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Role of *saccharomyces boularii* in acute watery diarrhea in children between 2 months- 5 years

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Abstract

Background: Acute diarrhea kills more than 1.5 million children under 5 years of age every year globally, and is the second most common cause of death in this age group. The present study was conducted to assess the role of *saccharomyces boularii* in acute watery diarrhea in children between 2 months- 5 years.

Materials & Methods: 70 children of acute watery diarrhea between 2 months- 5 years were divided into 2 groups. Group I received the active product (*S. boulardii*) 250 mg twice a day for 5 days and oral rehydration solution (ORS) and zinc and group II received ORS and zinc only. The duration of diarrhea and consistency and frequency of stools were recorded.

Results: Group I had 20 males and 15 females and group II had 18 males and 17 females. In group I, stool frequency >3 was seen in 35 on day 1, 30 on day 2, 25 on day 3, 10 on day 4 and in 35, 32, 28, 24 and 6 in group II respectively. The difference was significant ($P < 0.05$). The stool consistency liquid was seen in 35 on day 1, 32 on day 2, 4 on day 4 and 35 on day 1, 33 on day 2, 20 on day 3, 12 on day 4, 8 on day 5 and 1 on day 6 in group I and II respectively. The difference was significant ($P < 0.05$).

Conclusion: *Saccharomyces boulardii* shortens the duration of diarrhea and normalizes stool consistency and frequency.

Keywords: Diarrhea, stool, *Saccharomyces boulardii*

Introduction

Acute diarrhea kills more than 1.5 million children under 5 years of age every year globally, and is the second most common cause of death in this age group. Mostly acute diarrhea in children is of viral origin, and the commonest agent being rotavirus, worldwide [1]. Epidemiological studies have shown that nearly all children under five suffer at least one rotavirus infection, irrespective of the socio-economic status. Globally, rotavirus causes approximately 600 000 deaths in children per year, around 80% of which occur in developing countries [2].

The mainstay of treatment of an acute rotavirus diarrhea episode includes oral rehydration therapy (ORT) and zinc. ORT aims to prevent or reverse dehydration, and has no effect either on the duration of diarrhea or on the stool output. Zinc is not universally effective in the treatment of acute diarrhea, and has been used mainly in developing country settings [3].

Saccharomyces boulardii is a probiotic yeast that has a direct antagonistic effect on many pathogens [4]. The efficacy of *S. boulardii* is attributed to 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. The polyamine increase induced by *S. boulardii* in humans results in an increased secretion of brush border disaccharidases and enzymes (lactase, sucrase, maltase, and aminopeptidase) [5]. The increased secretion of polyamines enhances maturation of enterocytes. Polyamines increase the glucose carrier activity on the membrane of enterocytes, which is essential to achieve maximal glucose absorption [6]. The present study was conducted to assess the role of *saccharomyces boularii* in acute watery diarrhea in children between 2 months- 5 years.

Materials and Methods

The present study was conducted at postgraduate Department of pediatrics Govt Medical College Srinagar from April 2018 to October 2018.

It comprised of 70 children of acute watery diarrhea between 2 months- 5 years of both genders. Parents were informed regarding the study and their written consent was obtained. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I received the active product (*S. boulardii*) 250 mg twice a day for 5 days, zinc and oral rehydration solution (ORS) and group II received ORS and zinc only. The duration of diarrhea and consistency and frequency of stools were recorded according to the information provided by the mother or attendant every morning telephonically starting from day 1. Diarrhea was defined as passing three or more loose stools per day. Results thus obtained were subjected to statistical

analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

Groups	Group I	Group II
Method	<i>S. boulardii</i> +zinc+ ORS	ORS+zinc
M:F	20:15	18:17

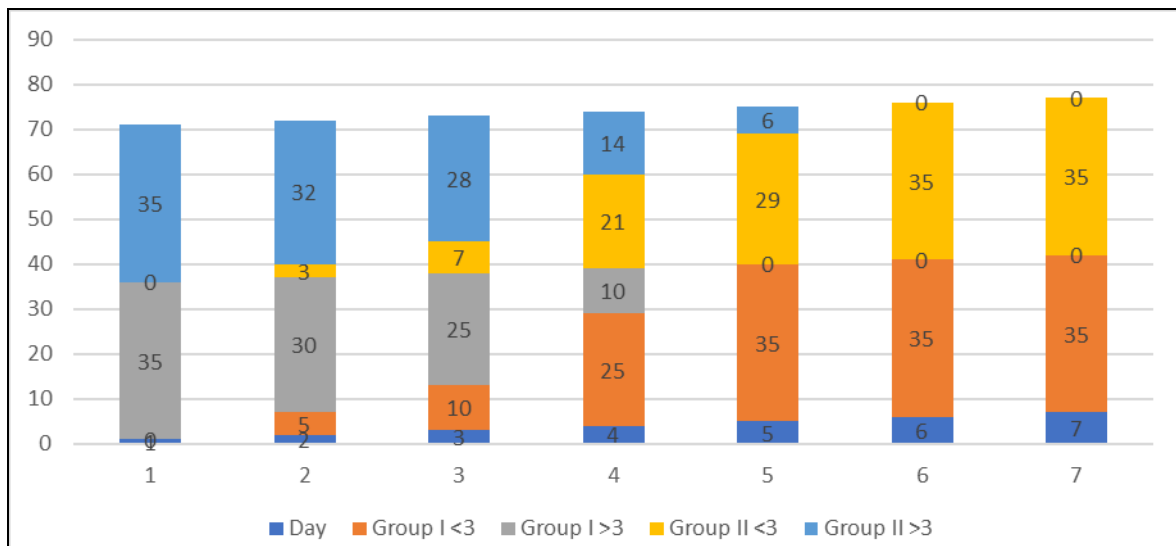
Table 1 shows that group I had 20 males and 15 females and group II had 18 males and 17 females.

Table 2: Stool frequency in both groups

Day	Group I		Group II		P value
	<3	>3	<3	>3	
1	0	35	0	35	0.90
2	5	30	3	32	0.05
3	10	25	7	28	0.02
4	25	10	21	14	0.12
5	35	0	29	6	0.25
6	35	0	35	0	0.31
7	35	0	35	0	0.45

Table 2, graph I shows that in group I, stool frequency >3 was seen in 35 on day 1, 30 on day 2, 25 on day 3, 10 on

day 4 and in 35, 32, 28, 24 and 6 in group II respectively. The difference was significant ($P < 0.05$).



Graph I: Stool frequency in both groups

Table 3: Stool consistency in both groups

Day	Group I		Group II		P value
	Solid	Liquid	Solid	Liquid	
1	0	35	0	35	1
2	3	32	2	33	0.04
3	20	15	15	20	1
4	31	4	23	12	0.03
5	35	0	27	8	0.01
6	35	0	34	1	0.35
7	35	0	35	0	0.41

Table 3 shows that stool consistency liquid was seen in 35 on day 1, 32 on day 2, 4 on day 4 and 35 on day 1, 33 on day 2, 20 on day 3, 12 on day 4, 8 on day 5 and 1 on day 6 in group I and II respectively. The difference was significant ($P < 0.05$).

Discussion

Probiotics are live microorganisms, which when administered in adequate amounts confer a health benefit on the host [7]. They have been studied in many pediatric diseases including acute childhood diarrhea [8]. There are different probiotic strains available in the market, but the efficacy and safety of *Lactobacillus GG* and *Saccharomyces boulardii* has been consistently established in acute childhood diarrhea [9]. *Saccharomyces boulardii* (SB) is a non-pathogenic yeast that have demonstrated an anti-inflammatory, anti-microbial, enzymatic, metabolic and anti-toxin activity including trophic effect by enhancing the metabolic function of the gut mucosa [10]. The present study was conducted to assess the role of *saccharomyces boularii* in acute watery diarrhea in children between 2 months- 5 years.

In present study, group I had 20 males and 15 females and group II had 18 males and 17 females. Htwe *et al.* ^[11] evaluated the efficacy of *Saccharomyces boulardii* in acute diarrhea. One hundred hospitalized children in Myanmar were included. Fifty were treated with *S. boulardii* for five days in addition to oral rehydration solution (ORS) and 50 were given ORS alone (control group) in an alternating order. The mean duration of diarrhea was 3.08 days in the *S. boulardii* group and 4.68 days ($P < 0.05$) in the control group. Stools had a normal consistency on day 3 in 38 (76%) of 50 patients in the *S. boulardii* group compared with only 12 (24%) of 50 in the control group. On day 2, 27 (54%) of 50 had less than three stools per day in the *S. boulardii* group compared with only 15 (30%) of 50 in the control group. *Saccharomyces boulardii* shortens the duration of diarrhea and normalizes stool consistency and frequency. The shortening of the duration of diarrhea results in a social and economic benefits.

We found that in group I, stool frequency >3 was seen in 35 on day 1, 30 on day 2, 25 on day 3, 10 on day 4 and in 35, 32, 28, 24 and 6 in group II respectively. Das *et al.* ^[12] studied the efficacy and safety of *Saccharomyces boulardii* (SB) in acute childhood rotavirus diarrhea. Children (3 months to 5 years) with WHO-defined acute watery diarrhea and stool rotavirus positive ($n = 60$) were randomized into intervention ($n = 30$) and control ($n = 30$) groups. The intervention group received SB (500 mg/day) for 5 days. The median duration (hours) of diarrhea was significantly shorter in the intervention group. A significantly shorter duration of hospitalization was also seen in the intervention group, but no significant difference was seen for fever and vomiting. There was also no difference between the two groups in the proportion of children requiring parenteral rehydration and persistence of diarrhea lasting beyond day 7. There was no report of any adverse event.

Conclusion

Authors found that *Saccharomyces boulardii* shortens the duration of diarrhea and normalizes stool consistency and frequency.

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