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A Study of Nutritional Status of Children Attending Anganwadi Centres of a District in Central India

Anil Singh Baghel[1], Saket Kale[1], Arpit Verma[1], Sanjay Kumar Chourasiya[2]

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Author's Affiliation:
[1]Assistant Professor; [2]Associate Professor, Dept of Community Medicine, Ruxmaniben Deepchand Gardi Medical College, Ujjain

Correspondence
Dr. Saket Kale
kale.saket@gmail.com

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ABSTRACT

Introduction: The burden of under-nutrition among children has not changed much even though various intervention programs are in operation in India. The study was conducted to assess the magnitude of under nutrition among children under 6 year of age and to study factors associated with under-nutrition of selected children.

Material & Methods: This community based cross sectional study had utilized two stage sampling technique. Sample size was determined by the use of formula $4pq/l^2$. In first stage, selection of anganwadi centers (AWC) was done by using simple random sampling method. In second stage, children were selected from selected AWCs.

Result: Out of total 380 children 192 boys and 188 were girls. 180 (47.4%) children were under nutrition out of which 99 (55%) children were of grade I, 62(34.4) were grade II and 19 (10.6%) children were of grade III as per the Indian Association of Pediatrics (IAP) classification of under nutrition.

Conclusion: Among the factors studied, educational status of mother and socio-economic status of family were most strongly associated with the under nutrition.

Key words: Nutritional status, Under-nutrition, Anganwadi centers, Community, Children

INTRODUCTION

Malnutrition is a silent emergency, and it continues to be a major public health problem worldwide, especially in South-East Asia and sub-Saharan Africa. It is an indicator of poor nutrition, having a major consequence on human health as well as for the social and economic development of a population.[1]

Nutrition plays a key role in physical, mental and emotional development of children and much emphasis has been given to provide good nutrition to growing populations especially in the formative years of life.[1]

The mothers and children are the major consumers of health services. They comprise approximately two-thirds of the population in the developing countries. In India, women in the childbearing age (15 - 44+ years) and children less than 15 years of age together they constitute nearly 60% of the total population.[2] According to India's national policy, "the nation's children are a supremely important asset. Their nurture and solicitude are our responsibility.[2]

The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub- Saharan Africa.[3]

The percent of Children below 6 year in Madhya Pradesh & the study District were 14.5 &13.2 respectively.[4]

The Government of India has launched the Integrated Child Development Services (ICDS) program in 1975 with the objective of improving the nutritional status of pre-school children in addition to other services.[1] The beneficiaries include children below 6 years of age, pregnant and lactating mothers and women in the age group of 15 to 44 years. The package of services provided by the ICDS Scheme includes Supplementary Nutrition, Immunization, Health Checkups, Referral Services, Nutrition and Health Education and Pre-school Education. The services are rendered essentially through Anganwadi worker at a village centre called the "Anganwadi".

Today ICDS operates through 7072 projects and 1346186 Anganwadi centers (AWCs). Covering total 10.22.crore beneficiaries under supplementary nutrition; 3.65 crore are beneficiaries between 3-6 years for Non Formal Pre-School Education.[5,6]

The burden of under-nutrition among children has not changed much even though various intervention programs are in operation in India. There is little information available regarding the factors responsible for under nutrition among the children.

With the aim of knowing the prevalence of undernutrition among children and possible association of different socio-demographic factors with under nutrition the present study was conducted.

MATERIALS & METHOD

The present study was conducted during 1st January 2017 to 31st December 2017, at Anganwadi centers of urban area of a central Indian city.

It is a community based cross sectional design utilizing two stage sampling method. A total of 4 Integrated Child Development Services (ICDS) projects functioning in urban are included with 375 Anganwadi which were functional.

Study sample size was calculated by using formula $4pq/l^2$. In Previous study prevalence of malnutrition in anganwadi children is 42.8% (NFHS-4) which was used in the present study to calculate the sample size[7]. By using formula $n = 4pq/L^2$ the calculated sample size $= 377 \approx 380$

In this study two stage sampling method has been utilized. In first stage of sampling 10 %of anganwadi centers were selected by the use of simple random sampling (N) =10 %of 375 =37.5 round up 38. Hence 38 anganwadi centers were selected in Ist stage of sampling.

In the second stage; 10 children were selected randomly from each selected Anganwadi centers. This is to ensure equal contributions from each of the selected anganwadi centers with fulfilment of minimum required sample size for the study already calculated i.e. 380. Hence, the final sample size for the study was calculated as: 38X10 =380 .

Children registered in selected anganwadies were included in the study. Those children who are not at all attending the anganwadi and those who were not present at the time of anganwadi visit were excluded from the study.

Enlisting and selection of anganwadi centers was done prior to field visit .Visit to anganwadi center was conducted followed by random selection and written informed consent was obtained from the mothers of the selected child after the purpose of study was explained .Data collection was done by using a semi-structured, pre-tested questionnaire & physical examination for minor illness .After that interview with mother of selected children was done for collection of pertaining information which includes socio-demographic profile and educational qualifications of mother. Kuppuswami classification was used for socioeconomic status [2]. Grading of under-nutrition was done by using Indian Academic of Pediatric (IAP) classification **(Table.1)**. The Data were entered in Microsoft-Excel and analyzed in statistical package for the social science)SPSS(version 16.0 software Mann . for C s'Tau Kendall ,data group two for test U -whitney for used were test square-chi and data rank rectangular of grades with respectively group more or two analysing undernutritionThe study was approved by Institutional ethics committee .

RESULT

The Mean age (in month) of the study population was 29±14. Mean age (in month) for boys was 29±14. Mean age (in month) for girls was 29±15. The proportion of malnutrition decreased as the age of child increased when observed separately for both sex. This pattern was not found when overall study population distribution as per age range was studied **(Table.2)**. The 37-48 month age group was commonest with 27% of total population.

Table.1: IAP Classification[8] of Underweight among children age (range)

Weight for age (%)	Nutritional Grade
≥ 80	Normal
70- 89.9	Grade I (Mild Undernutrition)
60-69.9	Grade II (Moderate Undernutrition)
50-59,9	Grade III (Severe Undernutrition)
< 50	Grade IV (Severe Undernutrition)

Table.2: Distribution of children by age, and nutritional grades (according to IAP classification).

Age In Months	Grades				Total (n=380) (%)
	Normal (n=200) (%)	Grade I (n=99) (%)	Grade II (n=62) (%)	Grade III (n=19) (%)	
6-12	28 (14)	9 (9.1)	7 (7.1)	1 (5.3)	45 (11.8)
13-24	45 (23)	25 (25.3)	11 (18)	9 (47.4)	90 (23.7)
25-36	34 (17)	12 (12.1)	17 (27)	4 (21.1)	67 (17.6)
37-48	59 (30)	26 (26.3)	13 (21)	4 (21.1)	102 (26.8)
49-60	22 (11)	17 (17.2)	9 (15)	1 (5.3)	49 (12.9)
61-72	12 (6)	10 (10.1)	5 (8)	0 (0)	27 (7.1)

Chi square test , χ^2 =2.392, P=0.495

Table 3: Relationship between Sex and nutritional grades

Nutritional grades	Male (n=192) (%)	Female (n=188) (%)	Total (n=380) (%)
Normal	108 (56.2%)	92 (48.9%)	200 (52.6%)
Grade-I	52 (27.1%)	47 (25.0%)	99 (26.1%)
Grade-II	29 (15.1%)	33 (17.6%)	62 (16.3%)
Grade-III	3 (1.6%)	16 (8.5%)	19 (5.0%)

Mann Whitney U Test for Rank order of two groups (male, Female) U=16023.5, P=0.038

Table.4: Distributions of factors as per the grades of under-nutrition (according to IAP classification).

Characteristic	Normal (n=200) (%)	Grade I (n=99) (%)	Grade II (n=62) (%)	Grade III (n=19) (%)	Total (n=380) (%)	P value
Religion						
Hindu	150 (75)	83 (84)	49 (79)	12 (63)	294 (77)	0.84*
Muslim	48 (24)	15 (15)	13 (21)	7 (37)	83 (22)	
Christian	2 (1)	1 (1)	0 (0)	0 (0)	3 (1)	
SES²						
class 2	25 (13)	1 (1)	3 (5)	0 (0)	29 (8)	<0.001*
class 3	147 (74)	67 (68)	29 (47)	4 (21)	247 (65)	
class 4	28 (14)	31 (31)	30 (48)	14 (74)	103 (27)	
class5	0 (0)	0 (0)	0 (0)	1 (5)	1 (0)	
Mother's education						
high school or above	96 (48)	31 (26)	13 (21)	1 (5.4)	141 (37)	<0.001**
middle school	69 (34.5)	41 (41)	21 (34)	5 (26.3)	136 (36)	
Up to primary	35 (17.5)	27 (27)	28 (45)	13 (68.3)	103 (27)	

*Chisquare test, **Kendall Tau C test

A total of 380 participants, out of which 192 (50.5%) were boys and remaining 188 (49.5%) were girls participated in this study **(Table.3)**. The males and females children were having nearly equal number.

The Overall proportion of under nutrition was 47.4%. The proportion of under nutrition was 43.8 % in males as compared to 51.1% of females. Thus, more females were found to be malnourished then males.

According to sex female children were more malnourished in grade II (17.6%) and grade III (8.5%) in comparison with boys grade II (15.1%) and grade III (1.6%), in grade I malnutrition male were suffered (27.1%) & female were (25.0%.)

Statistical analysis found that sex and grades of malnutrition are significantly associated (P=0.038), female child were more malnourished as compared to male. Mann Whitney U test was utilized to construe this rank relation (Mann Whitney U statistic=16023.5)

Among 380 children majority of the children belongs to Hindu religion 294 (77.4), Muslim 83 (21.8%) and rest were others 3 (0.8%). Additionally, the most common socio-economic status class was 3rd with highest percentage of mother having middle school education. **(Table.4)**. Statistical analysis shows that religion and grades were not related (p= 0.84).

Mother's education (p<0.0001) and socioeconomic status (p<0.0001) where found to be significantly related with grades of malnutrition.

The education of mother was inversely related with proportion of severe under nutrition with larger proportion of severely under nourished children (94.6%) in mothers having education up to middle school or lower education. Kendall Tau's C test (τ= 0.27) has been utilized to test the rank or-

der and found rank order relationship of mother's education to be related with severity of under nutrition of these children.

DISCUSSION

The present study conducted with objective of assessing the magnitude of under nutrition among children less than 6 year of age and factors associated with under-nutrition of selected children.

A study done by Bhalani KD (1998) observed that as the age advances, the proportion of normal children in the age group decreased.[9] Although the finding of current study does not conforms to this finding when considering overall study population; but when both genders were considered separately the pattern confirms to the finding showing trends of decreased in proportion of under nutrition with increasing age.

In another study conducted on nutritional status of anganwadi children of phansidewa block of darjeeling district of west bengal, India, the nutritional status of the age group of 3-4 years and 4-5 years were serious.[10] Furthermore, Silva and Silva (2017) observed that the proportion of underweight children in the age group of 6 months to 36 months was higher (38.1%) than the proportion of underweight children (24.9%) in the age group of 37-72 months, and this difference was found to be statistically significant ($\chi2 = 14.1373$, $P = 0.0001$).[11]

In our study females were significantly (P=0.38) more malnourished than male children when considering overall under nutrition. The proportion of female was more in grade II (17.6%) and grade III (8.5%) in comparison with boys grade II (15.1%) and grade III (1.6%). In grade I male were having higher proportion of sufferers (27.1%) compare to female (25.0%).

Similar finding was noted in a study conducted by Sachdev AVSM et al. (1995), it was observed that severe malnutrition in the female children (6.5%) was higher compared to their male counterparts (5%).[12] In another study, Bhalani KD (1998) observed girls (68.2%) were more malnourished than boys (58%) and the difference was statistically significant.[9]

Conversely, in a study conducted on nutritional status of anganwadi children of phansidewa block of darjeeling district of west bengal, India, no significant difference was observed between sex when considering overall under nutrition status as well as moderate underweight. Though, 2.73% girls were were found to be severely underweight in same study. [10]

In another study conducted on Anganwadi Children under the Integrated Child Development Services Scheme (ICDS) in a Rural Area in Goa, It was observed that 35.1% of girls were underweight, and 31.7% of boys were underweight, but this difference was not found to be statistically significant.[11]

In current study socioeconomic status ($p<0.0001$) was found to be related with grades of malnutrition. Similar finding was obtained in a study conducted at Goa under ICDS (Silva & Silva (2017), it was observed that the proportion of underweight children was found to be the highest (51.3%) in lower class; followed by 30.6% in upper lower; 28% and 32.8% in lower middle and upper middle class, respectively; and lowest (17.1%) in upper class, and this difference was found to be statistically significant ($\chi2 = 37.02$, $P = 0.000$). [11]

In contrast to this study, Maheshwari & Shashi (1992) observed that socioeconomic status did not have a significant effect on nutritional status of the children. They observed that 76.7% urban families belonged to lower middle class of socioeconomic status and remaining families in the middle and lower class.[12]

The current study rejected the null hypothesis of no relation between the grades of malnutrition and education level of mother ($P<0.0001$). A study conducted by Ahmed E et al, found similar finding of relation between proportion of children suffering from PEM and respective education level of mothers with higher proportion belonging to those mother who were illiterate.[13] Another study conducted by Verma et al reported a significant ($p< 0.001$) inverse relationship with malnutrition; being highest (70%) among children whose mothers were illiterate.[14]

In contrast to this, a study done on Nutritional Status of Children Aged 3-6 Years in a Rural Area of Tamilnadu by Anuradha et al, No significant association was found between educational status of parents and nutritional status of the children.[15]

CONCLUSION

This study concluded with recommendations for addressing the key finding of significant relation of under nutrition with mother's education and socioeconomic status. This study thus recommends that prioritizing the work responsibilities of anganwadi workers should be considered keeping in view the educational status of mother and socio-economic status of family. Adult non-formal education program focusing the mothers' of undernourished children should be integrated with ICDS.

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