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Influence of socio economic status on grades of malnutrition

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Abstract
Rapid socio-economic transition leads to malnutrition. Those belonging to socio-economically backward groups especially, early childhood are nutritionally the most vulnerable segments of the population. Any nutritional insults during this period results into under or over nutrition.
Objective: To study the influence of Socio Economic Status (SES) on various grades of malnutrition.
Material and Method: Total of 200 preschool children, 100 each from rural and urban areas were randomly selected. Anthropometric measurements were taken using standard techniques.
Results: Comparatively rural children tend to show a high percentage of underweight (69%) than urban ones (53%). 25% of urban children had stunted growth where in the rural areas it was 45%. Of the total population, wasting was in the range 26-27%. The difference was highly significant ($p<0.001$).
Conclusion: It is obvious from the present study that children from the urban areas were well nourished in comparison with the rural ones.

Keywords: Anthropometric measurements, SES, Nutrition, Rural areas, Urban areas

1. Introduction
Good nutrition plays a prime role in physical, mental and emotional development of children as it is the most important aspect of socio-economic development. Early childhood is the most vulnerable phase of life because of rapid growth. Any nutritional insults during this period results into under or over nutrition [1, 2].
Children aged 1-5 years are generally called preschoolers and they represent about 12 percent of the general population in India. A large majority of these children live in rural and tribal areas and in urban slums. By virtue of their numbers, they are entitled to a large share of health and social services. Their development is in the interest of the total national development; therefore they need special attention. Unfortunately, pre-school children are comparatively less attended [3].
Growth and nutritional status of preschool children are useful and sensitive indicators for judging health of a community or a nation [4]. In the developing countries, 146 million children are underweight and more than half of them live in South East Asia. Out of this 146 million, 57 million live in India [5]. According to National Family Health Survey-3(2005-2006), in India, the percentage of children under 3 years who are stunted, wasted and underweight is 48%, 20% and 43% respectively and in Karnataka it is 38%, 18% and 41% respectively [6]. India is still among high infant mortality rate country (67 in the year 2002).
There are many causes of undernutrition and these are mainly lack of adequate intake of food, particularly so in the first three years when rapid growth occurs [7], improper child care [8], high prevalence of communicable diseases [9]. Due to this about 80% of children suffer from various grades of growth retardation [3]. Those belonging to socio-economically backward groups and the communities residing in drought affected rural areas are nutritionally the most vulnerable segments of the population.
Further, the country is passing through a phase of rapid socio-economic transition leading to over nutrition in certain segments of the population, especially in the urban communities. Changing lifestyles and dietary habits are contributing to increase in the prevalence of overweight/obesity among children and young adults exposing them to the risk of chronic degenerative disorders such as hypertension, Type 2 diabetes, coronary artery disease, stroke, cancers etc. in the later part of life. More over undernutrition during early childhood can lead to overweight/obesity in adulthood, a risk factor for diet related chronic diseases [10].

The need for this study is to re-assess the findings of earlier similar studies which mostly showed that there is a significant difference in nutritional status of urban and rural preschool children.

The objectives of the study are:

1. To assess the grades of malnutriton of preschool children aged 2-5 yrs in Udupi District.
2. To compare the grades of malnutrition between rural and the urban subjects.
3. To compare the grades of malnutrition on different socio economic status of study areas and
4. To compare the grades of malnutrition between boys and girls preschoolers.

2. Material and Method

It is a community based cross-sectional study.

2a. Sampling Method: Random sampling method has been used in this study. 200 preschool children aged 2-5 years, 100 each from rural Anganwadi centres and the urban playschools were randomly selected. Data in the rural areas were collected from the Anganwadi teachers and the mothers and in the urban areas from the playschool incharge and the mothers. A questionnaire was developed to elicit the demographic details including educational status and occupation of the parents, income and attendance.

2b. Anthropometric measurements: The children were weighed using portable spring balance to the nearest 500g. Height was measured using a non stretchable tape and reading was noted to the nearest 0.1cm. The obtained values were compared with World Health Organisation (WHO) recommended standards [11] and the nutritional status was assessed according to Gomez [12] and Waterlow's classification [13] by finding percentage of median.

Table 1a: Gomez classification of Grades of Malnutrition

Gomez Classification for weight for age	
>90%	Normal
75-90%	Mild underweight
60-75%	Moderate underweight
<60%	Severe underweight

Table 1b: Waterlow's classification of Grades of Malnutrition

Waterlow's Classification for height for age	
>95%	Normal
90-95%	Mild stunting
85-90%	Moderate stunting
<85%	Severe stunting

Waterlow's Classification for weight for height	
>90%	Normal
80-90%	Mild wasting
70-80%	Moderate wasting
<70%	Severe wasting

2c. Statistical Analysis of data: The individual data obtained were made into data sheet for easy access of information. It was tabulated in excel 2007 version. Mean, Standard Deviation and percentage were calculated. Chi square was applied to describe the relationship and significance among variables of the study.

3. Results and Discussion

Growth and nutritional status of preschool children are useful and sensitive indicators for judging health of a community or a nation [4]. According to National Family Health Survey-3 (NFHS- 3) there is a significant difference in nutritional status between urban and rural children. In rural areas, half of young children are stunted, almost half are underweight and one out of every five is wasted. Although nutritional deficiencies are lower in urban areas than in rural areas, the occurrence of undernutrition in urban areas is widespread. In urban areas, 40 percent of young children are stunted, one-third are underweight and 17 percent are wasted. Children in rural areas are almost 40 percent more likely to be underweight than children in urban areas. The prevalence of stunting is 28 percent higher in rural areas than in urban areas [6].

As per Gomez classification for weight for age, majority of study population were underweight in rural areas as compared to urban areas. It is obvious from the table 3, that 69% of them were underweight in rural areas, of which 64% were mild underweight and 5% moderately underweight. 53% were underweight in urban areas, all belonging to mild underweight category. The differences between the two were statistically significant. The prevalence of stunting in the subjects of two areas as per Waterlow's classification for height for age is also presented in the table. The prevalence of stunting was 45% in rural areas with 34%, 10% and 1% belonging to mild, moderate and severe wasting categories. In urban areas, 25% were found to be stunted of which 23% were mildly stunted and 2% moderately stunted. The difference was highly significant. As per Waterlow's classification for weight for height, 28% and 26% of rural and urban children of the total population were wasted of whom 25-27% were mildly wasted and 1% of them were moderately and severely wasted. There was no significant difference.

Table 3: Classification of Grades of Malnutrition of the participants:

Variables	Grades of underweight -weight for age				Chi-square
	Normal %(n)	Mild %(n)	Moderate%(n)	Severe	
RURAL	31 (31)	64 (64)	5 (5)	-----	0.009**
URBAN	47 (47)	53 (53)	0		
Grades of Stunting -height for age					
RURAL	55 (55)	34 (34)	10 (10)	1 (1)	0.009**
URBAN	75 (75)	23 (23)	2 (2)	0	
Grades of wasting -weight for height					
RURAL	72 (72)	27 (27)	1 (1)	-----	0.949^{NS}
URBAN	74 (74)	25 (25)	1 (1)		

**P<0.01, NS-Not significant

Protein Energy Mal-nutrition (PEM) prevailing among pre-school children is another problem for the country. Kwashiorkor and Marasmus are the two main clinical forms of severe protein and energy deficiency respectively. Due to this about 80% of children suffer from various grades of growth retardation [3]. Those belonging to socio-economically backward groups and the communities residing in drought affected rural areas are nutritionally the most vulnerable segments of the population.

A perusal of table 4 presents the grades of malnutrition among low and middle economic status. In lower socio-economic group, 76 %, 57% and 31% and in middle socio-economic group, 53%, 25% and 25% children were underweight, stunted and wasted respectively. The influence of socio-economic status was highly significant for weight for age, extremely significant on height for age and not significant for weight for height. Since there were no children belonging to low income group in urban areas, the comparison between the areas was done only with the middle income groups. The results did not show any level of significance. Since majority of subjects in rural areas belonged to low socio-economic group, the low nutritional status is justified.

Table 4: Classification of grades of malnutrition Vs. socio-economic status

Variables	G(rades	SOCIO-ECONOMIC STATUS		Chi square
		Low Income %(n)	Middle income %(n)	P value
Weight For Age	Normal	23(15)	47(63)	
	Mild underweight	71 (46)	53(71)	
	Moderate underweight	6 (4)	1(1)	0.001**
Height For Age	Normal	43 (28)	75(101)	
	Mild stunting	45(29)	21(29)	
	Moderate stunting	11(7)	4(5)	
	Severe stunting	1(1)	0	0.0001***
Weight For Height	Normal	69(45)	75(101)	
	Mild wasting	31(20)	24(32)	
	Moderate wasting	0	2(2)	0.369^{NS}

**p<0.001- highly significant, ***p<0.0001- extremely significant, NS- not significant

Nutritional problems are substantial in every state in India (NFHS-3). Although nutritional deficiencies are lower in urban areas than in rural areas, the occurrence of undernutrition in urban areas among middle income group is widespread [6]. Perusal of table 5 presents the grades of malnutrition among middle income group of study areas. 51-62% are mild underweight on weight for age in both the areas. Height for age and weight for height had almost 74-75% of normal subjects with mild stunting and wasting ranging from 17-25% with a few percentage of moderate categories. The association between the grades of malnutrition and different variables were not statistically significant.

Table 5: Classification of grades of malnutrition Vs. middle income of study areas

Variables	Grade	RURAL n=35	URBAN n=100	Chi-square
		MIDDLE INCOME %(n)		P VALUE
WEIGHT FOR AGE	Normal	46(16)	3(38)	
	Mild underweight	51(18)	62(62)	
	Moderate underweight	3(1)	0(0)	0.155^{NS}
HEIGHT FOR AGE	Normal	74(26)	75(75)	
	Mild stunting	17(6)	23(23)	
	Moderate stunting	9(3)	2(2)	0.179^{NS}
WEIGHT FOR HEIGHT	Normal	74(27)	74(74)	
	Mild wasting	20(7)	25(25)	
	Moderate wasting	2.85(1)	1(1)	0.655^{NS}

NS- not significant

In Udupi District, out of the total population of 11.12 lakhs, rural population was 9.06 lakhs (82%) and urban population was 2.06 lakhs (18%). According to 2011 census, there were a total of 1,00,579 children under the age of 6yrs. They form 9% of the total population of Udupi district. Of them, rural and urban preschool children were 72,508 and 28,071 respectively [14].

Table 6 shows that 68% of rural girls were found to be underweight, whereas it was only 42% in urban girls. The difference is statistically significant. While 36% of rural girls were stunted, the percentage of urban girls who were stunted was only 21%. The difference was highly significant. But wasting in rural and urban girls was 28% and 23% respectively and no statistical difference was observed. Both boys and girls of the urban areas proved to be well nourished than the rural ones. Percentage of boys who were underweight was 70% in rural and 63% in urban areas. Stunting was 55% in rural boys and 29% in urban ones. 28% rural and 29% of urban boys were wasted. The difference was not statistically significant.

WHO has published multicentre growth reference standards for 0-60 month aged boys and girls in 2006 [12]. The median weights and heights of preschool children can be taken as reference values for Indian children also.

It is very obvious that 50% of the girls were mildly underweight in contrast with boys (60%) and an appreciable percentage of normal subjects under the variable of weight for age. 38% Mild stunting was extremely high among boys (38%) wherein the girls with only 18%. With this as the reference the 72% girls and 58% of boys were normal. Very alarming to know that girls shared an equal percentage i.e., each with 19% both for mild and moderate stunting on height for age. The variable weight for height had an extremely high percentage of normal subjects (72-76%). were Thus the overall prevalence of malnutrition was found to be more in boys when compared to girls. However, the difference was non-significant for weight for age, extremely significant for height for age and non significant for weight for height.

Table 6: Grades of weight and height for age and weight for height of the participants (Girls and Boys)

Variables	Grade	Girls (n=95)	Boys (n=105)	Chi square / P Value
WEIGHT FOR AGE	Normal	44(42)	34(36)	0.070^{NS}
	Mild underweight	51(48)	65(69)	
	Moderate underweight	4(4)	1(1)	
HEIGHT FOR AGE	Normal	72(68)	58(61)	0.0001***
	Mild stunting	19(18)	38(40)	
	Moderate stunting	19(18)	4(4)	
	Severe stunting	1(1)	0	
WEIGHT FOR HEIGHT	Normal	72(70)	72(76)	0.171^{NS}
	Mild wasting	23(22)	29(30)	
	Moderate wasting	2(2)	0	

P<0.0001- extremely significant, NS- not significant

4. Conclusion

Prevalence of underweight, stunting and wasting were more in rural preschool children when compared to urban ones. 69%, 45% and 27% of rural children and 53%, 25% and 26% of urban children were underweight, stunted and wasted respectively. It was observed that prevalence of malnutrition was more in low socio-economic group compared to middle socio-economic group. Among the middle income groups of rural and urban areas, it was found that there was no significant difference. The prevalence of malnutrition was found to be more among boys when compared to girls. Urban girls were well nourished than the rural girls and urban boys were well nourished than the rural ones.

The study strongly favours a food based approach and will serve as an effective strategy to correct deficiencies, improve the general nutritional status and promote health and wellbeing of children. Thus from the present study it can be concluded that both rural and urban preschool children suffer from undernutrition in any form, be it underweight, stunting or wasting. The urban preschool children were well nourished in comparison to rural preschool children.

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