

Background

Children malnutrition (undernutrition and overnutrition) is a major public health problem in developing countries. Identifying the risk factors of malnutrition and determining their magnitude is necessary to develop nutritional interventions to confront this problem. Therefore, the aim of this study is to assess the determinants associated to stunting, wasting, overweight and obesity in children under 5 years in Bengo Province, Angola.

Methods

The study was conducted at the Centro de Investigação em Saúde de Angola (CISA) study area in Bengo Province, Dande Municipality (Fig 1)

A community-based cross sectional study was used during August to September 2014. A questionnaire adapted from ProPAN 14, willing to collect data on children's general health care, breastfeeding and feeding practices, food ingestion in the previous 24 hours, socioeconomic characteristics and water supply, was applied.

Anthropometric measures were collected to describe children's and mothers malnourished status. Weight and height/length were measured according to standard procedures (Fig 2, Fig 3), and were used to determine child WHZ and HAZ score with ANTHRO software, and mother BMI. Data were analyzed using IBM SPSS statistical software, version 22.

Both univariate and multivariate analyses by logistic regression were made. The final multivariate analysis was performed including those variables with a p value $\leq 0,25$ at the univariate analysis step. Odd ratios were estimated to determine the association between mother child pairs and the independent variables.

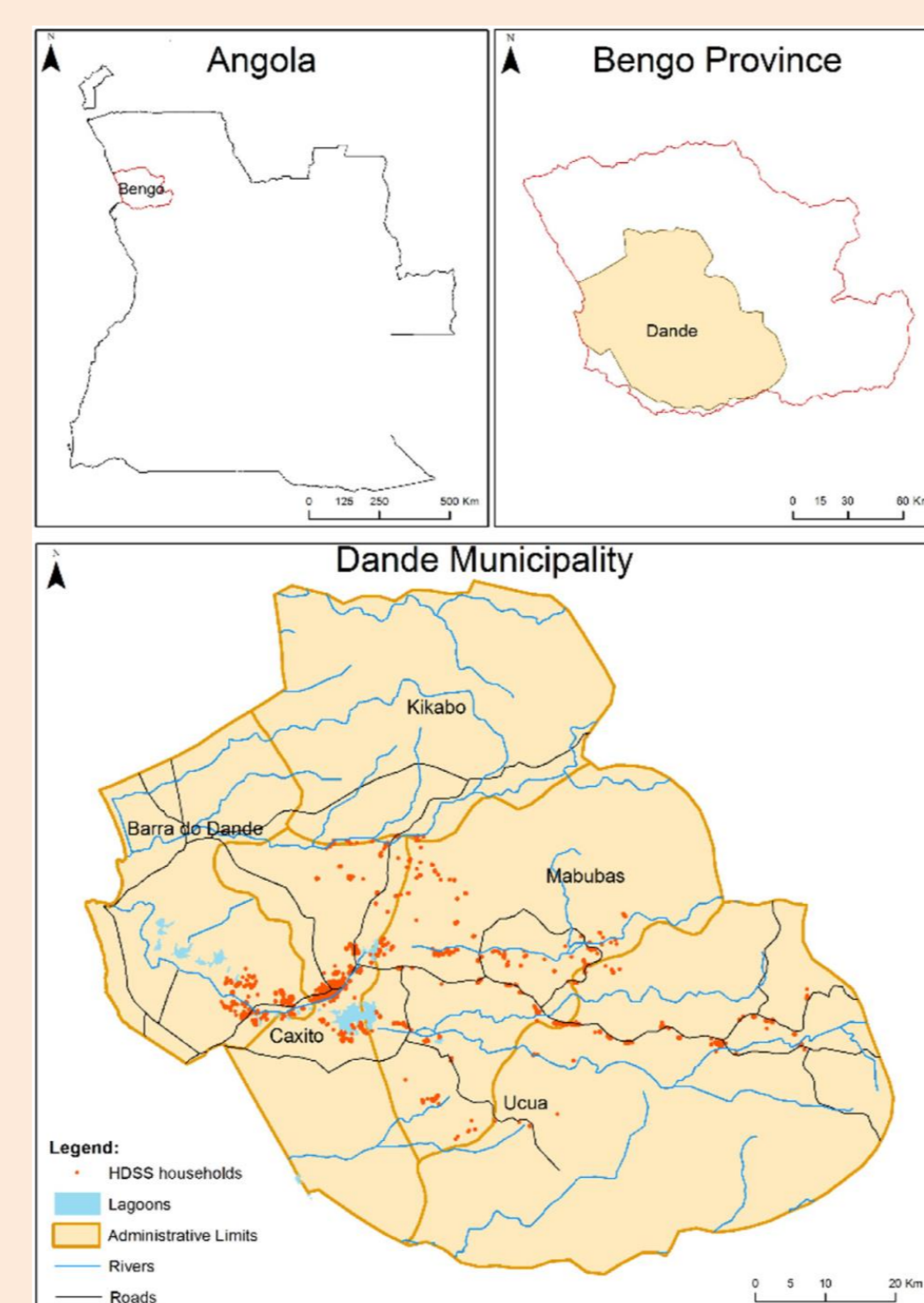


Fig 1. Study area

Fig 2. MUAC determination



Fig 3. Anthropometric evaluation

Results

The survey was conducted during 30 days and comprehended 808 children aged 0 to 59 months, from which 50.5% were male. Infant wasting, stunting and underweight prevalence were 5.0%, 28.7% and 11.3% respectively. Overweight and obesity prevalence were 2.6% and 2.3 respectively (Table 1).

Table 1. Nutrition indicators in the sample population and by age classes.

Indicators	Z Score	Total sample		0 to 11 months		12 to 23 months		24 to 59 months	
		%(n/N)	95% CI (%)	%(n/N)	95% CI (%)	%(n/N)	95% CI (%)	%(n/N)	95% CI (%)
Wasting (WHZ)	<-3	2.5 (19/775)	[1.4 - 3.6]	2.4 (4/165)	[0.6 - 4.8]	6.8 (11/162)	[3.1 - 11.1]	0.9 (4/448)	[0.2 - 1.8]
	<-2	2.5 (20/775)	[1.5 - 3.7]	4.2 (7/165)	[1.2 - 7.3]	3.7 (6/162)	[1.2 - 6.8]	1.6 (7/448)	[0.7 - 2.9]
Stunting (HAZ)	<-3	7.9 (61/775)	[5.9 - 9.8]	0.6 (1/165)	[0.0 - 1.8]	12.3 (20/162)	[7.4 - 17.9]	8.9 (40/448)	[6.3 - 11.6]
	<-2	20.8 (161/775)	[18.1 - 23.6]	9.1 (15/165)	[4.8 - 13.9]	21.0 (34/162)	[14.8 - 27.2]	25.0 (112/448)	[20.8 - 29.0]
Underweight (WAZ)	<-3	3.2 (25/775)	[2.1 - 4.4]	1.2 (2/165)	[0.0 - 3.0]	6.2 (10/162)	[3.1 - 9.9]	2.9 (13/448)	[1.6 - 4.7]
	<-2	8.1 (63/775)	[6.3 - 10.2]	7.1 (12/165)	[3.6 - 11.3]	13.6 (22/162)	[8.6 - 19.1]	6.5 (29/448)	[4.2 - 8.9]
Overweight /Obesity (BAZ)	>3	2.3 (18/775)	[1.3 - 3.4]	0 (0/165)	[0.0 - 0.0]	3.1 (5/162)	[0.6 - 6.2]	2.9 (13/448)	[1.3 - 4.7]
	>2	2.6 (20/775)	[1.4 - 3.6]	0 (0/165)	[0.0 - 0.0]	5.6 (9/162)	[2.5 - 9.3]	2.5 (11/448)	[1.1 - 4.0]

Results (Cont.)

Risk factors significantly associated to wasting were low birth weight (OR=3.64; 95%CI 1.01. 13.11) and having diarrhea in the last 2 weeks (OR=6.89; 95%CI 1.70. 27.93). And risk factors significantly associated with overweight and obesity was having diarrhea in the last 2 weeks (OR=2.01; 95%CI 1.03. 3.92) (Table 2). Risk factors significantly associated to stunting were increased age of children (OR=6.05. 95%CI 2.58 - 14.25. and OR=4.71. 95%CI 2.16 - 10.25), mother BMI below 18.5 (2.55 95%CI 1.37 - 4.74) low birth weight (OR=2.02; 95%CI 1.16. 3.52) and having diarrhea in the last 2 weeks (OR=1.86; 95%CI 1.06. 3.28) (Table 2).

Table 2. Determinants associated to stunting, wasting, overweight and obesity.

Variable	Wasting		Stunting		Overweight/ Obesity	
	Unadjusted OR [95%CI]	AdjustedOR [95%CI]	Unadjusted OR [95%CI]	AdjustedOR [95%CI]	Unadjusted OR [95%CI]	AdjustedOR [95%CI]
Age in months						
6-12	1 (ref)	1 (ref)	1 (ref)	1 (ref)	-	-
12-24	1.64 [0.74 - 3.62]	0.50 [0.10 - 2.39]	4.45 [2.45 - 8.09]	6.06 [2.58 - 14.25]**	-	-
24-59	0.35 [0.15 - 0.83]*	0.33 [0.07 - 1.54]	4.52 [2.64 - 7.74]*	4.71 [2.16 - 10.25]**	-	-
Mother's Education						
None	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Primary	1.69 [0.50 - 5.67]		0.92 [0.36 - 1.50]	0.71 [0.28 - 1.82]	0.61 [0.24 - 1.54]	
Medium-high	1.03 [0.22 - 4.75]		0.59 [0.31 - 1.13]	0.56 [0.18 - 1.69]	0.37 [0.09 - 1.51]	
Mother's age						
<30 years	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
>30 years	0.57 [0.25 - 1.28]	1.54 [0.39 - 6.07]	0.82 [0.58 - 1.17]		0.84 [0.38 - 1.86]	
Mother BMI						
18.5 to <25	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Less than 18.5	0.73 [0.35 - 1.53]		2.37 [1.62 - 3.46]**	2.55 [1.37 - 4.74]**	0.69 [0.32 - 1.49]	
More than 25kg/m	1.66 [0.52 - 5.29]		1.99 [0.99 - 4.05]	2.43 [0.65 - 9.09]	1.32 [0.36 - 4.83]	
Birth Weight						
Normal	1 (ref)	1 (ref)	1 (ref)	1 (ref)	-	-
Low Birth weight	2.46 [0.78 - 7.78]	3.64 [1.01 - 13.11]*	2.02 [1.16 - 3.52]*	2.01 [1.07 - 3.76]*	-	-
Birth place						
Home	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Hospital/ care centre	1.35 [0.70 - 2.58]		0.69 [0.30 - 0.94]*	1.52 [0.87 - 2.66]	1.03 [0.54 - 1.98]	
Mother counselled						
Yes	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
No	0.61 [0.31 - 1.20]	0.49 [0.13 - 1.87]	0.84 [0.61 - 1.16]		0.82 [0.41 - 1.61]	
Diarrhoea last 2 weeks						
No	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Yes	2.62 [1.36 - 5.01]**	6.89 [1.70 - 27.93]**	1.58 [1.15 - 2.18]**	1.86 [1.06 - 3.28]*	2.22 [1.15 - 4.27]*	2.01 [1.03 - 3.92]*
N children U5						
<2 children	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
>2 children	2.11 [0.91 - 4.89]	1.25 [0.28 - 5.51]	1.14 [0.81 - 1.60]		0.66 [0.34 - 1.28]	
Improved water						
Yes	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
No	0.92 [0.48 - 1.79]		1.11 [0.81 - 1.52]		1.08 [0.56 - 2.08]	
Dietary Diversity Score						
>4 groups	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
<4 groups	1.30 [0.64 - 2.63]		1.17 [0.85 - 1.63]		0.51 [0.26 - 0.98]*	0.53 [0.27 - 1.03]

*P<0.05. ** P<0.001

Discussion

Undernutrition is common among children under 5 years in Bengo province. Age, birth weight, child feeding knowledge, type of breastfeeding, dietary diversity, diarrhea morbidity and number of under five children living at household were related to undernutrition. The presented results evidence the need of nutritional interventions in order to control children malnutrition risk factors.

Key messages

The prevalence of wasting was 5.0%, of stunting was 28.7% and of underweight 11.3%, in Angolan Children under five years old.

The prevalence of overweight was 2.6% and of obesity 2.3% in Angolan Children under five years old.

The main determinants of malnutrition in this population were age of children, mother BMI below 18.5, low birth weight and having diarrhea in the last 2.

The study highlights that earlier interventions with mothers (during pregnancy and in the first months after birth) can have a significant impact in malnutrition reduction.

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