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Original Research Article

Assessment of growth and development of under five children as per new WHO child growth standards

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ABSTRACT

Background : An quick and non-invasive procedure to assess the general health and well-being of the child is growth monitoring. In 2006 WHO published growth charts and these charts are now more frequently used to assess growth of children. These charts have also been adopted by CDC. The current study was planned to assess the status of growth of children in Haryana using these charts.
Aims: To assess the growth and development of under five children as per new WHO growth standards in selected community of Haryana.
Settings and Design: A descriptive design was used and study was conducted in rural and urban community of Ambala, (Haryana) to assess their Growth and Development.
Material and M ethods: Total 140 under five children of conveniently selected setting were enrolled through door to door survey. Various checklists were used to ascertain competency of data collectors and inter-observer reliability was calculated and it was 0.82. Screening sheet, and growth and development assessment performa with growth charts were used to collect data. The anthropometric measurements were taken and recorded for all children.
Statistical analysis: Data was analysed by using SPSS 17 (Statistical Package for Social Sciences)**.**
Results: Most of the children were born between gestational age of 34-40weeks, and more than half were males. Related to initiation of breast feeding 73 (52.1%) of children were breast fed within one hour of birth. About introduction of solid food in more than half of the children it was started in age of 6-7 months. Half of the fathers were labourers, and all most all of the mothers were housewives. As per weight for age and length/height for age chart 61.4 of the children fell in -2 to +2 SD that is normal. As per indicator of acute malnutrition that is weight for length/height 54.2% of children were normal. Only 3.6% children were above 2SD for length/height and weight for age, rest other were below 2SD and were underweight, stunted and wasted as the related indicators.
Conclusions: There is a need to implement education program for parents of children on nutrition as many children were at risk of both acute and chronic malnutrition and few were malnourished.

1. Introduction

The early period of life is associated with considerable opportunity for growth and development and is sensitive to harm. The Growth and development are the essential features of life of child that distinguish him or her from an adult.[1] Adequate nutrition during early years of life is of paramount importance for growth, development and long-term health throughout the adulthood.[2] The process of growth starts from the time of conception and continue

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till the child grows into mature adult. Growth denotes a net increase in size or mass of tissue and development specifies maturation of function.[3] To assess the growth and development various Growth Charts are used. Growth monitoring consist of serial assessment of both weight and height measurement over time so that the growth velocity can be assessed. Growth Charts are a graphical presentation of body measurement that aid in the assessment of body size, shape and in the observation of trends in growth performance. They are used in the assessment and monitoring of the individual children. Poor nutrition during this critical period contributes to significant morbidity and mortality, long term consequences include reduced work capacity, impaired intellectual performance and increased risk of chronic diseases. In India common illness occur in children less than 3 years of age include: fever (27%), acute respiratory infections (17%), diarrhoea (13%) and malnutrition (43%).[4] Malnutrition is responsible, directly or indirectly for about one third of deaths among children under five,[4] so time to time assessment and monitoring is essential.

All major national surveys carried out in India by the National Nutrition Monitoring Bureau, the National Family Health Survey[5–8] and the District Level Household Survey have used IAP standards to estimate the prevalence of under nutrition. On top of it through review literature it has been observed that the most of the studies related to growth and development /nutrition of children were conducted as per standards other than 21st century WHO growth standards. Very few studies have been conducted as per WHO New Global Child growth standards (MGRS multi growth reference study).[2] In relation to Indian setting most of the studies have focused on growth and development of children as per IAP standards. Out of these studies very few have focused on under five, few of them were on premature infants, some were on children of age birth upto 2 years of age or from 5-12/18 years of age.[8–12] In a study conducted at Chandigarh, Punjab India the prevalence of underweight was calculated using both IAP and new WHO growth standards. The prevalence of underweight in the first 6 months of life was nearly 1.6 times higher when calculated with WHO Child Growth Standards compared with IAP growth curves. For children of all ages combined, the prevalence of underweight was 1.4 times higher when IAP standards rather than the new WHO standards were used, with the absolute difference being 14.5% ($P < 0.001$). Overall estimates for severe malnutrition were 3.8 times higher using the new WHO standards rather than IAP standards ($P < 0.001$). Furthermore, IAP standards led to an overestimated prevalence of undernutrition among girls in particular (by 21.2% compared with WHO standards).[13] So the present study has been taken up keeping in mind the superiority of the WHO growth standards and paucity of information available from the present setting.

2. Aim

To assess the growth and development of under five children as per new WHO growth standards in selected community of Haryana.

3. Materials and Methods

The study design was descriptive in nature and was conducted on confidently selected rural and urban community of Haryana i.e.village Tandwali and Pooja vihar, Ambala. The study focuses upon all under five children. In the sample under five children who met the following inclusion criteria were included parents /Guardians able to understand Hindi/English/Punjabi and are willing to participate and also allow child to participate.

A sample of 140 children was taken on total enumeration basis. Eighty five (85) were from urban and 55 were from rural community. The tool consists of Screening sheet, Growth and development Performa with new WHO growth charts and 5-6 checklists to ensure accurate measurements. Inter-observer reliability of all checklists was found to be greater than 0.80. The main tool that is Growth and Development Assessment Performa consisted of three parts demographic variables of child, demographic profile of parents and anthropometric assessment of the child. In Anthropometric assessment of the child along with measurement, z-score interpretation (weight-for-age, length/height-for-age, and weight for height /length) was also included. Tool try out was done and reliability was found to be 0.80. Pilot study was conducted and the study was found to be feasible. Data was collected by door to door survey. After filling the screening sheet, anthropometric assessment was done and growth charts were plotted and interpreted. Recording was done in Growth and Development assessment Performa. After data collection, data was coded, tabulated and analyzed with SPSS-17. Data was presented with help of tables, frequency and percentages.

4. Results

4.1. Socio-Demographic variables of children.

Majority of the children 113 (80.7%) were in age group 1-5 years, 23 (16.3%) were of 2months -1year of age, and only 4 (2.9%) were infants. Gender of 83 (59.3%) was male. Out of total 132 (94.3%) were born in gestation of 34-40 weeks and remaining 8 (5.7%) were born in the gestation of 28-34week. All (100%) children had single birth, 124 (88.6%) had birth weight in range of 2-3 kg and equal number 8(5.7%) had birth weight in range of 1-2 kg and 3-4 kg respectively, 114 (81.4%) were vegetarian; out of all 73 (52.1%) children were breastfed within1 hour of birth.

4.2. Socio-Demographic variables of Family.

Majority of the fathers 75 (53.6%) were in age group 25-30 years, 69 (49.3%) mothers were in age group 18-25 years, 49 (35.0%) fathers were educated up to 8-10th standard, 53 (37.9%) of mothers were educated up to 8th, 138 (98.6%) mothers were housewives, 84 (60.0%) families were nuclear, 98 (70%) children had siblings ranging between 1-2, eighty-four (60.0%) families had 0- 5 family members, 53 (37.9%) families had family income between 5000-10000Rs.

4.3. Anthropometric Measurements of child and Z-score interpretations.

4.3.1. Weight for age

Table 1: Frequency and Percentage Distribution of Z-Score related to weight for age of Child. N=140

Weight for age (Z-score)	Inter-pretation	F	%
> 1 to ≤ 2	Normal	2	1.4
≤1 to >-1	Normal	72	51.4
≤-1 to >2	Normal	12	8.6
≤-2 to ≥ -3	Underweight	32	22.9
<-3	Severely under –weight	22	15.7

As per weight for age charts 86 (61.4%) children were normal, 32 (22.9%) were underweight, 24 (17.1%) were severely underweight.

4.3.2. Length for age

Table 2: Frequency and Percentage Distribution of Z-Score related to length/height for age of child N= 140

Length /height for Age (Z Score)		F	%
> 2	Height is above normal	5	3.6
≥ 1 to ≥ 2	Normal	8	5.7
≥ 1 to> -1	Normal	62	44.3
≤ -1 to ≥ -2	Normal	16	11.4
<-2 to ≥ -3	Stunted	26	18.6
< -3	Severely Stunted	23	16.4

As per Length for Age charts 86 (61.4%) children had normal length/height, 26 (18.6%) were stunted, 23 (16.4%) of children were severely stunted.

4.3.3. Weight for length/height

As per weight for length/height out of all the children 42 (54.2% 9.9%) were normal, 32 (22.9%) were wasted, 27 (19.3%) were severely wasted. Only 3 (2.2%) were overweight and only 2 (1.4%) were obese.

Table 3: Frequency and Percentage Distribution of Z-Score related to weight for length/height of Child. N=140

Weight for length / height (Z score)	Interpretation	F	%
>3	Obese	2	1.4
≥ 2 to ≤3	Overweight	3	2.2
> 1 to< 2	Normal	10	7.1
≤ 1 to ≥-1	Normal	42	30.0
<-1 to ≥ -2	Normal	24	17.1
<-2 to ≥ -3	Wasted	32	22.9
<-3	Severely wasted	27	19.3

5. Discussion

Various studies have been conducted to assess the growth and development of the under five children with the use of different growth standards (WHO growth standards, IAP growth standards and NCHs growth references) in Indian as well as in foreign setting. In most of the studies it was revealed that the percentage of stunted children was high followed by underweight and wasting using any of the standards. Similarly one of the studies which was conducted at Vietnam based on the reference data from the National Centre for Health Statics (NCHS), it was revealed that out of 650 children, 269 (44.3%) were stunted, 193 (31.8%) children were underweight and 72 (11.9%) were wasted.[14] In another study conducted at Allahabad the nutritional assessment was done by the WHO criterion using summary indices of nutritional status weight-for-age, height-for-age- and weight for height. It was reported that among all under five children 51.6% were stunted, 36.4% were underweight, and 10.6% were wasted.[15] Whereas, the results of the present study revealed that out of 140 under five children 26 (18.6%) were stunted, and equal number 32 (22.9%) were underweight and wasted respectively which represent that underweight and wasting is approximately double the number of children stunted. This is in contrast with the trend of study conducted at Puruliya where stunting was 17.6%, and underweight was 33.7% and was nearly more than the double of stunting.[16]

In relation to severe malnutrition in present study 23 (16.4%) children were severely stunted, 22 (15.7%) were severely underweight, and 27 (19.3%) were severely wasted. This is evident that approximately equal numbers of children were severely stunted and severely underweight. This is in similar to one of the study form west Bengal in which it was observed that out of 2016 children, aged 3.0-5.9 year approximately equal percent of children were stunted and underweight whereas, the percentages were more than the double in comparision to present study that is 48.20%, and 48.30% respectively.[17] Whereas in relation to severe underweight and severe wasting the percentage of children in the present study was higher than any other. This can be because of some acute process of malnutrition

which might have taken place among growing children of the study population and underweight status being a composite index of chronic or acute malnutrition. Secondly as Compared to the old NCHS/WHO growth reference, the new WHO growth standards estimate that a higher proportion of children are stunted and wasted.

6. Conclusion

The study has revealed that 23 (16.4%) of children were severely stunted, 22 (15.7%) were severely underweight and 27 (19.3%) were severely wasted, which indicates that children had both acute and chronic malnutrition. These findings of study are eye opening and are suggestive of a need of assessment of malnutrition on large scale, In addition there is need to implement education programme to educate mother on and prevention and management of malnutrition among children.

7. Source of Funding

None.

8. Conflict of Interest

None.

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