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# Lifestyle factors accelerating ageing of PLHIV in the ART clinics of Kampala, Uganda

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## ABSTRACT

### Introduction

*Ageing is an un-avoidable and natural phenomenon of life, but with modified lifestyle, physical and cognitive function and the quality of life of a person living with HIV can help them live a quality ageing life while on ART. This study sought to understand a range of geriatric lifestyle factors that accelerate ageing among HIV-infected persons who are actively on ART in Makindye Division in Uganda. Specifically, we assessed how smoking, alcohol consumption, physical activity and body weight control accelerated ageing in this category of patients.*

### Methods

*This was a descriptive cross-sectional study involving PLHIV actively on ART aged 45 and above in public and faith-based healthcare facilities in Makindye Division, the highest populated in Kampala District. 478 participants were sampled from Nsambya Hospital, Kiruddu Hospital and Ggaba Fishing Community ART clinic. Data collectors were trained, a pre-testing done, and data was exported to STATA for analysis.*

### Results

*Running (p=0.044) and exercise bike (0.043) were the only factors associated with ageing in the multivariate model. Neither smoking nor alcohol consumption had a statistically significant association with ageing; recreational drug use was also not associated with ageing. Frequency of physical exercise (p=0.021), engaging in running (p=0.046) or exercise bike (p=0.027) as a physical activity had a statistically significant association with ageing. Only perception of overweight status had a statistically*

*significant association with ageing among this study population (p=0.016).*

***Conclusion***

*In conclusion, exercising only 1-2 times a month is a risk factor to accelerated ageing for a PLHIV aged 45+ on ART in Makindye. However, both engaging in running and the use of exercise bike as forms of physical exercise are protective against accelerated ageing among them. Surprisingly, smoking, alcohol consumption and the use of recreational drugs are of no risk to their accelerated ageing. More frequent exercises through aerobics and the purchase of jogging costumes and bicycles are highly recommended.*

**Keywords:** Ageing, lifestyle, Accelerated ageing, smoking, alcohol consumption, physical activity, body weight control.

## Introduction

There exist theories of influence of lifestyle risk factors on ageing such as excessive use of alcohol, smoking, and use of illicit drugs, among others. The influence of lifestyle factors on ageing in HIV could be explained by the influence of smoking status, alcohol abuse, physical inactivity, body weight control, or additional indicators of health and are present in younger participants (Steptoe and Zaninotto, 2020).

In a related study in the United States of America, it was found that smoking substantially reduced the life expectancy of HIV-infected people who were linked to HIV care and that smoking cessation could have a major impact on survival (Krishna et al, 2016). This implies that smokers in HIV care may now lose as much or more life expectancy from smoking as from their HIV infection, thus progressively accelerating their ageing. Unfortunately, many people living with HIV less likely quit smoking, compared counterparts who are HIV -uninfected. In yet another study, smokers on average were found to be biologically older than lifetime non-smokers by 4.6 years (Rowan Hooper, 2005).

Excessive alcohol use is common among people living with HIV. In a cross-sectional/longitudinal study quantified regional brain volumes for ageing in HIV, it was revealed that the HIV-infected cohort that was with alcohol dependence exhibited steeper declining volume trajectories than control subjects, consistently in the frontal cortex (Adolf et al., 2018). In another study to assess comprehensive neuro-cognition, it was revealed that there were adverse effects of history of alcohol usage on neurocognitive measures that were evident only in HIV positive individuals 60 years and older (Gongvatana et al., 2014).

It is also recommended that older persons living with HIV need to have levels of increased physical activity so as to reduce functional impairment among them (Erlandson et al., 2012). Aerobic and strengthening exercises are an effective intervention to reduce the impact of HIV related physical impairments and secondary effects of HAART that affect quality of life and participation in society (Ortiz, 2014). Therefore, this section of literature maps out the empirical evidence on the effects of physical activity and exercise among persons ageing with HIV.

It's been well established that having added visceral fat tissue upsurges the risk of developing agerelated illnesses, reduces the life expectancy, and increases lifetime health costs and expenditure. At the age of 60 years, the weight of the body tends to generally decrease and there is a redistribution of fat to abdominal fat with increasing age thereafter.

In order to address these limitations, we conducted a large study to assess the lifestyle among 45 year-olds and above HIV-infected patients receiving care and treatment in 3 high-volume health facilities in Kampala. Additionally, the study defined the lifestyle factors associated with accelerated ageing in this particular group of patients.

## Methods

### Study design, setting and population

This was a descriptive cross-sectional study that was conducted between August 2021 and October 2021 among PLHIV actively on ART aged 45 and above in public and faith-based healthcare facilities in Makindye Division, the highest populated in Kampala District. These are outpatient clinics that offer comprehensive HIV prevention, care and treatment services at no cost to a total of over 40,000 patients in the division with daily clinic attendance of 400-500 patients daily. The study involved 478 participants who were sampled from Nsambya Hospital (a faith based facility), Kiruddu Hospital (a public facility) and Ggaba Fishing Community ART clinic. The determination of the number of clients required in each health facility was calculated using Probability Proportionate by Size (PPS) sampling, while sampling within the sampled health facilities involved simple random sampling technical to randomly select the ART client numbers for the cases based on the computer generated appointment list in each facility.

### Data collection

Up on study enrollment, a structured questionnaire was administered by graduate level and trained data collectors in either English or Luganda (the native and most commonly used local language in the clinic catchment region) and a pre-testing done. Demographic characteristics including age, gender, weight, height, religion, marital status, highest educational level attained, ever disclosure of their HIV status, current ARV drug combination and duration on treatment. In addition, information on smoking, alcohol consumption, use of recreational drugs within the last twelve months, physical activity and body weight control was collected.

The data was entered in KoBoCollect Software Application and then exported to STATA for analysis. The qualitative key informant data was analysed using thematic analysis. Ethical approval was sought and informed consents obtained from the study participants. Confidentiality/privacy was ensured and the findings published in peer-reviewed journals.

## Results

About 68 (14.2%) respondents had ever smoked cigarettes and of these, only 8 (11.8%) still smoked; a majority of respondents who had ever smoked had smoked for more than 10 years (33.8%). Current smokers, smoked an average of 3.6 (±2.8) cigarettes. Among the 60 respondents who quit smoking, 60 (83.3%) had quit 6-10 years prior to the study, 8 (13.3%) had quit 1-5 years prior to the study while 2 (3.3%) had quit less than a year prior to the study. A total of 203 (42.5%) respondents had ever taken alcohol and of these,

88 (43.35) were current alcohol consumers. A majority of current alcohol consumers drank alcohol once a week (65, 73.9%) followed by 20 (22.7%) who consumed alcohol 2-3 times a week; 2 respondents drank alcohol 4-6 times a week while 1 respondent drank alcohol every day of the week. Alcohol consumers drank an average of 2 (±1.1) bottles a week. Only 7 (1.5%) respondents had ever taken recreational drugs and an even smaller number (2 respondents) was still taking recreational drugs at the time of the interview with one taking once a week and the other 2-3 times weekly.

Table 1: Lifestyle factors associated with ageing among HIV positive patients aged 5 years and above

| Variable | Frequency (N=478) | No (N=268) | Yes (210) | p-value |
|---|---|---|---|---|
| **Ever smoked** | | | | 0.448 |
| No | 410 (85.8%) | 227 (55.4%) | 183 (44.6%) | |
| Yes | 68 (14.2%) | 41 (60.3%) | 27 (39.7%) | |
| **Ever taken alcohol** | | | | 0.879 |
| No | 275 (57.5%) | 155 (56.4%) | 120 (43.6%) | |
| Yes | 203 (42.5%) | 113 (55.7%) | 90 (44.3%) | |
| **Frequency of physical exercise** | | | | 0.021* |
| Not at all | 54 (11.3%) | 25 (46.3%) | 29 (53.7%) | |
| 1-2 times a month | 18 (3.8%) | 05 (27.8%) | 13 (72.2%) | |
| 1-2 times a week | 69 (14.4%) | 41 (59.4%) | 28 (40.6%) | |
| 3-4 times a week | 130 (27.2%) | 83 (63.9%) | 47 (36.1%) | |
| 5+ times a week | 207 (43.3%) | 114 (55.1%) | 93 (44.9%) | |
| **Exercise-Running (n=428)** | | | | 0.046* |
| No | 356 (83.2%) | 197 (55.3%) | 159 (44.7%) | |
| Yes | 72 (16.8%) | 49 (68.1%) | 23 (31.9%) | |
| **Exercise-Walking (n=428)** | | | | 0.159 |
| No | 79 (18.5%) | 51 (64.6%) | 28 (35.4%) | |
| Yes | 349 (81.5%) | 195 (55.9%) | 154 (44.1%) | |
| **Exercise-Exercise bike (n=428)** | | | | 0.027* |
| No | 401 (93.7%) | 225 (56.1%) | 176 (43.9%) | |
| Yes | 27 (6.3%) | 21 (77.8%) | 06 (22.2%) | |
| **Exercise-swimming (n=428)** | | | | 0.150 |
| No | 415 (97.0%) | 236 (56.9%) | 179 (43.1%) | |
| Yes | 13 (3.0%) | 10 (76.9%) | 03 (21.1%) | |
| **Exercise-weight training (n=428)** | | | | 0.514 |
| No | 416 (97.2%) | 238 (57.2%) | 178 (42.8%) | |
| Yes | 12 (2.8%) | 08 (66.7%) | 04 (33.3%) | |
| **Occupation involves much physical exercise** | | | | 0.784 |
| No | 188 (39.5%) | 104 (55.2%) | 84 (44.7%) | |
| Yes | 288 (60.5%) | 163 (56.6%) | 125 (43.4%) | |
| **Consider yourself overweight** | | | | 0.016* |
| No | 412 (86.2%) | 240 (58.3%) | 172 (41.8%) | |
| Yes | 66 (13.8%) | 28 (42.4%) | 38 (57.6%) | |
| **Finances influence taking part in a healthy eating program** No | 95 (19.9%) | 60 (63.2%) | 35 (36.8%) | 0.120 |
| Yes | 383 (80.1%) | 208 (54.3%) | 175 (45.7%) | |
| **Weekly eat out frequency** | | | | 0.112 |
| Never | 301 (63.0%) | 156 (51.8%) | 145 (48.2%) | |
| 1-2 times | 37 (7.7%) | 24 (64.9%) | 13 (35.1%) | |
| 3-4 times | 60 (12.6%) | 38 (63.3%) | 22 (36.7%) | |
| 5+ times | 80 (16.7%) | 50 (62.5%) | 30 (37.5%) | |
| **Weekly fast foods frequency** | | | | 0.942 |
| Never | 352 (74.0%) | 194 (55.1%) | 158 (44.9%) | |
| 1-2 times | 53 (11.1%) | 31 (58.5%) | 22 (41.5%) | |
| 3-4 times | 39 (8.2%) | 22 (56.4%) | 17 (43.6%) | |
| 5+ times | 32 (6.7%) | 19 (59.4%) | 13 (40.6%) | |
| **Had a recent cholesterol check** | | | | 0.208 |
| No | 449 (93.9%) | 255 (56.8%) | 194 (43.2%) | |
| Yes | 29 (6.1%) | 13 (44.8%) | 16 (55.2%) | |

| | | | | |
|---|---|---|---|---|
| **Participated in weight management program** | | | | 0.681 |
| No | 452 (94.8%) | 254 (56.2%) | 198 (43.8%) | |
| | 25 (5.2%) | 13 (52.0%) | 12 (48.0%) | |
| **Personal weight loss rate important** | | | | 0.205 |
| No | 209 (43.7%) | 124 (59.3%) | 85 (40.7%) | |
| | 269 (56.3%) | 144 (53.5%) | 125 (46.5%) | |

* Denotes statistical significant at p<0.05

The odds of ageing were 2.2 (unadjOR=2.2; 95% CI 0.7-7.2) times higher among respondents who exercised only 1-2 times a month compared to those who did not exercise at all while they were lower among all other exercise frequencies. In fact, in the multivariate model, however, all forms of all exercise frequencies had higher odds of ageing compared to those who did not exercise. However, respondents who engaged in running (unadjOR=0.5; 95%CI 0.3-1.0) and exercise bike (unadjOR=0.4; 95%CI 0.1-0.9) as forms of physical exercise had lower odds of ageing compared to respondents who did not. In fact, in the multivariate model, there was a slight increase in the odds of ageing among respondents who undertook running as a form of exercise from 0.5 to 0.6 (adjOR=0.6; 95%CI 0.3-1.0).

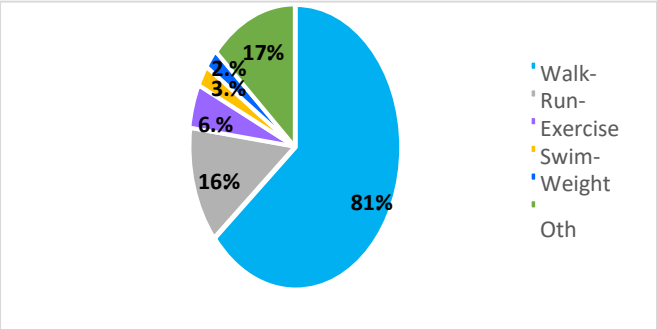


Figure 1: Forms of physical exercises engaged in

Respondents who considered themselves to be overweight had 90% (1.9 (1.1-3.2) higher odds of ageing compared to those who did not consider themselves overweight. In the multivariate model, there was a 10% decrease in the odds of ageing for respondents who considered themselves overweight (adjOR=1.8; 95%CI 1.0-3.2), albeit still higher than those who did not consider themselves as such.

Table 2: Logistic regression analysis of lifestyle factors associated with ageing among the respondents

| Variable | Unadj OR (95% CI) | p-value | Adj. OR (95%CI) | p-value |
|---|---|---|---|---|
| **Frequency of physical exercise** | | | | |
| Not at all | 1 (Reference) | 0.173 | 1 (Reference) | 0.094 |
| 1-2 times a month | 2.2 (0.7-7.2) | 0.149 | 8.4 (0.7-102.3) | 0.518 |
| 1-2 times a week | 0.6 (0.3-1.2) | 0.029* | 2.2 (0.2-21.9) | 0.597 |
| 3-4 times a week | 0.5 (0.3-0.9) | 0.251 | 1.9 (0.2-18.5) | 0.409 |
| 5+ times a week | 0.7 (0.4-1.3) | | 2.6 (0.3-25.6) | |
| **Exercise-Running (n=428)** | | | | |
| No | 1 (Reference) | 0.048* | 1 (Reference) | 0.044* |
| Yes | 0.5 (0.3-1.0) | | 0.6 (0.3-1.0) | |
| **Exercise-Exercise bike (n=428)** | | | | |
| No | 1 (Reference) | 0.034* | 1 (Reference) | 0.043* |
| Yes | 0.4 (0.1-0.9) | | 0.4 (0.1-1.0) | |
| **Consider yourself overweight** | | | | |
| No | (Reference) | 0.017* | (Reference) | 0.053 |
| Yes | 1.9 (1.1-3.2) | | 1.8 (1.0-3.2) | |

* Denotes statistical significant at p<0.05

In summary, running (p=0.044) and exercise bike (0.043) were the only factors associated with ageing in the multivariate model. Neither smoking nor alcohol consumption had a statistically significant association with ageing; recreational drug use was also not associated with ageing. Frequency of physical exercise (p=0.021), engaging in running (p=0.046) or exercise bike (p=0.027) as a physical activity had a statistically significant association with ageing. Only perception of overweight status had a statistically significant association with ageing among this study population (p=0.016).

## Discussion

Smoking significantly reduces the life expectancy of HIV-infected people and that smoking cessation could has a major impact on survival (Krishna et al, 2016). Good enough, only 14,2% of the respondents in this study had ever smoked cigarettes with only 11.8% of these still smocking, implying that the majority took the right path of cessation of smoking while on ART.

Irrespective of having ever smoked, whether currently smoking or the duration of smoking, smoking did not have a statistically significant association with accelerated ageing among the HIV patients on ART in this study. This is contrary to findings by other scholars where it was stipulated that smokers in HIV care may now lose as much or more life expectancy from smoking as from their HIV infection, thus progressively accelerating their ageing (Rowan Hooper, 2005). This can be explained by the fact that in Makindye division of Kampala district, Uganda, there are smoking cessation interventions among PLWH ART clinics as one of the measures on emphasizing treatment adherence to enable viral suppression and good health outcomes in this particular age group.

Excessive alcohol use is common among people living with HIV. Not surprisingly, 42.5% of the respondents had ever taken alcohol and of these, 43.4% were current alcohol consumers, most of whom (73.9%) drinking alcohol once a week, taking an average of 2 (±1.1) bottles a week. Regardless of having ever taken alcohol (44.3%) and despite the acceleration of ageing being lower among respondents who currently drank alcohol compared to those who were not current drinkers, alcohol consumption did not have any statistically significant association with accelerated ageing among the HIV patients on ART in this study. This was not in line with another similar study in Kampala where alcohol use among PLHIV was found to be high, particularly among participants who had not yet been started on ART (Wandera et al., 2015). This could be explained by the fact our study focused on those who had been already on ART. Much as Uganda is known to have one of the highest per capita alcohol consumption levels in SSA (WHO, 2016), and regular heavy sporadic drinking sprees that are common with Ugandans, but the story is different when clients are initiated on ARV treatment. Clients are counselled on reduction or even cessation of alcohol consumption while on daily ART medication so as to achieve good clinical outcomes.

Taking recreation drugs and being addicted to them could cause early onset of age-related disease, as a result of multi-system toxicity induced by the drugs and a harmful lifestyle. In this study, only 7 (1.5%) of the respondents had ever taken recreational drugs and an even smaller number (2 respondents) were still taking recreational drugs at the time of the study. Recreational drug use either, did not have any statistically significant association with accelerated ageing among the HIV patients on ART in this study. A scholar in one of the

papers related aspects of ageing to drug careers, which was also contrary to our findings, reason being that there exists a knowledge gap on the use of recreational drugs among elderly PLHIV on ART in Uganda.

Encouraging to note is that 43.3% of the HIV patients on ART were engaged in physical exercise five or more times a week while only 11.3% did not engage in physical exercise. Exercise and physical activity can improve cardiac sufficiency and respiratory fitness and the overall quality of life among PLWH (O'Brien et al., 2016). The odds of ageing were 2.2 (unadjOR=2.2; 95%CI 0.77.2) times higher among respondents who exercised only 1-2 times a month compared to those who did not exercise at all while they were lower among all other exercise frequencies. Whereas it's know that physical activity has an impact on health and well-being in older age, yet out study findings revealed otherwise. In fact, in the multivariate model, however, all forms of all exercise frequencies had higher odds of ageing compared to those who did not exercise. This could be explained by the fact that many PLHIV on ART in Uganda, as a developing country, have jobs that involve a lot of physical activity walking to-and-from their routine places of work, odd jobs such as cleaning of roads and buildings, animal and poultry raring, agricultural farming since Uganda is an agricultural state, among others. In addition, the modes of transport of many of them involve physical work. This explains why more than half (60.5%) of the study participants indicated that their occupation involved much physical exercise. In fact, walking was the most frequently performed physical exercise done by 81% of the respondents in this study.

Studies have generally shown that, people in low-income countries seem to integrate a sufficient amount of physical activity in their lifestyles, unlike those in wealthier countries (UNCDA, 2018). However, respondents who engaged in running (unadjOR=0.5; 95%CI 0.3-1.0) and exercise bike (unadjOR=0.4; 95%CI 0.1-0.9) as forms of physical exercise had lower odds of ageing compared to respondents who did not. This kind of lifestyle prevents premature onset of ill health, disease and frailty among the ageing HIV patients on ART which is also key in maintenance of good health in later life and possibly reduce accelerated ageing.

Having added visceral fat tissue upsurges the risk of developing age-related illnesses, reduces the life expectancy, and increases lifetime health costs and expenditure (Ding et al., 2007). In the multivariate model, there was a 10% decrease in the odds of ageing for respondents who considered themselves overweight (adjOR=1.8; 95%CI 1.0-3.2), albeit still higher than those who did not consider themselves as such. This could be explained by the fact that obesity increases the onset of metabolic imbalances, affects cellular and molecular processes in a fashion resembling aging and thus leading to a reduced life span (Salvestrini et al., 2018).

## Conclusions and Recommendations

Exercising only 1-2 times a month as a PLHIV aged 45+ on ART in Makindye is a risk factor to accelerated ageing. However, all forms of all exercise frequencies had higher odds of ageing compared to those who do not exercise. Both engaging in running and the use of exercise bike as forms of physical exercise are protective against accelerated ageing among PLHIV aged 45+ on ART in Makindye. A PLHIV aged 45+ on ART in Makindye considering themselves to be overweight is at a

higher risk for accelerated ageing. Importantly, smoking, alcohol consumption and the use of recreational drugs are of no risk because they all have no statistically significant association with acceleration of ageing among PLHIV aged 45+ on ART in Makindye.

We recommend Makindye division administration to purchase bicycles and costumes for the running and jogging, as these have been found to be protective against accelerated ageing. Similarly, the health facilities should provide aerobic services to the PLHIV clients as they come to the clinics to improve on their physical activity, and also sensitizing them on physical exercises while at home.

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