

Original Research Article

Role of yogurt in children having diarrhea and severe acute malnutrition at Nutrition Stabilization Center Hyderabad

Abstract:

Aim: The aim of conducting this study is to evaluate the role of yogurt in the dietary management of diarrhea in the severe malnourished children.

Study Design: Observational prospective study

Place and duration: Nutrition Stabilization Center, Department of Pediatrics
Civil Hospital Hyderabad from 1st July 2018 to 31st December 2018

Methodology: A total of 100 children with severe acute malnutrition and Diarrhea, age 6 months to 5 years were enrolled. After admitting children were treated with yogurt instead of fluids, f-75 and ORS. Within 7 days of admission we observed and recorded that children tolerated the breast milk and yogurt, clinically improvement, General condition, Edema, Sunken eyes, Thirst, Skin pinch, Weight gain and Social response of baby. Chi-square test was also applied to observe the difference efficacy of yogurt in diarrhea in


children suffering from malnutrition. P-value ≤ 0.05 was considered as significant.

Results: Most of the children were 13 to 48 months of age. The average age and weight of the children was 32.04 ± 13.53 months and 5.23 ± 1.39 kg respectively. Average number of stool was significantly reduced at day 1 and day 5. Overall it was observed that efficacy of yogurt in diarrhea in children suffering from malnutrition was 69%

Conclusion: This study suggest that yogurt-based diet is effective in treating diarrhea in severely acute malnourished children. It should be granted priority in the nutritional management of severe malnutriated children affected by diarrhea.

Keywords: Malnutrition, Yogurt, Children, Diarrhea

Introduction

Diarrhea in severely malnourished children is a life threatening and is difficult to manage. Diarrhea causes malnutrition by slowing or lessen nutrient absorption or making children to take less food, which causes more demand or wastage of nutrients. Main cause of diarrhea in developing countries is absence of sanitation and hygiene. Globally diarrhea is a leading cause of mortality in children. 

Diarrhea kills 760,000 children every year.² Diarrhea mostly results from contaminated food and water sources.³ Malnourished children are most at risk of lethal diarrhea.⁴

About 50% children in South Asia (Pakistan, India, and Bangladesh) are malnourished.⁵ Pakistan, has the second highest child mortality rate in South Asia.⁶ In most cases malnutrition is the cause of high infant and under five child mortality.⁷ “As per the National Health Survey of Pakistan, one out of every three children is malnourished”⁸.

Yogurt has been used traditionally in children as it is good source of energy rich protein and other nutrients than do other foods.⁹ Yogurt is healthy food made by fermentation of bacteria in milk. Yogurt is easily palatable for children. Yogurt contains probiotics which enhances its actions in maintenance of bacteria necessary for healthy digestive system. It provides depleted good bacteria in the gut that helps to firm bowel movement.

F-75 is milk commonly given in the management of severe acute malnutrition having diarrhea but is not commonly available and is not economic. Easily available and economic thing is Yogurt. Yogurt is often easier to tolerate than milk and other feed and is a good source of complete or high-quality zinc and calcium¹⁰

Previous studies conducted on role of Low osmolar ORS, F-75, Low lactose milk, Lactose free diet in diarrhea has been done. The aim of conducting this

study is to evaluate the role of yogurt in the dietary management of diarrhea in the severe malnourished children.

MATERIAL & METHODS

This Observational prospective study was conducted with Non-probability convenience sampling technique at the indoor NSC Department of Pediatrics Civil Hospital Hyderabad from 1st July 2018 to 31st December 2018. A sample size of 100 patient required calculated by the exact 95% confidence interval. Children with severe acute malnutrition and Diarrhea, age 6 months to 5 years were enrolled.

Children having severe acute malnutrition and Diarrhea with other serious complications like meningitis, cerebral palsy, coeliac disease and parenteral infections were excluded from the study. Permission was taken from the ethical review committee of university. Severe **Acute malnutrition is defined as wasting and/or edematous condition in which MUAC < 11.5 mm or presence of bilateral pitting edema or Z score <-3SD and diarrhea is defined as the passage of three or more loose or liquid stools per day.**

Children suffering from Malnutrition along with diarrhea attending the pediatrics OPD and ward fulfilling the inclusion criteria were registered after taking informed verbal consent from the mothers. Variables included demographic details like name, age, sex and address, symptomatology like general physical examination, weight for height, dehydration status. After

admitting children were treated with yogurt instead of fluids, f-75 and ORS.

Children were given 100 gram of yogurt three times a day. Within 7 days of admission we observed and recorded that children tolerated the breast milk and yogurt, clinically improvement, General condition, Edema, Sunken eyes, Thirst, Skin pinch, Weight gain and Social response of baby. All the information was collected into predesigned proforma which was filled by the investigator herself.

A statistical package for social science (SPSS-22) was used to analyze data. Frequency and percentages were calculated for categorical variables like gender, anemia, assessment of diarrhea, feeding history, diarrhea with dehydration status and categorical outcome. Mean and standard deviation were computed for quantitative variables like age, weight, clinical examination and numeric outcomes. Paired sample t test was applied to observe mean difference in number of stool among three different time (1,3 and 5 days), similarly McNemar and marginal homogeneity test was used to compare the difference in categorical outcome like vomiting, consistency, dehydration status among three different time point. Chi-square test was also applied to observe the difference efficacy of yogurt in diarrhea in children suffering from malnutrition. P-value ≤ 0.05 was considered as significant.

RESULTS

A total of 100 children with severe acute malnutrition and diarrhea were included in this study. Most of the children were 13 to 48 months of age as shown in table 1. The average age and weight of the children was 32.04 ± 13.53 months and 5.23 ± 1.39 kg respectively. There were 52% male and 48% female as shown in table 2. About 20% children had anemia as shown in table 1. Assessment of diarrhea was also done in term of number of stool per day, consistency, blood in stool and duration of diarrhea as presented in table 2. Regarding the history of feeding of children, breast feeding was observed in 40% children and average feeding per day was 5.83 ± 2.14 days.

Role of yogurt in dietary management of diarrhea in severe malnutrition children in term of average number of stools, frequency of vomiting status, consistency and dehydration status as well as feeding status according to day1, day-2 and day-5 were observed and shown in table 3, table 4 and 5 respectively. Average number of stool was significantly reduced at day 1 and day 5 as shown in figure 1. Overall it was observed that efficacy of yogurt in diarrhea in children suffering from malnutrition was 69% as shown table 1. At the end of the treatment, Number of stools, Vomiting, Consistency, and Dehydration were observed low.

TABLE 1

DESCRIPTIVE STATISTICS OF DEMOGRAPHIC AND CLINICAL
EXAMINATION OF CHILDREN n=100

Variables	Mean	Std. Deviation
Age (Months)	32.04	13.53
Weight (kg)	5.23	1.39
Gender	percentage	
Male	52	
Female	48	
Anemia present	20	
Yogurt was effective	69*	

* P-Value = 0.0005

Table 2:- Assessment of Diarrhea

Number of stools per days	
Mean \pm SD	12.76 \pm 1.77
Max-Min	16-8
Consistency	
Watery	73%
Semi Solid	26%
Mucoid	1%
Blood in stool	27%
Duration of diarrhea (days)	
Mean \pm SD	4.62 \pm 1.57
Max-Min	10-3

TABLE 3

ROLE OF YOGURT IN DIETARY MANAGEMENT OF DIARRHEA IN SEVERE
MALNUTRITION CHILDREN IN TERM OF VOMITING
STATUS ACCORDING TO FOLLOW-UP

n=100

Vomiting	Day-I	Day-III	Day-V
Zero	61%	71%	90%
1-2	30%	24%	8%
3-5	9%	5%	2%

McNemar test applied

Day -I vs. Day-III p=0.450

Day- I vs. Day-V p=0.0008

Day-III vs. Day-V p=0.002

TABLE 4

ROLE OF YOGURT IN DIETARY MANAGEMENT OF DIARRHEA IN SEVERE
MALNUTRITION CHILDREN IN TERM OF CONSISTENCY ACCORDING TO FOLLOW-
UP

n=100

Consistency	Day-I	Day-III	Day-V
Watery	76%	71%	53%
Semisolid	20%	23%	31%
Mucoid /Bloody	4%	4%	4%
Normal	0%	2%	12%

Marginal Homogeneity Test

Day -I vs. Day-III p=0.204

Day- I vs. Day-V p=0.0005

Day-III vs. Day-V p=0.0005

TABLE 5

ROLE OF YOGURT IN DIETARY MANAGEMENT OF DIARRHEA IN SEVERE
MALNUTRITION CHILDREN IN TERM OF DEHYDRATION STATUS ACCORDING TO
FOLLOW-UP

n=100

Dehydration status after treatment	Day-I	Day-III	Day-V
No	0%	65%	89%
Some	41%	25%	9%
Severe	59%	10%	02%

Marginal Homogeneity Test

Day -I vs. Day-III p=0.680

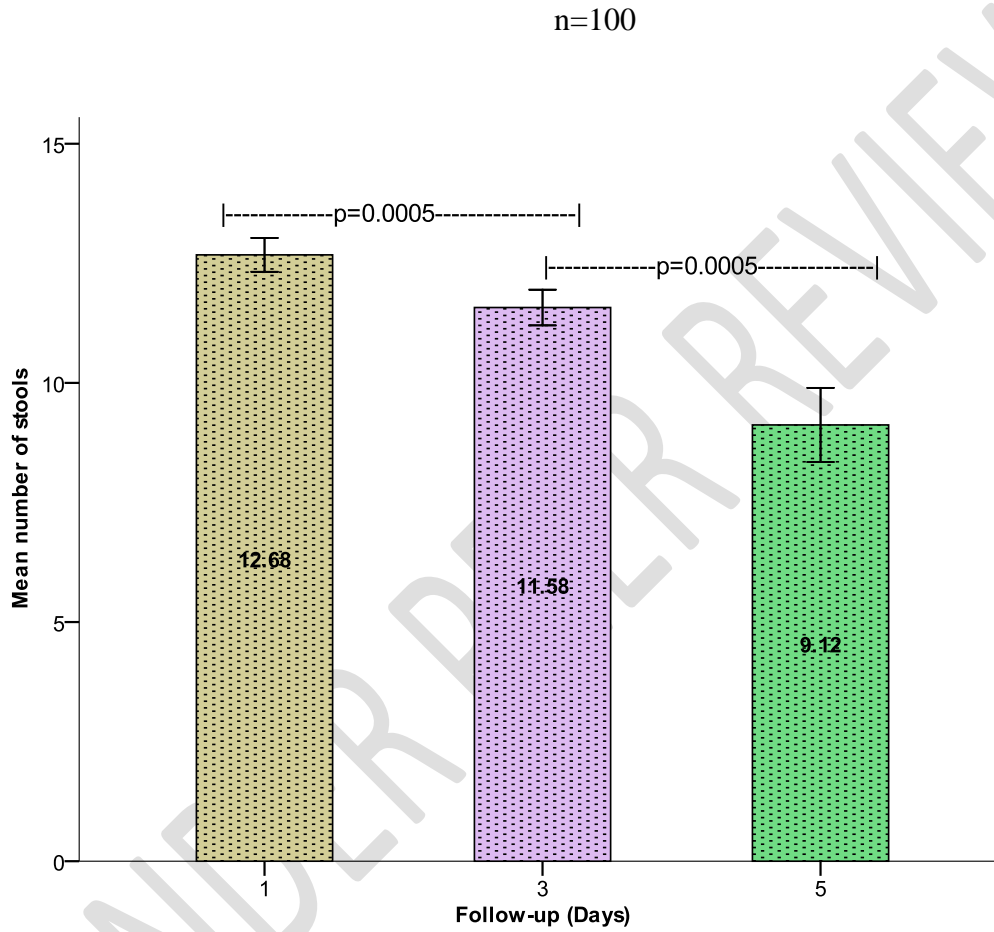
Day- I vs. Day-V p=0.0003

Day-III vs. Day-V p=0.0002

FIGURE 1

ROLE OF YOGURT IN DIETARY MANAGEMENT OF DIARRHEA IN SEVERE MALNUTRITION CHILDREN IN TERM OF AVERAGE NUMBER OF STOOLS

ACCORDING TO FOLLOW-UP



DISCUSSION

Severe acute malnutrition is associated with hypernatremia and hypokalemia that's why, the standard WHO oral rehydration salts (ORS) solution should not be given to malnourished children. As Rehydration salts solution for severely malnourished children (ReSoMal) contains less sodium and more potassium, so it is the ideal solution for malnourished children.¹¹

Research has proved that yogurt can also be effective in reducing the duration of diarrheal episode.¹² In this study Overall it was observed that efficacy of yogurt in diarrhea in children suffering from malnutrition was 69%. There are only a few studies that used yoghurt in acute diarrhoea. A study by Eren et al showed that yoghurt administration was associated with non-significantly shorter hospital stays compared to the children administered probiotic in earlier resolution of the diarrhea¹³ Binnendijk and Rijkers have reported that yogurt and probiotics improved duration, frequency, and severity of diarrhea as well as hospital stay in malnourished children¹⁴

In an unsimilar study all children recovered from diarrhea within a maximum of six days,¹⁵ while in our study only 69% children were recovered. This difference may be due to severely malnourished children in our study. An Indian study showed no significant differences in diarrhoea outcomes comparing a milk to yogurt regimen among malnourished boys with diarrhoea.¹⁶ A study done in India to evaluate the difference between F 100 milk and yogurt in malnourished children with diarrhea. Use of yogurt in malnourished children with acute diarrhea does not achieve any significant clinical benefit versus milk.¹⁷

In an international study duration of diarrhea and number of stools were significantly less in group who took yogurt compared with group who took milk. Forty-eight hours after admission, diarrhea was still present in 62% of milk group versus in 35% of yogurt group ($P < 0.002$).¹⁸

Study limitation:

The study did not include the cost of yogurt consumed by each children, so further studies can be done to note the cost difference between yogurt and other modalities.

CONCLUSION

This study suggest that yogurt-based diet is effective in treating diarrhea in severely acute malnourished children. It should be granted priority in the nutritional management of severe malnutriated children affected by diarrhea. Nevertheless, large scale studies should be conducted prior to its generalized application.

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