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# **Empowerment of Fisher Women**

**in Coastal Ecosystem of Andhra Pradesh,  
Karnataka, Kerala and Tamilnadu**

THE COASTAL ECOSYSTEM OF  
ANDHRA PRADESH, KARNATAKA, KERALA  
AND TAMILNADU  
ON  
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UNIVERSITY AUDITORIUM  
P. N. G. RANGA AGRICULTURAL UNIVERSITY  
RAJENDRANAGAR, HYDERABAD - 500 002



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## Chapter 6

# ANTHROPOMETRIC MEASUREMENTS OF FISHERWOMEN AND PRESCHOOL CHILDREN

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### Abstract

Anthropometric measurements of height and weight were taken of all fisherwomen and their children. Weight of women was found to be 48.5 kg. Height was found to be 150 cm and their BMI was found to be 21.3. forty-nine percentage of the women were normal, 17 % were below low normal, 10.5 % were mildly malnourished, 4 % were moderately malnourished, and 2.9 % were severely malnourished. only 11.5 % were over weight and 4.6 % were obese. Overall, height of the preschool children surveyed was found to be 90 cm and their overall weight was 12.7 Kg. Majority ( 41%) of them were in grade-1 category of malnutrition, 32 % were in normal grades, 19% were in grade -2 category of malnutrition and the remaining were grade -3 category of malnutrition.

### Introduction

Anthropometry is one of the methods used in nutritional assessment. Nutritional anthropometry can be defined as measurement of variation of the physical dimensions and the gross composition of the human body at different age levels and degrees of malnutrition.

Growth retardation may be first response of the body towards nutritional deficiencies, while appearance of clinical signs may be the final stage. From the public health point of view, identification of sub-clinical forms of malnutrition is very important for planning programmes of nutritional intervention so as to prevent such milder cases going into severe forms with consequent risk of high mortality.

The measurements that are selected should be the simplest and quickest to measure and the easiest to reproduce, providing simultaneously maximum information concerning a number of nutritional problems.

The most commonly used measurements in routine surveys are 1) Body weight, 2) crown heel length or standing height, 3) mid – upper arm circumference etc.

### Methodology

Anthropometric measurements of height and weight were taken on all fisher women and preschool children.

(i) Height (cm): It was measured using height rod for women and infantometer for preschool children respectively

(ii) Weight (kg): Weight was measured using baby weighing scale for infants, salter spring balance for children between 1 – 2.5 years and bathroom weighing scale for children above 2.5 years to 5 years. For adults, the weighing scale was utilized.

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Standards for reference : The height and weight obtained by survey were compared with NCHS standards. They were also classified by Gomez Classification using weight for age which is based on percentage deviation from the medium of the reference standard. Hence based on this classification one can distinguish grades of deficit Grade – I ( mild ) Grade – II ( moderate) and Grade – III ( severe ) and normal by establishing arbitrary cut off points. The details of Gomez classification is given below.

* Gomez classification : for children	
Nutritional Status	Grades of Nutrition .
Normal	> 90% of standard weight for age
Grade – I (Mild)	75-89% of standard weight for age
Grade – II (moderate)	60 –74% of standard weight for age
Grade – III (severe)	< 60% of standard weight for age

(i) **Body Mass Index ( BMI)**

$$\text{The Body Mass Index} = \frac{\text{Weight in (kg)}}{\text{Height in ( mt)}^2}$$

was used an indicator of nutritional status for fisher women. Classification of malnutrition by grades of BMI as suggested by James et al (1988) is given below. The prevalence rates of these forms of malnutrition has been found and provided for the fisherwomen by states.

BMI	Nutritional grade
<16.00	III degree - Severe
16.0 – 17.0	II degree - Moderate
17.0 – 18.0	I degree - Mild
18.5 – 20.0	Low normal - Low
20.0 – 25.0	Normal
25.0 – 30.0	Overweight
>30.0	Obese.

**Statistical analysis**

The data generated has been utilized to meet the objectives of the study. Frequency distributions, Mean and Standard Deviations and tests of significance were utilized and the results are provided for each of the variables studied. Analysis variance, Chisquare test and multiple comparison 't' test procedures were utilized and the results are been provided in the chapters (Visveswara Rao, 1996)

**Results and discussion**

Anthropometry of women : It was observed that the mean height of the fisher women was found to be 150 cm, weight was found to be 48.3 kg and BMI was 21. 3.

**Table 1: Mean (SD) of Anthropometric measurements of women**

Sl.No	State	Anthropometric measurements			Total ranks	$\bar{x}$
		Height ( cms)	Weight ( kgs)	BMI		
1	Andhra Pradesh	153 <sup>a</sup> (5.50)	48.0 <sup>a</sup> (06.3)	21.4 <sup>a</sup> (2.9)	5.0	1.7
2	Karnataka	151 <sup>b</sup> (5.20)	47.1 <sup>a</sup> (05.7)	20.5 <sup>b</sup> (7.6)	10.0	3.3
3	Kerala	149 <sup>c</sup> (3.00)	47.3 <sup>a</sup> (03.5)	21.0 <sup>ab</sup> (1.1)	9.5	3.2
4	Tamilnadu	149 <sup>c</sup> (8.00)	52.0 <sup>b</sup> (13.0)	22.6 <sup>c</sup> (5.3)	5.5	1.8
5	<b>Mean + SD</b>	<b>150.9+7.23</b>	<b>49.2+ 9.17</b>	<b>21.6+ 4.67</b>		
6	<b>'F' ratio between states (d.f)</b>	<b>***</b> 42.05 (3,1534)	<b>***</b> 27.68 (3,1534)	<b>***</b> 13.68 (3,1534)		
7	<b>Expected Height &amp; Weight *</b>	163.7	56.6	18.5 – 2.5 (Normal)		

Note: 1. All the 'F' ratios are significant (\*\* \* p<0.001)  
2. Variation in superscript given indicates significance of difference between states(p<0.05)

\* National centre for health statistics (NCHS), (USA), standards

From the above table it was observed that the mean height of all women in the surveyed villages was similar. The mean weight of women of Andhra Pradesh was found to be high followed by Karnataka. Mean weight of women was similar in all the surveyed states except Tamilnadu. Average BMI was found to be almost similar among the women in the states of Andhra Pradesh, Karnataka Kerala and Tamilnadu.

**Forms of malnutrition of women based on James classification.**

Based on the height and weight of women, BMI was calculated.. Based on the Body Mass Index the women were categorized as obese, over weight , normal, low normal, mildly malnourished, moderately malnourished and severely malnourished. The results are presented in table 2, Figs 1&2

**Table 2: Prevalence rates of malnutrition in women by grades of BMI**

Sl. No	State	Total	Grades of malnutrition						
			Severe	Moderate	Mild	Low	Normal	Over weight	obese
1	Andhra Pradesh	100.0	0.6	2.1	8.2	19.4	60.3	9.0	0.4
2	Karnataka	100.0	0.0	0.0	6.7	30.0	60.4	2.9	-
3	Kerala	100.0	6.1	2.4	11.5	17.6	50.9	6.7	4.8
4	Tamilnadu	100.0	5.8	8.6	14.5	9.5	32.1	1.5	10.0
	<b>Overall</b>	<b>100.0</b>	<b>2.9</b>	<b>4.1</b>	<b>10.5</b>	<b>17.2</b>	<b>49.5</b>	<b>11.6</b>	<b>4.2</b>



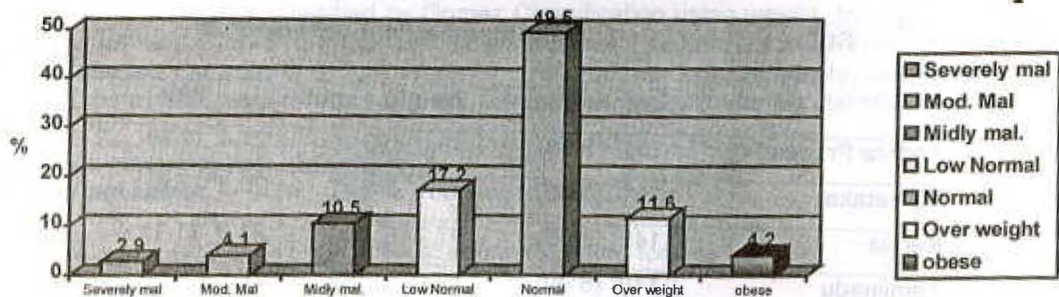


Fig 1: Prevalence rates of malnutrition in women by grades of BMI as suggested by James et al(1988)

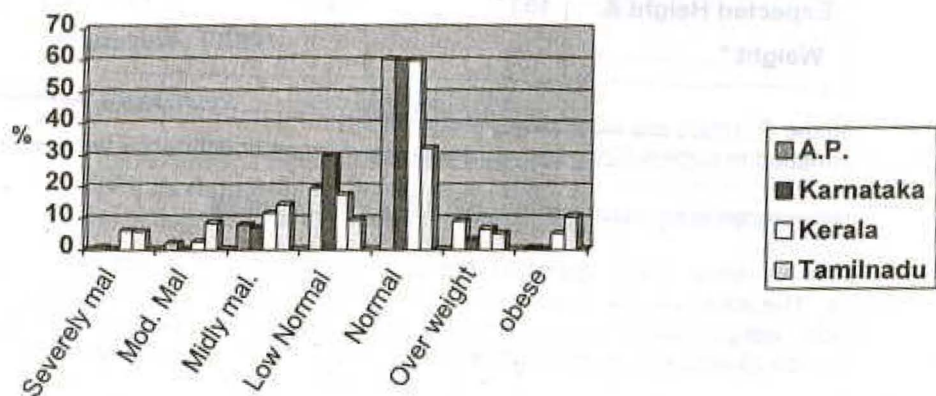


Fig 2: States wise forms of malnutrition of fisherwomen based on James classification

It was found that 2.9% of women in the Surveyed states were severely malnourished, 4% were moderately malnourished, 10.5% were mildly malnourished, 17.1% were low normal, 49.4% were normal, 11.6% were over weight and 4.6% of women were obese. Over weight or obesity was more among women of Kerala and Taminadu. Normal were more in Karnataka and Andhra Pradesh than in Kerala and Tamilnadu . Prevalence rates of malnutrition are varing between states ( $p < 0.01$ )

### (b) Anthropometrical measurements of Preschool children

Height and weight were measured for all children of below 5 years. These were compared with the standards for given age and weight Gomez classification was utilized for the assessment of various forms of malnutrition. The mean (SD) of height and weight of preschool children is given in Table 3 below:

**Table 3: Mean (SD) of height and weight of Preschool children by states**

Sl.No	State	Height ( cm)	Weight ( kg)
1	Andhra Pradesh	92 <sup>a</sup> (16.2)	11.6 <sup>a</sup> ( 3.9)
2	Karnataka	89 <sup>b</sup> (08.6)	12.4 <sup>b</sup> (2.0)
3	Kerala	80 <sup>c</sup> (06.0)	12.0 <sup>a</sup> (1.1)
4	Tamilnadu	99 <sup>d</sup> (16.0)	14.8 <sup>c</sup> (5.2)
5	<b>Overall Mean (SD)</b>	<b>90.6(35.8)</b>	<b>12.7(3.83)</b>
6	<b>Expected height &amp; Weight *</b>	<b>98.5</b>	<b>15.4</b>
7	<b>'F' ratio between states (d.f)</b>	<b>***</b> <b>82.34(3,966)</b>	<b>***</b> <b>41.38(3,966)</b>

Note: Figures given are mean (SD) values

- National centre for health studies (NHSC), (USA), standards

The data show that the overall height of the preschool children surveyed in south India was 90.6 cm and their mean weight was 12.7 kg. All the children are shorter and lower in weight than the standards. Pre school children of Tamilnadu are taller and heavier than other states. Kerala children were shortest, Andhra Pradesh children were with lowest mean heights ( $p < 0.001$ )

#### Forms of malnutrition in pre school children

Prevalence rates of malnutrition by Gomez classification are provided in table 4.

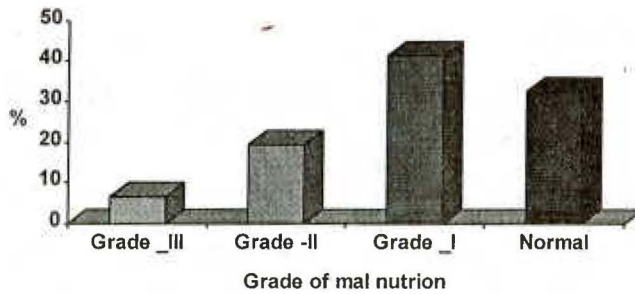
Variations in forms of malnutrition between states are significant. Severe forms and moderate forms are more in Andhra Pradesh and Tamilnadu. Mild forms of malnutrition were highest in Karnataka and Kerala. Normals, were very high in Tamilnadu and Andhra Pradesh followed by Kerala, Karnataka.

**Table 4: Forms of malnutrition of children based on weight for age (Gomez classification)**

Sl.No.	State	Sample surveyed	Forms of malnutrition			
			Grade – 3 (severe)	Grade – 2 (moderate)	Grade – 1 (Mild)	Normal
1	Andhra Pradesh	316 (100.0)*	44 (14.0)	82 (26.0)	97 (30.5)	93 (29.5)
2	Karnataka	186 (100.0)	--	19 (10.0)	110 (60.0)	57 (30.0)
3	Kerala	215 (100.0)	3 (1.5)	26 (12.0)	115 (53.0)	71 (33.5)
4	Tamilnadu	253 (100.0)	18 (7.0)	64 (25.0)	80 (32.0)	91 (36.0)
5	<b>Overall</b>	<b>970 (100.0)</b>	<b>65 (6.5)</b>	<b>191 (19.5)</b>	<b>402 (41.5)</b>	<b>312(32.5)</b>

Note:\* 1. Figure given are number (percentages)

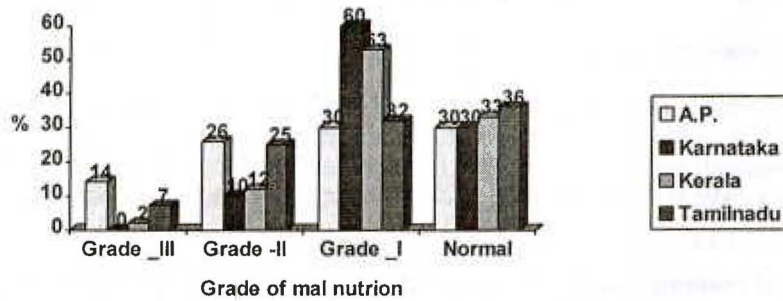
2. Variation between states in percentages of malnutrition are significant ( $\chi^2 = 109.6$ ;  $P < 0.001$ )



**Fig 3: Forms of malnutrition in children by Gomez classification – overall states.**

It is observed that 6.5% of the preschool children in all states were severely malnourished, 19.5% were moderately malnourished, 41.5% of them were mildly malnourished and the remaining 32.5% were normal.

It is clear from the table 4 that 14% of the children in Andhra Pradesh were severely malnourished inspite of the child welfare programmes run by the state government. Hence, nutrition education was given on the nutritive value of the meal given at the anganwadi center. The parents of the preschool children were requested to send their children to anganwadi school.



**Fig. 4: Grades of malnutrition prevailing in states (%)**

In Tamil Nadu, majority (36%) of them were normal and the remaining were in different grades of malnutrition. In Karnataka majority (60%) of children were mildly malnourished and 30% were normal. In Kerala 53% were mildly malnourished and 33% were normal. Nutrition education was provided with emphasis on nutritive value of meal given at Anganwadi Centre.

**Conclusion**

Overall, the height and weight of preschool children were 90 cm and 12.7 kg. respectively. Prevalence rates of malnutrition of grade I, grade II and grade III and normal respectively were 41.5, 19.5, 6.5 and 32.5. Nutrition education was provided during the survey period.