

Research Article

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“Factors Associated with Malnutrition among Adults Living with HIV in the Rutshuru Health Zone (DRC)”

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ABSTRACT

Introduction: The aim of this study was to determine the factors associated with malnutrition among adults living with HIV (PLHIV) in the Rutshuru Health Zone.

Methodology: The study was a 4-month cross-sectional analysis of 307 adult PLHIV undergoing antiretroviral treatment (ART). Malnutrition was assessed by calculating the body mass index (BMI) and food insecurity by the food insecurity score (HFIAS - FANTA).

Results: The prevalence of malnutrition was 13% and food insecurity 71%. Diarrhoea was a factor associated with malnutrition { $p = 0.013$; OR = 3.113; 95% CI = [1.236-7.836]}.

Conclusion: Malnutrition and food insecurity were significant among adult PLHIV on ART, and diarrhoea was an exposure factor. Shortcomings in the provision of care were noted among providers. Hence the need to implement nutritional education and capacity-building programmes for care providers at the sites surveyed.

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Introduction

Human Immunodeficiency Virus (HIV) infection and malnutrition are public health problems, particularly in the food-insecure countries of sub-Saharan Africa. Approximately one adult in four infected with HIV suffers, and in 25% to 50% of cases dies, from malnutrition [1,2]. Studies have shown that HIV infection and malnutrition interact, and ART is only effective if it is accompanied by adequate nutritional intake [3]. A good nutritional status of PLHIV helps them to stay on ART, increase their CD4 count, reduce their viral load and combat opportunistic infections (OIs) [4]. Achieving the last 95 strategic UNAIDS goals (elimination of viral load in 95% of PLHIV on ART) and the vision of Zero new HIV infections, Zero discrimination and Zero AIDS-related deaths depend on good nutritional status [5-10].

Despite all the achievements in the fight against HIV and the new strategies for access to ART described above in African countries in general, efforts are still needed in the care of PLHIV in the DRC [11]. This particularly concerns the nutritional aspects of adult PLHIV, which are still poorly documented in terms of the associated factors and the bottleneck linked to access to food. Surveys carried out in the provinces of Lualaba and Kinshasa in

the DRC have shown that nutritional support activities for adult PLHIV are poorly integrated into health services [4,12,13].

In the province of North Kivu, affected by the activism of armed groups and the resurgence of the 23 March Movement (M23), which prevents the population from freely engaging in farming activities, 70% of which are sources of income, studies on the nutritional status of adults living with HIV and its determinants are non-existent. Hence this study, which we conducted in the Rutshuru health zone. This health zone is prey to the activism of armed groups and the resurgence of the M23 war, the source of poor food security. This situation would seriously affect the response to HIV infection and ART among PLHIV.

We believe that by documenting the nutritional situation of PLHIV, the results could highlight their nutritional problem and lead to more interventions in favour of PLHIV. In addition, the determinants found could enable evidence-based interventions to be put in place. The aim of this study is to determine the factors associated with malnutrition in PLHIV in order to put forward recommendations for improving their state of health.

Materials and Methods

This was a cross-sectional analytical study. The study ran from 1

April to 31 July 2021, i.e. 4 months. Adults living with HIV/AIDS on ARV treatment constituted our statistical unit. The following were excluded from our study: PLWHA under 18 years of age, PLWHA on ARV treatment for less than 3 months, PLWHA not being followed up in health care institutions selected for reasons of convenience, PLWHA meeting the above criteria but who refused to sign the letter of consent. The sample size was calculated using the Lunch formula.

Five health care facilities responsible for the care of PLWHA were chosen by convenience. These five facilities alone account for nearly 80% of the PLWHA in the health zone, while the other facilities have few PLWHA, which is why they were excluded.

To collect the data, we carried out a literature review using the registers and records of PLHIV in the various care facilities in the Rutshuru health zone. We also used a structured, pre-tested questionnaire to collect information that was not available on the forms or in the registers. After quality control, the data were collected using kobocollect and analysed using SPSS version 25. The chi-square test was used in the bivariate analysis to identify associations between independent factors and malnutrition in adult PLHIV on ART.

Presentation of Results

Socio-Demographic Characteristics of the PLHIV Surveyed and their Association with Malnutrition

Table I shows the socio-demographic characteristics of the 307 PLHIV surveyed in the Rutshuru HZ.

Table I shows the following:

- The average age of the study subjects was 41.9 years (± 10.7), ranging from 18 to 74 years;
- The majority of the PLHIV interviewed were women, and nearly eight out of ten were malnourished;
- Around seven out of ten people surveyed were heads of household;
- Only 28% of the PLHIV surveyed had a good level of education, and of these around 40% were malnourished;
- The average household size was 6 people (± 3), with extremes ranging from 1 to 13 people;
- Approximately nine out of ten PLHIV surveyed had an occupation that was not very enumerative, i.e. petty trade and agriculture, and almost nine out of ten were malnourished;
- 57.3% of the PLHIV surveyed did not live with a partner, and nearly six out of ten of them were malnourished;
- No socio-demographic factors were associated with malnutrition.

Table 1: Socio-Demographic Characteristics of PLHIV Surveyed and their Association with Malnutrition in the Rutshuru HZ in 2021

Variable	Terms	Nutritional status		Total (N=307)	OR	IC	P
		Good condition (n=267)	Poor condition (n=40)				
Gender	Male	60 (19,5%)	8 (2,6%)	68 (22,1%)	1,159	0,507-2,649	0,453
	Female	207 (67,4%)	32 (10,4%)	239 (77,9%)			
Status of head of household	Yes	194 (63,2%)	30 (9,8%)	224 (73,0%)	0,886	0,412-1,903	0,461
	No	73 (23,8%)	10 (3,3%)	83 (27,0%)			
Level of study	Good level	71 (23,1%)	15 (4,9%)	86 (28,0%)	0,604	0,301 - 1,210	0,108
	Low level	196 (63,8%)	25 (8,1%)	221 (72,0%)			
Household size	Less than or equal to 6 people	167 (54,4%)	21 (6,8%)	188 (61,2%)	1,511	0,775-2,948	0,149
	More than 6 people	100 (32,6%)	19 (6,2%)	119 (38,8%)			
Occupation	Gainful occupation	25 (8,1%)	2 (0,7%)	27 (8,8%)	1,963	0,447-8,625	0,286
	Low-paid occupation	242 (78,8%)	38 (12,4%)	280 (91,2%)			
Marital status	Not living with a partner	152 (49,5%)	24 (7,8%)	176 (57,3%)	0,881	0,448-1,735	0,425
	Living with a partner	115 (37,5%)	16 (5,2%)	131 (42,7%)			

Proportion of adult PLHIV on Tarv with Malnutrition by Fosa

The figures below show the proportion of adult PLHIV on ART with malnutrition, the different forms of nutritional status and the weight of each health facility. Figure 1 shows:

- o The proportion of malnutrition among adult PLHIV on ART is 13%. This prevalence includes all three forms of malnutrition: mild, moderate and severe;
- o The Rutshuru HC comes 1st with 5.5% of cases in a poor nutritional state.

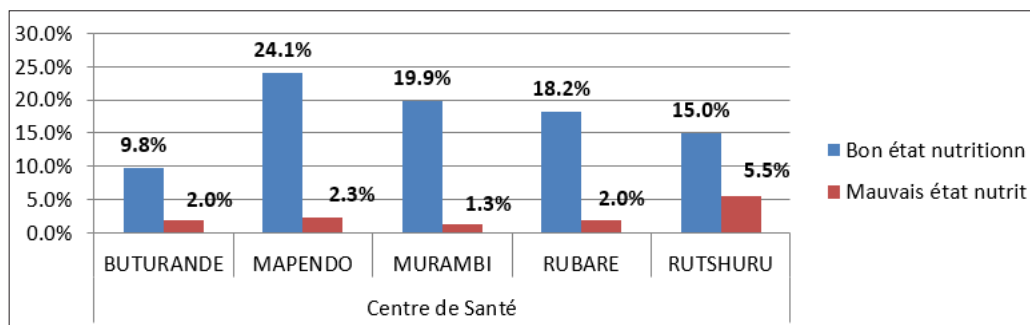


Figure 1: Distribution of Nutritional Status by Health Facility of PLHIV Surveyed in the Rutshuru HZ in 2021

Prevalence of food Insecurity among adult PLHIV on Tarv

Figure 2: below shows the prevalence of food insecurity among adult PLHIV on ART in the Rutshuru HZ. Figure 2 shows that 71% of respondents are food insecure, i.e. around seven out of 10 PLHIV surveyed are food insecure.

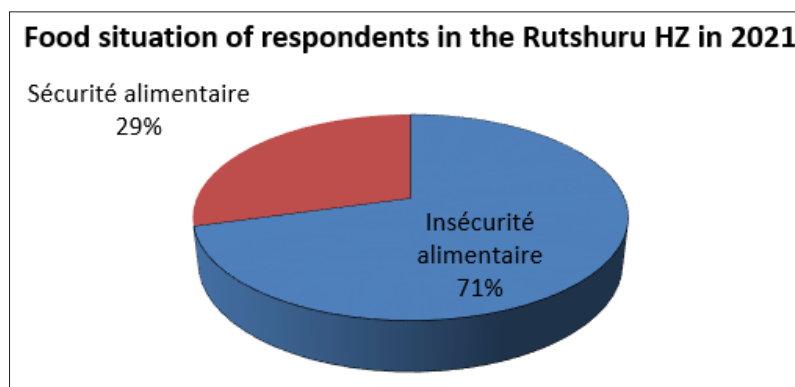


Figure 2: Prevalence of food Insecurity among adult PLHIV on ART in the Rutshuru HZ in 2021

Nutritional factors and their Association with Malnutrition

Table II shows the nutritional factors of the 307 PLHIV surveyed in the Rutshuru HZ. Table II shows that the number of meals per day was identified as the only nutritional factor associated with malnutrition, with an OR of 2.777, a CI [1.387-5.560] and a p value of 0.003.

Table II: Facteurs Nutritionnels et Leur Association a la Malnutrition des PVVIH Enquetees Dans la ZS de Rutshuru en 2021

Variable	Terms	Nutritional status		Total	OR	IC	p
		Good condition (n=267)	Poor condition (n=40)				
Food consumption restrictions	Yes	14 (4,60%)	0 (0,00%)	14 (4,60%)	1,158	1,107-1,2012	0,135
	No	253 (82,40%)	40 (13,00%)	293 (95,40%)			
Ingestion of traditional products	Yes	4 (1,30%)	1 (0,30%)	5 (1,60%)	0,593	0,065-5,445	0,505
	No	263 (85,70%)	39 (12,70%)	302 (98,40%)			
Do you smoke cigarettes	Yes	13 (4,20%)	1 (0,30%)	14 (4,60%)	1,998	0,254-15,688	0,434
	No	254 (82,70%)	39 (12,70%)	293 (95,40%)			
Intake of indigenous alcohol	Yes	36 (11,70%)	5 (1,60%)	41 (13,40%)	1,091	0,401-2,967	0,549
	No	231 (75,20%)	35 (11,40%)	266 (86,60%)			

Number of meals per day	2 or more meals a day	160 (52,10%)	14 (4,60%)	174 (56,70%)	2,777	1,387-5,560	0,003*
	Less than 2 meals a day	107 (34,9%)	26 (8,50%)	133 (43,30%)			
Advice at each visit	Yes	68 (22,1%)	9 (2,9%)	77 (25,1%)	1,177	0,533-2,597	0,427
	No	199 (64,8%)	31 (10,1%)	230 (74,9%)			
Food situation	Food insecurity	188 (61,2%)	29 (9,4%)	217 (70,7%)	0,903	0,430-1,896	0,474
	Food security	79 (25,70%)	11 (3,60%)	90 (29,30%)			

Health factors and their Association with Malnutrition

Table III shows the health factors of the 307 PLHIV surveyed in the Rutshuru HZ. Table III shows that the following factors were identified as being associated with malnutrition with a p value of < 0.05: mouth sores (oral candidiasis), diarrhoea and TB/HIV infection.

Table III: Health factors and their Association with Malnutrition among PLHIV Surveyed in the Rutshuru HZ in 2021

Variable	Terms	Nutritional status		Total (N=307)	OR	IC	p
		Good condition (n=267)	Poor condition (n=40)				
Compliance with ARV treatment	Good compliance	252 (82,1%)	39 (12,7%)	291 (94,8%)	0,431	0,055-3,353	0,357
	Poor compliance	15 (4,9%)	1 (0,3%)	16 (5,2%)			
Unwanted events following ARV treatment in the last 3 months	Yes	10 (3,30%)	1 (0,30%)	11 (3,60%)	1,518	0,189-12,184	0,568
	No	257 (83,70%)	39 (12,70%)	296 (96,40%)			
Mouth sores in the last 3 months	Yes	5 (1,60%)	10 (3,30%)	15 (4,90%)	0,057	0,018-0,179	0,000*
	No	262 (85,30%)	30 (9,80%)	292 (95,10%)			
Diarrhoea in the last 2 month	Yes	5 (1,60%)	23 (7,50%)	28 (9,10%)	0,014	0,005-0,042	0,000*
	No	262 (85,30%)	17 (5,50%)	279 (90,90%)			
Cough in the last 3 months	Yes	19 (6,20%)	5 (1,60%)	24 (7,80%)	0,536	0,188-1,528	0,188
	Non	248 (80,80%)	35 (11,40%)	283 (92,20%)			
TB treatment	Yes	5 (1,60%)	5 (1,60%)	10 (3,30%)	0,134	0,037-0,485	0,005*
	Non	262 (85,30%)	35 (11,40%)	297 (96,70%)			
Weight loss in the last 3 months	Yes	49 (16,00%)	11 (3,60%)	60 (19,50%)	0,593	0,277-1,267	0,127
	Non	218 (71%)	29 (9,40%)	247 (80,50%)			

Logistic Regression Model

In our logistic regression model, only the following variable significantly influences the nutritional status of adult PLHIV on ART in the Rutshuru health zone: Diarrhoea in the last 2 months.

Table IV: Adjusted ORs for the Association between factors and Malnutrition among PLHIV Surveyed in the Rutshuru HZ in 2021

	Model	coefficients Standardised		Coefficients No-Standardised		Probability
		B	Standard error	Beta	OR	
1	Constant	6,458	2,316	637,764	7,77	0,005
F1	Diarrhoea in the last 2 months	-3,959	0,664	0,019	35,59	0,000*
F2	Mouth sores	-0,631	0,897	0,532	0,49	0,482
F3	TB treatment	0,14	1,035	1,15	0,02	0,893
F4	Number of meals per day	-0,57	0,454	0,566	1,58	0,209

Discussion

The mean age of the subjects in our study was 41.9 years (± 10.7) close to that (41.16 years ± 10.81) found in the KAMINA health zone in the DRC by MPEMBA Edo, 38.5 years by SIDIBE S et Coll and (39.9 years ± 8.7) found by the Bernadette T [14]. Picbougoum panel. Picbougoum panel [12,15]. This shows that HIV infection is prevalent among young adults not only in the DRC, but almost everywhere else in Africa. Young adults make up the active workforce. The fact that they are affected by HIV infection will lead to a drop in productivity, which in turn will lead to food insecurity and malnutrition [12,15]. More than two out of three adults (68%) and almost 90% of children infected with HIV live in sub-Saharan Africa. HIV/AIDS continues to have serious consequences for nutrition, food security and other socio-economic aspects of people infected and affected by HIV [8]. HIV and AIDS also have serious repercussions on agricultural production and employment. Families lose their capacity to work and produce. The poorer households become, the more difficult it is for them to obtain food and cover their most basic needs [16].

Approximately 80% of our surveys were conducted among women, and malnutrition affected women working in low-paying jobs such as farming and petty trading. In sub-Saharan Africa, HIV-positive women are in the majority and are more exposed than men [12,15]. According to the DHS II, HIV prevalence is very high among widows (7.9%) and divorced/separated women (2.9%), so the trend is still towards feminisation and ruralisation [17]. This places a heavy burden on rural women and makes them vulnerable to extreme poverty [12,15]. In the Rutshuru HZ, a large proportion of the population earns its living from agriculture or petty trade. With the kidnapping and armed group phenomena in this region, the population has less access to large-scale farming activities. The onset of HIV infection is thought to be one of the causes of physical weakness, frequent absences from work, stigmatisation, job loss, low productivity and low household income, all of which are factors leading to food insecurity and malnutrition [12,18]. MPEMBA Edo found in his work that a large proportion of PLHIV are women, widows and for the most part heads of households, engaged in low-paying activities (petty trade, agriculture), with the majority of them responsible for more than 6 people in the household etc [14]. The DRC has a generalised epidemic, with a general prevalence of 1.2% and 3.5% among pregnant women. According to the 2010 sero-surveillance report, the epidemic is also tending to become more juvenile, more feminised, more rural and more concentrated along the river and in mining and border regions [16].

The prevalence of malnutrition among adult PLHIV on ART is 13% and that of food insecurity 71%. These results are close to those found by KOUAME YAO Sébastien, who found a prevalence

of malnutrition of 11.2% among PLHIV on ART. He justified this prevalence by the existence of poor health and eating habits among patients, unbalanced diets due to food insecurity and a lack of information about the disease and a lack of information [19]. In Burkina-Faso Bernadette T. Picbougoum et al. found a prevalence of malnutrition of 18.5%, KOUAME Kouadio Lambert found a prevalence of 12.4% [20,21]. MPEMBA KALONDA Edo in 2019 in the KAMINA health zone found a prevalence of malnutrition of 27.2%, i.e. nearly three people in ten were malnourished, and food insecurity was insecurity of 94.7%. He justifies this prevalence probably by the size of his sample, which was small [14]. SIDIBE S. et al found a prevalence rate of 19.6%. In addition, the territory of Rutshuru has been facing political insecurity for more than a decade, which means that the population has less access to their fields, leading to poverty within the community. Since poverty is a major cause of household food insecurity, the prevalence of malnutrition among PLHIV is bound to be high [12]. In resource-rich countries such as Canada, recent research has shown that the prevalence of food insecurity among PLHIV ranges from 49% to 71%. In Quebec, the prevalence was estimated at 58%, according to a 2013 study. While food insecurity is widespread among people living with HIV/AIDS in wealthy countries, it is increasingly recognised in Canada that this situation is one of the main determinants of their health. Food insecurity and HIV/AIDS are closely linked, with both conditions exacerbating each other. Food insecurity also depends on a range of factors that can be described as aggravating conditions. According to Olivier Nkakudulu of the WFP, West and Central Africa are characterised by a level of food insecurity in excess of 30%, with chronic malnutrition accounting for 40% and acute malnutrition 17-20%, leading to risks of HIV infection [3]. Agriculture is the main source of food for most people living in rural areas. A reduction in production factors can lead to food insecurity due to a lack of food, and can result in malnutrition [16].

Diarrhoea had a statistically significant association ($p=0.000$) with malnutrition. This result is similar to that of KOUAME KOUADIO Lambert, since diarrhoea is a frequent OI and causes undernutrition in 80% of PLWHA. According to MPEMBA K., in his study of factors associated with malnutrition in adult PLHIV on ART in the KAMINA/DRC health zone, diarrhoea was a factor associated with malnutrition [14,21]. This factor raises questions about the follow-up and compliance with co-infection prophylaxis against OIs and the proper management of diarrhoea by service providers. Medical treatment is needed to combat HIV infection and opportunistic infections. Treating infections improves nutrient absorption and metabolism, although it can also have undesirable metabolic consequences. Treatment thus paves the way for nutritional and dietary support to have an even greater impact on rebuilding tissues and improving nutritional

and health status. It is important to note, however, that weight loss during HIV infection is mainly due to a reduction in food intake induced by a decrease in appetite [22]. Malnutrition and HIV infection are linked. The malabsorption of nutrients caused by HIV infection is at the root of malnutrition in PLHIV. HIV destroys the immune system and exposes patients to the risk of infections such as tuberculosis, influenza and rapid progression to AIDS [8]. Nutritional management combined with ART improves food security and reduces the occurrence of opportunistic AIDS infections [8]. Malnutrition favours the onset of opportunistic diseases [8]. HIV, which favours the onset of opportunistic diseases, affects nutritional status through inadequate food consumption, intestinal malabsorption of nutrients, diarrhoea and metabolic disorders. Malnutrition and macronutrient and micronutrient deficiencies increase oxidative stress and immunodepression, which favours HIV replication [8]. HIV infection leads to profound metabolic changes (increased basal metabolic rate) with reduced food intake (intestinal malabsorption, mouth sores, anorexia) [16]. Malnutrition can also predispose a person to developing active tuberculosis [16]. Diarrhoea, which is a common symptom in PHAs, causes food to pass rapidly through the digestive tract so that it is not properly digested and fewer nutrients are absorbed for a person receiving treatment for opportunistic infections (OIs), ARV treatment or anti-tuberculosis treatment, nutrition can have an influence on improving the patient's state of health. Good nutrition promotes the absorption of medicines and adherence to treatment.

Conclusion

Malnutrition and food insecurity affect a large proportion of adult PLHIV on ART in the Rutshuru HZ. Women were in the majority, with low-paying jobs, and most did not live in couples (single, widowed or divorced/separated). From our logistic regression model, only diarrhoea had a significant influence on the nutritional status of adult PLHIV on ART in the Rutshuru health zone. Diarrhoea makes PLHIV vulnerable to developing malnutrition. More than half the PLHIV had a low level of education [23-42].

We propose that income-generating activities be set up for PLHIV to alleviate some of the food insecurity they suffer.

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