https://doi.org/10.29309/TPMJ/2023.30.02.7243

The Professional Medical Journal
www.theprofesional.com
2023, Volume, 30 Issue, 02

ORIGINAL ARTICLE

Efficacy of therapeutic F75 & F100 in malnourished child admitted at NICH.

Bushra Qamer[1], Arit Parkash[2], Ayesha Altaf Marchant[3], Mehmood Shaikh[4], Mohammad Hanif[5], Ayesha Sardar[6]

Article Citation: Qamer B, Parkash A, Marchant AA, Shaikh M, Hanif M, Sardar A. Efficacy of therapeutic F75 & F100 in malnourished child admitted at NICH. Professional Med J 2023; 30(02):224-229. https://doi.org/10.29309/TPMJ/2023.30.02.7243

ABSTRACT… Objective: To evaluate the effectiveness of F 75 and F 100 in children with severe acute malnutrition. **Study Design:** Cross Sectional study. **Setting:** National Institute of Child Health, Karachi. **Period:** 1st Jan 2021 to 30th June 2021. **Material & Methods:** All children with severe acute malnutrition, aged 6 months to 5 years, irrespective of gender were included in the study. Children of parents/guardians who failed to give consent were excluded from the study. Relevant history was recorded. After acute intervention as per departmental standards, F-75 was initiated. When the subject gained weight at the rate of 0.5g per kg/day for three consecutive days, the patient was then administered F-100. Both diets were administered 6-8 times a day. Outcome was recorded by comparing the post treatment mean weight with baseline weight. **Results:** The mean age of the child and the mother were 30.53 ± 13.37 months and 31.31 ± 6.34 years, respectively. The mean increase in weight was 0.75 ± 0.77 kgs (Pre- and post-treatment). Increase in BMI was 1.12 ± 1.34 kg/m^2 while the increase in MUAC was 0.93 ± 0.89 cm. Statistically significant increments were observed in weight, MUAC, and body mass index after administration of F75/F100 diet in the severely malnourished children ($p<0.0001$). **Conclusion:** The present study revealed statistically significant increments in weight, MUAC, and body mass index, after administration of F75/F100 diet in the severely malnourished children.

Key words: Critical Illness, F 75, F 100, Pediatric Population, Severe Acute Malnutrition.

INTRODUCTION

Severe acute malnutrition is a serious morbidity which affects approximately 15 million youngsters, globally. It is associated with elevated mortality rates leading to a million deaths annually for children under the age of 5.[1,2] Severe acute malnutrition is characterized by a weight for-height Z-score greater than three below the mean growth standards, and a mid-upper arm circumference, abbreviated as MUAC of < 115 millimeters. Patients with severe acute malnutrition may also present with edema.[3] This condition is different from chronic malnutrition in terms of its presentation. In severe chronic malnutrition, the patient also presents with stunted growth.[1] Those individuals who are malnourished however suffer from no severe complications are managed in outpatient departments using specially customized feed called, "ready-to-use therapeutic food".[3] Whereas, those with complications including presence of fever, declined appetite, pulmonary infections, dehydration, and severe edema require attentive inpatient treatment.

Such patients undergo a three-phase plan of management. Firstly, the patient is stabilized, during which, life-threatening issues are dealt with. Once the child is metabolically stabilized, a low-protein formula feed, 'F-75', is administered. The patient then regains his appetite, which is considered a positive sign. After that, edema starts to resolve, and the patient slowly transitions back to his normal regular diet which consists of higher protein levels. During the transition stage, it is upto the discretion of the physician to use any of the commonly available feeds. F100 is commonly supplemented with F75. Finally, the third stage of management constitutes nutritional rehabilitation, where it is ensured that the patient finishes all feeds and is clinically stable to be discharged

1. FCPS Trainee Pediatrics Medicine, National Institute of Child Health, Karachi.
2. MBBS, FCPS, Assistant Professor Pediatric Gastroenterology and Hepatology and Nutrition, National Institute of Child Health, Karachi.
3. MBBS, FCPS, Senior Registrar Pediatric Medicine, National Institute of Child Health, Karachi.
4. MBBS, FCPS (Pediatrics), FCPS (Neonatology), Assistant Professor Neonatology Intensive Care Unit, National Institute of Child Health, Karachi.
5. MBBS, FCPS (Pediatrics), FCPS (Neonatology), Assistant Professor Neonatology Intensive Care Unit, National Institute of Child Health, Karachi.
6. FCPS Trainee Pediatric Medicine, National Institute of Child Health, Karachi.

Correspondence Address:
Dr. Bushra Qamer
Department of Pediatrics Medicine
National Institute of Child Health, Karachi.
drsham084@gmail.com

Article received on: 23/08/2022
Accepted for publication: 25/10/2022

home.[3] If the management is not proper during any stage, it can lead to poor patient outcomes and even mortality. In some cases, mortality can reach up to thirty percent for patients with severe acute malnutrition. The mortality rates are highest in the stabilization phase.[4-8] In a study conducted in Bangladesh, the authors revealed that certain demographic factors including low income, illiterate mothers, greater parity, minimal access to technology and other basic facilities are all contributory to severe malnutrition among children.[9] Ashraf et al., revealed that the mean weight of children with severe acute malnutrition was increased from 4.97kg±2.34 at baseline to 7.36±2.63 kg after one month of F75 and F100 diet.[10]

If therapeutic nutritional supplements are found to increase weight of the children then the same would be advised and recommended in cases of severe acute malnutrition. Due to the scarcity of the literature, the current study was conducted to evaluate the outcome of therapeutic feeding of F 75 and F 100 in children with severe acute malnutrition.

MATERIAL & METHODS

A descriptive long analytical study was conducted at National Institute of Child Health, Karachi between 1st Jan 2021 to 30 June 2021. A non-probability consecutive sampling technique was used for the recruitment of participants.

The sample size was calculated using the select statistics calculator by keeping the mean weight gain in children with severe acute malnutrition as 7.36±2.63 kg, the population variance as 6.91, margin error as 0.58%, and a confidence level of 98%.[10] A sample size of 112 was obtained.

All children with severe acute malnutrition, aged 6 months to 5 years, irrespective of gender were included in the study. Children of parents/ guardians who failed to give consent were excluded from the study. Children with celiac disease, cerebral palsy or mental health issues were also excluded. Severe acute malnutrition was defined by a very low weight for height (below -3z scores of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional edema.

Study was initiated after obtaining approval of the ethical review committee. Informed consent was obtained from parents/guardians of each child after giving a detailed description of the study. Children with SAM admitted at National Institute of Child Health (NICH) meeting the inclusion criteria were enrolled.

Relevant history was recorded which included gender and age of the child, and maternal age, maternal educational status, family monthly income, number of siblings, rural or urban.

At the National Institute of Child Health, a PCM room where WHO protocol for malnutrition is followed. According to the inclusion criteria, baseline parameters were recorded and patients were started on F75 and F100 diets. Out of these 5 patients left against medical advice and were excluded from the final analysis. At the time of presentation and at discharge, height, weight, and MUAC were measured using the appropriate measuring scale. The difference between these parameters at presentation and discharge were recorded in a predefined proforma.

F-75 was initiated at first and when the subject gained weight at the rate of 0.5g per kg/day for three consecutive days, the patient was then administered F-100. Both diets were administered 6-8 times a day. Alternate mother feed will be given to children on mother feeding. One sachet F-75 or F-100 will be put in 500 ml water to make 75 or 100 calories/100ml solution respectively. At the end of the week of treatment the weight will be assessed on an electronic weighing scale in light clothes and without shoes. This information along with explanatory variables mentioned above will be entered in the proforma.

Outcome was recorded by comparing the post treatment mean weight with baseline weight. Daily weight gain of >10gm/kg/day was considered as adequate.

Statistical package for social sciences (SPSS)

version 26 was used for statistical analysis. Mean and standard deviation will be calculated for age of the child, weight at presentation, maternal age, family monthly income and weight post treatment at the end of a week. Frequency and percentages were calculated for gender of the child, mother occupation, educational status of the mother and area of residence. Post stratification unpaired t test was applied. P-value ≤0.05 will be taken as statistically significant.

RESULTS

Table-I demonstrates the sociodemographic characteristics of study participants. A total of 118 patients were included in the study. The mean age of the child and the mother were 30.53 ± 13.37 months and 31.31 ± 6.34 years, respectively. The majority had two to four children while most of the mothers were housewives and resided in the rural areas.

Parameter	
Age of child (months)	30.53 ± 13.37
Gender	
Male	62 (52.5%)
Female	56 (47.5%)
Maternal age (years)	31.31 ± 6.34
Maternal Education	
No formal education	77 (65.3%)
Primary	29 (24.6%)
Secondary	5 (4.2%)
Matric	5 (4.2%)
College or more	2 (1.7%)
Number of children	3.13 ± 1.62
Number of children	
One child	21 (17.9%)
Between 2-4	72 (61.5%)
More than 5	24 (20.5%)
Maternal Occupation	
Housewife	107 (90.7%)
Employed	11 (9.3%)
Family monthly income (PKR)	21406.78 ± 7876.44
Residential Status	
Rural	69 (58.5%)
Urban	49 (41.5%)

Table-I. Sociodemographic characteristics of patients

Table-II illustrates the clinical characteristics of the patients at baseline and post-treatment. The mean hospital stay was 12.47 ± 6.18 days. The mean increase in weight was 0.75 ± 0.77 kgs (Pre- and post-treatment). Increase in BMI was 1.12 ± 1.34 kg/m^2 while the increase in MUAC was 0.93 ± 0.89 cm.

Parameter	Mean ± SD
Edema	
Present	15 (12.7%)
Absent	103 (87.3%)
Hospital stay (days)	12.47 ± 6.18
Weight at admission (kg)	8.39 ± 2.34
Weight post treatment (kg)	9.14 ± 2.45
Height at admission (cm)	75.83 ± 8.77
Height Post-treatment (cm)	75.83 ± 8.77
Body Mass Index at presentation (kg/m^2)	14.42 ± 2.82
Body Mass Index post treatment (kg/m^2)	15.53 ± 2.62
MUAC at admission (cm)	10.02 ± 0.82
MUAC post treatment (cm)	10.95 ± 0.77

Table-II. Clinical characteristics of study participants

Table-III illustrates that statistically significant increments were observed in weight, MUAC, and body mass index after administration of F75/F100 diet in the severely malnourished children (p<0.0001).

Parameter	Pre-treatment	Post-treatment	P-Value
Weight (kg)	8.34 ± 2.37	9.26 ± 2.49	<0.0001
MUAC (cm)	9.87 ± 0.64	11.0 ± 0.74	0.009
BMI (kg/m2)	14.08 ± 2.52	15.51 ± 2.57	<0.0001

Table-III. Therapeutic effectiveness of F75/F100 in severe acute malnutrition children in patients without pre-therapy edema

Table-IV. illustrates that in patients with pretherapy edema, there was significant reduction in weight and MUAC, P=0.011 and <0.0001, respectively. However, the body mass index remained unchanged.

Parameter	Pre-treatment	Post treatment	P-Value
Weight (kg)	8.77 ± 2.2	8.2 ± 1.97	0.011
MUAC (cm)	11.03 ± 1.14	10.58 ± 0.88	<0.0001
BMI (kg/m2)	16.76 ± 3.68	15.68 ± 3.03	0.178

Table-IV. Therapeutic effectiveness of F75/F100 in severe acute malnutrition children in patients with pre-therapy edema

DISCUSSION

The aim of this study was to identify the result of treating children with the F75/F100 formula who have been diagnosed with severe acute malnutrition. Weight after treatment in patients without edema was significantly increased along with body mass index (BMI) and mid-upper arm circumference (MUAC). In patients who presented with edema, the weight was reduced significantly after treatment post treatment along with the MUAC and BMI. Severe acute malnutrition is a major public health issue worldwide.[11-12] In particular, this issue needs a great deal of improvement in developing countries like Pakistan. Several nutritional therapies are being used to cater to this problem. F75 and F100 are also one of the recommended therapies.[13] Recently, the PCM unit has been established in the medical unit 3 of National Institute of Child Health, Karachi, Pakistan which is managing 30-40 patients on average monthly. All these patients managed according to the World Health Organization guidelines for management of acute severe malnutrition at the nutritional rehabilitation centre.

Our findings coincided with previously published data. For instance, Salahuddin et al. studied the result of using F100 formula (recommended by WHO) as a therapeutic feed in patients hospitalized for severe acute malnutrition.[14] The average weight at admission increased (4.62±1.45 kg to 6.02±1.17kg) at a p-value of <0.001, which was consistent with our study. Islam et al. discussed patients who were fed F-100 and diluted F-100 were found to have high weight gain as compared to patients who were given infant formula.[15] Mumbere et al. on the other hand discussed cow milk with porridge made up of soybean, maize, vegetable oil and sugar to be a good alternative to F75, RUTF and F100 and no significant difference was seen between the two despite the type of malnutrition.[16] Bitew et al. in their study found supplementation of F100 and vitamin A to increase recovery time in children suffering from severe acute malnutrition.[17] This was consistent with another study conducted in Ethiopia by Fikrie et al. in which children who were given F-100 were 1.63 times more likely to recover in contrast to patients who were not given F-100.[18] The mean weight gain of patients in the stabilization center was 11.2 g/kg per day which was higher than our study. Furthermore, Fikrie found the average duration of stay to be 18.3 days which was similar to the study conducted by Desyibelew et al. (18.0 days).[19] These results may have been due to regular monitoring of patients with severe acute malnutrition, timely medication, therapeutic diet and less duration of stay in the hospital than the recommended duration of time.

One limitation in our study was that it was a single center study. If this study would have been conducted in multiple centers, it would allow us to identify patient load in different hospital settings as well as the factors leading to increased in-hospital mortality.

CONCLUSION

The present study revealed statistically significant increments in weight, MUAC, and body mass index after administration of F75/F100 diet in the severely malnourished children. Moreover, it was found that in children with edema, significant decline in weight and MUAC was observed. However, the body mass index was not changed significantly in edematous children. Further large scale studies should be conducted to ascertain the efficacy of such supplemental diets in patients who are critically ill.

REFERENCES

1. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al. **Maternal and child under nutrition and overweight in low-income and middle-income countries.** Lancet. 2013; 382:427–51. DOI: 10.1016/S0140-6736(13)60937-X

2. Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, et al. **Evidence based interventions for improvement of maternal and child nutrition: What can be done and at what cost?** Lancet. 2013; 382:452–77. DOI: 10.1016/S0140-6736(13)60996-4

3. World Health Organization. **WHO guideline: Updates on the management of severe acute malnutrition in infants and children.** Geneva: World Health Organization; 2013.

4. Maitland K, Berkley JA, Shebbe M, Peshu N, English M, Newton CR. **Children with severe malnutrition: Can those at highest risk of death be identified with the WHO protocol?** PLoS Med. 2006; 3:e500. DOI: 10.1371/journal.pmed.0030500

5. Irena AH, Mwambazi M, Mulenga V. **Diarrhea is a major killer of children with severe acute malnutrition admitted to inpatient set-up in Lusaka, Zambia.** Nutr J. 2011; 10:110. DOI: 10.1186/1475-2891-10-110

6. Heikens GT, Bunn J, Amadi B, Manary M, Chhagan M, Berkley JA, et al. **Case management of HIV-infected severely malnourished children: Challenges in the area of highest prevalence.** Lancet. 2008; 371:1305–7. DOI: 10.1016/S0140-6736(08)60565-6

7. Bhutta ZA, Ghishan F, Lindley K, Memon IA, Mittal S, Rhoads JM. **Persistent and chronic diarrhea and malabsorption: Working group report of the second world congress of Pediatric Gastroenterology, Hepatology, and nutrition.** J Pediatric Gastroenterology Nutr. 2004; 39:S711–6.

8. Kerac M, Bunn J, Chagaluka G, Bahwere P, Tomkins A, Collins S, et al. **Follow-up of post-discharge growth and mortality after treatment for severe acute malnutrition (FuSAM study): A prospective cohort study.** PLoS One. 2014; 9:e96030. DOI: 10.1371/journal.pone.0096030

9. Khan MM, Kraemer A. **Factors associated with being underweight, overweight and obese among ever-married non-pregnant urban women in Bangladesh.** Singapore Med J. 2009; 50(8): 804–13.

10. Ashraf1 M, Mahmood S, Chaudhry MA. **Effect of F-75, F-100 and RUTF (ready to use therapeutic food) supplementation in children with severe malnutrition.** Pak J Med Health Sci. 2017; 11(1):339-42.

11. Qasim H, Shahid M, Razzaq T. **Effectiveness of F100 and F75 Therapeutic feed for the management of severe acute malnutrition in children under 5 years.** Pak J Paeds; 2018: 4, 18- 22.

12. Versloot CJ, Voskuijl W, van Vliet SJ, et al. **Effectiveness of three commonly used transition phase diets in the inpatient management of children with severe acute malnutrition: A pilot randomized controlled trial in Malawi.** BMC Pediatr 2017; 17(1):112. DOI: 10.1186/s12887-017-0860-6

13. World Health Organization. **Training course on the management of severe malnutrition.** World Health Organization; 2002.

14. Salahuddin I, Naveed A, Kausar M. **Determine the Outcomes of F100 therapeutic feed in children with severe acute malnutrition.** Pak J Med Health Sci. 2020; 1(65):49-52

15. Islam MM, Huq S, Hossain MI, Ahmed AM, Ashworth A, Mollah MA, Ahmed T. **Efficacy of F-100, diluted F-100, and infant formula as rehabilitation diet for infants aged< 6 months with severe acute malnutrition: A randomized clinical trial.** European journal of nutrition. 2020 Aug; 59(5):2183-93. DOI: 10.1007/s00394-019-02067-5

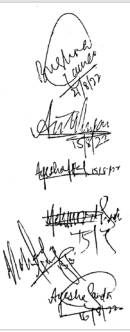
16. Mumbere M, Katsuva Mbahweka F, Furaha Nzanzu BP. **Management of severe acute malnutrition by cow milk in resource constraints settings: Experience of the Nutritional Centre of the University Clinics of Graben.** BMC pediatrics. 2018 Dec; 18(1):1-9. DOI: 10.1186/s12887-018-1115-x

17. Bitew ZW, Alebel A, Worku T, Alemu A. **Recovery rate and its predictors among children with severe acute malnutrition in Addis Ababa, Ethiopia: A retrospective cohort study.** Plos one. 2020 Jul 23; 15(7):e0235259. DOI: 10.1371/journal.pone.0235259

18. Fikrie A, Alemayehu A, Gebremedhin S. **Treatment outcomes and factors affecting time-to-recovery from severe acute malnutrition in 6–59 months old children admitted to a stabilization center in Southern Ethiopia: A retrospective cohort study.** Italian journal of pediatrics. 2019 Dec; 45(1):1-9. DOI: 10.1186/s13052-019-0642-x

19. Desyibelew HD, Fekadu A, Woldie H. **Recovery rate and associated factors of children age 6 to 59 months admitted with severe acute malnutrition at inpatient unit of Bahir Dar Felege Hiwot Referral hospital therapeutic feeding unite, northwest Ethiopia.** PloS one. 2017 Feb 6; 12(2):e0171020. DOI: 10.1371/journal.pone.0171020

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Bushra Qamer	Manuscript writing, Data collection.	
2	Arit Parkash	Manuscript writing, Supervising and rechecking.	
3	Ayesha Altaf Marchant	Data analysis.	
4	Mehmood Shaikh	Methodology and SPSS work.	
5	Mohammad Hanif	Data collection.	
6	Ayesha Sardar	Data collection.	