Valley International Journals
Open Access Journal

International Journal of Medical Science and Clinical Inventions
Volume 2 issue 03 2015 page no. 809-815 ISSN: 2348-991X
Available Online At: http://valleyinternational.net/index.php/our-jou/ijmsci

Nutritional Status Of Under Three Children In South India - A Cross Sectional Study

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Abstract:

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 in countries but also can advance the progress of nations. Children under 3 years of age, an age which is nutritionally critical, 38% of children are stunted,18% wasted and 41% are underweight according to National Health and Family Welfare Survey 3 (NFHS-3). For such a great burden of malnutrition, particularly among children under three years of age there are very few studies done in India. Thus it becomes imperative that studies be carried out to gain a deeper understanding of the factors affecting the nutritional status of children. Keeping this in mind the present study is undertaken to determine the role of various factors influencing the nutritional status. **Objectives:** 1. To assess the nutritional status of children less than three years by anthropometric measurements. 2. To study association of nutritional status with age, gender, socio-economic status, infant feeding & child feeding practices in terms of timing of initiation of exclusive breastfeeding, timing of complementary feeding & timing of family diet.**Methodology:** A Cross-sectional study was conducted in the Field practice area of Department of Community Medicine. Two - Stage stratified, probability proportional to size sampling technique was used to select study sample. A total of 934 mothers of children aged less than three years were contacted in the present study, 893 mothers responded to the interview (91.6%). The non response rate was (8.4%). The data was entered and analyzed using Statistical Package for Social Sciences version 16. **Summary:** Among the study population, the prevalence of mild, moderate, severe and very severe underweight children were 103 (11.5%), 24(2.8%), 2 (0.2%) and 3 (0.3%) respectively. The data shows that male and female children had equal distribution of malnutrition. Among the study population, the prevalence of stunting, wasting and stunting & wasting was 28.1%, 16.1% and 7.7% respectively. Two forty three (52.3%) of male children had malnutrition as compared to 221(51.6%) of female children. The higher prevalence of malnutrition was observed among children belonging to lower socio-economic status, born with low birth weight, who had faulty initiation of breast feeds, complementary feeds and family diet

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Introduction:

"We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer "Tomorrow". His name is "Today". *Gabriela Mistral, 1948*[1]

Adequate nutrition is essential for children's health and development. Globally it is estimated that under nutrition is responsible, directly or indirectly, for at least 35% of deaths in children less than five years of age. Under nutrition is also a major cause of disability preventing children who survive from reaching their full development potential. An estimated 32% or 186 million, children below five years of age in developing countries are stunted and about 10% or 55 million are wasted. Unless massive improvements in child nutrition are made, it will be difficult to achieve MDG 1 and 4 by 2015. [2]

Under nutrition jeopardizes children's survival, health, growth and development, and it slows down national progress towards development goals. Under nutrition is often an invisible problem. [2]

There is a critical window of opportunity to prevent under nutrition by taking care of the nutrition of children in the first two years of life, girls during adolescence, and mothers during pregnancy and lactation – when proven nutrition interventions offer children the best chance to survive and reach optimal growth and development. Detrimental and often undetected until severe, under nutrition undermines

the survival, growth and development of children and women, and diminishes the strength and capacity of nations. With persistently high levels of under nutrition, vital opportunities to save millions of lives are being lost, and many more millions of children are not growing and developing to their full potential. Nutrition is a core pillar of human development and concrete, large-scale programming not only can reduce the burden of under nutrition and deprivation in countries but also can advance the progress of nations. [3]

In India the prevalence of under nutrition is the highest in Madhya Pradesh (55%), followed by Bihar (54%), Orissa (54%), Uttar Pradesh (52%) and Rajasthan (51%), while Karnataka (41%), Kerala (37%) and Tamil Nadu (27%) have lower rates.[4]

Children under 3 years of age , an age which is nutritionally critical, 38% of children are stunted,18% wasted and 41% are underweight according to National Health and Family Welfare Survey 3 (NFHS-3) .[4]For such a great burden of malnutrition, particularly among children under three years of age there are very few studies done in India.

Thus it becomes imperative that studies be carried out to gain a deeper understanding of the factors affecting the nutritional status of children. Keeping this in mind the present study is undertaken to determine the role of various factors influencing the nutritional status. Also this will help in bridging the gaps in existing literature related to factors affecting the nutritional status of the children under three years of age in our field practice area.

Objectives:

1. To assess the nutritional status of children less than three years by anthropometric measurements.

2. To study association of nutritional status with age, gender, socio-economic status, infant feeding & child

feeding practices in terms of timing of initiation of exclusive breastfeeding, timing of complementary feeding & timing of family diet.

Methodology:

A Cross-sectional study was conducted in the Field practice area of Department of Community Medicine. Two - Stage stratified, probability proportional to size sampling technique was used to select study sample. A total of 934 mothers of children aged less than three years were contacted in the present study, 893 mothers responded to the interview (91.6%). The non response rate was (8.4%). All the children less than three years of age residing on the day of data collection at their homes were taken as study population. Mothers were interviewed using a pre-designed questionnaire by personal face to face interview during house to house visit. If the mother of the child was not available, the home was revisited twice. If the respondent was not available even on the third visit they were considered as non-responsive. If the mothers were working ladies the homes were visited on days of their availability at homes.

Weight was measured using the digital weighing machine. Height was measured by using infantometer /measuring tape. Socio-economic status was assessed by modified Uday-Parikh scale. The data was entered and analyzed using Statistical Package for Social Sciences version 16.

Results:

A total of 893 children were studied, of which 52.1% were males and 47.9% were females. Of the total study population, majority were Hindus (82.3%), followed by Muslims (14.2%) and Christians (3.5%). About 5% of the parents were illiterates while 62% of the parents had schooling between 5th grade and 10th grade. Fifteen percent of the parents had completed graduation or post graduation. The literacy rate among mothers of the study subjects was 95%, Fathers had a literacy rate of 95%. Among the mothers, 87.6 % were house-wives and 12.4% of the mothers worked outside the home. Majority of the fathers 35.4 % are semi-skilled workers.

Table 1 : Distribution of nutritional status of the children assessed by Indian Academy Of Paediatrics (IAP) ClassificationAmong the study population, the prevalence of mild, moderate, severe and very severe underweight children were 103 (11.5%), 24(2.8%) , 2 (0.2%) and 3 (0.3%) respectively. The table shows that male and female children had equal distribution of malnutrition. So, there is no gender bias among the children in this community.

The proportion of children under three years of age who are underweight in the present study (14.8%) is lower than that was revealed in National Family Health Survey (NFHS-3) (41%).[4] The present study showed that the prevalence of underweight children among boys and girls was 15.3% and 14.3% respectively and is much lower than reported by Rehman et al [5] (43% boys and 39% girls).

Nutritional status	Males N= 465	Females N = 428	Total N= 893
	No (%)	**No (%)**	**No (%)**
Normal	394 (84.7%)	367 (85.7%)	761 (85.2%)
Mild	53 (11.4%)	50 (11.7%)	103 (11.5%)
Moderate	16 (3.5%)	8 (1.9%)	24 (2.8%)
Severe	0 (0%)	2 (0.5%)	2 (0.2%)
Very severe	2 (0.4%)	1 (0.2%)	3 (0.3%)
Total	465 (100%)	428 (100%)	893 (100%)

Table-2: Distribution of children according to nutritional status assessed by Waterlows Classification

Nutritional Status	Males N= 465	Females N = 428	Total N= 893
	No (%)	**No (%)**	**No (%)**
Normal	222 (47.7%)	207 (48.4%)	429 (48.0%)
Stunted	137 (29.5%)	114 (26.6.%)	251 (28.1%)
Wasted	68 (14.6%)	76 (17.8%)	144 (16.1%)
Stunted &Wasted	38(8.2%)	31(7.2%)	69 (7.7%)
Total	465 (100)	428 (100)	893 (100)

According to Waterlow's classification the proportion of children having malnutrition was 52.0%. Among the study population, the prevalence of stunting, wasting and stunting & wasting was found to be 28.1%, 16.1% and 7.7% respectively. The above table shows that 52.3% of male children had malnutrition as compared to 51.6% of female children.

Our study shows that the prevalence of stunting (28.1%) and wasting (16.1%) is lower in comparison with NFHS 3 data (stunting and wasting are 38% & 18% respectively). [4]

The total prevalence of malnutrition in present study is lower (52%) when compared to the study done in Sudan[7] which was reported it as 73.3%.

In a cross-sectional nutritional survey [8] of 0-3 years children done in Tamil Nadu State of India, with a representative sample of 2039 children, the prevalence of stunting of 27.6% was consistent with our findings(28.1%) .

Table-3: Age wise distribution according to nutritional status

Age group	**Wasted N = 144**	**Stunted N= 251**	**Stunted & wasted N = 69**	**Normal N = 429**	**Total** N= 893
	No (%)	**No (%)**	**No (%)**	**No (%)**	**No (%)**
0-6	53 (32.7)	16 (9.9)	5 (3.1)	88 (54.3)	162 (18.1)
7-12	32(22.7)	13(9.2)	2(1.4)	94(66.7)	141(15.8)
13-18	19(12.0)	44(27.8)	16(10.1)	79(50.0)	158(17.7)
19-24	11(6.1)	69(38.5)	22(12.3)	77(43.0)	179(20.0)
25-30	16(11.5)	56(40.3)	14(10.1)	53(38.1)	139(15.6)
31-36	13(11.4)	53(46.5)	10(8.8%)	38(33.3)	114(12.8)
Total	144(16.1)	251(28.1)	69 (7.7)	429(48.0)	893(100)

$\chi 2 = 152.06$, p value < 0.001

In the study population, children who are wasted were mostly infants. Among the stunted group majority of children were in the age groups of 1-3 years. Simultaneous presence of stunting and wasting was high among children aged 19-24 months as compared to the other groups. This association was found to be statistically significant ($p < 0.001$).

Our study revealed that prevalence of stunting increased with increasing age in the age group of of children 1-3 years and similar findings were reported in studies conducted in Rajasthan,[8] TamilNadu[6] and Andhrapradesh.[9]

Table 4 : Distribution of nutritional status of children according to Socio- Economic Status

Socio-economic Status	**Wasted N= 144**	**Stunted N= 251**	**Wasted &Stunted N= 69**	**Normal N= 658**	**Total N = 893**
	No (%)	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Low	53 (17.7)	94 (31.4)	28 (9.4)	24 (41.5)	299 (100)
Middle & High	91 (15.3)	157 (26.4)	41 (6.9)	305 (51.3)	594 (100)
Total	144 (16.1)	251 (28.1)	69 (7.7)	329 (48)	893 (100)

$\chi 2 = 8.086$, p value = 0.044

This study showed the prevalence of malnutrition in the form of wasting among children of low and middle & high socio-economic status was found to be 17.7% and 15.3% respectively and this difference is statistically significant (p= 0.044).

The proportion of children suffering from stunting among low and middle & high socio-economic status was found to be 31.4 % and 26.4 % respectively.

Also the prevalence of stunting & wasting was found to be 9.4% and 6.9% in low and middle & high socio-economic status group of children.

Our study revealed that children belonging to low socio-economic status were more malnourished in contrast to study done by dinesh kumar and others[10] which revealed that children of middle socio-economic status were more malnourished.

The malnutrition gradient seen across the socio economic levels in the present study is similar to the findings of the study conducted in Uttar Pradesh[11]

Initiation of Breast feeding	**Wasted N= 144**	**Stunted N= 251**	**Wasted & Stunted N= 69**	**Normal N= 429**	**Total N=893**
	No (%)	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Appropriate	50 (15.3)	97 (29.8)	21 (6.4)	158 (48.5)	326 (100)
Delayed	94 (16.6)	154 (27.2)	48 (8.5)	271 (47.8)	567 (100)
Total	144 (16.1)	251 (28.1)	69 (7.7)	429(48.0)	893 (100)

Table-5: Distribution of nutritional status of children according to timing of initiation of Breast feeding

$\chi 2 = 1.810$, p value = 0.613

In the present study the percentage of mothers who initiated breastfeeding at appropriate time were 36.5%. The study conducted in Rural Bangalore demonstrated that 44% of mothers initiated breastfeeding within half an hour after birth[12]. Mallikharjuna Rao K and others reported that majority of the mothers initiated breast-feeding on the third day of the delivery.[8]

Table-6: Distribution Of nutritional status of children according to timing of initiation of complementary feeding

Fischer's exact= 4.731 , p value = 0.538

Initiation of complementary feeding	Wasted N= 110	Stunted N= 239	Wasted & Stunted N= 67	Normal N= 378	Total N= 794
	No (%)	**No (%)**	**No (%)**	**No (%)**	**No (%)**
< 6 months	69 (13.9)	141 (28.4)	39 (7.9)	247 (49.8)	496 (100)
6 months	1 (11.1)	2 (22.2)	0 (0)	6 (66.7)	9 (100)
>6 months	40 (13.8)	96 (33.2)	28 (9.7)	125 (43.3)	289 (100)
Total	110 (13.9)	239 (30.1)	67 (8.4)	378 (47.6)	794 (100)

In this analysis children who were not initiated on complementary feeds were excluded. The proportion of children initiated on complementary feeds age less than 6 months was 496 (62.4%) . Two hundred and eighty three (36.3%) children were initiated after the age of 6 months..

Benefits of weaning the children at the appropriate age of immediately after 6 months is reiterated by studies conducted in Jabalpur and in Calcutta [13],[14].

In our study in majority of cases (62.4%) complementary feeding was initiated among children less than 6 months of age .However in contrast in a study done in Rajasthan[8] most of the children (68%) in the age group of 13-18 months received complimentary feeding.

.Table-7: Distribution of nutritional status of children according to initiation of family diet

Initiation of family diet	**Wasted N= 56**	**Stunted N = 219**	**Stunted & Wasted N = 61**	**Normal N = 254**	**Total N= 590**
	No (%)	**No (%)**	**No (%)**	**No (%)**	**No (%)**
< 1 year	22(15.1)	45 (30.8)	14 (9.6)	65 (44.5)	146 (100)
1 year	7 (20.6)	15 (44.1)	2 (5.9)	10 (29.4)	34 (100)
> 1 year	27 (6.6)	159 (38.8)	45 (11)	179 (43.7)	410 (100)
Total	56 (5.9)	219 (37.1)	61 (10.3)	254 (43.1)	590 (100)

Fischer's exact= 16.741 , p value = 0.008

In this analysis children who were not initiated on family diet were excluded from analysis. This study noted that the prevalence of wasting among children who were initiated on family diet at age of less than 1 year was 15.1% , at 1 year 20.6% and more than 1 year of age 6.6% . The difference was statistically significant (p=0.008).

The percentage of stunting among children who were initiated on family diet at age of less than 1 year, at 1 year and more than 1 year of age observed were 30.8%, 44.1% and 38.8% respectively. The common practice to start family diet later than one year among majority (69.5%) of children was seen in our study area.

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