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EFFECT OF NUTRITIONAL BOLUS WITH PLANNED TEACHING PROGRAMME ON PROTEIN ENERGY MALNUTRITION

Dr. M.A. SAHBANATHUL MISSIRIYA*

Associate Professor, Saveetha College of Nursing, Saveetha University, Thandalam. Chennai. 602 105. India.

ABSTRACT

Childhood constitutes the foundation of adult productivity, and nutrition is the major determinant of this foundation. True experimental design was adopted to determine the effect of nutritional bolus on protein energy malnutrition among preschool children. From north Chennai, in control group 168 children and in intervention group 174 children with grade I & II malnutrition according to IAPA classification were selected randomly. Nutritional bolus is food with mixed powder(100gms) made by grinded Rice(30gms), Soya(20gms), Groundnut(20gms), Bengal gram(10gms) and Jaggery(20gms)] were provided to all children regularly for 6 months in experimental group with planned teaching pogramme on PEM. 59.8% improvement was observed after intervention. There was highly significant association between age group and sex of the children with grading of underweight, stunted and wasted and also mid-arm circumference impairment (P<0.001). The study concluded that nutritional bolus on PEM was effective to improve the nutritional status of children.

KEYWORDS: ***Nutritional bolus, Protein energy malnutrition, IAPA grade, Preschool children.***

M.A. SAHBANATHUL MISSIRIYA
Associate Professor, Saveetha College of Nursing, Saveetha University, Thandalam. Chennai. 602 105. India.

***Corresponding author**

INTRODUCTION

Children represent the future, and ensuring their healthy growth and development ought to be a prime concern of all societies[1]. Early childhood constitutes the foundation of adult productivity, and nutrition is the major determinant of the quality or strength of this foundation.Child's health includes physical, mental and social well-being[2]. All parents must know the basics of keeping their children healthy, like offering them healthy foods, making sure of getting enough sleep and exercise and insuring their safety. It is also important to check the development of the children because it is a good time to prevent health problems[3]. Growth is one of the best indicators of good health and nutrition in children. Healthy food choices are necessary for child's growth. Nutrients are substances that are crucial for human life, growth & well-being. Among the nutritional problems Protein Energy Malnutrition (PEM) has been identified as a major nutritional problem in India. It is not only an important cause of childhood morbidity and mortality, but also leads to permanent impairment of physical and mental growth of those who survive[4]. The current concept of PEM is that its clinical forms – Kwashiorkor & Marasmus, are two different clinical pictures at opposite poles of single continuum[5]. United Nations Children's Emergency Fund (UNICEF) in the year 2008, estimated that 146 million under-five children were under weight in the developing world. India accounts for 57 million of them. It is also attributed 50 % of childhood deaths in India due to malnutrition[6]. According to Indian Academy of Pediatrics Association (IAPA), PEM can be classified as underweight, stunted and wasted by using anthropometric measurements of children[7]. The impact of nutritional therapy on quality of life and food intake was indicated by Rufenacht U, et al.,(2010). The nutritional therapy group received individual nutritional counseling and interventions, including oral nutritional supplements if appropriate, by a dietician. The oral nutritional supplement group received oral nutritional supplements in addition to hospital meals without further instruction or counseling. They concluded that the both interventions caused a significant increase in energy and protein intakes and quality of life. In the nutritional therapy group, every patient received an efficacious individualized intervention[8].

PEM is more prevalent in urban slum areas resulting from poor nutritional intake, bad hygiene practices and frequent infections. It is an important indicator of the health of the country; hence there is a need for adequate preventive and control measures for PEM. These measures may vary from clinical measures to public health measures such as dietary diversification,food fortification, anti parasite prophylaxis, food supplementation and health education. If not adequately treated, some children may progress towards severe acute malnutrition which is life threatening conditions. Thus improving nutritional status is essential for achieving the Millennium Development Goals (MDGs). Therefore, the management of PEM should be a public health priority[9]. The objectives of the research were to evaluate the effectiveness of nutritional bolus on outcome of PEM in experimental group and to associate the selected socio demographic variables with the effectiveness of nutritional bolus.

MATERIALS AND METHODS

A randomized interventional study with true experimental design was adopted to determine the effectiveness of nutritional bolus on PEM among children residing at slums in north Chennai. The preschool children with grade I & II underweight according to IAPA classification residing at the slums of selected zones from north Chennai were selected as samples by using simple random sampling technique for evaluating the effectiveness of nutritional bolus on PEM. In that 174 children were experimental and 168 children were control group. Complete demographic data was obtained from both groups. Weight, Height and Mid arm circumference were assessed to identify underweight, stunted, wasted and mid arm circumference impairment. Nutritional bolus, the

food from mixed powder (100gms) made by grinded Rice (30gms), Soya (20gms), Groundnut (20gms), Bengal gram (10gms) and Jaggery (20gms) which was served to the children of intervention group in the form of Ball for 6 months. This was prepared monthly twice in home setup and served to children daily at 4-5 pm. The nutritive value of each 100gms nutritional bolus after preparation gives energy 344.8Kcal, Protein 17.304gms, Calcium 106.3mg and Iron 7.988mg. Nutritional advice was provided to the control group. Post test was conducted to assess the anthropometric measurements after 6 months among children of both groups.

RESULTS

Among 168 children in control group, 82(49%) were 3 years old. Totally, 94(56%) were boys and 74(44%) were girls, 120(71%) were non vegetarian. 116(69%) were never gone to balwadicentre, remaining were irregular. Regarding occurrence of respiratory infection within 6 months, 57(34%) was affected once. Among 174 children in experimental group, 92(53%) were 3 years old. Totally, 89(51%) were boys and 85(49%) were girls, 120(69%) were non vegetarian. 124(71%) were never gone to balwadicentre, remaining were irregular. Regarding occurrence of respiratory infection within 6 months, 66(38%) was affected once.

Figure 1

Frequency and percentage distribution of underweight among children

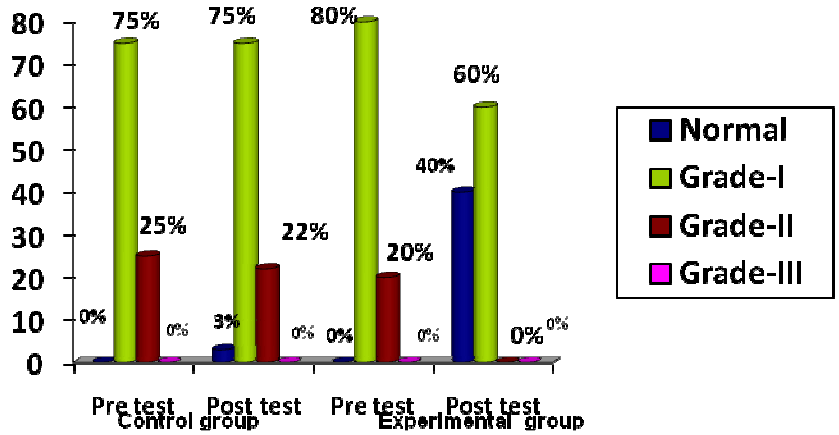

Figure.1 shows the frequency & number percentage distribution of underweight. Out of 168 children in control group, 75% were in Grade I and 25% in Grade II in Pretest. But in posttest, 3% were normal, 75% in Grade I & 22% were in Grade II. Out of 174 children in experimental group, 80% were in Grade I and 20% in Grade II in Pretest. But in posttest, 40% were normal, 60% in Grade I & no one was in Grade II.

Figure 2
Frequency and percentage distribution of stunted among children

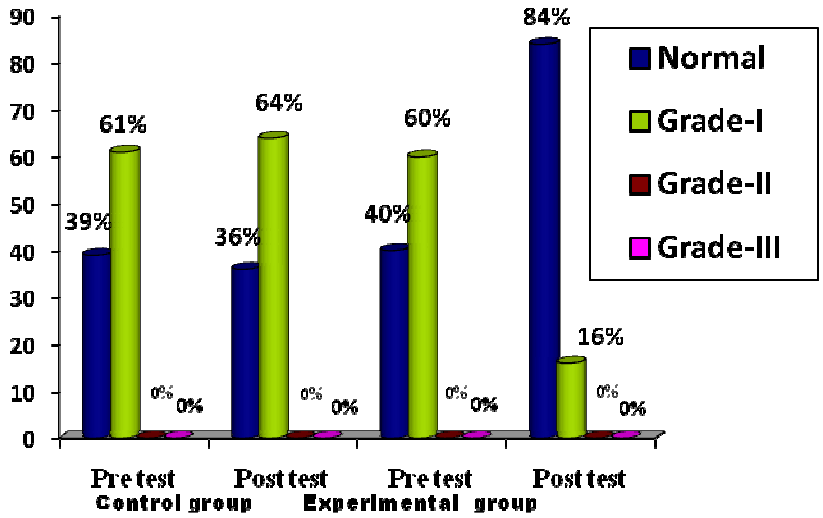

Figure.2 shows the frequency & number percentage distribution of stunted. Out of 168 children in control group, 61% were in Grade I and 39% normal in Pretest. But in post test, 36% were normal & 64% were in Grade I. Out of 174 children in experimental group, 60% were in Grade I and 40% normal in Pretest. But in posttest, 84% were normal, 16% in Grade I & no one was in Grade II.

Figure 3
Frequency and percentage distribution of wasted among children

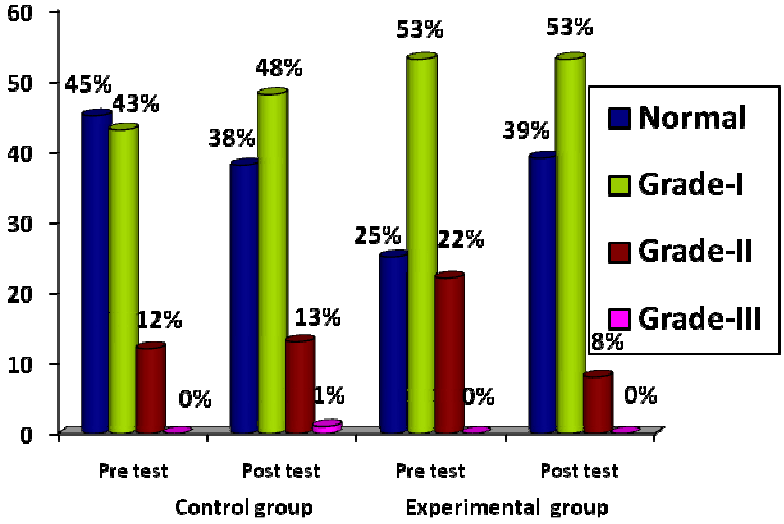

Figure.3 shows the frequency & number percentage distribution of wasted among children in control and experimental group. Among control group, 45% were normal, 43% were grade I, 12% grade II in pretest and 38% were normal, 48% grade I, 1.3% was Grade II in posttest. Among experimental group, 25% were normal, 53% were grade I, 22% grade II in pretest and 39% were normal, 53% grade I and 8% were Grade II in post test.

Table 1
Paired "t"-test for nutritional bolus on PEM among children in experimental group n=176

Anthropometry	Pre test		Post test		't'-value	P-value
	Mean	SD	Mean	SD		
Weight	11.5	1.2	13.1	1.3	59.2	<0.001 S
Height	99.8	4.4	99.7	4.3	54.9	<0.001 S
MAC	14	0.7	14.6	0.7	70.4	<0.001 S

S- Significant

Table.1 shows among children in experimental group, the't' value for weight, height & MAC was 59.2, 54.9 & 70.4 respectively which were highly significant (P<0.001).

Table 2
Mann-Whitney 'U' test for nutritional bolus on PEM among children in posttest of control and experimental group

PEM	'T' Value	P-value
Under weight	9.9	<0.001
Stunted	9.2	<0.001
Wasted	0.7	0.483
Mac-grade	7.6	<0.001

Table.2 shows Mann-Whitney 'U'-test for nutritional bolus on PEM in selected parameters among children. The 'T' value for underweight, stunted, wasted & MAC-grade was 9.9, 9.2, 0.7 & 7.6 respectively in which underweight, stunted & MAC grade was highly significant (P<0.001).

There was significant association between age & sex and underweight in pretest, age of children and underweight in posttest (P<0.01) among control group. There was significant association between mother's occupation and number of under5 children and grades of underweight in pretest (P<0.01) among experimental group. There was significant association between father's age and grades of underweight in pre and posttest (P<0.05) among control group.There was significant association between respiratory infections of child and grades of underweight in pretest (P<0.001) among experimental group. There was no significant association between demographic variables of family and grades of underweight in pretest and posttest among experimental group.

DISCUSSION

Paired "t"-test for nutritional bolus on Protein energy malnutrition in selected parameters among children in control group showed that the 't' value for weight, height & MAC was 59.2, 54.9 & 70.4 respectively which were highly significant (P<0.001). Mann-Whitney 'U'-test for nutritional bolus on Protein energy malnutrition in selected parameters among children in experimental group showed that the z- value for underweight, stunted, wasted & MAC-grade was 10.2, 8.8, 4.3 & 6.6 respectively which were highly significant (P<0.001). S. Biswas, K. Bose, A. Mukhopadhyay (2009) had done a study on age and sex variations in height and weight, and levels of stunting, among 673 (boys = 323; girls = 350) 1-5 years old rural children of Bengalee ethnicity at 30 Integrated Child Development Services (ICDS) Centers of Chapra Block, Nadia District, West Bengal, India. Height-for-age (HAZ) was used to evaluate stunting following the National Center for Health Statistics (NCHS) Guidelines. Results showed that boys were significantly heavier and taller than girls at ages 2-4 years. Significant age differences existed in mean height and weight in both sexes. Mean HAZ was less than those of NCHS for both sexes at all ages. The overall stunting was 39.2 %. The prevalence of

stunting was higher among boys (43.4 %) than girls (35.4)[9]. Based on WHO classification, overall prevalence of stunting was very high (≥ 40 %) among boys and high (30-39 %) among girls. The study concluded that, nutritional status of the subjects is unsatisfactory indicating a major public health problem. There is scope for much improvement in the form of enhanced supplementary nutrition[10].

AbolfazlPayandeh, et al.,(2012) had conducted a population based study on prevalence of malnutrition among preschool children in northeast of Iran. The study was estimated the rate of underweight, stunting and wasting among preschool children in northeast of Iran. A cross sectional population based study was conducted and 70339 children; 35792 males and 34547 females were recruited. The primary outcome variables were; weight, height, age and gender of the children. The sex and age specific rate and overall rate of underweight, stunting, and wasting were calculated. The rate of underweight, stunting, and wasting was 7.5%, 12.5% and 4.4% respectively. There were significant differences in stunting and wasting rate between boys and girls. The overall rate of stunting was significantly higher than the overall rates of underweight and wasting. The rate of malnutrition increased with child's age. In compare to WHO criteria, the rate of malnutrition among this study population was low. According to the higher rate of stunting, the main goal of future research and interventions must be finding the causes of deficiency in height growth and improving it[11].

CONCLUSION

PEM is an important public health problem in India. The occurrence of PEM is more in children of 3-6 years of age group and also it has linear trends which mean as the age increases the prevalence rate is decreasing[12]. So the mothers of the children should pay special attention towards nutrient need of them at the earliest. The PEM is higher in children of mothers with primary education because of lack of awareness. The extent of malnutrition can be countered by educating the parents with respect to basic nutritional requirements of their children and encouraging them to consume locally available low cost foods[13]. If child's health improved, the country status will improve definitely[14]. As the literacy status of the parents has been revealed to be strongly associated with nutritional status of children, there is an increasing need to focus the efforts towards the parents to improve the nutritional status of primary school children[15]. Maternal factors significantly affect a child's nutritional status[16,17]. Thus encourage the people in improving the social status of women so as to have healthy children and thereby a healthy future.

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