ORIGINAL ARTICLE

DOUBLE BURDEN OF MALNUTRITION IN CHILDREN RECEIVED FOR IMMUNIZATION IN THE HEALTH CENTER IN BASSILA (NORTH-WEST BENIN)

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Abstract

Background: The nutritional status of children under five years of age is a determinant of their weight gain. **Purpose**: The purpose of this study is to assess the nutritional status of children under-five received for vaccination at the Bassila Health Center and to identify the determinants. **Methods**: This is a cross-sectional analytical and descriptive study that took place in the second quarter of 2019. The survey concerned children received for vaccination during the study period. Anthropometric measurements (weight, height of age) were collected and their mothers subjected to a series of questionnaires. The weight for height, height for age and weight for age indexes were calculated using WHO anthro software. The Chi-square test was used to determine the factors associated with P <0.005. **Results**: A total of 320 children aged 11.7 ± 1.1 months were identified. Nearly 17% were stunted, 19.1% were wasted, and 14.7% were underweight. At the same time, 23.1% of the children were overweight. The comparison of the different z-scores (P / T, T /A and P / A) distribution curves of our study population with those of the respective WHO reference population showed a shift to the left. Poor weaning practices, the level of education and the occupation of mothers are among the determinants of this malnutrition. **Conclusion**: 19.1% of children are emaciated, 17% are stunted, 14.7 % are underweight and 23% of overweight. There is a situation of "double burden" of malnutrition, which is to say both the problem of under nutrition and overweight.

Key words: *double burden, emaciated, stunted, underweight, weaning, Bassila.*

1. Introduction

Malnutrition among children under 5 is a real public health problem in developing countries. It results from acute or chronic deficits of energy, proteins, or micronutrients. It is the cause of at least half of all child deaths worldwide. Under-nutrition alone is responsible for more than a third of these deaths [1]. In Africa, the prevalence of stunting is 40% and the prevalence of underweight 25% [2]. According to the Demographic Health Survey in Benin, 32% of children under-five are stunted, of which 21% are in severe form. The prevalence of underweight and wasting is respectively 17% and 5% [3]. The nutritional status of an individual can be defined by the relationship between intake and nutrient requirements and the body's ability to digest absorb and use these nutrients [4]. It is evaluated by the anthropometric method which is a universally applicable, fast, simple, reliable and inexpensive technique [5]. The still high frequency of malnutrition and especially the presence of both forms of malnutrition (undernutrition and overnutrition) in children under 5, suggests a failure of programs implemented for its eradication. So, a continual study on malnutrition would be necessary to discern the true ones of this pathology.

2. MATERIAL ET METHODS

2.1. Type and population of study

The study was conducted during the second quarter of 2019 at the Bassila Health Center in the Donga Department of northwestern Benin (Figure 1). This was a prospective, cross-sectional, descriptive and analytical study of children received for vaccination and their mothers or carers. Included are all children under five years old whose parents are consenting and have no pathology. All children over the age of five and those suffering from any pathology are excluded from the survey.

Figure1: cartography of the municipality of Bassila
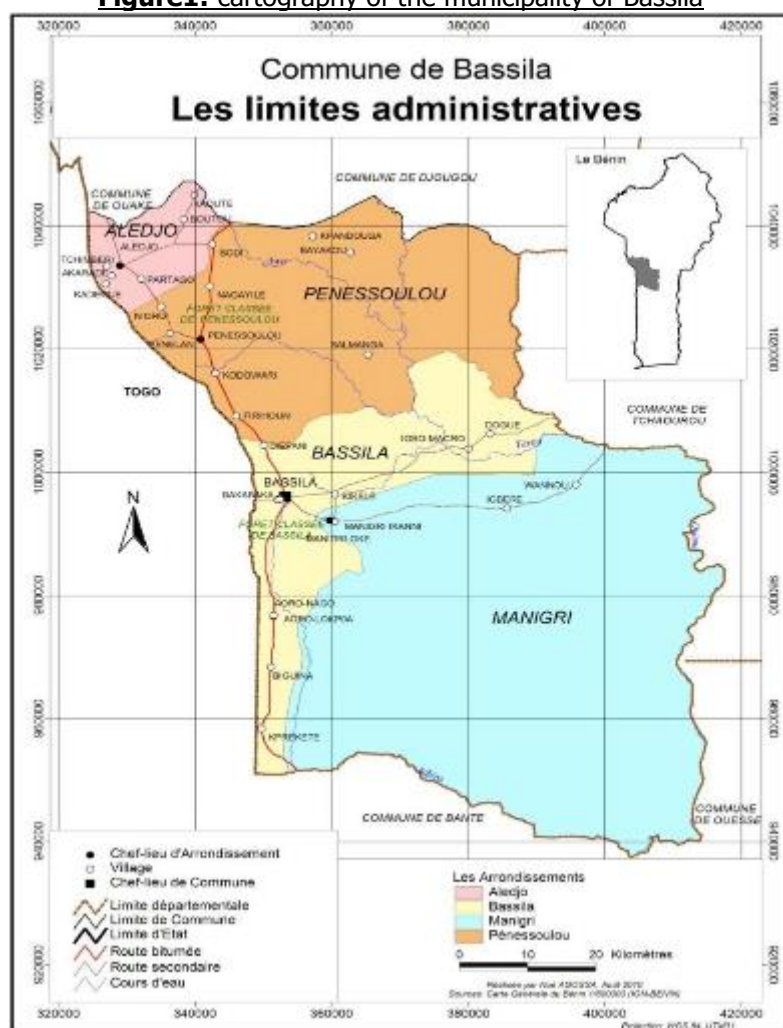
2.2. Sample size

The minimum sample size was determined according to the Schwartz (1994) formula, by considering p = 27% the prevalence of stunting in the Donga Department [3-6]. Thus, the minimum sample size is estimated at 304 children.

2.3. Materials and methods of study

Anthropometric measurements were collected according to WHO recommendations [7].
The weight was taken by a baby weighing scale (EBSD brand) and a 100g precision SECA scale.
The height was measured using a 1 mm precision measuring board: for children under 2 years, the board was placed in a horizontal position on a flat surface parallel to the floor; for children over 2 years, the measurement was performed while standing with the same height. The age of the child has been determined from the date of birth entered in his vaccination book, or given by the parents.
After taking anthropometric measurements (weight, height and age); information on socio-demographic characteristics, eating and hygiene habits were collected from mothers or caregivers.

2.4. Assessment of the nutritional status of children

The anthropometric weight-for-age (P / A), height-for-age (T / A) and weight-for-height (P / T) indices were calculated according to the new growth norms in children [8].
The classification of children was done as follows:

Systems Limit Values Classification of WHO malnutrition (Weight / Height, Weight / Age, Height / Age):
-2 <Z-score <-1 Mild,
-3 <Z-score to <-2 Moderate,
Z-score <-3 Severe.

● P / A below - 2 SD: Underweight and P / A; < -3 SD: Severe Weight Inadequacy,
● T / A below -2 SD: Growth retardation and T / A; < -3 SD: Severe growth retardation,
● P / T below -2 SD: Emaciation; P / T; < -3 SD: Severe acute malnutrition; P / T above +1 SD: Overweight.

2.5. Data processing

It was done using WHO Antho software version 3.2.2, 2011 and Excel 2010. The Pearson correlation tests (chi²) were performed to determine the various factors associated with the nutritional status of children.

2.6. Ethical considerations

The survey was carried out after the authorization of the leaders of the Bassila Health Zone (No. 016/2019 / DDS-D / ZSB / MCC / SA). The consent of the mothers or caregivers of the children was obtained prior to the administration of the questionnaire. The confidentiality of the data collected has been guaranteed; the dignity and freedom of the respondents were respected during the investigation.

3. RESULTS

In sum, 320 children aged 11, 7 ± 1.1 months were studied in this study with a sex ratio of 1.1 in favor of males. The results on children's nutritional status are as follows: 19.1% of children were emaciated, of which 6.6 were severely emaciated, 18.1% were at risk of being overweight, 5% were overweight and 0.6% were obese; hence a 23.7% overweight percentage with 12.8% of them less than 6 months old. In addition, 16.6% of the children were stunted, 4.1% were significantly retarded and 14.7% of the children surveyed were underweight with 2.5% severe cases. The different distribution curves of the study population (P / A and T / A) are shifted to the left relative to the distribution curves of the reference population. On the other hand, the P / T distribution curve is shifted partly to the left and a small portion to the right. Correlation tests have shown that there is a significant relationship between different forms of malnutrition and certain sociodemographic factors and dietary practices (Table 1).

Table1: Representation of relationships between different forms of malnutrition and determinants.

| underweight P-value	Growth retardation P-value	Emaciation P-value	Sociodemographics and dietary factors
0,0773	0,0047*	0,0005*	**AME**
0,3147	0,0223*	0,0723	**Porridge consumption**
0,1133	0,1987	0,0122*	**Family dish**
0,0023*	0,1651	0,0017*	**Education Level**
0,1178	0,3215	0,0122*	**Mother occupation**

*significatif si p<0,05
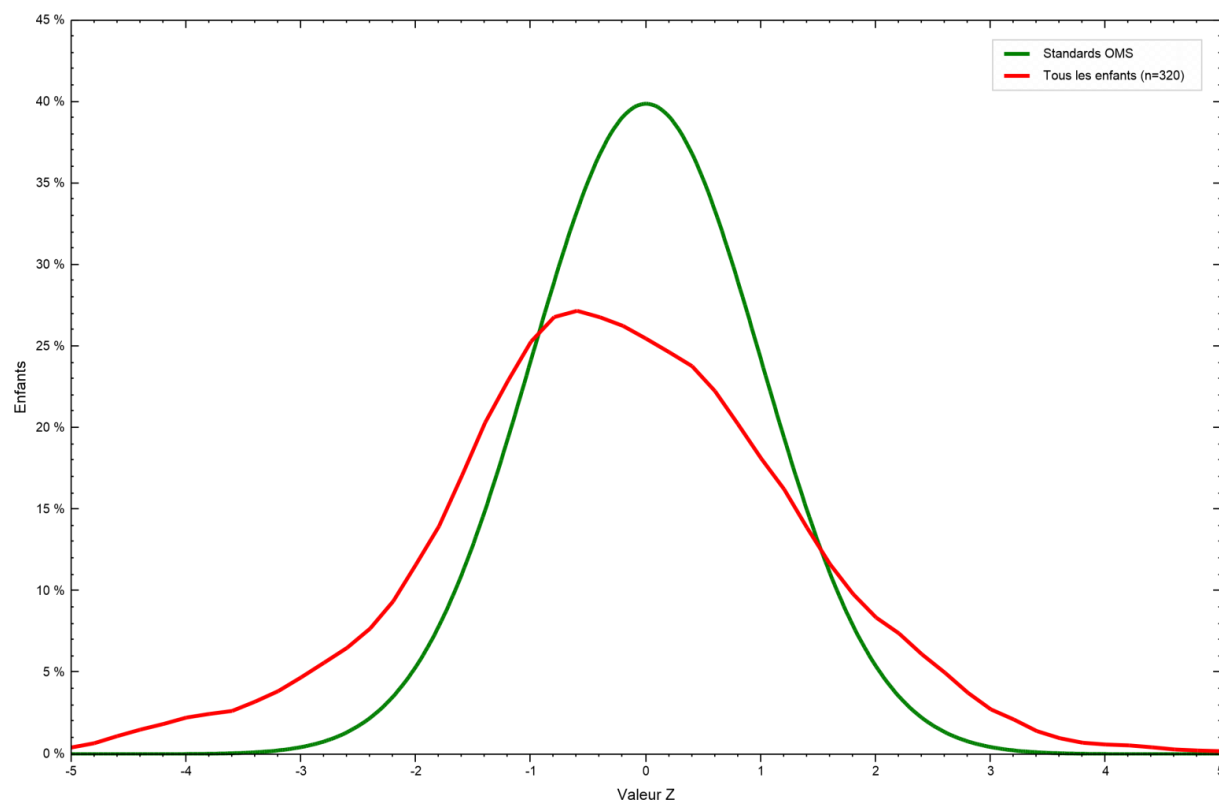
Figure2: Distribution of the weight/height index in z-score compared to WHO standards.
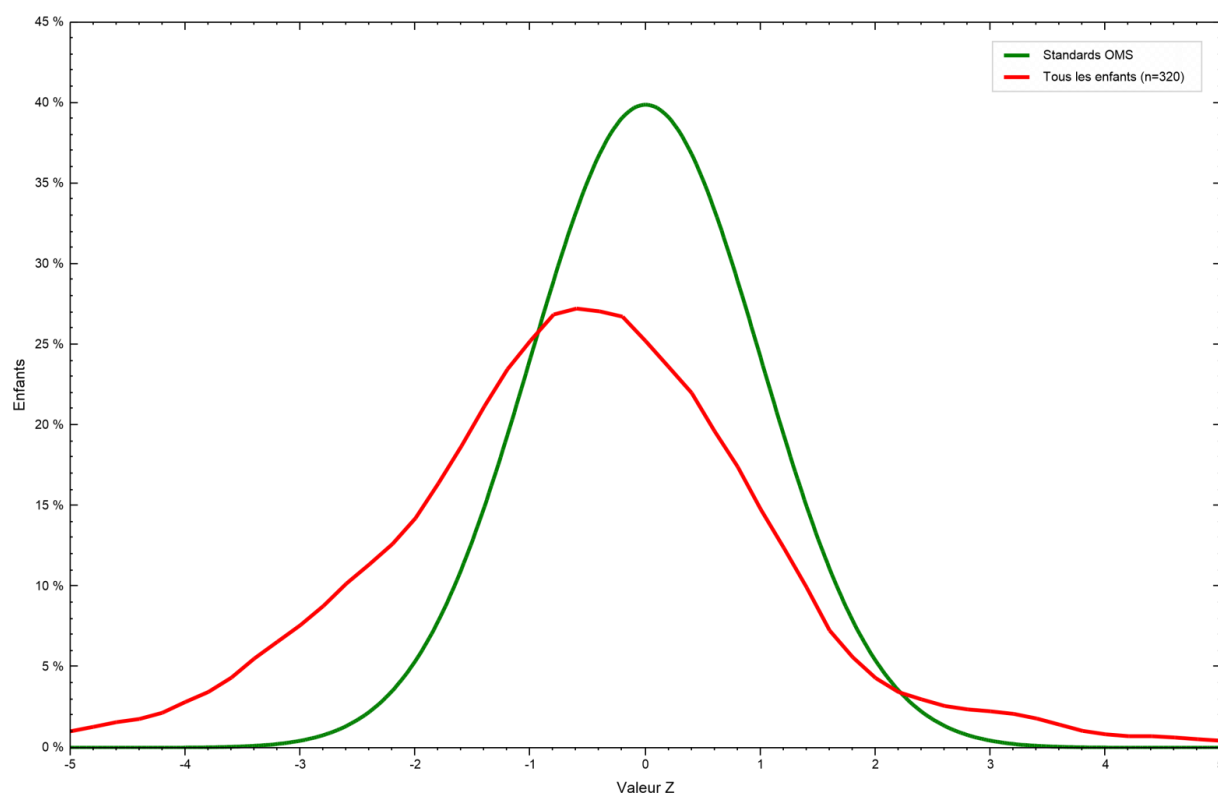
Figure3: Distribution of the z-Score height / Age index relative to WHO standards
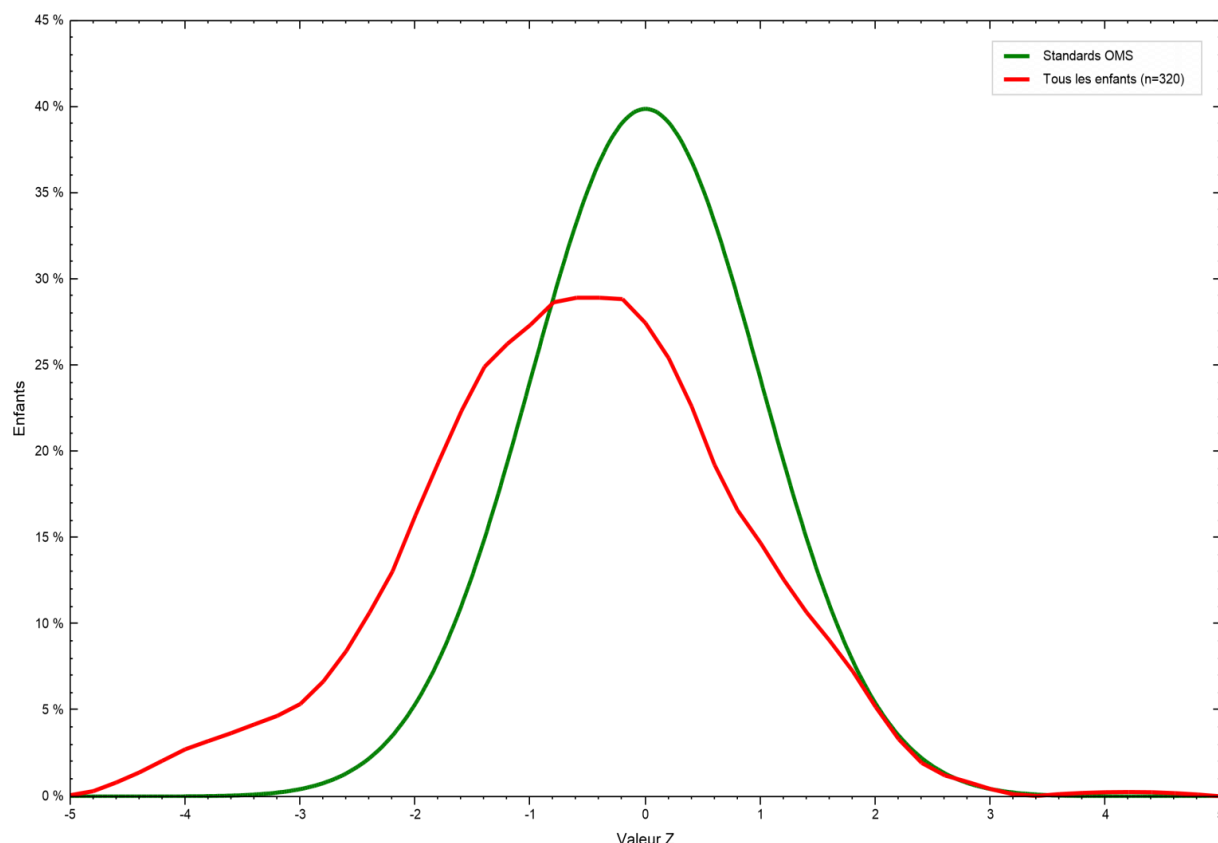
Figure 4: Distribution of the weight / age index in z-score compared to WHO standards

4. DISCUSSION

The study population is characterized by an inequitable distribution of the sexes, with a sex ratio of 1.1 in favor of the male sex. This result is comparable to those obtained by Yessoufou et al (2016) and Achouri et al (2016) in their studies respectively in southern Benin and northwestern Morocco [9, 10]. In addition, about ¾ were less than one year old, which is close to the results obtained from studies conducted in 2015 at the CHR Lomé commune in Togo [11] and in 2016 at the Hounsouko health center in Porto-Novo at Benin (Yessoufou et al, 2016) [9]. The high rate of children in this age group could be explained by the free EPI, which takes into account only children from 0 to 9 months. On the other hand, the presence of children over one year of age in the study population could be explained mainly by the fact that the vaccination campaign against measles and rubella (Edition 2019) coincided with our study period. Also, it is easy to see that almost half of the mothers of the children surveyed have no level of education. Indeed, the level of education is an indicative factor in the openness of the mothers in the concept of exclusive breastfeeding during the first six months and in the complementary feeding of the child as the pointed out [12].

At concerning nutritional status of children, our results show that 16.6% of children were stunted, 19.1% were wasted and 14.7% were underweight. Overweight was 23.7%. The prevalence of underweight found in our study is close to that (14.3%) resulting from the Demographic Health Survey in Benin at the departmental level and that obtained (12.3%) in Porto-Novo in southern Benin by Yessoufou (2016) [3-9]. On the other hand, this rate is much higher than that of Houado (2010), 8.6% in his study carried out in Lomé on the children received for vaccination at the CHU-SO and the Bè hospital in 2010 [13]. This difference could be explained by the socio-economic level of each zone and the strategies for combating malnutrition adopted for each country. The frequency of chronic malnutrition was well below that obtained (27.2%) at the departmental level, this finding could be explained by the fact that our study mainly concerned the apparently healthy children received for vaccination while the national survey chose children regardless of their health status [3]. In addition, the rate of emaciated children is much higher than that obtained in Porto-Novo, in Lomé [9-13]. This high prevalence is thought to be due to the period during which the survey was conducted, which corresponds to the lean period in which the accessibility of food is a problem for poor households. On the other hand, the high rate of overweight suggests that there is over-nutrition among the surveyed population. Among children who are overweight, 12.8% are under six months old. This finding could be explained by the non-respect of the practice of exclusive breastfeeding during the first six months of life and by the bad practice of weaning by the mothers of these children. Breastfeeding is a safe and hygienic source of nourishment for children from 6 months of age. Mothers, who certainly had comfortable incomes, fed their children with powdered cow's milk and / or breast milk, which could be the basis of the overweight observed in this age group in the population study. Indeed, cow's milk contains 3 times more protein than breast milk (3.2g / 100ml against 1g / 100ml) [14]. High intakes of protein in infants are responsible for high metabolic activity in children which could lead to early weight gain and obesity [15]. The comparison of the P / T, P / A and T / A curves with the respective reference curves

showed that these curves were shifted to the left with respect to the reference curves. These results are comparable to those obtained in other studies: in Timbuktu in Mali Diarra (2010), in Lomé in Togo Yessoufou (2015) and in Porto Novo in southern Benin Yessoufou (2016) [9-11-16]. This observed discrepancy expresses an insufficient nutritional state compared to that of the reference population evoking a situation of undernutrition. In contrast, a portion of the P / T distribution curve is shifted to the right relative to the WHO reference curve, suggesting a trend towards over-nutrition. This confirms the high prevalence of overweight (23%) observed in the study population.

5. CONCLUSION

In fact, 19.1% of children are emaciated, 17% are stunted and 14.7% are underweight. Our study confirms the high prevalence of overweight (23%) observed in the study population. In view of this we can say that malnutrition remains a major problem in children under five in the municipality of Bassila who face both "burdens": undernutrition and overnutrition

Acknowledgement

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