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Neglected Growth Retardation in Children Aged 6-59 Months in Developing Countries: Case of a Sub-neighborhood of Abidjan Cocody – Angré (Ivory Coast)

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Abstract: The aim of this work is to evaluate the growth retardation observed on children from 6 to 59 months in a suburb of Abidjan Cocody Angré. To this end, a cross-sectional, descriptive and analytical study was conducted at the community-based health facility in Abidjan (Cocody-Angré) over a three-month period (August to October 2016). In the course of this study, 958 children and mothers / accompanying persons were consulted. Of these children, 58 were suffering from retardation growth. Data were collected during the study period through the availability of structure staff, the use of growth curve tables and exchanges with selected mothers using individual questionnaires. These anthropometric data have been determined and compared with international ones. This study found that the age group of 12-23 months was more affected (41%) by stunting, most of whom had a low birth weight (57%) and belonged to a family where siblings exceeded more than 3 children (95%). Moreover, these results should be complemented by further studies to better define the scope of actions to effectively combat malnutrition in children in the CocodyAngré health area in Ivory Coast.

Keywords: Chronic Malnutrition, Child from 6 to 59 Months, Ivory Coast

1. Introduction

Chronic malnutrition is a public health problem in developing countries (Onis *et al.,* 2000). In infants and young children, chronic malnutrition affects growth as well as the development of staturo-weight, psychomotor and socio-emotional development (Aké-Odile *et al.,* 2010). This malnutrition generally appears during the weaning period which is around the age of six months (Zannou *et al.,* 2011). During this period, breast milk becomes insufficient to meet the growing needs of the infant, hence the introduction of other foods supplemented with weaning or complementary foods. Inadequate food intake and coverage of the body's growth needs inevitably leads to chronic malnutrition (Egnon et al., 2016). More than 195 million children under five years of age suffer of growth retardation with 90% living in developing countries (WHO, 2013). In Ivory Coast, According to the Demographic and Health Survey of Côte

d'Ivoire EDSCI- 2011-2012, 28% of children suffer from stunting due to chronic malnutrition, 74.3% with a high Mortality rate.

This malnutrition is often underestimated in so-called high income neighborhoods. The means available for the treatment of malnutrition in developing countries are more concentrated on acute malnutrition because of its lethal character (Michel *et* al., 2013). This study aims to evaluate the growth retardation in children under 5 years of age in a sub -quarter of Abidjan Cocody-Angré (Ivory Coast).

2. Equipment and Methodology

2.1. Equipment

An elaborate survey collection sheets containing questions for the collection of socio-demographic and anthropometric data as well as anthropometric measuring instruments (Administrative Documents, Mother-Child Birthbook, Shorr's Toise, Scale of Scales). The anthropometric measurements concerned weight, height and age.

2.2. Methodology

This cross-sectional descriptive and analytical study was carried out over a period of three months (August to October 2016). The sample for this study consisted of 958 children consulted in the community-based health facilities of Nimatoullah Abidjan Cocody-Angré (Ivory Coast), 58 of whom were stunted. Data were collected during this study period through the availability of structure staff, the use of growth-curve tables and exchanges with selected mothers using individual questionnaires. Anthropometric data were determined and compared with international standards.

2.3. Data Processing

The data from this study were processed with the excel 2007 version.

3. Results

3.1. Child's Characteristics and Nutritional Status

The age group of children aged 12-23 months was more affected with 41% of the sample, 66% female and 34% male.

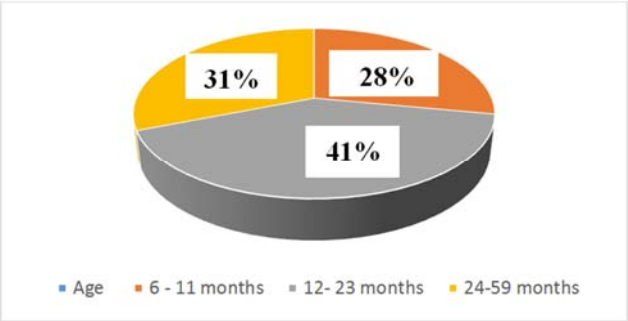

Figure 1. *Distribution of malnourished children by age.*

3.2. Influence of Sex in the Onset of Malnutrition

There was a female predominance of 62% compared to boys (38%), meaning a sex ratio of 1.63.

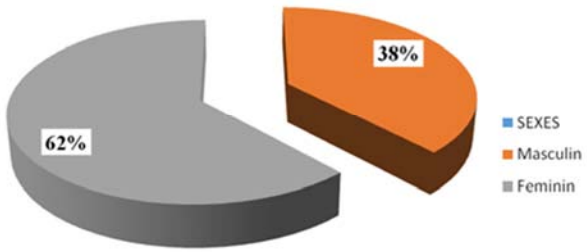

Figure 2. *Distribution of malnourished children by age.*

3.3. Influence of Rank in Siblings

Siblings of more than three children were more vulnerable to chronic malnutrition (93%) compared with other families.

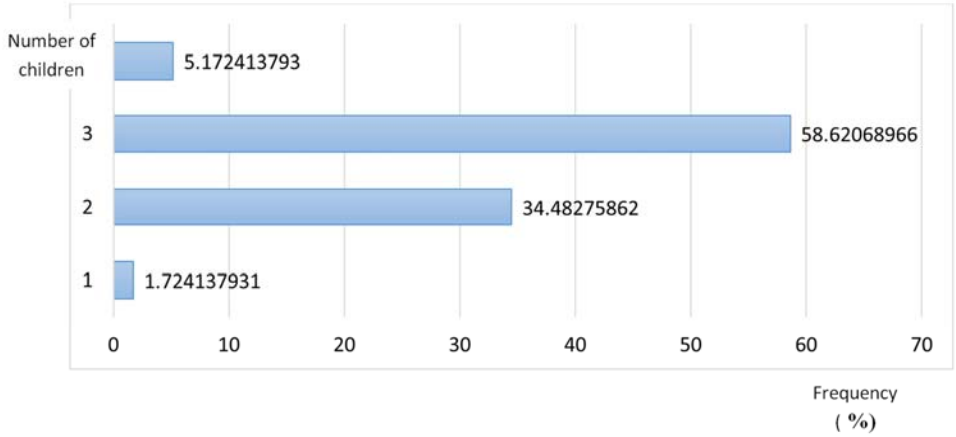

Figure 3. *Distribution of children by siblings.*

3.4. Influence of Feeding Mode at Birth

In this study, 69% of chronic malnutrition cases were recorded in children who received mixed diet (AM). Thus, although mothers reported breastfeeding exclusively, malnourished children remained slightly higher (19%) to those fed artificial milk (12%).

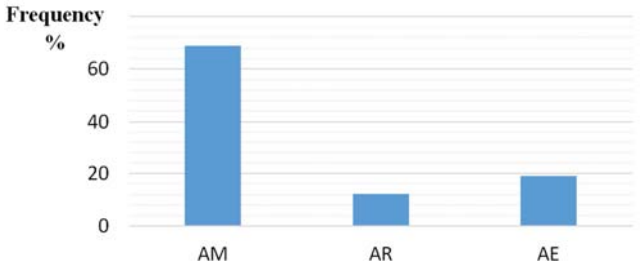

Figure 4. *Frequency of children according to food received at birth.*

AM: Mixed feeding (breast milk + artificial milk)
AR: Replacement power supply
AE: Exclusive breastfeeding

3.5 Distribution of Children by Age of Introduction of Supplementary Foods

In this study, 90% of registered malnourished children received supplemental food before the 6th month, of which 76% received it before the age of 3 months.

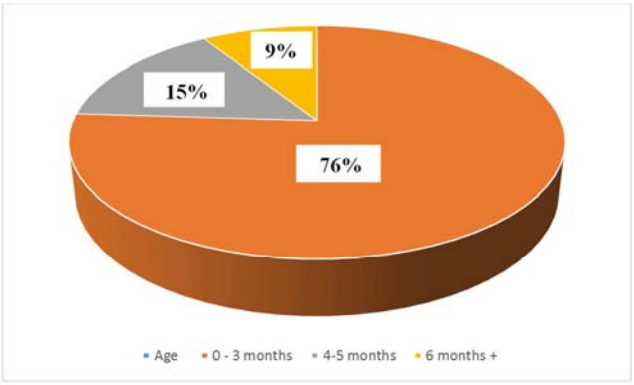

Figure 5. *Distribution of children by age of introduction of supplementary foods.*

3.6. Distribution According to Vitamin A supplementation

Children not supplemented with vita A registered the high rate of stunting (62%).

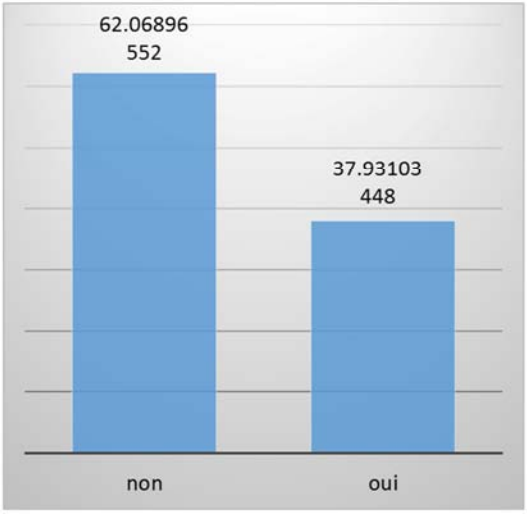

Figure 6. *Distribution according to supplementation in Vitamin A.*

3.7. Repartition According to Measles Vaccination Status

In the present study, more than half (51.7%) of children suffering from delayed growth had measles vaccines. In properly immunized children, stunting was 36%.

Table 1. *Distribution by measles vaccination status.*

	Children Vaccinated	Children not vaccinated	Children less than 9 months
Frequency (%)	37.93	51.7	10.37

* Each frequency is the ratio of the number of children to the total number of children.

3.8. Prevalence (%) of Chronic Malnutrition by Sex

The ratio of the size-for-age index was used to assess growth retardation. In both forms of chronic malnutrition, girls were in the majority. For a total of 58 children examined suffering from stunting, 46 of them had moderate chronic malnutrition or 79.3%. Girls accounted for 65.2% of this group. Similarly, 20.7% of children suffered from severe chronic malnutrition, 77% of which were attributed to girls.

Table 2. *Prevalence (%) of chronic malnutrition by sex.*

	Malnutrition Chronic moderate	Malnutrition Severe chronic
Girl	65.2	16.4
Boy	14.1	4.3

* Each frequency is the ratio of the number of children to the total number of children

3.10. Prevalence of Birth Weights of Children with Chronic Malnutrition

It was found that nearly 70% of children had a birth weight of less than 2500 grams, 47.91% of which was attributed to girls, compared with 22.91% of boys. For children weighing 2500 g, the proportion of boys was higher than for girls.

Girls 47.91 10.58

Boys 22.91 18.60 Prévalence des poids de naissance des enfants souffrant de malnutrition chronique

Table 3. *Prevalence of Birth Weight by Sex.*

	Birth weight ≤ 2500 g	Birth weight ≥ 2500 g
Girl	47.91	10.58
Boy	22.91	18.60

* Each frequency is the ratio of the number of children to the total number of children

4. Discussion

In this study, the age range of 12-23 months was the most represented with more than 41% of chronic malnutrition. It is higher than that found by Aouehougon, 2007 in her study on protein-energy malnutrition and its risk factors in children under five in the Tougan health district. This study found a predominance of girls compared to boys, with a sex ratio of 1.63. This ratio is much higher than those of Piechuleck and Mendoza, 2009 which recorded 1.05. Thus, there may be a

link between the female gender and chronic malnutrition in this study. These results are in contrast to those of Aouehougon, 2007, which reported 40.3% of boys and 37.1% Girls exposed to chronic malnutrition for the same age group. According to them, boys are more susceptible to chronic malnutrition than girls. The difference between these results and those of Aouehougon, 2007 could be explained by the sample size (58 children) of the present study, although it remains debatable.

It also emerged during the study that the number of consultation posts in the health facility, compared with the estimated one-time coverage of about 16 children per day, remains insufficient. In addition, problems related to the provision of services, breaks in inputs for care, a lack of communication to the communities, and a lack of information on the program to deal with stunting would be the Major difficulties that would prevent mothers from bringing children into the Nimatullah health facility. The same barriers were found in the national coverage survey in Sierra Leone by Ernest, 2011 and in a rural health area in the northeastern part of the Democratic Republic of Congo Kirerem et al. 1999.

Chronic malnutrition or stunting in size results from chronic health or nutrition problems with cumulative effects (PNN, 2015).

Siblings may influence the nutritional status of young children (Wamba, 2013). This study revealed that families with more than 3 children are more vulnerable to chronic malnutrition (93%), and the number of dependent children appears to reflect nutritional status in this study. Thus, the more the family is numerous, the less there is food to eat because, it is necessary to share the little food to a greater number of people. This observation is identical to that of the study conducted by Aké-Odile *et al.,* 2010, in the north of Ivory Coast.

In this study, although mothers reported breastfeeding exclusively, malnourished children remained slightly higher (19%) to those fed with artificial milk (12%). The benefits of a good nutritional start of the infant with breast milk is not verified in this study. This information suggests that breast milk would be given in addition to other foods. This finding is consistent with that of the National Nutrition Program (EDS-CI, 2012); Studies showed that the majority of mothers were breastfeeding, but only 12% did so exclusively. This information could be explained by the inadequate nutritional practices adopted with children during this period. These observations are consistent with those of Lalasoa, 2005 in their studies of malnutrition of children aged 0-5 years in Antananarivo, Madagascar. The study also found that over 69% of cases of chronic malnutrition were observed with children who received a mixed-feeding (AM) children. Unsuitable milk, mixtures, and dilutions were used with children under one year due to lack of information. These abilities are one of the causes of recurrent childhood diarrhea and pediatric diseases. These findings are consistent with those of Simonnet, 2014 in the study on artificial breastfeeding and its consequences on infants.

Early weaning (before 6 months) would favor the onset of stunting. This study found that the addition of weaning food supplemented with milk did not meet WHO standards for complementary foods. It appears that more than 90% of the malnourished children observed received complement food before the 6th month. Among this group of children, 76% received it before the age of 3 months. The availability of "cheap" flour commonly known as Anangobaka, due to low purchasing power, supported by a strong message of persuasion, causes mothers to opt early for this food. Consumption of this food may partly explain the stunting in children. Similar observations were recorded with Egnon et al. 2016 in their study on ‘’Anagobaka: what pathological risk on growing wistar rat?’’

The measles immunization coverage of this study was 51%. This study indicates that vaccination status is not associated to chronic malnutrition. This result is consistent with that found by Agbozognigbe et al. 2006 during their study "factors associated with malnutrition of children from 0 - 59 months in the village of Lagbo (Aklankpa) in Benin". They found that the association between vaccination status and malnutrition was not statistically significant.

On the other hand, the child population not supplemented with Vitamin A was the one with the high rate of stunted children (62%). Specific biochemical studies could confirm this correlation between Vit A and growth in infants.

5. Conclusion

This study showed that cases of chronic malnutrition are common among children under five years of age in the Nimatullah health facility. More than 16% of these children, including more than 62% of girls aged 6-59 months, suffer from chronic malnutrition in this study.

The risk factors associated with malnutrition are multiple and beyond the health sector, ranging from low birth weight to large household sizes to the large number of infants per household.

Studies consulted in connection with ours have confirmed that these factors are linked to chronic malnutrition in other regions.

It is important to know the extent of chronic malnutrition and its risk factors. However, it would be necessary to use these findings to limit the inter-generational cycle as much as this malnutrition affects girls more than boys in this study. Indeed, the fight against this form of malnutrition requires the support of the community, the partners, the authorities as well as the actors of health and especially the latest scientific advances.

In sum, this study shows that improving the nutritional status of children is the necessary condition for the reduction of chronic malnutrition in Ivory Coast.

Nevertheless, as these studies have significant limitations, it would be important to carry out further studies to invalidate or confirm the prevalence of chronic malnutrition in the nimatullah health facility.

6. Limitations of the Study

Data were collected in a very short time of the year (three months, 90 days). In addition, the study was conducted from August to October, a period corresponding to the vacancy period in Côte d'Ivoire. This could influence the prevalence of chronic malnutrition as food availability and the arrival of village holidaymakers in Abidjan is usually very high at this time. In these conditions, the results on the number of chronic malnutrition that came to the consultation can only reflect the situation of this period of the year.

It was also found that the study of the factors associated with chronic malnutrition in a global way, without distinction between the different forms, was not addressed in this study. These factors represented indications of some probable causes of chronic malnutrition for subsequent analytical studies. Moreover, since this study is of a cross-sectional type, it does not pretend to underline any causal relationships.

Finally, it should be recognized that this work has not been able to take into account all the factors that seem to be associated with chronic malnutrition (hygiene, case management, food safety, serum balances, etc.). Further and complementary studies could take into account all these aspects in the Abidjan Cocody-Angré (Ivory Coast) Community Health Center.

7. Ethical Considerations

The participation was voluntary after a discussion on the subject matter with the mother of the child who came in consultation. The information was collected after the informed consent of the mothers.

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