Scientific Research Publishing

Open Journal of Pediatrics, 2023, 13, 641-648
https://www.scirp.org/journal/ojped
ISSN Online: 2160-8776
ISSN Print: 2160-8741

Prevalence of Undernutrition among Children Aged 6 - 59 Months in the Municipality of Toucountouna (Benin) in 2017

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How to cite this paper: Noudamadjo, A., Mohamed, F.A., Kpanidja, M.G., Dogo, M.A., Tchando, G., Adédémy, J.D. and Agossou, J. (2023) Prevalence of Undernutrition among Children Aged 6 - 59 Months in the Municipality of Toucountouna (Benin) in 2017. *Open Journal of Pediatrics*, **13**, 641-648.
https://doi.org/10.4236/ojped.2023.135071

Received: July 5, 2023
Accepted: September 2, 2023
Published: September 5, 2023

Abstract

Introduction: Undernutrition is a public health problem in the world and especially in developing countries. According to the demographic and health survey with multiple indicators of Benin IV (DHS-MICS-IV), the prevalence of acute undernutrition (AU), chronic undernutrition (CU) and that of underweight (UW) was 16%, 45% and 21%, respectively. The objective of this work was to determine the prevalence of undernutrition in children aged 6 to 59 months in the municipality of Toucountouna in 2017. **Materials and Methods:** This was a descriptive cross-sectional study with two-stage cluster random sampling, composed of 390 children aged 6 to 59 months, living in the municipality of Toucountouna for at least six months. The study variables were: socio-demographic, economic, behavioral, socio-sanitary and anthropometric. Data were entered and analyzed using Epi-info 7.2 software. **Results**: 203 out of 390 children included, were boys (sex ratio of 1.08). The mean age of the children was 28.70 ± 11.79 months. The prevalence of AU, CU and UW was 10.26%, 31.54% and 11.79%, respectively. **Conclusion**: The results of this study showed that efforts remain to be made in terms of undernutrition and other surveys could identify the determinants linked to this situation in the locality for the effective implementation of prevention.

Keywords

Prevalence, Undernutrition, Children, Benin

1. Introduction

Malnutrition in children is an absolute evil of the contemporary world that persists both nationally and globally. It includes two major types: undernutrition and obesity with significant consequences in terms of psychomotor retardation and an increased risk of infections and mortality [1]. Globally, 89% of the 149 million children under 5 years, suffering from growth retardation and 93% of the 45 million children of the same age, suffering from emaciation lived in developing countries, particularly in sub-Saharan Africa (2020) [2]. In Africa in 2017, the prevalence of growth retardation in children under 5 years of age was high (above 30%) or very high (above 40%) in 25 out of 47 countries. Only 17 out of 47 countries had an acceptable prevalence of emaciation among children of the same age group (less than 5%) [3]. In Benin, DHS-MICS-IV reported that among children under 5, the respective prevalence of acute malnutrition, chronic malnutrition and underweight was 8%, 38%, and 23% in 2006 and 16%, 45%, and 21% in 2012 [4]. In 2018, the prevalence was 5%, 32% and 17%, respectively [5]. This study aimed to determine the prevalence of undernutrition among children aged 6 to 59 months in the municipality of Toucountouna in 2017.

2. Materials and Methods

This was a descriptive cross-sectional study with prospective data collection, conducted in the municipality of Toucountouna from September 15 to October 5, 2017. The study population consisted of children aged 6 to 59 months, living in the municipality. A two-stage cluster random sampling was performed according to WHO technique [6]. The sample size was calculated using Schwartz formula on the basis of the prevalence of growth retardation at 45% from the Demographic and Health Study in Benin (2012) [4]. The sample size was 390 children. The children included in the study were those who were present, aged 6 to 59 months, living in the municipality and whose mothers gave their consent. Critically ill children were excluded from the study. The data collection tools used were:

- SECA electronic scale to measure the children's weight;
- SHORR measuring board meeting WHO specifications for height measurement;
- A Tricolor tape (Shakir's tape) to measure the Mild Upper Arm Circumference (MUAC) of children;
- The child's health record to determine his age;
- Weight-for-height (WH), height-for-age (HA) and weight-for-age (WA) indices from WHO standards (2006);
- The pre-tested questionnaire for each child to provide information on socio-demographic, economic and health characteristics during structured individual interviews with the children's mothers.

The study variables were: socio-demographic, behavioral, socio-sanitary and anthropometric. AU was defined as a WH index less than −2 Standard Deviation (SD) from the reference median, and/or a MUAC under 125 mm, and/or the

presence of bilateral edema attributable to malnutrition. The AU was moderate when the WH index was between −3 and −2SD or the MUAC was between 115 and 125 mm in the absence of any edema. Severe AU was defined by a WH index less than −3SD or a MUAC under 115 mm or the presence of edema attributable to malnutrition [7]. CU was defined by a HA index less than −2SD of the median. It was moderate with a HA index between −3 and −2ET, then severe with a HA index under −3ET [8]. UW was defined by a WA index lower than −2SD. Its moderate form was retained when the WA index was between −3 and −2SD, then the severe form was defined by a WA index less than −3SD [8]. Data were entered and analyzed using Epi info version 7.2 software. The text processing and the creation of tables were done using Microsoft Word and Excel version 2007 softwares. The parameters of central tendencies and dispersion (Mean, Standard deviation) were used for the description of quantitative variables. The proportions with their confidence interval were used to describe the main qualitative variables.

Ethical and Deontological Considerations

The agreement of administrative and health authorities was obtained before data collection. The free informed consent of mothers was obtained before any participation. Data confidentiality was ensured. Diagnosed cases of severe malnutrition were treated free of charge in the ambulatory therapeutic feeding centers (ATFC) of the municipality of Toucountouna or at the therapeutic feeding center (TFC) of Saint Jean de Dieu district general hospital in Tanguieta.

3. Results

3.1. Description of the Study Population

A total of 390 children were included in the study and 52.05% of them were boys, *i.e.* a sex ratio of 1.08. The mean age of the children was 28.70 ± 11.79 months. Children of age group 6 - 17 months were the most represented (33.08%). The mothers of children lived in rural areas in 83.33% of cases. They had no level of education in 51.28% of cases. The average household size was 10 ± 4.58 individuals including 6 ± 2.02 children on average per household and an average birth interval of 23 ± 5.78 months. The lowest birth interval was 16 months. In 91.80% of cases, the mothers of children lived as a couple. Households were without toilets in 08.21% of cases. The proportion of households using electricity or solar panels for lighting was 32.31%. **Table 1** shows the distribution of children according to socio-demographic and economic characteristics.

3.2. Anthropometric and Dietary Characteristics

The average weight of the children was 11.62 ± 2.99 kg and the average height was 84.00 ± 12.11 cm. Exclusive Breastfeeding (EBF) up to 6 months was practiced in 65.19% of children. The average age at food diversification was 8.02 ± 3.33 months and that of complete cessation of breastfeeding (BF) was 19 ± 8.12 months.

Table 1. Distribution of children according to socio-demographic and economic characteristics in the municipality of Toucountouna in 2017.

	Size	(%)
Sex of the child		
Male	203	52.05
Female	187	47.95
Child's age (months)		
6 - 17	129	33.08
17 - 28	86	22.05
28 - 39	76	19.49
39 - 50	53	13.59
50 - 59	46	11.79
Child's place of residence		
Rural	325	83.33
Urban	65	16.67
Mother's level of education		
None	200	51.28
Literate	46	11.79
Primary	114	29.23
Secondary	28	07.18
Higher	2	0.51
Mother's marital status		
Single/Widow	32	08.20
Married/As a couple/Cohabitation	358	91.80
Household toilets		
Rudimentary	322	82.56
Modern	36	09.23
None	32	08.21
Household lighting		
Electric current/Solar panels	126	32.31
Oil lamp	264	67.69

No child was exclusively fed with artificial milk. The proportions of breastfeeding and mixed feeding were 86.08% and 13.92%, respectively. The average age of the complete cessation of breastfeeding in children was 19 ± 8.12 months. The porridge consumed was light in 35.47% of cases and thick (34.53%). The average number of meals per day in households was 3 ± 1.02.

3.3. Data on Vaccination Coverage, Deworming and Micronutrient Supplementation

The vaccination coverage of children against tuberculosis, measles and poliomyelitis was 81.02%, 77.00% and 75.00%, respectively. The proportion of vitamin A and iron supplementation was 42.60% and 68.70%, respectively. Table 2 shows the distribution of children according to data on vaccination coverage, deworming, vitamin A and iron supplementation.

3.4. Nutritional Status

In this study, the assessment of the nutritional status of children in relation to acute malnutrition showed that 350 children had a good nutritional status (89.74%) against 40 children who suffered from acute undernutrition (10.26%). Regarding chronic undernutrition, 267 children were healthy (68.46%) against 123 children who suffered from chronic undernutrition (31.54%). In terms of underweight, 344 children were eutrophic (88.21%) against 46 underweight children (11.79%).

3.5. Prevalence of Undernutrition

The prevalence of AU was 10.26% (95% CI [5.20 - 17.80]) including 2.80% of severe form. The prevalence of CU was 31.54% (95% CI [27.10 - 36.30]) with 12.57% of severe form. The prevalence of UW was 11.79% (95% CI [9.00 - 15.40]) with 2.05% of severe form. Table 3 shows the distribution of children according to their nutritional status.

Table 2. Distribution of children according to data on vaccination coverage, deworming, vitamin A and iron supplementation in the municipality of Toucountouna in 2017.

	Size	(%)
Vaccination coverage		
BCG	316	81.02
Measles vaccine	300	77.00
Oral polio vaccine	292	75.00
Deworming		
Yes	196	50.30
No	194	49.70
Vitamin A supplementation		
Yes	166	42.60
No	224	57.40
Iron supplementation		
Yes	267	68.70
No	123	31.30

Table 3. Distribution of children according to their nutritional status in the municipality of Toucountouna in 2017.

	Size	(%)	CI (95 %)
Acute undernutrition	**40**	**10.26**	**[5.20 - 17.80]**
Moderate acute undernutrition	29	07.44	[2.00 - 10.70]
Severe acute undernutrition	11	02.82	[1.20 - 5.50]
Chronic undernutrition	**123**	**31.54**	**[27.10 - 36.30]**
Moderate chronic undernutrition	74	18.97	[15.40 - 23.20]
Severe chronic undernutrition	49	12.57	[9.60 - 16.30]
Underweight	**46**	**11.79**	**[9.00 - 15.40]**
Moderate underweight	38	09.75	[7.20 - 13.10]
Severe underweight	08	02.05	[1.00 - 4.00]

4. Discussion

During this study, the following measures were taken to limit selection and information bias: a clusters random sampling, the use of anthropometric measurement tools recommended by WHO, the training of interviewers in a therapeutic feeding center before the start of data collection.

Prevalence of undernutrition

According to the WHO classification, the acceptable prevalence of undernutrition in the population must be less than 5% for AU, 20% for CU and 10% for UW [9]. This shows that we are facing a real public health problem in the municipality of Toucountouna where the prevalence remains higher than sanitary standards. The prevalence of AU in this work was higher than that reported by the survey on the assessment of the Nutritional Situation and Mortality in the department of Atacora, more precisely in the municipality of Toucountouna in 2015 which was 5.70% [10]. This prevalence was higher than that reported in the department (7.50%) [10]. It was also higher compared to the prevalence of AU reported by the Demographic and Health Survey of Benin in 2006 (7.00%) [11]. The difference in prevalence could be explained by the fact that MUAC was not taken into account in these different studies. Indeed, the calculation of the prevalence of acute malnutrition reported in many studies does not take into account either MUAC or the presence of edema, which does not meet all WHO criteria. Better still, the measurement of MUAC in the assessment of nutritional status is of paramount importance because it is an indicator of survival in children aged 6 to 59 months [7]. Not taking it into account, minimizes the prevalence of acute malnutrition and the chance of detecting children potentially at risk of dying. However, this prevalence is lower than that reported by Yessoufou *et al.* in the Pendjari Plain in 2014 (34.00%) [12]. It shows that efforts continue to be made to reverse the trend even if the situation remains critical.

As for CU, the prevalence found (overall, moderate and severe) in this study

was similar to that noted by the nutritional survey in the department of Alibori in 2014 [13]. It was lower than the one found by the survey on the assessment of the Nutritional Situation and Mortality in the department of Atacora in 2015 which was 38.40% in this municipality and also remains lower than that noted in the department (37.20%) [10]. Moreover, it was lower than that reported by Yessoufou, *et al.* in 2014 (53.00%) [10]. On the other hand, Yessoufou, *et al.* in Togo in 2015 reported a lower prevalence (12.50%) than that of our study [14].

Since chronic malnutrition is the consequence of several episodes of poorly treated or untreated acute undernutrition, a reduction in the prevalence of AU should lead to a reduction in CU; this tendency is noticeable in our study. However, the prevalence of 31.00% remains very high and suggests that actions should be taken such as consultation of healthy infants, regular screening and management of AU.

The prevalence of UW in Benin in 2006 was 22.60% according to Benin DHS III [11]. In 2011, DHS IV reported a prevalence of 21.30% similar to DHS III. The prevalence of 11.79% noted in the present study is clearly lower than the results of DHS III and IV. This high and downward trend can be explained by the reduction in the prevalence of AU and CU; UW being a composite indicator combining AU and CU.

5. Conclusion

In total, one child in ten, three children in ten and one child in ten in the municipality of Toucountouna suffer from acute undernutrition, chronic undernutrition and underweight, respectively. Despite the various nutritional actions carried out, the prevalence remains high and raises deeper analysis in order to identify the various associated factors. It is therefore necessary to conduct surveys on the determinants of undernutrition in this locality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Rice, A.L., Saccl, L., Hyder, A. and Black, R.E. (2004) Malnutrition as an Underlying Cause of Death from Infectious Diseases among Children in Developing Countries. *Bulletin of the World Health Organization*, **78**, 1207-1221.

[2] FAO, IFAD, UNICEF, WFP and WHO (2022) The State of Food Security and Nutrition in the World 2022. Repurposing Food and Agricultural Policies to Make Healthy Diets More Affordable. FAO, IFAD, UNICEF, WFP and WHO, Rome. https://doi.org/10.4060/cc0639en

[3] World Health Organization (2017) Nutrition in the WHO African Region. World Health Organization, Brazzaville. https://www.afro.who.int/sites/default/files/2017-11/Nutrition%20in%20the%20WHO%20African%20Region%202017_0.pdf

[4] National Institute of Statistics and Economic Analysis (INSAE) and ICF Interna-

tional (2013) Demographic and Health Survey of Benin 2011-2012. INSAE and ICF International, Calverton.
https://instad.bj/images/docs/insae-statistiques/enquetes-recensements/EDS/2011-2012/EDS_2012_Rapport_final-11-15-2013.pdf

[5] National Institute of Statistics and Economic Analysis (INSAE) and ICF (2019) Demographic and Health Survey in Benin, 2017-2018. INSAE and ICF, Cotonou, Benin and Rockville.
https://instad.bj/images/docs/insae-statistiques/enquetes-recensements/EDS/2017-2018/1.Benin_EDSBV_Rapport_final.pdf

[6] Bennett, S., Woods, T., Liyanage, W.M. and Smith, D.L. (1991) A Simplified General Method for Cluster-Sample Surveys of Health in Developing Countries. *World Health Statistics Quarterly*, **44**, 98-106.
http://apps.who.int/iris/bitstream/handle/10665/47585/WHSQ_1991_44(3)_98-106_eng.pdf?sequence=1

[7] World Health Organization and UNICEF (2009) WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children: Joint Statement by the World Health Organization and the United Nations Children's Fund. https://www.who.int/iris/handle/10665/44129

[8] World Health Organization (2008) Training Course on Child Growth Assessment. WHO, Geneva. https://apps.who.int/iris/handle/10665/43601

[9] World Health Organization (2000) The Management of Nutrition in Major Emergencies. WHO Library, Geneva. https://apps.who.int/iris/handle/10665/42085

[10] National Institute of Statistics and Economic Analysis (INSAE), United Nations Children's Fund (UNICEF) and Catholic Services Relief (CSR) (2015) Assessment of the Nutritional Situation and Mortality in the Department of Atacora.
https://www.unicef.org/about/annualreport/files/Benin_2015_COAR_Final.pdf

[11] National Institute of Statistics and Economic Analysis (INSAE) and Macro International Inc. Demographic and Health Survey in Benin (DHSB III)-Benin 2006. National Institute of Statistics and Economics Analysis and Macro International Inc., Calverton.
https://instad.bj/images/docs/insae-statistiques/enquetes-recensements/EDS/2006/EDS%202006.pdf

[12] Yessoufou, G.A., Ahokpe, M., Behanzin, J., Kountori, R., Sénou, M. and Sézan, A. (2014) Prevalence of Acute Malnutrition in Children under Five Years in the Plain of Pendjari in North-West Benin. *Journal de la Recherche Scientifique de l'Université de Lomé*, **16**, 69-78.

[13] National Institute of Statistics and Economic Analysis (INSAE), United Nations Children's Fund (UNICEF) and Catholic Relief Services (CRS) (2014) Nutritional Survey Using the SMART Methodology in the Department of Alibori (Benin).
https://www.unicef.org/about/annualreport/files/Benin_Annual_Report_2014.pdf

[14] Yessoufou, G.A., Yessoufou, K.A., Gbaguidi, B., Sézan, A. and Agbere, A.R.D. (2015) Anthropometric Assessment of the Nutritional Status among Children Aged 0-59 Months Admitted at the Vaccination Unit of Lome-Commune CHR (Togo). *African Journals Online*, **17**, 3.