Research Article

NUTRITIONAL STATUS OF ANGANWADI CHILDREN OF MATIGARA BLOCK OF DARJEELING DISTRICT OF WEST BENGAL

M. Sarkar[1], G.P. Mandal[2], S. Prabha[3], P. Baidya[4], S. Baidya[5] *

ABSTRACT: A cross sectional study was undertaken in Matigara block of Darjeeling district in West Bengal to find out the nutritional status of the Anganwadi children of the block and socio demographic profile of the parents. Amongst 314 Anganwadi centres, 5 centres was selected randomly. Anthropometric measurements (weight. height and mid upper arm circumference) of 215 Anganwadi children both boys and girls between age group of 1-6years were carried out. Mid upper arm circumference was taken between 1-5 years of age group. Out of 215 children 10.23% children were moderately and 2.79% were severely malnourished. 3.48% boys were severely malnourished and 2% girls were severely malnourished. Severe wasting was more common in the boys. The maximum educational qualification of the parents of the children were above primary to below higher secondary and occupations were either labourer or housewife. The average income level of the family was moderate.

Key wards: Nutritional Status, Anganwadi, Children, WHO, Z-score.

INTRODUCTION

Nutrition plays a key role in mental, physical and emotional development of a child. Adequate nutrition should be provided during the growing phase of one's life. Malnutrition weakens the immune system which makes the child susceptible to infection and severe illness. Nearly half of the deaths in children under 5 are attributable to under nutrition (UNICEF 2016). The level of under nutrition in children remains unacceptable throughout the world, with 90% of the developing world's chronically undernourished (stunted) children living in Asia and Africa (Arepalli 2016). In India, according to the Census of India (2011), the child population (0-6years) was 13.94%. In 2010, one in five children was estimated to be underweight in developing countries (Sengupta *et al*. 2010). In developing countries like India malnutrition during childhood can also affect growth potential and the risk of morbidity and mortality in later years of life (Alderman *et al*. 2003). It has been estimated that in India 65%, *i.e*., nearly 80 million children under 5 years of age suffer from varying degrees of malnutrition (Elizabeth

2010). The 4th National Family Health Survey (NFHS-4) showed that the under-five mortality rate (U5MR) in India is 32 children. NFHS-4 also reported that the percentage of children under 5 years who are stunted (height-for age) and underweight (weight-for-age) are 32.5 and 31.5. The percentage of children under 5 years who are wasted (weight-for-height) and severely wasted are 20.3 and 6.5 expectedly.

In developing countries malnutrition is mainly poverty induced. Though the immediate cause is dietary deprivation, the aggravating and conditioning factors like infections, infestations, illiteracy, large family size, etc., are other manifestation of poverty (Bagchi 1986).

To combat the malnutrition Government of India proclaimed a National Policy on Children in August 1974 declaring children as, "supremely important asset" (GOI 1974). As a result on 2nd October, 1975, Government of India launched 'Integrated Child Development Services'(ICDS) with the objectives of the programme to improve the nutritional status of children (0-6 years), to reduce morbidity and mortality rates, to reduce school

[1]PhD Scholar, Department of Home Science, Jharkhand Rai University, Ranchi, Jharkhand, India.
[2]Associate Professor, Deptt. of Animal Nutriton, WBUAFS, Kolkata, West Bengal, India.
[3]Assistant Professor, Department of Home Science, S.G.M. College, Ranchi University, Ranchi, Jharkhand, India.
[4]Medical Officer, Saptibari Primary Health Centre, Maynaguri, West Bengal, India.
[5]Assistant Professor, Deptt. of Veterinary Parasitology, WBUAFS, Kolkata,West Bengal, India.
* Corresponding author. e - mail: vetsurajit@gmail.com

dropout rates through early stimulation of programme for children (3-6 years), to provide the environmental conditions necessary for mental, physical and social development of the child, to enhance mother's capacity to look after the health and nutritional needs of the child through nutrition and health education and to achieve effective coordination at the policy making and implementation level among Government department to promote child development.

The services are delivered through Anganwadi Centres which is run by Anganwadi worker (AWW) and a supportive helper. The children are provided supplementary nutrition. In 2009 the amount of cost for supplementary feeding per child was revised to Rs. 4.00 and for severely underweight children was Rs. 6.00. To bridge the gap of Recommended Dietary Allowances (RDA) and Actual Dietary Intake (ADI) among the children of age group 6 months to 6 years 500 calorie of energy and 12-15 gm of protein per child per day in this programme should be provided. For severely underweight children the amount should be changed to 800 calories and 20-25 gm protein. This present study was undertaken to evaluate the nutritional status of the children enrolled in the Anganwadi centres.

MATERIALS AND METHODS
Study Design
This study was a community based cross sectional study. The study was conducted in the Anganwadi centres of Darjeeling district of West Bengal during March, 2016.

Selection of Anganwadi centres and children
The study was conducted at Matigara Block of Darjeeling district, West Bengal, India. This Block is under Siliguri Sub-division. In present, there are 314 operational Anganwadi centres in this block. Among these 5 centres were selected randomly to avoid bias. All the name of the centre was written in a piece of paper separately, folded and kept in a container blindly. Among then 5 folded papers were picked up.

For the data collection, official approval was taken from the District Project Officer (DPO).

Anthropometric measurements (height, weight and mid upper arm circumference) were taken from the enrolled children between 1-6 years of Anganwadi centre who were present at the time data collection. A total of 215 children were present. Among them 115 children were boys and 100 were girls (Table 1). The age of the children was recorded from the Mother and Child Protection Card supplied by the Government.

Weight was taken by using digital weighing machine to the nearest 100 gm with minimal clothing and bare foot. The portable scale was checked and calibrated every

Table 1. Distribution of Anganwadi children (N=215) according to age and gender.

Age group	Boys	Girls	Total
0-1 year	3 (42.86%)	4 (57.14%)	7 (100%)
1-2 year	31(58.49%)	22 (41.51%)	53 (100%)
2-3 year	20 (47.62%)	22 (42.38%)	42 (100%)
3-4 year	30 (54.55%)	35 (45.45%)	55 (100%)
4-5 year	22 (56.41%)	17 (43.59%)	39 (100%)
5-6 year	9 (47.37%)	10 (52.63%)	19 (100%)
Total	115 (53.46%)	100 (46.51%)	215 (100%)

day using known standard weight.

Height was taken by Height/Length board of UNICEF (Union Nations Children's Fund) to the nearest centimetre with bare foot.

The Mid upper arm circumference was taken by using MUAC (Mid Upper Arm Circumference) tape of UNICEF to the nearest centimetres. MUAC was taken between age group of 1-5years.

A structured questionnaire (Table 5) was asked to the mother of the children to obtain the occupational and level and family income.

Analysis of Data
The anthropometric indices were calculated using reference medians recommended by the World Health

Table 2. Prevalence of malnutrition (%) in Anganwadi children.

Parameters	Boys (%)	Girls (%)
Weight-for-age Z-score (N=215)		
Normal	74.78	79.0
Moderate underweight	20.87	16.0
Severe underweight	4.35	5.0
Weight-for-height Z-score (N=215)		
Normal	91.30	84.0
Moderate wasting	4.35	14.0
Severe wasting	4.35	2.0
Height-for-age Z-score (N=215)		
Normal	64.35	68.0
Moderate Stunting	21.74	19.0
Severe Stunting	13.91	13.0
MUAC-for-age Z-score (N=196)		
Normal	86.09	88.0
Moderate Malnutrition	10.43	10.0
Severe Malnutrition	3.48	2.0

Table 3. Prevalence of malnutrition among Anganwadi children according to their age.

Type of Malnutrition	0-1year	1-2year	2-3year	3-4year	4-5year	5-6year	Total
Weight for Height (N=215)							
Normal	3.7	26.46	19.58	26.46	16.4	7.4	100
Wasting	0	5.26	21.06	15.79	36.84	21.05	100
Severe wasting	0	28.57	14.29	28.57	14.28	14.29	100
Weight for Age (N=215)							
Normal	3.03	26.67	20	25.45	18.18	6.67	100
Underweight	5	17.5	10	27.5	20	20	100
Severe Underweight	0	20	50	20	10	0	100
Height for Age (N=215)							
Normal	2.11	21.83	20.42	28.17	15.5	11.97	100
Stunting	4.55	22.73	15.91	27.27	27.27	2.27	100
Severe Stunting	6.89	41.37	20.68	10.34	17.24	3.48	100
MUAC for Age (N=196)							
Normal	4.14	24.85	21.31	29.59	20.11	0	100
MUAC <-2SD	0	38.1	23.81	14.28	23.81	0	100
MUAC <-3SD	0	50	16.67	33.33	0	0	100

Organization (WHO) and classified according to standard deviation units (SD; z-scores), based on WHO criteria (Olack *et al*. 2011).

The following indexes of nutritional status were used (WHO 2006, WHO 2007)

   I)   Weight for age (to detect underweight)
   II)   Height for age (to detect stunting)
   III)   Weight for height (to detect wasting)
   IV)   MUAC for age (to detect under nutrition)
Weight-for height z-score (WHZ) <-2_SD and <-3_SD

indicate wasting and severe wasting respectively. This is used to detect acute malnutrition which is the result of recent nutritional deficiencies.

Height-for-Age z-score (HAZ) <-2_SD and <-3_SD are marked as stunting and severe stunting which means chronic malnutrition. This indicates a long period of nutritional deficiency.

Weight-for age z-score (WAZ) <-2_SDand <-3_SD indicate underweight and severe underweight respectively. This is a measure for both acute and chronic malnutrition.

For MUAC <-2_SD was considered as moderate malnutrition and <-3_SD as severe malnutrition.

Above 2 z-score value is considered as normal for each

Table 4. Socio-demographic profile of parents (N=215).

Parameter	Father (%)	Mother (%)
Education		
Lower	30.23	28.84
Moderate	66.05	66.98
Higher	3.72	4.18
Occupation		
Lower	64.65	96.28
Moderate	22.33	2.32
Higher	13.02	1.40
Income		
Lower	1.40	--
Moderate	87.44	--
Higher	11.16	--

Table 5. Interview questionnaire of mothers.

A. Identification
1. Name of the respondent
2. Village
3. Gram Panchayat
4. Block
5. District

B. General Information
1. Gender
2. Date of Birth

C. Specific information of parents
1. Occupation   a) Father   b) Mother
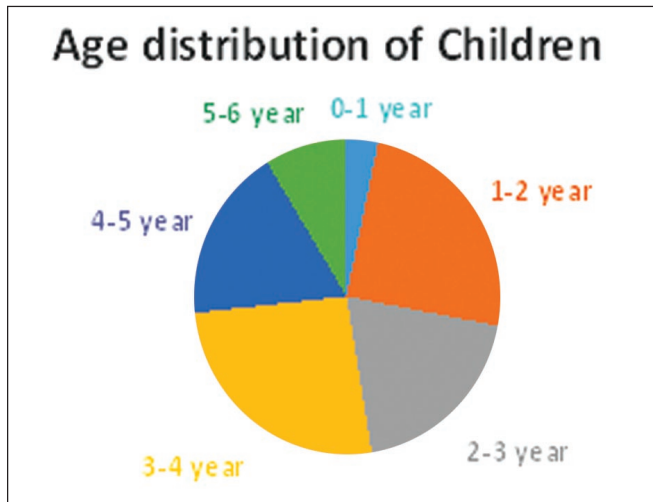2. Education   a) Father   b) Mother
3. Monthly Family Income

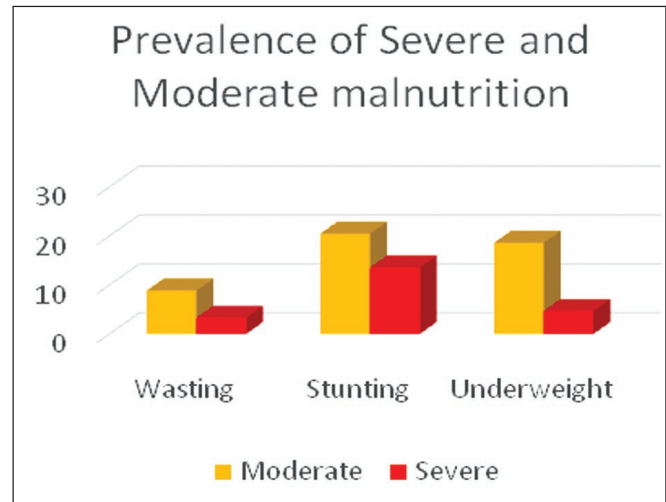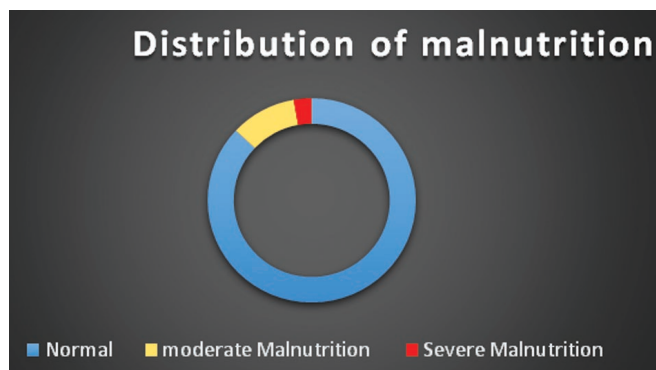**Fig. 1. Age distribution of Anganwadi children.**

Fig. 2. Distribution of malnutrition among Anganwadi children.

index.

The educational and occupational level of the parents was divided into three groups. The groups were graded as below :

For educational level

I. Lower (below primary)

II. Moderate (primary to higher Secondary)

III. Higher (above higher secondary)

For occupational level

I. Lower (labour and housewife)

II. Moderate (business holder)

III. Higher (service worker)

In same way income level of family was also divided into three categories. At first highest and lowest income was identified of the family of the children of that Anganwadi Centre. After that mean and SD of the total income of all of the family of the children of the centre was calculated and then the income was categorised as below (Snedecor and Cochran 1994).

I. Lower [(lowest income to (mean-SD)]

II. Moderate [(mean-SD) to (mean+SD)]

III. Higher [(mean+SD) to highest income]

Fig. 3. Total Percentage of prevalence of severe and moderate malnutrition among Anganwadi children.

RESULTS AND DISCUSSION

Age distribution

All the 215 children were between 1-6 years of age. They were grouped in 6 classes (Fig. 1). In 0-1 years there were 7 (3.27%) children. In 1-2 years and 2-3 years there were 53 (24.65%) and 42 (19.53%) respectively. In the group of 3-4 years, 4-5 years and 5-6 years the number of children were 55 (25.58%), 39(18.14%) and 19 (8.83%) respectively.

Sex distribution

Out of 215 children 115 (53.49%) children were boys and 100 (46.51%) children were girls (Table 2). In 0-1 year 42.86% (3 children) was boys and 57.14% (7 children) was girls. In 1-2 years 58.49% (31 children) was boys and 41.51% (22 children) was girls. In 2-3 years 47.62% 20 children) was boys and 52.38% (22 children) was girls. In 3-4 years 54.55% (30 children) was boys and 45.45% (35 children) was girls. In 4-5 years 56.41% (22 children) was boys and 43.59% (17 children) was girls. In the last group that was in 5-6 years 47.37% (9 children) was boys and 52.63% (10 children) was girls.

Malnutrition

By taking mid upper arm circumference it was found that 10.23% was moderately malnourished and 2.79% was severely malnourished (Fig. 2). Among 115 boys 86.09% was normal. Rest 10.43% and 3.48% were moderately and severely malnourished. Among 100 girls 88.0% was normal and 10.0% was moderately malnourished (Table 2). Rest 2.0% was severely malnourished. Moderate and severe malnutrition was common in the children between 1-2 years (Table 3). Among moderate wasting and severe wasting 38% and 50% were in the age group of 1-2 years.

Wasting

In overall 8.84% children was found as moderate wasting and 3.26% was severe wasting (Fig. 3). Moderate wasting was more common in girls *i.e.* 14.0%. For boys it was 4.35%. But 4.35% boys were found as severely wasting whereas only 2.0% girls were severely wasting. Among moderate wasting, 36.84% was in children between 4-5 years. Among severe wasting, the percentage of severe wasting was 28.57 both in 1-2 years and 3-4 years. There was no wasting between 0-1years. In 2-3 years, 4-5 years and 5-6 years the percentage of severe wasting was same *i.e.* around 14%.

Underweight

18.60% children were moderately underweight and 4.65% children were severely under weight. Among boys 20.87% was moderate underweight and 4.35% was severe underweight. Among girls the result was 46.0% and 5.0% respectively. 27.5% moderate under weight was in 3-4 years children. Whereas 50% severe under weight was in 2-3 years children.

Stunting

Total prevalence of moderate stunting was 20.47% and severe stunting was 13.49%. It was more found in boys. 21.74% boys were suffering from moderate stunting and 13.91% from severe stunting. Whereas 19.0% girls were moderate stunting and 13.0% was severe stunting. 27.27% moderate stunting was in the children between 3-4 year and 4-5 year separately and 41.37% severe stunting was in the age group between 1-2 years.

Parent's Education

In this centre 30.23% father and 28.84% mother of the children had lower educational level *i.e.,* below primary education. 66.05% father and 66.98% mother had educational level between primary and higher secondary or moderate (Table 4). Rest 3.72% father and 4.18% mother was highly educated *i.e.,* above higher secondary.

Parent's Occupaton

64.65% father was labourer whereas 96.28% mother was either housewife or labourer. 22.33% father and only 1.40% mother were involved in business. 13.02% father and 2.32% mother had higher occupational level *i.e.* service holder.

Family Income

Only 1.40% family was belonged to lower income group whereas 87.44% family was belonged to moderate income group. Rest 11.16% was in the upper income group.

To prevent malnutrition in India, Government of India has introduced various supplementary feeding programmes. Among them ICDS (Integrated Child Development Services) programme has been running successfully and has reduced the number of malnutrition in India between the ages of 6 months to 72 months.

In this study, there were few children that were suffering from severe wasting and underweight. But many children were suffering from moderate malnutrition. Large number of children was suffering from severe stunting which indicates chronic malnutrition. There is need to use WHO standards at the grass route levels to correctly identify the burden of malnutrition as it is very simple, reliable and easy to understand at grass route level by health workers (Shanawaz *et al*. 2013).

Goel *et al.*(2007) found that proportions of under nutrition were more among males when compared to females (Goel *et al.* 2007). The studies of Kumar *et al*. (2006) also stated that there were more number of male underweight children as compared to female children by using WHO weight for age criterion (SD classification) (Kumar *et al*. 2006). In this study underweight and stunting were more common in boys whereas wasting was more in girls. A study available evidences show that MUAC is the best (*i.e*. in terms of age independence, precision, accuracy, sensitivity and specificity) case-detection method for severe and moderate malnutrition and that it was also simple, cheap and acceptable (Biswas 2010). In this study percentage of severe malnutrition is low but 10% children both in girls and boys were suffering from moderate malnutrition. But percentage of severe malnutrition was 1.5 times more in boys than girls.

REFERENCES

Alderman H, Hentschel J, Sabares R (2003) With the help of one's neighbours: externalities in the production of nutrition in Peru. Soc Sci Med 56(10): 2019-2031.

Arepalli S, Rao GV (2016) Study of nutritional status of preschool children in areas of Kallur Primary Health Center, Kurnool District. Int J Medical Sci Publ Health 5(11): 2351-2354.

Bagchi K (1986) Public Health Nutrition in Developing Countries. Academic Publishers. 1st edn. 30-31.

Olack B, Bruke H, Breiman RF (2011) Nutritional status of under-five-children living in an informal urban settlement in Nairobi, Kenya. J Hlth Popul Nutri 29: 357-363.

Biswas S, Bose K, Mukhopadhyay A, Bhadra M (2010) Mid upper arm circumference based under nutrition among Bangalee children of Chopra, West Bengal. Iranian J Pediatrics 20(1): 63-68.

Elizabeth KE (2010) Nutrition and child development. Pars Medical Publisher. 163.

Goel MK, Mishra R, Gaur DR, Das A (2007) Nutrition surveillance in 1-6 years old children in urban slums of a city in northern India. Int J Epidem 5(1): 01-04.

Government of India (GOI) (1974) National Policy for Children. http://www.childlineindia.org.in/CP-CDownloads/national_policy_for_children.pdf.

Kumar D, Goel NK, Mittal PC, Misra P (2006) Influence of infant-feeding practices on nutritional status of Under-five Children. Indian J Pediatr 73(5): 417- 421.

Sengupta P, Philip N, Benjamin AI (2010) Epidemiological correlates of under nutrition in under-five years children in an urban slum of Ludhiana. Hlth Popul 33: 01-09.

Shanawaz A, Nasir A, Sundar K, Khan M, Rani S, Padmanabha B (2013) An evaluation of nutritional status of children in Anganwadi centre of Hyderabad district of Andhra Pradesh state using WHO Z-score technique. Global J Medic Pub Hlth 2(6): 01-06.

Snedecor WG, Cochran WG (1994) Statistical Methods. Oxford and IBH publication. New Delhi. India.

UNICEF/WHO/World Bank Group (2016) Levels and trends in child malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of 2016 edn. http://www.who.int/nutgrowthdb/jme_brochure2016.pdf.

World Health Organization (2006) WHO Multicentre Growth Reference Study Group. WHO Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development. Geneva. World Hlth Org. 312.

World Health Organization (2007) WHO Multicentre Growth Reference Study Group. WHO Child Growth Standards: Head circumference-for-age, arm circumference-for-age, triceps skin fold-for-age and subscapular skin fold-for-age: Methods and development Geneva: World Hlth Org. 217.