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Nutritional status of the population of Haut-Sassandra (Central-Western Côte D'Ivoire)

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Abstract

Objective:

The present study assessed the nutritional status of the population as a whole in the Haut-Sassandra region using nutrition data from the regional health service.

Methodology and results:

The results of the qualitative assessment of nutritional status revealed that nutritional management in the Haut-Sassandra region had a high number (372534) of people having benefited from a nutritional assessment (weight gain and height). Acute malnutrition affected a significant number of the target population, with 1138 severe acute malnourished without complications and 2662 moderate acute malnourished. Thus, 2820 people were overweight and 1188 obese. However, stunting affected 44 children under the age of 5. The total population of Haut-Sassandra studied was made up of 165803 males, 214905 females, 61900 pregnant women and 27547 nursing mothers, for a total of 380708. Females accounted for the majority in 56% of cases, with a sex ratio of 0.77. Pregnant women accounted for the majority of cases (69%), although 61900 of the 89447 women were breastfeeding. People aged 25 and over represented the majority age group in 32.73% of cases, however, 45.11% of children under 5 were represented, which shows the real problem of nutritional health in the population as a whole. Among the population of Haut-Sassandra, 1138 were severely acutely malnourished without complication (13.92%); 322 were severely acutely

with complication (3.94%); 2662 were moderately acutely malnourished (32.57%); 2820 were overweight (34.50%); 1188 were obese (14.53%) and 44 were stunted (0.54%). This was referred to in the 2015 report on the analysis of the nutritional situation in Côte d'Ivoire, where it is stipulated that Côte d'Ivoire is experiencing the problem of the double burden of malnutrition marked by undernutrition (stunting, acute malnutrition, underweight, and micronutrient deficiencies) and the emergence of overnutrition (overweight and obesity) and nutrition-related chronic non-communicable diseases.

Partial conclusion

The nutritional status of the population of Haut-Sassandra was assessed. Data results showed that this region is heavily affected by non-communicable diseases.

Key words:

" Malnutrition, Nutritional status, Haut-Sassandra region, Population."

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Introduction:

According to the Food and Agriculture Organization of the United Nations (FAO), malnutrition affects almost 90% of the world's population, or 1 billion people in developing countries **(FAO, 2009).** Malnutrition can affect people at any age in a variety of ways. Worldwide, the three most common forms of micronutrient malnutrition are iron, vitamin A and iodine deficiencies. They affect at least a third of the world's population **(WHO & FAO, 2011).** Several studies have shown that malnutrition has multiple, overlapping causes. These causes have been organized hierarchically into immediate, underlying and fundamental causes.

It is estimated that in 2022, worldwide, around 149 million children under the age of 5 were stunted (too small for their age), 45 million were wasted (too thin for their height), and 37 million were overweight or obese **(FAO, 2022).**

In many African countries, the population consumes food to fill their stomachs, without taking into account the dietary balance (proteins, lipids, carbohydrates, vitamins and minerals). Yet nutrition plays an essential role in the optimal functioning of the body. The state of health of an individual or group influenced by diet, the level of nutrients in the body and the ability of these levels to maintain normal metabolic integrity is called nutritional status **(Shubhangini, 2012).** Nutritional status is the physiological state of an individual that results from the balance between nutrient requirements and intakes, and the body's ability to utilize these nutrients **(Srilakshmi, 2016).** A healthy population is essential for any country to be productive and promote national development. It is therefore the primary duty of every country to monitor and care for the health of its population. Nutritional status can be determined by correlating information obtained from a careful medical and dietary history, taking physical measurements of the body, clinical examination and appropriate laboratory tests. However, it has been reported that nutritional status is influenced by food consumption patterns, income, religion, attitudes, cultural practices, gender, lifestyle, education level, physiological status and age **(Srilakshmi, 2016).** These factors affect the quality and quantity of nutritional intake. Adequate dietary intake is essential, as nutritional well-being plays an important role in promoting and maintaining health. Poor nutritional status is associated with inadequate dietary intake.

Like other Sahelian countries, Côte d'Ivoire is no exception. Although Côte d'Ivoire has a diversity of food resources sufficient to feed its population, malnutrition remains a public health problem affecting all age groups: infants, pre-school and school-age children, adolescents, pregnant and breastfeeding women, and the elderly. It also affects adolescents, pregnant and breastfeeding women, and the elderly. These food resources are available on the markets **((Srilakshmi, 2016) ; Kanasop et al, 2014)).**

However, this has often been lacking both qualitatively and quantitatively in some communities, leading to the emergence of malnutrition. In Côte d'Ivoire, a food security survey was carried out in July 2011. It showed that around 29.3% of rural households surveyed in the ten development poles were food insecure, of which 6.9% were severely and 22.4% moderately food insecure **(EDS-CI, 2012).** This is the case of the Haut Sassandra region, which was considered an exemplar in terms of food security (98.7%). It is marked by a problem of malnutrition in all its forms.

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Despite the abundance of various foodstuffs in the Haut Sassandra region, undernutrition rates among children under 5 and other vulnerable groups persist and are on the rise. Given this situation, the major question is whether the nutritional status and quality of the food consumed by the population in the Haut Sassandra region are known? And what is the impact of the food consumed on the population's health? The aim of this research is to assess the nutritional status of households in the Haut Sassandra region, with a view to setting up programs to combat malnutrition.

Materials and Methods:

1. Presentation of the sampling study area

Data were collected from the regional health service to assess the nutritional status of the population in the Haut-Sassandra region. Haut-Sassandra is located in central-western Côte d'Ivoire. The region is bordered to the north by the Worodougou (Séguela) and Béré (Mankono) regions, to the south by the Gôh (Gagnoa) and Nawa (Soubré) regions, to the west by the Guémon (Duékoué) and Tonkpi (Man) regions, and to the east by the Marahoué (Bouaflé) region. Covering an area of 17,761 km², Haut Sassandra represents 5.5% of the national territory. It comprises four Departments: Daloa (capital), 141 km from Yamoussoukro and 383 km from Abidjan; Issia; Vavoa; Zoukougbeu. Its population is 1,611,490 **(Anonymous 1, 2022).**
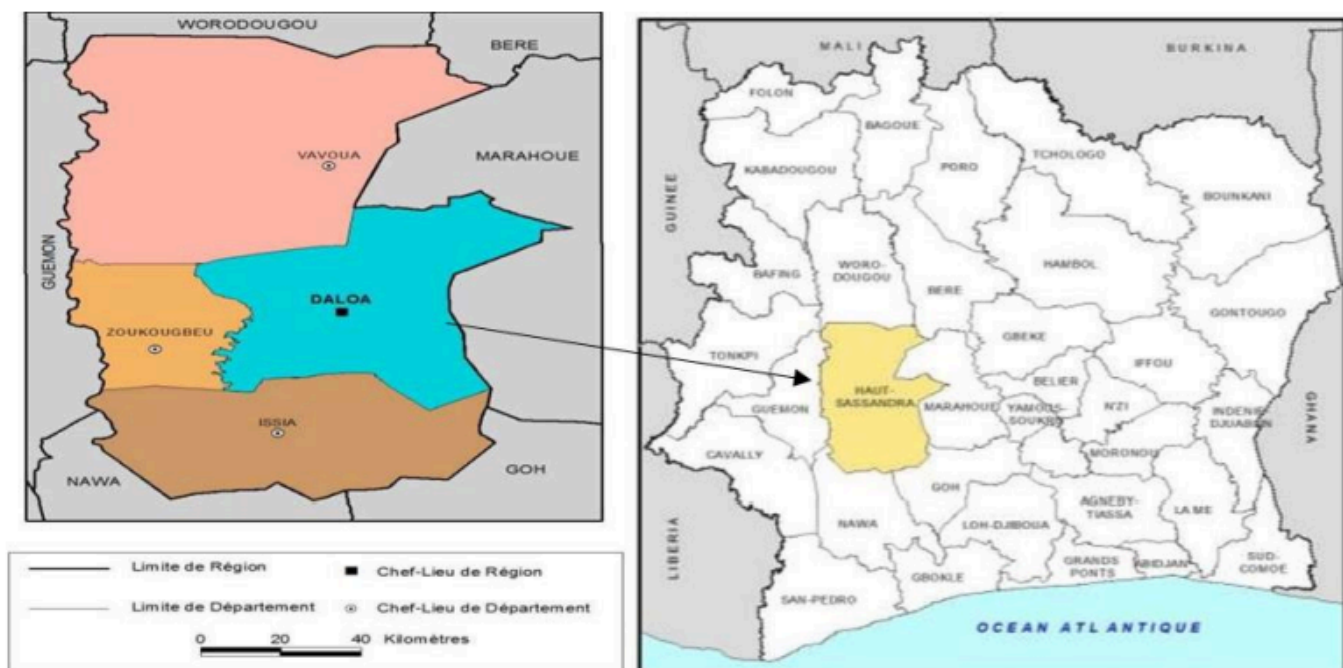
Source: INS, 2015
Figure 1: Map of the Haut-Sassandra region taken from the map of Côte d'Ivoire

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2. Preparation of collection tools

To assess the nutritional status of the target population, we based ourselves on indicators. The choice of these indicators, was obtained from the objectives of this work and highlight several indicators that were considered to be variables in the questionnaires to support our survey. The variables collected concerned: Number of people having benefited from a nutritional assessment; Severe acute malnutrition without complication; Severe acute malnutrition with complication; Moderate acute malnutrition; Overweight; Obesity; Growth retardation. The target population was made up of the following age groups: 0-5 months, 6-11 months, 12-23 months, 24-59 months, 5-9 years, 10-14 years, 15-19 years, 20-24 years, 25 years and over, pregnant and breastfeeding women.

Sampling and selection of respondents

Households participating in the survey were selected using the systematic sampling technique. The number of households surveyed was 500 urban households and 406 rural households determined according to the expression of **Giezendanner (2012).** The choice of the number of households in each department chief town was proportional to the demographic size of each department (quota sampling) and the number of households per department chief town.

$$n = t^2 x \frac{p(1-p)}{e^2}$$

With n: the sample size, e: the margin of error, t: the margin coefficient deduced from the confidence rate, p: the proportion of items in the parent population that exhibit a given property .

Table I: Number of households surveyed by study area

Departmental capitals	Number of households surveyed
Zougougbeu	72
Issia	208
Vavoua	254
Daloa	372

3. RESULTS

In order to meet the requirements of a healthy and profitable diet, it is important to take a closer look at nutrition data and assess the nutritional status of the population of the HautSassandra region. The aim of this study was to describe nutrition initiatives in the different departments of the Haut-Sassandra region. The aim was to gain a better understanding of the relationship between these actions and the quality of food consumed. This investigation is a prerequisite for, on the one hand, understanding the impact of nutritional status on the quality of food consumed and, on the other hand, identifying the nature and origin of risks in order to propose appropriate measures to reduce malnutrition and chronic diseases.

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Socio-demographic characteristics of target populations

Overall, 372534 interviews were carried out for the number of people who benefited from a nutritional assessment (weight and height gain), including 30560 (0-5 months), 25018 (6-11 months), 45433 (12-23 months), 67554 (24-59 months), 24721 (5-9 years), 13890 (10-14 years), 18210 (15-19 years), 25875 (20-24 years), 121273 (25 years and over), 61651 (pregnant women) and 27490 (breastfeeding women) (Table II).

Profile of target populations by nutritional status indicator

For severe acute malnourished without complications, there were 1138 in total, including 47 (0-5 months), 246 (6-11 months), 453 (12-23 months), 273 (24-59 months), 26 (5-9 years), 3 (10-14 years), 4 (15-19 years), 9 (20-24 years), 77 (25 years and over), 22 (pregnant women) and 1 (nursing women). Severe acute malnutrition with complications totalled 322, with 45 (0-5 months), 70 (6-11 months), 120 (12-23 months), 60 (24-59 months), 9 (5-9 years), 4 (10-14 years), 0 (15-19 years), 1 (20-24 years), 13 (25 years and over), 0 (pregnant women) and 0 (breastfeeding women).

As for moderate acute malnourished, 2662 in total with 0 (0-5 months), 290 (6-11 months), 527 (12-23 months), 408 (24-59 months), 259 (5-9 years), 153 (10-14 years), 131 (15-19 years), 195 (20-24 years), 699 (25 years and over), 47 (pregnant women) and 7 (breastfeeding women).

Thus, 2820 people were overweight, with 0 (0-5 months), 18 (6-11 months), 16 (12-23 months), 10 (24-59 months), 49 (5-9 years), 42 (10-14 years), 140 (15-19 years), 376 (20-24 years), 2169 (25 years and over), 142 (pregnant women) and 38 (nursing women).

Obesity affected 1188 people, including 0 (0-5 months), 3 (6-11 months), 2 (12-23 months), 4 (24-59 months), 9 (5-9 years), 10 (10-14 years), 72 (15-19 years), 147 (20-24 years), 941 (25 years and over), 38 (pregnant women) and 11 (breastfeeding women).

In addition, stunted growth affected 44 children under 5, including 8 (0-5 months), 12 (6-11 months), 13 (12-23 months) and 11 (24-59 months) (Tables II and III).

Table II: Presentation of target population by indicator

Age group	Sex	NPRNA	MAMW	SAMW	MAM	Overwei	Obesity	RC
Total		372534	1138	322	2662	2820	1188	44
F.A		27490	1	0	7	38	11	0
F.E		61651	22	0	47	142	38	0
25 years and+	M	79734	48	10	430	1341	684	0
	F	41539	29	3	269	828	257	0
20 – 24 years	M	17161	8	1	140	254	109	0
	F	8714	1	0	55	122	38	0
15 – 19 years	M	11358	2	0	75	104	50	0
	F	6852	2	0	56	36	22	0
10 – 14 years	M	7139	2	1	47	28	2	0
	F	6751	1	3	106	14	8	0
5 – 9 years	M	12007	11	3	132	27	5	0
	F	12714	15	6	127	22	4	0
24 – 59 months	M	33389	143	35	218	3	2	5
	F	34165	130	25	190	7	2	6
12 – 23 months	M	22233	250	46	280	8	0	6
	F	23200	203	74	247	8	8	7
6 – 11 months	M	12277	136	31	160	10	3	0
	F	12741	110	39	130	8	0	12
0 – 5 months	M	14704	29	19	0	0	0	5
	F	15856	18	26	0	0	0	3

M: Male;

F: Female

NPRNA: Number of people who received a nutritional assessment (weight and height)

MAMWC: Severe acute malnutrition without complications

SAMWC: Severe acute malnutrition with complications

MAM: Moderate acute malnutrition

PW: Pregnant women **NW :** Nursing women

GR: GrowthRetardation

Table III: Presentation of target population by indicator

	0 - 5 months		6 - 11 months		12 - 23 months		24 - 59 months		5 - 9 years		10 - 14 years		15 - 19 years		20 - 24 years		25 years and over		F.E	F.A	Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
NPABEN	15856	14704	12741	12277	23200	22233	34165	33389	12714	12007	6751	7139	6852	11358	8714	17161	41539	79734	61651	27490	**372534**
MASSC	18	29	110	136	203	250	130	143	15	11	1	2	2	2	1	8	29	48	22	1	**1138**
MASAC	26	19	39	31	74	46	25	35	6	3	3	1	0	0	0	1	3	10	0	0	**322**
MAM	0	0	130	160	247	280	190	218	127	132	106	47	56	75	55	140	269	430	47	7	**2662**
Overwei	0	0	8	10	8	8	7	3	22	27	14	28	36	104	122	254	828	1341	142	38	**2820**
Obesity	0	0	0	3	2	0	2	2	4	5	8	2	22	50	38	109	257	684	38	11	**1188**
RC	3	5	12	0	7	6	6	5	0	0	0	0	0	0	0	0	0	0	0	0	**44**

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Representation of target populations by sex and maternal status

The target population was made up of 165803 males, 214905 females, 61900 pregnant women and 27547 nursing mothers, for a total of 380708 (Figures 1 and 2).

Females accounted for the majority in 56% of cases, with a sex ratio of 0.77.
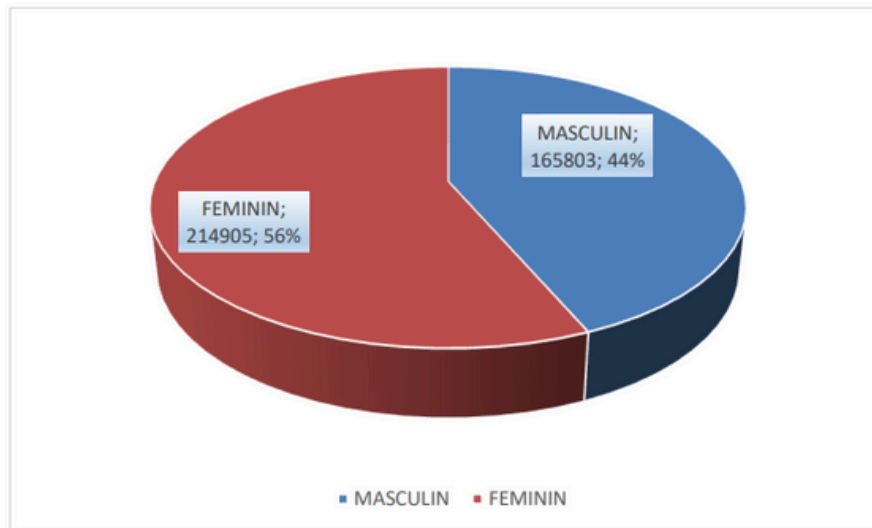

Figure 1: Representation by gender

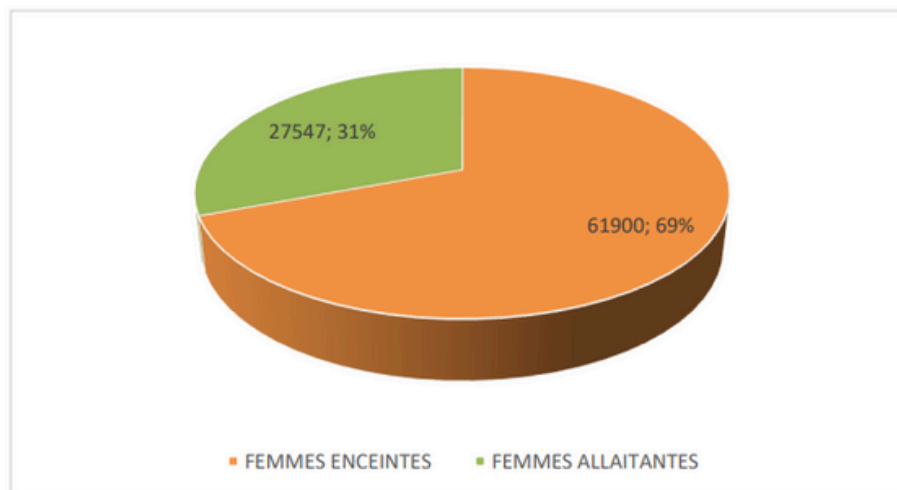Pregnant women accounted for the majority of cases (69%), although 61900 of the 89447 women were breastfeeding.

Figure 2: Breakdown of women by motherhood status

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Characteristics of target populations by nutritional category

Age range of target populations

People aged 25 and over represented the majority age group in 32.73% of cases, however, 45.11% of children under 5 were represented (Table IV). Table IV: Sample distribution by age group

N = 379548	Number	Percentage
0-5 months	30660	8,08%
6-11 months	25657	6,76%
12-23 months	46564	12,27%
24-59 months	68320	18,00%
5-9 years	25073	6,61%
10-14 years	14102	3,72%
15-19 years	18485	4,87%
20-24 years	26456	6,97%
25 years and over	124231	32,73%

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Representation of target populations by nutritional status

Among the target population (8174), 1138 were severely acutely malnourished without complications (13.92%); 322 were severely acutely malnourished with complications (3.94%); 2662 were moderately acutely malnourished (32.57%); 2820 were overweight (34.50%); 1188 were obese (14.53%) and 44 were stunted (0.54%) (Table V). Children aged 12-23 months were most affected by wasting (97.26%), while growth retardation was most prevalent in those aged 0-5 months (8%). Obesity was more prevalent among nursing mothers (19.3%), while 66.67% of these women were overweight (Table VI). Table V: Representation of target populations by nutritional status

N = 8174	Number	Percentage
Severe acute malnutrition without complications	1138	13,92%
Severe acute malnutrition with complications	322	3,94%
Moderate acute malnutrition	2662	32,57%
Overweight	2820	34,50%
Obesity	1188	14,53%
Stunted growth	44	0,54%

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Table VI: Distribution of different forms of malnutrition according to age

	Number	Emaciation	Obesity	Overweight	Stunted growth
0-5 months	100	92	0	0	8
		92,00%	0,00%	0,00%	8,00%
6-11 months	639	606	3	18	12
		94,84%	0,47%	2,82%	1,88%
12-23 months	1131	1100	2	16	13
		97,26%	0,18%	1,41%	1,15%
24-59 months	766	741	4	10	11
		96,74%	0,52%	1,31%	1,44%
5-9 years	352	294	9	49	0
		83,52%	2,56%	13,92%	0,00%
10-14 years	212	160	10	42	0
		75,47%	4,72%	19,81%	0,00%
15-19 years	275	135	0	140	0
		49,09%	0,00%	50,91%	0,00%
20-24 years	581	205	0	376	0
		35,28%	0,00%	64,72%	0,00%
25 years and over	2958	789	0	169	0
		82,36%	0,00%	17,64%	0,00%
Pregnant women	249	69	38	142	0
		27,71%	15,26%	57,03%	0,00%
Nursing mothers	57	8	11	38	0
		14,04%	19,3%	66,67%	0,00%
TOTAL	**8174**	**57,36%**	**1,05%**	**40,98%**	**0,60%**

.**Discussion**

The present study assessed the nutritional status of the population as a whole in the HautSassandra region, using nutrition data from the regional health service.

The results concerning the qualitative data of the nutritional status assessment revealed that nutritional management in the Haut-Sassandra region has a high number (372534) of people having benefited from a nutritional assessment (weight and height gain). This would appear to be due to the scale of chronic illnesses affecting this population. As a result, acute malnutrition affected a significant number of the target population, with severe acute malnourished without complications numbering 1138 and moderate acute malnourished 2662. Thus, 2820 people were overweight. Obesity affected 1188 people. However, stunted growth affected 44 children under the age of 5. This could be explained by the lack of nutrition interventions in the Haut-Sassandra region.

This is borne out by the results of the national Nutrition Intervention Mapping exercise. Of the 29 actions with available coverage, less than half cover more than 50% of their targets, and this in all regions. In regions with a high prevalence of chronic malnutrition, these actions could be strengthened **(RCI, 2015).**

The total population of Haut-Sassandra studied was made up of 165803 males, 214905 females of 61900 pregnant women and 27547 lactating women with a total of 380708. The female sex was in the majority in 56% of cases, with a sex ratio of 0.77. This contrasts with the results found by Laure Patricia **(Patricia, 2010),** whose male sex was in the majority in 51.5% of cases, with a sex ratio of 1.06. This could be explained by the sensitivity of the female sex to chronic diseases and their presence for nutritional management.

Pregnant women accounted for the majority of cases (69%), although 6,190 of the 89,447 women were breastfeeding. This majority could be explained by the lack of prenatal consultations, making them more susceptible to chronic diseases.

People aged 25 and over represented the majority age group in 32.73% of cases, however, 45.11% of children under 5 were represented, which shows the real problem of nutritional health in the Haut-Sassandra population as a whole.

Among the population of Haut-Sassandra, 1138 were severely acutely malnourished without complications, i.e. 13.92%; 322 were severely acutely malnourished with complications, i.e. 3.94%; 2662 were moderately acutely malnourished, i.e. 32.57%; 2820 were overweight, i.e. 34.50%; 1188 were obese, i.e. 14.53%; and 44 were stunted, i.e. 0.54%. This was referred to in the 2015 report on the analysis of the nutritional situation in Côte d'Ivoire, where it is stipulated that Côte d'Ivoire is experiencing the problem of the double burden of malnutrition marked by undernutrition (stunting, acute malnutrition, underweight, and micronutrient deficiencies) and the emergence of overnutrition (overweight and obesity) and nutritionrelated chronic non-communicable diseases **(RCI, 2015).**

The results showed that children over 12-23 months were most affected by wasting in 97.26% while stunting was more present in those aged 0-5 months in 8%. These results confirm our findings from the 2018 survey on the nutritional status of children surveyed in the dietary department of the Daloa CHR, where the prevalence of acute malnutrition (44.34%) is above 10% the acceptable threshold. This constitutes a fairly worrying nutritional situation in Daloa, and therefore in the Haut-Sassandra region, according to WHO standards, which indicate that a P/T index of between 5% and 10% is a severe situation, and at 10% the situation is considered

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serious, potentially leading to a nutritional emergency. However, stunting (64.15%) which was the most prevalent form in the Daloa region, in children aged 6 to 59 months to the lowest prevalence (8%) in children under 5 years in the Haut-Sassandra region **(Lassinan Ouattara, 2017).**

 Partial conclusion

The nutritional status of the population of Haut-Sassandra was assessed. The results showed that this region is heavily affected by non-communicable diseases. Indeed, 1138 people were severely acutely malnourished without complication, i.e. 13.92%; 322 severely acutely malnourished with complication, i.e. 3.94%; 2662 moderately acutely malnourished, i.e. 32.57%; 2820 were overweight, i.e. 34.50%; 1188 were obese, i.e. 14.53%; and 44 were stunted, i.e. 0.54%. Thus, nutritional deficiencies were 43.50% for wasting, 12.54% for obesity, 34.50% for overweight and 0.46% for stunted growth. The Haut-Sassandra region therefore needs to step up its efforts to improve nutritional status.

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