A STUDY ON THE PREVALENCE AND PATTERN OF MALNUTRITION AMONG CHILDREN UNDER 5 YEARS IN CHENNAI

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ABSTRACT

Malnutrition among under five children is a major public health problem. To estimate the prevalence and pattern of malnutrition among under-five children using the WHO Z- score system. This cross-sectional community-based survey was conducted among the beneficiaries of an Anganwadi centre in an urban slum of Egmore, Chennai. Background information, weight and length/ height of the children were obtained. The WHO Anthro software (version 3.2.2) was used to calculate the Z scores for underweight, stunting, wasting and overweight. A total of 357 children aged one month to 5 years were enrolled in this study. The overall prevalence of underweight, stunting and wasting was found to be 19.9% (95% CI 15.9-24.4), 17.1% (95% CI 13.3- 21.4) and 21.6% (95% CI 17.4 -26.2) respectively. The prevalence of underweight and wasting in the present study increased with increasing age (p < 0.05). The difference in the prevalence of under nutrition among male and female children was small and this difference was not found to be statistically significant (p > 0.05). The overall prevalence of overweight children was found to be 1.4%.The prevalence of under nutrition was found to be high among the urban under privileged children in Chennai. This, once again, reinforces the fact that under nutrition in children continues to be a major public health problem in our country and every effort should be taken to prevent under nutrition and its long term consequences.

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INTRODUCTION

Malnutrition among under five children is a major public health problem. India is one of the countries with the highest burden of under nutrition among children and this is nearly double that of Sub-Saharan Africa [1]. In India, a good part of the total growth-faltering occurs during pregnancy, which is evidenced by the fact that 30 % of babies are born with a low birth weight, and this damage continues during the first two years of life [2]. This crucial 1000 day period between pregnancy and the first two years of life is the called the "window of opportunity" and all efforts to fight under nutrition need to focus on this age group [3].It has been estimated that nearly half of all child deaths are associated with under nutrition [4]Globally, 5.9 million children under the age of 5 years died in 2015. About 45% of all child deaths are linked to under nutrition [5], [6]. The United Nations has adopted the Millennium Development goals (MDG) which aimed to halve childhood malnutrition indicators between 1990 and 2015 but malnutrition still contributes to significant morbidity and mortality among preschool children [7]. The government of India has initiated several national nutritional programs like the Integrated Child Development Services (ICDS), National Nutritional Anemia Prophylaxis program and National vitamin A prophylaxis program to combat this problem [8]. Evidence based interventions to address under nutrition are breastfeeding promotion, appropriate complementary feeding, immunization, supplementation with vitamin A and zinc and following good household water, sanitation and hygiene practices [9].There have been several attempts made at classifying malnutrition [10]. The current recommendation is to use the WHO child growth standards 2006 [11]. This allows us to measure all the above three indices in terms of Z scores or standard deviation units from the median of the international reference population.The term "malnutrition" refers to both under and over nutrition. Simultaneously, there are a small, but an increasing proportion of overweight children. They are at a greater risk for non-communicable diseases such as adult obesity, diabetes and hypertension later in life [12]. So, given the serious consequences of malnutrition and paucity of studies which investigate its rate among the poorer sections of the Chennai city, we conducted the present study to estimate the prevalence and pattern of malnutrition among the under five children using the WHO Z score system.

MATERIALS AND METHODS

This cross sectional community based survey was conducted during the January to March 2015 among the beneficiaries of an Anganwadi centre in an urban slum of Egmore, Chennai. The sample size of 357 children was calculated based on the 32.5% prevalence of under nutrition among under five children in Tamil Nadu as reported by the DLHS 4 survey[13]. The parents / guardian were informed about the study and their consent was obtained. Inclusion criteria were healthy children aged 0–5 years. Children who had metabolic disorders, congenital anomalies and any chronic diseases were excluded from the study. Two types of instruments were used for the study namely a prestructured questionnaire and anthropometric measurements including weight and height of the child. Weight was measured using a digital weighing scale (Omron) with 0.10 kg accuracy after removing heavy clothing, footwear and other accessories. The length was measured with an infantometer, the height with portable stadiometer with 0.10 cm accuracy. The three anthropometric measures calculated from these measurements were weight for age, height for age and weight for height using the WHO child growth standards 2006 [14]. Children whose weight-for-age, height-for-age and weight for height was 2 Z scores below the median of the WHO growth standards were classified as underweight, stunted and wasted respectively. Children with measurements below 3 Z scores were classified as severely undernourished. Children whose weight-for-age was 2 Z scores above the median of the WHO growth standards were classified as overweight. The WHO Anthro software (version 3.2.2) was used to calculate the Z scores for underweight, stunting, wasting and overweight.

STATISTICAL ANALYSIS

Data analysis was done with Statistical Package for Social Sciences (SPSS) version 16 software. Prevalence of malnutrition and 95% confidence interval were calculated. Chi-square test and p values were estimated to find out the associated risk factors for under nutrition. A p value of < 0.05 was considered as statistically significant.

RESULTS

A total of 357 children aged one month to 5 years were enrolled into this study. One hundred and eighty eight (52.7 %) were males while 169 (47.3 %) were females. The mean age of the children was 38.13 months (SD 14.41). The prevalence of underweight was found to be 19.9% with the 95% confidence interval from 15.9 to 24.4. The prevalence of stunting was found to be 17.1% with the 95% confidence interval of 13.3 to 21.4. The prevalence of wasting was found to be 21.6% with the 95% confidence interval of 17.4 to 26.2. The prevalence of under nutrition is given in Table 1.

Table 1
Prevalence of under nutrition

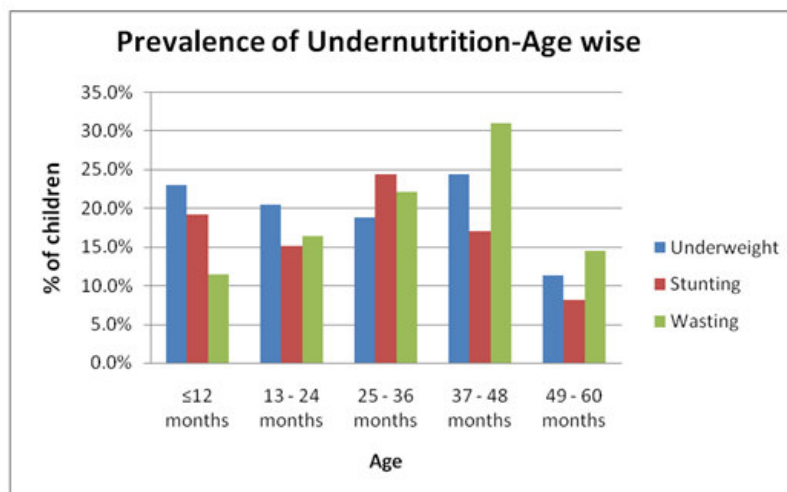|	Weight-for-age	Height-for-age	Weight-for-height
	n (%)	n (%)	n (%)
Normal	286 (80.1%)	296 (82.9%)	280 (78.4%)
Malnutrition	71 (19.9%)	61 (17.1%)	77 (21.6%)
Total	357	357	357

Figure 1
Prevalence of under nutrition – Age wise

Table 2
Prevalence Of Under nutrition -Gender wise

	Underweight	Stunting	Wasting	Chi-square test
	n (%)	n (%)	n (%)	p value
Male (n=188)	38 (20.2%)	30 (16.0%)	41 (21.8%)	$\chi2=0.30$ p=0.85
Female (n=169)	33 (19.5%)	31 (18.3%)	36 (21.3%)	

The difference in the prevalence of under nutrition among male and female children was small and this difference was not found to be statistically significant (p = 0.85). This is given in Table 2.

Table 3
The prevalence rate of underweight, wasting and stunting by age groups and sex among children under five years of age (n=357)

Characteristic	Children	Under nutrition					
		Underweight		Wasting		Stunting	
		% < - 2 to < -3SD	% < - 3 SD	% < - 2 to < -3SD	% < - 3 SD	% < - 2 to < -3SD	% < - 3 SD
Age							
≤12 months		5 (19.2)	1 (3.8)	3 (11.5)	0	3 (11.5)	2 (7.7)
13 - 24 months	73	10 (13.7)	5 (6.8)	7 (9.6)	5 (6.8)	8 (11.0)	3 (4.1)
25 - 36 months	90	12 (13.3)	5 (5.6)	8 (8.9)	12 (13.3)	17 (18.9%)	5 (5.6)
37 - 48 months	106	16 (15)	10 (9.4)	15 (14.2)	18 (17.0)	14 (13.2)	4 (3.8)
49 - 60 months	62	5 (8)	2 (3.2)	7 (11.3)	2 (3.2)	3 (4.8)	2 (3.2)
		$\chi2=23.82$	p=0.02	$\chi2=34.49$	p=0.001	$\chi2=8.43$	p=0.39
Sex							
Boys	188	26 (13.8)	12 (6.4)	18 (9.6)	23 (12.2)	21(11.2)	9 (4.8)
Girls	169	23 (13.6)	10 (5.9)	22 (13)	14 (8.3)	24 (14.2)	7 (4.1)
		$\chi2=2.86$	p=0.41	$\chi2=2.91$	p=0.71	$\chi2=0.79$	p=0.67

Children in the age group of 37 to 48 months had the highest prevalence of underweight to the extent of 24.4%. The difference in the prevalence of under nutrition in the different age groups was found to be statistically significant (p=0.02). The children in the age group of 37 to 48 months had the highest prevalence of wasting to the extent of 31.2%. The difference in the prevalence of wasting in the different age groups was found to be statistically significant (p= 0.001). The difference in the prevalence of shunting among different age groups was small and this was not found to be statistically significant (p=0.39). Details are given in Table 3.

Table 4
Prevalence of Overweight – Age & Gender Wise

Age	Children	Over weight/ obese
≤12 months	26	1 (3.8%)
13 - 24 months	73	1 (1.4%)
25 - 36 months	90	1 (1.1%)
37 - 48 months	106	0
49 - 60 months	62	2 (3.2%)
Sex		
Boys	188	2 (1.0%)
Girls	169	3 (1.8%)

Out of 357 children who were included in the study we found that 5 of them were overweight. The overall prevalence of overweight is 1.4%. The prevalence of overweight in the different age groups and sex distribution is given in Table 4

DISCUSSION

This study is aimed at determining the prevalence and pattern of malnutrition among under 5 children using the WHO Z-score system. The three most commonly used anthropometric indicators of under nutrition are stunting, wasting and underweight. Stunting (low height-for-age) is an indicator of chronic under nutrition due to prolonged food deprivation and /or illness. Wasting (low weight for height) is an indicator of acute under nutrition, the result of more recent food deprivation and/or illness. Underweight (low weight-for-age) is used as a composite measure that reflects both acute and chronic under nutrition [15]. The overall prevalence of underweight, stunting and wasting was found to be 19.9%, 17.1% and 21.6% respectively. The 95% confidence interval for the prevalence of under nutrition is quite precise for all the three parameters indicating good internal validity for the study. There are a few studies done on the prevalence of under nutrition in young children from different parts of India and outside of India. A study done in the Chittoor district of Andhra Pradesh by Venkatashiva et al reported the prevalence of underweight, wasting, and stunting among under-five children as 32.7%, 18.3% and 38.3% respectively [16]. Manujunath et al found a higher prevalence of underweight, stunting and wasting at 60.4 %, 55.4% and 43% respectively among the tribal children of Kadukuruba, Karnataka [17]. A study done by Sanjeev Davey et al reported 57.8% as the prevalence of under nutrition among children in a rural area of Delhi [18]. The study done in Iran by Elham Kavosi et al reported a lower prevalence of underweight, stunting and wasting at 9.66, 9.53 and 8.19% respectively [19]. The National Family Health survey (NFHS)-4, 2015-16 data showed that in the Tamil Nadu state the rates of under nutrition for children younger than five years of age were 28 % for wasting, 27 % for stunting and 33 % for underweight [20]. Globally, the prevalence of stunting, underweight and wasting in children under-five years are 26, 16, and 8%, respectively. The similar figures for

Asia are 26.8, 19.3, and 10.1%, respectively [21]. The prevalence of underweight and wasting in the present study showed that it increased with increasing age (p < 0.05) and this is in concurrence with a study done Shreyaswi et al in a rural community in Mangalore [22]. Bhutiaet al. reported a higher prevalence of under nutrition among girls than among boys [23]. In our study, we found the difference in the prevalence of under nutrition among male and female children was small and this difference was not found to be statistically significant. The overall prevalence of overweight children in the present study was found to be 1.4%. A study done by Kumar et al reported the prevalence of overweight and obesity among pre-school children in semi-urban South India to be 4.5% and1.4% respectively [24]. The results of the study help us to know the burden of the disease in this part of the country.

CONCLUSION

The overall prevalence of underweight, stunting and wasting was found to be 19.9%, 17.1% and 21.6% respectively among the urban poor in Chennai. This, once again reinforces the fact that under nutrition in children continues to be a major public health problem in our country and every effort should be taken to prevent under nutrition and its long term consequences.. This calls for strengthening of the existing public health interventions and programs with a focus on socioeconomic development to tackle this problem of under nutrition amongst the most vulnerable population of our country. Again, more research on overweight and obesity and its etiological factors are needed to address malnutrition among under five children in our country.

CONFLICTS OF INTEREST

Conflict of interest declared none.

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