

Nutritional Status Evaluation of Children Under Two Years of Age in 03 Provinces of Mozambique

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Abstract: According to 'Countdown to 2015', more than 114,000 children die each year in Mozambique before reaching their fifth birthday. And is estimated 45% of these deaths is linked to malnutrition. The purpose of this study was to determine the prevalence of chronic malnutrition, acute malnutrition and underweight in children under 2 years of age. A cross-sectional study was made at Cabo Delgado, Niassa and Nampula's province in Mozambique. Anthropometric measurements (height for age, weight for height and weight for age) were made to 689 children under 2 years age. A team formed by 6 pollsters, 3 controllers and 6 nurses conducted the anthropometric measurements from April to June 2015. The anthropometric indicators used to access the nutritional status were: height-for-age (HA), weight-for-height (WH) and weight-for-age (WA). Measures were expressed in the form of a Z-score, which include: HAZ < -2 (stunting/chronic malnutrition), WHZ < -2 (wasting) and WAZ < -2 (underweight). The total rate of positive cases of malnutrition was: 51.6% stunting (320/619), 9% of wasting (56/613) and 17.9% (119/662) of underweight. Stunting prevalence was especially high among children with 6-11 months old. Stunting prevalence was higher in Niassa (55.7%) compared to Cabo Delgado (50.5%) and Nampula (39.2%). The rate of acute malnutrition was three times higher in rural communities (10%) compared to urban communities (7%). Underweight prevalence was higher in Cabo Delgado (23.8%) compared to Nampula (20.4%) and Niassa (14.4%). Our findings allowed us to draw recommendations to improve the implementation of health programs against malnutrition in these provinces.

Keywords: nutritional status, children, malnutrition, Mozambique.

INTRODUCTION

According to 'Countdown to 2015', more than 114,000 children die each year in Mozambique before reaching their fifth birthday (WHO & UNICEF. (2000-2010). And is estimated 45% of these deaths is linked to malnutrition, even though it is rarely listed as direct cause (WHO & UNICEF. 2000-2010; Bain, L. E. *et al.*, 2013). Lack of access to highly nutritious foods is a common cause of malnutrition (WHO. 2018, January). Poor feeding practices, such as inadequate

breastfeeding, offering the wrong foods, and not ensuring that the child gets enough nutritious food, contribute to malnutrition (WHO. 2018, January). Malnutrition directly affects many aspects of children's development such as retarding physical and mental development, increasing susceptibility to infectious diseases such as diarrhea, pneumonia, and further increasing the probability of undernourishment (Panigrahi, A., & Das, S. C. 2014). It also undermines education attainment and productivity, thus affecting

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the economic growth (Panigrahi, A., & Das, S. C. 2014). There are three types of protein-energy malnutrition in children: acute malnutrition (wasting or thinness), chronic malnutrition (stunting or shortness) and the combination of acute and chronic malnutrition (underweight) (Panigrahi, A., & Das, S. C. 2014; London School of Hygiene and Tropical Medicine. December, 2015). Chronic malnutrition is recognized as the best indicator of quality of human capital of a country (Moçambique. 2020). In Mozambique, chronic malnutrition is the main problem affecting the nutrition of under-five children, compromising their growth potential physical, mental and cognitive development (Moçambique. 2020; Ministério da Saúde (MISAU).2011). In 2011, Nampula, Cabo Delgado and Niassa were the provinces of Mozambique with the highest prevalence of chronic malnutrition among under-five children (55.3% Nampula, 52.8% Cabo Delgado and 46.8% Niassa) (Ministério da Saúde (MISAU). 2011). A multisectorial plan for chronic malnutrition reduction in Mozambique with different package of activities and interventions which should contribute to a reduction in more than 20% of the rates of chronic malnutrition over a period of 10 years, was launched in 2011 (Moçambique. 2020). Thus, this cross-sectional study was undertaken to determine the prevalence of chronic malnutrition, acute malnutrition and underweight in children under 2 years of age residing in the provinces of Nampula, Cabo Delgado and Niassa.

METHODOLOGY

Study Sample and Design

Subjects of this cross-sectional study were children under 2 years of age residing in enumeration areas of districts at Cabo Delgado, Niassa and Nampula's province, Mozambique. The sample size was estimated in order to adequate to determine a reduction in prevalence of malnutrition of 2 percentage points per year with significance level of 95% and power of 80%. Thus, a sample of 2,196 households was estimated. The primary sampling units were enumerating areas, which were obtained through a list of enumerating areas provided by the National Institute of Statistics (INE). The secondary sampling units were households. A total of 25 rural households and 20 urban households were selected to participate in the study. Two pre-tested questionnaires were using during this study (a household questionnaire and a women's and adolescent questionnaire). The pre-test of the questionnaires was made on four enumerating areas of Bairro Eduardo Mondlane at Marracuene's district in

Maputo province. Information was collected by trained interviewers at the respondents' households.

Anthropometric Measurements

Anthropometric measurements (height for age, weight for height and weight for age) were made to 662 children under 2 years age. A team formed by 6 pollsters, 3 controllers and 6 nurses conducted the anthropometric measurements from April 2015 to June 2015. The anthropometric indicators used to access the nutritional status were: height-for-age (HA), weight-for-height (WH) and weight-for-age (WA). Measures were expressed in the form of a Z-score, which include: HAZ < -2 (stunting/chronic malnutrition), WHZ < -2 (wasting/ acute malnutrition) and WAZ < -2 (underweight/ mixed acute and chronic malnutrition) (Panigrahi, A., & Das, S. C. 2014).

Statistical Analysis

Data analysis were conducted in IBM SPSS, version 24 for windows (IBM Corp., Armonk, USA) and appropriate statistical tests were applied. A "p" value of ≤ 0.05 (2-tailed) denoted the presence of a statistical significance. The measured weight, height and age were converted to weight for age, height for age and weight for height SD units (z-scores) using the software ANTHRO Survey Analyser (Windows) from WHO (WHO child growth standards). Univariate analyses were conducted to provide characteristics from the socio-economic and demographic status from the child's. Bivariate analysis were made using qui-square test and multivariate logistic regressions to investigate the relationship between the converted variables with socio economic and demographics variables.

Ethical Aspects

This study was approved by the Health's National Review Board (Ref. 213/CNBS/13). Written informed consents from all subjects were obtained to participate in the study.

RESULTS

The study sample consisted of 689 children under two years old (50.4% male and 49.5% female), and the mean age was 12 month (SD = 7 month). Nearly 78.4 % of the sample (540/689) lived in rural area than in urban area. Twenty-one percent (21.5%) of the participants were in the poorest wealth quintile and nearly 13.4% were in the richest wealth quintile. The sociodemographic characteristics of the study sample are described in Table 1.

Table 1. Sociodemographic characteristics of the sample (2015, n = 689)

Sociodemographic characteristics	n(N=689)	% (95% CI)
Height for age		
Not stunted (at or above -2SD)	297	43,1(41,9-44,7)
Stunted (from -2SD and bellow)	322	46,7(45,1-48,4)
Missing	70	10,2(8,5-11,8)
Child's age (in months)		
<6	168	24,4(22,8-26,0)
6-11	169	24,5(22,9-26,2)
12-24	352	51,1(51,3-54,6)
Child's gender		
Male	351	50,9(49,3-52,6)
Female	338	49,1(47,4-50,7)
Socioeconomic status indicators		
Wealth quintile		
Poorest (Q1)	148	21,5(19,9-23,1)
Poorer (Q2)	130	18,9(17,2-20,5)
Middle (Q3)	134	19,4(17,8-21,1)
Richer (Q4)	111	16,1(14,5-17,7)
Richest (Q5)	92	13,4(11,7-14,9)
Area of residence		
Rural	540	78,4(76,7-80,0)
Urban	149	21,6(19,9-23,3)

95CI: 95 confidence interval; SD: standard deviation.

Bivariate Analysis

Table 2 displays results from the bivariate analyses of malnourished children by age, gender and other variables of interest. As presented in table 2, 52.0% of the children were stunted (344/662), 9.1% were wasted (60/662) and 18.0% (119/662) were underweight. Chronic malnutrition prevalence was especially high among children with 6-24 months old.

Chronic malnutrition prevalence was higher in Niassa (55.7%) compared to Cabo Delgado (50.5%) and Nampula (39.2%). The rate of acute malnutrition was three times higher in rural communities (9.8%) compared to urban communities (6.9%). Underweight prevalence was higher in Cabo Delgado (23.8%) compared to Nampula (20.4%) and Niassa (14.4%).

Table 2. Prevalence of malnutrition among children under two years old

Characteristics	Height for age		n	Weight for height		n	Weight for age		n	P ¹	P ²	P ³
	Stunting/ Chronic malnutrition			Wasting/ Acute malnutrition			Underweight					
	<-3DP	<-2DP		<-3DP	<-2DP		<-3DP	<-2DP				
Child's age (in months)												
<6	20,5	32,9	146	5,7	11,3	141	4,4	12,7	158	0,00	0,04	0,00
6-11	30,7	54,2	153	4,0	9,9	151	5,5	15,9	164			
12-24	39,7	59,7	320	3,4	7,8	321	7,9	21,5	340			
Child's gender												
Male	36,7	55,3	313	3,8	9,3	312	8,4	20,7	334	0,51	0,90	0,20
Female	29,1	48,7	306	4,3	9,0	301	4,6	15,2	328			
Province												
Cabo delgado	28,9	50,5	190	4,1	10,7	196	7,3	23,8	193	0,00	0,00	0,00
Niassa	36,6	55,7	350	3,5	6,5	340	5,1	14,4	376			
Nampula	26,6	39,2	79	6,5	16,9	77	10,8	20,4	93			
Total	33,0	52,0	619	4,1	9,1	613	6,5	18,0	662			
Socioeconomic status												
Area of residence												
Urban	26,2	43,1	130	3,1	6,9	131	2,1	9,7	144	0,00	0,77	0,04
Rural	34,8	54,4	489	4,4	9,8	482	7,7	20,3	518			
Total									662			
Wealth quintile												

Poorest (Q1)	37,7	50,8	130	3,2	11,3	124	7,9	22,3	139	0,05	0,41	0,25
Poorer (Q2)	30,5	51,7	118	5,1	8,5	118	5,6	20,6	126			
Middle (Q3)	37,3	61,9	126	3,3	8,9	123	8,4	16,8	131			
Richer (Q4)	24,3	42,7	103	1,0	6,8	103	3,7	13,0	108			
Richest (Q5)	26,7	44,0	75	6,3	8,8	80	4,7	9,4%	85			
Total	32,1	51,1	552	3,6	8,9	548	6,3	17,1	589			

Notes: Results here presented are related to children under two years old which were in the households on interview days. Each index is expressed in units of standard deviation (SD) of the WHO median of the Child Growth Standard adopted in 2006. This chart is based on children with valid birth dates (months and years) and valid height and weight measurements.

Child's age was more likely to be linked with acute malnutrition (table 2). Place of residence was more likely to be linked with underweight. And wealth quintiles were more likely to be linked with chronic malnutrition.

Multivariate Analysis

Results from table 3 indicate that child's aged (specifically, being older than 6 months age) is a

significant predictor of a child being stunted in the North of Mozambique. Children aged 12-24months, living in Niassa's province and in rural areas, are significantly more likely to be underweighted than children with other sociodemographic characteristics. The results also indicate that children living in rural areas (OR = 1.53; 95% CI: 1.02-2.29) are more likely to be stunted than children living in urban areas.

Table 3. Prevalence of malnutrition among children under two years old

Characteristics	Height for age		Weight for height		Weight for age	
	OR	p	OR	p	OR	p
Child's age (in months)						
<6	1,00	-	1,00	-	1,00	-
6-11	2,476(1,541-3,978)	0,000	0,874(0,412-1,854)	0,727	1,323(0,700-2,669)	0,389
12-24	2,913(1,924-4,411)	0,000	0,733(0,374-1,439)	0,367	1,971(1,142-3,400)	0,015
Province						
Cabo delgado	1,00	-	1,00	-	1,00	-
Niassa	1,166(0,809-1,679)	0,410	0,566(0,302-1,062)	0,076	0,487(0,311-0,763)	0,002
Nampula	0,685(0,396-1,187)	0,178	1,658(0,778-3,537)	0,191	0,902(0,487-1,669)	0,742
Socioeconomic status						
Area of residence						
Urban	1,00	-	1,00	-	1,00	-
Rural	1,530(1,023-2,288)	0,039	1,651(0,779-3,497)	0,191	2,592(1,420-4,732)	0,002
Total						

DISCUSSION

Analyzing the results of this study, 51% of children aged 0 to 24 months had stunting (HAZ <-2 SD). Male children had a higher prevalence of stunting in relation to female children (55.3% and 48.7%, respectively). Results from some studies, both in Mozambique and in other African countries, although with a differential prevalence, also show that male children have a high prevalence of stunting compared to female children (WHO & UNICEF. 2000-2010; Ministério da Saúde (MISAU).2011).

This study suggests also that living in rural areas increases the likelihood of being stunted of a child despite the influence of other sociodemographic variables. Over the last years (2003-2011), despite the prevalence of chronic malnutrition in under five children living in rural areas has suffered a slight declination, it's is still more than the average (Ministério da Saúde (MISAU).2011; Ministério da Saúde (MISAU).2003). Mozambique is still affected by the burden malnutrition at national level, being among the 34 countries accounting for 90% of the stunting

burden in the world (9. Ministério da Agricultura e Segurança Alimentar (MASA). 2016). this study provides important insights into the relationship between area of residence and nutritional status of children under 2 years of age. Children in our sample were more likely to be underweighted within children aged 12-24months, living in Niassa's province and in rural areas. This finding may be explained by cultural and economic differences.

CONCLUSION

The prevalence of chronic malnutrition was high in the three provinces, although with different magnitudes. Our findings allowed us to draw recommendations in order to improve the implementation of health programs against malnutrition in these provinces.

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