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A Study on Assessment of Nutritional Status of Pre-school Children Attending Anganwadi Centres of Bagchung Block of Jorhat District, Assam

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ABSTRACT

The present study has been undertaken to assess the nutritional status of pre-school children attending Anganwadi centres of Bagchung block of Jorhat district, Assam. 200 children in the age group of 2-5 years were selected by random sampling method. The results of the study revealed that the mean height of the 2-5 years children was significantly lower than the 95th centiles values of height (ICMR) ($p > 0.05$). The mean weight of the 2-5 years children was significantly lower than the 95th centile values of weight (ICMR) ($p > 0.05$). According to WHO (2007) Z-scores of height-for-age revealed that 75% of the 2-5 years children were in the normal range of nutritional status whereas 25% were stunted. While the nutritional status was assessed in terms of WHO (2007) Z-scores of weight-for-age, it was revealed that 70% of the 2-5 years children were in the normal range of nutritional status while 30% were underweight. The study revealed that there was prevalence of undernutrition among the target children. Nutrition intervention programmes should be carried out to create awareness on importance of balanced diet and adequate nutrition as well as the importance of growth assessment during the early childhood years to overcome the problem of childhood malnutrition.

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Introduction

The greatest contributor of under-five mortality and morbidity has been childhood malnutrition. In 2022, it was anticipated that 45 million children under the age of five were wasted and 149 million stunted worldwide. Undernutrition is a contributing factor in over half of fatalities in children under five. These mostly occur in low-and middle-income countries. The developmental, economic, social and medical impacts of the global burden of malnutrition are serious and lasting, for individuals and their families, for communities and for countries [1]. According to the National Family Health Survey (NFHS-5), 35.5% of children under the age of five in India are wasted, and 32.1% are underweight. These are some of the highest numbers in the world. Malnutrition can have detrimental effects. Malnourished children have a higher chance of experiencing stunted growth, decreased cognitive development, and an elevated risk of illness. They are more likely to die from preventable causes (Magadum et al., 2023). In 2020, the infant mortality rate in Assam stood at 36 deaths per 1000 live births (Statista Research Department, 2024). Children nutritional status in Assam hardly changed since NFHS-4 by all measures. The percentage of children who are underweight increased from 30 percent to 33 percent and children who are wasted increased from 17 percent to 22 percent since NFHS-4. The overall continuing high levels of undernutrition are still a major problem in Assam (NFHS-5, 2019-21).

The most widely used, affordable, and non-invasive technique for determining the size, proportion, and makeup of the human body is anthropometry WHO, 1995. It is commonly acknowledged

that anthropometry is a valuable method for evaluating the nutritional status and growth of a population or person [2-4]. Young children's anthropometric measures are especially vulnerable to shifts in their dietary condition [5]. Measurement of height, weight are reliable means by which the normal child is evaluated and gross abnormalities detected even when no other clinical signs of illness are manifested [6]. Therefore, an attempt has been made to assess the nutritional status of pre-school children attending Anganwadi Centre's of Bagchung block of Jorhat district, Assam.

Materials and Methods

A total of 200 pre-school children (2-5 years) were selected by multistage random sampling technique from four Anganwadi Centre's of Bagchung block of Jorhat district, Assam. A plan was developed to document anthropometric measures, such as sample weight and height, using standardized instruments and methods. The mean and standard deviation was calculated from the data obtained on measurement of height and weight of the target population. The results obtained were compared with 95th centile values of ICMR and WHO (2007) Z-scores values for validating the categories to different grades of malnutrition [7-9].

Results and Discussion

Height

The comparison of mean observed height of the 2-5 years boys and girls with 95th centile values of height (ICMR) has been presented in Table 1.

Table 1: Comparison of Mean Height of 4-6 years Boys and Girls with 95th Centile Values of Height (ICMR)

Age (years)	No. of subjects	Mean observed height(cm)±S.D.	95th Centile value of height (ICMR)	Mean difference (absolute value)	% of 95th centile value of height (ICMR)	% excess (+) or deficit (-)	't' value
Boys							
2	25	87.50±2.65	90.7	3.20	96.47	3.65(-)	3.81*
3	25	96.23±3.22	99.1	2.87	97.10	2.89(-)	5.33*
4	25	100.9±1.56	105.7	4.80	95.45	4.54(-)	2.89*
5	25	105.86±2.16	111.5	5.64	94.94	5.05(-)	4.57*
Girls							
2	25	85.54±3.93	89.8	4.26	95.25	4.74(-)	2.91*
3	25	94.21±4.19	98.2	3.99	95.93	4.06(-)	7.25*
4	25	101.35±2.74	105.1	3.75	96.43	3.56(-)	6.13*
5	25	104.19±1.95	111.0	6.81	93.86	6.13(-)	5.97*

Source: ICMR (2010)

a = Reference value-observed mean value

***- Significant at 5 per cent level**

The Table 1 reveals that the boys in the age range of two years showed 3.65 per cent deficit from the 95th centile values of height (ICMR). A deficit of 2.89 per cent from the standard was noted in the 3 years age group of boys, the height was recorded as 97.10 per cent of the standard. The mean height of 4 years boys was 95.45 per cent of the standard which was 4.54 per cent deficit from the 95th centile values of height (ICMR). In the age range of 5 years boys, it was observed that the mean height of the target group was 105.86cm which was 5.05 per cent deficit from the standard. Similarly, the girls in the age group 2 years showed 4.74 per cent deficit from the 95th centile values of height (ICMR). The mean height of 3 years girls was recorded to the 94.21cm which was 95.93 per cent of the standard. A deficit of 3.56 per cent from the standard was noted in 4 years girls, the height was recorded as 96.43 per cent of the standard. The mean height of 5 years girls was 104.19 cm with a deficit of 6.13 per cent from the 95th centile values of height. The mean height of the 2-5 years boys and girls were significantly lower than the 95th centile values of height (ICMR) in all the ages(p<0.05). Thus, it is evident that the target children had low height as compared to Indian reference standards in all the age groups. This may be due to the reason that the quality and quantity of the children were inadequate in terms of growth promoting nutrients such as energy and protein required during this period of life. Deficiency in height can be advocated as a reflection of genetic factor too (Gopalan,1990). Reported that the mean height of the under five children of North-East Delhi were significantly lower than the Indian standard [9,10].

The mean observed height of the 2-5 years boys and girls were further classified according to World Health Organization (WHO, 2007) Z-scores of height-for-age to observe the prevalence of stunting among the study sample. Table 2. shows the per cent distribution of 2-5 years boys and girls according to WHO (2007) Z-scores of height-for-age [7].

Table 2: Percent Distribution of 2-5 Years Boys and Girls according to WHO (2007) Z-scores of Height-for-Age

Age (years)	Observed no. of subjects (n=200)	Height-for-age (Z-scores)	
		Normal and above(>-2SD)	Stunting (<- 2SD)
Boys			
2	25	73	27
3	25	70	30
4	25	71	29
5	25	75	25
Girls			
2	25	70	30
3	25	72	28
4	25	75	25
5	25	71	29

Source: World Health Organization (2007) Z-Scores for height-for-age

From the Table 2, it is apparent that 73 per cent of the boys at 2 years, 70 per cent at 3 years, 71 per cent at 4 years and 75 per cent at 5 years were in the normal range of nutritional status. 27 per cent, 30 per cent, 29 per cent and 25 per cent were stunting at ages 2,3,4 and 5 years respectively. Among the girls, 70 per cent, 72 per cent, 75 per cent and 71 per cent were in the normal range of nutritional status at 2,3,4 and 5 years respectively. The prevalence of stunting among the 2-5 years was 30 per cent, 28 per cent, 25 per cent and 29 per cent at age 2,3,4 and 5 years respectively. The per cent distribution of 2-5 years boys and girls according to WHO (2007) Z-scores of height-for-age revealed that although the majority of the boys and girls were in the normal range of nutritional status, there was prevalence of stunting among the studied children in each age group [7]. Stunting reflects a failure to reach linear growth potential due to sub-optimal health and/or nutritional conditions. It is an indicator of chronic undernutrition, the prolonged children food deprivation and/or disease and illness [11]. The findings of the

present study are concurrent with the results reported by that the prevalence of stunting among 1 to 5 years children of Lucknow district was 48.8 per cent which was due to socio-economic variables that influence the health status of young children in developing countries [12].

Weight

The comparison of mean observed weight of the 2-5 years boys and girls with 95th centile values of height (ICMR) has been presented in Table 3.

Table 3: Comparison of Mean Height of 4-6 years Boys and Girls with 95th Centile Values of Height (ICMR)

Age (years)	Age (years)	Mean observed weight(kg)±S.D.	95th Centile value of weight (ICMR)	Mean difference (absolute value)	% of 95th centile value of weight (ICMR)	% excess (+) or deficit (-)	't' value
Boys							
2	25	12.20±2.13	13.0	0.8	93.84	6.15(-)	3.42*
3	25	14.17±3.29	14.8	0.63	95.74	4.25(-)	5.33*
4	25	15.27±1.16	16.5	1.23	92.54	7.45(-)	6.89*
5	25	17.36±2.52	18.2	0.84	95.38	4.61(-)	4.51*
Girls							
2	25	11.33±2.81	12.6	1.27	89.92	10.07(-)	4.11*
3	25	13.92±1.34	14.4	0.48	96.66	3.33(-)	3.19*
4	25	15.05±3.42	16.0	0.95	94.06	5.93(-)	6.77*
5	25	15.83±2.09	17.7	1.87	89.43	10.56(-)	4.82*

Source: ICMR (2010)

a = Reference value-observed mean value

***- Significant at 5 per cent level**

It is evident from the Table 4 that the boys in the age range of 2 years showed 6.15 per cent deficit from the 95th centile values of weight (ICMR) standard. A deviation of 4.25 per cent from the standard was noted in the 3 years age group, the weight was recorded as 95.74 per cent of the standard. The mean weight for 4 years boys was 92.54 per cent of the standard where the deficit was 7.45 per cent of the standard. It was observed that the mean weight of the 5 years boys was 4.61 per cent deficit from the 95th centile values of weight (ICMR) standard. Similarly, the girls in the age group of 2 years showed 10.07 per cent deficit from the standard. The mean weight of the 3 years girls was 96.66 per cent of the standard and the deficit was 3.33 per cent of the standard. A deficit of 5.93 per cent from the standard was noted in the 4 years girls, the weight was recorded as 94.06 per cent of the standard. The mean weight of the 5 years girls was 89.43 per cent of the 95th centile values of weight (ICMR) standard. Thus, it has been seen that the mean observed weight of the target population was significantly lower than the Indian standard($p < 0.05$). The low weight may be attributed to inadequate energy intake or it may be result of chronic or recurrent undernutrition, usually associated with poor socioeconomic conditions, poor maternal health, low education levels and related factors. While assessing the growth pattern of under five children of North-East Delhi, reported that the mean weight of the children was significantly lower than the Indian standard [10].

Table 4: Percent Distribution of 2-5 years Boys and Girls according to WHO (2007) Z-scores of Weight-for-Age

Age (years)	Observed no. of subjects (n=200)	Weight-for-age (Z-scores)	
		Normal and above(>-2SD)	Underweight (<-2SD)
Boys			
2	25	75	25
3	25	77.33	22.67
4	25	72	28
5	25	78	22
Girls			
2	25	70	30
3	25	76	24
4	25	73	27
5	25	75	25

Source: World Health Organization (2007) Z-Scores for weight-for-age

From the Table 4, it is apparent that 75 per cent of the boys at 2 years, 77.33 per cent at 3 years, 72 per cent at 4 years and 78 per cent at 5 years are in the normal range of nutritional status. 25 percent, 22.67 per cent, 28 per cent and 22 per cent of the boys were underweight at ages 2, 3, 4 and 5 years respectively. The prevalence of underweight among the 2-5 years girls was 30 per cent, 24 per cent, 27 per cent and 25 per cent at ages 2, 3, 4 and 5 years respectively. The per cent distribution of 2-5 years boys and girls according to WHO (2007) Z-scores of weight-for-age revealed that there was prevalence of underweight among the target population [8]. It may be due to early childhood diseases association among the boys and girls. According to Rayhan and Khan (2006), the factors that can cause underweight problem in children were birth interval, size at birth, mother's body mass index at birth as well as parents education level. The findings of the present study are similar to a study reported by that 28.9 per cent of children below 5 years of age in Attarkhel, Kathmandu, Nepal were undernourished might be due to the effect of low level of education of the parents and low socio-economic status [13].

Summary and Conclusion

The present investigation revealed that the height measurements of the target children were significantly lower than the 95th centiles values of ICMR ($p < 0.05$). The mean weight of the 2-5 years children was significantly lower than the 95th centile values of ICMR ($p < 0.05$). As per WHO (2007) height-for-age, majority (70-75 per cent) were in the normal range of nutritional status whereas (25-30 per cent) were stunted. According to WHO (2007) weight-for-age, majority (70-77.33 per cent) were in the normal range of nutritional status whereas (20-30 per cent) were underweight [7,8].

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