demonstrates that in group I, stool frequency >3 was seen in 70 on day 1, 60 on day 2, 50 on day 3, and 20 on day 4. In group II, the corresponding numbers were 70, 64, 56, 48, and 12. The distinction was noteworthy ($P < 0.05$).

Table 3: Consistency of stools in both groups

Day	Group I		Group II		P value
	Solid	Liquid	Solid	Liquid	
1	0	70	0	70	1.0
2	6	64	4	66	0.06
3	40	30	30	40	1.0
4	62	8	46	24	0.029
5	70	0	54	16	0.010
6	70	0	68	2	0.37
7	70	0	70	0	0.43

According to Table 3, in groups I and II, 70 people experienced liquid-like stools on Day 1, 64 on Day 2, 4 on Day 4, and 70 on Day 1, 66 on Day 2, 40 on Day 3, 24 on Day 4, 16 on Day 5, and 2 on Day 6. The distinction was appreciable ($P < 0.05$).

Discussion

"Probiotics" are live microorganisms that, when given in sufficient quantities, boost the host's health [7]. Numerous paediatric illnesses, such as acute childhood diarrhoea, have been examined with them [8]. Although there are several probiotic strains on the market, *Lactobacillus GG* and *Saccharomyces boulardii* have consistently been shown to be effective and safe in treating acute infantile diarrhoea [9]. The non-pathogenic yeast *Saccharomyces boulardii* (SB) has been shown to exhibit anti-inflammatory, anti-microbial, enzymatic, metabolic, and anti-toxin activities, as well as a trophic effect by improving the metabolic activity of the gut mucosa [10]. The objective of the current study was to evaluate the contribution of *Saccharomyces boulardii* to acute watery diarrhoea in children between the ages of 2 months and 5 years.

In the current study, group I consisted of 40 men and 30 women, while group II contained

36 men and 34 women. The effectiveness of *Saccharomyces boulardii* in treating acute diarrhoea was assessed by Htwe *et al.* [11]. There were 100 kids from Myanmar who were in hospitals. In alternate orders, 50 patients received oral rehydration solution (ORS) alone (control group) and *S. boulardii* treatment for five days. In the *S. boulardii* group, diarrhoea lasted an average of 3.08 days, while it lasted 4.68 days in the control group ($P < 0.05$). On day 3, 38 (76%) of the 50 patients in the *S. boulardii* group and only 12 (24%) of the 50 patients in the control group had normal-consistency stools. On day 2, 27 (54%) of 50 individuals in the *S. boulardii* group and only 15 (30%) of 50 individuals in the control group had less than three stools per day.

The bacteria *Saccharomyces boulardii* reduces the length of diarrhoea and restores normal bowel movements. The length of diarrhoea is reduced, which has positive social and economic effects.

We discovered that in group I, 70 individuals had a stool frequency greater than three on day one, 60 on day two, 50 on day three, and 20 on day four. In group II, the numbers were 70, 64, 56, 48, and 12, respectively. *Saccharomyces boulardii* (SB) has been examined for its effectiveness and safety in treating acute rotavirus diarrhoea in children by Das *et al.* [12]. Randomization was used to divide the 60 children (3 months to 5 years old) with acute watery diarrhoea and positive rotavirus smears into the intervention (n 14 ¼ 30) and control (n 14¼ 30) groups. SB was given to the intervention group (500 mg/day) for 5 days. In the intervention group, the median number of hours spent with diarrhoea was significantly lower.

The intervention group also experienced much less hospitalisation time, however there was no discernible difference in the incidence of fever or vomiting. The proportion of children who required parenteral rehydration and the persistence of diarrhoea lasting longer than 7 days did not differ between the two groups either. There were no adverse events reported.

Conclusion

In children with acute gastroenteritis, *Saccharomyces boulardii* is beneficial in lowering the amount of time spent in the hospital and the duration of the diarrhoea. In the *Saccharomyces boulardii* group, we observed a shorter duration of diarrhoea, a lower mean frequency of stools, and improved stoma consistency. Compared to the youngsters from the other group, those treated with *Saccharomyces boulardii* had hospital stays that were much shorter.

References

1. Szajewska H, Guarino A, Hojsak I, et al. European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. Use of probiotics for management of acute gastroenteritis: a position paper by the ESPGHAN Working Group for Probiotics and Prebiotics. *J Pediatr Gastroenterol Nutr.* 2014; 58:531-9.
2. Kelesidis T, Pothoulakis C. Efficacy and safety of the probiotic *Saccharomyces boulardii* for the prevention and therapy of gastrointestinal disorders. *Therap Adv Gastroenterol.* 2012; 5:111-25.
3. Grandy G, Medina M, Soria R, et al. Probiotics in the treatment of acute rotavirus diarrhoea. A randomized, double-blind, controlled trial using two different probiotic preparations in Bolivian children. *BMC Infect Dis.* 2010; 10:253.
4. Correa NB, Penna FJ, Lima FM, et al. Treatment of acute diarrhea with *Saccharomyces boulardii* in infants. *J Pediatr Gastroenterol Nutr.* 2011; 53:497-501.
5. Erdogan O, Tanyeri B, Torun E, et al. The comparison of the efficacy of two different probiotics in rotavirus gastroenteritis in children. *J Trop Med.* 2012; 2012:787240.
6. Guarino A, Berni Canani R, Spagnuolo MI, et al. Oral bacterial therapy reduces the duration of symptoms and of viral excretion in children with mild diarrhea. *J Pediatr Gastroenterol Nutr.* 1997; 25: 516-19.
7. Bonett DG, Price RM. Statistical inference for a linear function of medians: confidence intervals, hypothesis testing, and sample size requirements. *Psychol Methods.* 2002; 7:370-83.
8. Feizizadeh S, Salehi-Abargouei A, Akbari V. Efficacy and safety of *Saccharomyces boulardii* for acute diarrhea. *Pediatrics.* 2014; 134:176-91.
9. Wilhelmi I, Roman E, Sanchez-Fauquier A. Viruses causing gastroenteritis. *Clin Microbiol Infect.* 2003; 9:247-62.

10. Tate JE, Chitambar S, Esposito DH, et al. Disease and economic burden of rotavirus diarrhoea in India. *Vaccine*. 2009;27: F18-24.
11. Htwe K, Yee KS, Tin M, Vandenplas Y. Effect of *Saccharomyces boulardii* in the treatment of acute watery diarrhea in Myanmar children: a randomized controlled study. *The American journal of tropical medicine and hygiene*. 2008;78(2):214-6.
12. Das S, Gupta PK, Das RR. Efficacy and safety of *Saccharomyces boulardii* in acute rotavirus diarrhea: double-blind randomized controlled trial from a developing country. *Journal of tropical pediatrics*. 2016;62(6):464-70.