

Original Article

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Assessment of Nutrition, Morbidity & Immunization Status of Children (24 To 59 Months) Attending A Rural Medical College Hospital of West Bengal**Dr. Mausumi Basu¹, Dr. Tarun Kumar Sarkar², Ms. Gagori Chaudhury³, Dr. Jayanta Barua⁴, Dr. Ranjana Mandal⁵, Dr. Deb Kumar Ghosh⁶, Dr. Palash Das⁷.**¹Associate Professor, Community Medicine, IPGMER, Kolkata²Asstt. Prof., Community Medicine, CMSDH, Kamarhati, Kolkata³M Sc, Student, Rajabazar Science College, Kolkata⁴RMO-cum-Clinical Tutor, Dermatology, Malda Medical College, WB⁵Asso. Prof., Dept. Of Physiology, CMSDH, Kamarhati, Kolkata⁶Demonstrator, department of Anatomy, B S Medical College, Bankura⁷Associate Professor, Department of Community Medicine, CMSDH, Kamarhati, Kolkata.**Corresponding Author:**

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Abstract

Background: Nearly half of India's children - 43% are underweight, 45% are stunted and 20% are wasted; 26.3 million cases of ARI were reported in 2011 with an incidence rate of 2179 per lakh population; 10.6 million cases of diarrhoea with 1293 deaths were reported in 2011; fully immunized coverage in the age-group of 12-23 month old children was 61%. This study was conducted to assess the morbidity profile, under nutrition and

immunization status of 24 to 59 months old children in a medical college hospital of West Bengal. **Methods:** An Institution based cross sectional study was conducted among 450 children of 24 – 59 months, attended Paediatric Out Patient Department and Immunization Clinic of Midnapore Medical College & Hospital, from July to September 2013 using a predesigned pretested schedule. **Results:** the prevalence of underweight,

wasting and stunting was 42.44%, 20.22% and 51.78% respectively. Boys suffered more than girls in all three indicators. Acute Respiratory Infections (54.22%) and diarrhea (52.66%) were the common morbidities; 79.33% were fully immunized; 14.67% were partially immunized and 6% were

Introduction:

Child under-nutrition is an internationally recognized important public health problem. Globally, 162 million under-five children were stunted in 2012. The global trend in prevalence and burden of stunting continues to decrease. In 2012, 56% of all stunted children lived in Asia and 36% in Africa.¹ Ninety nine million under-five children were underweight in the globe in 2012. The global trend in prevalence of underweight continues to decrease, but at a slow pace which remains insufficient to meet the MDG. In 2012, 67% of all underweight children lived in Asia and 29% in Africa.¹ Globally 51 million under-

unimmunized. **Conclusion:** The problem of under-nutrition, common morbidities and low immunization amongst pre-school children needs to be addressed through comprehensive preventive, promotive, curative and social measures.

Key words: 24 – 59 months children, nutrition, morbidity, immunization

five year olds were wasted and 17 million were severely wasted respectively in 2012; approximately 71% of all severely wasted children lived in Asia and 28% in Africa, with similar figures for wasted children at 69% and 28% respectively.¹

Under nutrition among under-five children in India continues to be among highest in the world: almost five times more than in China and twice than in Sub-Saharan Africa. Nearly half of all India's children - almost 60 million (43%) are underweight, about 45% are stunted and 20% are wasted.²

The pre-school age is a crucial and transitional period when the child is struggling to come into equilibrium with its ecology. A child deprived of health care during these most impressionable years' is deprived of the opportunity of growing into a normal human being.

Infectious diseases like acute respiratory infections (ARI), diarrhea, measles, malaria, HIV/AIDS have been found to be the world's leading cause of under-five mortality and morbidity. On an average, globally children below 5 years of age suffer from 5 episodes of ARI per child per year, causing 238 million attacks.³ Globally for children up to 5 years, a median of 3 episodes of diarrhea occur per child per year causing 1.4 billion episodes of diarrhea per year with 123 million clinic visits annually.³

In India, about 26.3 million cases of ARI were reported in 2011 with an incidence rate of 2179 cases per lakh population; Pneumonia cases were about 7.15 lakh with incidence rate of 59 cases per lakh

population.⁴ Acute diarrhoeal diseases accounted for 8 percent of deaths in under-five years age group in 2011 in India; about 10.6 million cases with 1293 deaths were reported.⁵

There is a vicious circle between infection and under nutrition- infection contributing to malnutrition and malnutrition contributing to infection- both acting synergistically.⁶

Among the social determinants of malnutrition and morbidity of under-5 children, drop out immunization is one of the major determinants. According to nationwide Coverage Evaluation Survey (CES),⁷ conducted during November 2009 to January 2010 by UNICEF, the national fully immunized coverage in the age-group of 12-23 month old children was 61% whereas it was 54.1% and 47.3% as reported by District Level Household and Facility Survey (DLHS-3)⁸ (2007-08) and NFHS-III⁹ (2005-06) respectively.

With this background, this study was conducted to assess the morbidity profile,

under nutrition and immunization status of 24 to 59 months old children in a rural

medical college hospital of West Bengal.

Materials and Methods:

Study type and study population: An Institution based observational, descriptive study, cross sectional in design, was carried out in Paediatric Out-Patient-Department (OPD) and Immunization Clinic of Midnapore Medical College & Hospital, PaschimMedinipurDistrict in West Bengal from July to September 2013. 2- 5 years children (24 to 59 months) attending the Paediatric OPD and immunization clinic during the data collection period were the study population.

Study tools were a predesigned, pretested structured schedule; (prepared in consultation with experts of community medicine and paediatrics, pre tested, modified and validated by another 3 experienced persons of community medicine and paediatrics); weight machine; measuring tape; new WHO

growth chart; torch, stethoscope, immunization cards, relevant records and reports. The schedule had two parts: Part I consisted of socio demographic profiles of the study population. Part II consisted of study participant's anthropometric measurements; morbidity profiles and immunization status.

Study Variables: Age, sex, education of parents, occupation of parents, per capita monthly income (PCMI) were **explanatory** variables; anthropometric measurements (height, weight), clinical signs & symptoms, immunization status were **outcome** variables.

Sampling technique and Sample size: Based on the national prevalence of protein energy malnutrition, which was 47%,⁹ the sample size of the study was calculated using the Epi-info with relative precision of 10% and confidence interval

of 95%. Thus, using the formula, $N=(1.96)^2 \times pq \div e^2$, where N is total sample size required, p is prevalence of protein energy malnutrition (47%), q is 1-p (53%), and e is relative precision (10% of P).¹⁰ Thus, total sample size would be 433. To make it round-off, we included total 450 children of age 2-5 years.

By systematic random sampling every 5th child was selected till 450 sample size was met. The 1st child was selected by simple random technique.

Inclusion criteria: Children between 24-59 months, both sexes, not seriously ill, whose parents gave informed written consent were the criteria for inclusion in the study.

Exclusion criteria: Children above or below 24-59 months, seriously ill, whose parents did not give informed written consent were taken for exclusion of the child in the study.

Data collection technique:

Initially the informed written consent of the parents of the study population was

obtained after explaining the purpose and nature of the study and knowing their willingness to share the information. They were assured about their confidentiality and anonymity. Then data collection was conducted by exit interview of the parents of the study population followed by examining their children. Mothers were asked to give details of socio demographic profiles, immunization status, history of illnesses in last 6 months etc. Mothers were asked to show immunization card to confirm vaccination status. If not available, then verbal information from the mother was collected.

Socioeconomic status was measured by Modified Prasad's Classification 2013.¹¹

Anthropometric measurements taken were weight (kg) and height (cm) by standard techniques. Weight was measured to the nearest 0.1 Kg. Height was measured against a non-stretchable tape fixed to a vertical wall, with the participant standing on a firm/level surface and it was measured to the nearest 0.5 cm. The children were

dressed in light underclothing and without anyshoes during the measurement. Each measurement was done twice, and the mean of the two readings was recorded. The same measuring equipments were used throughout the study.

Subsequently, the children were categorized on the basis of their weight for age, height for age and weight for height as per WHO international growth standards 2006 generated for boys and girls aged 0 to 60 months.¹² General clinical examination of all the study population were carried out in natural light.

Operational definitions:

- **Fully immunized infant:** infant received BCG, all doses of DPT & OPV and Measles vaccine within 12 months of age.¹³
- **Fully immunized child:** fully immunized infant who received DPT 1st booster, OPV booster and

Institutional Ethics Committee (IEC)

approval: Institutional Ethics Committee of Midnapore Medical College, PaschimMedinipur was approached through proper channel prior to commencement of the study and proper permission was obtained.

Data management and statistical

analysis: Data entry and analysis was performed by the computer using SPSS Version 16 software. Percentages were calculated for descriptive analysis. Chi-square test was used to evaluate association between variables. The probability level for significance was fixed at $p < 0.05$.

measles vaccine (Through second opportunity) within 16-24 months of age.¹³

- **Stunting:** When height-for-age is below minus two (- 2) standard deviations (all the moderate and severe form) and minus three (- 3)

standard deviations (only severe form) from the median height-for-age of the reference population.¹²

- **Underweight:** When weight-for-age is below minus two (- 2) standard deviations (all the moderate and severe form) and minus three (- 3) standard deviations (only severe form) from

the median weight-for-age of the reference population.¹²

- **Wasting:** When weight-for-height is below minus two (- 2) standard deviations (all the moderate and severe form) and minus three (- 3) standard deviations (only severe form) from the median weight-for-height of the reference population.

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Tabular presentation of cut-off point for determining acute / chronic malnutrition and underweight

<u>Classification</u>	<u>Acute Malnutrition</u> <u>(weight for height)</u>	<u>Chronic Malnutrition</u> <u>(height for age)</u>	<u>Underweight</u> <u>(weight for age)</u>
Global	< - 2 SD	< - 2 SD	< - 2 SD
Moderate	< -2 SD and ≥ -3 SD	<-2 SD and ≥ -3 SD	<-2 SD and ≥ -3 SD
Severe	< - 3 SD	< - 3 SD	< - 3 SD

Results:

Socio demographic profiles of the study population: The study population

comprised of 450 (four hundred and fifty)24-59 months children. Male

children were 242(53.78%). and rest 208(46.22%) were females Two years (24 – 35 months) children were 227(50.44%), three years(36-47 months) children were 153(34.00%) and four years children (48-59 months) were 70 (15.56%). About 79.50% were Hindu and rest 20.50% were Muslim by religion. The literacy rate of fathers of the study population was 90.88%; ‘Graduate and above’ fathers were found 5.22%, higher secondary 14.34%, secondary 40.30%, mid-school 17.59%, primary school 13.43% and rest were illiterate(09,12%). The literacy rate of mothers of the study population was 88.78%; ‘Graduate and above’ mothers were found nil, higher secondary 10.67%,

Study revealed (**Table 1**) that according to WHO 2006 child growth standard, the prevalence rate of underweight, wasting and stunting was 42.44%, 20.22% and 51.78% respectively. Boys suffered more

secondary 39.15%, mid-school 17.69%, primary school 21.21% and rest were illiterate (11.28%). Distribution of fathers based on their occupation was unskilled labour (63.80%), skilled labour (15.40%), business (5.15%), service (6.25%) and rest 9.40% were unemployed. Distribution of mothers based on their occupation was home-makers (78.32%), unskilled labour (18.56%), social worker with (2.09%), service as teacher (1.03%). With regards to socio-economic status, as per Modified B. G. Prasad scale 2013; 39.30% belonged to class V followed by class IV (38.09%). Class III was 11.27%, class II 4.25% and class 07.09%.

than girls in all three indicators (45.87%,20.67% and 54.55% versus 38.46%, 19.72% and 48.56% respectively). However, the sex difference was not statistically significant ($p > 0.05$).

Table 1: Nutritional status of the study population as per WHO (2006) classification (n = 450)

Indices	Boys (n=242)		Girls (n=208)		Total (n=450)		χ^2 , p value
	Normal	Undernourished	Normal	Undernourished	Normal	Undernourished	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Weight for age (underweight)	131(54.13)	111(45.87)	128(61.54)	80(38.46)	259(57.56)	191(42.44)	2.51; 0.11
Height for age (stunting)	110(45.45)	132(54.55)	107(51.44)	101(48.56)	217(48.22)	233(51.78)	1.60; 0.20
Weight for height (wasting)	192(79.33)	50(20.67)	167(80.28)	41(19.72)	359(79.78)	91(20.22)	0.06; 0.80

Degree of freedom = 1; N = Number

Regarding the morbidity profiles, Acute Respiratory Infections (54.22%) and diarrhea (52.66%) were the common morbidities prevalent in the study population, along with worm Infestation (22%), and dental problems

(17.33%). Parents of some children reported multiple episodes of different diseases requiring treatment from health care providers. Girls suffered more than boys in ARI, diarrhoea and worm infestations(**Table-2**).

Table 2: Health status of the study population (n=450) * Multiple responses

Morbidity profile in last 6 months	Boys(n=242)	Girls(n=208)	Total
	N (%)	N (%)	N (%)
Acute Respiratory infection(ARI)	130(53.72)	114(54.80)	244(54.22)
Diarrhoea	124(51.24)	113(54.33)	237(52.66)
Malaria	07 (02.89)	05(02.40)	12(02.66)
Measles	05 (02.06)	04(01.92)	09(01.99)
Pain abdomen	04(01.65)	03 (01.24)	07(01.55)
Caries tooth/decayed tooth	46(19.00)	32(13.22)	78(17.33)
Enlarged/inflamed tonsils	18(07.44)	14(05.78)	32(07.11)
Scabies/ringworm	02 (00.82)	01(00.41)	3(00.66)
Worm expulsion	51(21.07)	48(23.07)	99(22.00)

Immunization status (**Table 3**) revealed that 79.33% of the study population were fully immunized; 14.67% were partially immunized and 6% did not receive any routine immunization.. Almost all

(98.99%) were vaccinated by Government facilities. Though the immunization rate was more among boys than girls, the sex difference was not statistically significant ($p>0.05$)

Table 3: Immunization status of the study population (n=450)

Immunization status	Boys N (%)	Girls N (%)	Total N (%)	χ^2 , p value
Fully immunized	195(80.58%)	162 (77.88%)	357(79.33%)	3.28;df = 2; 0.194
Partially immunized	37 (15.29%)	29 (13.94%)	66 (14.67%)	
Unimmunized	10(04.13%)	17(08.18%)	27(06.00%)	
Total	242(53.78)	208(46.22)	450 (100)	

Discussion:

In the present study, it was found that undernutrition was a problem of 24-59 months old children in Rural West Bengal of India because 42.44% children under study were underweight, 20.22% were wasted and 51.78% were stunted respectively which was almost similar to some other previous studies.^{14,15,16,17}

Study at Kakati by Mathad et al demonstrated the prevalence rate of underweight, wasting and stunting were 32.41%, 14.10% and 58.62% respectively;¹⁴ study at Coimbatore by Seetharaman et al revealed the prevalence of underweight was 49.6%, wasting 20.2% and stunting 48.4% respectively;¹⁵ study among brick kiln population of peri-urban Kolkata by Biswas et al showed 64.9% of the study population were underweight, 20.3% had wasting, & 64.9% were stunted respectively;¹⁶ study at

Bankura by Shit et al among slum children demonstrated that 46.1% had underweight; 71.8% of the children belonged to group stunting and wasting was 18.8%..¹⁷ In contrast, study at Karnataka by Brahmbhatt et al showed quite higher estimates where 95.5% were underweight, 81.8% had wasting and 74.8% had stunting respectively.¹⁸

Acute respiratory infections (ARI) and diarrhea were the common morbidities prevalent in the study population in our study and other previous studies.^{16, 19} The prevalence of acute respiratory infections was 54.22% which was corroborative with the findings by Biswas et al¹⁶ and by Srivastava et al.¹⁹ The prevalence of diarrhea (52.66%) was also comparable to that reported previously from Kolkata¹⁶ and from Etawah.¹⁹

In the present study, 79.33% children were fully immunized, 14.67% were partially immunized and 6.00% were not immunized. The corresponding figures were 58.66%, 30.70% & 27.7% respectively in Chandigarh slum study by Bhatia et al;²⁰ 55.02%, 24.61% & 20.37% respectively in Chandigarh study by Abrol et al;²¹ 17.85%, 48% & 34.15% respectively in Delhi study by Kumar et al;²² 44.1%, 32.0% & 23.9% respectively in Lucknow study by Nath et al;

Limitations:

There might be some recall bias of the adult care givers who were interviewed. This was a hospital based study. Since this was a descriptive study, no conclusive

Conclusion:

Using the WHO Child Growth Standards 2006 for assessment of nutritional status, it was found that more than two fifth of the study population suffered from under-weight, one fifth were wasted and half were stunted. Boys suffered more than girls in all three indicators though it was not statistically significant. ARI and diarrhoea were the common morbidities

Recommendations:

The problem of under-nutrition, morbidity and drop out immunization amongst under-five children needs to be addressed

²³33.3%, 48% & 18.7% respectively in Rajasthan study by Masand et al;²⁴ 81%, 17.6% & 1.4% respectively in Mumbai study by Sharma et al²⁵ and 34.95%, 50.09% & 14.96% respectively in Etawah study by Srivastava et al.¹⁹ However a study among brick kiln population of peri-urban Kolkata by Biswas et al revealed just opposite picture where 77.1% were partially immunized, 22.9% were not immunized and there was no fully immunized child.¹⁶

statement could be made about the association of different factors with under nutrition.

found among the children followed by worm infestations. Though the routine immunization coverage was almost four fifth, but rest 15% were partially immunized and 6% were unimmunized. The immunization status of boys was better than girls though it was not statistically significant.

through comprehensive preventive, promotive and curative measures. Campaign may be organized in order to

improve awareness regarding common health problems, nutrition and

immunization involving all stake holders.

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