RESEARCH ARTICLE

Prevalence of malnutrition in children under five years' age in District Tharparkar Sindh, Pakistan

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Abstract

Objective: To investigate the prevalence of malnutrition in children aged <5 years, and find out the risk factors associated with malnutrition in a rural setting.

Method: The survey-based cross-sectional study was conducted from October 2017 to March 2018 in four Tehsils of district Tharparkar, Sindh, Pakistan, and comprised children of either gender aged <5 years who were randomly selected and assessed for weight and height using the World Health Organisation Anthro-2007 tool to obtain Z-score. Data was analysed using SPPS Version 18.

Results: Of the 597 subjects, 299(50.1%) were girls and 298(49.9%) were boys. Overall, 219(36.7%) were aged 12-23 months and 63(10.5%) were aged 48-59 months. Stunting was found in 485(81.1%) subjects, wasting 112(18.2%) and 342(57.3%) were underweight. The causes of malnutrition included age 6-11 months, number of siblings, monthly income <6000 rupees and duration of breast feeding <12 months (p<0.05).

Conclusion: Higher prevalence of malnutrition was found in children aged <5 years in district Tharparkar.

Keywords: Malnutrition, Stunting, Wasting, Underweight, Tharparkar, Pakistan. (JPMA 72: 33; 2022)

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Introduction

The term malnutrition is commonly used for under-nutrition, but it is professionally classified into over-nutrition or obesity and under-nutrition.[1] Malnutrition is one the major health issues affecting approximately 2 billion people worldwide.[2] A recent study carried out by the World Health Organisation (WHO), the United Nations International Children's Emergency Fund(UNICEF) and the World Bank Group estimated that approximately 151 million children aged <5 years are stunted, while 50 million children are wasted and almost 17 million children are severely wasted across the world.[3,4] Globally, half of the mortality burden is due to under-nutrition.[5] Pakistan is a low-income country and has seriously high child mortality rate of 79 deaths out of 10000 live births (7.9%).[6]

Pakistan has one of the highest prevalence of child malnutrition compared to other developing countries.[7] Girls were more severely malnourished than boys in the flood-affected areas of Sanghar in the province of Sindh.[8] Some hospital-based studies have reported even higher prevalence of malnutrition from other districts of the province, like Thatta-Sajjawal[9] and Tharparkar.[10] To the best of our knowledge, no extensive study has been conducted regarding the prevalence of malnutrition and determination of factors associated with malnutrition in the drought-hit areas of Sindh province. The current study was planned to fill the gap by investigating the prevalence of malnutrition among children aged <5 years, and to evaluate the risk factors associated with malnutrition in a rural setting.

Subjects and Methods

The survey-based cross-sectional study was conducted from October 2017 to March 2018 in four Tehsils of district Tharparkar, Sindh, Pakistan. The sample size was calculated using online calculator (Creative research system software), which uses the formula:

$$SS = \frac{Z^2 \times (P) \times (1-P).}{C^2}$$

The sample was raised from among randomly selected children of either gender aged <5 (range: 06-59 months) who belonged to families that were permanent residents of the district. Children outside the age range and those from families that were not permanent residents of the district were excluded.

After informed consent from the families, data was collected using a pre-designed questionnaire during house-to-house survey. Interviews were conducted with the mothers of the children to collect appropriate information about their respective children. Demographic status of the district was obtained from the district administration office. The questionnaire was in the English language, but the questions were asked in the local 'Dhatki' language.

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Anthropometric data was collected for all the subjects. Children aged <24 months were laid horizontally and measured by children scale for weight with an exactness of 0.05kg. Height was measured using the height chart with nearness to 0.1cm. The weight was measured of barefoot children aged>24 months by using child (Baby Weight Machine Unique YRBB-20, China) and adult (MS Scale Bathroom Camry BR9011) weighing machines separately. The WHO Anthro version 3.2.2[11] was used to obtain Z-scores.

Data was statistically analysed using SPSS 18. height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height (WHZ), stunting, underweight and wasting values were calculated. Further, t-test was used to compare quantitative variables and odds ratio (OR)with 95% confidence interval (CI) was determined for assessing the risk factors. P<0.05 was taken as statistically significant.

Results

Of the 597 subjects, 299(50.1%) were girls and 298(49.9%) were boys. Overall, 219(36.7%) were aged 12-23 months and 63(10.5%) were aged 48-59 months (Table 1).

Stunting was found in 485(81.1%) subjects. Stunting was categorised as moderate or severe and its relation with gender and age was noted (Table 2). Overall, wasting was found in 112(18.2%) subjects. Its relation with gender and age was noted (Table 3).

Table-1: Stunting in relation to gender and age.

Variables	n (%)
Gender	
Boys	299 (50.1)
Girls	298 (49.9)
Age (months)	
06-11	101 (16.9)
12-23	219 (36.7)
24-35	112 (18.8)
36-47	102 17.7
48-59	63 (10.5)
Mother's education	
Primary	4 (0.7)
Secondary	8 (1.3)
Uneducated	585 (98)
Father's education	
Primary	52 (8.7)
Secondary	71 (11.9)
Graduate	4 (0.7)
Uneducated	470 (78.7)
No. of Siblings	
1-5	258 (43.20)
6-9	317 (53.10)
>9	22 (3.70)

Of the total, 342(57.3%) children were found to be underweight. Its relation with gender and age was noted (Table 4).

Logistic regression analysis suggested that significant causes of malnutrition included age 6-11 months, number of siblings, monthly income <6000 rupees and duration of breast feeding <12 months (p<0.05). Also, there was a significant relationship between different water sources and under-nutrition (p<0.05) (Table 5).

Table-2: Stunting in relation to gender and age.

Variables	n (%)	Stunting		Z-score
		<-2 z-score	<-3 z-score	Mean±SD
All children	597 (100)	22.4	58.8	-3.30±1.84
Gender				
Boys	299 (50.1)	21.7	60.5	-3.41±1.79
Girls	298 (49.9)	23.2	57.0	-3.19±1.88
Age groups (months)				
06-11	101 (16.9)	13.9	75.2	-3.80±1.90
12-23	219 (36.7)	25.6	54.4	-3.16±1.92
24-35	112 (18.8)	19.6	67.9	-3.60±1.84
36-47	102 (17.1)	18.6	54.9	-3.15±1.59
48-59	63 (10.5)	36.5	38.1	-2.70±1.59

SD: Standard deviation

Table-3: Wasting in relation to gender and age.

Variables	n (%)	Wasting		Z-score
		<-2 z-score	<-3 z-score	Mean±SD
All children	597 (100)	11.8	7.0	-0.57±1.69)
Sex				
Boys	299 (50.1)	12.3	8.7	-0.64±1.73)
Girls	298 (49.9)	11.0	5.4	-0.51±1.65)
Age groups (months)				
06-11	101 (16.9)	4.9	1.0	-0.47±1.65)
12-23	219 (36.7)	14.6	9.1	-0.88±1.7)
24-35	112 (18.8)	12.5	9.8	-0.72±1.61)
36-47	102 (17.1)	12.7	5.9	-0.70±1.51)
48-59	63 (10.5)	9.5	6.4	-0.71±1.58)

Table-4: Underweight status in relation to gender and age.

Variables	n (%)	Underweight		Z-score
		<-2 z-score	<-3 z-score	Mean±SD
All children	597 (100)	28.2	29.1	-2.28±1.34
Sex				
Boys	299 (50.1)	27.1	30.4	-2.32±1.35
Girls	298 (49.9)	29.2	27.8	-2.25±1.32
Age groups (months)				
06-11	101 (16.9)	32.8	24.8	-2.28±1.23
12-23	219 (36.7)	28.3	30.1	-2.29±1.40
24-35	112 (18.8)	28.6	33.0	-2.46±1.32
36-47	102 (17.1)	22.6	33.3	-2.22±1.36
48-59	63 (10.5)	28.6	19.0	-2.03±1.25

Table-5: Odds ratio (OR) for malnutrition of children aged <5 years using logistic regression analysis.

Variables	Stunting		Wasting		Underweight	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Gender						
Boys	1.14(0.75-1.72)	0.516	1.35(0.89-2.05)	0.147	1.01(0.73-1.41)	0.920
Girls	1					
Age (monthts)						
06-11	2.78(1.96-6.48)	0.014	0.33(0.11-0.97)	0.037	1.48(0.78-2.79)	0.220
12-23	1.35(0.70-2.61)	0.365	1.65(0.78-3.47)	0.183	1.54(0.88-2.71)	0.126
24-35	2.38(1.07-5.28)	0.029	1.52(0.67-3.42)	0.305	1.76(0.94-3.29)	0.073
36-47	0.94(0.46-1.93)	0.887	1.21(0.52-2.80)	0.654	1.39(0.74-2.61)	0.300
48-49	1					
No of Siblings						
1-5	1					
6-9	0.55(0.35-0.85)	0.007	1.57(1.02-2.41)	0.371	1.23(0.88-1.71)	0.211
>9	0.72(0.23-2.27)	NA	0.25(0.03-1.98)	NA	3.91(1.28-11.88)	0.010
Diarrhoea						
Yes	1.09(0.63-1.86)	0.751	0.98(0.56-1.66)	NA	1.15(0.76-1.75)	0.488
No	1					
Income						
>6000	1					
<6000	1.00(0.54-1.82)		1.86(1.08-3.20)	0.023	1.36(0.83-2.22)	0.208
Water sources						
R.O plant	1					
Well	0.77(0.37-1.58)	0.479	0.82(0.43-1.54)	0.543	1.23(0.72-2.12)	0.434
Hand pump	0.85(0.40-1.82)	0.689	0.39(0.18-0.81)	0.010	0.55(0.31-0.97)	0.004
Water supply	0.63(0.29-1.36)	0.240	1.00(0.50-1.97)	1.000	1.23(0.68-2.22)	0.479
Duration breast of feeding						
<12 months	1.32(0.87-1.99)	0.187	1.19(0.78-1.82)	0.413	1.11(0.80-1.55)	0.507
>12 months	1					

CI: Confidence interval, 1 is reference value.

Discussion

The current study indicated that more than half children aged <5 years in the studied population were under-nourished. The prevalence of stunting was 81.2%, wasting 18.8% and underweight 57.3%. In comparison with other developing countries, the prevalence of malnutrition was found to be higher in Pakistan.[12] The higher prevalence of malnutrition in the present study may have been influenced by the fact that the sample studied was taken from the drought-affected area of Pakistan.

The Pakistan Demographic and Health Survey (PDHS) 2017-18 determined that the prevalence of stunting, wasting and underweight was 37%, 7% and 23% respectively among under-five children.[13] In Tharparkar, 81.2% children were stunted, with 58.8% being severely stunted, 57.3% were underweight and 18.2% were wasted. Studies have reported 74% stunting in Badin,[14] 48.2% in Thatta-Sajjawal,[15] 57.7% in South Africa 57.7%[16] and 47.6% in Ethiopia.[17]

In the current study, boys were found slightly more (OR=1.14 [CI: 0.75-1.72]) stunted than males. The corresponding values in Thatta-Sujjawal was OR: 1.13(CI: 1.14-149), in southern Ethiopia OR: 2.3 (CI: 1.6-3.1), but in the southern Ethiopian district of Sodo Zuria, the prevalence of stunting was higher in females than males (OR: 1.6 [CI:1.2-2.2]). However, like the current study, there was no significant association between stunting and gender (p>0.05). Children aged 06-11 months were more stunted (OR: 2.78 [CI: 1.96-6.48], p=0.014) and the same was the case with those aged 24-35 months (OR: 2.38 [CI: 1.07-5.28], p=0.029). In Thatta–Sujjawal, children aged 36-47 months and 24-35 months were found more stunted, and in southern Ethiopia, children aged 24-35 months were more stunted.[18] The Children who had diarrhoea in the preceding two weeks in the current study were slightly more stunted (OR: 1.09 [CI: 0.63-1.86]), and the corresponding values in Thatta-Sujjawal was OR: 1.13 (CI: 0.97-1.33), while in southern Ethiopia it was OR: 2.01(CI: 1.4-2.7). Large family size in the current study was significantly associated with stunting (p=0.003)which is in line with the finding in northern Ethiopia.[19] In the current study, children who were fed on breast-milk for <12 months were more stunted (OR: 1.32 [CI: 0.87-1.91]). A study in Uganda showed that 58% females breastfed their young ones for <12 months owing mainly to repeated or early pregnancies.[20]

The overall prevalence of wasting was 18.8% in the current study, but in Thatta-Sujjawal it was 16.2% , in southern India 12.2%[21] in southern Ethiopia 13.4% and in Africa 13%.[22] The prevalence of wasting was found higher in boys (OR: 1.35 [CI: 0.89-5.05]) compared to girls in the current study. This was in line with earlier findings. Wasting was higher in children aged 12-23 months in the current study (OR: 1.65 [CI: 0.78-3.47), but in Thatta-Sujjawal it was 24-35 months. Children belonging to families with monthly income <6000 rupees were more wasted (OR: 1.36 [CI: 0.83-2.25]) in the current study, and similar findings were reported from Thatta–Sujjawal.

Overall prevalence of underweight was 57.3% in the current study, whereas it was 39.5% in Thatta–Sujjawal, 36.4% in Africa, and 29.2% in Ethiopia.

The current study has limitations as it was conducted in only limited Tehsils as it was difficult to access remote

villages due to unavailability of transportation. Also, it was difficult to raise a larger sample as people migrate to other areas during drought. Besides, the study only focussed on malnutrition without taking into account the element of drinking water. Further studies are required to cover the remote areas of the Tharparkar region.

Conclusion

Higher prevalence of stunting, wasting and underweight was found in Tharparkar. Male children were comparatively more stunted and wasted than female children. Infants were more malnourished than older children. Large family size, lower income, diarrhoea and lack of breast-feeding were causative factors for malnutrition in children aged <5 years.

Disclaimer: I further confirm my statement that my thesis was submitted in Turnitin repository (HEC).

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References

1. Organization WHO. Essential nutrition actions: mainstreaming nutrition through the life-course. Geneva: World Health Organization, 2019.
2. Webb P, Stordalen GA, Singh S, Wijesinha-Bettoni R, Shetty P, Lartey A. Hunger and malnutrition in the 21st century. BMJ. 2018; 361:k2238.
3. Organization WHO. Levels and trends in child malnutrition: key findings of the 2019 ed. Geneva: World Health Organization, 2019.
4. Fanzo J, Hawkes C, Udomkesmalee E, Afshin A, Allemandi L, Assery O, et al. 2018 Global Nutrition Report: Shining a light to spur action on nutrition. [Online] [Cited 2018 December 14]. Available from: URL: https://eprints.mdx.ac.uk/id/eprint/25842
5. Rogers BL, Wilner LB, Maganga G, Walton SM, Suri DJ, Langlois BK, et al. Program changes are effective and cost-effective in increasing the amount of oil used in preparing corn soy blend porridge for treatment of moderate acute malnutrition in Malawi. Matern Child Nutr. 2017; 13:e12393.
6. Unicef. Levels and trends in child malnutrition. eSocSci. [Online] [Cited 2018 May 11]. Available from: URL:https://EconPapers.repec.org/RePEc:ess:wpaper:id:12424.
7. Asim M, Nawaz Y. Child Malnutrition in Pakistan: Evidence from Literature. Children (Basel). 2018; 5:60.
8. Laghari ZA, Soomro AM, Tunio SA, Lashari K, Baloach FG, Baig NM, et al. Malnutrition among children under five years in district Sanghar, Sindh, Pakistan. Pak J Med Sci. 2015; 13:260-5.
9. Kureishy S, Khan GN, Arrif S, Ashraf K, Cespedes A, Habib MA, et al. A mixed methods study to assess the effectiveness of food-based interventions to prevent stunting among children under-five years in Districts Thatta and Sujawal, Sindh Province, Pakistan: study protocol. BMC Public Health. 2017; 17:24.
10. Ahsan S, Mansoori N, Mohiuddin SM, Mubeen SM, Saleem R, Irfanullah M. Frequency and determinants of malnutrition in children aged between 6 to 59 months in district Tharparkar, a rural area of Sindh. J Pak Med Assoc. 2017; 67:1369-73.
11. Organization WH. WHO Anthro (version 3.2). World Health Organization, Geneva, Switzerland. [Online] [Cited 2011 January 02]. http://www.who int/childgrowth/software/en.
12. Asim M, Nawaz Y. Child malnutrition in Pakistan: evidence from literature. Children (Basel). 2018; 5:60.
13. National Institute of Population Studies. Pakistan demographic and health survey 2017-18. Pakistan: NIPS/Pakistan and ICF Islamabad, 2019.
14. Sheikh SA, Kumbhar MI, Panhwar AA. Malnourishment status of childbearing families in Coastal Area of Sindh Province. 2014; 3:84-9.
15. Khan GN, Turab A, Khan MI, Rizvi A, Shaheen F, Ullah A, et al. Prevalence and associated factors of malnutrition among children under-five years in Sindh, Pakistan: a cross-sectional study. BMC Nutr. 2016; 2:69-72.
16. Akombi BJ, Agho KE, Hall JJ, Wali N, Renzaho A, Merom D. Stunting, wasting and underweight in sub-Saharan Africa: a systematic review. Int J Environ Res Public Health. 2017; 14:863.
17. Asfaw M, Wondaferash M, Taha M, Dube L. Prevalence of undernutrition and associated factors among children aged between six to fifty nine months in Bule Hora district, South Ethiopia. BMC Public Health. 2015; 15:41.
18. Dake SK, Solomon FB, Bobe TM, Tekle HA, Tufa EG. Predictors of stunting among children 6–59 months of age in Sodo Zuria District, South Ethiopia: a community based cross-sectional study. BMC Nutr. 2019; 5:23.
19. Gebregyorgis T, Tadesse T, Atenafu A. Prevalence of thinness and stunting and associated factors among adolescent school girls in Adwa Town, North Ethiopia. Int J Food Sci. 2016; 2016.
20. Namusoke M, Atuhaire S. Factors Contributing To Malnutrition among Under-Fives: A Survey of Mubende Regional Referral Hospital. Uganda J Health Sci Stud. 2019; 1:201-10.
21. Upadhyay RP, Chinnakali P, Bhilwar M, Krishnan B, Kulkarni V, Gupta A, et al. Prevalence of malnutrition, acute respiratory infections and diarrhoea in children aged 1-5 years in urban slums of Puducherry, South India. Int J Contemp Pediatr. 2015; 2:37-41.
22. Akombi BJ, Agho KE, Merom D, Renzaho AM, Hall JJ. Child malnutrition in sub-Saharan Africa: A meta-analysis of demographic and health surveys (2006-2016). PloS one. 2017;12:e0177338.