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Original Article

Practices Towards Physical Activity to Reduce the Risk of Cardiovascular Disease Among People Living with HIV in Kigali

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Abstract

Background: People living with HIV have a high risk of developing CVD, and they die more quickly from cardiac causes than non-infected individuals. Physical inactivity is among the leading causes of cardiovascular disease; however, it is the neglected risk factor in PLWH, where 82.6% of this vulnerable group were found to be physically inactive.

Aim: The purpose of this study was to identify practices towards physical activity to reduce the risk of cardiovascular diseases in People living with HIV in Kigali, a case of Muhima Hospital, to help in the prevention of cardiovascular diseases.

Methods: The study used a cross-sectional study. The target population of this study consisted of people living with HIV who were at least 18 years old, of either sex, and receiving regular care at Muhima Hospital, and samples of 384 were selected using systematic random sampling. Moreover, data were collected using structured questionnaires and were processed and analyzed by using IBM Statistical Package for Social Sciences (SPSS) version 26, where P-values were calculated using Chi square, and findings were also presented using frequencies and percentages in tables.

Results: Results indicated that practices of physical activity to reduce the risk of CVD in people with HIV, 83% of respondents did sufficient physical activity. The overall mean of results was 1.66, which was higher than the ordinal mean (1.5) of no (1) and yes (2), indicating that there was a significant practice of physical activity to reduce the risk of CVD in people with HIV. On the age group distribution, the proportion of physical activity was statistically significant with P value=.015, and education level, the proportion of physical activity was significant with a P-value=.031.

Conclusion: The study concluded that there was a significant practice of physical activity to reduce the risk of CVD in PLWH for those with knowledge and positive attitudes. The young and educated people significantly apply physical activity to reduce the risk of CVD more than other classes of people.

Recommendation: The study recommended that the Ministry of Health should develop a policy and campaign aiming to increase the practice of physical activity to reduce the risk of cardiovascular diseases in PLWH. People living with HIV should regularly engage the physical activities to reduce the risk of cardiovascular disease and enhance their lives.

Keywords: Cardiovascular disease, People living with HIV, Physical activity, Risk of cardiovascular disease, Sedentary behavior

Introduction

HIV remains a major global public health concern. In 2015 alone, 1.1 million people worldwide died from HIV-related causes, despite a 35% reduction in new infections compared to 2010. Approximately 2.1 million people continue to be newly infected each year. By 2021, 28.2 million individuals had access to antiretroviral therapy (ART) out of the 37.7 million people living with HIV (PLHIV) globally. While HIV-related deaths declined to 680,000 in 2020 from 1.9 million in 2004, this improvement is largely attributed to increased access to ART (WHO, 2016). However, as people with HIV live longer, they become more susceptible to chronic non-communicable diseases (NCDs), particularly cardiovascular diseases (CVDs), which have become a significant cause of mortality among PLHIV on ART (Nyaaba et al., 2017; Lambert et al., 2016). Globally, PLHIV are 61% more likely to develop cardiovascular disease than the general population. Physical inactivity is a key modifiable risk factor, contributing to 22% of ischemic heart disease and 11% of ischemic stroke (Vos et al., 2017). The World Health Organization (WHO) and other global health bodies emphasize physical activity (PA) as a cornerstone for preventing CVD and promoting general well-being. Yet, data show that 23% of people worldwide were physically inactive in 2010, and inactivity remains a widespread problem, particularly in high-income countries where rates rose from 31.6% in 2001 to 36.8% in 2016 (Guthold et al., 2018). In sub-Saharan Africa (SSA), the dual burden of infectious diseases and rising NCDs is a growing concern. Studies show high dropout rates from physical activity programs among PLHIV up to 30% and a lack of awareness about cardiovascular risks. In Kenya, most HIV-positive individuals lacked knowledge of heart attack symptoms and CVD prevention strategies (Temu et al., 2015). Factors like older age, low CD4 counts, and advanced HIV stages have been linked to reduced physical activity in SSA (Vancampfort et al., 2018). Despite WHO's advocacy for PA, many SSA countries face challenges in integrating physical activity into HIV care due to limited awareness and resources.

Regionally, the United States and other developed nations also grapple with low physical activity rates. As of 2013, 80% of Americans failed to meet the recommended levels of physical activity (CDC, 2013). Physical inactivity has been associated with muscle wasting, fatigue, reduced work capacity, and diminished quality of life in PLHIV, contributing to higher morbidity and mortality (Kock, 2013). In Rwanda, NCDs account for approximately 36% of all deaths and represent nearly a quarter of the national disease burden (MoH, 2015). Among PLHIV, the risk of developing CVD is notably higher, yet physical activity remains underutilized. In 2010, 15% of Rwandans were physically inactive, and Kigali City continues to report low levels of PA participation (Frantz & Mukaruzima, 2019; Mukaruzima et al., 2020). Understanding and addressing the social and behavioral determinants of PA in Rwanda is therefore critical for reducing CVD risk, especially among vulnerable populations like PLHIV. WHO defines physical activity as any movement produced by skeletal muscles that requires energy expenditure (WHO, 2020). PA can be structured (e.g., organized exercise) or unstructured (e.g., leisure play). Both forms are beneficial: unstructured PA enhances emotional and social skills in children (Dankiw et al., 2020), while structured PA improves balance, endurance, and cognitive function in adults (Okely et al., 2021). Replacing sedentary time with even light physical activity can reduce health risks in people with chronic illnesses.

Despite the known benefits, achieving widespread engagement in physical activity remains a global challenge. To promote cardiovascular health among PLHIV, especially in resource-constrained settings like Rwanda, a better understanding of local behavioral and environmental barriers is urgently needed (Pearson et al., 2013).

Materials and Methods

Research Design

This study employed a descriptive cross-sectional quantitative design to assess physical activity practices among PLHIV attending Muhima Hospital in Kigali. This design assessed variables at a single point in time (Ishtiaq, 2019). The quantitative approach was used to collect and analyze the numerical data. The Statistical Package for Social Science (SPSS) software version 26.0 was used to analyze the descriptive statistics.

Study Population

The study's participants were consenting people with HIV who were at least 18 years old and receiving care in Muhima Hospital. For selecting Muhima Hospital, the researcher used purposive sampling. For selecting the participants at hospitals, random sampling was used.

Inclusion criteria

The people (men and women) ≥ 18 years old and with HIV-positive receiving HAART and attending Muhima Hospital during the data collection period.

Exclusion criteria

People under 18 years were not included in the study, because of rigorous process of getting consent form from their parents or guardians, which may delay the study. In addition, patients in critical medical conditions, including those with serious injuries or mental problems and others did not attend Muhima Hospital during data collection were not included in the study.

Sample Size Determination

Sampling is the process of choosing a portion of a statistical population in order to estimate the characteristics of the entire population. This study used the following Fisher's formula for sample size calculation:

$$n = \frac{z^2 p\,(1-p)}{d^2}$$

Where n = Sample size, z = Normal standard variety= 5%, error$p-<0.005$, it will be 1.96. p =Probability of success= $1/2 = 0.5$, d^2 =precision error that is5%.

From this formula, $n = \frac{1.96^{2*0.0}*0.05(1-0.5)}{0.05^2} = 384$

In this study, 384 participants were included in this research as sample size.

Data collection instruments

Data collection refers to the device used to collect data. This study used structured questionnaires, where in self-administered; every participant was given a questionnaire to individually answer the questions provided. The structured questionnaire was composed of open-ended questions and closed-ended questions in 2 sections regarding the aim of the study: Section (a) contains the questions related to the social demographic characteristics of respondents, including sex, age, education level, marital status, professional status, and family history distribution of respondents. Section (b) contains questions related to the questions about practices of physical activity to reduce the risk of CVD in people with HIV. The researcher measured the level of practices using questions for assessing physical activity measures of frequency of days per week and duration of minutes per day.

Administration of data collection instruments

To gather data, the researcher used questionnaires that were sent to the sample size of target group. After obtaining an approval letter from Mount Kenya University Rwanda, and after receiving the authorization from Muhima

Hospital. The researcher distributed questionnaires to participants to express their own opinions and feelings. During the data collection period, the researcher gave a full explanation about the study and it objectives in order to get consent form, no one was urged to participate in the study, the participants were aware that no incentives to be provided and they voluntarily decided whether to participate or not. Participants assured of confidentiality; no names of the participants were written on the questionnaires. After every participant received a questionnaire to fill out, the researcher collected the filled-out questionnaires.

Validity and Reliability of Research Instrument

Reliability and validity are the most important tools to measure the accuracy and consistency of research instruments (Bolarinwa, 2015). In order to ensure the reliability of this study questionnaire, the questionnaire was distributed to different people with similar characteristics as the target population, to see whether the respondents have the same interpretation of the questions and answer in the same context. Then, after the consistency was measured using Cronbach's Alpha (CA).

In addition to ensuring the validity, researchers evaluated whether the questions effectively capture the topic under investigation, and checked if no confusing questions. A pilot test of the questionnaire was done on a small number of people. After pilot data, cleaning the dataset followed, then identification of underlying components using principal components analysis (PCA) to enable questions loading onto the same factors for aggregation and comparison during the final data analysis phase.

Data analysis

The data analysis procedure is the process of evaluating data using analytical and logical reasoning to examine each component of the data provided. The researcher followed the following steps for analyzing the data collected from participants: data organizing, coding, editing, tabulation, and descriptive analysis. Data Analysis was done using the Statistical Package for Social Sciences (SPSS) version 26.0. The findings are presented in the form of frequencies, percentages, and standard deviation in tables. Regarding practices, the researcher measured the level of practices using questions for assessing physical activity measures of frequency of days per week and duration of minutes per day.

Ethical consideration

From Mount Kenya University's ethics committee, permission to conduct the study was sought before it began. Support letters prepared by the University were delivered to Muhima Hospital for permission to conduct research at the hospital. Health facilities administration approved to conduct research in their institution. Participants

received informed consent forms with thorough information about the study. The researcher made sure that the participants understood the information of contents and allowed them time for queries. Additionally, participants were made aware that participation in the study is optional and that anonymity and confidentiality were maintained.

Results

Demographic Characteristics of Respondents

The results of the socio-demographic characteristics of respondents include sex, age, education level, marital status, professional status, and family history distribution of respondents. As shown in Table 1, out of 384 respondents, the sex distribution of respondents, 38.5% were male, and 61.5% were female. On the age group distribution of respondents, 17.2% were in the age group of 18-30 years; 49.7% were in the age group of 31-45 years; 26.6% were in the age group of 46-60 years; 6.5% were in the age upper 60 years.

On the education level of respondents, 1.8% had not attended school; 22.1% attended primary school; 56.5% attended secondary school; and 19.5% attended the university. On the marital status of respondents, 24.5% were single, 35.2% were married, 29.7% were widowed, and 10.7% were separated. Of the professional status of respondents, 5.7% were unemployed, 69.3% were self-employed, 7.0% were working in the public sector, 7.0% were working in the private sector, 5.2% were retired, and 5.7% were students. On the family history, 11.2% had high blood pressure, 6.3% had diabetes, 2.6% had obesity, and 0.8% had dyslipidemia.

Table 1.Socio-demographic Characteristics of Respondents

Attributes	Frequency (n=384)	Percentage (%)
Sex of Respondents		
Male	148	38.5
Female	236	61.5
Age Group of Respondents		
18-30	66	17.2
31-45	191	49.7
46-60	102	26.6
>60	25	6.5
Education Level of Respondents		
Never Attended School	7	1.8
Primary School	85	22.1

Secondary School	217	56.5
University	75	19.5
Marital Status of Respondents		
Single	94	24.5
Married	135	35.2
Widowed	114	29.7
Separated	41	10.7
Professional Status of Respondents		
Unemployed	22	5.7
Self-employed	266	69.3
Public Sector	27	7.0
Private Sector	27	7.0
Retired	20	5.2
Student	22	5.7
Family History		
High Blood Presure	43	11.2
Diabetes	24	6.3
Obesity	10	2.6
Dyslipidemia	3	.8

Source: Primary data (2025)

Practices of Physical Activity to Reduce the Risk of CVD in People with HIV

Researchers identified the practices of physical activity to reduce the risk of CVD in people with HIV in Kigali, Rwanda. The researcher measured the level of practices using questions for assessing physical activity measures of frequency of days per week and duration of minutes per day.

Out of 384 respondents, 100.0% responded that their work involves mostly sitting, standing, with walking for more than 10 minutes at a time. 66.4% agreed and 33.6% disagreed that their work involves vigorous physical activity like (heavy lifting, digging, or construction) for at least 15 minutes at a time. 54.4% agreed and 45.6% disagreed that their work involves moderate intensity activity, like brisk walking (or carrying light loads) for at least 30 minutes at a time. 26.6% agreed and 73.4% disagreed that they spend at least 150 minutes per week doing moderate intensity aerobic exercise.

60.7% agreed and 39.3% disagreed that they spend at least 75 minutes per week doing vigorous physical activity.

83.6% agreed and 16.4% disagreed that on a typical day on which they did vigorous activity, they spent at least 15 minutes doing such work. 70.1% agreed and 29.9% disagreed that on a typical day on which they do moderate-intensity physical activity, they spend at least 30 min doing such work. The overall mean of results was 1.66 that was upper to the ordinal mean (1.5) of No (1) and Yes (2), this shows that there was a significant practices of physical activity of participants, with 83% to reduce the risk of CVD in people with HIV in Kigali, Rwanda.

Table 2. Practices of Physical Activity to Reduce the Risk of CVD in People with HIV

Statement	**Yes**		**No**		**Total**		
	N	**%**	**N**	**%**	**N**	**Mean**	**SD**
Does your work involve mostly sitting, standing, with walking for more than 10 minutes at a time?	384	100.0	0	0.0	384	2.00	.000
Does your work involve vigorous physical activity like heavy lifting, digging, or construction) for at least 15 minutes at a time?	255	66.4	129	33.6	384	1.66	.473
Does your work involve moderate intensity activity, like brisk walking (or carrying light loads) for at least 30 minutes at a time?	209	54.4	175	45.6	384	1.54	.499
Do you spend at least 150 minutes per week doing moderate intensity aerobic exercise	102	26.6	282	73.4	384	1.27	.442
Do you spend at least 75 minutes per week doing vigorous physical activity?	233	60.7	151	39.3	384	1.61	.489
On a typical day on which you did vigorous activity, do you spend at least 15 minutes doing such work?	321	83.6	63	16.4	384	1.84	.371
On a typical day on which you did moderate-intensity physical activity, do you spend at least 30 minutes doing such work?	269	70.1	115	29.9	384	1.70	.459
Overall Mean						**1.66**	

Source: Primary data (2025)

Sociodemographic Factors Associated with Physical Activity to Reduce the Risk of Cardiovascular Diseases in People Living with HIV in Kigali

The demographic characteristics factors were the factors associated with physical activity to reduce the risk of cardiovascular diseases in people living with HIV in Kigali, Rwanda. The association is statistically significant if the P-value is less than 0.05. On the gender, the proportion of physical activity to reduce the risk of cardiovascular diseases in people living with HIV was not significant, with a P-value of .067. On the age group distribution, the proportion of physical activity was statistically significant with P value=.015. On the education level, the proportion of physical activity was significant with a P-value of .031. On the marital status, the proportion of physical activity was not significant with a P-value of .071. On the professional status, the proportion of physical activity was not significant with a P value of .069. In general, the physical activity to reduce the risk of cardiovascular diseases in people living with HIV was statistically significant by age group and education level.

Table 3. Sociodemographic Factors Associated with Physical Activity to Reduce the Risk of Cardiovascular Diseases in People Living with HIV in Kigali

Variables	With Physical Activity		No Physical Activity		χ2	df	P -value
	n	%	n	%			
Gender							
Female	94	24.4	142	37.1	4.43	1	.067*
Male	142	36.9	6	1.6			
Age Group							
18-30	62	16.1	4	1.1	2.93	3	.015*
31-45	132	34.3	59	15.4			
46-60	34	8.9	68	17.7			
>60	8	2.1	17	4.4			
Education level							
University	68	17.7	7	1.8	7.48	3	.031*
Secondary school	111	28.9	106	27.6			
Primary school	51	13.3	34	8.8			
No school	6	1.5	1	0.3			
Marital Status							
Single	89	23.2	5	1.3	4.92	3	.071
Married	64	16.7	71	18.5			

Widowed	55	14.3	59	15.4			
Separated	31	8.1	10	2.6			
Professional Status							
Retired	8	2.08	12	3.12	4.89	5	.069
Self-employed	135	35.2	131	34.1			
Unemployed	22	5.7	0	0.0			
Public sector	27	7.0	0	0.0			
Private sector	22	5.7	5	1.3			
Students	22	5.7	0	0.0			

Source: Primary data, (2025)

Multivariate Analysis of Factors Associated with Physical Activity to Reduce the Risk of Cardiovascular Diseases in People Living with HIV in Kigali

Logistic regression was used to identify the independent factors associated with physical activity to reduce the risk of cardiovascular diseases in people living with HIV. The significant variables at bivariate analysis (age group and education level) were considered together in a multiple logistic analysis. All are independently significantly associated with physical activity. According to the results, respondents in age group of 18-30 years were 3.59 times [AOR=3.59; 95%CI = 1.60-6.82; P value = .002], respondents in age group of 31-45 years were 2.73 times [AOR=2.73; 95%CI = 1.05-7.42; P value=.041], respondents in age group 46-60 years were 0.96 times [AOR=0.96; 95%IC = 0.54-1.88; P value=.717]. On education level, respondents with university level were 3.64 times [AOR=3.64; 95%CI = 1.68-7.90; P value = .000 and respondents with secondary school were 3.63 times [AOR=3.63; 95%CI = 1.64-7.53; P value = .005] more likely to make practical activity than respondents with primary school were 1.04 times [AOR=1.04; 95%CI = 0.38-3.7; P value = .246].

Table 4. Multivariate Analysis of Factors Associated with Physical Activity to Reduce the Risk of Cardiovascular Diseases in People Living with HIV in Kigali

Variables	COR(95%CI)	P-value	AOR(95%CI)	P-value
Age Group				
18-30	3.06(1.48-6.37)	.003	3.59(1.60-6.82)	.002
31-45	3.71(1.45-9.04)	.006	2.73(1.05-7.42)	.041
46-60	1.37(0.77-2.62)	.282	0.96(0.54-1.88)	.717
>60	Ref		Ref	

Education level				
University	3.16(1.57-6.61)	.001	3.64(1.68-7.90)	.000
Secondary school	3.15(1.52-6.55)	.013	3.63(1.64-7.53)	.005
Primary school	1.24(0.47-3.13)	.161	1.04(0.38-3.7)	.246
Not attended school	Ref		Ref	

COR = Crude Odds Ratio; CI = Confidence Interval; AOR = Adjusted Odds Ratio

Source: Primary data, (2025)

Discussion

This study was guided by objective of identifying practices on physical activity to reduce the risk of cardiovascular diseases in people living with HIV in Kigali a case of Muhima Hospital. To identify the practices of physical activity to reduce the risk of CVD in people with HIV, the data was analyzed, and it was indicated that 100.0% of respondents responded that their work involves mostly sitting, standing, and walking for more than 10 minutes at a time. The 66.4% agreed that their work involves vigorous physical activity, like heavy lifting, digging, or construction, for at least 15 minutes at a time.

The 45.6% disagreed that their work involves moderate intensity activity, like brisk walking (or carrying light loads), for at least 30 minutes at a time, and 73.4% disagreed that they spend at least 150 min per week doing moderate intensity aerobic exercise. In high-income nations, the prevalence of physical inactivity increased with time, increasing from 31.6% in 2001 to 36.8% more than two times as high as in low-income nations in 2016 (16.2%) (Guthold et al., 2018).

Adult physical activity levels are declining in developing nations as a result of rapid urbanization, notably because of improved housing and transportation infrastructure, as well as industrialization. At the same time, prolonged television watching and other sedentary behaviors have sharply grown. Physical activity was recommended by both health experts and researchers as a way to enhance population energy and lessen the burden of chronic diseases worldwide. Physical inactivity ultimately contributes to obesity. WHO and FAO came to the conclusion that excessive weight gain could significantly increase the risk of CVD (Fernandez et al., 2012).

Recommendation

The Ministry of Health should develop a policy and campaign aiming to increase the practice of physical activity to reduce the risk of cardiovascular diseases in people living with HIV. People living with HIV should regularly engage the physical activities to reduce the risk of cardiovascular disease and enhance their lives.

Conclusion

According to the WHO, physical activity is any skeletal muscle-driven motion that causes the body to expend energy. The biggest risk factor for cardiovascular illnesses is physical inactivity (WHO, 2020). One of the four main NCD risk factors and a growing global health and economic burden is physical inactivity, despite the substantial evidence linking regular physical exercise participation to good health. This study identified practices towards physical activity to reduce the risk of cardiovascular diseases in people living with HIV in Kigali. Conclusions were taken based on the results. The study concluded that physical activity reduces the risk of CVD in people with HIV The study concluded that most People living with HIV did not have the required equipment to do moderate exercise. Typically, day on which they did vigorous activity, they spent at least 15 minutes doing such work. The study concluded that there was a significant benefit of physical activity in reducing the risk of CVD in people with HIV. It concluded that young people and educated people significantly apply physical activity to reduce the risk of CVD more than other classes of people.

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