ORIGINAL ARTICLE

Frequency and determinants of malnutrition in children aged between 6 to 59 months in district Tharparkar, a rural area of Sindh

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Abstract

Objective: To assess the nutritional status of children living in Tharparkar.

Methods: This cross-sectional study was conducted in four villages of Tharparkar district of Sindh, Pakistan, in 2014, and comprised children aged between 6 and 59 months. Data was collected from mothers and anthropometry of children was done using standard techniques. Nutritional status was assessed by using age- and sex-specific World Health Organisation standard charts for underweight, stunting and wasting. Data was analysed using SPSS 16.

Result: Of the 304 children assessed, 117(38.5%) were stunted, 58(19.1 %) were wasted and 101(33.2 %) were underweight with no gender discrimination. Under-nutrition was particularly observed in the second year of life. Statistically significant factors associated with stunting were illiteracy of mother, family size of >5 members, pregnancy>4 times, child mortality in last 6 months, absence of breastfeeding and no history of child vaccination($p<0.05$ each). Logistic regression revealed family size of $\leq$5 members, pregnancy ?4 times, breastfeeding and vaccination were protective factors for stunting ($p<0.05$ each). Mortality of a child in the last 6 months in the family was 3 times more likely to have a stunted child.

Conclusion: Stunting was the most common type of under-nutrition with no sex discrimination.

Keywords: Developing countries, Malnutrition, Risk factors. (JPMA 67: 1369; 2017)

Introduction

Nutrition plays a fundamental role in the socio-economic development of a country. It is therefore included as one of the essential components of millennium development goals (MDGs) and primary health care (PHC).[1] Malnutrition is a pathological condition resulting from deficiency of one or more nutrients and has a wide range of clinical manifestations.[2] Children are the most vulnerable group affected by malnutrition and therefore child growth is internationally recognised as an important indicator of nutritional status and health in populations.[3] According to a joint report of the United Nations Children's Fund (UNICEF), World Health Organisation (WHO), and World Bank, out of the 667 million under-five children worldwide, 250 million had malnutrition in 2014,159 million were stunted and 50 million were wasted.[4]

The burden of malnutrition is not evenly distributed among different countries of the world. More than half of world's malnourished children lived in South East Asia (India, Bangladesh and Pakistan) and it is therefore one of the major public health challenges in these countries.[4] In Pakistan, nearly 800,000 children died every year; 35 per cent of them, i.e. 280,000 deaths, occur due to malnutrition.[5] The risk of death is nine times higher for a child suffering from malnutrition compared to a child with a balanced diet.[6] As per the National Health Survey of Pakistan, one out of three children in the country is malnourished, of them 6.2-8.3 million (30-40%) have a low height for their age, i.e., stunting, and more than 2.9 million children (>14%) have low weight for their height, i.e. wasting.[7]

Recent drought in Pakistan has affected most of the areas of the country, with the Tharparkar district undergoing the most drastic changes. Tharparkar district is situated in Pakistan's southern Sindh province, facing a drought for the third consecutive year.[8] The present study was designed to assess the nutritional status of the children in Tharparkar.

Subjects and Methods

This cross-sectional study was conducted in the four villages of Tharparkar district of Sindh, Pakistan, in 2014, and comprised children aged between 6 and 59 months. Approval was obtained from the institutional review board of Hamdard University, Karachi. A list of four villages affected by malnutrition was collected from district headquarters (Tharparkar). Each village was

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considered a cluster and from each cluster, children within the study age range were selected in a randomised manner. Only one child from one family was selected and examined. Mothers of selected children were interviewed. Data was collected on a pre-designed, structured questionnaire on socio-economic status, breastfeeding, weaning and feeding practices of children.

Medical students received standardised education on anthropometric measurement technique at the beginning of the study. The children were measured with light-weight clothing. Children aged below 12 months were laid horizontally and measured by children's scale for weight with an exactness of 0.05 kilograms (kg), and tapeline for length with an exactness of 0.01 meters (m). Children aged between 12 to 59 months were measured barefoot and weights were measured with an exactness of 0.5kg using digital weighing scale. Height was measured by a stadiometer with an exactness of 0.01m after a child barefooted standing straight on a flat surface with heels together and eyes looking straight forward.

Nutritional status was assessed by plotting the weight for age, height for age and weight for height values, respectively, for underweight, stunting and wasting on sex specific WHO standard charts.[9] Values below -2 standard deviation of the reference population on these charts were taken for underweight, stunting and wasting.

SPSS 16 was used for data analysis. The descriptive data was given as mean ± standard deviation (SD). A chi-square test was used for the analytic assessment where appropriate. Logistic regression analysis was done for risk assessment. P≤0.05 was considered as statistically significant. Variables showing significant difference in univariate analysis were assessed in a logistic regression model.

Result

Of the 304 children, 172(56.6%) were boys and 132(43.4%) were girls. The overall mean age of children was 3.32±1.28 years. Besides, fathers of 165(54.3%) participants were literate, whereas mothers of 262(86.5%) participants were illiterate. Moreover, 170(55.9%) families had >5 members. The majority of families used well water 264(86.8%) and sewage system was present in 249(81.9%) houses.

Furthermore, 200(66%) mothers had <4 times history of pregnancy. Mortality of child in last 6 months was found in only 18(5.9%) families. Cow's milk, baby formula or water was used by 159(52.3%) of the mothers and 237(78%) children recruited in the study were vaccinated.

Of all participants, 117(38.5%) children were found to be stunted, 58(19.1%) were wasted and 101(33.2%) were underweight. Malnutrition was especially seen in the second year of age (Table-1).

No significant difference instunting, wasting and underweight distribution between boys and girls were

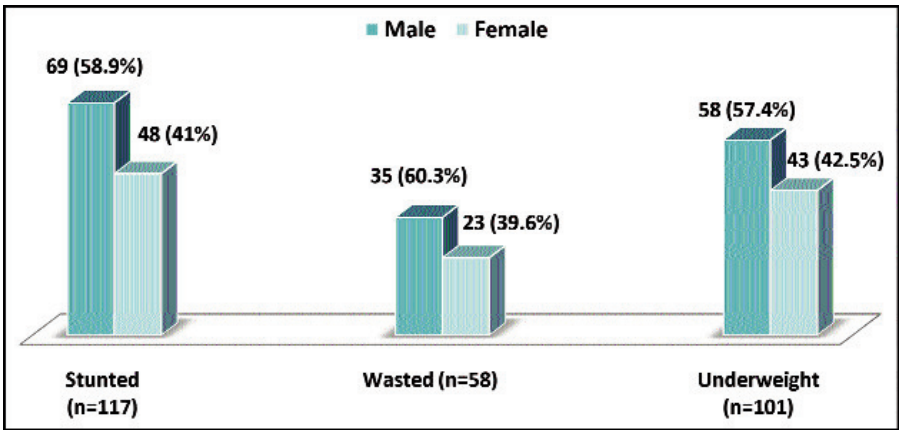

Figure: Distribution of undernourished children by gender.

Table-1: Distribution of Undernourished Children by Age Groups.

Age Groups (n)	Stunted		Wasted		Underweight	
	n	%	n	%	n	%
Year 01 (27)	5	18.5	10	37	8	29.6
Year 02 (59)	34	57.6	17	28.8	34	57.6
Year 03 (87)	25	28.7	18	20.7	29	33.3
Year 04 (53)	20	37.7	7	13.2	11	20.8
Year 05 (78)	33	42.3	6	7.7	19	24.4
Total (304)	117	38.5	58	19.1	101	33.2

Table-2: Distribution of Chronic Undernourished Children by Risk Factor.

Risk factors	Stunted n (%)	Not Stunted n (%)	P-value
Age (in years)			0.001
1	5 (4.3)	22 (11.8)	
2	34 (29.1)	25(13.4)	
3	25 (21.4)	62(33.2)	
4	20(17.1)	33(17.6)	
5	33 (28.2)	45(24.1)	
Sex			NS
Male	69(59)	103(55.1)	
Female	48(41)	84(44.9)	
Father's education			NS
Literate	68 (58.1)	97(51.9)	
Illiterate	49 (41.9)	90(48.1)	
Mother's education			< 0.001
Literate	02 (1.7)	39(20.9)	
Illiterate	115 (98.3)	148(79.1)	
Family size			0.025
≤ 5 members	42 (35.9)	92(49.2)	
≥ 5 members	75 (64.1)	95(50.8)	
Water source			NS
Well water	104 (88.9)	160 (85.6)	
Tap water	13 (11.1)	27 (14.4)	
Type of sanitation			NS
Sewage system	98 (83.8)	151 (80.7)	
Other	19 (16.2)	36 (19.3)	
No of pregnancies			< 0.001
≤ 4 times	50 (42.7)	150 (80.2)	
≥ 4 times	67 (57.3)	37 (19.8)	
Mortality of child in last 6 months			0.012
Yes	12 (10.3)	6 (3.2)	
No	105 (89.7)	181 (96.8)	
Breastfeeding			0.003
Yes	43 (36.8)	102 (54.5)	
No	74 (63.2)	85 (45.5)	
Vaccination			< 0.001
Yes	57 (48.7)	108 (96.3)	
No	60 (51.3)	7 (3.7)	
Wasting			NS
Yes	27 (23.1)	31 (16.6)	
No	90 (76.9)	156 (83.4)	
Underweight			< 0.001
Yes	76 (65.0)	25 (13.4)	
No	41 (35.0)	162 (86.6)	

observed (Figure).

Relationship of chronic undernourished children by risk factor was observed using chi- square test. Illiteracy of mother, family size (>5 members), number of pregnancy (>4 times), child mortality in last 6 months, the absence of breastfeeding and no history of child vaccination were significant risk factors for nutritional stunting (Table-2).

Statistically significant factors were assessed by using logistic regression analysis and it was found that, child of aliterate mother was less likely to be stunted. Similarly, family size (≤5 members), number of pregnancy (≤4 times), babies who breastfed and get vaccinated were protected whereas an underweight child was 12 times more likely to be stunted. Mortality of a child in last 6 months in the family was 3 times more likely to have a stunted child (Table-3).

Table-3: Logistic regression analysis for selected risk factors for stunting.

Characteristics	Univariable Analysis OR (95% CI)	P-value
Underweight		
Yes	12 (6.81 - 21.17)	
No	1	<0.0001
Mother Education		
Literate	0.06 (0.01 - 0.27)	
Illiterate	1	<0.001
Family size		
<5 members	0.57 (0.36 - 0.92)	
≥5 members	1	0.024
Number of Pregnancy		
<4 times	0.17 (0.10 - 0.29)	
≥4 times	1	<0.001
Child mortality in last 6 months		
Yes	3.44 (1.25 - 9.45)	
No	1	0.016
Breastfeeding		
Yes	0.48 (0.30 - 0.77)	
No	1	0.003
Vaccination		
Yes	0.03 (0.01 - 0.08)	
No	1	< 0.001

OR: Odds ratio
CI: Confidence interval.

Discussion

This current study is the first to report under-nutrition estimates among pre-school children based on WHO reference 2006 in Pakistan. A similar study conducted in 2003 among pre-school children used Centres for Disease Control and Prevention (CDC) standards for stunting, wasting and underweight categories, though these standards are designed for US population. The consideration for using the 2006 WHO international growth charts for children in this study was based upon recommendation preceded by the acknowledgement of breastfeeding as a standard for infant feeding.[10]

In the present study, stunting was observed with highest frequency (57.6%) among children of ≤ 2 years and minimum (18.5%) in ≤ 1 year age group. This observation

is consistent with a previous study that has reported an increase in stunting from 30% to 60% within a period of six months to two years of age.[11] The higher frequency of stunting and underweight among children of less than 2 years of age could be due to improper weaning or early cessation of breastfeeding, signifying the importance of extended breastfeeding.[12]

Though "exclusive breastfeeding" has proven nutritional, antimicrobial and hygienic benefits to infants, "extended breastfeeding" protects them from serious morbidity and mortality of gastrointestinal and respiratory infections, especially in second year of life. Thus the association between extended breastfeeding and childhood growth is an important public health issue.[13] In this study, breastfed children were at lesser risk of stunting (odds ratio (OR) 0.48, confidence interval (CI) 0.3-0.7). However, a study conducted in the same area of southern Sindh in 2003 did not find significant association between breastfeeding and stunting.[14] This lack of consistency in association between stunting and breastfeeding could be due to duration of breastfeeding. It is thus worthwhile to endorse the duration of breastfeeding while defining such association.[15]

Distribution of under-nutrition between boys and girls in the present study was found to be insignificant. This is contrary to the general perception that a male child is being given preferences in Asian populations. A study carried out in southern Pakistan a decade ago also found no gender difference in nutritional markers,[14] hence, further weakening the prevalent belief of gender discrimination by parents. However, studies conducted in South India and China have shown higher rate of under-nutrition among female children.[16] Similar trend was observed in a recent study in children of Nepal and Bangladesh.[17] It is to wonder why Pakistan is consistently showing a positive trend towards gender bias that further needs longitudinal studies and qualitative exploration.

In the present study, mother's education was of the potential risk factor for stunting. This has been observed as a consistent finding associated with under-nutrition in several studies conducted in developing countries, prompting the need of proper education among females. Though no association was found between stunting and father's education, it was also observed in a study conducted in India.[18] The reason could be that the majority of workforce in Tharparkar area were reported to be self-employed (73%), and with low (16%) male literacy, education of father might not have a direct influence on socio-economic conditions and consequently the nutritional status of the child.[19] There could be reporting bias due to over or under-reporting of age and immunisation, probably due to illiteracy and lack of documents (e.g. vaccination card). Keeping in mind the norms associated with local attitudes and practices, this situation was addressed by careful history taking in the present study.

Conclusion

Stunting was found to be the most common type of under-nutrition with no sex discrimination. Literacy of mother, small size of family, less number of pregnancy, breastfeeding and vaccination of child are more likely to be the protective factors from stunting.

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Conflict of Interest: None.

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