Relationship of Sociodemographic Factors with Malnutrition in Preschool Children: A Community Based Study

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Abstract

Objectives: To assess the nutritional status and potential risk factors for malnutrition in children less than 5 years of age in a community.

Settings and duration: Basic Health Unit at Nawanshehr, Abbottabad from December 2008 to June 2009.

Subjects and Methods: A community based cross sectional study was done over 06 months. Random cluster sampling was done and sample size of 393 houses was calculated with an error of 10%. The parameters studied in children were age, weight, nutritional status and weaning practices while for mothers the parameters included their literacy and knowledge about their health. WHO's criteria of malnutrition – NCHS was used. Data were entered in SPSS 15.0 and analyzed.

Results: A total of 393 children and their mothers were included in the study. In children; nutritionally, 245(62.3%) were normal, 148 malnourished, 77(19.6%) undernourished and 71(18.19%) over nourished. When data of normal children was compared with malnourished and it was found that literacy of mother, her knowledge about health including hand washing and maintaining contact with lady health worker, boiling water and giving ORS and practice of not throwing garbage at open spaces were significant predictors of better child nutritional status.

Conclusion: Child's nutritional status is strongly associated with the literacy of mothers, their health awareness and child rearing practices.

Key words: Malnutrition, preschool children, sociodemographic factors, maternal literacy.

Introduction

Childhood nutrition plays a key role in national manpower development. The risk factors for malnutrition can be organic, non organic or a combination. Poverty, ignorance, disordered feeding, nutritional status, repeated pregnancies, parent's separation and mother's health are established risk factors for malnutrition[1]. Physical environment, personal hygiene and consumption of contaminated water and food are also important non organic risk factors[2]. According to UNICEF, about 40% children under 5 years in developing countries have moderate to severe malnutrition[3]. Malnutrition is associated with 50% deaths among children[4] half of these are children in South Asia. Determinants of high rate of malnutrition in this largely food sufficient region are poorly understood; the problem is referred to as The Asian Enigma & evidence indicates that as amount of food available per person increases or

decreases, its power to reduce child malnutrition weakens[5]. Attention has therefore been turning to factors other than nutritional intake, such as household behaviours and socio-cultural practices, which may influence child's health & development.

The latest estimates of the WHO and FAO for the number of underweight children (i.e. less than 2 S.D. of NCHS standard) globally is 184 million, while South Asia which includes Bangladesh, India and Pakistan comprising of 1.1 billion people, has over 100 million undernourished children; of these, a substantial number are under 3 S.D. as well[6]. Data from UNICEF for the years 1996 to 2005[6] indicate that 45% of South Asian children under 5 years of age were moderately to severely underweight, as compared to the global estimate of 25% for the same time period.

Studies from Pakistan also highlight the extent of the problem. In a study in the urban slums of Peshawar[7], almost 50% children under five years of age were malnourished, the peak being in the ages of 6 months to two years. The risk factors were non-provision of colostrum by the mothers and late age of weaning. Another study from Lahore[8] conducted in children 1-10 years of age associated malnutrition in children with poverty and lack of maternal awareness about balanced

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diet. Another hospital based study from Lahore[9] reported improper feeding and weaning practices, large family size with more than 2 children under five years of age, poor vaccination status, working mothers and unemployed fathers as risk factors for malnutrition in children. A wider multi-centre study from 4 different districts of Pakistan[10] concluded that malnutrition was present in a higher proportion in children under 3 years of age who were unvaccinated, weaned after seven months of age, not exclusively breast-fed for first six months, and lived in poor environmental conditions.

The partial attributable risk of malnutrition to the overall death of children shows that about 55% of childhood deaths could be attributed to underlying malnutrition, i.e. if children were normally nourished, there would be 55% less deaths among them[11].

The extent of present neglect, says UNICEF, is a scandal of which the public is largely unaware. On average, the governments of developing countries are devoting 10% of their budgets in helping the poor to meet their needs for nutrition and health care. However there is now an accumulation of reasons for believing that an age of neglect may be giving way to an age of concern[4].

As local data on non organic risk factors for nutritional status are largely unavailable, the present study is being undertaken to determine the significance of socio-demographic and physical environmental factors related to malnutrition in preschool children. In this study malnutrition was defined as the condition of under nutrition in children whose weight for age was below minus 2 standard deviations from the median WHO reference[12].

Subjects and Methods

This community based cross sectional comparative study was conducted in 11 mohallahs of Nawanshehr, Abbottabad including Dhodial, Mohallah Musa Zai, Kund, Ghumawan, Muhammad Zai, Jogan, Ilyasi Dheri, Orash Colony, Mohallah Imran Zai, Mohallah Shoaib Zai and Mohallah Khalil Zai. The study was undertaken from December 2008 for 06 months to document the sociodemographic factors associated with malnutrition in preschool children.

According to Tehsil Union Council demographic and map record, Nawanshehr has a population of about 35000 people with 4000 households and 26 statements named mohallahs. A random cluster sample was obtained for a calculated sample size of 393 houses (allowable error of 10%) further sampled through systematic random sampling technique. A total of 16 mohallas were sampled to obtain the required number of 393 children.

Data were collected according to the variables defined in proforma. Households were marked with the help of a local surveyor. Approximately 10-12 households were visited per day on alternate working days. The child was subjected to examination while the mother was attending / holding the child and the relevant information was collected and recorded into proforma; variables included age, length/height and weight were recorded using standard procedures. Ages of children were taken as the age in months and weeks calculated to the nearest day from the birth certificate, EPI card, event calendar or last birthday celebrated. Length/heights of children were obtained by measuring tapes. Weights were obtained in kilograms by means of baby scales with weight calibration of 0.1 kg units. The children were divided into 2 groups, i.e., normal or malnourished on the basis of WHO weight to age charts with the help of birth certificate or EPI card.

Maternal data was collected by interview and examination and entered into performa. Literacy level was determined by two parameters: a) Number of years of formal/informal schooling, b) General awareness about child nutrition and child rearing as per questionnaire/performa

Data were entered in SPSS version 15.0 and analyzed after completion of all cases. For data analysis, groups of normal and malnourished children were made for comparison; groups of literate and illiterate mothers were be made for comparisons and correlations. Additional groups like gender, socio-economic status, feeding habits, maternal and child BMI, etc. were made for analysis.

Qualitative data were subjected to calculations for frequencies, proportions, percentages and ratios. Quantitative data were subjected to calculations of frequencies, Mean and SD.

Relevant tests of significance were applied to compare qualitative and quantitative variables (chi square and t test respectively); a $p \leq 0.05$ denoted significance.

For correlations, the Pearson's (and where needed, Spearman's Rho) Correlation Coefficient (r) was calculated and scattergrams made; the p value of r was also calculated.

Results

A total of 393 children were included in the study out of whom 213 were males (61%) and 180(39%) females. Their ages ranged from 10 days – 59 months (mean age 26.63±13.31). In females age ranged between 26 days to 58 months (mean age 26.19±12.89) and in males from 10 days – 57 months (mean age 27.01±13.68). Overall their weights ranged from 2.1 – 27 kg (mean 12.68±4.62kg) with females weights ranging from 5.1 – 27 kg (mean 12.57±2.60kg) and for males between 2.1 – 24 kg (mean 12.77±4.64kg) as shown in Table-1. Weights of these children ranged according to the reference curves given on the growth chart (adopted from WHO) used currently in our BHUs. The upper

reference curve represents the 97th percentile and lower represents 3rd percentile. The 3rd percentile corresponds approximately to 2 standard deviations below the median of the weight for age reference value. In the present study the WHO definition of malnutrition was used which is defined as a weight for age below the median minus two standard deviations of the NCHS reference population[12].

Table 1: Summary of child data.

Details		n	%
Gender of these children were	Male	213	54.2
	Female	180	45.8
Range of ages of children	10 days – 12 month	58	14.7
	13 – 24 months	111	28.2
	25 – 36 months	105	26.7
	37 – 48 months	96	24.4
	49 – 59 months	23	5.9
Range of weights of children	2.1 – 10 kg	110	28
	10.1 – 20 kg	254	64.6
	20.1kg – 27 kg	59	7.4
Nutritional Status	Normal	245	62.3
	Undernourished	77	19.6
	Overnourished	71	18.1
Birth Order in the family	First	97	24.7
	Second	128	32.6
	Third	76	19.3
	Fourth	53	13.5
	Fifth	24	6.1
	Sixth	9	2.3
	Seventh	4	1.0
	Eighth	1	0.3
Vaccination Status	Vaccination Done	387	98.5
	Vaccination Not Done	6	1.5
Daily Teeth Brushing	Yes	176	44.8
	No	217	55.2
Washing hands after toilet use	Yes	287	73.0
	No	106	27.0
Washing hands before meals	Yes	289	73.5
	No	104	26.5
Number of times the child is fed	< 3 times a day	09	2.3
	3 – 6 times a day	131	33.3
	> 6 times a Day	65	16.5
	Not applicable	188	47.8
Who feeds the child	Mother	324	82.4
	Elder Sister	13	3.3
	Self	25	6.9
	Other relatives	29	7.4
Does child get food during illness?	Yes	281	71.5
	No	112	28.5

Of 393 children; 77 were malnourished (<3rd percentile or medial – 2SD), 245 were normally nourished (b/w 3rd + 97th percentile or b/w ±2SD) while 71 were lying above 97th percentile. Comparisons were made between the 1st two groups e.g. malnourished and normal children (< 3rd percentile) whose weights ranged from 2.1 – 13.8kg. Almost 31.2% children were severely malnourished (WHO criteria < - 3SD) with 50% males and 50% females. The 2nd group of normal children had weights between 10 – 20.8kg. The difference in weights in two groups as shown in Table-2) was statistically significant ($p<0.001$).

Regarding socio demographic variables such as household structure, house facilities, latrine facility, source of drinking water, mode of storage of water, waste water disposal and fuel used for cooking were not found significant.

Table 2: Comparison of normal (n=245) and malnourished (n=77) children.

Variables	Normal n(%)	Mal-nourished n(%)	p Value
Garbage disposal facilities			
- Thrown in open spaces	174(71.0)	71(92.2)	
- Stored at home	36(14.7)	03(3.9)	0.005
- Collected by garbage collectors	24 (9.8)	03(3.9)	
- Others	11 (4.5)	0(0)	
Education Status of Mothers			
- Literate	204(83.3)	42(54.5)	0.001
- Illiterate	41(16.7)	35(45.5)	
Does mother read newspaper			
- Yes	199(81.2)	39(50.6)	<0.001
- No	46(18.8)	38(49.4)	
Does mother watch TV			
- Yes	184(75.1)	37(48.1)	<0.001
- No	61(24.9)	40(51.9)	
Does mother maintain contact with LHW	209(85.3)	56(72.7)	
- Yes	36(14.7)	21(27.3)	0.012
- No			
Does mother do daily teeth brushing	238(91.7)	69(89.6)	
- Yes	07(2.9)	08(10.4)	0.006
- No			
Weights of children			
- 2 – 10 kg	54	55	
- 10.1 – 20 kg	189	22	<0.001
- 20.1kg – 30 kg	02	0	
How often is child weighed?			
- Every month	55(22.4)	10(13.0)	
- Every 06 month	91(37.1)	22(28.6)	0.044
- Every Year	48(19.6)	22(28.6)	
- Never	51(20.8)	23(29.8)	
When was the child last weighed?			
- One month ago	103(42.1)	19(24.7)	
- Six months ago	88 (35.9)	30(38.9)	0.009
- Other	54(22.0)	28(36.4)	
Giving ORS during loose motion			
- Yes	228(93.1)	66(85.7)	<0.046
- No	17(6.9)	11(14.3)	
Important to boil drinking water.			
- Yes	226(92.2)	65(84.4)	0.042
- No	19(7.8)	12(15.6)	
Do you boil drinking water.			
- Yes	120 (49.0)	27(35.1)	0.032
- No	125(51.0)	50(64.9)	
Know about child height gain			
- Yes	219 (89.4)	58(75.3)	0.002
- No	26(70.6)	19(24.7)	

Comparison between socio demographic status based on monthly income was also made. Income ranged from < 5000 – 40000 and above per/ month. According to these data maximum number of malnourished children (38.9%) belonged to the income group of 10,000 –

Table 3: Maternal data, showing knowledge, attitude and practices (KAP) of mothers about child rearing.

Variable			Yes n(%)	No n(%)
Importance of Breast Feeding	K		383(97.5)	10(2.5)
	A		385(98.0)	08(2.0)
	P		387(98.5)	06(1.5)
	K		383(97.5)	10(2.5)
Introduction of Solid Foods	A	Less than six month	90(22.9)	
		6-12 month	279(71.0)	
		More than 12 month	03 (0.8)	
		More than 2 years	21 (5.3)	
	P	6 month	319(81.2)	
		7 month	50(12.7)	
		Others	24(6.1%)	
No. of times per day child is fed	K	3 times	34(8.7)	
		3 -6 times	268(68.2)	
		More than 6 times	91(23.2)	
	A	3 times	34(8.7)	
		3 -6 times	268(68.2)	
		More than 6 times	91(23.2)	
	P	3 times	42(10.7)	
		3 -6 times	265(67.4)	
		More than 6 times	86(21.9)	
Energy giving foods	K		351(89.3)	42(10.7)
Growth promoting foods	K		327(83.2)	66(16.8)
Protective Foods	K		276(70.2)	117(29.8)
Mixture of Foods	K		335(85.2)	58(14.8)
Importance of regular weight gain by child	K		332(84.5)	61(15.5)
- Frequency of weighing child	A			
o Monthly			71(18.1)	
o Six month			140(35.6)	
o Yearly			98(24.9)	
o Never			84(21.4)	
- When your child last weighed				
o One month ago			139(35.4)	
o 06 month ago			160(40.7)	
o Others			94(23.9)	
ORS	K		387(98.5)	06(1.5)
	A		346(88.0)	47(12.0)
	P		361(91.9)	32(8.1)
Does cleanliness save from illness	K		387(98.5)	06(1.5)
	P		371(94.4)	22(5.6)
Use of Iodized Salt	K		365(92.9)	28(7.1)
	A		356(90.6)	37(9.4)
	P		326(83.0)	67(17.0)
Use of Iron rich foods	K		311(79.1)	82(20.9)
	P		316(80.4)	77(19.6)
Boiling water before drinking	K		372(94.7)	21(5.3)
	P		185(47.1)	208(52.9)
Importance of gaining height	K		342(87.0)	51(13)
	P		188(47.8)	205(52.2)

20,000 rupees/ month with 32.5% in the group 5,000–10,000 rupees/ month. Another significant association was found between maternal literacy and nutritional status of a child. Out of 246 literate mothers 204(83.3%) had normal children, as compared to the illiterate mothers where only 16.7% had normal children (*p*<0.001) (Table-2).

Family's socio-economic status, household hygiene, vaccination status of children, rearing and weaning practices, diet of household and children health care practices and access to health care facilities did not show any significant association with malnutrition too (Table-3).

Out of 393 children, there were more males (54.2%). Maximum children were in the age range 13-24 months (28.2%) followed by range 25-36 months (26.7%). Most children weighed between 10.1-20kg. Only 19.6% were undernourished and 18.1% were over nourished. Almost all children were vaccinated (98.5%).

A greater percentage of children were fed 3-6 times a day (33.3%) and mother was the main person

feeding the child (82.4%). Mothers knew and gave child food during illness (71.5%).

Discussion

The present study reports 19.6% malnutrition in under 5 years children in Nawanshehr, Abbottabad. This was much less than 38% reported in National Nutritional Survey 2001-2002[13]. A study conducted in Peshawar in 2002 reported 50% children under five years of age as malnourished[7], however from Egypt only 7.3% children were reported to be underweight[14] and in children less than 03 years of age this prevalence was 15.6%[15].

The maternal literacy in our study was 62.5% which may be a contributing factor in decreasing the prevalence of malnutrition in this area. Maternal literacy is an important factor for nutritional status of children in developing countries[16-18]. Other studies also showed strong inverse relationship between literacy of mothers and malnutrition in children <3 years of age[19-22]. Another worker reported that maternal literacy and lack of breast feeding were associated with fourfold increase risk of malnutrition[3]. The mothers of normal children were also more aware and informed by reading newspapers or through media in our study and this were reinforced by regular contact of mothers with lady health workers.

The present study did not show any gender predilection in malnourished children and same was reported from Malaysia[23], however other studies[24,25] have reported a higher prevalence of wasting in boys. In the present study the family's socioeconomic status was not a significant contributing factor for malnutrition but according to "Vietnam Living Standards[26] 1997-98 Survey, rural residents and poor households showed 17.6% and 10.9% greater prevalence of malnutrition than urban residents while another worker reported that low family income was a significant risk factor for malnutrition[21]. Large family size has also been reported to be associated with malnutrition in some studies[27,28].

A study from Ghana[29] showed an association between household possession, (an indicator of socioeconomic status), and under 5 malnutrition. The study also showed that ownership of radio and television sets was associated with reduction of malnutrition by 4 and 3 times respectively. Low intake of proteins and calories increases the prevalence of malnutrition[30]. Most malnourished children belonged to families where the importance of weight as an index of child health was given more importance while milestones of development were not given serious consideration. The practice and frequency of weighing the children were significantly least practiced among these families as compared to the normal children.

A Pakistani study recommended growth monitoring of all 3-10 year children[31] as dietary supplements and ORS during childhood illnesses is now frequently noticed. This was also shown by the National Survey which indicated that CDD (Childhood Diarrhea Disease programme) has been successful in increasing knowledge regarding use of ORS. However, actual use of ORS lags far behind as though 91% mothers had heard of ORS but only 34.7% had administered it to their child during last illness[32]. In families of malnourished children, due importance was not given to boiling of water before use. This could have contributed to recurrent diarrhea in these children, which were poorly controlled or treated.

In conclusion, it was seen that childhood malnutrition was strongly associated with mother's literacy level, health awareness and child rearing practices.

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