

## Can mother's education and family welfare reduce under-nutrition of pre-school children in India?

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### *Abstract:*

*Background:* Since, the children are the future well-being of the entire society, it is necessary to see how the status of health of children can be improved.

*Objective:* This paper reveals the growth and nutritional status of 0-59 month old children in India and also tries to delineate the responsible socio-economic factors behind nutrition.

*Methodology:* The sample size of this study is 30,105 which have been collected by the third National Family Health Survey (NFHS-3). Data on socio-economic backgrounds are gender differences of the children, place, religion, education and age-group of mothers, wealth index and impact of colostrums on children's growth and nutrition. Under nutrition has been assessed through the cutoff point of  $-2$  of the z-score value corresponding to weight for age and height for age.

*Results:* The data show that in India, 35.7 per cent children are undernourished. By age-group distribution, the maximum occurrence is noticed in the age between 24-35 months. More than 50% occurrences of underweight and stunted children are found in the states of east to central belt of India. It is also found that the distributions of weight and height around the means remain remarkably stable over age. This would appear to indicate that using of colostrums and weaning practices are possibly more important factors than solid food intake. Data reveals that mother's education and family welfare are the prime factors to regulate the nutritional status of children. The study also reveals that mother's education, economy, age-groups, and religion have great impact on use of colostrums.

*Conclusion:* Analysis of possible regional and socio-economic factors thought to influence child nutrition outcomes does not reveal any substantive causal relations except for the mother's educational status and household welfare.

*Key words:* Under-nutrition, Pre-school children, Mother's education, Family welfare

### **INTRODUCTION:**

Pre-school children constitute the most vulnerable segment in the society. Malnutrition in this group is a major public health problem and a huge obstacle to overall national

development (Bishnoi et al., 2004), because it not only increases the morbidity and mortality, it has significant effect on adolescent and adult life. South Asia has the highest prevalence of under-weight and stunted children (Bamji, 2003). It is regarded that India is home to the largest number under-weight and stunted children in the world. Though in South Asia, especially in India, there will be a substantial reduction of under-nutrition rates, but Asia and India will still continue to have by far the largest number of under-weight children in the world in 2015 (Ramchandran, 2007). There is a large disparity in occurrence between rural and urban India (Gragnotati, et al. 2005) and also there exists great interstate variation in the patterns and trends. For example, in rural India including West Bengal, under nutrition among pre-school children is creating an important public health problem (Mustaphi and Dobe, 2005).

Positive growth during infancy and childhood depends on high birth-weight, adequacy of infant feeding and absence of infection. In India, approximately 30 % children are born with low birth weight (Bamji, 2003) The low birth weight babies, in adverse socio-economic condition are more affected by growth retardation in the first two years of life (Ramchandran, 2007). Most of the babies do not exclusively live on breast feeding up to six months. These babies are introduced other milk or below quality semi-solid foods which cause morbidity and hence under-nutrition. So to inhibit the under-nutrition, consciousness intervention is necessary regarding weaning of food among the babies.

Another cause of under-nutrition of pre-school children in India is the inadequate food allocation among the children rather than poverty. It was studied from National Nutrition Monitoring Bureau (NNMB, 2005-06) intra-household food distribution data that mean energy consumption is the least among the pre-school children i.e. there is widest gap between recommended diet and actual diet. Not only that, most of the children are having predominantly adult food with low energy and nutrient density. These data confirm that in the last decade, in addition to poverty, poor child feeding and caring practices are responsible for inadequate dietary intake in pre-school children.

So from the above discussion, it follows that unusual food allocation, not maintaining the actual timing on exclusive breast-feeding or introduction of semi-solid food are the result of economic condition, and low awareness of parents. In this context, it is

necessary to understand the socio-economic conditions influencing the retardation of growth and nutrition.

The main objectives of the study thus are (i) to study the growth and nutrition status of 0-59 month children on the basis of different age-groups and (ii) to delineate the responsible socio-economic factors among them.

## **MATERIAL AND METHODS**

The data on growth and nutritional status of children was accessed from the data of third round National Family Health Survey (NFHS-3) of 2005-06. The survey was coordinated by International Institute for Population Sciences (IIPS) in collaboration with Ministry of Health and Family Welfare. Children of age 0- 59 months are taken to form eight age-groups and the sample size is 30,105.

This survey collected data on weight and height of the children as well as computed 'z' scores health parameters through weight for age and height for age indices. We have considered those height and weight data for which the selected socio-economic data are also available. So to make parity of height and weight data with those socio-economic variables, some outlying observations have been excluded.

Z-score value '-2' was used as a cut-off point for prevalence estimation (WHO, 1995). Z-score is defined as the deviation of the value observed for an individual from the median of the reference population, divided by the standard deviation (SD) of the reference population.

The classification of Z-score (followed by NCHS/WHO) is as follows: "below normal" ( $< -2$ ), "normal" ( $-2$  to  $< + 2$ ) and "above average" ( $\geq + 2$ ). To explain the nutritional status, the socio-economic variables like sex of the children, place of residence, religion, level of education of mother, age of mother have been considered. Places of residence are taken as "rural" and "urban". Religion has been divided into four groups like Muslim, Hindu, Christian and Others. Likewise mother's educational status is grouped into four categories such as illiterate (those who can neither read nor write), primary (literate up to class IV standard), secondary (class V to class X standard) and the fourth group is class XI and onwards (i.e. Higher Secondary, Graduate or Post graduate etc). Age groups of mother during child birth are grouped into three categories such as

15-24 years (younger mother) and 25-34 years (middle aged) and 35 years and above (older mother). Wealth index is a measure of the economic status of the household (Rutstein, 1999). Though it is an indicator of the level of the wealth in the household, it is consistent with expenditure and income measure. It is based on 33 household assets and housing characteristics like household electrification, type of windows, sources of drinking water, types of toilet facility, flooring, roofing, cooking fuel and house ownership, material of exterior walls, number of household members per sleeping room, ownership of a bank or post-office account, ownership of a mattress, a pressure cooker, a chair, a cot/bed, a table, an electric fan, a radio/ transistor, a black and white television, a colour television, a sewing machine, a mobile telephone, and any other telephone, a computer, a refrigerator, a watch or clock, a bicycle, a motorcycle or scooter, an animal-drawn cart, a car a water pump, a thresher, and a tractor. Here each household asset was assigned a weight generated through principal component analysis and the resulting score was standardized in relation to a normal distribution and each household was assigned a score for each asset and the scores were summed for each household and individuals were ranked according to the score of the household in which they resides and total sample number was divided into five quintile from lower strata to higher strata like poorest, poorer, medium, higher and highest. Feeding of colostrums or breast-milk from birth to four days has a great impact on children's future growth and natural immunization of the body. Here this duration has been divided into three groups like immediately after birth, within the day after one hour or after one day.

To present the relative and effective intervention, the risk of Z-score value for under-nutrition was regressed on socio-economic variables using categorical logistic regression analysis. Dependent variables are taken as binary. Children whose Z-scores are below  $-2$  are coded as '1' and those with Z-scores  $-2$  or higher are coded as '0'. An estimated odd ratio of '1' indicates that the nature of dependent variable is no different from the reference category. If the estimated odd ratio is  $>1$ , the probability of becoming affected is more in this category compared to the reference category and if it is  $<1$ , then it is just opposite to that of ' $>1$ ' case.

## RESULTS

Table 1 describes the mean and SD of weight and height for each of eight sub-groups of age of 0-59 month children. It also describes the test of significance of the differences in the mean values between successive age-groups. All along the age-groups, there has been a positive upward movement of weight and height though the magnitude of changes differed from one age group to the other age group. T-tests also prove that the differences between two successive age-groups for weight are always significant at 1 % level and for height, the differences are always significant except for the age group 9-11 months.

**Table 1 Mean Weights and heights at different age-groups of 0-59 Month Children in India**

Age group (months)	N	Weight (kg.)			Height (cm.)		
		Mean	SD	t-test <sup>†</sup>	Mean	SD	t-test <sup>†</sup>
0-2	1289	4.18	1.02	----	54.76	4.54	-----
3-5	2032	5.84	1.07	9.54**	61.83	4.21	3.45**
6-8	2203	6.93	1.15	5.55**	66.44	4.22	2.34*
9-11	1990	7.59	1.21	2.93**	69.65	4.12	1.52
12-23	7820	8.78	1.43	6.04**	75.29	5.11	3.18**
24-35	6142	10.61	1.68	10.90**	84.03	5.85	6.38**
36-47	4768	12.29	1.93	7.52**	91.54	6.22	4.41**
48-59	3861	13.97	2.28	6.35**	98.44	6.58	3.35**

<sup>†</sup> Between successive age groups;

\*\* Significant at 1% level; \* Significant at 5% level

Table 2 describes the relationship of mean weight and height with different socio-economic variables. It is seen that mean weight and height are significantly different among the groups of socio-economic variables. Highest mean values of weight and height are seen among the children of the male gender, urban areas, Christian community,

highest educated and aged mother, richest wealth index and who was put to breastfed just after birth and these results are statistically significant at 1% level of significance.

**Table 2 Distribution of mean weight and height of (0-59) months children in India by socio-economic groups**

Socio-economic variables	N	Weight (kg.)	ANOVA 'F' value	Height (cm.)	ANOVA
<b>Sex of the children</b>					
Male	16159	10.156	543.748	81.009	290.955
Female	13946	9.326	Sig. 0.000	78.422	Sig. 0.000
<b>Place of residence</b>					
Rural	18569	9.451	524.846	78.700	347.371
Urban	11536	10.288	Sig. 0.000	81.597	Sig. 0.000
<b>Religion</b>					
Muslim	4638	9.517	24.168	78.697	13.047
Hindu	21304	9.769	Sig. 0.000	80.009	Sig. 0.000
Others	1431	9.973		80.011	
Christians	2732	10.123		80.043	
<b>Women's education</b>					
Illiterate	11315	9.231		78.134	147.725
Primary	4318	9.658	279.582	79.545	Sig. 0.000
Secondary	11787	10.074	Sig. 0.000	80.701	
Higher	2685	10.903		83.393	
<b>Women's age group</b>					
15-24	10889	8.673	1214.829	74.877	1374.327
25-34	16018	10.288	Sig. 0.000	82.120	Sig. 0.000
35-49	3198	10.929		85.039	
<b>Wealth index</b>					
Poorest	4975	8.838	387.082	76.919	227.802
Poorer	5220	9.187	Sig. 0.000	77.814	Sig. 0.000
Middle	6119	9.621		79.232	
Richer	6781	9.959		80.339	
Richest	7010	10.820		83.342	
<b>When child was put to breastfed</b>					
Immediately	9184	9.992	59.462	80.551	45.350
Within the day after one hour	9934	9.863	Sig. 0.000	80.226	Sig. 0.000
After one day	10524	9.437		78.552	

**Table 3 Age-group wise percentage distribution of nutritional status among 0-59 month children in India**

Age group	N	Weight for age			Height for age		
		Underweight	Normal	Overweight	Stunted	Normal	Tall
0-2	1289	23.7	73.8	2.6	19.2	72.0	8.8
3-5	2032	26.1	73.2	0.7	18.0	74.6	7.4
6-8	2203	28.0	71.4	0.6	22.7	71.7	5.6
9-11	1990	31.0	68.5	0.6	28.3	68.2	3.5
12-23	7820	36.9	62.8	0.3	47.1	50.9	2.0
24-35	6142	40.1	59.5	0.4	50.3	47.9	1.8
36-47	4768	39.7	59.9	0.4	46.4	52.6	1.0
48-59	3861	37.7	61.7	0.6	41.6	57.7	0.8
<b>0-59</b>	<b>30105</b>	<b>35.7</b>	<b>63.7</b>	<b>0.5</b>	<b>40.7</b>	<b>56.6</b>	<b>2.7</b>

Percentages of under-weight and stunted children by age-group are described in Table 3. It is evident that magnitudes of these percentages are quite high and increases up to 12 to 35 months then it moves downward.

Table 4 describes the zone and state-wise percentage distribution of different under-nutrition and over-nutrition categories. It is seen that 35.7 % of Indian children are under-weight and 40.7 % are stunted whereas 0.5 % are over-weight when 2.7 % are tall. Zone-wise distribution shows that lowest under-weight and stunted children are found in north-east zone where as both the highest underweight and stunted children are in the central zone. The highest over-weight and tall children are found in south zone. It may be surprising to note that north-east zone also has very high percentages of overweight and tall children. Out of all states, more than 50 % under-weight states are Bihar (54.0 %),

**Table 4 Zone and State-wise percentage distribution of nutritional status among 0-59 months children in India**

Zones/ States	N	Weight for age			Height for age		
		Underweight	Normal	Overweight	Stunted	Normal	Tall
<b>North-east</b>	<b>5599</b>	<b>27.1</b>	<b>72.2</b>	<b>0.7</b>	<b>36.3</b>	<b>60.4</b>	<b>3.4</b>
Arunachal Pradesh	493	32.0	66.9	1.0	40.2	56.4	3.4
Assam	998	33.5	66.1	0.4	41.4	47.3	1.3
Manipur	1256	19.8	79.6	0.6	30.7	66.1	3.3
Meghalaya	427	46.8	52.7	0.5	49.4	47.3	3.3
Mizoram	533	18.6	80.1	1.3	35.8	60.0	4.1
Nagaland	1061	22.4	76.6	0.9	32.5	62.1	5.4
Sikkim	385	18.4	80.5	1.0	33.8	61.8	4.4
Tripura	446	37.7	62.1	0.2	35.4	62.8	1.8
<b>East</b>	<b>5089</b>	<b>43.9</b>	<b>55.6</b>	<b>0.5</b>	<b>43.7</b>	<b>54.2</b>	<b>2.2</b>
Bihar	1373	54.0	45.7	0.2	49.9	48.3	1.8
Jharkhond	951	53.3	46.5	0.2	46.2	51.3	2.5
Orissa	1174	39.3	60.1	0.7	42.4	55.2	2.4
West Bengal	1600	32.9	66.3	0.8	37.8	60.2	2.1
<b>Central</b>	<b>6429</b>	<b>44.4</b>	<b>55.4</b>	<b>0.2</b>	<b>48.5</b>	<b>49.3</b>	<b>2.2</b>
Madhya Pradesh	1807	54.5	45.4	0.1	43.4	54.0	2.7
Chhattisgarh	1048	45.0	55.0	0.0	50.3	48.5	1.2
Uttar Pradesh	3574	39.2	60.6	0.2	50.6	47.2	2.2
<b>West</b>	<b>3267</b>	<b>34.6</b>	<b>64.8</b>	<b>0.6</b>	<b>40.4</b>	<b>57.4</b>	<b>2.1</b>
Goa	613	24.8	73.6	1.6	25.3	72.6	2.1
Gujarat	966	42.1	57.8	0.1	47.8	50.3	1.9
Maharashtra	1688	33.9	65.6	0.5	41.7	56.0	2.3
<b>North</b>	<b>5430</b>	<b>32.5</b>	<b>67.0</b>	<b>0.5</b>	<b>38.7</b>	<b>58.6</b>	<b>2.7</b>
Haryana	785	39.0	60.9	0.1	42.9	55.3	1.8
Himachal Pradesh	655	33.1	66.1	0.8	34.5	63.5	2.0
Jammu andKashmir	720	25.3	74.2	0.6	34.4	61.3	4.3
New Delhi	519	27.0	72.3	0.8	41.8	55.1	3.1
Punjab	821	23.8	75.8	0.5	35.6	62.2	2.2
Rajasthan	1197	38.9	60.6	0.5	40.3	56.1	3.6
Uttranchal	733	35.1	64.5	0.4	40.9	57.4	1.6
<b>South</b>	<b>4282</b>	<b>29.3</b>	<b>69.8</b>	<b>0.9</b>	<b>34.3</b>	<b>62.3</b>	<b>3.5</b>
Andhra Pradesh	1329	28.4	70.9	0.8	37.2	60.5	2.3
Karnataka	1068	35.8	63.5	0.7	41.9	55.5	2.5
Kerala	732	22.3	77.2	0.5	24.3	72.0	3.7
Tamil Nadu	1153	28.9	69.7	1.4	30.1	64.4	5.6
<b>India</b>	<b>30105</b>	<b>35.7</b>	<b>63.7</b>	<b>0.5</b>	<b>40.7</b>	<b>56.6</b>	<b>2.7</b>



Jharkhond (53.3 %) and Madhya Pradesh (54.5 %) and the states with below 20 % underweight children are only Mizoram (18.6 %) and Sikkim (18.4 %). In case of stunted children, most of the children fall in the range of 30 to 35 percent and only in two states, namely Chattisgarh and Uttar Pradesh, the percentage of affected children are 50.3 % and 50.6 % respectively. In case of over-weight, though the occurrence varies from 0.1 to 1.6 % but out of these, high percentages have been observed in Mizoram, Goa and Tamil Nadu. Regarding stunted children, generally it varies from 1.2 % to 5.4 % but high percentages occurred in Mizoram (4.1 %), Nagaland (5.4 %), Sikkim (4.4 %) and Jammu and Kashmir (4.3 %).

Now we turn to the changes in the incidence of under-nutrition by socio-economic characteristics (Table 5). It is evident that the variables taken in our analysis affect z scores very much as seen by degrees of variation in the percentages of stunting and underweight children in the different categories of socio-economic variables. It is seen from the table that the children of rural areas, Muslim and Hindu community, illiterate and aged mother, poorest wealth index and child being breastfed after one day, are more affected than other categories of respective socio-economic variables. All these results are statistically significant at 1% level of significance. However, there is not much difference between male and female percentages of these occurrences. The results in table 5 are further confirmed by the logistic regression analysis as shown in the table 6.

Just after birth mother secretes breast milk, named colostrums, for the first few days. It is recognized to differ from normal breast milk by its colour, consistency and function. It is seen from our present study (Tables 7a, 7b, and 7c) that there is a direct relationship between the timing of first breast milk (colostrums) to the child with mother's education, age groups and wealth index of the family. As education, age-groups of mother and wealth index of the family increases, the percentage of the mothers, who give colostrums to their child immediately after birth, goes up. Religion-wise, it is seen (Table 7d) that the introduction of immediate colostrums is the lowest (25.7 %) among the Muslim mothers and it is highest (56.3 %) among the Christian mothers. It may be due to the fact that Muslims are more conservative and less educated than Christians. Literacy has a great impact on the introduction of colostrums just after birth.

**Table 5 Percentage of under nutrition among the (0-59 months) children in relation to different socio-economic variables**

Independent variables	N	% of under-weight	Chi-Square	% of stunted	Chi-Square
<b>Sex of the children</b>			0.320		14.232
Male	16159	35.8	sig.- 0.852 df=2	41.7	sig.- 0.001 df=2
Female	13946	35.7		39.7	
<b>Place of residence</b>			444.134		310.64
Rural	18569	40.3	Sig. 0.000 df=2	44.7	Sig. 0.000 df=2
Urban	11536	28.4		34.4	
<b>Religion</b>					
Muslim	4638	37.4	215.012 Sig. 0.000 df=6	42.8	69.502 Sig. 0.000 df=6
Hindu	21304	36.6		41.2	
Others	1431	30.0		37.4	
Christians	2732	24.2		35.2	
<b>Women's education</b>					
Illiterate	11315	47.8	1611.355 Sig. 0.000 df=6	51.7	1407.88 Sig. 0.000 df=6
Primary	4318	38.9		44.9	
Secondary	11787	27.8		33.9	
Higher	2685	14.4		18.1	
<b>Women's age group</b>					
15-24	10889	35.7	25.998 Sig. 0.000 df= 4	40.7	44.224 Sig. 0.000 df= 4
25-34	16018	35.0		39.7	
35-49	3198	39.6		46.0	
<b>Wealth index</b>					
Poorest	4975	54.9	2076.499 Sig. 0.000 df=8	55.6	1590.184 Sig. 0.000 df=8
Poorer	5220	46.1		50.0	
Middle	6119	37.3		44.6	
Richer	6781	30.2		37.1	
Richest	7010	18.4		23.5	
<b>When child was put to breastfed</b>					
Immediately	9184	31.8	217.958 Sig. 0.000 df=6	37.9	156.180 Sig. 0.000 df=6
Within the day after one hour	9934	34.0		38.4	
After one day	10524	41.3		45.5	
Days number missing	10	20.0		40.0	

**Table 6 Categorical Logistic regressions of weight for age and height for age on different socioeconomic variables**

Independent variables	Weight for age	Height for age
	Odd Ratio	Odd Ratio
<b>Sex of the children</b>		
Female®	1.00	1.00
Male	1.024	1.11**
<b>Religion</b>		
Muslim®	1.00	1.00
Hindu	1.117**	1.014
Others	0.918	0.965
Christians	0.645**	0.841**
<b>Women's education</b>		
Illiterate®	1.00	1.00
Primary	0.873**	0.890**
Secondary	0.710**	0.717**
Higher	0.415**	0.407**
<b>Women's age group</b>		
15-24®	1.00	1.00
25-34	1.129**	1.093**
35-49	1.209**	1.245**
<b>Wealth index</b>		
Poorest®	1.00	1.00
Poorer	0.780**	0.866**
Middle	0.587**	0.746**
Richer	0.468**	0.598**
Richest	0.294**	0.380**
<b>When child was put to breastfed</b>		
Immediately®	1.00	1.00
Within the day after one hour	1.036	0.986
After one day	1.160**	1.124**

® Reference category

&lt;0.01 : 1 % level \*\*

0.01 - 0.05 : 5 % level \*

Table 7a Relationship between time of first introduction of colostrums and mother's education

Mother's education	When child was put to breastfed				Chi-Square value
	Immediately	Within the day after one hour	After one day	Total	
No education	25.4	29.7	48.0	11198	1402.078 df = 9 Sig. 0.000
Primary	32.3	33.8	33.8	4262	
Secondary	37.5	36.0	26.4	11565	
Higher	36.7	38.0	25.2	2627	

Table 7b Relationship between time of first introduction of colostrums and mother's age

Age of mother (yrs.)	When child was put to breastfed				Chi-Square value
	Immediately	Within the day after one hour	After one day	Total	
15-24	28.9	33.6	37.5	10763	62.113 df = 6 Sig. 0.000
25-34	32.2	34.0	33.7	15744	
35-49	31.7	30.7	37.6	3145	

Table 7c Relationship between time of first introduction of colostrums and household wealth index

Religion	When child was put to breastfed				Chi-Square value
	Immediately	Within the day after one hour	After one day	Total	
Poorest	22.2	30.1	47.7	4944	725.586 df = 12 Sig. 0.000
Poorer	28.6	28.9	42.4	5171	
Middle	34.1	32.3	33.5	6036	
Richer	33.7	36.1	30.2	6655	
Richest	33.7	38.0	28.3	6846	

Table 7d Relationship between time of first introduction of colostrums and religion of the households

Religion	When child was put to breastfed				Chi-Square value
	Immediately	Within the day after one hour	After one day	Total	
Muslim	25.7	33.3	40.8	4562	1072.401 df = 9 Sig. 0.000
Hindu	28.6	34.0	37.3	20993	
Christian	56.3	29.7	14.0	2692	
Others	34.3	34.0	31.7	1405	

## DISCUSSION

The present study examined the growth and nutritional status of 0-59 month children in India during 2005-06. The study reveals linear positive growth of weight and height among the children in respect of all the age-groups. It is also seen that upward mean growth of weight and height are significantly related with some socio-economic variables like male gender, urban area, Christian community, higher educated and aged mother, richest wealth index family and putting to breastfed immediately after birth. These findings prove that immediate introduction of breast feeding is a good indicator of awareness as one-third of mother are practicing immediate introduction of colostrums and it may be explained by social and economic differences within the population.

Regarding nutritional status of pre-school children in India, it is seen that 35.7 % children are under-weight and 40.7 % are stunted where as 0.5 % are over-weight and 2.7 % are tall. Zone-wise distribution shows that the lowest under-weight and stunted children are found in north-east zone and highest over-weight and tall children are found in south zone. More than 50 % under-weight states are Bihar (54.0 %), Jharkhond (53.3 %) and Madhya Pradesh (54.5 %) and the state with below 20 % occurrences are only Mizoram (18.6 %) and Sikkim (18.4 %). The reason for high underweight states may be high illiteracy among women. Besides this, the coverage of ICDS developmental programme for children has ranked bottom in those states (World Bank Report, 2006). In

case of stunted children, most of the children fall in the range of 30 to 35 percent and only two states namely Chattisgarh and Uttar Pradesh, the number of affected children are 50.3 % and 50.6 % respectively. In case of over-weight, though the occurrence varies from 0.1 to 1.6 % but out of these, highest percentage occurs in Mizoram, Goa and TamilNadu. Regarding stunted children, generally it varies from 1.2 % to 5.4 % but high percentage occurs in Mizoram (4.1 %), Nagaland (5.4 %), Sikkim (4.4 %) and Jammu and Kashmir (4.3 %). This stunting feature may reflect the Mongoloid affinity in the states of Mizoram, Nagaland and Sikkim but in Jammu and Kashmir, it reflects the effect of political disaster during the last twenty years.

Percentage changes of under-weight and stunted children among 0-59 month age groups are seen to be quite high among 12 to 35 month children and then the trend is downward. In case of stunted children, the rate of stunting goes upwards from 6 to 35 months and then goes little downwards but there are great differences of occurrences of affected children between 0-6 month children and 12 months onward children. The high dispersions and low growth rates of the means during the first two years for both weight and height indicate high rates of under-nutrition and stunting during this age.

Analysis between socio-economic variables with under-nutrition reveals that the children of rural areas, Muslim and Hindu community, illiterate and aged mothers, poorest wealth index and children who were put to breastfed after one day are mostly affected. So the study proves that awareness of mother which is the basic expression of mother's literacy and economic status are the most important predictor for good health of a child. It is evidenced from the study of 80s (Caldwell, 1981 and Chen, 1986) through the very recent ones (Bharati et al., 2008) that education is an important determinants of infant and child mortality and nutritional status. In this context, the present study also confirms the findings that mother's education is very important factor for the betterment of their children's health status. As health of a child is irreversibly related with mothers' whole bio-social environment, so it is better that childhood under-nutrition in India may lie less in the way we treat our children and more in the way we treat our women.

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