



COMPONENTS AFFECTING PREVALENCE OF MALNUTRITION AMONG CHILDREN UNDER THREE YEARS OF AGE IN MUZAFFARPUR

Pediatrics

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ABSTRACT

Malnutrition influences physical development, morbidity, mortality, psychological turn of events, reproduction, and physical work limit, and thus impacts on human execution, wellbeing and survival. It is a basic factor in numerous diseases for both children and adults, and is particularly prevalent in developing countries, where it influences one out of each 3 preschool-age children. A well-nourished child is one whose weight and height measurement compare very well with standard normal distribution of height and weight of healthy children of same age and sex. There are various factors that contribute to malnutrition. The objective of the current study is to assess the degree of malnutrition and the effect of socioeconomic and demographic factors of family on the nutritional status of children less than 3 years of age in Muzaffarpur. Variables included: the number of children less than 3 years of age, marital status, income of family, education of parents, sex of child, and breastfeeding practices. The study was a cross-sectional descriptive type. Preformed questionnaire was used for weight and height measurement. 400 children along with their mother were participated in the study. Reference guidelines utilized were those of the National Centre for Health Statistics (NCHS). EPI Info software (version 5) was utilized for data entry and analysis. The result shows that the degree of wasting, stunting, and underweight in children under three years of age was 5.5%, 38.7%, and 15.6% respectively. Malnutrition was significantly ($p < 0.01$) higher among boy than girl. Underweight was less common among children whose parents worked in the farming segment than among kids whose guardians were associated with casual business. Kids raised by single parents experienced underweight to an essentially ($p < 0.01$) more significant level than kids living with the two parents. The predominance of underweight diminished significantly ($p < 0.01$) as family salary expanded. The higher the degree of the mother's education, the lower the degree of underweight. Breastfeeding was found to lessen the event of underweight among children. These study efforts to redressing the child under nutrition issues, and factors associated with malnutrition in Muzaffarpur.

KEYWORDS

Malnutrition, Socio-economic Factors, Breastfeeding practice, School Children, Stunting, Underweight, Wasting

INTRODUCTION

Malnutrition affects physical growth, morbidity, mortality, cognitive development, reproduction, and physical work capacity [1]. Children under five years constitute the most vulnerable segment of a country. Their nutritional status and mortality rate is a sensitive indicator of community health and nutrition. Nutritional status plays a vital role in deciding the health status in children. Nutritional deficiencies give rise to various morbidities, which in turn, may lead to increased mortality. Malnutrition apart from impairing growth and development of the child increases his or her susceptibility to infections like diarrhea and pneumonia. It acts in two ways to cause high mortality and morbidity [2]. Malnutrition is particularly prevalent in developing countries, where it affects one out of every three preschool-age children [3]. The best way to evaluate the nutritional status and overall health of a child is to compare the child's growth indices with the set cut-off points in the standard normal distribution of well-nourished children that are associated with adequate growth [4]. Factors that contribute to malnutrition are many and varied. The primary determinants of malnutrition, as conceptualized by several authors relate to unsatisfactory food intake, severe and repeated infections, or a combination of the two [5, 6, 7]. Inappropriate breast feeding practices like early initiation of complementary feeds, late weaning and inadequate amount of complementary feeds in the later months are the leading causes of Malnutrition. It is often associated with infection, which in turn increases their proneness to infections which further decreases their already poor nutritional status thus leading to a vicious cycle of malnutrition and infection and contributes to high child mortality in underprivileged communities. Under this background this study aimed to assess the prevalence of under nutrition issues and factors associated with Malnutrition (wasting, stunting and underweight) in muzaffarpur [8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]. The results may help in the formulation of appropriate policies aimed at addressing factors affecting malnutrition among children and

It is hoped that relevant interventions would then be designed with the view of reducing the incidence of malnutrition in children.

METHODOLOGY

A community based cross sectional study was conducted. Pre-tested questionnaires administered to heads of households. The questionnaire covered demographic information, mother's education, breastfeeding practices, socio-cultural and economic factors and anthropometric data. Weights and heights of all eligible children were measured using weighing scales and height measuring boards. The age, date of birth, was recorded by asking mother and confirmed by the records (MCP cards/Immunisation cards) and measurements of weight and height to determine the nutritional status of children. The research assistants were trained in basic interviewing techniques and in taking anthropometric measurements. The dependent variables for this study were the three anthropometric measurements: height-for-age (H/A), which indicates the level of stunting, weight-for-age (W/A), which indicates level of underweight, and weight-for-height (W/H) which indicates the level of wasting. Reference standards used were those of the National Centre for Health Statistics (NCHS).

Sampling. Four villages were randomly selected first for study and then in each village 50 households were randomly selected for study purpose. Mother or other care taker of under five children present at the time of household visit was interviewed for data collection. If any household has 2 under 5 children then the youngest is selected to be the study subject. If no under 5 children in a house, then the adjacent house with under 5 children was included in the study. Children who were visitors and were found to have stayed less than one month were excluded from the study. In this manner total 400 children were included in the study.

Data analysis. Data entry and analysis was performed using the EPI

Info (version 5) computer software package.

RESULTS

CHARACTERISTICS OF THE HOUSEHOLDS

Demographic and economic properties of the 400 households, which participated in the study, are given in Tables 1 and 2. As Table 1 shows, two hundred and eighty (70 %) of the households studied had 3 - 8 members, with 5 being the most common number of family members. The percentage of female members in the households tends to be higher (52.2 % - 77.9 %) among households with smaller number of members (2 - 10). Male members were generally more than females among households with larger number of members (11-17). A high percentage (50 % - 100 %) of family members did not have special needs. Among those with special needs, lactating mothers formed the largest group, and TB patients came second. Mental retardation was the least reported special need, almost exclusively 0 %. Pregnancy, physical disability, hearing impairment and sight problems occurred to a low extent (mostly none or as single digit percentages).. Data given in Table 2 indicate that a little more than half (53.3 %) of the households studied, had monthly incomes below 400 (equivalent to US \$87), which was the lowest income range in the study. This puts them among poorer sectors in the society. The majority of households (88.6 %) had only one child less than three years of age. Households with two and three children who were under three years of age. The results in Table 2 also indicate that the incidence of underweight among children decreased significantly ($p < 0.01$) as income increased.

Table 1: Family composition and special needs of family members

Number of family members (N)	Number of households with corresponding number (N) of members	Sex of family members (%)		Special needs of family members (%)							
		M	F	Lactating	Pregnant	TB patient	Physical disability	Hearing impaired	Sight problems	Mental retardation	None
2	10	22.1	77.9	19.7	0.5	2.5	0.5	1.0	1.0	0.0	74.7
3	44	40.9	60.0	6.7	0.5	3.1	0.5	0.5	1.5	0.0	87.2
4	46	36.8	63.2	8.7	0.0	1.2	1.2	0.6	0.6	0.6	87.3
5	64	44.0	56.0	2.7	1.3	1.3	0.7	1.3	0.7	0.0	91.9
6	50	50.0	50.0	2.5	0.0	2.5	0.0	0.8	0.8	0.0	92.2
7	32	45.7	54.3	2.2	1.1	3.2	1.1	0.0	0.0	0.0	92.5
8	44	44.2	55.8	8.0	0.0	6.0	1.3	1.3	0.0	0.0	89.3
9	20	41.8	58.2	3.7	1.9	0.0	0.0	0.0	0.0	0.0	94.4
10	24	47.8	52.2	9.3	0.0	2.3	2.3	0.0	0.0	0.0	86.0
11	20	54.5	45.5	6.1	0.0	4.1	3.0	0.0	0.0	0.0	84.8
12	12	65.2	34.8	0.0	0.0	4.3	0.0	0.0	0.0	0.0	95.7
13	14	70.6	29.4	5.9	0.0	5.9	0.0	0.0	0.0	0.0	88.2
14	4	60.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
15	6	37.5	62.5	0.0	0.0	0.0	0.0	12.5	0.0	0.0	87.5
16	2	20.0	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
17	2	75.0	25.0	0.0	0.0	80.0	0.0	0.0	0.0	0.0	50.0
18 or more	6	0.0	100.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	66.7

Table 2: Monthly income of family

Income range	%
7000	53.3
1000-9000	9.6
10000-15000	9.3
16000-20000	9.1
21000 above	18.8

ATTRIBUTES OF MOMS OF THE KIDS <3 YEARS OLD

Table 3 demonstrate that a high rate (76.4 %) of the moms taking an interest in the study were single compared with 22.1 %, who were married. Nearly half (49.7 %) of mothers work in the agricultural sector with 32.5 % of them involved in livestock production and 17.2 % in crop production. The rest work in formal business (3.1 %) or informal business sector (47.2 %) like transport, fisheries, etc. Information in Table 3 also shows that a high proportion (82.9 %) of the mothers had either primary (35.9 %) or secondary (47.0 %) level of education. Hardly any moms had tertiary education (8.5 %) or no education (8.6 %).

Table 3: Characteristics of the mothers of children < 3 years of age

Marital Status of the mother		Occupation of the mother		Education of the mother	
Marital status	%	Occupation	%	Education level	%
Single	76.4	Livestock	32.5	None	8.6
Married	22.1	Crops	17.2	Primary	35.9
Divorced	1.0	Formal Business	3.1	Secondary	47.0
Widowed	0.5	Others	47.2	Tertiary	8.5

Table 4: Levels (extent) and types of malnutrition among children < 3 years of age

Nature (type) of malnutrition	Indicator used	%	
Wasting	Weight/Height	Total	5.5
		Boys	7.0
		Girls	3.5
Stunting	Height/Age	Total	38.7
		Boys	44.7
		Girls	30.6
Underweight	Weight/Age	Total	15.6
		Boys	18.4
		Girls	11.8

CHARACTERISTICS OF THE MOTHER OF CHILDREN AND MALNUTRITION

Results of the study on the nutritional status of children < 3 years of age, the level of malnutrition based on the three indicators (W/H, H/A, and W/A), and the differences between male and female children is summarized in Table 4. The results show that the level of malnutrition among children under three years of age was 5.5 % (wasting), 38.7 % (stunting) and 15.6 % (underweight). All the three types of malnutrition were significantly ($p < 0.01$) more prevalent among boys than among girls. Results in Table 5 show that the percentage of underweight children among households with two children under three years old (27.8 %) was significantly ($p < 0.01$) higher than the percentage of underweight children among households with one child (14.8 %). Table 5 also indicates that underweight occurred to a lesser extent among children whose parents work in agriculture than among children whose parents were involved in other business (40.0 %). Children in single-parent households suffered from underweight to a significantly ($p < 0.01$) higher level (15.8 %) than children brought up by both parents (13.6 %) (Table 5).

Table 5: Relationship between underweight and various factors related to children under three years of age

Factor	% of underweight children
Number of children under 3 years of age	
1	14.8
2	27.8
3*	0.0
*Only two households had three children under three years of age	
Occupation of parents	
Livestock	7.5
Crops	28.6
Formal Business	40.0
Others	30.0
Marital status of parents	
Single	15.8
Married	13.6
Family monthly income (Pula)	
< 400	18.1
400-599	15.8
600-799	16.7
800-999	5.6
1000 & more	10.8
Education level of the mother	
None	29.4
Primary	18.3
Secondary	12.9
Tertiary	0.0
State of breastfeeding	
Mother breastfed and is still breastfeeding	14.7
Mother breastfed and stopped breastfeeding	13.7
Mother never breastfed	40.0

DISCUSSION

The present study reports on the level of malnutrition and the impact of some socioeconomic and demographic characteristics of households on the nutritional status of children less than three years of age. Four hundred households and mothers of under-three children participated in the study; hence the study may be regarded as a reasonable reflection of the nutritional status of children under-three years old country-wide. A number of similar studies have been conducted in various parts of the world [12, 20, 21, 22, 23, and 24]. The study reveals that malnutrition is a problem that affects 5.5 % (wasting), 38.7 % (stunting), and 15.6 % (underweight) of children. Overall, a comparison of observations from these reports indicates that the prevalence of malnutrition is still a problem. The reports also suggest that the risk for undernutrition differs across population groups of children, with children in rural areas being at a higher risk. Some of these studies report malnutrition in general without giving details of the three indicators [28]. Other studies give figures for specific indicators of malnutrition in children under five years of age and not for children under three years of age [26, 27]. These results cannot be objectively compared to the results of the present study. A few studies provide enough detail for estimates of stunting, underweight and wasting in children less than 3 years of age to be determined [17, 21, and 29]. Of these, the levels of underweight

reported, 17.3 % and 16.2 %, respectively, are the two most comparable to the levels found in the present study (15.6 %) [17, 21]. With regard to wasting, the level found in the present study (5.5 %) is lower than that reported (8.5 %) [21]. On the other hand, the level of stunting found in the present study (38.7 %) is higher than the level (27.4 %) reported [17, 21]. Contrary to an earlier study, conducted in Tanzania among children under four years of age which concluded that males had better nutritional status than females, the current study indicates that the prevalence of all the three types of malnutrition was significantly ($p < 0.01$) higher among boys than among girls [20]. Further studies are required to definitively explain the relationship between sex and the nutritional status of children.

CONCLUSIONS

The present study confirms the observations of other studies that show higher levels of under nutrition in children less than three years from single parent households, households with low income, low parental education or households in rural areas [17, 21, and 26]. Maternal education, faulty breastfeeding practice are contributory factor of high prevalence of disease. The study findings imply that efforts for redressing child under nutrition issues on factors associated with development outcomes such as maternal income, maternal education, and the creation of employment or economic engagements that do not compromise important child care practices such as breastfeeding. Such efforts should also have clearly thought out strategies for targeting children in single parent households and in elucidating factors that place boy children at greater risk for malnutrition compared to girl children. Encouraging and strengthening appropriate complementary feeding with breast feeding in child after six months of age. Girl's education to be promoted. Applying these measures will improve the health of children and fight malnutrition in the community.

REFERENCES

- Pelletier DL and EA Frongillo Changes in child survival are strongly associated with changes in malnutrition in developing countries. Washington D.C.: Food and Nutrition Technical Assistance (FANTA) Project, Academy for Educational Development, 2002.
- Murray CJL and AD Lopez The global burden of diseases: A comparative assessment to mortality, disability from disease, injury and risk factors in 1990 projected to 2020. The Global Burden of Diseases and Injury Series, vol 1. Harvard School of Public Health, Cambridge, M.A., 1996.
- United Nations Sub-Committee on Nutrition 5th Report on the World Nutrition Situation: Nutrition for Improved Outcomes. March 2004.
- de Onis M, Monteiro C, Akre J and G Clugston The worldwide magnitude of protein-energy malnutrition: an overview from the WHO Global Database on Child Growth. In: <http://www.who.int/whosis/cgrowth/bulletin.htm> (Accessed on 29/5/2003).
- UNICEF The state of the World's children. Oxford University Press, Oxford 1998.
- Rowland MG, Rowland SG and TJ Cole The impact of nutrition on the growth of children from 0-2 years in age in an urban West African community. *Am. J. Clin. Nutr.* 1988;47:134-48.
- Schroeder DG and KH Brown Nutritional status as a predictor of child survival: Summarizing the association and quantifying its global impact. *Bull. WHO* 1994; 72:569-79.
- Grummer-Strawn LM, Caceres JM and BP Herreva de Jaimes Trend in the nutritional status of Salvadorian children: the post war experience. *Bull. WHO* 1996;74:369-374.
- Dettwyler KA Breast feeding and weaning in Mali: cultural context and hard data. *Soc. Sci. Med.* 1987;24:633-644.
- Serventi M, Dal Lago AM and DN Kimaro Early cessation of breast feeding as a major cause of serious malnutrition in under twos: a hospital based study – Dodoma Region, Tanzania. *E. Afr. Med. J.* 1995;72:132-34.
- Goetghebuer T, Brasseur J, Dramaix M, De Mol P, Donnen P and P Bahwere et al Significance of very low retinal levels during severe protein-energy malnutrition. *J. Trop. Pediatr.* 1996;42:158-161.
- Madzvingira N Malnutrition in children under five in Zimbabwe: effect of socioeconomic factors and disease. *Soc. Biol.* 1995;42(3-4):239-46.
- Barret H and A Browne Health Hygiene, maternal education: Evidence from Gambia. *Soc. Sci. Med.* 1996;43:1579-1590.
- Reed BA, Habicht JP and C Niamego The effects of maternal education on child nutritional status depends on socio-environmental conditions. *Int. J. Epidemiol.* 1996; 25:585-592.
- Waihenya EW, Kogi-Makau W and JW Muita Maternal nutritional knowledge and the nutritional status of preschool children in a Nairobi slum. *E. Afr. Med. J.* 1996; 73:419-423.
- Phimmasone K, Douangpoutha I, Fauveau V and P Pholsena Nutritional status of children in Lao PDR. *J. Trop. Pediatr.* 1996;42:5-11.
- Ubomba-Jaswa Sand K Belbase Determinants of child nutritional status in Botswana: A national study. (Gaborone, Botswana), Food Strategy Unit, Rural Development Coordination Division, Ministry of Finance and Development Planning; Food and Nutrition Unit, Family Health Division, Ministry of Health; and UNICEF, Botswana, 1996.
- Tuncbilek E, Unalan T and T Coskun Indicators of nutritional status in Turkish preschool children : results of Turkish Demographic and Health Survey 1993. *J. Trop. Pediatr.* 1996;42:78-94.
- Sevedberg P Undernutrition – gender bias in sub-Saharan Africa. *J. Devel. Stud.* 1996;32:933-943.
- Mbago MC and PP Namfua Some determinants of nutritional status of on-to-four-year-old children in low income urban areas in Tanzania. *J. Trop. Pediatr.* 1991; 38(6):299-306.
- Tharakan CT and CM Suchindran Determinants of child malnutrition- an intervention model for Botswana. *Nutr. Res.* 1999;19(6):843-860.
- Fawzi WW, Herrera MG, Nestel P, el Amin A and KA Mohamed A longitudinal study of prolonged breastfeeding in relation to child undernutrition. *Int. J. Epidemiol.* 1998; 27(2):255-60.
- Gorstein J and J Akre The use of anthropometry to assess nutritional status. *World Health*

- Stat. Q. 1988; 41(2):48-58.S
- Kamau-Thuita F, Omwega AM and JW Muita Child care practices and nutritional status of children aged 0-2 years in Thika, Kenya. *E. Afr. Med. J.* 2002;79(10):524-9.
- Taylor D Report: Finding, measuring and predicting malnutrition in Botswana. Gaborone, Botswana, Ministry of Health, 1980.
- Gobotswang K Determinants of the nutritional status of children in a rural African setting: the case of Chobe district, Botswana. *Fd. and Nutr. Bull.* 1998;19(1):42-45. UNUPress.
- Central Statistics Office Botswana Multiple Indicator Survey 2000. Department of Printing and Publishing Services, Gaborone 2001.
- The World Bank Group Botswana at a glance. <http://inweb18.worldbank.org/AFR/a.../5a66ec5ca3cafe71852567d100424330?OpenDocument> (Accessed on 10/6/2003)
- Nnyepi MS. Linking Child Survival Programs with Malnutrition Alleviation Strategies. A Dissertation Submitted to Michigan State University, East Lansing 2004.
- Smith LC, Ramakrishnan U, Ndiaye A, Haddad L and R Martorell The Importance of Women's Status for Child Nutrition in Developing Countries. International Food Policy Research Institute, 2003.