Journal of Medicine, Physiology and Biophysics
ISSN 2422-8427 An International Peer-reviewed Journal
Vol.41, 2018

WEIGHT GAIN ON WHO RECOMMENDED F100 DIET IN CHILDREN UNDER 5 YEARS OF AGE HOSPITALIZED WITH SEVERE ACUTE MALNUTRITION

DR. HUMAIRA QASIM, MBBS

NISHTAR HOSPITAL, MULTAN, PAKISTAN.

DR. ZAHRA MUNWAR, MBBS

DHQ HOSPITAL, RAJANPUR, PAKISTAN.

DR. SYED KAMRAN ZAFAR, MBBS

MAYO HOSPITAL, LAHORE, PAKISTAN.

DR. JAWARIYA SAFDAR, MBBS

NISHTAR HOSPITAL, MULTAN, PAKISTAN.

Abstract;

Background; Severe acute malnutrition (SAM) affects approximately 19 million children below five years of age in low and middle income countries, which is defined as low weight for height or mid-upper arm circumference with respect to international standards, or the presence of bipedal edema. These children have a considerably increased risk of dying and it is estimated that malnutrition is the underlying cause of 45% of global deaths in children below 5 years of age. **Material and Methods;** Patients of severe acute malnutrition having weight for height/length less than -3 SD (Less than 70% of expected) were admitted in hospital nutritional. In stabilization phase, life-threatening problems were identified and treated, metabolic abnormalities were reversed and feeding was begun with F75 diet according to guidelines set by World Health Organization (WHO), the duration of stabilization phase was at least seven days. Patients in rehabilitation phase on F100 formula were included in study. Duration of rehabilitation phase is usually two to six weeks. Initial weight (W1) was measured as soon as the child was admitted and final weight (W2) was measured on 7th day of rehabilitation phase about one hour after a feed after standardizing the scale. **Results;** Mean age of our study cases was 16.68 ± 10.37 months, 16 (36.4%) were male and 28 (63.6%) were female patients. Mean weight at the time of admission was 4.82 ± 1.70 Kg. Similarly mean height of these study cases was 64.36 ± 11.24 cm. Mean weight at the start of F-100 was 4.85 ± 1.69 kg. Mean weight at the time of discharge was 5.72 ± 1.67 kg. Mean duration of hospital stay was 12.91 ± 6.85 days. Mean weight gain in our study cases was 14.10 ± 5.23 g/kg/day. Adequate weight gain was seen in 36 (81.8%) of our study cases while inadequate gain was seen 8 (18.2%) of our study cases.

Conclusion; Use of F-100 milk significantly improved weight gains among our study cases, hence we recommend its use in children with SAM. No adverse side effects were seen in our study population which emphasize towards safety of this product.

Keywords; Severe acute malnutrition, Weight gain, F100.

Introduction:

The first five years of life are the most important years for a child's survival, growth and development [1-2]. In Pakistan children under five years comprise about 9.4% of the total global population[3-12].Protein energy malnutrition is a common disease in Pakistani children. In order to reduce the mortality associated with

malnutrition, WHO has recommended that children with severe acute malnutrition should be managed in hospitals[13]. Severe acute malnutrition is identified by the presence of severe wasting (<70% Weight-for-height median or <-3SD Weight-for-height z-score)[4].The hospital management is accomplished in two phases[1]: an initial stabilization phase where the acute medical conditions are managed , specific deficiencies are corrected, metabolic abnormalities are reversed and feeding is begun; and a longer rehabilitation phase for rapid weight gain of >10 gm/kg/day[7].It is recommended that malnourished children should be fed in stabilization phase on F75 containing 75 kcal/100 ml and 0.9 gm protein/100 ml providing energy intake of 100 k cal/kg/day and protein intake of 1-1.5 gm/kg/day[4]. In rehabilitation phase, they should receive an energy- and protein dense ,milk-based diet F100 containing 100 kcal/100ml and 2.9 gm protein/100 ml providing energy intake of 150-220 kcal/kg/day and protein intake of 4-6 gm/kg/day[14]. This rehabilitation phase usually takes 3–4 weeks and is carried out in the hospital or in a residential therapeutic feeding center[4].

The global guidelines of the World Health Organization (WHO) for management of acute severe malnutrition are being implemented in developing countries and children with severe acute malnutrition are showing significant weight gain[6,7]. In a study on children with severe acute malnutrition done at therapeutic feeding centers, southern Ethiopia ,it was found that average weight gain for children in Ethiopia with severe wasting was 14gm/kg/day with 87% of children showing adequate weight gain[7].

Material and Methods;

Children coming to the Nishtar Hospital, Multan with SAM having age six months to five years with weight for height/length less than -3SD (>70% of expected) were included in our study. Patients with persistent vomiting, acute infection like severe pneumonia and any congenital malformations e.g. cleft lip and cleft palate were excluded from our study.
Those patients, who fulfilled the inclusion and exclusion criteria, were recruited for the study. Patients of severe acute malnutrition having weight for height/length less than -3 SD (Less than 70% of expected) were admitted in hospital nutritional. In stabilization phase, life-threatening problems were identified and treated, metabolic abnormalities were reversed and feeding was begun with F75 diet according to guidelines set by World Health Organization (WHO), the duration of stabilization phase was at least seven days. Patients in rehabilitation phase on F100 formula were included in study. Duration of rehabilitation phase is usually two to six weeks. Initial weight (W1) was measured as soon as the child was admitted and final weight (W2) was measured on 7th day of rehabilitation phase about one hour after a feed after standardizing the scale. Average daily weight gain was calculated as follows

$$Average\ daily\ wt\ gain = \frac{(W2 - W1) \times 1000}{Wt \times D}$$

W1 = weight at start of F100 diet (kg);

W2 = weight at discharge while on F100 diet (kg)

D= duration of hospital stay while on F100

Daily weight gain of >10gm/kg/day has been taken as adequate. Data was entered in SPSS (Statistical Package for social science) version 20.0.

Results;

A total of 44 study cases meeting inclusion and exclusion criteria of our study were included. Mean age of our study cases was 16.68 ± 10.37 months (minimum age was 6 months while maximum age was 36 months). Of these 44 study cases, 16 (36.4%) were male and 28 (63.6%) were female patients. Mean weight at the time of admission was 4.82 ± 1.70 Kg (with minimum weight was 2.1 Kg while maximum was 9.5 Kg) (Table-5). Similarly mean height of these study cases was 64.36 ± 11.24 cm (with minimum height was 46 cm and maximum height was 88cm). Mean weight at the start of F-100 was 4.85 ± 1.69 kg (with minimum weight was 2.1 Kg while maximum weight was 9.5 Kg). Mean weight at the time of discharge was 5.72 ± 1.67 kg (with minimum weight 3.5 kg while maximum weight was 10.6 kg). Mean duration of hospital stay was 12.91 ± 6.85

days (with minimum 6 days and maximum 30 days). Mean weight gain in our study cases was 14.10 ± 5.23 g/kg/day (with minimum weight gain 5.34 g/kg/day and maximum 28.35 g/kg/day). This weight gain was significantly greater than that of the weight at the time of admission (p=0.000). Adequate weight gain was seen in 36 (81.8%) of our study cases while inadequate gain was seen 8 (18.2%) of our study cases. This weight gain was stratified with regards to gender and p-value was also calculated (p=0.689). When this weight gain was stratified with regards to age, p value was calculated (p= 0.259). Weight gain was significantly associated with weight at the time of admission as p-value calculated was p=0.005.

Discussion;

Children with severe acute malnutrition and life-threatening complications require short-term inpatient care for treatment of infections, fluid and electrolyte imbalances, and metabolic abnormalities. Initial dietary management relies on low-lactose, milk-based, liquid formulas but semi-solid or solid foods can be started as soon as appetite permits, after which children can be referred for ambulatory treatment [15].

Our study included 44 children suffering from severe acute malnutrition, of these 44 study cases, 16 (36.4%) were male and 28 (63.6%) were female patients. This shows significantly high proportion of malnourishment among girls. Mean weight at the time of admission was 4.82 ± 1.70 Kg and the study results have indicated that average weight gain was significantly associated with increasing weight at the time of admission to hospital. Mean duration of hospital stay was 12.91 ± 6.85 days in our study. Diop et al [16] reported 17.3 days average duration of stay at hospital. Teferi et al [7] reported 21 days duration of hospital stay. Yebyo et al [17] reported as high as 43.68 days of duration at hospital.

Mean weight gain in our study cases was 14.10 ± 5.23 g/kg/day having minimum weight gain 5.34 g/kg/day and maximum 28.35 g/kg/day. This weight gain was significantly greater than that of the weight at the time of admission (p=0.000). Diop et al [16] reported 10.1 g/kg/day average weight gain among children suffering from SAM on F100 milk. Yebyo et al[17] reported 6.30 g/kg/day average weight gain among children fed with F 100 formula diet. Teferi et al [7] reported 13.4 g/kg/day which is very close to our study results. Yebyo et al[17] reported lower proportions while findings of others are in compliance with that of ours.

Adequate weight gain was seen in 36 (81.8%) of our study cases while inadequate gain was seen 8 (18.2%) of our study cases. Teferi et al [7] reported 87 % in their study. Yebyo et al[101] reported 61.78 % adequate recovery of severly malnourished children with F100 milk. Weight gain was significantly associated with weight at the time of admission as p-value calculated was p=0.005, in our study.

In our study, diarrhea was present in 34 (77.3%) of our study cases. Yebyo et al [17] reported 33.92 % children presenting with diarrhea at the time of admission. Fever was present in 26 (59.1%) of our study cases while Yebyo et al [17] reported 6.4 % fever among such cases.

The results of our study are in compliance with that of other studies reported from different countries. Significant weight gain is associated with the use of F100 formula milk among children suffering from severe acute malnutrition. Most of the studies have confirmed these findings from different parts of world.

Conclusion;

Our study results confirm that the current protocols for management of severe acute malnutrition can successfully be employed to save lives of our children with high cure rate and minimum death rate compared to traditional treatment. Use of F-100 milk significantly improved weight gains among our study cases, hence we recommend its use in children with SAM. No adverse side effects were seen in our study population which emphasize towards safety of this product. Further studies from other parts of the country are suggested to generate data at national level and for national health policy guidelines.

References:

1. Pelletier DL, Frongillo EA Jr, Schroeder DG, Habicht JP. A methodology for estimating the contribution of malnutrition to child mortality in developing countries. J Nutr.1994 Oct;124(10 Suppl):2106S-22S.
2. Rice AL, Sacco L, Hyder A, Black RE. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. Bull World Health Organ.2000;78(10):1207-21.
3. Schaible UE, Kaufmann SH. Malnutrition and infection: complex mechanisms and global impacts.PLoS Med.2007 May;4(5):e115.
4. WHO/UNICEF/WFP/SCN Joint statement. Community-based management of severe acute malnutrition.Geneva,New York,Rome.2007.
5. UNICEF.State of the world's children [Internet].2007.Available from:URL http://www.unicef.org/sowc07.
6. Ramírez Prada D, Delgado G, Hidalgo Patiño CA, Pérez-Navero J, Gil Campos M. Using of WHO guidelines for the management of severe malnutrition to cases of marasmus and kwashiorkor in a Colombia children's hospital. Nutr Hosp.2011 Sep-Oct;26(5):977-83.
7. Teferi E, Lera M, Sita S, Bogale Z, Datiko DG, Yassin MA. Treatment outcome of children with severe acute malnutrition admitted to therapeutic feeding centers in Southern Region of Ethiopia. Ethiop J Health Dev.2010;24(3):234 –38.
8. Mexitalia M, Nugroho YT, Susanto JC. The effect of soybean formula and formula 100 supplementation on the growth of preschool children.Pediatr Indones. 2005;45:256-63.
9. Dube M, Rongsen T, Mazumder S, Taneja S, Rafiqui F, Bhandari N,et al. Comparison of Ready-to-Use Therapeutic Food with Cereal Legume-based Khichri Among Malnourished Children. Indian Pediatr.2009;46:383-88.
10. Akram DS, Bharmal FY, Hussain T. PediaSure in the Treatment of Severe Malnutrition in Pakistani Children. J Pak Med Assoc.2000;50(11):377-80.
11. Pelletier DL, Frongillo EA Jr, Schroeder DG, Habicht JP. The effects of malnutrition on child mortality in developing countries. Bull1995;73(4):443-8.
12. Nahar B, Hossain MI, Hamadani JD, Ahmed T, Huda SN, Grantham-McGregor SM, et al. Effects of a community-based approach of food and psychosocial stimulation on growth and development of severely malnourished children in Bangladesh: a randomised trial. Eur J Clin Nutr. 2012 Jun;66(6):701-9.
13. Nutrition[Internet].2012.Available from: http://www.who.int/nutrition/topics/severe_malnutrition/en/index.html
14. UNICEF . National Guidelines for the Management of Severely Malnourished Children in Bangladesh[Internet].2007 May.Available from: URL:www.unicef.org/bangladesh/SAM_Guideline.pdf.
15. Rytter MJH, Kolta L, Briend A, Friis H, Christensen BV. The immune system in children with malnutrition- A systematic review. PLoS ONE. 2014;9(8):e105017. doi:10.1371/journal.pone.0105017.
16. Diop EI, Dossou NI, Ndour MM, Briend A, Wade S. Comparison of the efficacy of a solid ready to use food and a liquid, milk based diet for rehabilitation of severely malnourished children: a randomized trial. Am J Clin Nutr. 2003;78:302-7.
17. Yebyo HG, Kendall C, Nigusse D, Lemma W. Outpatient Therapeutic Feeding Program Outcomes and Determinants in Treatment of Severe Acute Malnutrition in Tigray, Northern Ethiopia: A Retrospective Cohort Study. PLoS ONE. 2013;8(6):e65840. doi:10.1371/journal.pone.0065840