

# A study of prevailing cooking practices – calorie-protein intake and nutritional status of less than six years children in rural area

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## Abstract

**Introduction:** Foods, in their natural state, contain different nutrients in varying amounts. Cooking improves the digestibility of most foods. Flesh foods get softened on cooking and become easily chewable. Proper methods of cooking render foods palatable by improving the appearance, taste, flavor and texture, thereby enhancing acceptability. Repeated washing of food grains like rice and pulses results in losses of certain minerals and vitamins. Vegetables and fruits should be washed thoroughly with potable water before cutting. **Aims and Objectives:** To study prevailing Cooking Practices – Calorie-Protein Intake and Nutritional Status of Less than Six Years Children in Rural Area **Methodology:** The present study was conducted during 1<sup>st</sup> Oct 2010- 30<sup>th</sup> Sep 2011. Community based, cross sectional study. The study was undertaken in rural field practice area of the department of preventive and social medicine of government medical college. 476 under six children were studied starting from randomly selected first village sequentially as selected by lottery system till adequate sample size is reached. They were asked questionnaire regarding Cooking Practices – Calorie-Protein Intake. **Result:** Problem of undernutrition was more i.e. 66.67% among children who were having unsatisfactory cooking practices as compared to children who had satisfactory cooking practices i.e. 47.21%. ( $X^2=22.78$ ,  $p<0.0001$ ). The proportion of undernutrition was more i.e. 63.67% among children who did not received adequate calories required as per age than 52.15 % among children who received adequate calories. ( $X^2=6.41$ ,  $p<0.05$ ) The proportion of undernutrition was more i.e. 75.37% among children who did not received adequate protein as per their age requirement compared to children who received adequate proteins i.e. 36.27% ( $X^2= 74.44$ ,  $p<0.0001$ ). **Conclusion:** Unsatisfactory cooking practices and in adequate calorie and protein intake are implicated in the etiology of undernutrition so detailed education regarding satisfactory cooking practices and adequate calorie and protein intake should be given.

**Keywords:** Satisfactory Cooking Practices, Adequate Calorie-Protein Intake, Undernutrition, PEM.

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## INTRODUCTION

Foods, in their natural state, contain different nutrients in varying amounts. Cooking improves the digestibility of most foods. Flesh foods get softened on cooking and

become easily chewable. Proper methods of cooking render foods palatable by improving the appearance, taste, flavor and texture, thereby enhancing acceptability. In addition, they help in destroying disease causing organisms and eliminating natural inhibitors of digestion. In the course of food preparation, depending on the recipe, foods are subjected to various processes such as washing, grinding, cutting, fermentation, germination and cooking. In the Indian cuisine, fermentation (idli, dosa, dhokla) and germination (sprouting) are common practices. These methods improve digestibility and increase nutrients such as B-complex vitamins and vitamin C. Foods should be washed well before cooking and consumption to remove contaminants like pesticide residues, parasites and other extraneous material

However, certain precautions need to be taken while washing and cutting to minimize the loss of nutrients. Repeated washing of food grains like rice and pulses results in losses of certain minerals and vitamins. Vegetables and fruits should be washed thoroughly with potable water before cutting. Cutting of vegetables in to small pieces exposes a greater surface area of the foodstuff to the atmosphere, resulting in loss of vitamins due to oxidation. Therefore, vegetables should be cut in to large pieces. Cut vegetables should not be soaked in water for long, as water-soluble minerals and vitamins get dissolved. There are many methods of cooking like boiling, steaming, pressure cooking, frying, roasting and baking. Boiling is the most common method of cooking, during which heat-labile and water-soluble vitamins like vitamin B-complex and C is lost. The practice of using excess water while cooking rice should be discouraged since it leads to loss of vitamins; just sufficient water to be fully absorbed should be used<sup>13</sup>. PEM is identified as major health and nutrition problem in India. It occurs particularly in weanling and children in the first year of life. It is not only an important cause of childhood morbidity and mortality but also leads to permanent impairment of physical and possibly of mental growth of those who survive<sup>1</sup>. Death in children constitutes more than 34% of total death in India<sup>2</sup>. Seven out of ten of these deaths are due to respiratory infection, diarrhea and malnutrition. There is high under five morbidity and mortality in India<sup>1</sup>. Children are considered to be backbone of any nation. India is considered home to the largest number of underweight and stunted children in world. Nutritional problems among children cause major morbidity and mortality in India<sup>3</sup>. Nearly one fourth of children under 5 years of age, worldwide suffer from undernutrition. Undernutrition is a global health problem and more so in developing countries<sup>4</sup>. Exhibiting a sluggish trend over past decade and half the recent estimate from the National Family Health survey -3 (NFHS-3)-the unique source for tracking the child malnutrition in India – indicates about 43 percent of children under 5 years of age are underweight (thin for age), 48 percent are stunted (short for age), and approximately 20 percent are moderately to severely wasted (thin for height)<sup>5</sup>. The decline in prevalence however becomes unimpressive with the average levels marked by wide inequality in childhood malnutrition across the states and various socio-economic groups<sup>6,7</sup>. In South Asian region nearly 5 million children are dying every year and up to 3 million of these are directly or indirectly related to malnutrition<sup>8</sup>. As per the recent nationwide studies, majority of children are of mild-to-moderate grade, and those of severe grade are only 2.5%<sup>1</sup>. Estimates from the most recent nationally representative

survey indicate that 6.4% of children below 60 months of age have weight for height below -3 SD. In the current Indian population of 1205 million, there would be about 132 million under five children (~12% of population), of which 6.4% or roughly 8 million can be assumed to be suffering from SAM<sup>9</sup>. The UN ranks India in the bottom quartile of countries by Infant mortality (the 53<sup>rd</sup> highest), and under-5 child mortality (78 deaths per 1000 live births)<sup>10</sup>. According to the 2008 CIA fact book, 32 babies out of every 1,000 born alive, die before their first birthday<sup>9</sup>. Malnutrition impedes motor, sensory, cognitive and social development, so malnourished children will be less likely to benefit from schooling, and will consequently have lower income as adults<sup>10</sup>. The most damaging effects of under-nutrition occur during pregnancy and the first two years of a child's life. These damages are irreversible, making dealing with malnutrition in the first two year crucially important<sup>11</sup>.

In spite of a large number of national programmes related to nutrition such as ICDS, mid-day meal, etc., about 6600 under-five children die every day, accounting to 46% child deaths due to protein energy malnutrition (PEM)<sup>12</sup>.

## AIMS AND OBJECTIVES

To study prevailing Cooking Practices – Calorie-Protein Intake and Nutritional Status of Less than Six Years Children in Rural Area

## MATERIAL AND METHODS

The present study was conducted during 1<sup>st</sup> Oct 2010-30<sup>th</sup> Sep 2011. Community based, cross sectional study. The study was undertaken in rural field practice area of the department of preventive and social medicine of government medical college. According to ICDS August 2010 survey the rural block has total population of 12329 children in age group of 0-6. The ICDS block, in which RHTC was situated, had two ICDS sub blocks, one was selected randomly which consisted population catered by 4 primary health centers. List of all villages under these 4 primary health centers was prepared and the villages were selected randomly by lottery system to examine all under six children and interview their parents till desired sample size is achieved.

Sample size calculation<sup>14</sup>: Sample size was estimated by the formula

$$n = \frac{4pq}{l^2} \times 100$$

When = Sample size

p = prevalence of underweight children = 47%<sup>3,4</sup>

q = 100 - p = 100 - 47 = 53%

l = allowable error = 10% of p = 4.7

n = 450 was the minimum sample size

476 Under-six children were included in the study. 476 under six children were studied starting from randomly selected first village sequentially as selected by lottery system till adequate sample size is reached. Children under six years of age and are living in the same area for past 1 year or more were included into study, Children living in the study area, for less than 1 year were excluded from the study. Data was collected using semi structured; predesigned and pretested questionnaire by interviewing parents and thorough clinical examination of all 476 under six children from randomly selected villages during 1<sup>st</sup> Oct 2010 to 30<sup>th</sup> Sep 2011. Predesigned proforma consisting of standard questions related to socio-demographic factors, environmental conditions, birth history and feeding practices. In addition questionnaire also included questions on past and present medical history, followed by general and systemic examination. Weight measurement was recorded to nearest 100 gm using Salter's baby weighing apparatus for infants and standard weighing machine for children above 1 yr. Satisfactory cooking

**Practice:** The cooking is taken as satisfactory if the prevailing practice of cooking were for moderate duration, vegetables washing before cutting, rice dhal water using.

**Diet<sup>1</sup>:** 24 hour recall method was used for calculation of calorie and protein intake, these were calculated as per ICMR guidelines Adequate diet: If child is getting required calories and proteins according to his/her age – wise recommended dietary allowances (RDA). Inadequate diet: If child is not getting required calories and proteins according to his/her age-wise recommended dietary allowances (RDA)

**Underweight<sup>93</sup>:** WHO's criteria was used to classify under six children into underweight (<-2SD of median weight for age) and Normal (≥-2SD of median weight for age). Underweight children further classified into mild underweight (≥ -3 SD to < -2 SD of median weight for age) and severe underweight (< -3SD of median weight for age).

## RESULT

**Table 1:** Distribution of under six children according to cooking practices and nutritional status

Cooking practice	Undernutrition	Normal	Total
Satisfactory	93 (47.21)	104(52.79)	197 (100)
Unsatisfactory	186 (66.67)	93(33.33)	279 (100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476(100)</b>

$\chi^2=22.78$ ,  $p<0.0001$ , (Figures in parenthesis indicate horizontal percentages)

Table 1. Shows the distribution of under six children according to cooking practice and nutritional status. Out

of 476 under six children, 197 were having satisfactory cooking practices while 279 had unsatisfactory cooking practices. It is clear from above table that problem of undernutrition was more i.e. 66.67% among children who were having unsatisfactory cooking practices as compared to children who had satisfactory cooking practices i.e. 47.21%. The Chi-square test was applied to test the difference in cooking practices and nutritional status of children, which was highly significant. ( $p<0.0001$ ).

**Table 2:** Distribution of under six children according to adequacy of calorie consumption and nutritional status

Adequacy of calorie consumption (Req. as per age)	Undernutrition	Normal	Total
Adequate	109 (52.15)	100(47.85)	209 (100)
Inadequate	170 (63.67)	97 (36.33)	267 (100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476 (100)</b>

$\chi^2=6.41$ ,  $p<0.05$  (Figures in parenthesis indicate horizontal percentages)

Table 16. Shows the distribution of under six children according to adequacy of calorie consumption and nutritional status. Out of 476 under six children, 209 children had adequate calorie consumption required as per age, whereas 267 did not. It is clear from table that proportion of undernutrition was more i.e. 63.67% among children who did not received adequate calories required as per age than 52.15 % among children who received adequate calories. The Chi-square test was applied to test the difference in adequacy of calorie consumption and nutritional status of children which was statistically significant. ( $p<0.05$ ).

**Table 3:** Distribution of under six children according to adequacy of protein consumption and nutritional status

Adequacy of protein consumption (Req. as per age)	Undernutrition	Normal	Total
Adequate	74 (36.27)	130 (63.72)	204 (100)
Inadequate	205 (75.37)	67 (24.63)	272 (100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476(100)</b>

$\chi^2= 74.44$ ,  $p<0.0001$ . (Figures in parenthesis indicate horizontal percentages)

Table 17. Shows the distribution of under six children according to adequacy of protein consumption and nutritional status. Out of 476 under six children 204 had adequate consumption of proteins required as per age, where as 272 children did not. It is clear from the above table that proportion of undernutrition was more i.e.

75.37% among children who did not received adequate protein as per their age requirement compared to children who received adequate proteins i.e. 36.27% The observed difference in adequacy of protein consumption and nutritional status of children was highly significant ( $p < 0.0001$ )

## DISCUSSION

Use of baking soda for hastening cooking of pulses should not be practiced, as it results in loss of vitamins. Frying involves cooking food in oil/ghee/ vanaspati at high temperatures. Shallow frying involves use of much smaller amounts of oils than deep frying. Repeated heating of oils particularly PUFA-rich oils resolution of peroxides and free radicals and, hence, should be avoided. In our study problem of undernutrition was more i.e. 66.67% among children who were having unsatisfactory cooking practices as compared to 47.21% in children who had satisfactory cooking practices. This may be attributed to reason that unsatisfactory cooking practice makes the food less nutritious because of loss of important nutrients like vitamins and mineral. The observed difference in cooking practices and nutritional status of children was highly significant ( $p < 0.0001$ ). proportion of undernutrition was more i.e. 63.67% among children who did not received adequate calories required as per age, than 52.15 % among children who received adequate calories, confirming importance of adequate calorie consumption required as per age. The observed difference in adequacy of calorie consumption and nutritional status of children was statistically significant ( $p < 0.05$ ) This is in confirmation with Singh MB *et al* (2006)<sup>15</sup>. Proportion of undernutrition was more i.e. 75.37% among children who did not received adequate proteins required as per age than 36.27% among children who received adequate proteins. This confirms importance of protein consumption as per age requirement. The observed difference in adequacy of protein consumption and nutritional status of children was highly significant ( $p < 0.0001$ ).

## CONCLUSION

Unsatisfactory cooking practices and in adequate calorie and protein intake are implicated in the etiology of undernutrition so detailed education regarding satisfactory

cooking practices and adequate calorie and protein intake should be given.

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