



Asian Journal of Modern and Ayurvedic Medical Science | ISSN 2279-0772 [ONLINE]

Volume: volume1,number 1 | publication Date: Sunday, July 01, 2012

Published by Mpasvo [article url

<http://www.ajmams.com/viewpaper.aspx?pcode=007c0e67-fd02-447f-82dc-6ef00a558dd4>

**Title of Research Paper : Correlates
Birth Order and Literacy with
Nutritional Status under '6' Children in
Rural Area of Allahabad, India.**

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Research Paper

Correlates Birth Order and Literacy with Nutritional Status under '6' Children in Rural Area of Allahabad, India.

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Declaration

The Declaration of the authors for publication of Research Paper in Asian Journal of Modern and Ayurvedic Medical Science (ISSN 2279-0772) We Hari Shankar¹and S. Dwivedi² the authors of the research paper entitled Correlates Birth Order and Literacy with Nutritional Status under '6' Children in Rural Area of Allahabad, India. declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in ajmams , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the publisher of ajmams to own the copyright of our research paper.

Received june 3 , 2012 ; accepted june 25 , 2012 , published july 1 , 2012

Abstract:

Research question: Correlates birth order and literacy with nutritional status

Objective: To find out any association between nutritional status and socio-demographic variables. **Methods:** A stratified multistage random sampling procedure was adopted to select study **Setting:** Community based cross sectional study in Two blocks of Allahabad district **Statistical analysis:** Proportion, percentage and. χ^2 tests was applied.

Result: Study showed that maximum prevalence of underweight children (**weight for age below median – 2SD**) was found to be 39 (36.79%) in the age group 25-36 months, followed by (34.64%) in age group 37-72 months. An increasing trend of severe stunting in children (**height of age below median - 3SD**) was observed with increasing age up to 3 years being (14.86%), (16.50%) and (22.64%) in age groups 0-12, 13-24 and 25-36 months respectively. Thereafter decreasing trend of stunting children was observed to be (17.64%) in the 37-72 months age. A reverse pattern of severe stunting was observed in severely wasted children up to the age of 0-36 months i.e. severity of wasting (**weight for height below median-3SD**) decreases with increasing age (8.10%), (5.82%) and (2.83%) in age groups 0-12, 13-24 and 25-36 months respectively. A similar decreasing trend of stunting was also observed with education. The decreasing trend of wasting was also observed with increased education level as shown in **Table-2**. No wasted child was present in mothers educated up to graduate & above. None of the severely wasted children (**weight for age below median-3SD**) were in mothers educated up to primary



school level, Intermediate level & above. Maximum severely wasted children (**weight for height below median-3SD**) were (8.97%) in birth order three followed by (3.78%) in birth order two and (3.5%) in birth order one. The proportion of underweight children among those having birth order one was found to be significantly higher as compared to those of higher birth order, however proportion of children having weight below median - 3 SD was significantly lower as compared to children of birth order three & above ($p < 0.002$). Stunting as well as wasting was not found to be differing significantly in birth order categories.

Conclusion: Study showed that under nutrition was more prevalent in early age of life hence detection should be started as early as possible, so that the mild or moderate cases could not progress to severe form of malnutrition.

KEYWORDS: Weight, Height and Protein Energy Malnutrition. SD classification

Introduction: Protein energy malnutrition (PEM) has been identified as a major health and nutrition problem in the world. PEM is a spectrum having two different clinical manifestations Kwashiorkor being at one end of spectrum and marasmus at the other end¹. High rates of malnutrition in South Asia are due to poor care of girls and women by their families. The inter-generational cycle of growth failure shows the cycle of poor nutrition and its implication across generations. Young girls who grow poorly become stunted women and are more likely to give birth to low birth weight (LBW) infants. If these infants are girls, they are likely to continue the cycle by being stunted in adulthood. Adolescent pregnancy below (18 years) heightens the risk of low birth weight and breaking the cycle become difficult. Thus, good nutrition is needed at all stages-infancy, early childhood, adolescence and adulthood, especially for girls and women. Nutritional problems among children and women cause major morbidity and mortality in India. Despite spectacular increase in food grain production in recent years the problem of chronic malnutrition continues to exist extensively; especially among children and women, as they are caught in a relentless sequence of ignorance, poverty, inadequate food intake, disease and early death. Nutritional status of a nation is closely related to the level of poverty, status of women, rate of population growth, and access to health education, safe drinking water, environmental sanitation, hygiene and other social services. The nutritional status is thus an outcome of complex and interrelated set of factors². The population of U.P. is mainly rural, with more than 70% people residing in villages. Forty two percent of the total population lives below the poverty line and every third child are born with weight below 2500 grams. 73%



of the mothers are illiterate ³. The problems arising from cultural, political and economic realities must be addressed in tandem. However, significant steps should be taken to educate and to make them aware against the terrible problems of malnutrition. Malnutrition among women has long been recognized as a serious problem in India, but national-level data on levels and causes of malnutrition have been scarce. ⁴ A sign of nutritional deprivation is failure in growth and development. To evaluate the nutritional status up to the age of maturity, sex- and age-based assessment of growth and development is necessary. Any nutritional disorder or deficiency leads to mental and growth failure and low activities⁵ Therefore, to estimate the prevalence of stunting, wasting of muscles and underweight, we assessed anthropometric indices for children in the rural areas of Allahabad district, Uttar Pradesh, India.

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

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. Within selected villages children below 6 years of age were to be surveyed as ultimate study subjects. 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 Optimal. 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 errors Information on some background characteristics like caste, religion, socioeconomic status, source of drinking water, environmental sanitation etc was noted. In some selected study subjects dietary history was also taken. The anthropometric measurements like weight, height, and mid arm circumference of study subject was also taken for assessing nutritional status of women and children.



Characteristics of Households	No. of families	Percentage
(A) Religion		
- Hindus	338	98.83
- Muslims	4	1.16
(B) Caste		
- General Caste	48	14.03
- Backward caste	160	52.63
- Scheduled caste	130	35.08
(C) Type of family		
- Nuclear family	130	38.01
- Joint family or extended	200	58.48
(D) Occupation		
- Farmer	197	57.6
- Laborers	101	29.5
- Service	13	3.8
- Business	26	7.6
- Skilled worker	5	1.5
(E) Literacy Status		



- Illiterate	187	54.7
- Primary	92	26.9
- Middle	19	5.6
- High school	20	5.8
- Intermediate	7	2.0
(F) Socioeconomic Status		
- Low	180	52.64
- Middle	123	35.96
- High	39	11.40
Total	342	100

Table-1: General Characteristics of Household surveyed

	Total	Under weight		Stunting		Wasting	
		M-3SD	M-2SD	M-3SD	M-2SD	M-3SD	M-2SD
Age in months							
0 - 12	74	7 (9.45)	21 (28.37)	11 (14.86)	21 (28.37)	6 (8.10)	8 (10.81)
13 - 24	103	13 (12.62)	33 (32.03)	17 (16.50)	38 (36.89)	6 (5.82)	13 (12.62)
25 - 36	106	12 (11.32)	39 (36.79)	24 (22.64)	43 (40.56)	3 (2.83)	13 (12.26)
37 - 72	153	20 (13.07)	53 (34.64)	27 (17.64)	50 (32.67)	5 (3.26)	19 (12.41)
Birth Order							
One	225	25 (11.11)	108 (48.0)	50 (22.22)	95 (42.22)	7 (3.5)	30 (15.0)
Two	133	14 (10.53)	22 (16.54)	18 (13.53)	34 (25.56)	6 (3.78)	15 (9.49)



Three & above	78	13 (16.67)	16 (20.51)	11 (14.10)	23 (29.49)	7 (8.97)	8 (10.25)
Education of mother							
Illiterate	352	43 (12.21)	119 (33.80)	69 (19.60)	123 (34.94)	18 (5.11)	46 (13.06)
Primary	25	3 (12.0)	8 (32.0)	4 (16.0)	10 (40.0)	0	3 (12.0)
High school	35	4 (11.42)	10 (28.57)	4 (11.43)	10 (28.57)	2 (5.71)	3 (8.57)
Inter	20	2 (10.0)	8 (40.0)	2 (10.0)	8 (25.0)	0	1 (5.0)
Graduate & above	4	0	1 (25.0)	0	1 (25.0)	0	0
Total	436	52 (11.92)	146 (33.48)	79 (18.11)	152 (34.86)	20 (4.58)	53 (12.15)

Table- 2: Nutritional Grade as per WHO / SD classification

Birth order and under nutrition; p value 0.002

Birth order and stunting; p value 0.970

Birth order and wasting; p value 0.125

Results:

Study showed that maximum prevalence of underweight children (**weight for age Z-score below median - 2SD**) was found to be (36.79%) in the age group 25-36 months, followed by (34.64%) in age group 37-72 months. It was (32.03%) and (28.37%) in age group 13-24 months and in age group 0-12 months respectively. Majority of the severely underweight children (**weight for age Z- score below median - 3SD**) were belonged to the age group 37-72 months (13.07%) , while only (9.45%) children weight were (weight

for age below median-3SD) in age group 0-12 months. The maximum children whose **height for age Z –score below median -2SD** were reported in age group 25-36 months (40.56%) followed by (38.89%) in the age group 13-24 months. The minimum stunting (28.37%) was reported in age group 0-12 months. An increasing trend of severe stunting in children (**height of age Z-score below median -3SD**) was observed with increasing age up to 3 years being (14.86%), (16.50%) and (22.64%) in age groups 0-12, 13-24 and 25-36 months respectively. Thereafter decreasing trend of stunting children was observed to be (17.64%) in the 37-72 months age. Similarly the proportion of wasted children (**weight for height Z-score below median-2SD**) was found to be (12.62%), (12.41%) and (12.26%) in age groups 13-24, 37-72 and 25-36 months respectively. A reverse pattern of severe



stunting was observed in severely wasted children up to the age of 0-36 months i.e. severity of wasting (**weight for height Z- score below median-3SD**) decreases with increasing age (8.10%), (5.82%) and (2.83%) in age groups 0-12, 13-24 and 25-36 months respectively.

According to education of mothers:

A decreasing trend of severe underweight (weight for age below median - 2SD) with increased education was observed. It was found to be (12.21%) underweight children in illiterate mothers followed by (12.0%) underweight in mothers educated up to primary school level. whereas (11.42%) underweight in mothers educated up to High school level and (10.0%) underweight children were present in mothers educated up to intermediate level. No severely underweight child (**weight for age Z-score below median-3SD**) was observed where the mothers were educated up to graduate & above. A similar decreasing trend of stunting was also observed with education. The decreasing trend of wasting was also observed with increased education level as shown in **Table2**. No wasted child was present in mothers educated up to graduate & above. None of the severely wasted children (**weight for age Z – score below median-3SD**) were in mothers educated up to primary school level, Intermediate level & above.

According to birth orders: The maximum prevalence of underweight children (**weight for age Z- score below median – 2SD**) and severely underweight children (**weight for age Z- score below median-3SD**) was found to be (20.51%) and (16.67%) respectively in birth order three followed by (48.0%) and (11.11%) respectively in birth order one. The maximum prevalence of stunted whose **height for age Z-**

score below median -2SD and severely stunted children (**height of age Z- score below median -3SD**) was observed in birth order one being (42.22%) and (22.22%) respectively followed by (29.49%) and (14.10%) in birth order three respectively. Maximum severely wasted children (**weight for height Z- score below median-3SD**) were (8.97%) in birth order three followed by (3.78%) in birth order two and (3.5%) in birth order one. The proportion of underweight children among those having birth order one was found to be significantly higher as compared to those of higher birth order, however proportion of children having weight below median - 3 SD was significantly lower as compared to children of birth order three & above. Stunting as well as wasting was not found to be differing significantly in birth order categories. ($P < 0.001$).

Discussion: In developing countries, children and adults are vulnerable to malnutrition because of low dietary intakes, infectious diseases, lack of appropriate care, and inequitable distribution of food within the household. Evaluation of nutritional status is based on the rationale that in a well-nourished population, there is a statistically predictable distribution of children of a given age with respect to height and weight. The use of a reference population is based on the empirical finding that well-nourished children in all population groups for which data exist follow very similar growth patterns before puberty. Until 2006 the most commonly used reference population, which was used in **NFHS-1 (National Family Health Survey)** and **NFHS-2**, was the U.S. National Centre for Health Statistics (NCHS) standard, which was recommended at that time by the World Health Organization (**Dibley et al., 1987a; 1987b**).^{6, 7} In this study table showed estimates based



on a new international reference population released by WHO in April 2006 (WHO Multicenter Growth Reference Study Group, 2006) and accepted by the Government of India. Three standard indices of physical growth that describe the nutritional status of children are presented in this study. Height-for-age (stunting), Weight-for-height (wasting), Weight-for-age (underweight). Each of the three nutritional status indicators is expressed in standard deviation units (Z-scores) from the median of the reference population. Each index provides different information about growth and body composition, which is used to assess nutritional status. The height-for-age index is an indicator of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted) and are chronically malnourished. Children below minus three standard deviations (-3 SD) from the median of the reference population are considered to be severely stunted. Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and does not vary according to recent dietary intake. The weight-for-height index measures body mass in relation to body length and describes current nutritional status. Children whose Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered thin (wasted) for their height and are acutely malnourished. Wasting represents the failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of

inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition. Children whose weight-for-height is below minus three standard deviations (-3 SD) from the median of the reference population are considered to be severely wasted. Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic malnutrition. Children whose weight-for-age is below minus two standard deviations from the median of the reference population are classified as underweight. Children whose weight-for-age is below minus three standard deviations (-3 SD) from the median of the reference population are considered to be severely underweight. Children of illiterate mothers are three times as likely to be severely undernourished as children of mothers with at least a high school education^{8, 9}. Present study revealed that maximum overall prevalence of mild underweight children was found to be 33.48%. The maximum overall prevalence of severely underweight children was 12% **(weight for age Z- score below median-3SD)**. The maximum 18% children were severely stunted. Only 4% children had severe wasting **(weight for height Z- score below median-3SD)**. **NFHS-3 (2005-2006)**¹⁰ reported similar findings but showed that 16 percent children were severely undernourished **(weight for age Z- score below median-3SD)** and 24 percent children had short height according to height-for-age. Wasting was also quite a serious problem affecting 20 percent of children under five years of age. The study further stated that severity of under nutrition is closely related to birth orders, which was found to be statistically significant. Literacy did not show any statistical significance with nutritional status of a child, but it was observed that



overall prevalence of both mild and severe malnutrition was more in illiterate as compared to literate. Nutritional status of child is directly related to educational status of the mother. This may be because of an educated mother will follow better child care practices like exclusive breast feeding, timely complementary feeding, care of child during sickness and better hygiene practices which in turn enhance the chances of child survival.

Conclusion:

Study showed that under nutrition was more prevalent in early age of life hence detection should be started as early as possible, so that the mild or moderate cases may not progress to severe form of malnutrition. Exclusive breast feeding, timely weaning and supplementary feeding is another way to improve nutritional status of the child. Since child nutrition ultimately depends upon maternal health, hence mothers should be encouraged for availing Anti Natal Care such as registration, immunization against Tetanus, 100 IFA tablets and adequate diet during pregnancy. Nutritional and health awareness should be created among rural girls to ensure a better quality of life for the next generation.

It was realized that detailed interview with mothers regarding feeding habits, nutritional practices would give additional information regarding correlates of nutritional status of children but mothers were not willing to spare sufficient time for the interview which has posed constraint in this study. This may be subject matter of the future studies in this direction.

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