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FACTORS ASSOCIATED WITH OUTCOMES OF NUTRITIONAL SUPPORT AMONG MALNOURISHED PEOPLE LIVING WITH HIV IN SELECTED HEALTH FACILITIES IN KIGALI, RWANDA

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Abstract

Human Immunodeficiency Virus (HIV) is a ribonucleic acid (RNA) virus that attacks human immunity and if not treated it leads to acquired immunodeficiency syndrome (AIDS), It is not curable as per current medical evidences, but with medical care HIV can be controlled and people living with it on effective antiretroviral therapy(ART) can live long, healthier and protect their partner. The city of Kigali being loaded with mixed clients of adequate and inadequate means of living, it sets the ground of possibility to PLWH eligible to nutritional support. Therefore, this study was conducted to determine factors associated with outcomes of nutritional support among malnourished people living with HIV in selected health facilities in Kigali, Rwanda. A cross-sectional study was conducted among undernourished PLWH aged 15 years and older in six selected health facilities of Kigali. PLWH with undernutrition who received nutritional support between January 2021 to September 2022 were recruited in the study. Data were collected through administering a structured questionnaire. Statistical Packages for Social Sciences (SPSS) V. 21 was used for data analysis. In this study, 45.2% respondents were male while 54.8% were female. The findings illustrated that 60.5% respondents had non- cured malnutrition while 39.5% respondents had cured malnutrition. Taking alcohol, being enrolled in nutritional support before, age group, gender, religion and ubudehe category were factors associated with persistent malnutrition at p-value of 0.05. This study revealed that respondents aged 51 years and above were more likely to have persistent malnutrition [AOR=1.546; 95%CI=1.245-4.833; P=0.047] compared to younger respondents aged <20 years old. This study recommends the Government to design a vibrant specific sensitization program about nutrition for people living with HIV and specific sustainable strategies are required to improve the nutritional status of people living with HIV especially those presenting persistent malnutrition.

Keywords: Nutritional support, People living with HIV

Introduction

Human Immunodeficiency Virus (HIV) is a ribonucleic acid (RNA) virus that attacks human immunity and if not treated it leads to acquired immunodeficiency syndrome (AIDS), It is not curable as per current medical evidences, but with medical care HIV can be controlled and people living with it on effective antiretroviral therapy(ART) can live long, healthier and protect their partners [1] . HIV epidemic has dramatically been global life-threatening event since the last 4 decades [2]. It is very harmful, deteriorating quality of life amongst the people living with HIV (PLWH), if nothing is done especially when associated with poor educational level and illness beliefs [3]. Currently HIV is not yet controlled, though figures decreased time to time but it is far from being eradicated from human kinds' threats. Around 38 million of adults and children are estimated to be living with HIV worldwide making the prevalence rate of 0.7%, among whom 20.7 million live in Eastern and Southern Africa and 4.9 million live in Western and central Africa [4]. Several interventions have been in place to contribute in mitigation of the epidemic, limiting its spread from infected to non-infected people, but new infections continue to occur on considerable rates every year. In 2019 around 1.7million of adults and children were newly infected and around 690 000 AIDS related deaths occurred globally, among new infections 59% were from Sub-Saharan Africa [4]. PLWH experience too much of life disturbances throughout their course of life along with their families in response to HIV epidemic which affects their lives quality [5].

Sub-Saharan Africa, being a host to around 60% of all PLWH and where the HIV prevalence is estimated to be 6.7% has been experiencing declines in new infections at about 50% but still with increased prevalence due to combined efforts and joint interventions from different stakeholders that prolongs life of PLWH [6]. Among effective interventions, availability and accessibility of the ART to everyone infected with HIV without any other consideration has been a remarkable success toward the epidemic control [7]. However, as only 67% worldwide and 72% in sub-Saharan Africa of PLWH are on ART, it reveals the miles we still have to go for the epidemic

control [8]. Highly active antiretroviral treatment (HAART) though providing good health outcome to the users, it is recommended to be associated with other boosters to reinforce perfect and timely improvement of their life amongst which nutritional support in case of undernutrition are considered corner stone [9]. In Africa HIV/AIDS is combined to the endemic malnutrition; mainly undernutrition and give hardships in its management. Several recommendations are available to fuel the curbing of HIV but also not leaving behind the concern of undernutrition as the last can even slow down the progress to wellness despite good adherence to ART [10].

PLWH require a good nutritional status due to excess energy demand for immunity reconstruction, opportunistic infection that exacerbate depletion of the immunity and the long use of ART compared to the required energy expenditures in non-HIV infected people [11].

In 2020 the undernourished people were estimated at 9.9% worldwide, Africa accounting up to 21% of its population being undernourished in the same year, and the biggest proportion being in Sub-Saharan region where 24.1% of the population were undernourished, majority of them found in eastern and central Africa with the prevalence of 28.1% and 31.8% respectively [12]. In Sub-Saharan Africa, undernutrition in adults as they grow older compared to other regions is estimated to be around 7% to 16% [13]. On the other side, even if the journey is still demanding, HIV/AIDS is being controlled thanks to the surge of ART use, knowledge and improved understanding of the community and it is clearly becoming a chronic infectious disease in the region that we have to understand living with [14].

Rwanda has managed to maintain HIV prevalence constant at 3% in the general population over the past 10years [15]. Despite tremendous efforts being put in place, the nutrition status consideration in the management of HIV/AIDS for adults PLWH is of great concern. Around 13% of men and 7% of the females in the general population are underweight [16]. The recent study done in some selected health facilities in Kigali, Rwanda estimated the prevalence of undernutrition in PLWH at 15% [17]. It is clearly needed to understand the nutritional status of the people living with HIV/AIDS in Rwanda to better support their good outcome while on ART.

Methods

Study design

The current study was a quantitative cross-sectional study design, aiming to consider only undernourished adults living with HIV who received the nutritional support in the stated period of January 2021 to August 2022. Collected data helped to assess factors that influence the outcomes of nutritional support provided to adult clients living with HIV who are on ART and related services in Kigali City, Rwanda.

Target Population

The study population was people living with HIV who are aged 15 years and above, receiving ART and other HIV related services in the cited health facilities of Kigali City, who were presenting undernutrition on top of HIV and received nutritional supports during January 2021 to August 2022. This study is targeting a total number 3168 adult individuals receiving ART and related services in six cited health centers of Kigali City.

Sample size and sampling procedure

Sample size was 385 participants and were calculated following Cochran W. G 1977 using population, proportion formula. Consented participants were sampled according to their appointments attendance to health facilities if they meet the inclusion criteria and up to the complete required sample at the health facility.

Data analysis and ethical consideration

Data were analyzed using statistical package for social science (SPSS) V. 21 software. Completeness of the data was verified manually before its further treatment. Descriptive statistics including but not limited to; frequencies, percentages, means, median, standard deviations, etc. were used to summarize data. Logistic regression using the bivariate analysis will be used to identify the association between nutritional support outcomes with its factors one by one to consider those that are significantly associated. Logic regression using the multivariate analysis was used to adjust significantly associated determinants in the bivariate analysis to reevaluate the factors that are statistically associated with good nutritional status outcomes in PLWH after considering all factors under study.

Participation in the study as it considered the data prerecorded and also meet with the clients in the present time during data collection, it was only considered the inclusion criteria described to be fetched from the medical records at the study sites for all included PLWH. The project was approved by Mount Kenya University (MKU) and its institutional review board (IRB) issued the

ethical clearance to start the data collection process. RBC HIV program which supervises the health centers considered as study site in the present research project, provided the permission for data collection after reviewing the approval from MKU.

Results

Demographic Characteristics of Respondents

As indicated in Table 4.1, those are socio-demographic characteristics of 372 respondents all reached and data collected using questionnaire through face to face interview.

Table 1 Socio-demographic characteristics of the respondents.

Variables	Frequency	Percent
Age group		
15-20 Years	12	3.2
21-35 Years	78	21
36-50 Years	154	41.4
51 years and above	128	34.4
Gender		
Male	168	45.2
Female	204	54.8
Resident District		
Gasabo	193	51.9
Kicukiro	106	28.5
Nyarugenge	73	19.6
Health insurance		
CBHI/ Mutuelle de Santé	306	82.3
Private insurance	5	1.3
I do not have any insurance	61	16.4
Marital status		
Single	54	14.5
Married	195	52.4
Widowed	68	18.3
Separated/Divorced	55	14.8
Religion		
Catholic	160	43
Protestant	107	28.8
Muslim	24	6.5
Other Religion	81	21.8
Education Level		
No formal school	102	27.4

Primary	209	56.2
Secondary or TVET	57	15.3
University	4	1.1
Ubudehe category		
Category 1	77	20.7
Category 2	209	56.2
Category 3	86	23.1
Occupation		
Housekeeper	59	15.9
Casual work	247	66.4
Student	11	3
Self employed	46	12.4
Employed	9	2.4
Number of households		
< 2 Person	111	29.8
3 to 4 Person	197	53
5 Person and above	64	17.2
Do you have under five years' children		
Yes	289	77.7
No	82	22

Table 1 above shows that the majority of respondents 154(41.4%) were aged between 36-50 years old, 168(45.2%) were male while 204(54.8%) were female and a significant number 306(82.3%) respondents were using CBHI/ Mutuelle de Santé as insurance. The majority of respondents 195(52.4%) were married, 209(56.2%) of respondents had primary level of education, 77(20.7%) of respondents belonged in category one and 247(66.4%) of respondents used to do casual work.

Presentation of findings

The findings of this study are presented according to the three research objectives. The first objective was to determine the prevalence of persistent malnutrition among malnourished PLWH receiving nutrition support, the second objective was to identify individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support and the third objective was to determine structural barriers affecting nutritional status amongst PLWH receiving nutritional support from selected health facilities in Kigali.

The prevalence of persistent malnutrition among malnourished PLWH receiving nutrition support from selected health facilities in Kigali

The first objective was to determine the prevalence of persistent malnutrition among malnourished PLWH receiving nutrition support, and the BMI was used to reach this objective. Respondents with BMI less than 18 were considered as the one with persistent malnutrition.

Graphical presentation of persistent malnutrition prevalence

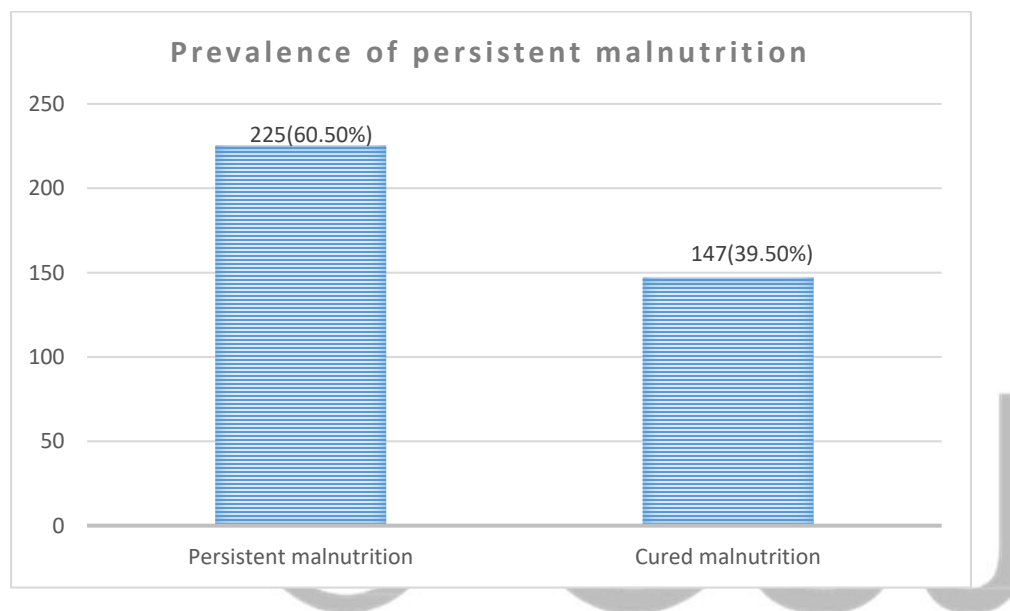


Figure 1: Prevalence of persistent malnutrition

Figure 1 shows that 225(60.5%) respondents had non- cured malnutrition while 147(39.5%) respondents had cured malnutrition.

Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support.

Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support had been assessed by using thirteen variables including time of initiation of regime, type of regime, stage when starting nutritional support, recent CD4 cells count, infections present at the initiation or diagnosed during nutritional support and so on.

Table 2 Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support from selected health facilities in Kigali.

Variables	Frequency	Percentage
Time of initiation of regime		
Within <2 years ago	171	46
Within 3 to 4 years ago	80	21.5
Within >5 years ago	121	32.5
Type of regime		
ABC/3TC/DTG	27	7.3
AZT/3TC/NVP	14	3.8
TDF/3TC/DTG	304	81.7
Others	27	7.3
Stage when starting nutritional support		
Stage 1	269	72.3
Stage 2	53	14.2
stage 3	40	10.8
Stage 4	10	2.7
Recent CD4 Cells count		
<300 CD4 Cells	161	43.3
301 to 600 CD4 Cells	146	39.2
601 to 900 CD4 Cells	41	11
>900 CD4 Cells	24	6.5
Infections present at the initiation or diagnosed during nutritional support		
TB	38	10.2
Other infection	42	11.3
None	292	78.5
Recent Viral load copies/ml		
<20 Viral Copies	209	56.2
21 to 150 Viral Copies	123	33.1
> 150 Viral Copies	40	10.8
NCDs present at the initiation or diagnosed during nutritional support		
Diabetes	7	1.9
Hypertension	12	3.2
Asthma	6	1.6
None	347	93.3
DSDM category at the start of nutritional support		
Stable A	97	26.1
Stable B	56	15.1
Unstable	219	58.9
Do you share nutritional supplements with your children		
Yes	331	89
No	41	11
Have you ever had side effect because of consuming nutritional supplements		

Yes	8	2.2
No	364	97.8
Have you ever had nausea after consuming nutritional supplements		
Yes	8	2.2
No	364	97.8
Do you take any Alcohol?		
Yes	171	46
No	201	54
Do you consume tobacco?		
Yes	40	10.8
No	332	89.2

Among individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support, 171(46%) respondents started regime within <2 years ago, 304(81.7%) respondents took TDF/3TC/DTG as regime and 269(72.3%) respondents were at the stage 1 when starting the regime. 161(43.3%) respondents had <300 CD4 cells recent CD4 cells count, Diabetes was an NCD present at the initiation or diagnosed during nutritional support among 7(1.9%) respondents while 12(3.2%) respondents had Hypertension and 331(89%) respondents used to share nutritional supplements with your children.

Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support from selected health facilities in Kigali.

The second objective was to identify individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support. Bivariate analysis was performed to check variables which are statistically significant and associated with persistent malnutrition with p-value <0.05 calculated at 95%CI.

Table 3 Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support from selected health facilities in Kigali (Bivariate analysis).

Variables	Malnutrition status				Chi-Square	P-Value
	Persistent Malnutrition		Cured Malnutrition			
	n	%	n	%		
Time of initiation of regime						
Within <2 years ago	101	59.10	70	40.90	2.143	0.343

Within 3 to 4 years ago	54	67.50	26	32.50		
Within >5 years ago	70	57.90	51	42.10		
Type of regime						
ABC/3TC/DTG	16	59.30	11	40.70	1.093	0.779
AZT/3TC/NVP	7	50.00	7	50.00		
TDF/3TC/DTG	184	60.50	120	39.50		
Others	18	66.70	9	33.30		
Stage when starting nutritional support						
Stage 1	157	58.40	112	41.60	2.47	0.481
Stage 2	33	62.30	20	37.70		
Stage 3	28	70.00	12	30.00		
Stage 4	7	70.00	3	30.00		
Recent CD4 Cells count						
<300 CD4 Cells	95	59.00	66	41.00	0.461	0.927
301 to 600 CD4 Cells	91	62.30	55	37.70		
601 to 900 CD4 Cells	24	58.50	17	41.50		
>900 CD4 Cells	15	62.50	9	37.50		
Infections present at the initiation or diagnosed during nutritional support						
TB	24	63.20	14	36.80	0.312	0.856
Other infection	24	57.10	18	42.90		
None	177	60.60	115	39.40		
Recent Viral Load copies						
<20 Viral Load Copies	122	58.40	87	41.60	0.448	1.607
21 to 150 Viral Load Copies	80	65.00	43	35.00		
> 150 Viral Load Copies	23	57.50	17	42.50		
NCDs present at the initiation or diagnosed during nutritional support						
Diabetes	2	28.60	5	71.40	5.709	0.127
Hypertension	10	83.30	2	16.70		
Asthma	4	66.70	2	33.30		
None	209	60.20	138	39.80		
DSDM category at the start of nutritional support						
Stable A	60	61.90	37	38.10	0.118	0.943
Stable B	34	60.70	22	39.30		
Unstable	131	59.80	88	40.20		
Do you share nutritional supplements with your children						
Yes	205	61.90	126	38.10	2.641	0.104
No	20	48.80	21	51.20		

Have you ever had side effect because of consuming nutritional supplements					0.721	0.396
Yes	6	75.00	2	25.00		
No	219	60.20	145	39.80		
Have you ever had nausea after consuming nutritional supplements					0.721	0.396
Yes	6	75.00	2	25.00		
No	219	60.20	145	39.80		
Do you take any Alcohol?					7.158	0.007
Yes	116	67.80	55	32.20		
No	109	54.20	92	45.80		
Do you consume tobacco?					0.923	0.337
Yes	27	67.50	13	32.50		
No	198	59.60	134	40.40		

Table 3 above shows that only single variable was statistically significant associated with persistent malnutrition with p-value <0.05 calculated at 95%CI and that variable is taking alcohol. The researcher couldn't undergo multivariate analysis with just a single significant variable.

Structural barriers affecting nutritional status amongst PLWH receiving nutritional support.

Structural barriers affecting nutritional status amongst PLWH receiving nutritional support had been assessed by using seven variables including enrollment in nutritional support, the time taken from residence to the health facility, provision of nutritional service at your favorable day being abused by health care provider, feeling ashamed to take nutritional supplement at health facility, receiving nutritional supplement as required and the type of nutritional support provided.

Table 4 Structural factors associated with nutritional status amongst PLWH receiving nutritional support from selected health facilities in Kigali.

Variables	Frequency	Percent
Was the respondent ever enrolled in nutritional support previously?		
Yes	257	69.1
No	115	30.9
How long time taken from your residence to the health facility		
30 Minutes	33	8.9
Between 30 and 60 Minutes	202	54.3

More than one hour	137	36.8
Does your HF provide nutritional service at your favorable day		
Yes	343	92.2
No	29	7.8
Have you ever been abused by health care provider		
Yes	39	10.5
No	333	89.5
Do you feel ashamed to take nutritional supplement at health facility		
Yes	82	22
No	290	78
Do you receive nutritional supplement as required/recommended		
Yes	340	91.4
No	32	8.6
Nutritional support provided		
RUTF	5	1.3
CSB+	279	75
Both	88	23.7

Table 4 showed that 257(69.1%) respondents had been enrolled in nutritional support before, 202(54.3%) respondents used between 30 and 60 Minutes to reach the health center, 343(92.2%) respondents agreed that HF provided nutritional service at the favorable day, 82(22%) respondents were feeling ashamed to take nutritional supplement at health facility and 340(91.4%) respondents received nutritional supplement as required.

Structural barriers affecting nutritional status amongst PLWH receiving nutritional support from selected health facilities in Kigali.

The third objective was to determine structural barriers affecting nutritional status amongst PLWH receiving nutritional support. Bivariate analysis was performed to check variables which are statistically significant and associated with persistent malnutrition with p-value <0.05 calculated at 95%CI.

Table 5 Structural barriers affecting nutritional status amongst PLWH receiving nutritional support from selected health facilities in Kigali (Bivariate analysis).

Variables	Malnutrition status				P-Value	Chi-Square
	Persistent Malnutrition		Cured Malnutrition			
	n	%	n	%		
Was the respondent ever enrolled in nutritional support					0.033	9.856

Yes	164	63.80	93	36.20		
No	61	53.00	54	47.00		
How long time taken from your residence to the health facility					0.757	0.556
30 Minutes	18	54.50	15	45.50		
Between 30 and 60 Minutes	124	61.40	78	38.60		
More than one hour	83	60.60	54	39.40		
Does your HF provide nutritional service at your favorable day					0.333	0.564
Yes	206	60.10	137	39.90		
No	19	65.50	10	34.50		
Have you ever been abused by health care provider					0.582	0.302
Yes	22	56.40	17	43.60		
No	203	61.00	130	39.00		
Do you feel ashamed to take nutritional supplement at health facility					0.539	0.378
Yes	52	63.40	30	36.60		
No	173	59.70	117	40.30		
Do you receive nutritional supplement as required					0.168	1.901
Yes	202	59.40	138	40.60		
No	23	71.90	9	28.10		
Nutritional support provided					0.239	2.866
RUTF	3	60.00	2	40.00		
CSB+	162	58.10	117	41.90		
Both	60	68.20	28	31.80		

The table 5 above shows that only single variable was statistically significant associated with persistent malnutrition with p-value <0.05 calculated at 95%CI and that variable was asking whether the respondent was ever enrolled in nutritional support. The researcher couldn't also undergo multivariate analysis with just a single significant variable.

Socio-demographic factors associated with persistent malnutrition.

Social demographic characteristics have been also assessed to see whether they are associated with persistent malnutrition.

Table 6 Socio-demographic characteristics of the associated with persistent malnutrition (Bivariate analysis).

Variables	Malnutrition status		P-Value	Chi-Square
	Persistent Malnutrition	Cured Malnutrition		

	n	%	n	%		
Age group					0.005	12.85
15-20 Years	9	75.00	3	25.00		
21-35 Years	41	52.60	37	47.40		
36-50 Years	83	53.90	71	46.10		
51 years and above						
Gender					<0.001	12.195
Male	118	70.20	50	29.80		
Female	107	52.50	97	47.50		
Resident District					0.208	3.143
Gasabo	124	64.20	69	35.80		
Kicukiro	57	53.80	49	46.20		
Nyarugenge	44	60.30	29	39.70		
Marital status					0.456	2.61
Single	32	59.30	22	40.70		
Married	114	58.50	81	41.50		
Widowed	47	69.10	21	30.90		
Separated/Divorced	32	58.20	23	41.80		
Religion					0.019	9.907
Catholic	108	67.50	52	32.50		
Protestant	64	59.80	43	40.20		
Muslim	9	37.50	15	62.50		
Other Religion	44	54.30	37	45.70		
Education					0.461	1.549
No formal school	62	60.80	40	39.20		
Primary	122	58.40	87	41.60		
Secondary or TVET	41	67.20	20	32.80		
Ubudehe category					0.007	14.888
Category 1	55	71.40	22	28.60		
Category 2	121	57.90	88	42.10		
Category 3	49	57.00	37	43.00		
Occupation					0.917	0.172
Housekeeper	42	60.00	28	40.00		
Casual worker	151	61.10	96	38.90		
Employed	32	58.20	23	41.80		
Number of households					0.473	1.499
< 2 Person	62	55.90	49	44.10		
3 to 4 Person	124	62.90	73	37.10		
5 Person and above	39	60.90	25	39.10		

The table above shows that four variables were statistically significant associated with persistent malnutrition with p-value <0.05 calculated at 95%CI and those variables are: age group, gender, religion and ubudehe category.

Table 7 Socio-demographic characteristics associated with persistent malnutrition (Multivariate analysis).

Variables	AOR	95%CI		P-Value
		Lower	upper	
Age group				
<20 Years	Ref			
21-35 Years	2.896	0.694	12.081	0.144
36-50 Years	2.821	0.7	11.372	0.145
51 years and above	1.546	1.254	4.833	0.047
Gender				
Male	Ref			
Female	1.938	1.24	3.028	0.004
Religion				
Catholic	Ref			
Protestant	1.206	0.702	2.072	0.497
Muslim	2.55	0.996	6.529	0.0051
Other Religion	1.613	0.903	2.881	0.0106
Ubudehe category				
Category 1	1.07	0.617	1.856	0.016
Category 2	0.744	0.367	1.506	0.81
Category 3	Ref			

This study revealed that respondents aged 51 years and above were more likely to have persistent malnutrition [AOR=1.546; 95%CI=1.254-6.371; P=0.047] compared to younger respondents aged <20 years old. Female were more likely to have persistent malnutrition [AOR=1.938; 95%CI=1.24-3.028; P=0.004] compared to male. Muslim respondents and the ones with other religion were more likely to have persistent malnutrition [AOR=2.55; 95%CI=0.996-6.529; P=0.0051] and [AOR=1.613; 95%CI=0.903-2.881; P=0.0106] respectively, compared to catholic respondents.

Discussion of the study findings

Rwanda being on the track to curb HIV/AIDS, the burden of undernutrition in adults living with HIV estimated at 8% is also challenging, reason why the National program abided with the WHO

recommendations and set the nutrition support program for PLWH [18]. The present study revealed that 60.5% respondents had non-cured malnutrition while 39.5% respondents had cured malnutrition. Although, the majority had persistent malnutrition, nutrition support had an impact because a client to be enrolled in the program should be undernourished so the 39.5% respondents had better nutrition status because of nutritional support provided.

A study done in Ethiopia was not in the same line with the present study where it revealed that PLWH who recovered from undernutrition at least 72.9% relapsed once, 18.3% relapsed twice and even some others recurred up to three times (5.9%) while those recurring up to four times were estimated at 2.9%. Amongst the factors that influenced those recurrences, lower education level was associated with increased odds, as well as having opportunistic infections and non-belonging to any community support group [19].

The study done in Uganda and Kenya, was almost in the same line with present study, where it came up with confirming results that from the people admitted into the nutritional program only 47.6% were declared cured as success of the nutrition program when clients were exiting from it. Amongst those who failed the program, there were including 13.5% discharged uncured and 11.9% died. Clients declared cured were treated for a median of 3.7 months while those uncured were treated for a median of 7.2 months both using RUTF and CSB as intervention according to the severity of the undernutrition. Among different factors that might have influence to nutritional recovery, severe malnutrition at the admission in HIV program was found to be inclusively associated with the failure to recover [20].

Individual factors associated with malnutrition status among undernourished PLWH receiving nutritional support had been assessed by using thirteen variables including time of initiation of regime, type of regime, stage when starting nutritional support, recent CD4 cells count, infections present at the initiation or diagnosed during nutritional support and so on. The that only single variable was statistically significant associated with persistent malnutrition with p-value <0.05 calculated at 95%CI and that variable is taking alcohol.

The study conducted by Daka and colleagues was not marching with the present study, it revealed that marital status; widow or widower was significantly associated with under nutrition up to 2 times higher than married PLWH. The odds of clients with undernutrition who were unable to

access water supply, were elevated up to 1.69 higher compared to clients with good access to water supply [21]. WHO clinical stage 3 and stage 4 had increased odds of about 2 times and 3 times higher to fall into undernutrition compared to their colleagues in WHO stage 1. PLWH with CD4 cell counts of $<200\text{cells}/\text{mm}^3$ were associated with undernutrition at about 2 times much more than those with CD4 cell counts of $\geq 200\text{cells}/\text{mm}^3$. The functional status of the PLWH was similarly found influencing the undernutrition to the extent estimated to be 2.4 times higher in ambulatory and 3.6 times higher in bedridden functional statuses than clients with working functional status [13].

The third objective was to determine structural barriers affecting nutritional status amongst PLWH receiving nutritional support and for the respondent to be ever enrolled in nutritional support found to be a barrier which may affect nutritional status.

The study conducted in sub-Saharan African countries by Anema and colleagues, was focusing on structural barriers, a number of factors contribute to the smooth progress or constitute a serious blockade of the program in place to support those in need. Nutritional counselling services, micronutrients supplementations, treatment for severe malnutrition, food rations [including foods intending to promote adherence and adults' food security] [22].

Conclusion

The main purpose of this study was to determine factors influencing outcomes of nutritional support among malnourished people living with HIV from selected health facilities in Kigali and the study revealed that more than a half of respondents had persistent malnutrition. The study results also showed that association with persistent malnutrition and alcohol consumption, positive previous history of nutritional support, age, gender, religion and ubudehe category were statistically significant with p-value <0.05 calculated at 95% CI.

Recommendation

Counselling on diet could be one of interventions to serve the education and awareness to PLWH with poor nutritional status, the odds of those who did not receive counselling sessions during their visits were found to be undernourished.

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