CO-RELATES OF NUTRITIONAL STATUS AMONG CHILDREN UNDER SIX YEAR OF AGE IN RURAL ALLAHABAD

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ABSTRACT

Background: A child's entire life is determined in large measures by the food given to him during his first five years because childhood period is of rapid growth and development and nutrition is one of the influencing factors in this period. Traditionally preschool children have been considered as one of the most vulnerable segments for under nutrition. The magnitude of the problem of malnutrition among children under five is very high throughout India especially under nutrition among under five years of children continues to be a major problem of public health. **Objectives:** (a) To find out magnitude of the problem. (b) To determine the factors influencing nutritional status of children. (c) To co relates factors influencing the nutritional status of the children. **Materials & Methods**: The sample of 369 under six children was drawn by applying multistage random sampling technique. Chi-square test was applied for data analysis. **Result**: The mean age of male children was found to be 34.84 ± 17.82 months while it was 34.13 ± 17.51 months in female children. 190 (55.55%) were found to be living in kaccha houses, 102 (28.82%) were living in semi pucca houses and only 50 (14.62%) were living in pucca houses. Nutritional status of male children was significantly associated with age $\chi^2= 8$, Nutritional status of female children was significantly associated with age $\chi^2= 7.9$ (P< 0.05). **Conclusion:** Present study showed proportionally all groups of malnutrition were more prevalent in age group 0-12 months.

Key Words: Birth order, Environmental factors, Gomez classification, Malnutrition.

Introduction:

Good nutrition is needed at all stages of life; infancy, early childhood, adolescent and adulthood but nutrition during the first five years has an impact not only on growth and morbidity during childhood but also act as determinants of nutritional status in adolescent and adult life. A child's entire life is determined in large measures by the food given to him during his first five years because childhood period is of rapid growth and development and nutrition is one of the influencing factors in this period.[1]

Traditionally preschool children have been considered as one of the most vulnerable segments for under nutrition. UNICEF report revealed that out of 148 million underweight under-five year old children in the world, two third live in South Asia and this region accounts for 41% of total 9.2 million words wide annual deaths in the same age group.[2] The World Health Organization estimates that by the year 2015, the prevalence of malnutrition 17.6% globally with 113.4 million with children younger than five years affected as measured by low weight for age.[3]

Despite global efforts for improving child health and specific efforts like Integrated Child Development Services (ICDS), the magnitude of the problem of malnutrition among children under five is very high throughout India especially under nutrition among under five years of children continues to be a major problem of public health; National Family Health Survey (NFHS-3) reported over 40 percent of preschool children in India are under weight. The percentages of children affected with malnutrition in various states were Madhya Pradesh (55%), Orissa (54%) and Uttar Pradesh (52%). The problem of malnutrition in this state shows regional

variability, which may be due to its diversified geographical, socio-cultural and economic conditions.[4]

Hence it is imperative to examine the burden of under-nutrition, study it's determine the factors to combat malnutrition among under- six children. Since the problem of under nutrition is more prevalent in western U.P. probably due to recurrent flood, drought, illiteracy, poverty and ignorance (Health care services) specially in rural areas. With this background this study was conducted in rural area of Allahabad District.

Objectives:

- To find out the magnitude of the problem.
- To determine the factors influence nutritional status of children.
- To co relates factors influencing the nutritional status of the children.

Inclusion: Willing to participate in the study.

Exclusion: Children having any chronic illness, deformities or congenital problems were excluded from the study.

Material and Methods:

Place of Study: The present study was conducted in rural area of Allahabad district with the broad objectives of studying nutritional status of under six children.

Study Design: A stratified multistage random sampling procedure was adopted to select study units. A sample of two blocks namely Jasara in trans Yamuna area and Saidabad in trans Ganga area

were selected randomly as primary stage units. Within selected primary stage units a sample of villages were selected as secondary stage units. With in selected villages, children below 6 years of age were selected as ultimate study subjects.

Sample Size: Optimal sample size was calculated on the basis of pilot survey results wherein about 40.0% under six children were found to be malnourished in the community surveyed.

Based on this the sample size with an acceptable error of 5% and 5% level of significance the sample size was obtained to be 369 children using the following formula:

$$n_{opt} = 4\ p\ (1-p)\ /\ L^2$$

Where p = proportion of malnourished subjects

L = percentage of permissible error.

*For the present study total 436 children were examined.

Data Collection: Information was collected using interview schedule, Anthropometric measurement was done with the help of measuring tape, weighing machine, and for assessment of nutritional status Gomez's Classification was used as given below.

Weight for age (%) = $\dfrac{\text{Weight of the child}}{\text{Weight of the normal child of the same age}}$ x 100

Between 90 and 110%   Normal Nutritional Status

Between 75 and 89%   1st degree, mild malnutrition

Between 60 and 74%   2nd degree, moderate malnutrition

Under 60%   3rd degree, severe malnutrition

Analysis of data: Data entry and analysis was done in SPSS Software. Percentage, proportion and chi square tests were used for analysis.

Results:

Table -1: Distribution of children by general characteristics.

General Characteristic		Age in months								Total	
		0 - 12		13 - 24		25 - 36		37 - 72		No.	
		No.	%	No.	%	No.	%	No.	%	No.	%
Religion	Hindu	71	16.63	103	24.12	105	24.59	148	34.66	427	97.94
	Muslim	03	33.33	0	0.0	01	11.11	05	55.55	09	2.06
Caste	General	06	9.38	36	56.25	20	31.25	02	3.13	64	14.68
	Backward	43	17.20	49	19.60	60	24.00	98	39.20	250	58.55
	Schedule	22	19.47	18	15.93	25	22.12	48	42.48	113	25.92
Total		**71**	**16.62**	**103**	**24.12**	**105**	**24.59**	**148**	**34.06**	**427**	**100.0**
Sex	Male	42	16.60	61	24.11	58	22.92	92	36.66	253	58.03
	Female	32	17.49	42	22.95	48	26.23	61	33.33	183	41.97
Total		**74**	**16.97**	**103**	**23.62**	**106**	**24.31**	**153**	**35.09**	**436**	**100.0**

Out of 436 surveyed children majority of the children belonged to Hindu religion 97.94% while the rest were Muslims 2.06%.Mean ages of males and females surveyed children was not found to be differing significantly (P>0.10).The sex ratio was found to be 723 females per 1000 males. Mean age of male children was found to be 34.84 ± 17.82 months. While it was 34.13 ± 17.51 months in female children.

Table- 2: Distribution of households by Environmental factors

Environmental factors		No.	%
Type of house	Kaccha	190	55.55
	Puccka	50	14.62
	Mixed	102	28.82
Locality	Congested	136	39.77
	Open	206	60.23
Kitchen	Separate	38	11.11
	Combined	304	88.89
Source of drinking water	Well	190	55.56
	Hand pump	148	43.28
	Tap	04	1.16
Excreta disposal	Absent (open field)	280	81.87
	Present (Water seal type)	62	18.13
Drainage facilities	Absent	331	96.8
	Present	11	3.2
	Total	**342**	**100**

Table 2 shows distribution of households by environmental factors. Out of 342 households 55.55% were found to be living in kaccha houses 28.82% were living in semi pucca houses and only14.62% were living in pucca houses. Locality was found to be congested in 39.77% houses and open in 60.23% houses.

Table- 3: Nutritional grades of male children by age (Gomez's classification)

Age in Months	Normal Children		Mild Malnutrition		Moderate Malnutrition		Sever Malnutrition		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 12	19	45.24	13	30.95	08	19.05	02	4.76	42	16.60
13 - 24	34	55.74	13	21.31	14	22.95	0	0.0	61	24.11
25 - 36	40	68.97	14	24.14	03	5.17	01	1.72	58	22.92
37 - 72	44	47.83	37	40.22	11	11.96	0	0.0	92	36.36
Total	**137**	**54.15**	**77**	**30.43**	**36**	**14.23**	**03**	**1.19**	**253**	**100.0**
$\chi^2= 8.02$ (P < 0.05)										

According to table 3 Out of 253 male subjects majority 54.15% were normal grade of nutrition while remaining 45.85% were found to be malnourished. Overall prevalence of malnutrition 45.86%. The highest prevalence of severe malnutrition 4.76% was recorded in 0–

12 month's age group, while maximum moderate 22.95% was found to be in age group of 13-24 months. Maximum mild malnutrition 40.22% was in age group 37-72 months. Nutritional status of male children was significantly associated with age (P< 0.05).

Table -4: Nutritional grades of female children by age (Gomez's classification)

Age in Months	Normal Children		Mild Malnutrition		Moderate Malnutrition		Sever Malnutrition		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 12	09	28.13	13	40.63	9	28.33	1	3.13	32	17.49
13 - 24	25	59.52	13	30.95	2	4.76	2	4.76	42	22.95
25 - 36	25	52.08	15	31.25	7	14.25	1	2.08	48	26.23
37 - 72	27	44.26	25	40.98	9	14.75	0	0.0	61	33.33
Total	**86**	**46.99**	**66**	**36.07**	**27**	**14.74**	**4**	**2.19**	**183**	**100.0**
χ^2= 7.9 (P < 0.05)										

As shown in table 4 out of 183 girls subject 46.99% were normal and the rest were found to be malnourished 53.00%. The highest prevalence of severe malnutrition 4.76% was recorded in age group 13-24 months, while maximum moderate malnourished 28.33%was found to be in age group of 0-12 months. Maximum mild malnutrition 40.98%was found in age group of 37-72 months. The table shows that more malnourished girls were present in 0 – 12 months age group as compared to other age groups. Nutritional status of female children was significantly associated with age (P < 0.05).

Table- 5: Nutritional grades (according to Gomez's classification) of children by age

Age in Months	Normal Children		Mild Malnutrition		Moderate Malnutrition		Sever Malnutrition		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 12	28	37.84	26	35.14	17	22.97	3	14.05	73	16.97
13 - 24	59	57.28	26	25.24	16	15.33	2	1.94	103	23.62
25 - 36	65	61.32	29	27.36	10	9.43	2	1.89	106	24.31
37 - 72	71	46.41	62	40.52	20	13.07	0	0.0	153	35.09
Total	**223**	**51.15**	**143**	**32.80**	**63**	**14.45**	**7**	**1.61**	**436**	**100.0**
Mean age	34.82$\pm$15.71		36.30$\pm$19.47 P>0.10		33.02$\pm$19.54 P> 0.10		17.17$\pm$13.02 P < 0.01		34.54$\pm$17.68	
χ^2= 12.56; (P < 0.01)										

Overall prevalence of malnutrition was recorded 62.16% in the age group 0–12 months followed by 53.59% in the age group 37–72 months and 42.51% in 13–24 months age group Minimum prevalence was found to be in the age group of 25–36 months 38.68%. Proportionately all grades of malnutrition was more prevalent in the age group 0-12 months. Nutritional grades of male children were found to be significant with age P < 0.01.

Table- 6: Nutritional grades by birth order (According to Gomez's classification)

Grading of Malnutrition	Birth order						Total	
	1		2		> 3			
	No.	%	No.	%	No.	%	No.	%
Normal	99	50.77	89	54.60	35	44.87	223	51.15
Mild	67	34.36	48	29.45	28	35.89	143	32.80
Moderate	27	13.85	23	14.11	13	16.68	63	14.45
Severe	02	1.02	03	1.84	02	2.56	07	1.61
Total	**195**	**44.72**	**163**	**37.38**	**78**	**17.89**	**436**	**100**

$\chi^2 = 2.02$ (P > 0.10)

Table 6 shows. Out of 436 surveyed children maximum were found to be of birth order one 44.72% followed by 37.38% of birth order two and 17.89% were in birth order three & above. The overall prevalence of malnutrition was found to be maximum 55.13% in birth order three & above, followed by 49.23% in birth order one and 45.4% in birth order two. Majority of normal children were present in birth order two 54.60% followed by 50.77% in birth order one and only 44.87% were in birth order three. Although increasing trend of severe under nutrition with increasing birth order was recorded but statistically it was not found to be significant (P> 0.10).

Discussion:

Present study investigated the magnitude of malnutrition among under six children based on Gomez classification and co related factors influencing the nutritional status of children. Children from rural area were more likely to be malnourished. Examine the general characteristics of children reveals that the mean age of male children was found to be 34.84 $\pm$ 17.82 months while it was 34.13 $\pm$ 17.51 months in female children. Mean age of males and females surveyed children were not found to be differing significantly (P>0.10). Majority of subjects were belonged to Hindu religion while in case of caste more than half subjects belonged to backward class.

More than half of households were made from mud and thatch. The pucca houses were present only in 14.62% households. The rest 28.82% were of combined category. A study conducted by IASDS (1995)[5] in UP observed that 43% households had Kaccha houses made from mud and thatch. The present study shows a higher percentage of kuccha houses in the area of study. The members of 60.23% households were living in open areas while the rest 39.77% were living in congested areas. Members of 55.55% households were drinking well water while 43.28% were using hand pump as a source of drinking water. Only 4 1.16% were using tap water. In the IASDS[5] study the main source of drinking water was found to be hand pump and taps 67%.Members of majority of the households 81.87% defecated in the fields. Only 62 households 18.13% had toilet facilities. Similar observations were reported in the Government of UP document[7] and NFHS[6]. They stated that 88% of the

rural population practiced open field defecation. The IASDS report states that only 12% households had toilet facilities. The drainage facility was present only in 3.2% households. The rest 96.8% had no drainage facilities. IASDS[5] in UP reported that only 6% households had drainage facilities, whereas the government of UP document[7] and NFHS[8] report stated that in the rural areas 68% households had inadequate drainage facilities. Family Health Survey -3 (NFHS-3)[8] the unique source for tracking the status of child malnutrition in India indicates about 46 percent of the children under 5 years of age are moderately to severely underweight(thin for age), 38 percent are moderately to severely stunted (short for age), and approximately 19 percent are moderately to severely wasted (thin for height). The overall prevalence of malnutrition based on Gomez classification found to be 48.86% of which 32.80% were classified in to mild category followed by 14.45% children were classified as moderate and 1.61% as severely undernourished. Similar finding were found in a study conducted by Harshal et.al[8] reported the overall prevalence of malnutrition based on Gomez classification 51.14% children were undernourished of which 76 were classified in to mild category followed by 40.3% children were classified as severely undernourished. Overall prevalence of malnutrition was found to be more in female children 53.01% as compared to males 45.85%. Severe grade of malnutrition was also prevalent in females 2.19% as compared to their male counterparts. The association between sex and malnutrition was not found to be significant. Similar findings were reported by Srivastava et al[9] in children below 6 year of age in rural Lucknow, where 45.3% prevalence of malnutrition was observed in females as compared to 40.9% in males' children. The IASDS[5] report also gives similar findings in the UP. NFHS[8] report stated that examining severe malnutrition only, a gender differential becomes more apparent with a higher proportion of girls being severely malnourished in 11 of the 14 large states translating into a difference at national level of 21% among girls versus 20.2% among boys. Malnutrition was found to be maximum in age group 37-72 months 70.59%, while the minimum was in the age group 25-36 months 38.68%.The maximum prevalence of severe grade of malnutrition was found to be 4.05% in the age group 0-12 months and minimum was 1.89% in 25-36 months age group. The prevalence of all grades of malnutrition was found to be in birth order three & above declined in birth order one and to the minimum in birth.

Conclusion:

Present study showed that proportionately all groups of malnutrition was more prevalent in age group 0-12 months. It also showed decreasing trend of severe malnutrition along with increasing age and was found to be statistically significant. Pregnant women should be encouraged for utilization of the anti natal services, hospital delivery, initiation of breast feeding (Colostrum) within half an hour after birth ,exclusive breast feeding up to six month and thereafter complementary feeding. Community should be educated regarding personal hygiene, environmental sanitation, healthy life style and use of locally available nutritive food available in the community.

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