Health assessment of malnourished children by anthropometry and clinical examination

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■**ABSTRACT :** Malnutrition is one of the most important risk factor for illness and death of the children. A cross sectional study was conducted among one hundred children belonged to the age group of 0-5 years in tribal areas of Malkanagiri district, Odisha to know their health status by anthropometric measurements and clinical assessment. It was observed that 60 per cent of the respondents were suffering from grade III and grade - IV degrees of malnutrition belonged to the age group of 7-12 months. Mean weight, height and mid upper Arm Circumference of the respondents was found to be lesser than ICMR and Wolanski standard, respectively. The percentage of deficiency was found to be more in case of boys in comparison to girls and also found to increase with advancement of age. Visible Severe wasting (45%) irritable (30%) and lethargy (22%) pallor (56%), dehydration (50%) and Severe B/L pedal edema (12%) were the most common clinical symptoms found among the respondents. Thus, it can be concluded that illiteracy, ignorance and low income of the parents were the most important factors in prevalence of malnutrition among the respondents.

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Malnutrition is one of the major health problems throughout the developing world and is an under lying factor of mortality and morbidity among children. About 10-13 millions of Children under five years of age die each year due to preventable causes of malnutrition (UNICEF) (1994). In the field of nutrition no other disease can be compared with Severely Acute Malnutrition as it ultimately afflicts the physical, cognitive and social development of the children. Despite the India's remarkable economic growth over the last decade, many children still struggle to meet their most basic needs, including access to in sufficient food

and health care. Remarkably, India has 43 per cent underweight children which is twice higher than the average figure in Sub-Saharan Africa (22%). The country grows sufficient food, has a functional democratic system with effective feedback mechanisms, the world's largest public distribution system is working for food delivery and an extensive network of state mechanisms to reach every citizen in the country. Enough policy attention has also been paid to health and nutrition issues in recent years. Yet its malnutrition rates remain high.

Keeping these facts in mind the present research was undertaken to asses health status of children under

five years by Anthropometry and clinical examination which will ultimately help the authority of ICDs and Health Department as a guideline for Combating Malnutrition in that area.

■ RESEARCH METHODS

The study was carried out in 7 blocks of Malkanagiri District of Odisha. One hundred children belonged to the age group of 0-5 years suffering from different degrees of Malnutrition were selected by random purposive sampling method for the present study. Information on demographic profile of the children was obtained by interviewing the mothers with the help of questionnaire schedule. Weight, height and arm circumference of the children were taken with the help of weighing machine and measuring tape, respectively and clinical assessment was done with the help of a Pediatrician. The mean and standard deviation of all the measurements were calculated and compared with ICMR, Wolanski and WHO standard.

■ RESEARCH FINDINGS AND DISCUSSION

The collected informations were tabulated, statistically analyzed and discussed below :

Family background :

Out of one hundred malnourished children 49 were male and 51 were female. Joint family system having more than 6-7 members was found in most of the cases. The respondents belonged to different tribal communities such as Adiwasi (42%), Durua (17%) Halva (15%), Koya (26%). More than 80 per cent of the parents were found to be illiterate and were working as labourers either in their own land or in others land (77%-85%). Annual Income of parents was found to be less than Rs. 20,000 in 37 per cent respondents. 72 per cent of them were staying in Kutcha houses and were using water from tube well for the purpose of cooking and drinking. None of the families use latrine for defecation.

Anthropometric measurements :
Weight :

Table 1 reveals that all the children were deficient in weight. In 0-6, 7-12, 25-36 months of age group the boys were found to be less deficient than girls (Fig. 1 and 2). However, the percentage of deficiency was found to be increased with advancement of age in case of both boys and girls. Similar trend was also observed by Leela *et al.* (1990) that beyond 5 months their was faltering in weight curve.

Table 1 : Mean weight (kg) of children upto 5 years of age							(n = 100)
Sr. No.	Age in month	Boys			Girls			Total children
		Actual mean wt. (kg.)	ICMR standard (kg)	% of deficiency	Actual mean wt (kg)	ICMR standard (kg)	% of deficiency	
1.	0-6	4.4±0.14	5.4	18.51 (-)	3.95±2.2	5.4	26.85 (-)	4
2.	7-12	5.507±1.4	8.6	36.04 (-)	5.012±1.2	8.6	41.47(-)	38
3.	13-24	6.352±1.2	10.54	39.73 (-)	6.343±0.7	9.98	36.44(-)	40
4.	25-36	8.085±1.4	12.51	35.37 (-)	6.9±0.8	11.67	40.87(-)	10
5.	37-48	7± 0	14.78	52.63(-)	8.13±1.02	13.79	41.04(-)	4
6.	49-60	9.7±1.8	19.33	49.80(-)	9.4±0.8	18.67	49.05(-)	4
								100

Table 2 : Mean height (cm) of malnourished children according to age							(n=100)
Sr. No.	Age in month	Boys			Girls			Total children
		Actual mean ht. (cm)	ICMR standard (cm)	% of deficiency	Actual mean ht. (cm)	ICMR standard (cm)	% of deficiency	
1.	0-6	58.5± 0.7	67.8	13.71 (-)	57± 12.8	66.6	14.41 (-)	4
2.	7-12	66± 7.1	72.3	17.02 (-)	63.416± 5.04	71.1	10.81(-)	38
3.	13-24	67.2± 15.6	80.07	16.06 (-)	71.25± 3.9	78.09	8.75(-)	40
4.	25-36	80± 6.1	90.01	11.12 (-)	77.333± 1.5	87.93	12.05(-)	10
5.	37-48	80± 0	98.36	18.66 (-)	80.67± 5.7	96.21	16.15(-)	4
6.	49-60	90± 0	113.51	20.70 (-)	92± 5.6	112.24	18.03(-)	4
								100

Height :

Table 2 reveals that all the children were deficient in height in comparison to ICMR Standard. But the girls were found to be deficient in height than boys in the age group of 0-6 months and 25-36 months. Thus boys were found to be more prone to malnutrition in comparison
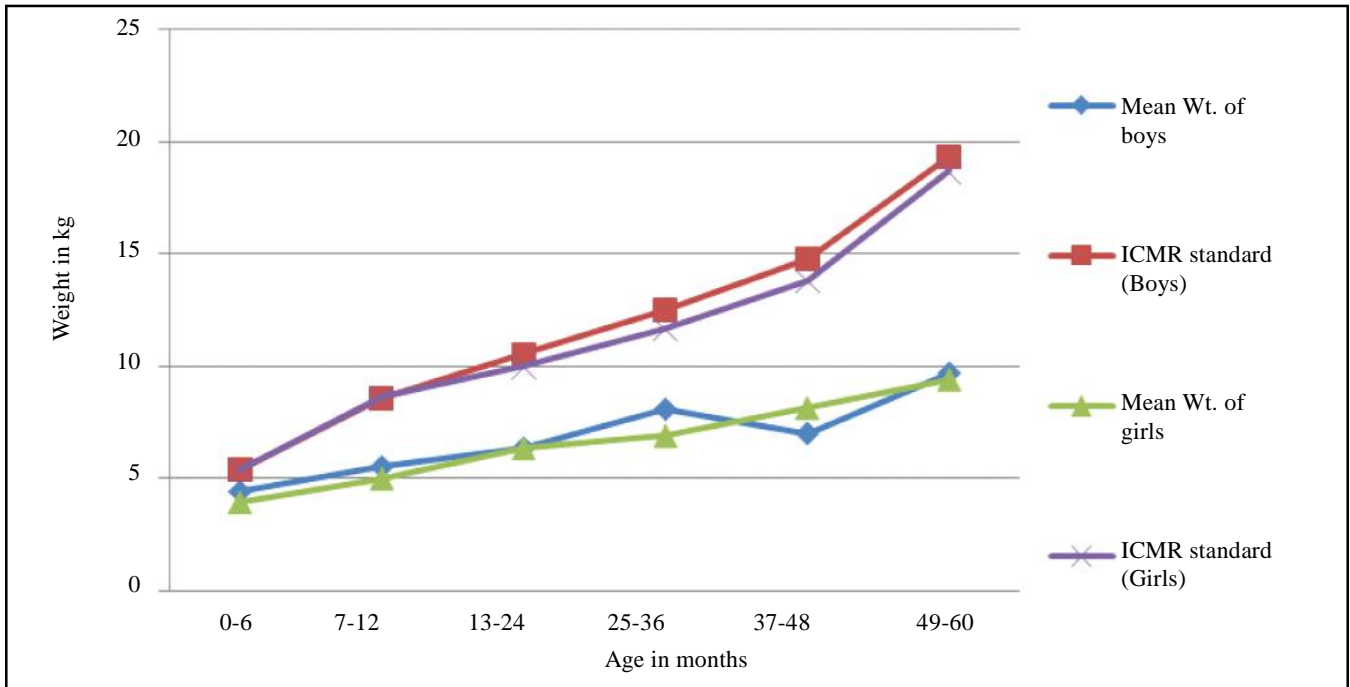

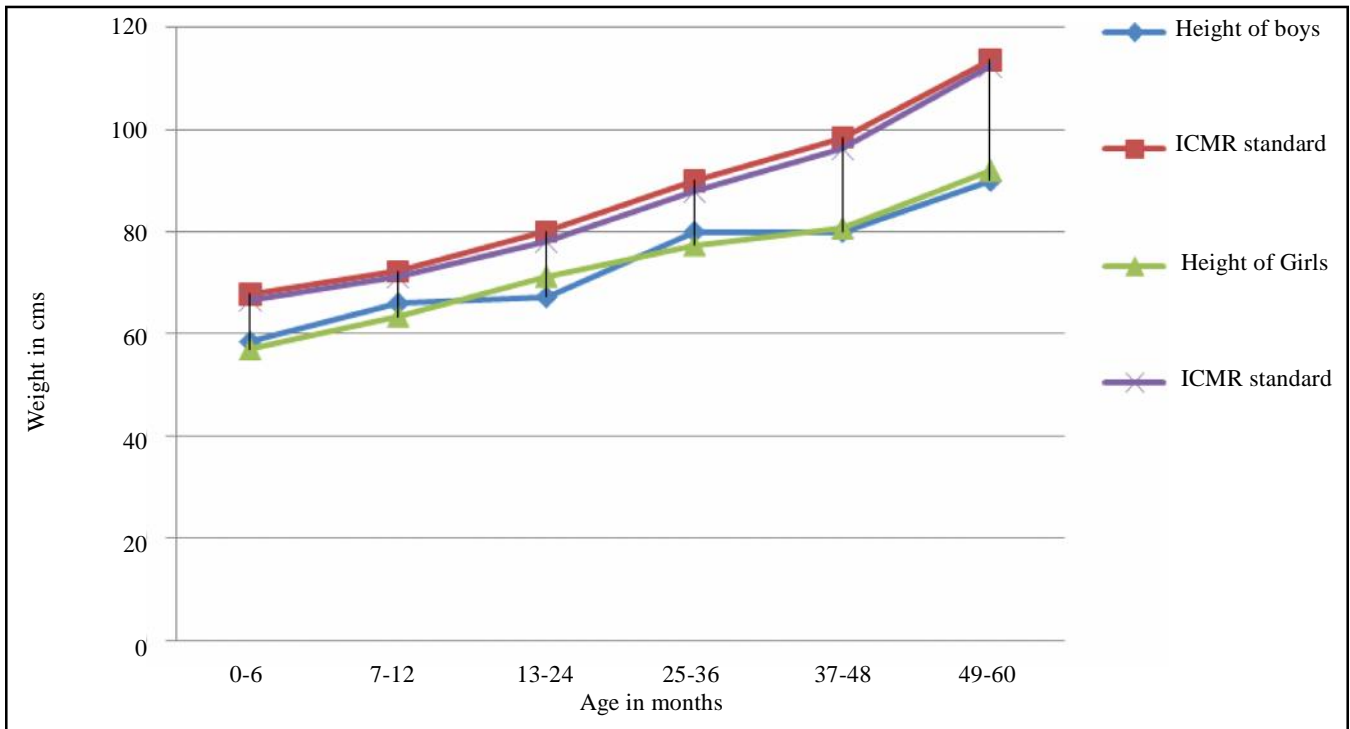**Fig. 1 : Mean weight of girls upto 5 years of age**

Fig. 2 : Mean weight of boys upto 5 years of age

to girls. Similar findings were also observed by Dahiya and Kapoor (1992) and Lenka (2013).

Mid upper Aim Circumference (MUAC) :

Table 3 reveals that MUAC of all children was deficient in comparison to Wolanski Standard. In the age group of 0-6 months and 25-36 Month MUAC of girls were more deficient in comparison to boys. But in other age groups MUAC of boys was more deficient than girls. Similar findings were also observed by Dahiya and Kapoor (1992) and Lenka (2013).

Nutritional status of children according to Z score:

Table 4 reveals that only 1 per cent children were under < - ISD *i.e.* Grade-I Malnutrition, 21 per cent were under < 2SD *i.e.* Grade - II Malnutrition, 47 per cent children were under Grade - III malnutrition *i.e.* < - 3SD

and 31 per cent children were suffering from Grade - IV malnutrition *i.e.* < - 4 S.D. However 60 per cent children were found to suffer from Grade - III (34%) and Grade - IV (26%) malnutrition belonged to the age group of 7 - 12 months. Only 15 per cent children found to suffer from Grade - III and Grade - IV malnutrition belonged to the age group of 25 - 60 months. Thus prevalence of Severely Acute Malnutrition was found to be more in the age group of 7-12 months where sex difference was not significantly observed. Similar findings were also observed by Jena *et al.* (2013).

Clinical examination :
Heart rate :

Heart rate was found to be normal in 54 per cent children that is 120-160 in new born, 100-120 in infant and 80-100 in 1-5 yr child. Below normal and above

| Table 3 : Mean MUAC (cm) of children according to age							(n=100)
Sr. No.	Age in month	Boys			Girls		Total children
		Actual mean MUAC in cm	Wolanski standard in cm	% of deficiency	Actual mean MUAC in cm	Wolanski standard in cm	% of deficiency	
1.	0-6	9.35±0.5	14.50	35.5 (-)	8.8±3.7	14.30	38.46(-)	4
2.	7-12	10.38±1.16	15.70	37.46 (-)	10.4±1.0	15.60	33.33(-)	38
3.	13-24	10.83±1.17	16.20	31 (-)	11.06±0.85	15.90	27.041(-)	40
4.	25-36	11.47±0.54	16.30	29.63 (-)	11.10±1.8	16.10	31.051(-)	10
5.	37-48	11.30±0	16.40	31.09 (-)	11.40±1.6	16.20	29.621(-)	4
6.	49-60	12.40±0.85	16.60	25.60 (-)	12.50±2.1	16.40	23.78(-)	4
								100
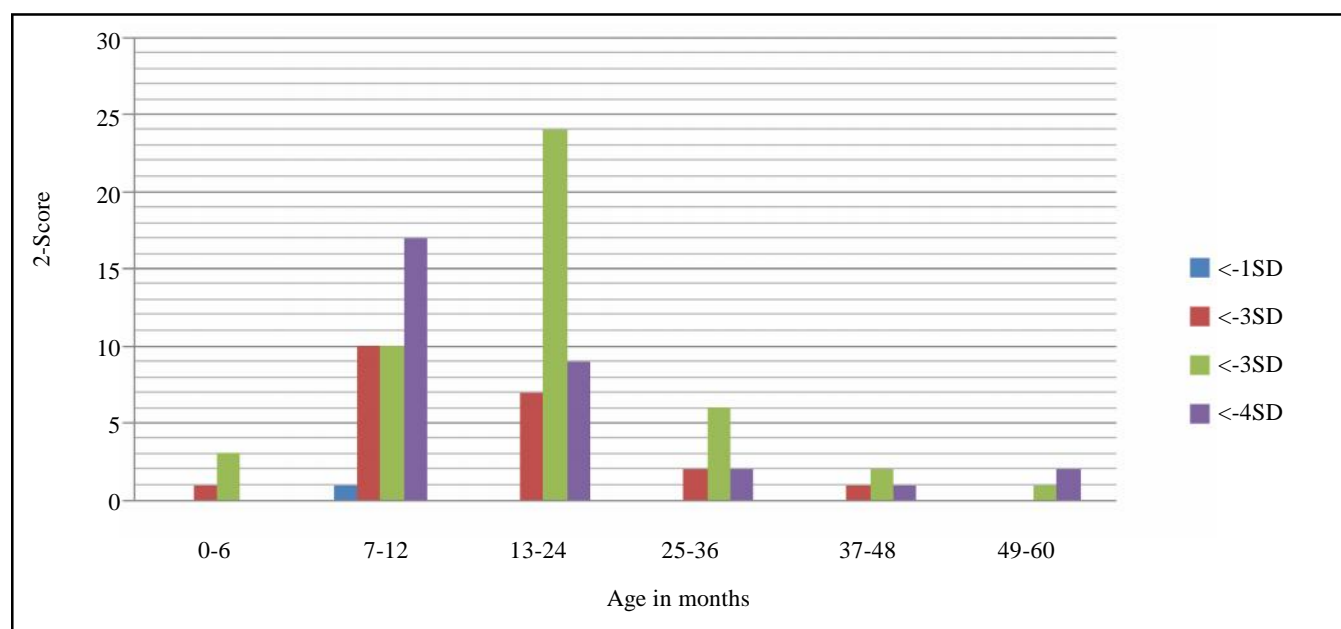
Fig. 3 :   Mean nutritional status of children according to Z score

normal heart rate was found in 10 per cent and 35 per cent respondents, respectively (Table 5).

Respiratory rate :

Respiratory rate was found to be normal in 94 per cent respondents which was 30-60 in new born, 50 in 2 months to 1 year and 20-40 in 1-5 year. Only 4 per cent and 2 per cent children had above normal and below normal respiratory rate, respectively (Table 6).

Table 4 : Distribution malnourished children according to Z score standard									(n=100)
Sr. No.	Age in month	<-1 SD		<-2 SD		<-3 SD		<-4 SD		Total no. of children
		M	F	M	F	M	F	M	F	
1.	0-6				1	2	1			4
2.	7-12	1	3	7	3	7	8	9		38
3.	13-24		4	3	13	11	6	3		40
4.	25-36		2		4	2	1	1		10
5.	37-48		1			2	1			4
6.	49-60				1	1	1	1		4
		1	9	12	23	24	17	14		100

According to WHO standard

Table 5 : Heart rate of severely malnourished children							(n=100)
Sr. No.	Age in month	< Normal		< Normal		> Normal		Total no. of children
		Boys	Girls	Boys	Girls	Boys	Girls	
1.	0-6	1	1	1	1	-	-	4
2.	7-12	7	14	5	1	2	9	38
3.	13-24	14	10	-	1	9	6	40
4.	25-36	4	2	1	-	2	1	10
5.	37-48	-	-	-	-	1	3	4
6.	49-60	1	1	-	-	1	1	4
		27	28	7	3	15	20	100

Table 6 : Distribution of severely malnourished children according to respiratory rate							(n=100)
Sr. No.	Age in month	Normal		<Normal		>Normal		Total no. of children
		Boys	Girls	Boys	Girls	Boys	Girls	
1.	0-6	1	1	1	1	-	-	4
2.	7-12	13	23	-	-	1	-	38
3.	13-24	22	15	1	-	-	1	40
4	25-36	6	3	1	-	-	-	10
5.	37-48	1	3	-	-	-	-	4
6.	49-60	2	2	-	-	-	-	4
		45	49	3	1	1	1	100

Table 7 : Distribution of malnourished children according to temperature							(n=100)
Sr. No.	Age in month	Normal		<Normal		>Normal		Total no. of children
		M	F	M	F	M	F	
1.	0-6	-	1	1	-	1	1	4
2.	7-12	10	14	2	3	2	7	38
3.	13-24	15	15	3	1	5	1	40
4.	25-36	4	2	-	-	3	1	10
5.	37-48	1	2	-	-	-	1	4
6.	49-60	1	1	-	-	1	1	4
		31	35	6	4	12	12	100

Temperature of the respondents :

Table 7 shows that 66 per cent children had normal temperature that is 36.5-37 degree celcius.24 per cent and 10 per cent respondents were suffering from fever and hypoglycemia, respectively (Table 7).

Physical signs :

It was observed that 45 per cent children had visible sign of severe wasting, 48 per cent children were alert, 30 per cent were Irritable, 22 per cent were lethargy (Table 8).

Table 8 : Distribution of severely malnourished children according to physical signs

Sr. No.	Age in month	Visible severe wasting (Yes)		Visible severe wasting (No)		Alert		Irritable		Lethargy	
		M	F	M	F	M	F	M	F	M	F
1.	0-6	1	1	1	1	1	1	1	1	-	-
2.	7-12	9	8	5	16	6	9	3	8	5	7
3.	13-24	11	7	12	10	11	9	7	5	5	3
4.	25-36	3	1	4	2	3	-	3	2	1	1
5.	37-48	1	-	-	3	1	3	-	-	-	-
6.	49-60	1	2	1	-	2	2	-	-	-	-
		26	19	23	32	24	24	14	16	11	11

Table 9 : Distribution of severely malnourished children according to B/L pedal edema (n=100)

Sr. No.	Age in month	No		Yes						Total no. of children
				(+)		(++)		(+++)		
		M	F	M	F	M	F	M	F	
1.	0-6	1	2	-	-	-	-	1	-	4
2.	7-12	9	18	5	-	-	2	-	4	38
3.	13-24	20	16	2	1	-	-	1	-	40
4.	25-36	6	2	-	-	1	1	-	-	10
5.	37-48	-	3	-	-	1	-	-	-	8
6.	49-60	2	-	-	1	-	-	-	1	8
		38	41	7	2	2	3	2	5	100

Table 10 : Distribution of children according to physical change (n=100)

Sr. No.	Types of change		% of respondents
1.	Hair -	Sparse and brittle	07%
		Dis-coloured hair	28%
2.	Skin -	Rough and Dry	12%
		Scabies	08%
3.	Nail -	Dirty	65%
		Flattened	08%
		Pale	16%
4.	Eye infection	Conjunctivitis	18%
		Redness	03%
5.	Ear infection	Pus	12%
		Watery Discharge	17%
6.	Mouth infection	Glossitis	18%
		Oral thrush	11%
		Angular Stomatitis	06%
7.	Pallor		56%
8.	Lymphadenopathy		17%
9.	Dehydration		60%
10.	Pot belly		7%
11.	Monkey face		12%

B/L Padal edema :

Table 9 reveals that Only 21 per cent children were suffering from edema. out of them 7 per cent were suffering from severe edema who are considered as at risk children.

Physical examination of malnourished children :

It was interesting to observed that 58 per cent respondents had change in hair 12 per cent had rough and dry skin, 20 per cent had scabies on their body, 65 per cent had dirty nails and 18 per cent had conjunctivitis. Pallor (56 %) and dehydration (80%) was found among majority of the respondents. Ear infection such as pus and watery discharge and mouth infection such as glossitis, oral thrush and angular stomatitis was found among 39 per cent and 35 per cent respondents, respectively (Table 10). Pot belly condition and monkey face was, respectively found among 7 per cent and 12 per cent respondents. Similar finding were also observed by Dahiya and Kapoor (1992) Lenka (2013).

Conclusion :

The results of the present research revealed interesting conclusion. Out of 100 respondents 60 per cent children were found suffer from Grade III (34%) and Grade IV (26%) degrees of Malnutrition and belonged to the age group of 7 -12 months. Mean weight, height and mid upper Arm Circumference of the respondents was found to be lesser than ICMR and Wolanski standard, respectively. The percentage of deficiency was found to be more in case of boys in comparison to girls and also found to increase with advancement of age. Heart rate, Respiratory rate, Temperature was found to be normal in majority of the respondents. Visible severe wasting was observed among 45 per cent respondents. 30 per cent and 22 per cent respondents were found to be irritable and lethargy, respectively. Severe (B/L) pedal edema was found among 7 per cent respondents. Dry hair, rough and dry skin, dirty nail, conjunctivitis, dehydration, pallor were the most common clinical symptoms found among the malnourished children. Thus it can be concluded that health status of the children was mostly affected by the education, occupation and income of the parents and prevailing breast feeding practices as well as health services rendered in that area.

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