Original Article

POSITIVE DEVIANCE APPROACH AND SUPPLEMENTARY NUTRITION UNDER ICDS SCHEME ON IMPROVEMENT OF NUTRITIONAL STATUS OF 2–6 YEAR CHILDREN IN RURAL BANGALORE

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ABSTRACT

Introduction: Childhood malnutrition is a significant health problem in India and important cause for childhood morbidity and mortality. Lack of knowledge about child feeding contributes significantly to poor nutritional status among children. A system to deliver nutrition education effectively would be of value in India. Hence, the present study was designed to assess nutritional status of 2 to 6 year Anganwadi children and to evaluate effect of nutrition education and supplementary nutrition on nutritional status of malnourished Anganwadi children

Methods: An Interventional study was carried out in rural anganwadi centres selected by cluster sampling technique. Intervention was done in the form of Nutrition education based on positive deviance approach, supplementary nutrition and supervision. Weight for age of study participants was measured every quarter for a period of one year.

Results: The prevalence of underweight initially was 47.3%. After intervention prevalence reduced to 43%, 40%, 32% and 30 % during first, second, third and fourth quarter assessment. The improvement was significant between baseline and first quarter assessment (P<0.01), between second and third quarter assessment (P<0.001) and between third and fourth quarter assessment (P = 0.03) though not significant between first and second quarter assessment.

Conclusion: Nutrition education based on positive deviance approach and supplementary nutrition helps to improve the nutritional status of the anganwadi children.

Keywords: Protein energy malnutrition, Positive deviance approach, Supplementary nutrition, Anganwadi centres

INTRODUCTION

Good nutrition is a fundamental requirement for positive health[1]. Children between 1 to 6 years of age in India constitute 15% of the total population[2]. In India 43% of children below 5 years of age are underweight (<2SD) and 15.8% severely underweight (<3SD).[3]

Malnutrition increasing a child's risk of dying.[4] Lack of food is not the sole cause of malnutrition. Lack of awareness and knowledge about feeding amount, frequency, type of food, etc., contributes significantly to poor nutritional status among children.[5]

Some of the reasons for the lack of improvement in nutritional status in ICDS areas includepoor nutrition

education to improve feeding practices at home, inadequate training of workers on nutrition andgrowth monitoring, irregularities of food deliveries to anganwadis and hence irregular feeding and poor supervision.[6]

As there are few follow up studies following intervention published as on date, the present study was undertaken to address a few of the above mentioned reasons for lack of improvement in nutritional status of preschool children under ICDS scheme and to evaluate the effect of nutrition education, supervision and supplementary nutrition on nutritional status of 2 to 6 year children under ICDS scheme in rural area.

MATERIALS AND METHODS

The present study was an interventional study carried out in Sarjapura, which is a rural field practice area of Vydehi Institute of Medical Sciences and Research Centre, Bangalore. The study was carried out over a period of one year from January 2010 to December 2010. Cluster sampling technique was adopted to select study subjects, The whole Sarjapura area was divided into four equal quadrants geographically. There were total 2079 children enrolled in the 35 Anganwadi centres. From each quadrant, Anganwadi centres were selected randomly and from each selected Anganwadi, all children aged between 2-6 years were included in the study. Children who were not attending Anganwadi regularly and severely ill children were excluded from the study. Based on the study by Mandal et al.,[7] the prevalence of underweight for preschool children was 63.3%, assuming for present study the prevalence rate 63% at 95% confidence level and 10% of allowable error, the sample size required was calculated as 226. A total of 19 Anganwadi centres with 245 children aged between 2-6 years were included. Ethical clearance was obtained from the Institutional ethics committee and permission of Anekal Taluk CDPO was taken before starting the study.

A pretested semi structured questionnaire was used and mothers of undernourished children were interviewed. A meticulous enquiry was done on dietary habits and the daily dietary intake of each child was calculated by 24 hours recall method. General physical examination including recording of anthropometry was done. This was followed by relevant systemic examination. Weight of the child was measured without any footwear and with minimal clothing and recorded to the nearest 0.1kg (accuracy of 100g) using Salter's weighing scale. The scale was zeroed before each session. Children below 80% of expected weight for age according to IAP classification were considered as underweight.

Intervention design: In the present study intervention was done in the form of Nutrition education, Supplementary nutrition and supervision.

Nutrition education: Target group for nutrition education was mothers or caretakers of anganwadi children who were undernourished. Education activities were carried out in local language (Kannada) using printed material like posters and charts once in 3 months in each selected Anganwadi centres on predefined date and time. At least four lectures or activities were implemented in each anganwadi centre during the 1-year study period.

Positive Deviance Approach: Based on positive deviance strategy, from each anganwadi centre, 4-6 mothers who had children with normal weight for age and who were willing to participate voluntarily in education programmes were identified as successful mothers. These successful mothers were interviewed to collect information regarding child feeding, care giving and health seeking practices which helped them to achieve normal growth status of their children. These mothers were given a short training before each education session in their respective Anganwadi centres on how to communicate these successful behaviors to other mothers who had malnourished children. These successful mothers were allowed to share their experiences during education sessions.

Supplementary nutrition: Food provided in Anganwadi centres under ICDS scheme was used as supplementary nutrition. Double the quantity was served to the children who had grade II protein energy malnutrition.

Supervision: Supervision was done for regularity of food supply and maintenance of hygiene during cooking and serving of supplementary food to anganwadi children by Anganwadi workers. Regular supply of drugs for periodic deworming and vitamin-A supplementation was ensured by the author. Regular health check-up of Anganwadi children was conducted, treatment of minor illnesses was given at Anganwadi centres and the children who required specialty care were referred to pediatricians at Vydehi Institute of Medical Sciences and Research Centre.

Assessment of the intervention: Nutritional status of the study children was assessed based on weight for age, according to IAP classification once in 3 months for a period of one year.

Statistical analysis: Data thus obtained was coded and entered into Microsoft excel worksheet. This was analyzed using SPSS version 17 and OpenEpi version 2.3.McNemar test was used to find out significance of improvement in weights of children after intervention.

RESULTS

The study was conducted among 245 children aged 2-6 years. During follow-up over a period of one year after intervention 13(5.3%) children were lost to follow up due to migration. Out of 245 children, 121(49.4%) were boys and 124(50.6%) were girls. Majority 200(81.6%) of children were Hindus and 220(89.8%) of fathers and 208(84.9%) mothers were literate. Most of the children belonged to Socio-economic status class

III 149(60.8%) according to modified B G Prasad classification (updated in 2009).

It was found that 116(47.3%) of the children were underweight. There were 87(35.5%) children in grade I PEM and 29(11.8%) in grade II PEM. No child was of grade III and IV during baseline assessment **(Table 1)**.

During first quarter assessment, 13 children improved their weights to the normal level (> 80% of expected weight for age), the number of underweight children reduced to 103(43%). This difference was significant statistically ($p < 0.001$) **(Table 2)**. It was observed that weight of one child dropped from grade II to grade III PEM during first quarter assessment **(Table 1)**.

During second quarter assessment 5 children were lost to follow-up because of migration. Children who were lost to follow up were not taken into consideration while comparing first and second quarter assessment. The number of underweight children during second quarter was reduced to 96(40%). Though 5 children improved in their nutritional status this was not statistically significant between first and second quarter assessment ($p = 0.070$) **(Table 2)**. The child who was in grade III PEM during first quarter assessment remained in same grade during second quarter also. Mother of this child was interviewed personally during home visits. It was found that she was an illiterate working mother separated from her husband and belonged to class IV socioeconomic status. Lack of knowledge on nutrition, poor feeding practices at home and poverty were the main reasons behind her child's poor nutritional status. Nutrition education was given and she was encouraged to attend education sessions in the Anganwadi centres regularly.

During third quarter the number of underweight children reduced to 77(32%). Compared to second quarter assessment this improvement was highly significant statistically ($p<0.001$) **(Table 3)**. The child who was in grade III PEM during first and second quarter assessment improved to grade II PEM during third quarter assessment.

Table 1: Nutritional status of children during baseline, first, second, third and fourth quarter assessment

Assessment of weight	Normal	Underweight					Total
		Grade I	Grade II	Grade III	Grade IV	Total	
Baseline Assessment	129(52.6%)	87(35.5%)	29(11.8%)	-	-	116(47.3%)	245
First Quarter	142(57.9%)	82(33.4%)	22(8.9%)	1(0.4%)	-	103(42.7%)	245
Second Quarter	144(60%)	80(33.3%)	15(6.2%)	1(0.4%)	-	96(40%)	240
Third Quarter	163(67.9%)	67(27.9%)	10(4.2%)	-	-	77(32.1%)	240
Fourth Quarter	162(69.8%)	62(26.7%)	8(3.4%)	-	-	70(30%)	232

Table 2: Comparison of baseline versus first quarter assessment and first quarter versus second quarter assessment of weight for age

Comparison of baseline versus first quarter assessment of weight for age					
		First quarter assessment		Total	P value
		Normal	Underweight		
Baseline assessment	Normal	129	0	129(52.6%)	<0.001
	Underweight	13	103	116(47.3%)	
	Total	142(57%)	103(43%)	245	
Comparison of first versus second quarter assessment of weight for age					
		Second quarter assessment		Total	P value
		Normal	Underweight		
First quarter assessment	Normal	138	1	139(57.9%)	0.070
	Underweight	6	95	101(42 %)	
	Total	144(60%)	96(40%)	240	

Table 3: Comparison of second versus third quarter assessment and third versus fourth quarter assessment of weight for age

Comparison of second versus third quarter assessment of weight for age					
		Third quarter assessment		Total	P value
		Normal	Underweight		
Second quarter assessment	Normal	144	0	144(60%)	<0.001
	Underweight	19	77	96(40%)	
	Total	163(68%)	77(32%)	240	
Comparison of third versus fourth quarter assessment of weight for age					
		Fourth quarter assessment		Total	P value
		Normal	Underweight		
Third quarter assessment	Normal	157	0	157(67.6%)	0.0313
	Underweight	5	70	75(32.2%)	
	Total	162(69.8%)	70(30%)	232	

Between third and fourth quarter assessment 8 children were lost to follow up because of migration.

In the fourth quarter the number of underweight children reduced to 70(30%). Compared to third quarter assessment this improvement was significant statistically (p = 0.031) **(Table 3)**. Repeated intervention showed significant improvement in nutrition status of undernourished children.

DISCUSSION

The underfed still outnumber the overfed in the developing world among Asian, African and Latin American population. In spite of economic advances in the region, undernutrition remains significant problem in many Asian countries.[8]

The results of the present study showed that 47.3% of children were in various grades of PEM while 52.7% were normal during baseline assessment according to IAP classification. 35.5% and 11.8%of children were in grade I and grade II PEM respectively. There was no child in grade III and grade IV PEM.

According to NFHS 3 (2005-06) [3], 43% of children under five years of age were underweight which is nearer to the results of the present study. In other studies, [8-12] 51.97% - 67% of the children were undernourished.

Above studies on underweight, demonstrated high levels of PEM compared to the present study. These findings suggested widespread malnutrition among preschool children.

Kindergarten based education is a popular method for conducting nutrition intervention for preschoolers and parental involvement influences the effects of any intervention in a positive manner. Because parents are responsible for planning, shopping and preparing their childrens' meal, their nutrition knowledge and behaviors have an impact on development of their childrens' eating behavior.[12]

The present study was one among the few interventional studies conducted in developing countries to assess the impact of nutrition intervention programme based on positive deviance strategy on nutritional status of preschool anganwadi children.

The intervention programme produced significant beneficial changes in nutritional status of the undernourished children. It appears that good foods, good child care, and good health care taught during repeated nutrition education sessions and the growth monitoring and promotion sessions over a period of one year with the utilization of positive deviance strategy did help in better nutritional outcomes in our study.

An earlier study by Ghoneim EH et al (2004) [13] indicated that following an intervention programme which included 2 meals per day, nutrition education for parents and training for supervisors the childrens' nutrition status improved. Another study by Amani R et al (2006) [14] which employed nutrition education alone did not show any changes in anthropometric data. This may be due to difference in intervention measures or lack of time period involved. A study conducted by Chaunlai Hu et al (2009) [12] to evaluate Kindergarten-based nutrition education intervention for preschool children found a significant improvement in nutrition knowledge among intervention group parents though it failed to detect significant effect on height and weight of study children. A study by Agnes TM et al (2002) [15] on sustained positive deviance child care practices showed that, younger children from the study group were nutritionally better than those in comparison group and this difference was statistically significant. In a study by Kiralu A et al (2005) [5] it was observed that female infants enrolled in the intervention group had growth velocity 77g per month greater than non intervention girls and this difference was statistically significant.

CONCLUSION

In conclusion, the positive deviance approach in nutrition education sessions along with supplementary nutrition has been very useful in improving the nutritional status of 2 to 6 year children in Anganwadi centres in Bangalore rural area.

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REFERENCES

1. BhalwarRajvir, Rajesh Vaidya, RinaTilak et al. Text book of Public Health and Community Medicine, 1st ed. Pune: Department of Community Medicine, Armed Forces Medical College; 2009. p 713.
2. Tripathi MS, Sharma V. Assessment of nutritional status of pre schoolers in slum areas of Udaipur city. Indian J Public Health 2006;50(1):33–4.
3. International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005–06: India: Volume I. Mumbai: IIPS. Available at: http://www.measuredhs.com/pubs/pdf/FRIND3/00FrontMatter00.pdf. Accessed May 01st 2011
4. WHO Messages for World Health Day 2005. Available at: http://www.who.int/world-health-day/previous/2005/toolkit/messages/en/index1.html. Accessed May 01st, 2011.
5. Kilaru A, Griffiths P.L, Ganapathy S, et al. Community-based Nutrition Education for Improving Infant Growth in Rural Karnataka. Indian pediatrics 2005;42:425-32.

6. Kishore J. National Health Programmes of India, 7thed. New Delhi: Century publications; 2007. p 351.

7. Gopal Chandra Mandal, Kaushik Bose, SamiranBisal. Thinness among rural children in Bengal. Indian J Pediatr 2009;76:817-19.

8. 8. Mandal GC, Bose K, Bisai S, et al. Undernutrition among ICDS scheme children aged2 – 6 years of Arambag, Hoogly District, West Bengal, India: A serious public health problem.IJPH 2008; 5(1):28-33.

9. Ehtisham Ahmad, Zulfia khan, Najamkhalique, et al. A study of utilization of integrated child development services in 1 – 5 years old children registered with rural health training center, Jawan, Aligarh, UP. Indian J PrevSoc Med 2005;36(3&4):137-42.

10. Chakraborty S, Gupta SB, Chaturvedi B, et al. A study of protein energy malnutrition (PEM) in children (0 to 6 year) in a rural population of Jhansi district (U.P). Indian J Community Med 2006; 31(4):164-8.

11. Md Salim Shakur, Melek MA, NasreenBano, et al. Serum and hair zinc in severely malnourished Bangladeshi children associated with or without acute lower respiratory infection. Indian J Pediatr 2009;76:609-14.

12. Chuanalai Hu, Dongquing Ye, Yingchun Li, et al. Evaluation of a Kindergarten nutrition education intervention for pre-school children in China. Public Health Nutrition 2010;13(2):253-60.

13. Ghoneim EH, Hassan MH, Amine EK. An intervention programme for improving the nutritional status of children aged 2-5 years in Alexandria. East Mediterr Health J 2004;10(6):828-43.

14. Amani R, Soflaei M. Nutrition education alone improves dietary practices but not hematologic indices of adolescent girls in Iran. Food nutr Bull 2006;27(3):260-4.

15. U. Agnes Trinh Mackintosh, David R. Marsh, Dirk G. Schroeder. Sustained positive deviant child care practices and their effects on child growth in Viet Nam. Food and Nutrition Bulletin 2002;23(4):16-25.