

Analysis of the Evolution of Acute Malnutrition among Children Aged under Five in Côte d'Ivoire From 2016 to 2018

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Abbreviations: AC: Arm Circumference ; CNN: National Nutrition Council (Conseil National de Nutrition) ; FETP: Field Epidemiology Training Programme; MICS: Multiple Indicator Cluster Surveys; MUAC: Mid-upper Arm Circumference Measure; SDGs: Sustainable Development Goals; W/H: Weight/Height ratio; DHIS2: District Health Information Software 2

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Introduction

Malnutrition, including stunting, underweight, overweight, and obesity, are global public health problems. In 2016, approximately 1 billion people were underweight, 1.9 billion were overweight, and 650 million were obese. These conditions are linked to low and high income rates of child mortality.

In 2016, approximately 1 billion people were underweight, 1.9 billion were overweight, and 650 million were obese. These conditions are linked to low and high income rates of child mortality.

The development of global burden of disease and the malnutrition of 3.5 million children under 5 years old or more.

There are several factors that may directly affect malnutrition (Wasting) when associated with acute malnutrition.

Côte d'Ivoire

is affected by both the persistence of undernutrition and the accentuation of over nutrition. In 2012, Severe Wasting affected 7.5% of children under 5 years old [3]. However, this prevalence has been stabilized below the alert threshold (10%) in the regions concerned by nutritional emergency in the Great North region ("Grand Nord"). This situation remains fragile and requires increased monitoring. Many children continue to be born with low birth weight, particularly those in the group of teenage mothers who are themselves an at-risk population. In 2012, it was estimated that 14% of children were born weighing less than 2,500 grams. [3].

In June 2013, Côte d'Ivoire joined the global movement SUN (Scaling up Nutrition) based on the principle of the right to food and good nutrition for all. It has made the fight against malnutrition a national priority, demonstrating its commitment to the recommendations of the November 2014 ICN2 in Rome through the creation

of the National Council for Nutrition ("Conseil National pour la Nutrition").

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- The W/H z-score (weight/height ratio expressed in z-score): between -2 and -3 units of standard deviation (<-2 z-scores and ≥-3 z-score) from the median weight of the reference population, i.e. children of the same height (WHO child growth standards, 2006)
- The AC (arm circumference-for-age) : <125 mm and ≥115 mm

Severe Wasting is defined as:

- The W/H z-score (weight/height ratio expressed in z-score): less than -3 units of standard deviation (<-3 Z scores) from the median weight of the reference population, i.e. children of the same height (WHO child growth standards, 2006)
- The AC (arm circumference-for-age) : <115 mm.

The presence of bilateral oedema of the lower limbs always corresponds to Severe Wasting regardless of the W/H index and the AC.

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Data analysis was performed using the EXCELL spreadsheet. To facilitate the analysis of the data, we have subdivided Côte d'Ivoire into 3 zones (Zone 1, Zone 2, and Zone 3).

of large savannahs with thick grasses and resistant shrubs with increasingly marked Sahelian trends [6]. Each Zone contained more than 100 villages.



Zone 1: Sahelian zone, semi-arid climate, low rainfall, and high temperatures.

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	Year 2016		Year 2017		Year 2018	
	Live births	Low birth weight n (%)	Live births	Low birth weight n (%)	Live births	Low birth weight n (%)
Zone 1	438 324	30 441 (6,94)	449 863	29 854 (6,64)	478 143	25 540 (5,34)
Zone 2	333 351	23 933 (7,18)	342 491	23 827 (6,96)	361 280	21 788 (6,03)
Zone 3	171 250	17 725 (10,35)	176 125	16 159 (9,17)	192 931	14 179 (7,35)
Total	942 926	72 099 (7,65)	968 476	69 840 (7,21)	1 032 354	61 507 (5,96)

*n: number of cases

Table II: Prevalence of low birth weight in the 3 zones 2016-2018.

Examination of the monthly distribution of moderate and severe Wasting cases, all zones combined, shows two peaks, the largest of which, in July 2017, is of more than 5,500 cases (Figure 2). The

distribution of Wasting and Severe Wasting data cases are parallel with each other; Wasting cases being about twice as numerous as Severe Wasting cases.

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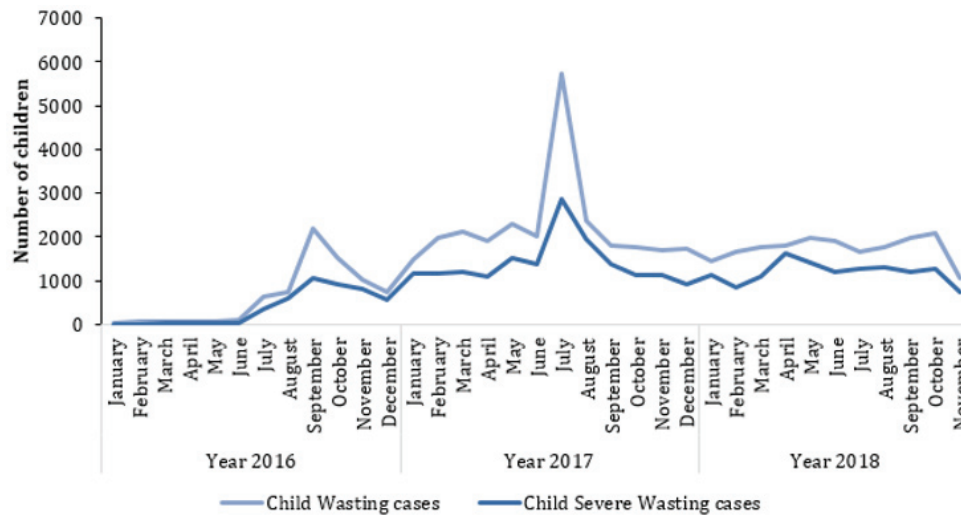


Figure 2: Monthly distribution of cases of Severe Wasting and Wasting among children under 5 years of age in Côte d'Ivoire; years 2016-2018.

The analysis of malnutrition data by geographical zone reveals that the malnutrition peaks mainly concern zone 3 (Figures 3 and 4), i.e. the north. We also note a peak in Severe Wasting cases in July 2017 in the centre of the country (Figure 4).

During 2018, no peak in Wasting cases was observed in zone 3, with a lower trend than in zones 1 and 2. An examination of Zone 1 data shows a late start of notification activities, starting only in December 2016 (Figure 3). A peak of Severe Wasting cases was observed in April 2018. (Figure 4).

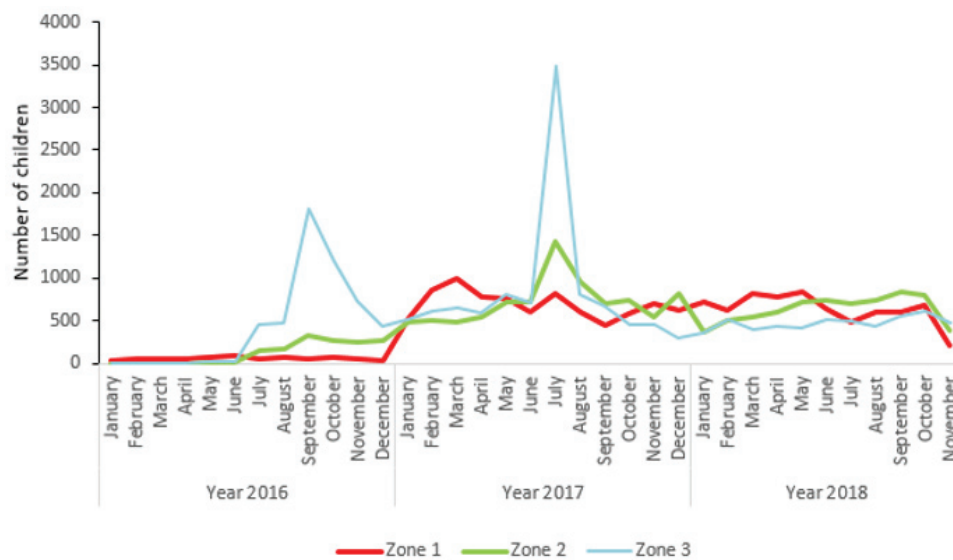


Figure 3: Monthly distribution of non-severe Wasting cases of children under 5 years of age in Côte d'Ivoire; 2016-2017.

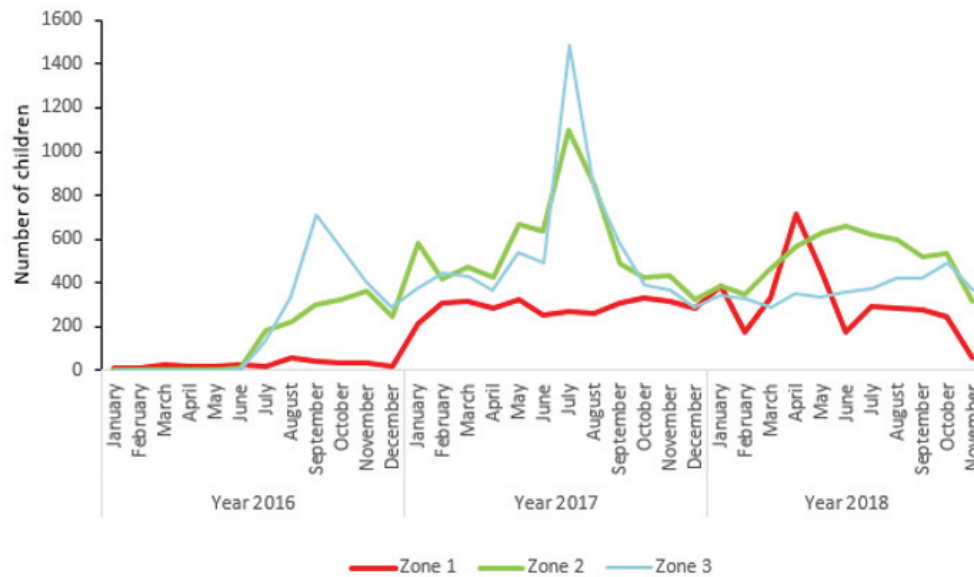


Figure 4: Monthly distribution of Severe Wasting cases of children under 5 years of age in Côte d'Ivoire; 2016-2017.

	Children < 5 years of age	YEAR 2016			YEAR 2017			YEAR 2018		
		Wasting n (%)	Severe Wasting n (%)	SW with cplic. n (%)	Wasting n (%)	Severe Wasting n (%)	SW with cplic. n (%)	Wasting n (%)	Severe Wasting n (%)	SW with cplic. n (%)
Zone 1	1 844 055	680 (0.04)	318 (0.02)	12 (0.00)	8264 (0.45)	3468 (0.19)	294 (0.02)	7004 (0.38)	3386 (0.18)	223 (0.01)
Zone 2	1 401 900	1443 (0.1)	1650 (0.12)	133 (0.01)	8611 (0.61)	6821 (0.49)	1220 (0.09)	6907 (0.49)	5645 (0.4)	965 (0.07)
Zone 3	728 667	5134 (0.71)	2437 (0.33)	206 (0.03)	10046 (1.38)	6612 (0.91)	409 (0.06)	5192 (0.71)	4079 (0.56)	177 (0.02)
TOTAL	3 974 022	7257 (0.18)	4405 (0.11)	351 (0.01)	26921 (0.68)	16901 (0.43)	1923 (0.05)	19103 (0.48)	13110 (0.33)	1365 (0.03)

*n: number of cases; SW with cplic: severe Wasting with complications

Table III: Incidence of Wasting among children under 5 years of age in Côte d'Ivoire, years 2016, 2017, 2018.

Incidence of Wasting among children under 5 years of age in Côte d'Ivoire was 0.18% in 2016, 0.68% in 2017, and 0.48% in 2018. This incidence is higher in the North (Zone 3) compared to the other zones and decreases over time. However, with regard to the incidence of Severe Wasting with complications, it is higher at the centre (0.09 vs. 0.06 in 2017 and 0.07 vs. 0.02).

Discussion

The National Multisectoral Nutrition Plan (PNMN) 2016-2020 was developed and adopted in 2016. Global targets include reducing

the low birth weight rate to 12% (14.8% of births in 2012) and reducing Wasting to 5%. [7]

However, we have noted that the prevalence of low birth weight observed from the general information system data in 2016 (7.65%) is much lower than the rate obtained in the last MICS 2016 survey (17%). [8]. This discrepancy could be explained more by poor sampling in the MICS 2016 survey than by a reporting problem. Indeed, after extracting the data, we were able to observe that low birth

weight was the only data variable that was systematically and regularly reported in all the health districts, without exception. However, under-notification cannot be ruled out.

It is from June 2016 that Wasting and Severe Wasting data start to appear in the general information system. This corresponds to the end of the training of the first cohort of health professionals in field epidemiology, FETP-frontline [9]. We attribute the impetus of the reporting activities to this training. This is confirmed by the late appearance of malnutrition data in zone 1; from December 2016 (Figure 3) which corresponds to the end of the training in epidemiology for health actors in this zone.

The malnutrition peaks observed in zone 3 correspond to the lean season (generally between July and September). Indeed, the nutritional situation in the north has always been critical due to the Sahelian (desert) climate. In July 2016, the alert threshold was reached in the north [8] leading to emergency interventions. In 2018, no peak in malnutrition was observed in the north. This is due to the many nutrition interventions that have been made in this area.

It should be noted that, in addition to this, the national nutrition program organises training courses for the diagnosis of Wasting, during which equipment is made available to the health districts (MUAC, scales, Z score tables, etc.). These interventions are re-launching reporting activities and are at the origin of data malnutrition peaks. For example, a peak of Severe Wasting cases was observed in April 2018, following training in the Abidjan region (Figure 4). All indications are that we are in a situation of under-reporting, judging by the increase in malnutrition cases as a result of reporting activities. This situation is often due to the lack of equipment to carry out nutrition diagnosis. In this context, the data obtained are difficult to interpret.

The upward trend in the malnutrition curves for zones 1 and 2 reflects both a problem in reporting cases of malnutrition and a problem of food availability. Indeed, the Ivorian forest is said to have shrunk from 16 million hectares to less than 2 million in about 50 years [10]. Forest destruction for cash crops has been to the detriment of subsistence crops [11]. This also raises the problem of the survival of wild food plants, which are a real source of nutritional supplements and currency in rural areas [12]. Many of them have played an important role in the survival of populations in the past, especially in times of war, drought and crop invasion by locusts. Many wild food species are now extinct or in short supply [12; 13].

The fact is that the nutritional situation remains a cause for concern despite the measures taken. The question is whether these are suitable? Nutritional epidemiological surveillance is more than indispensable in order to assess not only the nutritional situation in Côte d'Ivoire but also the impact and relevance of the actions carried out.

Conclusion

Côte d'Ivoire has made the fight against malnutrition a national priority. Several actions have been carried out. The impact of the actions carried out has been manifested by a Decrease of Wasting Cases in the North. However, Wasting remains high in the South and the Center. All indications are that we are in a situation of under-reporting. The nutritional situation in Côte d'Ivoire remains fragile, which is why routine surveillance needs to be the object of priority actions. Child malnutrition has lifelong consequences for health, human potential, economic development, prosperity and equity. Little information is available on the impact of food security and nutrition interventions due to the inefficiency of the monitoring and evaluation mechanism. Appropriate measures are needed for the management of malnutrition. For this, precise data is required. Evaluation of actions is necessary, hence the importance of prioritising epidemiological surveillance activities in general, in particular the implementation of a nutritional Early Warning System (EWS) in accordance with WHO recommendations.

Acknowledgments

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