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Role of Probiotics Saccharomyces Boulardii in The Management of Acute Watery Diarrheas in Children

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Abstract

Objective: To determine role of probiotics saccharomyces Boulardii in management of acute watery diarrhea in children

Methods: The study was conducted on 64 children in Bahawal Victoria Hospital's pediatrics wards in Bahawalpur. This was placebo controlled randomized control trial. Ethical issue was solved by taking permission from the institutional committee. Informed consent from parents or guardians were taken of every child. All children with age from two months to twelve years, who presented with acute watery diarrhea, were recruited by non-probability consecutive sampling and were divided into two groups by lottery method. Group A was treated by recommended WHO protocol plus saccharomyces Boulardii (250mg twice a day orally for three days). Group B was treated with recommended WHO protocol plus placebo. Whole data of study was processed by SPSS volume 23. All the numerical variables in study were statistically calculated and analyzed in their mean values and standard deviation and t test was used to determine the significance. similarly, all qualitative variables in study were analyzed by percentage and frequency and significance were checked by applying chi square test. A significance is considered when p value was $\leq$0.05.

Results: . The mean age and weight of the patients of group A was 22.25±10.09 months and 8.65±2.84 kg respectively. There were 68.8% (n=22) boys and 31.2% (n=10) girls. While, the mean age and weight of the patients of group B was 25.81±6.75 months and 9.46±2.62 kg respectively. There were 56.2% (n=18) boys and 43.8% (n=14) girls. Bacteria isolated noted as 68.8% (n=22) and 18.8% (n=6) for the group A and B respectively. Mean number of stools reported on d 0, mean number of stools reported on d 3 and duration of diarrhea (d) of the patients of group A was 10.25±1.03, 2.72±1.82 and 3.16±1.80 days respectively. While, the Mean number of stools reported on d 0, mean number of stools reported on d 3 and duration of diarrhea (d) of the patients of group B was 9.33±1.25, 4.66±1.55 and 4.95±1.11 days respectively. The differences were statistically significant among the groups at (p=0.000).

Conclusion: Study concluded that use of probiotics saccharomyces Boulardii is significantly associated with reduction of duration and frequency of diarrhea. It should be used with oral rehydration in treating acute watery diarrhea. It can result in early recovery.

Key words: saccharomyces Boulardii, diarrhea, children, probiotics

Introduction

About two million deaths in whole world are caused by acute watery diarrhea in every single calendar year[1]. One of the main reason of childhood mortality and morbidity in Pakistan is gastrointestinal diseases[2]. Approximately two Lakhs children die every year because of diarrhea. In our country every child develops five to six episodes of diarrhea in each year. Recurrent development of diarrhea result in under nutrition[3]. Acute watery diarrhea is mainly treated by correcting dehydration rapidly[4]. Role of probiotics, as add on therapy, has shown reduction in time of infection about 24 hours in gastroenteritis with acute infection. Results of studies has shown significant advantage of using these probiotics in treating watery acute diarrhea majorly in young children and infants[5]. Strains are specific, that's why these are recommended for such organisms which are tested clinically. In last twenty years there has been lot of improvement regarding understanding of pathophysiology and simple management of diarrhea[6]. In different regions of the world, different interventions have been applied to reduce

the mortality and morbidity associated with diarrhea[7]. Some of these modalities are anti-emetics, anti-spasmolytic, anti-diarrheal agents, antibiotics and oral rehydration salts. Some of these interventions result in untoward effects such as increase worsening, increase duration and development of paralytic ileus. Also there have been reports about effects on other systems as well.

For long time, yogurt has been used (as probiotic) to treat diarrhea[8]. Probiotics have been recognized as most effect way to influence flora of the gut. Basically probiotic is living organism which promotes the health by preventing or treating the infection. The basis of using probiotics is that it maintains the balance of normal gut flora[9]. Studies have been done to use probiotics to treat diarrhea. It has shown beneficial in various kind of diarrhea such as viral, antibiotic associated and recurrent diarrhea due to *clostridium difficile*. Some agents like lactobacillus GG, lactobacillus reuteri and saccharomyces Boulardii play a role in course of acute watery diarrhea. Among these Boulardii is yeast and others are bacteria.

Saccharomyces Boulardii directly inhibit the pathogen[10]. It achieves its effect by inhibiting the growth, by its anti-secretary effect and by its anti-infectious effect. It causes increase secretion of polyamine which in turn enhances the enterocytes maturation. It also causes enterocyte's membrane to enhance its activity of carrying glucose that is necessary for absorption of glucose. It also stimulates the immune system in intestinal mucosa.

Locally the data is limited regarding use of saccharomyces Boulardii in treatment of acute watery diarrhea. So the purpose of study is to investigate any beneficial effect of this probiotic in treatment of diarrhea. This research will create awareness regarding this topic and will also establish some facts locally, which will encourage further research.

Materials and methods

The study was conducted on 64 children in Bahawal Victoria Hospital's pediatrics wards in Bahawalpur.. This was placebo controlled randomized control trial. Ethical issue was solved by taking permission from the institutional committee. Informed consent from parents or guardians were taken of every child. All children with age from two months to twelve years, who presented with acute watery diarrhea, were recruited by non-probability consecutive sampling and were divided into two groups by lottery method. Group A was treated by recommended WHO protocol plus saccharomyces Boulardii (250mg twice a day orally for three days). Group B was treated with recommended WHO protocol plus placebo. Exclusion criteria of investigation were 1) severe diarrhea and severe dehydration 2) children with temperature above 39 C3) children with inter-current illness 4) children with severe malnourishment and finally 5) children with history of treatment for diarrhea in last twenty-four hours. Sample size of the study was calculated by using WHO calculator of sample size for proportion size difference

All children who presented with acute watery diarrhea were evaluated with complete history and physical examination. Patients fulfilling the criteria were enrolled. After dividing into groups, group A was treated with saccharomyces Boulardii 250mg two times a day with other recommended treatment of world health organization. Group B was only managed by protocol recommended by world health organization. All children were examined at day 0 and day three. Primary outcome of study was number of stools at day 3. Secondary outcome was duration of diarrhea in both groups.

Whole data of study was processed by SPSS volume 23. All the numerical variables in study were statistically calculated and analyzed in their mean values and standard deviation and t test was used to determine the significance. similarly, all quantitative variables in study were analyzed by percentage and frequency and significance were checked by applying chi square test. A significance is considered when p value was ≤ 0.05.

Results

Overall, 100% (n=64) patients were enrolled in this study, both genders. The study patients were further divided into two equal groups i.e. Group A and Group B. The mean age and weight of the patients of group A was 22.25±10.09 months and 8.65±2.84 kg respectively. There were 68.8% (n=22) boys and 31.2% (n=10) girls. While, the mean age and weight of the patients of group B was 25.81±6.75 months and 9.46±2.62 kg respectively. There were 56.2% (n=18) boys and 43.8% (n=14) girls. Bacteria isolated noted as 68.8% (n=22) and 18.8% (n=6) for the group A and B respectively. Not isolated noted as 28.1% (n=9) and 84.4% (n=27) for the group A and B respectively. While, Rota Virus observed as 21.9% (n=7) and 28.1% (n=9) for the group A and B respectively. The differences were statistically insignificant except bacteria isolated (p=0.000) and not isolated (p=0.000). (Table. 1).

Mean number of stools reported on d 0, mean number of stools reported on d 3 and duration of diarrhea (d) of the patients of group A was 10.25±1.03, 2.72±1.82 and 3.16±1.80 respectively. While, the Mean number of stools reported on d 0, mean number of stools reported on d 3 and duration of diarrhea (d) of the patients of

group B was 9.33±1.25, 4.66±1.55 and 4.95±1.11 respectively. The differences were statistically significant among the groups at (p=0.000). (Table. 2).

Table. 1
Demographic and Baseline characteristics among the study groups

Variables	Group A (n=32)	Group B (n=390)	P value
Age (months)	22.25±10.09	25.81±6.75	**0.102**
Weight (kg)	8.65±2.84	9.46±2.62	**0.240**
Gender	B=68.8%, G=31.2%	B=56.2%, G=43.8%	**0.302**
Bacteria isolated	68.8% (n=22)	18.8% (n=6)	**0.000**
Not isolated	28.1% (n=9)	84.4% (n=27)	**0.000**
Rota virus	Positive=21.9% (n=7) Negative=78.1% (n=25)	28.1% (n=9), Negative=71.9% (n=23)	**0.564**

Table. 2
Mean numbers of stools and duration of diarrhea

Variables	Group A (n=32)	Group B (n=390)	P Value
Mean number of stools on d 0	10.25±1.03	9.33±1.25	**0.000**
Mean number of stools on d 3	2.72±1.82	4.66±1.55	**0.000**
Duration of diarrhea (d)	3.16±1.80	4.95±1.11	**0.000**

Discussion

Results of study showed that in group of children who were using saccharomyces Boulardii in addition to other recommended treatment had less number of stools at day three and also mean duration of diarrhea in this group was also significantly lower in comparison to other group who was treated just with conventional recommended treatment of world health organization. Mean number of stools in probiotic group were 2.7 as compared to 4.66 in group B. this was significant different. Duration of diarrhea was almost 5 days in group B than 3 days in group B.

Many mechanisms had been proposed to the antimicrobial activity of saccharomyces Boulardii, but yet it is not fully clear. One of this mechanism is that it inhibits invasion and growth of microorganism.[11] in animal study conducted by Geyik et al. showed that probiotic saccharomyces Boulardii was associated with decrease gut translocation of bacteria and barrier mechanism of intestine was enhanced.[12] in other study by Pothoulakis et al. showed that serine protease 54-kDa was secreted by probiotics caused inhibition of clostridium to bind with intestine.[13]

Study done by Burande MA et al. reported that if we add saccharomyces Boulardii in treating acute watery diarrhea it causes reduction in duration of diarrhea.[14] Study done by Pozzoni P et al. reported that saccharomyces boulardii was not associated with prevention of antibiotic associated diarrhea[15]

Billoo AG et al. conducted a study in 2006 to determine the efficacy of saccharomyces Boulardii in treatment of acute watery diarrhea and it was reported that this probiotic was significantly associated with reduction of duration and frequency of acute watery diarrhea.[16] In study done by Urganci N et al. concluded that saccharomyces boulardii can be added with oral rehydration in treating acute watery diarrhea.[17] In a study by Erdeve O et al. reported that saccharomyces Boulardii also prevented antibiotic associated diarrhea.[18]This finding was also supported with another study which showed that it prevented antibiotic associated diarrhea.[19] In one randomized trial saccharomyces Boulardii was compared with fresh yogurt in treating acute non bloody diarrhea. It reported that probiotic was associated with shorter duration as compared to fresh yogurt[20].

Limitation of study included its sample size which was not so enough that its results could not be generalized. Also it was single center study which dealt with pediatrics population of a specific geographical area. Study was followed for a short time in patients so long term effects of probiotics were not evaluated.

Conclusion

Study concluded that use of probiotics saccharomyces Boulardii is significantly associated with reduction of duration and frequency of diarrhea. It should be used with oral rehydration in treating acute watery diarrhea. It can result in early recovery.

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