Assessment of nutritional status of pre-school children (2-5 years) in Girwah tehsil of Udaipur city

■ KHUSHBOO SHARDA AND GARIMA BABEL

■**ABSTRACT :** 250 pre-school children from Girwah tehsil of Udaipur city were studied with the objective of assessing their nutritional status. For the purpose the information about anthropometric parameters such as height, weight, MUAC, head and chest circumference was collected. Nutritional status of subjects was assessed using different methods of anthropometry. The results were varied with the each method applied. Head and chest circumference relationship depicted 0.8 per cent and 20 per cent subjects were borderline undernourished and under nourished, MUAC classification depicted mild malnutrition among 29.6 per cent subjects and moderate and severe malnutrition among 14 and 4.4 per cent subjects, whereas SD classification indicated that the percentage of moderate underweight, stunning and wasting was 2.4 per cent, 4.8 per cent and 2.4 per cent, respectively. Girls were found to be more underweight, stunned and wasted in comparison to boys. Despite of normal nutritional status in most of the subjects the values of height and weight were found to be less in comparison to reference values given by WHO, especially in girls.

■ **KEY WORDS:** Pre-school children, Anthropometry, Nutritional status, WHO growth standards

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Children are essential to the nation's present and its future. Children have begun to be not only for whom they are today but for their future role in creating families, powering the work surface and making Indian democracy work (Tiwari, 2015). Mounting evidence that helps during childhood sets the stage for adult health not only reinforces this perspective but also creates an important ethical, social and economic vital to ensure that all children are as healthy as they can be. Healthy children are more likely to grow as healthy adults. Growth is an essential expression of health. It is also a way to measure efforts designed to reduce child mortality and disease (Gupte and Gomez, 2004). Basic growth assessment involves measuring a child's weight and height and comparing these measurements to growth standards. The purpose is to determine whether the child is growing normally or has a growth problem that should be addressed (Garza and de Onis, 2004). India is one among the many countries where child malnutrition is sever and major underlying cause of child's mortality. According to the report of Government of India (2012) : while an absolute increase of 181 million in the country's

population in decade 2001-2011, there is a reduction of 5.05 million in the population of children aged 0-6 years. Assessment of nutritional status is the first step for assessing malnutrition. The principal aim of such an assessment is to determine the type, magnitude and distribution of malnutrition in different geographic areas to identify at risk group and to determine the contributory factors. There are different ways of assessing malnutrition. Anthropometric parameters are found to be the effective method of determining health status and can be used to screen pre-school children in order to determine their nutritional status (The Kasongo Project Team,1983). In present study nutritional status of preschoolers has been assessed by use of anthropometry.

(Kuriyan and Kurpad, 2012) There are far too many children in the world who suffer from under-nutrition and growth faltering, with life time consequences such as reduced work capacity, increased infections, impaired intellectual performance and an increased risk of non communicable diseases later in life (Vyawahare *et al.*, 2010). Despite steady economic growth and the existence of large-scale government schemes such as Integrated Child Development Services (ICDS), the nutritional status of children in India remains troublesome. Mishra and Mishra (2007) on his study on pre-school in central Orissa found the percentage of children under malnourished group varied from 21 to 27 as per Body-Mass index, 27 to 31 as per mid-arm circumference, 15 to 17 as per Dugdale's index and 10 to 12 as per Gomez classification. Kumar *et al.* (2006) studied under-five-years children with the aim to found out nutritional status, in selected four anganwari areas of urban Allahabad (U.P.). Among all under five children surveyed, 36.4 per cent underweight (< 2SD weight- for -age), 51.6 per cent stunted (< 2SD height- for- age) and 10.6 per cent wasted (< 2SD weight- for- height). Proportions of underweight (45.5%) and stunting (81.8%) were found maximum among children aged 13-24 months. Wasting was most prevalent (18.2%) among children aged 37-48 months. Tarozzi (2008) and Nigam (2006) have explored the implications of the use of WHO growth standards for assessment of undernutrition *vis-avis* other standards which were widely used earlier in health services/surveys and Integrated Child Development Services Programme. The temporal trend indicates declines in the percentages of undernourished (low weight-for-age) and stunted (low height-for-age) children over the 7-year period, although

the degree of improvement was far better for stunting than for underweight (Sen *et al.*, 2011). On the contrary to previous study Rajaram *et al.* (2003) and Laxmaiah *et al.* (2002) on their study on malnutrition in pre-school children at Kerala and Punjab found high prevalence of undernourishment (<2SD weight for age); stuntning (<2SD height for age) and wasting (<2SD weight for height). These studies recommend more area-specific policies for the development of nutritional intervention programmes

Objectives:
– To assess nutritional status of pre-school children.
– Comparing growth curves for height and weight in studied children with the WHO (2006) standards.

■ RESEARCH METHODS
Material :
– Height measuring scale
– Weighing machine- electronic/spring balance
– Non-elastic measuring tape

Methods:
– Type of study: Cross sectional study
– Locale: Girwah tehsil, Udaipur city
– Period of study: Feb 2015 to Aril 2016.
– Study population: 250 Pre-school children
– Procedure: 250 Pre-school children with their mothers were selected purposively from 10 villages of Girwah tehsil (Baleecha, Bargaon, Bedla, Bedwas, Loyra, Saweena khera, Sukher, Sisarma, Teetardi, Umarda) with the equal representation from each village by using door to door contact and snow ball sampling method. Information about child's name, age, religion, family, Child's anthropometric details such as height, weight, MUAC, head and chest circumference were collected.

The nutritional status of pre-school children was assessed using different methods such as: Head and chest relationship, MUAC classification by WHO (Gupte, 2012) and SD classification by WHO (2006).The World Health Organization recommends use of SD classification (NIN, 2011) to categorize 1-5 year children into different nutritional grades. The Government of India has also accepted the use of WHO 2006 standards for assessment of nutritional status in pre-school children (Ramachandran, 2007). Therefore, the per cent

distribution of pre-school children was done according to weight for age, height for age and weight for height using WHO (2006) reference values.

Weight for height:

It is partially age dependent, was calculated as follows:

Per cent weight for height = (Actual weight / Expected weight for actual height) * 100

Height for age:

It is useful for assessing malnutrition spread over a prolonged period (Chronic malnutrition). Since change in height occurs only gradually compared to weight, early detection of malnutrition or diagnosis of acute malnutrition is not workable by this parameter.

Per cent height for age = (Actual height / Expected height for actual age) * 100

Weight for age:

It is useful for assessing under nutrition.

Per cent weight for age= (Actual height / Expected height for actual age) * 100

Height and weight of studied subjects was compared with the reference values published by the World Health Organization (WHO) as the Child Growth Standard for infants and children upto the age of 5 yr based on a multi-country study (Brazil, Ghana, India, Norway, Oman and USA) on growth of healthy breast-fed children under optimal conditions in April 2006 (De Onis *et al.*, 2006).

■ **RESEARCH FINDINGS AND DISCUSSION**

The mean height, weight, head and chest circumference of studied pre-school children has been presented in Table 1.

Head and chest relationship:

In present study 79.2 per cent subjects were found to have normal nutritional status according to their head and chest relationship. Whereas 0.8 and 20 per cent subjects were found with borderline under nutrition and under nutrition.

MUAC (Mid upper arm circumference):

It is an age independent simple tool for use among children between 6 – 60 months of age (Elizabeth, 2016). As depicted in Table 3, 52 per cent of children were found with normal nutritional status. Remaining 48 per cent subjects were malnourished among them 29.6 per cent were found with mild malnutrition, 14 per cent were moderately malnourished and 4.4 per cent were severely

Table 1 : Anthropometric measurements of pre-school children				
Age (months)	*Height(cm)	* Weight(kg)	*Head circumference	*Chest circumference
24- 36	84.27±0.61	10.19±1.87	46.2±5.22	46.15±2.36
37-48	93.22±0.74	12.62±1.50	47.1±1.79	48.66±2.26
49-60	96.75±0.99	13.99±2.71	47.4±2.10	49.27±3.29
Total	90.50±0.56	11.99±2.57	46.8±3.73	47.80±2.96

* Values are in mean±SD

Table 2 : Head and chest circumference relationship (After the age of one year)			
HC and CC relationship	Nutritional status	Frequency	Percentage
CC > HC	Normal	198	79.2
CC = HC	Borderline under nutrition	2	0.8
CC<HC	Under nutrition	50	20

Table 3 : MUAC classification of nutritional status							
MUAC range (cm)	Nutritional status	Male		Female		Total	
		No	%	No	%	No	%
13.5-17	Normal nutritional status	73	29.2	57	22.8	130	52
12.5- 13.5	Mild malnutrition	36	14.4	38	15.2	74	29.6
11.5- 12.5	Moderate malnutrition	11	4.4	24	9.6	35	14
< 11.5	Severe malnutrition	5	2	6	2.4	11	4.4
Total		125	50	125	50	250	100

Table 4 : SD Classification for nutritional status (% weight for age)

SD classification	Nutritional status	Male		Female		Total	
		No	%	No	%	No	%
≥ Median – 2SD	Normal	123	49.2	121	48.4	244	97.6
Median –2SD to ≥ Median–3SD	Moderate under nutrition	2	0.8	4	1.6	6	2.4
< Median–3 SD	Severe under nutrition	0	0	0	0	0	0
	Total	125	50	125	50	250	100

Table 5: SD classification for nutritional status (% height for age)

SD Classification	Nutritional status	Male		Female		Total	
		No	%	No	%	No	%
≥ Median – 2SD	Normal	124	49.6	114	45.6	238	95.2
Median –2SD to ≥ Median–3SD	Moderate stunning	1	0.4	11	4.4	12	4.8
< Median–3 SD	Severe stunning	0	0	0	0	0	0
	Total	125	50	125	50	250	100

Table 6 : SD classification for nutritional status (% weight for height)

| SD classification	Nutritional status	Male		Female		Total	
		No	%	No	%	No	%
≥ Median – 2SD	Normal	123	49.2	121	59.02	244	97.6
Median –2SD to ≥ Median–3SD	Moderate wasting	2	0.8	4	1.6	6	2.4
< Median–3 SD	Severe wasting	0	0	0	0	0	0
	Total	125	50	125	50	250	100

malnourished.

SD (standard deviation) classification of nutritional status:

According to SD classification the prevalence of underweight, stunting and wasting are presented in Tables 4-6. Maximum of children have fallen under the category of normal nutritional status. The percentage of moderate underweight, stunning and wasting was found to be 2.4 per cent, 4.8 per cent and 2.4 per cent, respectively. The prevalence was observed to be higher among girls compared to boys. None of the child found with sever under nutrition, stunning and wasting.

Relationship between observed and reference values of height and weight:

– Height and weight of studied subjects were compared with WHO,2006 reference values (Fig. 1-4). The interference revealed that there were remarkable difference between the observed and expected values of height and weight in studied subjects. Although the values of height and weight were increasing with the age among both boys and girls but they were less than reference values.

– In the age group of 24-48 months the difference
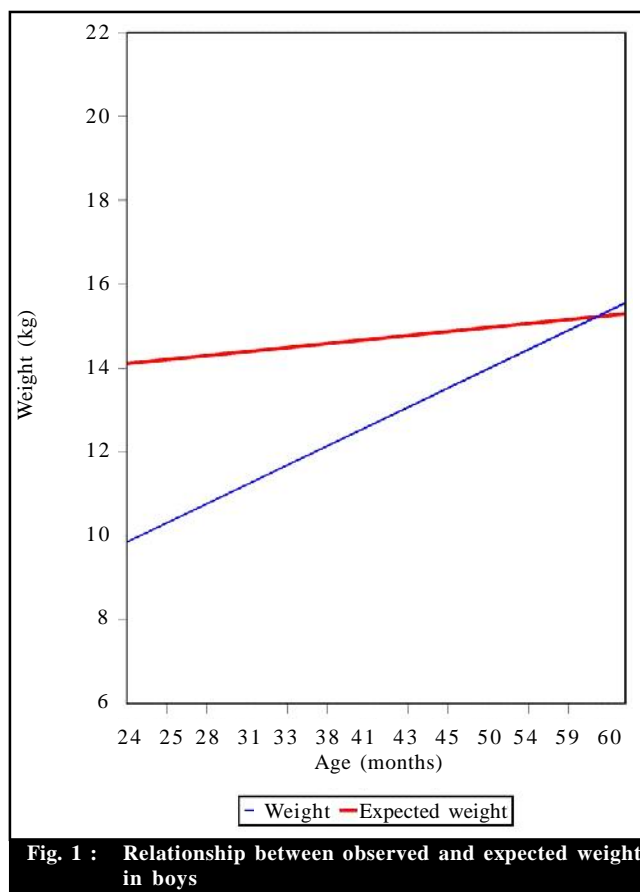
Fig. 1 : Relationship between observed and expected weight in boys
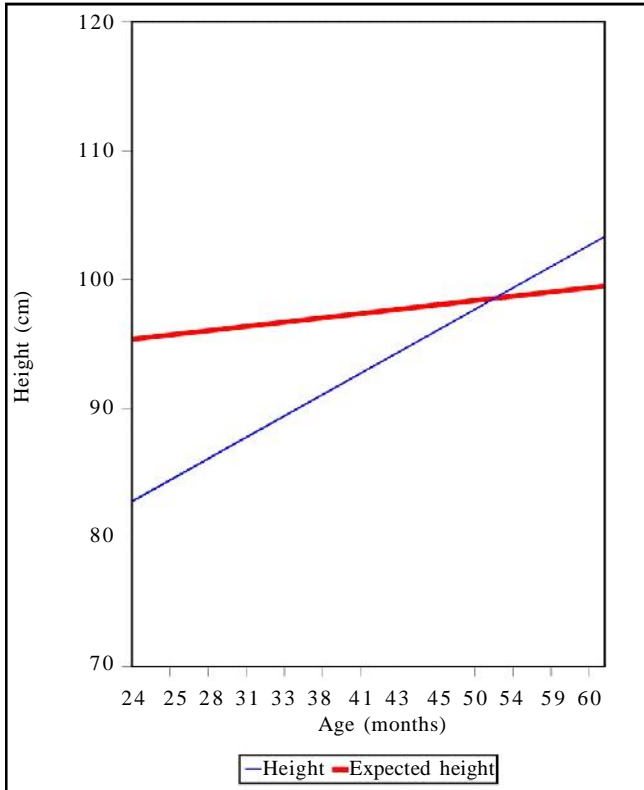
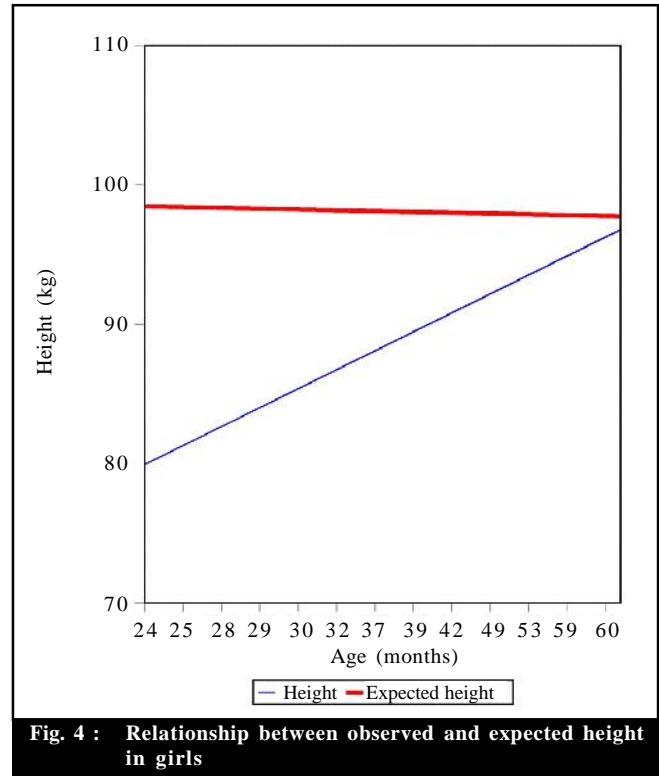Fig. 2 : Relationship between observed and expected height in boys

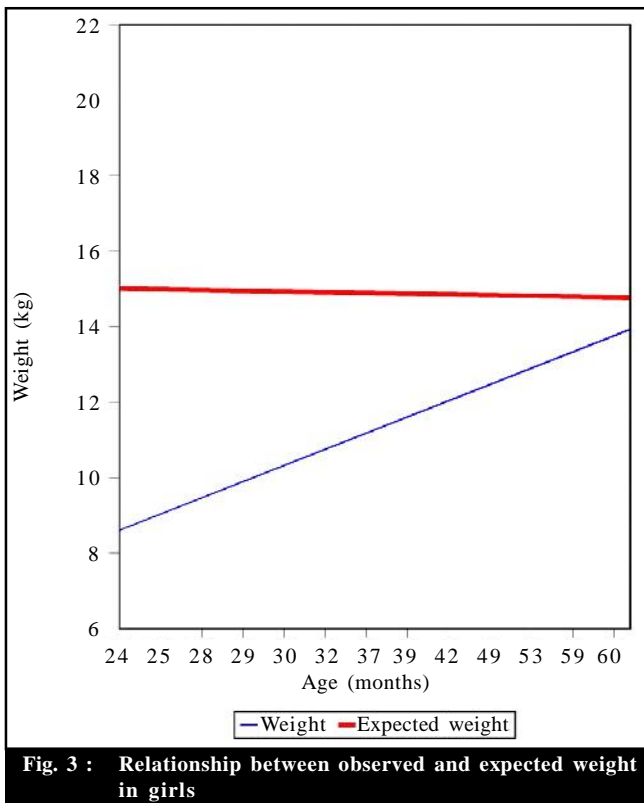Fig. 4 : Relationship between observed and expected height in girls

Fig. 3 : Relationship between observed and expected weight in girls

between expected and observed values of height and weight was high as observed values were very less than expected once. The difference was higher among girls in comparison to boys, it clearly narrate that girls were shorter and lighter in comparison to boys.

In the age group of 49-60 months the difference between observed and reference values of height and weight was comparatively less. The height of the boys of this age group was comparatively high than reference values and the difference between observed and reference or expected values weigh was less. Although the values of weight were less than expected values. One the contrary some boys from the age group of 60 months were heavier than expected, but all the girls were shorter and lighter than reference values of WHO. Among the boys of 50 to 60 months age the values of height were observed to be height than reference values but among the girls these values were found to be less.

Conclusion :

The percentage of malnutrition among studied subjects varies with each anthropometric method applied. According to SD classification the percentage of malnourished child was found between 2.4 to 4.8

percentages. Whereas on the basis of head and chest relationship 20.8 per cent children and on the basis of MUAC classification 48 per cent children were found malnourished, these findings has again put the big question mark on the status of girl child in our society. There is a strong need to work out on child's health status so they can emerge out as healthy adults.

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