

# Magnitude of HIV infection among older people in Mufindi and Babati districts of the Tanzania mainland

Vitus Nyigo<sup>1</sup>  
 Andrew Kilale<sup>2</sup>  
 Stella Kilima<sup>1</sup>  
 Elizabeth H Shayo<sup>1</sup>  
 Kesheni P Senkoro<sup>1</sup>  
 Jonathan Mshana<sup>1</sup>  
 Adiel K Mushi<sup>1</sup>  
 Lucas Matemba<sup>1</sup>  
 Julius Massaga<sup>1</sup>

<sup>1</sup>National Institute for Medical Research, <sup>2</sup>Muhimbili Medical Research Centre, National Institute for Medical Research, Dar es Salaam, Tanzania

**Introduction:** According to the 2011–2012 HIV and Malaria Indicator Survey, the prevalence of HIV infection in Tanzania is 5.1%, with limited information on its magnitude among older people, as the community believes that the elderly are not at risk. Consequently, little attention is given to the fight against HIV and AIDS in this group. The present study investigated the magnitude of HIV and AIDS infection among older people in rural and urban areas of the Tanzania mainland.

**Subjects and methods:** The study was conducted in Mufindi and Babati districts of Iringa and Manyara regions, respectively, through multistage sampling procedures. Dried blood spot cards were used to collect blood samples for HIV testing among consenting participants. HIV testing was done and retested using different enzyme-linked immunosorbent assay kits.

**Results:** A total of 720 individuals, 340 (47.2%) males and 380 (52.8%) females, were randomly selected, of whom 714 (99.2%) consented to HIV testing while six (0.8%) refused to donate blood. The age ranged from 50 to 98 years, with a mean age of 64.2 years. Overall, a total of 56 (7.8%) participants were HIV-positive. Females had a higher prevalence (8.3%) than males (7.4%), with Mufindi district recording the higher rate (11.3%) compared to the 3.7% of Babati district. The prevalence was higher in the rural population (9.4%) compared to 6.4% of their urban counterparts.

**Conclusion:** Although HIV/AIDS is considered a disease of individuals aged 15–49 years, the overall prevalence among the older people aged 50 years and above for Mufindi and Babati districts was higher than the national prevalence in the general population. These findings point to the need to consider strengthening interventions targeting older populations against HIV/AIDS in these districts while establishing evidence countrywide to inform policy decisions.

**Keywords:** HIV/AIDS, prevalence, elderly, Iringa, Manyara, HIV in the elderly, older population

## Introduction

The lives of many people are threatened by the HIV pandemic worldwide, with sub-Saharan Africa being the hardest hit. Among the 34 million people living with HIV and AIDS by the end of year 2010, 68% were from sub-Saharan Africa.<sup>1–3</sup> Similarly among 1.8 million recorded deaths in 2010, 1.2 million were from sub-Saharan Africa.<sup>3</sup> As one of the countries of sub-Saharan Africa, Tanzania is equally affected, despite the recent slight declining trend in HIV prevalence in the age group 15–49 years from 6.5% to 5.7% and 5.1% in 2004, 2007, and 2011, respectively.<sup>4–6</sup> These survey reports, however, show HIV infections among youths and adults of reproductive age only. The little existing information of HIV infection among older people comes from elsewhere.<sup>7–10</sup> While this strong evidence prevails for worldwide HIV infections in people aged 50 years

Correspondence: Vitus Nyigo  
 National Institute for Medical Research (NIMR), 2448 Ocean Road, Dar es Salaam, Tanzania  
 Tel +255 78 687 3558  
 Email nyigoo@yahoo.com

and older, some people, including older people themselves, perceive HIV/AIDS to be diseases of intravenous drug users, gay men, and youths.<sup>11,12</sup> Accordingly, there is enough evidence that very little effort is being directed toward the elderly in many places around the globe.<sup>13–16</sup> In Tanzania, there is limited HIV/AIDS-prevalence information on this group. Owing to this knowledge gap, planning and implementation of effective and feasible interventions by governments and stakeholder institutions is generally hampered. The current study, therefore, was conceived in order to determine the magnitude of HIV/AIDS infection among older people in rural and urban areas of the Tanzania mainland.

## Subjects and methods

### Study area

The study was conducted in Mufindi and Babati districts of Iringa and Manyara regions, respectively. Based on the Tanzania HIV and Malaria Indicator Survey, Iringa, with HIV prevalence of 15.7%, and Manyara, with 1.5%, respectively, were selected to represent regions with high and low HIV prevalence.<sup>5</sup> Iringa is located in the Southern Highlands, while Manyara is located in the northeast of Tanzania. Male circumcision is widely practiced in Manyara region, including traditional circumcision, as opposed to Iringa region.

### Study population

This cross-sectional study used a quantitative data-collection approach. Study subjects were older people aged 50 years and above of both sexes. The sample size for the study was determined using the World Health Organization's *Sample Size Determination in Health Studies*.<sup>17</sup> The following factors were taken into consideration: 95% confidence level, 6% prevalence among adult Tanzanians (2007–2008 Tanzania HIV and Malaria Indicator Survey), 1.8% absolute precision, 30% relative precision, and estimated population size of 64,500 of the older population in the two districts (11.0% of total population of 586,045 from Mufindi and Babati districts).

### Sampling procedure and data collection

Sampling procedure was multistage and random for selection of districts, wards, villages, hamlets, and then households. Households were randomly selected through the assistance of hamlet leaders by establishing a list of households with older people. Where the selected house lacked an eligible person for interview, the next house was included for interview. The research team comprised research scientists and nurse counselors who were responsible for filling the questionnaires. At the end of the interview, the nurse coun-

selors sought consent from respondents to take blood for HIV tests after providing appropriate counseling. Blood from consenting respondents was collected by finger prick using sterile safety lancets (disposable) directly into calibrated spots of filter paper (Whatman® 903 protein saver cards; Sigma-Aldrich, St Louis, MO, USA). The blood was left to dry in room temperature on drying racks. During transportation from study sites to laboratory, the dried blood spots were packed into zip lock bags with desiccant packs and humidity indicator cards for the purposes of drying moisture and monitoring levels of humidity in the packs, respectively.

### Laboratory methods

In the laboratory, the procedure involved separating a small disk of the saturated paper from the filter-paper sheet using an automated or manual hole punch and dropping the disk into a flat bottomed microtiter plate. The blood was eluted out in phosphate-buffered saline containing 0.05% Tween 80 and 0.005% sodium azide, agitating it overnight at 2°C–8°C (refrigerator) for a minimum of 16 hours. The anti-HIV antibodies were tested using two enzyme-linked immunosorbent assay (ELISA) kits: Microlisa (J Mitra, New Delhi, India) and Enzaids (J Mitra, New Delhi, India). Samples that tested negative were considered not infected, but the reactive samples on the first ELISA were retested using the second ELISA kit.

### Data analysis

After data collection, each questionnaire was coded and cleaned before double entry into computer statistical software (SPSS version 17.0; SPSS, Chicago, IL, USA; and Stata version 10; StataCorp, College Station, TX, USA). Sociodemographic information on age, education, and marital status was analyzed to facilitate data interpretation across and within different socioeconomic groups. Age information was processed from continuous variables collected and later collapsed into three age categories: 50–59, 60–69, and 70+ years. Education status was categorized according to the levels of the national education system.

### Ethical issues

Ethical clearance to conduct the study was granted from the Ethical Subcommittee of the Medical Research Coordinating Committee of the National Institute for Medical Research, Tanzania. Permission to conduct the study in selected districts and health facilities was requested from district health authorities. Before interviews, participants were requested for informed oral consent after they had been given an explanation on the purpose of the study. Confidentiality

was highly observed during interviews, and participants were assured that data were only to be used by researchers alone, and no other person would have access to them. The data were anonymous and unlinked, as identification of study participants was through a code number assigned to each questionnaire.

## Results

In the household survey, 720 subjects were recruited: 393 (54.6%) and 327 (45.4%) from Mufindi and Babati districts, respectively. The age of the study participants ranged from 50 to 98 years, with a mean age of 64.2 years. The demographic characteristics of the study population are shown in Table 1.

Screening for HIV infection was done on 714 (99.2%) respondents who consented for HIV testing among the 720 recruited interviewees, and thus only six (0.8%) people refused to donate blood for HIV tests. Nearly half (336, 46.7%) of all interviewees reported having been tested for HIV infection prior to this study. Laboratory results show that 56 (7.8%) were HIV-positive. Analysis shows that HIV infection among respondents who reported to have ever tested for HIV prior to the current study was more than two times higher (39 [11.6%]) as compared to 17 (4.5%) among those who had never taken the test before. Although there was some variation in prevalence of HIV infection by demographic characteristics of the study participants, the infection rate between the different marital statuses was not statistically significant ( $P>0.05$ ). Females were infected more (8.3%) than males (7.4%), with Mufindi district recording the higher (11.3%) prevalence compared to the 3.7% of Babati district. Prevalence was higher in the urban population (9.4%) compared to 6.2% in the rural population; however, this result was not statistically significant ( $P=0.1$ ). Individuals who were not living together in this study were 1.5 times more likely to have contracted HIV than married study participants (odds ratio 1.5, 95% confidence interval 0.9–2.6). However, this result was not statistically significant. Similarly, there was no statistical difference in prevalence between monogamous and polygamous married couples (Table 2).

## Discussion

Our findings shows HIV prevalence among study participants was higher than the reported national HIV prevalence (5.7%) in the general population among the 15- to 49-year age groups,<sup>5,6</sup> with females being more affected than males. HIV infection among monogamous and polygamous couples was not different. On the other hand, the observed prevalence among older people was higher than the 5% reported in Ethiopia.<sup>8</sup> Our findings correspond well to those reported elsewhere.<sup>8,10,12</sup>

**Table 1** Demographic characteristics of study participants from household survey

| Characteristic     | Babati district                    | Mufindi district                   | Total                              |
|--------------------|------------------------------------|------------------------------------|------------------------------------|
|                    | Number of respondents (percentage) | Number of respondents (percentage) | Number of respondents (percentage) |
| Age, years         |                                    |                                    |                                    |
| 50–59              | 130 (39.8)                         | 152 (38.7)                         | 282 (39.2)                         |
| 60–69              | 91 (27.8)                          | 104 (26.5)                         | 195 (27.1)                         |
| 70+                | 106 (32.4)                         | 137 (34.9)                         | 243 (33.8)                         |
| Total              | 327 (100)                          | 393 (100)                          | 720 (100)                          |
| Sex                |                                    |                                    |                                    |
| Males              | 167 (51.1)                         | 173 (44.0)                         | 340 (47.2)                         |
| Females            | 160 (48.9)                         | 220 (56.0)                         | 380 (52.8)                         |
| Total              | 327 (100)                          | 393 (100)                          | 720 (100)                          |
| Education          |                                    |                                    |                                    |
| No education       | 186 (56.9)                         | 232 (59.0)                         | 418 (58.1)                         |
| Old standard IV    | 63 (19.3)                          | 62 (15.8)                          | 125 (17.4)                         |
| Standard VII       | 65 (19.9)                          | 57 (14.5)                          | 122 (16.9)                         |
| Above standard VII | 13 (4.0)                           | 42 (10.7)                          | 55 (7.6)                           |
| Total              | 327 (100)                          | 393 (100)                          | 720 (100)                          |
| Marital status     |                                    |                                    |                                    |
| Married            | 199 (60.9)                         | 228 (58.0)                         | 427 (59.3)                         |
| Never married      | 4 (1.2)                            | 2 (0.5)                            | 6 (0.8)                            |
| Separated          | 39 (11.9)                          | 22 (5.6)                           | 61 (8.5)                           |
| Widowed            | 85 (26.0)                          | 141 (35.9)                         | 226 (31.4)                         |
| Total              | 327 (100)                          | 393 (100)                          | 720 (100)                          |
| Type of marriage   |                                    |                                    |                                    |
| a. Married         |                                    |                                    |                                    |
| Monogamous         | 150 (75.4)                         | 171 (75.0)                         | 321 (75.2)                         |
| Polygamous         | 49 (24.6)                          | 57 (25.0)                          | 106 (24.8)                         |
| Total              | 199 (100)                          | 228 (100)                          | 427 (100)                          |
| b. Separated       |                                    |                                    |                                    |
| Monogamous         | 24 (61.5)                          | 10 (45.4)                          | 34 (55.7)                          |
| Polygamous         | 15 (38.5)                          | 12 (54.6)                          | 27 (44.3)                          |
| Total              | 39 (100)                           | 22 (100)                           | 61 (100)                           |
| c. Widowed         |                                    |                                    |                                    |
| Monogamous         | 61 (71.7)                          | 98 (69.5)                          | 159 (70.3)                         |
| Polygamous         | 24 (28.3)                          | 43 (30.5)                          | 67 (29.7)                          |
| Total              | 85 (100)                           | 141 (100)                          | 226 (100)                          |
| Occupation         |                                    |                                    |                                    |
| Crop farming       | 281 (85.9)                         | 313 (79.6)                         | 594 (82.5)                         |
| Pastoralist        | 3 (0.9)                            | 2 (0.5)                            | 5 (0.7)                            |
| Employee           | 6 (1.8)                            | 8 (2.0)                            | 14 (1.9)                           |
| Retired            | 3 (0.9)                            | 10 (2.5)                           | 13 (1.8)                           |
| Businessman        | 2 (0.6)                            | 11 (2.8)                           | 13 (1.8)                           |
| Traditional healer | 1 (0.3)                            | 3 (0.8)                            | 4 (0.6)                            |
| Unemployed         | 20 (6.1)                           | 32 (8.1)                           | 52 (7.2)                           |
| Other              | 11 (3.4)                           | 14 (3.6)                           | 25 (3.5)                           |
| Total              | 327 (100)                          | 393 (100)                          | 720 (100)                          |

Despite the observed difference, it is inappropriate to generalize these findings to all older people in Tanzania, as the study covered only two districts. It is unfortunate that there are limited studies in this age group, as they are not regarded as sexually active.<sup>12</sup> Evidence indicates that

**Table 2** HIV prevalence by demographic characteristics and residence

| Characteristics            | n (%)     | Crude odds ratio | P-value* | 95% CI   | Total |
|----------------------------|-----------|------------------|----------|----------|-------|
| <b>Marital status</b>      |           |                  |          |          |       |
| Married                    | 28 (6.6)  | 1                |          |          | 422   |
| Never married              | 1 (20.0)  | 3.5              | 0.3      | 0.4–32.5 | 5     |
| Separated                  | 7 (11.5)  | 1.8              | 0.2      | 0.8–44   | 61    |
| Widowed                    | 20 (8.8)  | 1.4              | 0.3      | 0.7–2.5  | 226   |
| <b>Type of marriage</b>    |           |                  |          |          |       |
| a. Married                 |           |                  |          |          |       |
| Monogamous                 | 22 (6.9)  | 1                |          |          | 317   |
| Polygamous                 | 6 (5.7)   | 0.8              | 0.7      | 0.3–2.1  | 105   |
| b. Separated               |           |                  |          |          |       |
| Monogamous                 | 4 (11.1)  | 1                |          |          | 36    |
| Polygamous                 | 3 (12.0)  | 0.9              | 0.9      | 0.2–5.4  | 25    |
| c. Widowed                 |           |                  |          |          |       |
| Monogamous                 | 14 (9.1)  | 1                |          |          | 153   |
| Polygamous                 | 6 (8.2)   | 0.9              | 0.8      | 0.3–2.4  | 73    |
| <b>Residence</b>           |           |                  |          |          |       |
| Rural                      | 21 (6.1)  | 1                |          |          | 343   |
| Urban                      | 35 (9.4)  | 1.6              | 0.1      | 0.9–2.8  | 371   |
| <b>District</b>            |           |                  |          |          |       |
| Babati                     | 12 (3.7)  | 1                |          |          | 325   |
| Mufindi                    | 44 (11.3) | 3.3              | <0.05    | 1.7–6.4  | 389   |
| <b>Age category, years</b> |           |                  |          |          |       |
| 50–59                      | 36 (12.9) | 3.8              | 0.3      | 0.6–3.9  | 279   |
| 60–69                      | 11 (5.7)  | 1.6              | <0.05    | 1.8–8.1  | 193   |
| 70+                        | 9 (3.7)   | 1                |          |          | 242   |
| <b>Sex</b>                 |           |                  |          |          |       |
| Male                       | 25 (7.4)  | 1                |          |          | 337   |
| Female                     | 31 (8.2)  | 1.1              | 0.7      | 0.6–1.9  | 377   |
| <b>Education</b>           |           |                  |          |          |       |
| No education               | 28 (6.8)  | 1                |          |          | 413   |
| Old standard IV            | 3 (2.4)   | 0.3              | 0.08     | 0.1–1.1  | 125   |
| Standard VII               | 18 (14.9) | 2.4              | 0.01     | 1.3–4.5  | 121   |
| Above standard VII         | 7 (12.7)  | 2.0              | 0.1      | 0.8–4.8  | 55    |

**Notes:** \*Two-tailed test comparing *P*-values to preselected value of  $\alpha=0.05$ ; values less than 0.05 are considered to be statistically significant.

**Abbreviation:** CI, confidence interval.

the prevalence of HIV/AIDS among older people includes people who have been living with HIV for many years, older HIV-infected people who are just learning of their HIV status, and older people newly infected with HIV.<sup>18</sup> However, such findings could not be established in the current design of the study. Therefore, some older people may have acquired the infection years before being tested. By the time they are diagnosed with HIV/AIDS, the virus may be in the late stages. The results from our study did not differentiate between individuals who acquired the infection before the minimum-considered age for older people.

The high HIV-infection rate among females compared to males was in agreement with other studies conducted

elsewhere.<sup>10,12,19,20</sup> The high risk of HIV infection among women has been associated with their distinct biological factors, social status, and presence of sexually transmitted diseases.<sup>19</sup> For older women, the higher risk for HIV infections is said to be exaggerated, due to postmenopausal changes in the vagina.<sup>12</sup> Our findings also show that prevalence was high among urban residents compared to rural dwellers. This observation is congruent with previous studies done in Tanzania and other parts of the world.<sup>8</sup>

Discovering one's HIV status could be one of the most important things to do, as there are a number of benefits. For example, diagnosing HIV early in the disease course improves individual prognosis, and becoming aware of serostatus leads to an individual observing protective measures. It is unfortunate that despite ongoing campaigns on HIV testing, in our study only 42.6% of respondents reported that they had tested their HIV status. For those who had not tested, the main reason was not being at risk of acquiring HIV infection. This reason has been reported in another study on youths.<sup>21</sup> On the other hand, the reasons given for testing included the need to know serostatus and frequent illnesses. These findings were somehow different from other studies conducted elsewhere, where the main reasons were either due to spouse death or HIV-infected spouse.<sup>22</sup> The fact that HIV infection among respondents who reported that they had tested before was more than twofold higher compared to those who said that they had never tested indicates that already they were suspicious of their health status due to various reasons, including partner death, frequent fevers, and risky sexual behaviors.

The proportion of those widowed with HIV infection was 8.8%, greater than the general prevalence in the general population (7.8%). Although no evidence can be deduced, the findings might imply that their partners died of HIV and AIDS. The proportion of HIV infection among monogamous and polygamous couples was not different. These findings contradicted the data reported by the Tanzania Commission for AIDS in 2005,<sup>6</sup> which indicated polygamy as one of the factors for HIV infection, although this was for the general population in Tanzania.

## Conclusion

Although HIV/AIDS is considered a disease of individuals aged 15–49 years, prevalence among older people in our study districts was higher than the national prevalence in the general population. However, the present study was not able to establish whether older people were infected with HIV before or after the age of 50 years, thus creating the need



to design and conduct a larger-cohort study that will gather precise information and time of HIV infection among older people. Nevertheless, these findings point to the need to consider strengthening interventions targeting older populations against HIV/AIDS in the study districts while establishing evidence countrywide to inform policy decisions.

## Acknowledgments

We acknowledge Global Fund Round 8 for financial support. We greatly acknowledge the entire administration of Mufindi and Babati districts for granting permission and agreeing to assist the research team during data collection. Specifically, we would like to recognize the support given by the district executive directors and district medical officers for recognizing the importance of the study and for offering tireless follow-up of the study activities during data collection. We would also like to register our immense gratitude to the following for the enormous support they offered during data collection in the respective districts: Tina Mtui, Zenaice Aloyce, Furaha Godfrey, Stella Mushy, Silvia Sambu, and Karolina Lyimo. Last but not least, we are grateful to Bonita Kilama and Jaffer Sufi for their technical support and advice on the whole-blood sample collection and processing.

## Disclosure

The authors report no conflicts of interest in this work.

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