

# Prevalence and Factors Influencing Malnutrition among Children under Five Years of Age in a Peri-Urban Environment in Abidjan

Akaffou-Gbery Adja Evelyne<sup>1,2</sup>, Azagoh-Kouadio Richard<sup>2,3</sup>, Gbonon Apie Couso Précieuse<sup>1</sup>, Yao Atteby Jean-Jacques<sup>1,2</sup>, Attaï-Niamien Affoué Charlotte Amandine<sup>1,2</sup>, Dieth Atafy Gaudens<sup>1,2</sup>

<sup>1</sup>Department of Pediatrics, Mother-Child Hospital of Bingerville (HME), Bingerville, Côte d'Ivoire

<sup>2</sup>Mother and Child Department of the Teaching and Research Unit of Medical Science, Félix Houphouët-Boigny University, Abidjan, Côte d'Ivoire

<sup>3</sup>Medical Pediatrics Department of the Angré Hospital and University Center, Abidjan, Côte d'Ivoire

Email: azagoh.richard@gmail.com

**How to cite this paper:** Evelyne, A.-G.A., Richard, A.-K., Précieuse, G.A.C., Jean-Jacques, Y.A., Amandine, A.-N.A.C. and Gaudens, D.A. (2024) Prevalence and Factors Influencing Malnutrition among Children under Five Years of Age in a Peri-Urban Environment in Abidjan. *Open Journal of Pediatrics*, 14, 1063-1068.

<https://doi.org/10.4236/ojped.2024.146101>

**Received:** September 11, 2024

**Accepted:** November 5, 2024

**Published:** November 8, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Introduction:** Child malnutrition is a major public health problem in Côte d'Ivoire in sub-Saharan Africa. This study aimed to determine the prevalence and factors influencing malnutrition in children under five in the peri-urban area of Abidjan, the economic capital. **Patients and Methods:** We carried out a prospective cross-sectional analytical study from May 3<sup>rd</sup> to October 31<sup>st</sup> 2019 at the General Hospital of Yopougon Attié in a peri-urban district of Abidjan, the economic capital. The study included 522 children aged 0 to 59 months who were received for a consultation, with the informed consent of their parents. The assessment of nutritional status was based on WHO growth standards. Statistical comparisons were made using the Chi-2 test for a significant p-value below 5%. **Results:** The population was predominantly female (sex ratio of 0.91) with an average age of 8.21 months and overall modest socio-economic conditions. The prevalence of malnutrition was as follows: 3.45% of malnutrition by excess, including 0.57% of obesity, 16.09% of stunting (5.75% severe), 12.07% of underweight (3.45% severe), 8.04% emaciation (1.91% severe). Three risk factors were identified for default malnutrition: age less than 6 months ( $p = 0.022$ ), low birth weight ( $p = 0.003$ ), and prematurity ( $p < 0.0001$ ). **Conclusion:** Malnutrition by deficiency is common in peri-urban areas in Abidjan with the main risk factors being age less than 6 months, low birth weight and prematurity. Fighting against those risk factors could help improve the nutritional status of children under five in the peri-urban environment of Abidjan.

---

## Keywords

Children under Five, Nutrition Assessment, Malnutrition, Abidjan

---

### 1. Introduction

Malnutrition constitutes a major public health problem, particularly in developing countries. According to UNICEF in 2019, at least one in three children under the age of five were undernourished or overweight [1]. In West and Central Africa, wasting affected 7.3 million children in 2019 [2].

In Côte d'Ivoire, the 2011 national multiple indicator survey revealed rates of stunting, underweight and wasting, respectively of 30% including 12% severe, 15% including 3% severe and 8% including 2% severe. Overweight and obesity were 3%. The study by region showed lower rates in urban areas, respectively 21% compared to 35% in rural areas for stunted growth, 12% compared to 17% for underweight and there was no gap for wasting [3]. Several actions have been carried out to combat malnutrition, notably the creation of the national nutrition program which made it possible to put in place a national nutrition policy in 2015 [4]. Nearly a decade after the 2011 EDS and almost 5 years after the implementation of the national nutrition policy, it seemed appropriate to evaluate the prevalence of malnutrition among children under five years old and determine the factors that influence it in the commune of Yopougon, a peri-urban area of Abidjan, the economic capital.

### 2. Methods

We conducted a prospective study, from May 3<sup>rd</sup> to October 31<sup>st</sup>, 2019 (i.e., 6 months), at the Yopougon Attié general hospital, located on the outskirts of the city of Abidjan, the economic capital of Côte d'Ivoire. The study included 522 children under five years old. The criteria for entering the study were children aged 0 to 59 months, of consenting parents, seen for routine consultation at the Yopougon Attié general hospital, with a mother-child health record. Children in vital distress and those whose two parents were absent were not included. The criterion for exiting the study was the transfer to another care facility. As the patients were seen in a routine consultation, laboratory and radiological exams were not realised automatically but patients in need were conducted to the sick children consultation. The parameters studied were the socio-demographic and health characteristics, eating habits, and nutritional status. Data collection was carried out by interviewing, taking measurements and carrying out a complete physical examination of the child. The growth indices have been checked using the following anthropometric parameters: weight, height, head circumference, and weight/length, weight/age, length/age, body mass index (BMI). The Fenton growth chart for preterm infants was used for premature babies [5]. Nutritional status was assessed using WHO growth curves; classification was based on WHO reference

standards [6]. The following terms were defined for the study:

- Malnutrition: pathological state resulting from relative or absolute insufficiency or excess of one or more essential nutrients.
- Excess malnutrition: due to excessive food intake responsible for overweight or obesity, evidenced by a weight/height ratio greater than +2 Z score on the WHO growth curve [7].
- Malnutrition due to deficiency: due to insufficient food intake and including growth retardation (materialized by a height/age ratio less than -2 Z score on the WHO growth curve), underweight (materialized by a weight/age ratio lower than -2 Z score) and wasting (materialized by a weight/height ratio lower than -2 Z score). Micronutrient deficiencies were not taken into account in our study.

The analysis consisted of comparisons of means and proportions, and the statistical studies were carried out using the Chi-square test with a significant p-value below 5%.

### 3. Results

Our population was predominantly female (273 girls: 52.3%, a sex ratio of 0.91). The mean age was 8.21 months  $\pm$  10.52 with a median of 5 months. In 54% of cases, the individual daily budget was less than 500 FCFA (1 US dollar).

In terms of health, the children were born full term in 96.17% of cases. Birth weight was low in 13.22% and vaccination status was up to date for age according to the expanded vaccination program (EPI) in 79%. The study of feeding methods showed that at birth, 60% of children were fed with exclusive mother's milk, 36% with a mixed diet and 4% with an infant formula. At six months, the breastfeeding rate was 23.94% and most infants were fed with a mixed diet (55.37%) or infant formula (20.69%). The average age of diversification was 4.56 months  $\pm$  4 (range 1 to 15 months). Children were weaned in 18% of cases, all before 24 months, including 27.6% before 12 months. Sixteen children (3%) had at least one food ban, mainly an animal protein (81.8% for meat and 8.6% for fish) (see **Table 1**).

The study of nutritional status according to WHO criteria revealed 16.09% growth retardation (including 5.75% severe), 12.07% underweight (including 3.45% severe), 8.04% wasting including (1.91% severe) and 3.45% excess malnutrition including 3 cases of obesity (0.57%) and 15 cases of overweight (2.87%) (see **Table 2**).

The analytical study showed a significant link between malnutrition by deficiency and three factors: age less than 6 months ( $p = 0.022$ ), low birth weight <2500 g ( $p = 0.003$ ) and prematurity ( $p < 0.0001$ ) (see **Table 3**).

**Table 1.** Demographic and nutritional factors.

Demographic factors	
Age	Mean: 8.21 months $\pm$ 10.52
Sex	Ratio 0.91

## Continued

Individual daily budget	< 500 FCFA (1 US Dollar): 54%
	Full term: 96.17%
<b>Health status</b>	LBW: 13.22%
	Vaccination up to date for age: 79%
<b>Nutritional factors</b>	Breastfeeding: 59.96%
Feeding methods at birth	Mix diet: 36.02%, Infant formula: 4.02%
Feeding methods at 6 months	Breastfeeding: 23.94%
Average age of diversification	Mix diet: 55.37%, Infant formula: 20.69%
	4.56 months $\pm$ 4 (range 1 to 15 months) (including 27.6% before 12 months)
Food ban	3% (81.8% for meat and 8.6% for fish)

**Table 2.** Distribution of patients according to nutritional status.

nutritional status	Workforce (percentage)
Stunted growth	84 (16.09) of which 30 (5.75%) severe
Underweight	63 (12.07) of which 18 (3.45%) severe
Emaciation	42 (8.04) of which 10 (1.91%) severe
Malnutrition by excess	18 (3.45) of which 3 (0.57%) of obesity

**Table 3.** Factors influencing nutritional status.

	Normal N (%)	Malnutrition per deficiency N (%)	Total N (%)	P value
<b>Age (Month)</b>				
[0 - 6[	209 (72.07)	81 (27.93)	290 (100)	Khi2 = 4.46 P = 0.022
[6 - 12[	83 (79.80)	21 (20.19)	104 (100)	
[12 - 59[	95 (74.22)	33 (25.78)	128 (100)	
<b>Sex</b>				
Male	183 (73.49)	66 (26.50)	249 (100)	Khi2 = 3.26 P = 0.502
Female	204 (74.72)	69 (25.27)	273 (100)	
<b>Mother's education</b>				
Out-of-school or primary	277 (78.79)	75 (21.30)	352 (100)	Khi2 = 2.78 P = 0.268
Secondary school or university	131 (77.05)	39 (22.94)	170 (100)	
<b>Individual daily budget</b>				
< 1USD	210 (74.46)	72 (25.53)	282 (100)	Khi2 = 2.98 P = 0.367
$\geq$ 1USD	177 (73.75)	63 (26.25)	240 (100)	
<b>Term</b>				
Preemies	42 (60.86)	27 (39.13)	69 (100)	Khi2 = 6.07 P = 0.003
Term/post term	345 (76.15)	108 (23.84)	453 (100)	
<b>Birth weight (g)</b>				
< 2500	32 (46.38)	37 (53.62)	69 (100)	Khi2 = 31.96 p < 0.0001
> 2500	355 (78.37)	98 (216.3)	453 (100)	
<b>Type of diet at 6 months</b>				
Breastfeeding	85 (68.00)	40 (32.00)	125 (100)	Khi2 = 3.92 P = 0.198
> 2500	302 (76.07)	95 (23.93)	397 (100)	

## 4. Discussion

Yopougon, the setting for our study, is the largest commune in the city of Abidjan, the economic capital of Côte d'Ivoire. With its cosmopolitan population of 1,571,065 inhabitants, it is representative of the Ivorian population [8]. The poverty rate found in this municipality during our study was comparable to that noted nationally [9] and also in Sub-Saharan Africa [10].

The female predominance noted within our population contrasts with certain pediatric studies in children under 5 years of age [11]. This predominance, however, remains low (sex ratio of 0.91).

The prematurity rate of 2.49% in our study appears underestimated, compared to the 4 to 16% recorded by the WHO [12]. The rate of low birth weight was comparable to that of the MICS 2016 survey [13]. The exclusive breastfeeding rate of 60% is only a reflection of mothers' declaration, with the national exclusive breastfeeding rate being only 23.5% in 2016 [13] and 34% in 2021 [9]. The average age of diversification and weaning was lower than those recommended by the WHO [14].

Food prohibitions exist in all African cultures and societies, including in the Ivory Coast, and children are not spared [15]. In our study, 3% of children were affected, mainly by the ban on meat.

The prevalence of malnutrition among children under five was relatively lower in our study, particularly with regard to stunting. Indeed, the EDS-MICS 2011-2012 and the EDS 2021 revealed rates of 30% and 23%. This low rate noted in our study could be explained by the fact that it took place in a peri-urban area. In 2011 and 2021, the urban rates were 21% and 18%. This difference confirms the United Nations hypothesis that urban areas offer a generally higher standard of living than rural areas [16]. Regarding other forms of malnutrition, the rates were similar. The risk factors identified in our study are also recognized in the literature [3] [17].

## 5. Conclusion

Malnutrition remains common in peri-urban areas in Abidjan with a higher prevalence of malnutrition due to deficiency, particularly stunting. The main risk factors identified by our study are age less than 6 months, low birth weight and prematurity. Combating these factors could improve the nutritional status of children under 5 years old in peri-urban areas in Abidjan.

## Conflicts of Interest

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

## References

- [1] UNICEF. The Situation of the World's Children 2019. <https://www.unicef.org/fr/rapports/situation-enfants-dans-le-monde-2019>
- [2] UNICEF. West and Central Africa: More than 15 million Expected Cases of Acute Malnutrition in 2020. <https://www.unicef.org/wca/press-releases/west-and-central-africa-more-15->

- [million-expected-cases-acute-malnutrition-2020](#)
- [3] National Institute of Statistics (2013) Demographic and Health and Multiple Indicator Survey (EDS-MICS 2011-2012). Ministry of Health and the Fight against Aids, 561 p. <http://dhsprogram.com/>
  - [4] Republic of Côte d'Ivoire (2015) National Nutrition Policy. 23 p. <https://faolex.fao.org/docs/pdf/Ivc146623.pdf>
  - [5] Fenton, T.R. (2003) A New Growth Chart for Preterm Babies: Babson and Benda's Chart Updated with Recent Data and a New Format. *BMC Pediatrics*, **3**, Article No. 13. <https://doi.org/10.1186/1471-2431-3-13>
  - [6] World Health Organization. Training Course on Growth Assessment: WHO Child Growth Standards. <https://www.who.int/fr/publications/i/item/9789241595070>
  - [7] World Health Organization (1981) Development of Indicators for Continuous Monitoring of Progress towards Health for All by the Year 2000, Health for All. 102 p. <https://iris.who.int/handle/10665/40672>
  - [8] National Institute of Statistics (2022) 2021 General Population and Housing Census, Final Overall Results. Ministry of Planning and Development, 65 p. <https://www.ins.ci/RGPH2021/RESULTATS%20DEFINITIFSRP21.pdf>
  - [9] National Institute of Statistics, Ivory Coast (2021) Demographic and Health Survey 2021 (EDS-CI 2021). Ministry of State, Ministry of Planning and Development, 51 p. <https://dhsprogram.com/pubs/pdf/PR140/PR140.pdf>
  - [10] Hoogeveen, J., Mistiaen, J.A. and Wu, H. (2024) Accelerating Poverty Reduction in Sub-Saharan Africa Requires Stability. [https://blogs.worldbank.org/en/african/accelerating-poverty-reduction-sub-saharan-africa-requires-stability#:~:text=Poverty%20\(at%20%24%202.15\)%20increased.economic%20growth%20and%20poverty%20reduction](https://blogs.worldbank.org/en/african/accelerating-poverty-reduction-sub-saharan-africa-requires-stability#:~:text=Poverty%20(at%20%24%202.15)%20increased.economic%20growth%20and%20poverty%20reduction)
  - [11] Thurstans, S., Opondo, C., Seal, A., Wells, J., Khara, T., Dolan, C., *et al.* (2020) Boys Are More Likely to Be Undernourished than Girls: A Systematic Review and Meta-Analysis of Sex Differences in Undernutrition. *BMJ Global Health*, **5**, e004030. <https://doi.org/10.1136/bmjgh-2020-004030>
  - [12] WHO. Premature Births. <https://www.who.int/en/news-room/fact-sheets/detail/preterm-birth>
  - [13] National Institute of Statistics (2017) Multiple Indicator Cluster Survey—Côte d'Ivoire 2016 (MICS5). Ministry of Planning and Development, 410 p.
  - [14] WHO. Infant and Young Child Nutrition. <https://www.who.int/fr/news-room/fact-sheets/detail/infant-and-young-child-feeding>
  - [15] Akobi, S.B. (2021) Beliefs, Knowledge and Practices Regarding Breastfeeding and Dietary Diversification of HIV-Positive Mothers with Children Aged 6 to 23 Months in Abobo-Est (Abidjan, Ivory Coast). Dissertation, Senghor University of Alexandria (Egypt), 63 p. <https://hdl.handle.net/20.500.12177/7963>
  - [16] United Nations (2017) Principles and Recommendations for Population and Housing Censuses, Rev. 3. Department of Economic and Social Affairs, Statistics Division, 299 p. [https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles\\_and\\_Recommendations/Population-and-Housing-Censuses/Series\\_M67rev3-E.pdf](https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/Population-and-Housing-Censuses/Series_M67rev3-E.pdf)
  - [17] National Institute of Public Health, Quebec (Canada). Premature Births. [https://www.inspq.qc.ca/sites/default/files/responsabilite-population-nelle/f001\\_naissances\\_de\\_faible\\_poids.pdf](https://www.inspq.qc.ca/sites/default/files/responsabilite-population-nelle/f001_naissances_de_faible_poids.pdf)