SHORT ARTICLE

Study of Nutritional Status and Identification of Associated Risk Factors in Children below Five Years of Age in an Urban Slum of Bhopal, Madhya Pradesh

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Citation

Article Cycle

Abstract

Background: Child malnutrition is a single large contributor to under-five mortality due to greater susceptibility to infections and slow recovery from illness. Prevalence of malnutrition is high in Madhya Pradesh as compared to other states of India. **Aims & Objectives:** The study was aimed to find the prevalence, and study the risk factors for malnutrition, in children under the age of five years, in an urban slum, and also recommend appropriate remedial measures. **Material and Methods:** A community-based, cross-sectional study was conducted on 93 children under the age of 5 years in an urban slum Pipaliya Pende Khan in Bhopal, Madhya Pradesh from August 2013 to October 2013. Anthropometric measurements like weight and height were recorded. They were also made to fill a pretested questionnaire. Descriptive statistical analysis was done. **Results:** The prevalence of stunting, underweight and wasting according to WHO Child Growth Standards, April 2006 was 62.6% (52.1%, 73.1%), 41.9%(31.4% , 52.5%) and 17.4% (9.1% , 25.7%) respectively. Stunting was associated with educational status of mother, more prevalent in children of less literate mother. Underweight was associated with both educational status of mother and type of toilet facility. Wasting was more prevalent in Muslim community and families with low socio-economic status. **Conclusions:** The study shows very high prevalence of the malnutrition, in the given community. The results also confirmed that education status of mother, type of toilet facility, religion and socio-economic status are some of the key determinants of nutritional status of children under the age of 5 years.

Key Words

Nutritional Status; Malnutrition; Risk Factor Children; Urban Slum.

Introduction

Malnutrition is not only a medical disorder; it is a social one as well, often linked to poverty. Malnutrition and poverty together lead to a downward vicious cycle propelled by an increased burden of disease, stunted development and reduced ability to work. Malnutrition literally means "bad nourishment". This includes under nutrition or protein-energy malnutrition, where the diet does not provide adequate calories and protein for growth and maintenance as well as secondary malnutrition i.e. unable to utilize fully the consumed food, for example due to diarrhoea or other illnesses. Consumption of too many calories (over nutrition) is also a part of malnutrition (1). However, in the present study the term malnutrition refers mainly to under nutrition. Malnutrition in children is not affected by food intake alone; it is also influenced by access to health services, quality of care for the child and pregnant mother as well as good hygiene practices.

Malnutrition in early childhood has serious, long-term consequences because it takes its toll on motor, sensory, cognitive, social and emotional development. Malnourished children are less likely to perform well in school and more likely to grow into malnourished adults, at greater risk of disease and early death (2). Malnutrition kills 4 million children every year globally, one child every 8 seconds. Beyond the age of 2 to 3 years, the effects of chronic malnutrition are irreversible. This means that to break the vicious cycle of poverty and malnutrition, intervention must be done during their first two years of life. Child malnutrition is the single biggest contributor to under-five mortality due to greater susceptibility to infections and slow recovery from illness (3).

Malnutrition is a public health problem in India. One in every three malnourished children in the world lives in India, where around 46 percent of all children below the age of three are stunted, 47 percent are underweight and at least 16 percent are wasted. Many of these children are severely malnourished. The malnutrition rates vary across states, with Madhya Pradesh recording the highest rate (55 percent) and Kerala among the lowest (27 percent) (4). It is estimated that two thirds of children in Madhya Pradesh are malnourished. In fact, prevalence of malnutrition in children under five is higher here in Madhya Pradesh than in most countries of sub-Saharan Africa (5).

In the light of the above fact, this study was carried out in 'Pipaliya Pende Khan', an urban slum in Bhopal city, to study the prevalence of malnutrition among under-five and its association with various socio-demographic risk-factors.

Aims & Objectives

1. To find the prevalence, and study the risk factors for malnutrition, in children under the age of five years, in an urban slum,
2. Recommend appropriate remedial measures.

Material and Methods

The present community based cross-sectional study was conducted in under-five children from an urban slum 'Pipaliya Pende Khan' in Bhopal, Madhya Pradesh. Study was conducted from August 2013 to December 2013.

Study subjects consisted of under-five children. The optimal sample size of 92 study subjects was calculated on the basis of

$$n = \frac{z^2 \times p(1-p)}{d^2}$$

Where, n = required sample size, z = confidence level at 95% (standard value of 1.96), p = estimated prevalence of malnutrition in the study area (taken to be 60%) and d= relative margin of error at 10%.

By systematic random sampling, 93 under-five children were included in the study. A house-to-house survey was done. All the houses were numbered and a sampling frame was made and after selecting a random number, every third house was visited. All under-five children in that house were included in the study. If a house did not have any under-five children, next house was selected. The houses were visited till desired sample size was obtained. Any child who was visiting the house was not included in the study. If assent from parent/caregiver of the child was not obtained, next house was approached. If the house was locked, a second visit was made to cover the children in that particular house and if not found, were excluded. Birth certificates issued by Government agencies were referred for confirmation of the date of birth.

Pretested questionnaire was used to collect the data. Personal profile of the child, his or her family, demographic profile and socio-economic status were recorded. It contained two sections, one for the information about the suspected risk factors and the other for the background information about the child. The former was with multiple choices and single best response. It was designed on the basis of 'Nutrition in India, NFHS-3. It was converted in the vernacular language. Randomly every 10th questionnaire was screened by mentor for quality control. Anthropometric measurements taken were weight, height as per the following technique.

Weight: The weight of the subjects was measured using spring balance to nearest 100 gm. There was no zero error. The readings were noted at eye level. Length or Height: For children less than 2 years of age, length was measured and for those more than 2 years of age, height was measured to nearest 0.1 cm.

Statistical Analysis: Data was entered in Microsoft Excel. The data was exported from Microsoft Excel to WHO Anthro and Epi-Info 7. Descriptive statistical analysis in terms of proportion and 95 % Confidence Interval was carried out for indicators of malnutrition including Height-for-age, Weight-for-age and Weight-for-height. Chi Square Test was applied to test the association between various demographic variables and indicators of malnutrition.

Intervention: Parents/caregivers were called to an Anganwadi Centre. They were made aware about the problem of children malnutrition and it's after effects. They were also educated for proper nutrition and care of the child. Special stress was laid on the importance of education of mother, precautions during pregnancy and proper breast feeding practices.

Ethics and Informed Consent: Well informed, written consent was taken from the parent/caregiver before taking the anthropometric measurements of the child. Confidentiality was maintained. The project was approved by Institutional Human Ethics Committee.

Results

Out of the 93 children sampled, (45.2%; 42) were males and rest (54.8%; 51) were females. Majority of them (76.3%; 71) being Hindus and the rest (23.7%; 22) being Muslims.

A total of 91 children had valid length or height measurements and age data to calculate height for age Z-scores. Over three-fifths (63%) had a low height-for-age (Z-score < -2 S.D; stunting) with more than a quarter (31%) in very low category (Z-score < -3 S.D; Severe stunting). Children had an overall mean height for age of -2.34 ± 1.50 which was lower than the international average of 0.00.

Table 1 shows risk factors associated with indicators of malnutrition. By application of Chi Square Test, association between education status of mother and stunting was found to statistically significant (p<0.05).

A total of 93 children had valid weight measurements and age data to calculate weight-for-age Z-scores. Over two-fifths (42%) had a low weight-for-age (Z-score <-2 S.D; underweight) with more than a one-tenth (14%) in very low category (Z-score < -3 S.D; Severe underweight). Children had an overall mean weight-for-age of -1.84 ± 1.32 which was lower than the international average of 0.00.

Association between education status of mother and underweight and type of toilet facility and underweight was found to statistically significant (p<0.05). (Table 1)

A total of 92 children had valid length or height and weight measurements to calculate weight-for-height Z-scores. Just less than one-fifths (17%) had a low weight-for-height (Z-score <-2 S.D; wasting) 4% in very low category (Z-score < -2 S.D; Severe wasting). Children had an overall mean weight-for-height of -

0.56 ± 1.57 which was lower than the international average of 0.00.

Association between religion and socioeconomic status, and wasting was found to statistically significant (p<0.05)

Discussion

The histograms for distribution of Z-scores for all the three indicators of malnutrition shows normal distribution with a shift to left which indicates that the population of the area is malnourished. Not only those individuals below the cut-off point who are at risk; the entire population is at risk, and the cut-off point should be used only to facilitate the application of the indicator. (6)

The prevalence of stunting was found to be 63% (CI: 52.1%-73.1%) which being more than 40% is considered very high (7). It is an indicator of chronic malnutrition. It reflects a process of failure to reach linear growth potential as a result of suboptimal health and/or nutritional conditions. The poor socioeconomic conditions and increased risk of frequent and early exposure to adverse conditions such as illness and/or inappropriate feeding practices has lead to the increase in the prevalence of stunting.

There is significant statistical association between the education status of mother and prevalence of stunting. Studies of Damoret *et al*, (8) (2013), Kriti *et al*, (9) (2013), Dilaramet *et al*, (10) (2013) and Bhuvanesh, (11) (2011) also show the same. The lower the literacy of mother more the child is prone to malnutrition. So, it is quite evident that for treating chronic malnutrition we will have to educate the mothers. This shows the need to promote female education to get out of the vicious cycle of malnutrition.

The prevalence of underweight was found to be 42% (CI: 31.4%-52.5%) which being more than 30% is considered to be very high (7). It is an indicator of both acute and chronic malnutrition.

The association between educational status of mother and prevalence of underweight was found which was quite expected, as, educational status of mother affects chronic malnutrition, it will be reflected in underweight, as it is an indicator of both acute and chronic malnutrition.

Association with type of toilet facility also is an important observation. It draws attention to the relation of sanitation to nutrition. Improved toilet facilities reduce the prevalence of malnutrition. So,

spreading awareness for better sanitation is the need of the hour. It will reduce malnutrition and at the same time decrease the prevalence of water-borne infections.

The prevalence of wasting was found to be 17% (CI: 9.1%-25.7%) which being more than 15% is considered to be very high (7). It is an indicator of acute malnutrition. So, it can be easily altered by a recent illness or disease. Therefore, it may even indicate the state of morbidity in the child population.

It is more prevalent in families with high socio-economic status. This suggests that unavailability of adequate nutrition due to financial limitations may not be always be true. This result is inconsistent with the following studies, Damor *et al*, (8) (2013), Kriti *et al*, (9) (2013), Bhuvanesh, (11) (2011), Tamoghna *et al*, (12) (2011), and Shubhada *et al*, (13) (2009). This was unable to show the importance of early initiation of breast feeding for the neonates, which was shown by Tamoghna *et al*, (12) (2011).

Conclusion

The study shows very high prevalence of the malnutrition, stunting (62.6%), underweight (41.9%) and wasting (17.4%) in the study population. It portrays the pitiful condition of the community requiring immediate interventions by the authorities. Awareness about the effects of malnutrition should be spread. The results also confirmed that education status of mother, type of toilet facility, religion, socio-economic status and breast feeding practices are some of the key determinants of nutritional status of under-five children. Community based awareness programmes regarding the above mentioned determinants should be launched.

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Tables

TABLE 1 RISK FACTORS ASSOCIATED WITH INDICATORS OF MALNUTRITION

Indicator of malnutrition	Category		Number	Prevalence (%) Z-score < -2 S.D	p-value
Height-for-Age	Educational status of mother	Fourth grade or less	21	85.7	0.041
		Fifth to tenth grade	60	55.0	
		More than tenth grade	12	66.7	
Weight-for-Age	Educational status of mother	Fourth grade or less	21	61.9	0.036
		Fifth to tenth grade	60	40.0	
		More than tenth grade	12	16.6	
	Type of toilet facility*	Improved	81	37.0	0.013

		Not improved	12	75.0	
Weight-for-Height	Religion	Hindu	71	11.3	0.002
		Muslim	22	40.9	
	Socioeconomic status**	BPL	50	22.0	0.047
		APL	7	57.1	

Figures

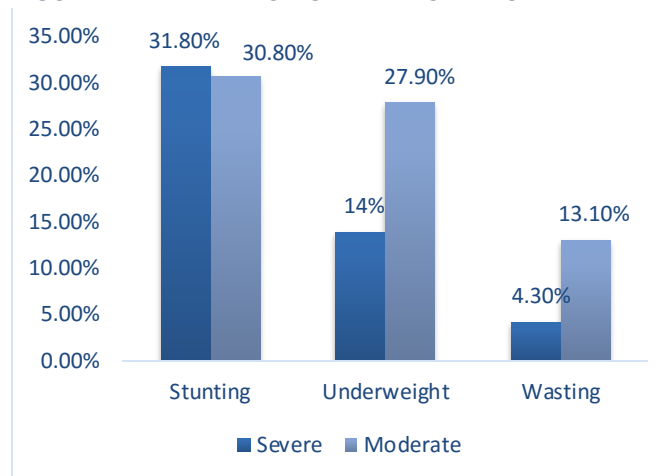### FIGURE 1 PREVALENCE OF MALNUTRITION

FIGURE 2 HISTOGRAMS FOR HEIGHT-FOR-AGE, WEIGHT-FOR-AGE AND WEIGHT-FOR-HEIGHT