ORIGINAL ARTICLE

Effect of F-75, F-100 and RUTF (ready to use therapeutic food)Supplementation in Children with Severe Malnutrition

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ABSTRACT

Aim: To determine Effect of F-75, F-100 and RUTF (ready to use therapeutic food) supplementation in children with severe malnutrition
Design: Quazi experimental study.
Setting: Pediatrics Department, Aziz BhattiShaheed Teaching Hospital Gujrat Pakistan.
Patients: 53 children were included from April 2015 to August 2016.
Results: Total 53 children were included from April 2015 to August 2016.Out of total 53 children, 31(58.49%) were female childrenwhereas 22(41.53%) were male children. 46 children (86.79%) were from 6 months to 2 years of age whereas 7(13.20%) were 2-5 years of age. MAC(mid-arm circumference) of 26 children (49.05%) was <10cm whereas MAC of 27(50.94%) was 10-11.5cm at presentation.Mean weight at presentation of the children was 4.97kg±2.34, mean weight after one week of nutritional therapy of the children was 5.43kg±2.21 and mean weight after one month of nutritional therapy of the children was 7.36±2.63. After start of proper treatment all the patients recovered in spite of the fact that their condition was becoming worse before start of proper treatment.
Conclusions: Under-nutrition is a life threatening problem in children. Under-nutrition may increase chances of multiple infections and may lead to stunted growth. After stabilization of the child if we start proper nutritional therapy and follow up then the child can be saved from different types of problems secondary to malnutrition.If we start nutritional therapy from F-75 and timely shift the child on F-100 and RUTF (ready to use therapeutic food) then required weight gain can be achieved without complications. Our government and media may help in awareness of the facts of proper nutrition in children.
Keywords: Therapeutic food, malnutrition, supplementation

INTRODUCTION

During the last century wonderful achievements are observed in the nutritional management. Now by the help of advanced nutrition, severe malnutrition can be treated easily.The term malnutrition encompasses both ends of the nutrition spectrum, from under-nutrition to overweight[1].

Globally under-nutrition is commonly observed in children and it results short as well as long term health problems in whichstunted growth, development delay, weight loss and wasting of muscles is important. According to World Health Organization(WHO) 54% of childhood mortality is due to malnutrition[2,3].

In another observation by WHO,weight below average causes about thirty five percent deaths in children less than five years of age[4].

Structural damage to the brain and impairment of motor development and exploratory behavior in children may be due to malnutrition[7].There is high risk of chronic diseases in children who are malnourished before two years of age and they gained weight rapidly after two years of age and it may be related to the nutrition[7].

There are many studies which shows a direct association with malnutrition and childhood mortality[8]. Proper growth is an indication of recovery and good health after treatment of malnutrition.Children may stay stunted for whole life even after the proper treatment of the malnutrition.Under-nutrition of mild degree may double the respiratory and diarrheal diseases mortality risk. This risk may increase rapidly in severely malnourished children[2].

Ultimately short stature may be seen in malnourished girls and there are more chances that they may have small children[7].

Under-nutrition in prenatal life and growth patterns in first few years of life may change metabolism and physiological patterns and may have bad effects on cardiovascular system. In adulthood a malnourished child may be shorter than other

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children, child may be having less achievements in school and in economic status[7].
When there is rapid growth, chances of malnutrition may increase which may leave many long lasting impacts on their health[2].

There should be a proper plan for the treatment of malnutrition in children. Though RUTF [ready-to-use therapeutic food] is important to use but all malnourished children may need antibiotics therapy to treat infections which may be seen in every malnourished child[11].

Ourstudy shows our experience of children with severe malnutrition whowere given F-75, F-100 and RUTF (ready to use therapeutic food) supplementation. For the initial management of malnutrition F-75 is started. It should be continued for 2-7 days until the baby is well stabilized.After stabilization of the child on F-75, F-100 is used for the catch-up growth to rebuild all the wasted tissues.

PATIENTS AND METHODS

A quazi experimental study on effect of F-75, F-100 and RUTF (ready to use therapeutic food) supplementation in children with severe malnutritionwas carried out on 53 children from April 2015 to August 2016 in pediatrics department of Aziz BhattiShaheed Teaching Hospital Gujrat.

Children 06 months to 05 years of age with severe malnutritionwith MAC <11.5cm (midarm circumference) were included in the study. All children were excluded from the study whose parents were not cooperative. Children included in the study were admitted in pediatrics unit of Aziz BhattiShaheed Teaching Hospital Gujratduring the treatment of the severe malnutrition.

Consent was taken from their parents or attendants. This study may be beneficial for the participants. The basic information including the name, age, gender and address was recorded. History of present illness was asked for the symptoms, their severity and duration.

Necessary investigations were advised like CBC, serum studies, blood culture, X-ray abdomen and ultrasonography of the abdomen. Daily check-up was done and investigations and treatment was decided as required.

Afterthe diagnosis of malnutrition, medical treatment of complications or acute problems like infection was decided. Treatment was started in ward or on the outdoor basis. Result and response of treatment was seen on clinical assessment and its improvement and investigations were advised whenever it was needed.

After acute management F-75 was started. When patient started gaining weight at 0.5g/kg/day at least for 3 days then patient was started F-100.

F-75 and F-100 was given 6-10 times/day. Alternate mother feed was given to children on mother feeding. One sachet F-75 or F-100 was put in 500 ml water to make 75 or 100 calories/100ml solution respectively.
On F-100 therapy if the patient maintained gaining weight at 0.5g/kg/day for one week then RUTF (ready to use therapeutic food) was started.Sugar, dried skimmed milk, oil, vitamins and mineral supplements are basic ingredients of RUTF. RUTF (ready to use therapeutic food)was continued at least for 2-months. When appetite is improved then normal diet along with RUTF (ready to use therapeutic food) was given. After start of RUTF (ready to use therapeutic food) MAC (mid-arm circumference) was regularly measured. When MAC (mid-arm circumference) reached >12.5cm on two different measurements one week apart then normal daily diet according to the age of the child was started.

Later on regular follow up will be maintained to prevent recurrent malnutrition till the age of 05 years.
Descriptive statistic like mean or proportion or percentage was calculated for age, gender etc.All information was recorded in aproforma.

RESULTS

Table 1: Composition F-75 and F-100

	F-75	**F-100**
Dried skimmed milk	25g	80g
Sugar	70g	50g
Cereal flour	35g	-
Vegetable oil	27g	60g
Mineral mix	20ml	20ml
Vitamin mix	140ml	140ml
Protein	0.9g	2.9g
Lactose	1.3g	4.2g
K	3.6mmol	5.9mmol
Na	0.6mmol	0.73mmol
Mg	0.43mmol	0.73mmol
Zn	2.0mmol	2.3mmol
Copper	0.25mg	0.25mg
Osmolarity	333mOsmol/l	419mOsmol/l
Energy from protein	5%	12%
Energy from fat	32%	53%

Total 53 children were included from April 2015 to August 2016.Out of total 53 children, 31(58.49%) were female children whereas 22(41.53%) were male children (Table 2,5). 46 children (86.79%) were from 6 months to 2 years of age whereas 7(13.20%) were 2-5 years of age (Table 3,4). MAC of 26 children (49.05%) was <10cm whereas MAC of 27(50.94%) was 10-11.5cm at presentation (Table 4,6). Mean

weight at presentation of the children was 4.97kg±2.34, mean weight after one week of nutritional therapy of the children was 5.43kg±2.21 and mean weight after one month of nutritional therapy of the children was 7.36±2.63 (Table 5,6). After start of proper treatment all the patients recovered in spite of the fact that their condition was becoming worse before start of proper treatment (Table 6).

Table2: Gender distribution (n=53)

Gender	**n**	**%age**
Males	22	41.53
Females	31	58.49
Total	53	100

Table3:Age distribution (n=53)

Age group	**n**	**%age**
6months-2years	46	86.79
2-5years	07	13.20
Total	53	100

Table 4:MACat presentation (n=53)

MAC	**n**	**%age**
<10cm	26	49.05
10-11.5cm	27	50.94
Total	53	100

Table5: Mean weight of malnourished children (n=53)

Mean weight at presentation	4.97kg±2.34
Mean weight after one week of nutritional therapy	5.43kg±2.21
Mean weight after one month of nutritional therapy	7.36±2.63

Table 6:Summary of malnourished children (n=480)

	n	**%age**
Age groups		
6 months – 2 yrs	46	86.79
2-5 yrs	07	13.20%
Gender		
Male	22	41.53%
Female	31	58.49
MAC at presentation		
10cm	26	49.05%
10-11cms	27	50.94
Mean weight at presentation		
4.97kg±2.34	53	100
Mean weight after one week of nutritional therapy		
5.43kg±2.21	53	100
Mean weight after one month of nutritional therapy		
7.36±2.63	53	100
Death observed	Nil	Nil

DISCUSSION

Malnutrition in children, here understood as under-nutrition is an alarming problem in under developed countries. Our country Pakistan is also facing problem of under-nutrition in spite of the fact that our country is an agricultural country and a lot of food can be produced yearly.In children malnutrition can be detected in three different ways;

1) stunting that is extremely low height for age.
2) underweight that is extremely low weight for age.
3) wasting that is extremely low weight for height.

All these measures of the under-nutrition are related with each other. But studies for the World Bank has shown that about nine percent of the children show stunting, underweight, and wasting[5].

If there is severe malnutrition, the child may be very thin but the child may be having swelling of the hands and feet. It may produce a problem for the clinicians in distinguishing it[6].Children with severe malnutrition are very susceptible to infection[2].

A lot of inequalities has been observed in the malnutrition in children in different countries. If we see Peru and Egypt, there is large gap in Peru and very tiny gap in the Egypt.In around 2000, the rate of development of the malnutrition were much higher in the countries with low income (36 percent) as compared to the countries having middle income (12 percent) and the United States of America (1%) [5].

In 2009 in a study in Bangladesh, they havefound that low monthly income, less education of the mother, more number of kids, very less access to electronic and other media, improper supplementation of diet and poor sanitation may lead to chronic diseases and severe malnutrition in the children[9].

In a study by World Bank it was observed that from 1970 to 2000 the number of malnourished children have decreased by twenty percent in the developing countries after the adequate measures taken by World Bank to decrease the malnutrition[5].

Trials for the supplementation of iodine were given to the pregnant women to decrease the baby deaths during the early years of life. It was observed that there was reduction of early deaths by twenty nine percent[6].

The Progresa program in Mexico which showed ten percent decrease in the prevalence of stunting in children 2-3 years of age. It was combinedconditional cash transfers with nutritional education and micronutrient fortified food supplementation[8].

A study was done in India in which iron and zinc was added in the milk and it decreased incidence of diarrhea by 18%.Mother feeding may decrease the rates of the malnutrition in children due to diarrheal diseases so the mothers should not be advised to stop the breast feeding[6].It has been observed in infants that mother feeding decreases the overall infant mortality[8].

It is observed that only thirty eight percent children below six months of age are properly breast

fed. That's why media awareness programs on breast feeding may have large effects on decreasing childhood malnutrition rates[10].

But if enough nutrients are not consumed properly it may be dangerous for the baby because mother feeding only cannot prevent the protein energy malnutrition[2].Our government should have proper check and balance to provide balanced nutrition to the children.

CONCLUSIONS

Under-nutrition is a life threatening problem in children. Under-nutrition may increase chances of multiple infections and may lead to stunted growth. After stabilization of the child if we start proper nutritional therapy and follow up then the child can be saved from different types of problems secondary to malnutrition. If we start nutritional therapy from F-75 and timely shift the child on F-100 and RUTF (ready to use therapeutic food) then required weight gain can be achieved without complications. Our government and media may help in awareness of the facts of proper nutrition in children.

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