

# A Study of Factors like Immunization, diarrheal and respiratory infections Responsible for Protein Energy Malnutrition in rural Maharashtra

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## Abstract

**Introduction:** Death in children constitutes more than 34% of total death in India. 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. **Methodology:** Present study is cross-sectional, observational study in field practice area and sample size was selected by simple random sampling method. **Result:** Proportion of undernutrition was more i.e. 92.86% in un-immunized children followed by 91.92% in partially immunized and 22.03% in completely immunized children. The problem Undernutrition was more i.e. 65.13% among children who had history of persistent diarrhea in past 12 months compared to 55.56% of undernutrition among whom there was no history of persistent diarrhea in past 12 months. Undernutrition was more i.e. 77.87% among children who had history of persistent febrile illness in past 12 months compared to i.e. 51.98% of undernutrition among children who did not have history of persistent febrile illness in past 12 months. **Conclusion:** All children should be fully immunized and early treatment of the children suffered from diarrheal and respiratory infections should be done.

**Key Word:** Immunization, diarrheal, respiratory infections.

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## INTRODUCTION

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>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>2</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>3</sup>.

## MATERIAL AND METHODS

- **Study duration:** The present study was conducted during 1<sup>st</sup> Oct 2010- 30<sup>th</sup> Sep 2011.
- **Study design:** Community based, cross sectional study.
- **Study area:** The study was undertaken in rural field practice area of the department of preventive and social medicine of government medical college in Maharashtra. 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>4</sup>:** Sample size was estimated by the formula

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

Where n= Sample size

p=prevalence of underweight children=47%<sup>5, 6</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.

- **Study population:** 476 under six children were studied starting from randomly selected first village sequentially as selected by lottery system till adequate sample size is reached.
- **Inclusion criteria :** Children under six years of age and are living in the same area for past 1 year or more
- **Exclusion criteria:** Children living in the study area, for less than 1 year.
- **Pilot study:** A pilot study was undertaken for assessing feasibility and finalization of proforma, on 90 respondent's. Necessary modifications were made after analyzing responses. The questionnaire was then finalized.
- **Data collection:** 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.

- **Study tools:** 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.

Height of the children was recorded to nearest 1 cm, with the help of markings on wall. For children below 24 month of age, length was measured using infantometer

#### Operational definitions

- **Immunization status<sup>2</sup>:**

- **Completely immunized:** A child, who has received all the vaccines according to his/ her age included in Indian National Immunization schedule.
- **Partially immunized:** A child who has received at least one of the vaccines included in Indian National Immunization Schedule
- **Unimmunized:** A child who has not received any vaccine included in Indian National Immunization schedule.
- **Underweight<sup>7</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 immunization and nutritional status

Immunization Status	Undernutrition	Normal	Total
Completely immunized	50(22.03)	177(77.97)	227 (100)
Partially immunized	216(91.92)	19 (08.08)	235 (100)
Un-immunized	13(92.86)	01 (07.14)	14 (100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476(100)</b>

$X^2 = 239$ ,  $p < 0.0001$  (Figures in parenthesis indicate horizontal percentages)

Partially immunized and unimmunized were grouped together for calculation of  $X^2$  value.) Table 1. Shows distribution of under six children according to immunization and nutritional status. Out of 476 under six children, 227 were completely immunized, 235 were partially immunized and 14 were un-immunized. It is evident from table that proportion of undernutrition was

more i.e. 92.86% in un-immunized children followed by 91.92% in partially immunized and 22.03% in completely immunized children. The Chi-square test was applied to test the difference in immunization status and undernutrition of children which was highly significant. ( $p < 0.0001$ )

**Table 2:** Distribution of under six children according to history Of Persistent diarrhea in past 12 months and nutritional status

H/O persistent Diarrhea in past 12 months	Undernutrition	Normal	Total
Yes	99(65.13)	53(34.87)	152(100)
No	180(55.56)	144(44.44)	324(100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476(100)</b>

$X^2=3.91$ ,  $p<0.05$ . (Figures in parenthesis indicate horizontal percentages)

Table 2. Shows the distribution of under six children according to history of persistent diarrhea in past 12 months and nutritional status. Out of 476 under six children, 152 were having the history of persistent diarrhea in past 12 months while 324 did not. It is obvious from above table that proportion of undernutrition was more i.e. 65.13% among children who

had history of persistent diarrhea in past 12 months compared to 55.56% of undernutrition among whom there was no history of persistent diarrhea in past 12 months. Chi-square test was applied to see the difference between history of persistent diarrhea in last 12 months and nutritional status of children, which was statistically significant. ( $p<0.05$ )

**Table 3:** Distribution of under six children according to nutritional status and history of persistent febrile illness in past 12 months

H/O persistent febrile illness in past 12 months	Undernutrition	Normal	Total
Yes	95(77.87)	27(18.03)	122(100)
No	184(51.98)	170(48.02)	354(100)
<b>Total</b>	<b>279(58.61)</b>	<b>197(41.39)</b>	<b>476(100)</b>

$X^2=25.07$ ,  $p<0.0001$ (Figures in parenthesis indicate horizontal percentages)

Table 3.Shows the distribution of under six children according to nutritional status and history of persistent febrile illness in past 12 months Out of 476 under six children 122 were having history of persistent febrile illness in past 12 months whereas 354 did not. Above table reveals that problem of undernutrition was more i.e. 77.87% among children who had history of persistent febrile illness in past 12 months compared to i.e. 51.98% of undernutrition among children who did not have history of persistent febrile illness in past 12 months. The observed difference between history of persistent febrile illness in past 12months and nutritional status of children was highly significant.( $p<0.0001$ )

## DISCUSSION

**Table No.1.** Shows distribution of under six children according to immunization and nutritional status. Out of 476 under six children 227 were completely immunized, 235 were partially immunized and 14 were un-immunized. It is evident from table that proportion of undernutrition was more i.e. 92.86% in un- immunized children followed by 91.92% in partially immunized and 22.03% in completely immunized children. This indicates that the proportion of undernutrition was less in completely immunized children compared to un-immunized and partially immunized. This explains the fact that immunization prevents infections which indirectly protect the children from infection →malnutrition vicious circle.

The observed difference in immunization status and undernutrition of children was highly significant.( $p<0.0001$ ) These findings are in confirmation with **Sabu S Padmadas et al (2002)**<sup>8</sup>, **Ayay SO et al (2004)**<sup>9</sup>,**Megha Luthra et al (2009)**<sup>10</sup>, **Farzana alim et al (2010)**<sup>11</sup>, **Jhani v et al (2011)**<sup>12</sup>,**Basit.A et al (2012)**<sup>13</sup>. **TableNo.2** Shows the distribution of under six children according to history of persistent diarrhea in past 12 months and nutritional status. Out of 476 under six children, 152 were having the history of persistent diarrhea in past 12 months, while 324 did not. It is obvious from table that proportion of undernutrition was more i.e. 65.13% among children who had history of persistent diarrhea in past 12 months compared to 55.56%, where there was no history of persistent diarrhea in past 12 months. This may be because of the fact that persistent diarrheal infections decreases absorption of important nutrients and minerals contributing to undernutrition. The observed difference between history of persistent diarrhea in past 12 months and nutritional status was statistically significant. ( $p<0.05$ ) These findings are in confirmation with **Bhutta ZA, et al (1997)**<sup>14</sup>, **Nikhil Chandra Roy et al (2000)**<sup>15</sup>, **Ray SK et al (2001)**<sup>16</sup>, **Bhatia et al (2007)**<sup>17</sup>, **Prasad Pore et al (2010)**<sup>18</sup>.**Aklima Jesmin et al (2011)**<sup>19</sup>. **Table No 3.** Shows the distribution of under six children according to nutritional status and history of persistent febrile illness in past 12 months. Out of 476 under six children 122 were having history of persistent febrile illness in past 12 months whereas 354 did not. Table reveals that problem

of undernutrition was more i.e 77.87% among children who had history of persistent febrile illness in past 12 months compared to 51.98%, where there was no history of persistent febrile illness in past 12 months. This could be due to the reason that persistent febrile illnesses because of so many undiagnosed conditions like tuberculosis, pneumonia and other illnesses results in poor intake and thereby causing poor weight gain. The observed difference between history of persistent febrile illness in past 12 months and nutritional status of children was highly significant. ( $p < 0.0001$ ) These findings are in confirmation with **Bhutta ZA, et al (1997)<sup>14</sup>**, **Nikhil Chandra Roy et al (2000)<sup>15</sup>**, **Ray SK et al (2001)<sup>16</sup>**, **Bhatia et al (2007)<sup>17</sup>**, **Prasad Pore et al (2010)<sup>18</sup>**. **Aklima Jesmin et al (2011)<sup>19</sup>**

## CONCLUSION

Immunization is very important in children, especially in 0-6 age group . The immunization which is most important is Measles and Vit.A which is essential for growth, those child fail to receive immunization are prone for diarrheal and respiratory infection causing growth faltering. So all child should be fully immunized and early treatment of the children suffered from diarrheal and respiratory infections.

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