Various Anthropometric Methods of Assessment of Nutritional Status in Under Five Children

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Abstract

Background: For assessment of nutritional status of under five children various anthropometric indices are being used indiscriminately and so the estimated prevalence of malnutrition varies in different methods. Objectives: 1. To determine the prevalence of under nutrition is assessed as per various methods assessment of nutritional status in children under five years of age attending Anganwadi. 2. To compare the common anthropometric measurements in order to find out best suitable method for individual assessment of malnutrition. Materials & Methods: The under-five children attending Anganwadies were selected randomly and each child underwent different anthropometric measurement such as Gomez classification (Weight for age), Wasting (Weight for height), Stunting (Height for age) and mid-arm circumference by Bangle test. Statistical Analysis: Percentage, proportion and discriminant analysis were applied. Results: Total 235 under five children were included in the study. As per Gomez classification 119 (51.14%) children were undernourished. 67 ((28.52%) children were wasted, 116 (49.36%) children were stunted and as per Bangle test 75 (31.91%) children were undernourished. The discriminant analysis of all these methods observed that stunting has the highest proportion of correctly classifying a child into normal or malnourished group. Conclusion: Stunting should be preferred over other methods for assessment of nutritional status of under five children.

Keywords
under five children, nutritional status, assessment, anthropometry

Introduction

Nutrition is a core pillar of human development and concrete large scale programming not only can reduce the burden of under nutrition and deprivation but also advances the progress of nations. Reliable data on child growth is a prerequisite for monitoring and improving child health. Despite the extensive resources invested in recording anthropometry, there has been little research into the reliability of these data. If these measurements are unreliable growth may be misreported, and health problems may go undetected. In countries like India it is specifically more important as 20% of children under five years of age suffer from wasting due to acute undernutrition, more than one third of the world’s children who are wasted live in India. 43% of Indian children under five years are underweight and 48% are stunted due to chronic undernutrition, India accounts for more than 3 out of every 10 stunted children in the world.

For assessment of nutritional status of under five children various anthropometric indices are being used indiscriminately and so the estimated prevalence of under nutrition varies in different methods. When attempting to improve the nutritional status of children, an appropriate reliable and consistent measurement tool is needed. Anthropometric indices are however, used indiscriminately when assessing under nutrition in children under five years old especially when community based surveys are concerned. the estimated prevalence of malnutrition therefore varies between methods. It is also needed for

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an age independent and simple method that could be used by peripheral/gross-root health workers to identify under
five children with under nutrition.6

The present study was conducted with the objectives of

1. To determine the prevalence of under nutrition is
   assessed as per various methods assessment of
   nutritional status in children under five years of
   age attending Anganwadi.

2. To compare the common anthropometric
   measurements in order to find out best suitable
   method for individual assessment of under
   nutrition.

Material & Methods

This cross-sectional study was conducted at different
Anganwadies in Pune city. Total 235 children under five
years age attending Anganwadies were randomly selected.

Each child selected for the study underwent different
anthropometric measurement such as Gomez classification
(Weight for age), Wasting (Weight for height), Stunting
(Height for age) and mid-arm circumference by Bangle test.

Weight for Age: most sensitive method when recorded
serially. A decrease in weight gain / loss in weight can be
seen within 1 month.

Height for Age: compares the child’s height with the
expected height for the age. Weight for Height: this compares
a child’s weight with the expected weight of the same height.
It is useful for differentiating between acute and chronic
malnutrition. Acute Malnutrition: child is wasted i.e. weight
for age and height is low but height for age is normal.
Chronic Malnutrition: child is stunted i.e. weight for age is
low and height for age is low.

Mid Upper Arm Circumference (MUAC): Normal
MUAC for a child between 1-5 years of age is greater than
13.5 cm. If the MUAC is 12.5-13.5, the child has mild to
moderate malnutrition and if it is less than 12.5 cm it is
suggestive of severe malnutrition. This is useful for
screening a large number of children but less useful in long
term growth monitoring. The techniques to measure mid-
arm circumference include, accurate measurement with a
tape and a simple bangle test. Bangle test using plastic
bangles of an inner diameter of 3.7 cm (Red Bangle) and
4 cm (Yellow bangle) The bangle was passed up the forearm
and the upper arm to decide if the upper mid-arm
circumference was below or above 12.6 cm.

Results

Total 235 children under five years of age were included
in the study. There were 118 boys and 117 girls included in
the study.

As per Gomez classification 119 (51.14%) children were
undernourished of which 76 were classified into mild
category followed by moderate 40. 3 children were classified
as severely undernourished (Table 1).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Frequency (%)</th>
</tr>
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<tbody>
<tr>
<td>Normal</td>
<td>116(49.36)</td>
</tr>
<tr>
<td>Mild</td>
<td>76(32.34)</td>
</tr>
<tr>
<td>Moderate</td>
<td>40(17.02)</td>
</tr>
<tr>
<td>Severe</td>
<td>03(1.28)</td>
</tr>
<tr>
<td>Total</td>
<td>235(100)</td>
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</tbody>
</table>

Total 67 ((28.52%) children were wasted. 40 children
were mildly wasted followed by 21 were moderately wasted
and 6 were severely wasted (Table 2).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Frequency (%)</th>
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<tbody>
<tr>
<td>Normal</td>
<td>168(71.49)</td>
</tr>
<tr>
<td>Mild</td>
<td>40(17.02)</td>
</tr>
<tr>
<td>Moderate</td>
<td>21(08.94)</td>
</tr>
<tr>
<td>Severe</td>
<td>06(02.55)</td>
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<td>Total</td>
<td>235(100)</td>
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</tbody>
</table>

116 (49.36%) children were stunted. 58 children were
mildly stunted, 54 were moderately stunted and 4 were
severely stunted (Table 3).

As per Bangle test 75 (31.91%) children were
undernourished, of those 66 were moderately
undernourished and 9 were severely undernourished
(Table 4).
Discriminant Analysis

Discriminant analysis is used to classify the observations in two or more groups. Discriminant analysis was performed so that to classify a child whose height over approximate age are known into normal or malnourished group. A child was classified into normal or undernourished group by using the sample discriminant function.

As per discriminant analysis it was observed that stunting has the highest proportion of correctly classifying a child into normal or malnourished group (Table 5). Thus Stunting should be preferred over other methods.

Discussion

The study conducted by Mohanan et al identified using weight for age against body mass index as the best method of assessing malnutrition among various anthropometric measurements. Since mid upper arm circumference is believed to be constant between 1 to 5 years of age in a nutritionally normal child, simple methods of assessing the arm circumference have been studied by several investigators. As per Jellife DB and Jellife EFP, Bangle test has been found to be simpler and cheaper and yet it is reported to give similar accurate information. The study by Pandve HT and Singru SA demonstrated the limitations of the bangle test in the assessment of Nutritional status of the children less than 5 years of age. The present study shows that stunting has the highest proportion of correctly classifying a child into normal or malnourished group. Thus Stunting should be preferred over other methods. This finding has to be confirmed by larger sample study.

To conclude, anthropometry involves the external measurement of morphological traits of human beings. It has a widespread and important place in nutritional assessment, and while the literature on anthropometric measurement and its interpretation is enormous, the extent to which measurement error can influence both measurement and interpretation of nutritional status is little considered. Anthropometry is an important tool for nutritional assessment, and the techniques should allow increased precision of measurement, and improved interpretation of anthropometric data. Analyses of all methods will help epidemiologists decide whether reliability can be increased by improving precision, and whether there is a need to improve reliability in the first place.

References


3. Pandve H.T., Singru S.A. — A study to assess the

<table>
<thead>
<tr>
<th>Classification</th>
<th>Frequency (%)</th>
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<tbody>
<tr>
<td>Normal</td>
<td>119 (50.64)</td>
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<tr>
<td>Mild</td>
<td>58 (24.68)</td>
</tr>
<tr>
<td>Moderate</td>
<td>54 (22.98)</td>
</tr>
<tr>
<td>Severe</td>
<td>04 (01.70)</td>
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<td>235 (100)</td>
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Table 4

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<tr>
<th>Classification</th>
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<tbody>
<tr>
<td>Normal</td>
<td>160 (68.09)</td>
</tr>
<tr>
<td>Moderate</td>
<td>66 (28.08)</td>
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<tr>
<td>Severe</td>
<td>09 (03.84)</td>
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<td>Total</td>
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Table 5

<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>Normal</td>
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<tr>
<td>Stunting</td>
<td>97%</td>
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<tr>
<td>Wasting</td>
<td>76%</td>
</tr>
<tr>
<td>Gomez</td>
<td>71%</td>
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<tr>
<td>Bangle test</td>
<td>64%</td>
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