



Analysis of the Impact of Food Insecurity on Antiretroviral Treatment in Subjects Living with HIV followed at Houphouët Boigny Hospital of Abobo

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Abstract

In order to research the repercussions of food insecurity on antiretroviral treatment in subjects living with HIV, a cross-sectional study with a descriptive and analytical aim has been carried out from October to November 2020 with 132 patients suffering from HIV-AIDS and on antiretroviral treatment for more than a year at the general hospital of Abobo Nord (Côte d'Ivoire). The majority of respondents lived in food insecurity including 12.12% in severe food insecurity, 15.90% practiced poor adherence to treatment and 10.60% had experienced treatment failure during the last 12 months. The study found a relationship between severe food insecurity, acute malnutrition, poor adherence and failure of antiretroviral therapy ($p < 0.05$).

Analysis of these results made it possible to understand that severe food insecurity strongly associated with malnutrition has repercussions on ARV treatment through three mechanisms which are: the fragility of the immune system linked to acute malnutrition, poor compliance with treatment with as a corollary resistance to molecules and failure of antiretroviral treatment. In view of these results, it would be advisable for the assessment of food security to be systematically integrated into the medical visits of PLHIV, in order to detect the most vulnerable persons and provide them with better care.

Keywords: Food Insecurity; HIV-AIDS; Antiretroviral Treatment; Côte d'Ivoire

Introduction

Food and nutrition security is ensured when all people, at all times, have economic, social and physical access to sufficient, safe and nutritious food that meets their nutritional needs and food preferences to enable them to lead active lives and healthy. It thus allows any individual to practice a noble activity representing for him a source of food or financial means necessary to cover his food and other subsistence needs [1]. This individual whose diet and livelihood are secure can then invest more in these activities and diversify them. However, it appears to be vulnerable to certain shocks such as disease, among which the HIV-AIDS pandemic looms large [2].

HIV-AIDS is a viral and fatal infectious disease that attacks and weakens the immune system, even forcing people to take drugs for life. This disease, which would disrupt the living conditions of populations and their families, indeed keeps them unable to work or earn a salary to ensure food security, while their medical costs

and their nutritional needs are increasing [3]. This could affect the antiretroviral (ARV) treatment.

According to UNAIDS (2020) [4] over 38 million people are living with HIV worldwide. In Africa, more than 26 million people are affected and over 75% of patients are on antiretroviral therapy. Among these patients, recent research has shown a rapid increase in treatment failures, especially in the less well-off countries. (UNAIDS, 2020)

The Ivory Coast, a developing country located in sub-Saharan Africa, is going through a worrying health situation that should attract everyone's attention. Indeed, it records the high prevalence of HIV in the sub-region (around 3%) [5] and is strongly affected by resistance to ARVs [6].

In addition, food and nutritional insecurity affects a large part of the population, especially those infected and affected by HIV (7.10%) [7].

Faced to this situation, a public health and nutrition research team decided to verify the probable responsibility of food and nutritional insecurity in the failure of antiretroviral treatment in people living with HIV-AIDS.

Thus, the research hypothesis was as follows: patients who are food and nutrition insecure experience more relapses during anti-retroviral therapy.

In order to verify this hypothesis, the following specific objectives have been formulated

- Determine the socioeconomic characteristics of the respondents and their level of vulnerability to food insecurity;
- Evaluate the level of food security, compliance and the rate of treatment failure;
- Evaluate the relationship between food insecurity and failure of anti-retroviral treatment

Study material

Period and framework of the study.

The investigation took place from October 20 to November 20, 2020 at the Abobo-Nord general hospital in the Abobo-Est health district located north of Abidjan, in the south-east of the Côte d'Ivoire. The municipality of Abobo is bounded by the town of Anyama to the north, by Williamsville, Adjamé and the two-Plateaux district of Cocody to the south. To the east by Angré-Cocody and to the west by the Banco forest. The population of Abobo is estimated at around 2,500,000 inhabitants in an area of 10,000 ha (100 km²) [8].

It has fifteen (15) public health establishments spread over the twenty-three (23) sub-districts of which it is composed. These hospitals are organized according to a two-level health pyramid. The primary level, made up of 13 first-contact health establishments (community health center, basic health facilities) and the secondary level made up of two referral health establishments for the first referral (general hospitals) including the Abobo Nord General Hospital, which served as the framework for our study.

In this hospital several services are available, namely a biological analysis laboratory, a general surgery, dental surgery, gynecology-obstetrics, pediatrics, ENT, ophthalmology, and medicine service where the patient is taken. burden of adults with HIV AIDS.

Data collection tools

The data were collected using a questionnaire designed for this purpose and validated during a pre-survey carried out at the Koumassi general hospital by a team of 03 medical students from the University Félix Houphouët Boigny. previously trained. The pre-survey covered 20 patients. The questionnaire was structured in three parts: in the first part we have the description of the so-

cio-economic characteristics of the patients. The second part assessed household food security. The last part highlighted aspects related to ARV treatment such as adherence to treatment, development of CD4 count, occurrence of opportunistic diseases during treatment and treatment failure.

Methods

Type of study

This is a cross-sectional study with a descriptive and analytical aim, which used qualitative and quantitative approaches relating to aspects of food and nutritional security but also the criteria for evaluating the clinical and immunological failure of the treatment (compliance with treatment, CD4 count and occurrence of opportunistic diseases).

Sampling and selection of respondents

Sampling

The required household sample size was calculated by applying Fisher's formula

$$N = t^2 \times p (1-p) / m^2$$

N = required sample size

t = 95% confidence level (typical value of 1.96)

p = estimated prevalence of food insecurity in the area. This prevalence is 7% according to food security assessment surveys carried out in 2015 by the national nutrition program.

m = margin of error at 5% (typical value of 0.05)

Calculation

$$N = \frac{1.96^2 \times 0.07 (1-0.07)}{0.0025}$$

The minimum sample expected in this study is 100 respondents.

The selection of respondents

The selection of respondents was carried out according to a systematic random method with application of sampling steps. The sampling interval being the number of patients who separate two sampled respondents. The calculation of the sampling interval was done by dividing the total number of patients in the active queue of HIV patients (2530) obtained at the hospital by the number of patients to be surveyed (100).

$$P = 2530 / 100 = 25.30$$

The first patient was chosen from the random random number table and had to be an integer random number between 1 and the sampling step (25,30). The patient with number (3) had been drawn and was the first patient to be investigated.

The choice of the other patients surveyed was made by adding the sampling interval each time (25,30).

Special cases.

When the selected patient did not meet the inclusion criteria or refused to participate in the study, he was replaced by another, each time adding the survey step (25,30) until the minimum size was obtained.

Data collection process

Once the patient has been selected, he is contacted, an appointment is made to obtain his consent and that of his head of household before starting the survey. The investigation took place in two phases: a first phase of administering the questionnaire to the patient, taking anthropometric measurements and collecting data (given for the evaluation of the ARV treatment) in the patient’s file at the hospital then a second phase in the household which consisted in surveying the household head on nutritional food security and livelihoods.

Statistical analysis

Data entry and analysis were done with SPSS 20 software. Quantitative variables were expressed as means with standard deviation and extreme values. Qualitative variables were expressed as a proportion.

Food security analysis

The food security assessment was carried out using the Food And Nutrition Technical Assistance (FANTA) method proposed by the FAO [9]. It consisted in sending the patient’s head of household a survey sheet comprising 9 questions relating to the availability, use, accessibility and stability of food in the household. All of these questions are asked assuming a 4 week (30 day) recall period.

Analysis of cases of therapeutic failure

Treatment failure was identified according to international criteria adopted in Côte d’Ivoire (MSHP, 2018) [7]. This is the occurrence of clinical manifestations testifying to the progression of the disease during treatment or immunological manifestations characterized by a considerable decrease in the CD4 count between two consecutive samples or virological manifestations based on an explicable increase in blood cell count. viral load [7].

Analysis of the relationship between food insecurity and cases of treatment failure

Levels of food insecurity and treatment outcome (failure or not) were expressed as a proportion. The comparison of the proportions was made using the Chi-square test or the Chi-square test with Yates correction or using Fisher’s exact test when the conditions for applying the Chi-square test were not met. The threshold of significance was set at a value of $p \leq 0.05$.

Ethical aspects

With regard to ethical considerations, the health authorities of the district of Abobo-Est were informed, the respondents and their heads of households participated in the study after free and informed consent. Confidentiality was guaranteed to them by assigning an anonymity number to each investigation sheet.

Results

Total sample size

After good awareness-raising among patients and hospital nursing staff, we were able to obtain the adhesion and consent of 132 patients, or 32 additional patients.

Socio-economic characteristics and vulnerability to food insecurity.

There are 17% of respondents who are between 50 and 75 years old and 8% who are between 18 and 29 years old. The majority (75%) of them are between 30 and 49 years old and the average age of the study population is 42 years old. In terms of sex, women are the most dominant with 75% and a sex ratio of 3 women to 1 man.

Regarding livelihoods, 6.8% of respondents are peasants, 53% of them do small jobs and 16.70% live on external aid. Large trade is practiced by 3.78%. Employees occupy 19.70%. Indeed, the livelihoods of the interviewees are dominated by small businesses providing daily income and small businesses.

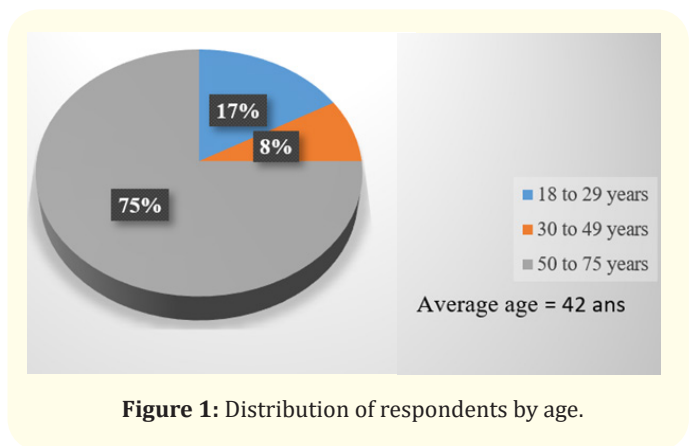


Figure 1: Distribution of respondents by age.

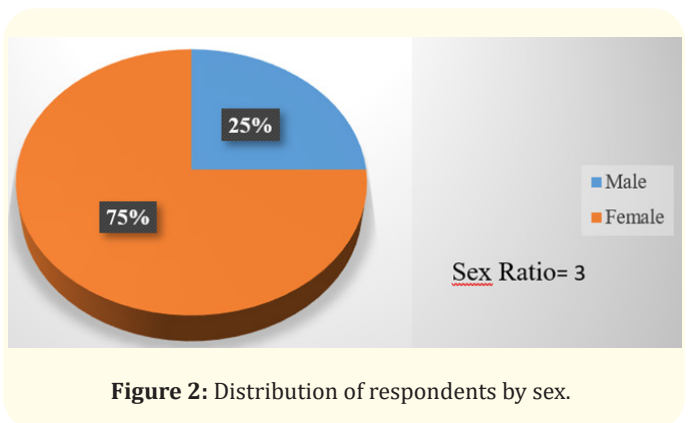


Figure 2: Distribution of respondents by sex.

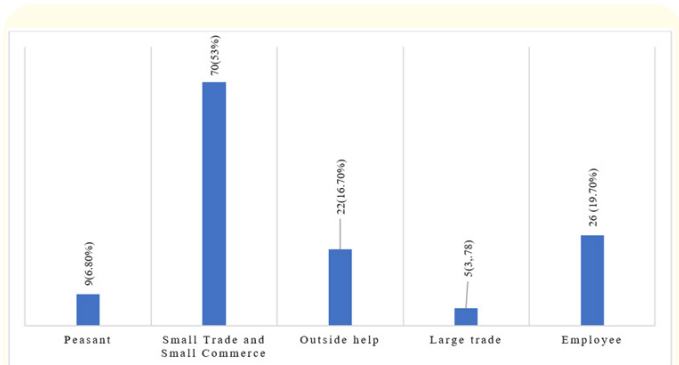


Figure 3: Distribution of respondents according to the means of subsistence of their households.

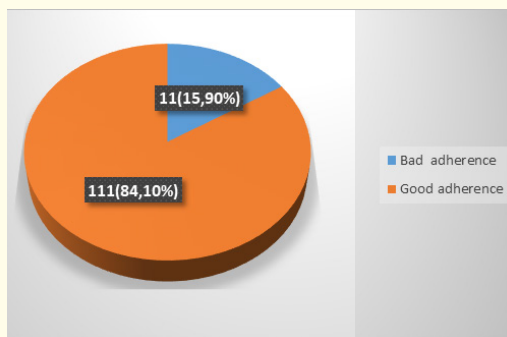


Figure 5: Distribution of respondents according to antiretroviral treatment adherence.

Food security and antiretroviral treatment

The majority of patients and their households live in food insecurity (83%) including 29.56% in light food insecurity, 41.66% in average food insecurity and 12.12% in severe food insecurity. Thus, the majority of respondents live in a situation of food insecurity.

The practice of poor adherence to antiretroviral treatment is found in 15.90% of the patients surveyed against 84.10% who are correctly observing. According to those concerned (21), the poor compliance with the treatment is due to the side effects of the molecules (57.14%), to the lack of financial means to go to the hospital and receive care (23.80%), but also to the temporary discontinuation of treatment (19.06%).

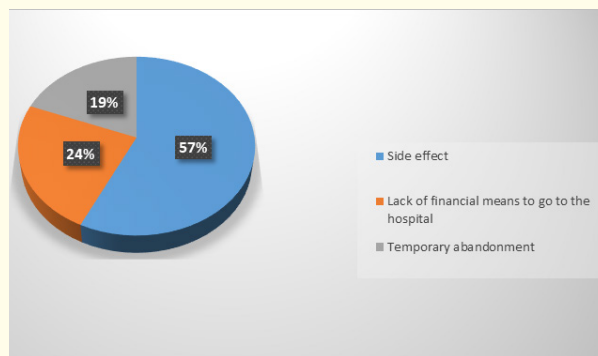


Figure 6: Distribution of respondents according to the reason for poor compliance.

Treatment failures during the last 12 months were found in 10.60% of patients.

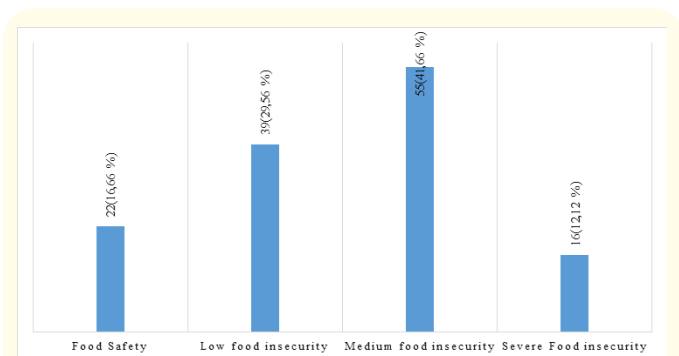


Figure 4: Distribution of respondents according to the level of food security in households.

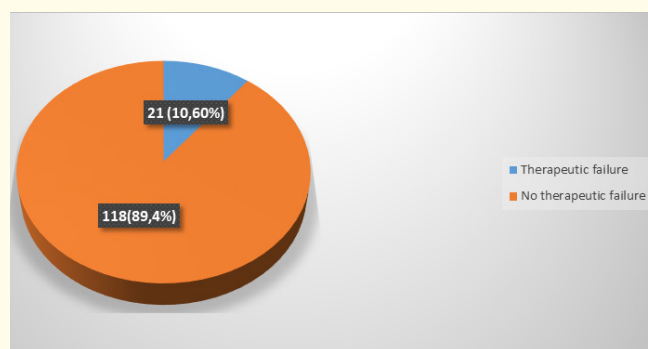


Figure 7: Distribution of respondents according to antiretroviral treatment failure experience.

Relationship between food security and antiretroviral therapy

The intersection of food safety and treatment adherence has shown that patients with low to moderate food insecurity do not have poor adherence. On the other hand, a relationship was determined between poor adherence to ARV treatment and those with severe food insecurity ($p < 0.05$). Also, research into the link between food insecurity and antiretroviral treatment failure has shown that a relationship exists between severe food insecurity and treatment failure ($p < 0.05$). However, no relationship has been identified at the level of other food insecure classes.

Food security level	Good compliance	Poor compliance	P value
Food Safety	20	2	0,523
Low food insecurity	37	2	0,053
Medium food insecurity	48	7	0,398
severe food insecurity	6	10	0,011
Total	111	21	-

Table 1: Relationship between food security and adherence to ARV treatment.

Food security level	No failure	Failure	P value
Food Safety	22	0	0,164
Low food insecurity	38	1	0,102
Medium food insecurity	53	2	0,559
Severe food insecurity	5	11	0,004
Total	118	14	-

Table 2: The Relationship between food safety and ARV treatment failure.

Discussion

The study involved a population of 132 adult patients, living with HIV-AIDS and receiving antiretroviral therapy for HIV for more than 12 months. The average age of the patients is 42 years and the female sex dominates the sample (75%) with a sex ratio of 3 in favor of women. These results are superimposable on those of YAO, according to which women are most affected by the disease in the region of Abidjan, which corresponds to our study area (YAO, 2012) [10].

In terms of livelihoods, the interviewees live on agriculture, small trades and small businesses, foreign aid, large businesses and monthly salaries for civil servants. These professional social groups are dominated by workers in small trades and small businesses with 53%. Our results are close to those of Maria Teresa Cuonzo, in her article entitled: Small trades and the informal economy sector in Africa, which reveals that small trades occupy more than 60% of the Abidjan population (Cuonzo, 2003) [11]. Moreover, these results show us that all socio-professional layers are affected by HIV-AIDS, however the most affected remain the least well off.

The majority of the study population (83%) and their households live in food insecurity including 29.56% in light food insecurity, 41.66% in moderate food insecurity and 12.12% in severe food insecurity. These figures are higher than those of the national trend (71%) [7] and confirm the vulnerability of this segment of the population apart.

Regarding ARV treatment, there is a rate of voluntary discontinuation of treatment and poor compliance of 15.90%. According to the patients, this poor compliance is explained by the temporary abandonment of the treatment (19%), the lack of financial means

to go to the hospital (24%) and especially the side effects of the molecules (57.14%) such as dizziness, disturbed alertness, nausea, vomiting, and diarrhea which are signs exacerbated by irregular meals during treatment [12]. These results are very close to those of the longitudinal study measuring patient compliance with ARV treatment carried out in 1997 in France and published by Carrieri and his colleagues in 2001 [13]. This study proved that 17% of the patients followed had poor adherence to treatment and that irregular meals were one of the contributing factors. In Kenya, a study carried out in 2006 showed that patients enrolled in the food support program while undergoing antiretroviral therapy reported better treatment adherence, fewer side effects related to food and less food-related side effects [14].

There is also a significant treatment failure rate estimated at 10.60%. These results are similar to those of Ojesina [15] who found in a study in OYO state in Nigeria, a treatment failure rate of 10%.

After an analysis of the relationship between food security, poor adherence and failure of antiretroviral therapy, it emerges that there is indeed a relationship between severe food insecurity and poor adherence to antiretroviral therapy ($p < 0.05$). This relationship could be explained by the fact that some antiretroviral molecules must be taken with food to minimize side reactions [16]. Thus, food insecure patients are exposed to side effects which are one of the main reasons for poor adherence.

In terms of treatment failure, there is a relationship between severe food insecurity and failure of ARV treatment ($p < 0.05$). Indeed, patients who are severely food and nutrition insecure have more relapses during antiretroviral therapy and justifies the re-

search hypothesis of the present study. This could be explained by the fact that the latter are exposed to malnutrition and less adherent to treatment. Malnutrition indeed prevents a good evolution of the level of CD4 T lymphocytes and weakens the immune system [17]. Regarding non-compliance with treatment, it leads to resistance of the virus to drugs [13]. The combination of these two phenomena, namely drug resistance and fragile immune system, inevitably lead to a high treatment failure rate [3].

Confirming the relationship between food security and poor adherence and failure to antiretroviral therapy allows us to understand the impact of food security on ARV therapy. Indeed, HIV/AIDS affects household food security by destroying their livelihoods, thus leading to food and nutritional insecurity. The severe food insecurity strongly associated with acute malnutrition has repercussions on ARV treatment through three mechanisms which are: the fragility of the immune system linked to malnutrition, poor adherence to treatment with the corollary of resistance to molecules and failure of the drug. ARV treatment due to the combination of the first two factors.

Conclusion

The impact of food and nutrition insecurity on ARV treatment is severe and can have enormous consequences on the life of the patient. This study found a relationship between severe food insecurity, poor treatment adherence and antiretroviral treatment failure. Indeed, severe food insecurity strongly associated with malnutrition has repercussions on ARV treatment by three mechanisms which are: the fragility of the immune system linked to acute malnutrition, poor compliance with treatment with the corollary of resistance to molecules and failure of antiretroviral therapy. In view of these results, it would be advisable for the assessment of food security to be systematically integrated into the medical visits of PLHIV, in order to detect the most vulnerable and provide them with better care.

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