Study of Socio-Demographic Factors Associated with Protein Energy Malnutrition in Less than Six Year Children in Field Practice Area of Rural Health Training Centre

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Research Article

Abstract: **Study objectives**: In spite of a large number of national programmes related to nutrition such as ICDS, mid-day meal, etc., about 6600 under-five children die every day, accounting to 46% child deaths due to protein energy malnutrition (PEM) in India, so considering the PEM , important nutritional problem and as ICDS, programme render the services to children less than six years of age, present study was undertaken to assess the nutritional status of children ageing less than six years of age residing in rural field practice area of Rural Health Training Centre of medical college. **Methodology**: Present study is cross-sectional, observational study in field-practice area and sample size was selected by simple random sampling method. **Results:** Overall prevalence of undernutrition in 0-72months (0-6 yrs) age group was 58.61%. Undernutrition was more in 49-60 months age group (70.21%) than other age group. Undernutrition was more among children whose mothers were illiterate or primary-secondry educated and less in higher and graduated, this difference was highly significant (χ^2_5=362.93, p<0.001). Undernutrition was highest among children belonging to unemployed fathers, least in children whose fathers were owner and cultivators (χ^2_4=272, p<0.0001).Proportion of undernutrition was highest in class V socio-economic-category children, where as lowest in children belonging to class I category. It is also clear that as socio-economic-status increases proportion of undernutrition decreases which was statistically highly significant. (χ^2_4 =141, p<0.001). **Conclusion:** In spite of various schemes for children to decrease malnutrition, still the PEM is high in the study area; an integrated approach is required to curb this problem.

Key words: Protein Energy Malnutrition (PEM), Under-weight, Under-nutrition, Malnutrition, Nutritional-status.

Introduction

Children are considered to be backbone of any nation. India is considered home to the largest number of underweight and stunted children in world. Nutritional problems among children cause major morbidity and mortality in India[1]. PEM is identified as major health and nutrition problem in India. It occurs particularly in weakling and children in the first year of life. It is not only an important cause of childhood morbidity & mortality but also leads to permanent impairment of physical and possibly of mental growth of those who survive[2]. Exhibiting a sluggish trend over past decade and half the recent estimate from the National Family Health survey -3(NFHS-3)-the unique source for tracking the child malnutrition in India – indicates about 43 percent of children under 5 years of age are underweight (thin for age), 48 percent are stunted (short for age), and approximately 20 percent are moderately to severely wasted (thin for height) [3]. The decline in prevalence however becomes unimpressive with the average levels marked by wide inequality in childhood malnutrition across the states and various socio-economic groups[4,5]. The UN ranks India in the bottom quartile of countries by Infant mortality (the 53rd highest), and under-5 child mortality (78 deaths per 1000 live births) [6]. According to the 2008 CIA fact book, 32 babies out of every 1,000 born alive, die before their first birthday[7]. In spite of a large number of national programmes related to nutrition such as ICDS, mid-day meal, etc., about 6600 under-five children die every day, accounting to 46% child deaths due to protein energy malnutrition (PEM)[8]. Considering the PEM , important nutritional problem and as ICDS, programme render the services to children less than six years of age, present study was undertaken to assess the nutritional status of children ageing less than six years of age residing in rural field practice area of Rural Health Training Centre of medical college.

Methodology

The present study was conducted during 1st Oct 2010- 30th Sep 2011. Community based, cross sectional study. The study was undertaken in rural field practice area of the department of community medicine of government medical college. According to ICDS August 2010 survey the rural block has total population of 12329 children in age group of 0-6. The ICDS block, in which

RHTC was situated, had two ICDS sub blocks, one was selected randomly which consisted population catered by 4 primary health centers. List of all villages under these 4 primary health centers was prepared and the villages were selected randomly by lottery system to examine all under six children and interview their parents till desired sample size is achieved.

Sample size was estimated by the formula,

$n = \frac{4pq}{l^2}$, Where n= Sample size, p=prevalence of underweight children=47% [9, 10.] q= 100-p= 100-47=53%, l= allowable error=10% of p = 4.7, n = 450 was the minimum sample size, 476 under-six children were included in the study.

Children under six years of age and are living in the same area for past 1 year or more were selected, Children living in the study area, for less than1 year were excluded.

Data collection: Data was collected using semi structured; predesigned & pretested questionnaire by interviewing parents and thorough clinical examination of all 476 under six children from randomly selected villages during 1st Oct 2010 to 30th Sep 2011.

Study tools: Predesigned proforma consisting of standard questions related to socio –demographic factors were asked.Weight measurement was recorded to nearest 100 gm using Salter's baby weighing apparatus for infants and standard weighing machine for children above 1 yr. Height of the children was recorded to nearest 1 cm, with the help of markings on wall. For children below 24 month of age, length was measured using infantometer.

Underweight [28]: WHO's criteria was used to classify under six children into underweight (<-2SD of median weight for age) and Normal (≥-2SD of median weight for age). Underweight children further classified into moderate underweight (≥ -3 SD to < -2 SD of median weight for age) &severe underweight (< -3SD of median weight for age).

Data analysis: Data was analyzed and presented in suitable tables; chi-square test was applied to test statistical significance where ever necessary.

Results

Overall prevalence of undernutrition in 0-72months(0-6yrs) age group was 58.61%. Prevalence of undernutrition in 0-36 months (up to 3yr) age group was 57.52%. Prevalence of undernutrition in 37-72 months (>3 to 6yrs) age group was 60%. No statistically significant difference was found between prevalence of undernutrition in 0-36 months and 37-72 months age group. ($p>0.05$) (Table 1). Undernutrition was more in 49-60 months age group i.e. 70.21%.Minimum undernutrition was observed in 0-12 months age group i.e. 25.37%. Difference in age groups of under six children and nutritional status which was highly significant ($X_5^2 = 48.73$, $p<0.0001$) (Table 2). It is evident from the (table 3) that proportion of girls suffered from undernutrition was more i.e. 61.87% than boys i.e. 56.96% no significant difference was observed between boys & girls so far as undernutrition is concerned ($X^2=0.71$,$p>0.05$). Undernutrition was more among children whose mothers were educated up to secondary standard i.e. 97.87%, only 6.52% undernutrition was observed among children whose mothers were educated up to Higher-secondary standard. The Chi-square test was applied to test the difference in educational qualification of mothers and nutritional status of children which was highly significant. ($X_5^2=362.93$, $p<0.001$) (Table 4). Undernutrition was highest i.e. 98.33% among children belonging to unemployed fathers, least proportion of undernutrition i.e. 15.72% was prevailing in children whose fathers were owner & cultivators ($X_4^2=272$, $p<0.0001$) (Table 5).

(Table 6) reveals that proportion of undernutrition was highest i.e. 94.74% in class V socio-economic-category children, where as lowest i.e. 18.97% in children belonging to class I category. It is also clear that as socio-economic-status increases proportion of undernutrition decreases which was statistically highly significant. ($X_4^2 =141$, $p<0.001$).

Discussion

The prevalence of undernutrition in 0-6 yrs children was :

→ The prevalence in 0-36 months (up to 3 yr) age group was 57.52%

→ The prevalence of undernutrition in 37-72 months (>3 to 6 yrs) age group was 60%.

→The overall prevalence of undernutrition in 0-6 yrs children was 58.61%.

It is evident from the (table 1) that, no statistically significant difference was found between the prevalence of undernutrition in 0-36 month's age group and 37-72 months age group. This could be because of equal distribution of undernutrition in these two i.e. 0-36 and 37-72 months age group. These findings are in confirmation with Jaya **seelan et al (1997)[11]**, **Manish Kumar Goal et al (2007)[12], HS Joshi et al (2011)[13].**While these findings are not in confirmation with **Ray SK et al(2001)[16]** where higher prevalence was in <2yr children which was statistically significant, **S.Chakraborty et al(2006)[15]** found significantly higher undernutrition (80.9%) in the age group of 1-3. In the present study out of 476 under six children, maximum i.e. 126 belonged to 13-24 months age group and minimum i.e. 38 in the 61-72 months age group. It is clear from the table that proportion of undernutrition was maximum in 49-60 months age group i.e. 70.21%, where as minimum

in 0-12 month's age group i.e. 25.37%. The observed difference in various age groups and nutritional status was highly significant. ($p<0.0001$). This indicates that children in the 49-60 months age group are more prone to undernutrition compared to age group of 0-12 month's age. This could be because of protective effect of breastfeeding and energy needs of children were satisfied in 0-12 months age group where as in the 49-60 yrs age group the energy needs were not satisfied due to various factors like low socio economic status, low education of parents and low awareness of parent's regarding growing children and their nutritional requirement and other factors like food fads and food taboos and various cultural factors might be there. These findings are in confirmation with **Jaya seelan et al (1997)[23],** While these findings are not in confirmation with **Ray SK et al(2001)[24]** where higher prevalence was in <2yr children which was statistically significant, **S.Chakraborty et al(2006)[26]** found significantly higher undernutrition (80.9%) in the age group of 1-3. Out of 476 children maximum i.e. 316 were males and 160 were females. It is evident from the table that proportion of girls suffered from undernutrition was more i.e. 61.87% than boys i.e. 56.96%. Observed difference in sex of children and nutritional status was not significant ($p>0.05$).These findings are in confirmation with **Ray SK et al (2001)[24]**, **Arshad Farookh et al (2002)[17] , SO Ayaya et al (2004)[18],** While these findings are not in confirmation with **Bhatia et al (2007)[19]** revealed prevalence of malnutrition was higher in males 65.87% compared to females 58.9%. Out of 476 children, maximum i.e.184 belonged to mothers educated up to higher-secondary and minimum i.e. 2children belonged to post graduate mothers. It is evident that proportion of undernutrition was more among children whose mothers were educated up to secondary standard i.e. 97.87% &less i.e. only 6.52% among children whose mothers were educated up to higher-secondary standard. This indicates that low educational status among mothers contributes to undernutrition in their children.These findings are in confirmation with **RO Abidoye et al (1994) [22], Giashuddin MS et al (2003)[21]** 98.33% among children belonging to unemployed fathers and least proportion of undernutrition i.e. 15.72% was prevailing in children whose fathers were owners & cultivators. This indicates that children belonging to unemployed and labourer class fathers were more undernourished, this could be due to less earning and inability to purchase nutritious food for their children or do expenses on health of their children. These findings are in confirmation with **Swami HM et al (2000)[22], Baitun Nahar et al (2010)[26].** Proportion of undernutrition was highest i.e. 94.74% in class V socio-economic-category children, where as lowest i.e. 18.97% in children belonging to class I category. This is because of less purchasing capacity of lower socio-economic-class towards nutritious food and expenses on health. The observed difference in socio economic and nutritional status of children was statistically significant. ($p<0.001$). These findings are in confirmation with **Fahaid H Al-Hashem et al (2003)[24], Ehtisham Ahmad et al (2011)[25].**

Conclusion

Proper care of fewer than six children with special attention on nutritional care of 49-60 months age group children should be given. The overall literacy and education level should be increased by proper implementation of literacy and adult literacy campaigns. The problem of unemployment and low level of economic status should be tackled by raising employment opportunities, providing income generating activities, schemes of low interest loans for small-scale business and promoting self help groups. The importance of small family norms should also be emphasized.

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References

1. Harishankar, Dwivedi S, Darbal SB et al. Nutritional status of children Under 6 years of age. Ind J Prev Soc Med, 2004 July –Dec; 35(3&4): 156-62.
2. K.Park, Park'sTextbook of Preventive and Social Medicine, Jabalpur; 21st ed. M/sBanarsidas Bhanot Publishers; 2011: 590,491,113.
3. International Institute for Population Sciences (IIPS) & ORC MACRO: National Family Health Survey (NFHS-3), 2005-06: India 2007. Mumbai: IIPS
4. Shiva Kumar AK: Why are child malnutritional levels not improving? 2007June 23 Saturday; Opinion-Leader Page Article The Hindu.
5. Bawdekar M, Ladusingh L: Contextual correlates of child malnutrition in rural Maharashtra. Journal of Biosocial Science 2008; 40:771-86.
6. Health Education to Villages, Programmes for Mother and Child Nutrition [cited Nov 11] Available from: www.hetv.org/programmes/nutrition.htm.
7. Fact book /rank order /2091rank. [cited oct.12].Available from. https://www.cia.gov/library/publications/the-world
8. Umesh k, Sachdev HPS. Management of Children with Severe Acute Malnutrition: A National Priority. Indian pediatric, August 2010; 651-653.

9. International institute for population sciences (IIPS) & ORC MACRO: National Family Health Survey (NFHS-3)2005-2006: India 2007 Mumbai: IIPS
10. UNICEF Annual Report 2005.
11. Jeyaseelan L, Lakshman M, Risk factors for malnutrition in south Indian children. J BiosocSci.1997; 29(1):93-100.
12. Manishkumar G, Reshmi M, Ansuman D. Nutrition surveillance in 1 Year Old children in urban slum of city Northan India, The Internet Journal Of Epidemiology [serial on the Internet]. 2007 [cited 2012 Oct 2]. (Availablefrom: http://ispub.com)
13. Joshi HS, Joshi MC, Singh A, Determinants Of Protein Energy Malnutrition(PEM) In 0-6 Years Children In Rural Community Of Bareilly. IndianJ.Prev.Soc.Med.2011 Apr; 42(2):154-158.
14. Ray SK, Haldar A, Biswas B, et al, Epidemiology of undernutrition. Indian J Pediatr 2001; 68(11):1025-1030.
15. Chakraborty S, Gupta S, Chaturvedi B. A Study of Protein Energy Malnutrition (PEM) in Children (0 to 6 Year) in a Rural Population of Jhansi District (U.P.).IJCM 2006; 31(4):291-92.
16. Ray SK, Haldar A, Biswas B, et al, Epidemiology of undernutrition. Indian J Pediatr 2001; 68(11):1025-1030.
17. Farooq A, Calcutti R, Bakshi S, Nutritional Status of Under Fives on National Immunization Day in Srinagar, JK Science 2004Oct; 4(4): 177-180.
18. Ayaya SO, Esmai FO, Rotich J,Socio-economic factors predisposing under five-year-old children to severe protein energy maknutrtion at Moi Teaching and Referral Hospital,Eldoret,Kenya.East Afr Med J2004 Aug;81(8): 415- 421.
19. Bhatia V, Puri S, Swami HM et al , Malnutrition among Under-Six Children in Chandigarh: Scarcity in Plenty. Journal of Clinical and Diagnostic Research.2007 Dec; 1(6):483-487.
20. Abidoye RO, Soroh KW, Astudy on the effects of urbanization on the nutritional statsus of primary school children in Lagos,Nigeria. Afr Dent J.1994;8:20-25.
21. Giashuddin MS, Kabir M, Rahman A. Exclusive breastfeeding and nutritional status in Bangladesh.Indian J Pediatr 2003;70(6):471-475.
22. Swami HM, Thakur JS, Bhatia SP et al. National immunization day to assess nutritional status of underfives in Chandigarh.Indian J. Pediatr.2000 Jan;67(1):15-17.
23. Baitun N, Tahmeed A, Brown KH et al , Risk Factors Associated with Severe Underweight among Young Children Reporting to a Diarrhoea Treatment Facility in Bangladesh. J HEALTH POPUL NUTR 2010 Oct; 28(5):476-483.
24. Fahaid H Al-Hashem, The prevalence of malnutrition among high& low altitude pre-school children of south western Saudi Arabia. Saudi Med J 2008;29(1):116-121.
25. Ehtisham A, Khalil S,Nutritional Status In Children (1-5yrs)-A Rural Study. Indian Journal of Community Health2011Jul;23(2):84-86. Joshi HS, Joshi MC, Singh A, Determinants Of Protein Energy Malnutrition(PEM) In 0-6 Years Children In Rural Community Of Bareilly. IndianJ.Prev.Soc.Med.2011 Apr; 42(2):154-158
26. Enakshi.G, Sudha N. Nutrtional state of growth faltered children aged 0-6 in rural Rangareddy district.Journal of Dr.NTR University of Health Sciences 2012;1:27-32.
27. WHO Child Growth Standards weight-for-age [cited Nov 2012] available from http:// www.who.int/childgrowth/publications.

Tables

Table 1: Prevalence of undernutrition in under six children

Age group In months	Undernutrition		Total Under nutrition	Normal	Total
	Moderate underweight	Severe underweight			
0-36	87 (32.70)	66(24.81)	153(57.52)	113(42.48)	266(100)
37-72	88 (41.91)	38(18.09)	126(60.00)	84(40.00)	210(100)
Total	175(37.76)	104(21.85)	279(58.61)	197(41.39)	476(100)

χ^2=0.29, p>0.05, (Figures in parenthesis indicate horizontal percentages, for application of Chi-square test mild and severe underweight were grouped together.)

Table 2: Distribution of under six children according to age Group and nutritional status

Age (months)	Undernutrition	Normal	Total
0-12	17(26.15)	48(73.85)	65(100)
13-24	86(68.25)	40(31.75)	126(100)
25-36	52(69.00)	23(31.00)	75(100)
37-48	42(55.26)	34(44.74)	76(100)
49-60	66(70.21)	28(29.79)	94(100)
61-72	16(40.00)	24(60.00)	40(100)
Total	279(58.61)	197(41.39)	476(100)

χ^2_5 = 48.73, p<0.0001, (Figures in parenthesis indicate horizontal percentages)

Table 3: Sexwise distribution of under six children according to nutritional status

Sex	Undernutrition	Normal	Total
Male	180(56.96)	136(43.04)	316 (100)
Female	99(61.87)	61(38.13)	160 (100)
Total	279 (58.61)	197 (41.39)	476 (100)

χ^2= 0.71, p>0.05, (Figures in parenthesis indicate horizontal percentages)

Table 4: Distribution of under six children according to education of mother and nutritional status

Education	Undernutrition	Normal	Total
Illiterate	78 (92.86)	6(7.14)	84(100)
Primary	140(94.60)	8(5.40)	148(100)
Secondary	46(97.87)	1(2.13)	47(100)
Higher-secondary	12(6.52)	172(93.48)	184(100)
Graduate	2(18.18)	9(81.82)	11(100)
Post graduate	1(50.00)	1(50.00)	2(100)
Total	279(58.61)	197(41.39)	476(100)

χ^2_5=362.93, p<0.001(Figures in parenthesis indicate horizontal percentages)

Table 5: Distribution of under six children according occupation of father and nutritional status

Occupation	Undernutrition	Normal	Total
Owner & cultivator	25 (15.72)	134 (84.28)	159 (100)
Employed	21 (42.00)	29 (58.00)	50 (100)
Own –business	11 (30.55)	25 (69.45)	36 (100)
Student	0	0	0 (100)
Agricultural –laborer	163 (95.32)	08(4.68)	171 (100)
Dependant	0	0	0 (0)
Unemployed	59 (98.33)	01(1.67)	60(100)
Others	0	0	0 (0)
Total	279(58.61)	197(41.39)	476(100)

χ^2_4=272, p<0.0001. (Figures in parenthesis indicate horizontal percentages.)

Table 6: Distribution of under six children according to socio-economic and nutritional status

Socio-economic-status	Undernutrition	Normal	Total
I	11 (18.97)	47 (81.03)	58 (100)
II	34 (25.00)	102 (75.00)	136 (100)
III	87 (75.65)	28 (24.35)	115 (100)
IV	93 (84.55)	17 (15.55)	110 (100)
V	54 (94.74)	03(05.26)	57 (100)
Total	279(58.61)	197(41.39)	476(100)

χ^2_4=141,p<0.001,(Figures in parenthesis indicate horizontal percentages)