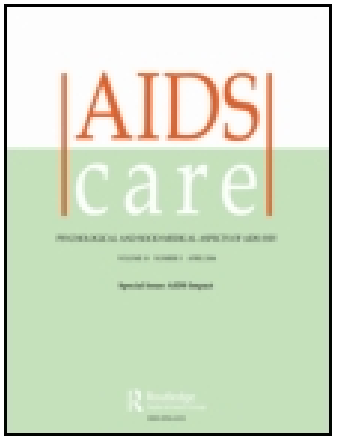

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Public knowledge and attitudes toward HIV/AIDS and antiretroviral therapy in Kabarole district, western Uganda

Walter Eigen Kipp [a] , Arif Alibhai [a] , Duncan Saunders [a] , Joseph Konde-Lule [b] & Alex Ruhunda [c]

[a] Department of Public Health Sciences, School of Public Health , University of Alberta , Edmonton, Alberta, Canada

[b] School of Public Health , Makerere University , Kampala, Uganda

[c] Kabarole Research & Resource Centre , Fort Portal, Uganda

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Public knowledge and attitudes toward HIV/AIDS and antiretroviral therapy in Kabarole district, western Uganda

Walter Eugen Kipp[a]*, Arif Alibhai[a], Duncan Saunders[a], Joseph Konde-Lule[b], and Alex Ruhunda[c]

[a]*Department of Public Health Sciences, School of Public Health, University of Alberta, Edmonton, Alberta, Canada;* [b]*School of Public Health, Makerere University, Kampala, Uganda;* [c]*Kabarole Research & Resource Centre, Fort Portal, Uganda*

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A study on knowledge about HIV/AIDS and antiretroviral therapy (ART) was conducted in the general population of a rural district in western Uganda. Three hundred seventy-two participants were selected by random cluster sampling and interviewed with an interview-administered questionnaire. Data were analyzed quantitatively with descriptive, univariate and linear multivariate statistical analysis with the knowledge score about ART as the dependent variable. The results indicate that the mean knowledge was 7.7 in a scale from 0 to 13. Predictor for better ART knowledge was a higher educational status of the participants. Older participants over 50 years were less ART knowledgeable. Only 19% of the participants have been tested for HIV. The conclusions are that the ART knowledge in this population is remarkably high which is reaffirming and important for achieving a high adherence to ART. Of concern is the low proportion of persons tested for HIV in this general population. Kabarole district seems to be receptive and capable for intensifying HIV testing which is a precondition for the ART roll-out.

Keywords: HIV/AIDS; Uganda; antiretroviral therapy; knowledge

Introduction

Since HIV/AIDS was first identified in Uganda in 1982, it has emerged as the most devastating pandemic the country has ever faced in its history. In 1992, the HIV prevalence rate reached a peak of 30% in some urban antenatal sentinel surveillance sites, and an average of 18% in the total adult population (MoH, 2002). In 2003, about 1,050,555 people were infected and 947,552 had died from HIV/AIDS-related illnesses (MoH, 2003). HIV/AIDS has had an equally devastating effect on the country's social and economic welfare. The most recent national survey of the Ugandan Ministry of Health concluded that the national figure for the HIV prevalence was 6% in 2004 (5% for males, 8% for females) (MoH, 2006).

Antiretroviral therapy (ART) has been integrated as part of the national Ugandan program for comprehensive HIV/AIDS care and support. Since 2004 antiretrovirals (ARVs) are provided free of charge under the free access initiative. So far ARVs are available to some 69,000 AIDS patients out of an estimated number of 116,000 AIDS patients eligible for free ARVs nationwide (MoH, 2005). This represents ARV treatment coverage of 59%.

In spite of this massive roll-out of ARV treatment in Uganda, little information about the public's ART knowledge is available. A Medline (1966 to present) search using key words ARV, HAART, knowledge and Uganda, did not reveal any published reports about the public's ART knowledge from Uganda and only one study from South Africa was found where ART knowledge was assessed in AIDS patients on treatment (Nachega et al., 2005). It has been shown that treatment knowledge is crucial for adherence to ARVs. Thus, it is somewhat surprising that ART knowledge in general has not been assessed in the public more often (Miller et al., 2003). Acknowledging that perceptions and experience of ill health by patients, family members and the community at large have been identified as important factors influencing health seeking behavior it is also important to understand what people know and perceive concerning antiretroviral treatment (Okello & Neema, 2006). In order to bridge this knowledge gap and generate information on what the population knows about ART, we conducted a quantitative and a qualitative study in western Uganda. In this paper, we report the findings from the quantitative survey with an interviewer-administered questionnaire. The data

*Corresponding author. Email: walter.kipp@ualberta.ca

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collection in Uganda took place between July 2005 and December 2005.

Background information: Kabarole district

Kabarole district has an estimated population of 373,300 according to the 2002 national census. The literacy rate is 49%. The population has a low socio-economic status with subsistence agriculture as the main source of income. Kabarole district has one of the highest fertility rates (TFR 8.0) in the country. Similarly, it has a high HIV prevalence in the district (around 11%). HIV prevalence is clustered and highest in urban centers, followed by semi-urban settlements and lowest in rural villages. A significant decline of the HIV prevalence in Kabarole district has been observed in young pregnant women from 33% in 1991 to 9% in 1997 (Kilian et al., 1999). An estimated ART program coverage of 60% has been possible only through the Joint Clinical Research Centre (JCRC) which treats most of the AIDS patients in the main regional hospital in Fort Portal and two health centers.

Objectives of the study

The objectives of the study were to:

1. assess knowledge and attitudes toward HIV/AIDS in a general population in western Uganda;
2. determine specific knowledge of antiretroviral therapy (ART) in the same population; and
3. investigate associations between ART knowledge and demographic variables of participants.

Methods

Study design, sample and enrollment

The study design was cross-sectional. The study population was a random sample of the general rural population in Kabarole district, western Uganda. Inclusion criteria of participants were age 18 years and older and being a resident in the area. AIDS patients irrespective of their treatment were excluded from the study.

A four-stage random cluster sampling was applied. First, out of 10 sub-counties three were selected using simple random sampling; second, in each sub-county 10 parishes were randomly selected; third, in each parish three villages were randomly selected; and fourth, in each village four households were randomly chosen. If in one household was more than one person above the age of 18 years, then one participant was randomly selected from the household members 18 years and older. The sample size was determined to be 350 which would enable the study to assess, for example, a difference in a response of 50% within an error of margin of $\pm 3\%$. To compensate for non-participation and a design effect through cluster sampling, 372 participants were selected.

The study was approved by the Health Research Ethics Board (Panel B) by the University of Alberta, Edmonton, Canada, the ethics research committee of the School of Public Health, Makerere University, the Uganda National Council of Science and Technology, Kampala, Uganda, and the District Officer of Health of Kabarole district. Information letters outlining the purposes and implications of the study, and clarifying that participation was completely voluntary were provided or read to participants. Participants were requested to give their consent by signing the consent form.

Questionnaire

A previously validated questionnaire available in Uganda about Knowledge, Attitude, Beliefs and Practice (KABP) was used. The validation of the questionnaire was done by faculty members of the School of Public Health, Makerere University, Kampala, Uganda. The original questionnaire contained 54 questions. The questionnaire was adapted to the local culture and modified to suit our purpose. More questions regarding antiretroviral therapy for HIV/AIDS were added. Demographic information included were age, sex, marital status, ethnic group, educational level, religious affiliation, and employment status. The questionnaire also included questions on HIV transmission, HIV testing including a personal history of the participants' HIV status, where to find an HIV testing centre, and on condom use. Participants were also asked if they were willing to pay for ART and how much they would be willing to spend.

To assess knowledge about HIV/AIDS and ART, questions about effectiveness of ART, adverse reactions, availability, costs, etc. were asked. These questions are summarized in Table 1. A weighted knowledge score regarding ART was calculated by adding the correct answers of the questions. Table 1 shows which questions were used for the calculation of the knowledge score and how they were weighted. The three questions (number 1, 2, 14) which were given the lowest weights were considered as quite common knowledge. The lower weight of these questions does not mean that they are less important, but that they were more likely to be known.

Table 1. Composition of the knowledge score for antiretroviral therapy.

Question	Rating of answers
Is it possible to cure HIV/AIDS?	Yes = 0 No = 1
Have you heard of ARVs, and if yes, what can they do?	Restore to normal function = 2 Relieve pain = 1 They are not effective = 0 Cure completely = 0
How long should an AIDS patient take them (ARVs)?	Lifelong = 0.5 Other duration = 0
Do you know about the government program to provide these drugs free of charge?	Yes = 1 No = 0
Do you think that these drugs can have serious side effects?	Yes = 1 No or don't know = 0
Do you think AIDS patients on these drugs should use condoms if they are sexually active?	Yes = 1 No or don't know = 0
Do you think if these drugs are available widely the HIV/AIDS epidemic will eventually disappear?	No = 1 Yes or don't know = 0
Can children also be treated with these drugs?	Yes = 1 No or don't know = 0
Can pregnant women be treated with these drugs?	Yes = 1 No or don't know = 0
When a pregnant woman is treated with these drugs, can it have harmful effects on the baby?	Yes = 1 No or don't know = 0
If somebody on these drugs forgets to take them, can this cause problems for him/her?	Yes = 1 No or don't know = 0
Do you know where to obtain drugs to treat HIV /AIDS (antiretrovirals)?	Yes = 1 No or don't know = 0
For how long should a person take ARVs?	Lifelong = 0.5 Other duration = 0
Total possible knowledge score	13

Inputs from local health officials like the District Officer of Health and other District Health Management Team members were sought and their suggestions were incorporated. The semi-final version of the questionnaire was pilot tested in 10 persons not connected to the study and modified according to the cultural understanding. Only minor changes were required.

Data entry and analysis

All questionnaires were checked for completeness. Open-ended questions were coded. Data were double entered, first into Epidata and then into ACCESS and finally transferred to Stata 9.0 which was used for the analysis (Stata Corporation, 2005). The database was checked for completeness and exception and/or out of range values. Descriptive analysis was performed by summary statistics. The normal distribution of the data was assessed with the Shapiro-Wilk test and a graphical distribution curve. The data were normally distributed (Shapiro-Wilk test for normal distribution 0.995). The dependent variable used in the statistical analysis was the aggregate knowledge score about ART. Univariate analysis was done with the student's two-tailed *t*-test as well as linear regression. A linear multivariate model was developed with the ART score as the dependent variable and the demographic variables as the independent variables in order to determine associations between the knowledge score and demographic characteristics. The model was developed by entering the variable with the lowest *p* value first, followed by the other variables according to their significance with the dependent variable. The significance level was set at 0.05.

Results

From a total of 372 participants included in the study 187 (50.3%) were male and 185 (49.3%) were female. One hundred and sixty-four (45.6%) were in the younger age group from 19 to 29 years, 111 (30.8%) were between 30 and 39 years, 49 (13.6%) were between 40 and 49 years and 36 (10.0%) were 50 years or older. Other demographic information is summarized in Table 2:

Three hundred and twelve (83.8%) of the participants knew where to go for HIV testing. Seventy-three participants (19.6%) said that they had been tested for HIV infection. Of those who were not tested, 257 (69.1%) said that they did not have enough money to go to a testing centre as it was too far away. General knowledge about HIV/AIDS was high: between 69 and 76% of the participants knew at least one major symptom of AIDS and 368 (98.9%) of participants knew that tuberculosis is associated with HIV infection.

Most participants (311, 83.6%) had heard about ARVs and 130 participants (34.9%) knew a relative or a friend who received antiretroviral therapy. Only a small proportion of participants (8, 2.1%) thought that ARV can cure an HIV illness. In addition, a small number of participants (21, 5.7%) said that ARVs taken in pregnancy can seriously harm the new born baby. A majority of participants (322, 86.6%) said that condom use during ART is important as it reduces the risk of infection with HIV. A majority of participants were also willing to pay for ART (189, 50.8%) while 135 (36.3%) said no and 48 (12.9%)

Table 2. Socio-demographic information about study participants.

Variable	
Age group (in years)	
18–29	164 (45.6%)
30–39	111 (30.8%)
40–40	49 (13.6%)
50+	36 (10.0%)
Sex	
Male	187 (50.3%)
Female	185 (49.3%)
Ethnic group	
Batoroo	185 (49.3%)
Bajika	83 (22.3%)
Bakonjo	81 (21.8%)
Others	23 (6.2%)
Religious affiliation	
Catholic	155 (41.7%)
Protestant	120 (32.3%)
Muslim	16 (4.3%)
Others	81 (21.8%)
Attend church at least once per week	330 (88.7%)
Education	
Never attended school	80 (21.5%)
Primary	215 (57.8%)
Secondary	57 (15.3%)
Tertiary/Technical	18 (4.8%)
Occupation of respondent	
Farmer	219 (58.9%)
Small-scale business owner	32 (8.6%)
Professional	11 (3.0%)
Others	110 (29.6%)
Occupation of head of household	
Farmer	211 (56.7%)
Small-scale business owner	55 (14.8%)
Professional	11 (3.0%)
Others	95 (25.5%)

had no opinion on this issue. Of those who were willing to pay, 165 (87.3%) said that 10,000 USH (6 US$) per month would be the appropriate amount. Only 22 (11.6%) said that they would be willing to pay between 10,000 and 50,000 USH (6–29 US$) per month and two (0.5%) said that they would pay more than 50,000 USH (29 US$) per month for ARV treatment.

The mean knowledge score about ART was 7.7 (median 8) (SD 1.9, range 2–12) out of a maximum score of 13. When the ART score was grouped according to score level, the following results were obtained: eight (2.2%) had a score between 0 and 3, 102 (27.4%) between 4 and 6, 192 (51.6%) between 7 and 9 and 70 (18.8%) between 10 and 13.

Associations with the knowledge score and the demographic variables are shown in Table 3. There was also a significant relationship in the univariate analysis between the knowledge score and HIV testing status of participants: those who said that they were tested for HIV had a higher knowledge score compared to those who said they were not tested for HIV (7.8 vs. 6.8, $p < 0.001$). When participants were asked if they felt they were at risk of acquiring HIV, those who said that they were at high risk had lower knowledge scores compared to those who said that they were only at medium or low risk. These differences in the knowledge score were not significant.

When the ART knowledge score was used to assess associations with the other variables in univariate and multivariate linear regression analysis, the following results were obtained (see Table 3).

The significant relationship between the ART knowledge score and the ethnic group in the univariate analysis was not significant in the multivariate model. This is explained by the educational level being a confounding variable, for example, Mutoro had a higher educational attainment than Mujika and Mujika had a higher educational attainment than Mukonjo. If occupation was omitted from the multivariate model then all levels of educational attainment were significantly associated with the ART knowledge score.

Discussion

We conducted a study on AIDS/ARV knowledge with 372 randomly selected participants in Kabarole district in western Uganda. However, as Kabarole district has made special efforts to roll out ARV treatment with an estimated ARV treatment coverage between around 60%, our results may not be representative for those districts with a much lower ART coverage.

Knowledge on ART was generally high with a mean score of 7.7 out of a maximum of 13. A total of 193 participants had excellent knowledge about ART (score 8 and higher) which we consider being quite good, as our participants were not AIDS patients or persons living with HIV, but sampled from the general population. Only a few participants (eight) had a very low score of 4 or less. Using our sample, Kabarole compares well in the ART knowledge score with South African AIDS patients from Soweto (70% Kabarole vs. 74% Soweto) (Nachega et al., 2005). In this comparison, having sufficient ART knowledge was defined as having a score of 50% and higher in Kabarole sample. Another study in tuberculosis patients from South Africa revealed a much lower

Table 3. Univariate and multivariate linear regression analysis with knowledge score of antiretroviral therapy as the dependent variable.

	Univariate analysis		Multivariate analysis*	
Variable	Slope ± SE	*p*	Slope ± SE	*p*
Age				
18–29	Reference		Reference	
30–39	−0.157 ± 0.689	0.820		
40–40	−0.148 ± 0.696	0.832		
50+	−1.034 ± 0.744	0.165	−1.326 ± 0.721	0.067
Sex				
Male	Reference			
Female	−0.220 ± 0.141	0.271		
Religious affiliation				
Catholic	Reference			
Anglican	0.221 ± 0.234	0.346		
Muslim	−0.539 ± 0.505	0.287		
Others	−0.301 ± 0.264	0.255		
Ethnic group				
Mutooro	Reference			
Mujika	−0.549 ± 0.252	0.030		
Mukonjo	−0.582 ± 0.254	0.023		
Others	0.404 ± 0.422	0.339		
Schooling**				
Yes	Reference			
No	−0.863 ± 0.239	<0.001		
Educational attainment				
None	Reference		Reference	
Primary	0.761 ± 0.243	0.002	0.477 ± 0.261	0.069
Secondary	1.186 ± 0.324	<0.001	0.539 ± 0.363	0.139
Tertiary	1.947 ± 0.489	<0.001	1.287 ± 0.538	0.017
Occupation***				
Farmer	Reference			
Small-scale business owner	0.692 ± 0.351	0.050		
Professional	1.162 ± 0.573	0.044		
Other	1.198 ± 0.217	<0.001		

*Only statistically significant results ($p < 0.01$) are displayed.
**Not included in multivariate model.
***Not included in model because of colinearity.

ART knowledge, as only 26% of the TB patients have ever heard of ARVs (Gebrekristos et al., 2005). This comparison is naturally limited, taking into account that different score assessment tools were used, but nevertheless gives a magnitude of the difference in the scores. As one would expect AIDS patients on ART to have a better knowledge of ART than the general population, our ART knowledge scores are even more remarkable as our study site is a rural district compared to the urban Soweto. It shows again that the HIV/AIDS Control Program of the Ugandan Government has made substantial progress in the education of ART in rural and remoter parts of Kabarole district.

The good level of HIV/AIDS knowledge in general and ART knowledge in particular in our Ugandan participants is important to note, as several studies from the developed world have found that higher general knowledge and treatment knowledge of AIDS was associated with better adherence to ARVs (Acri, Coco, Lin, Johnson, & Eckert, 2005; Goujard et al., 2003; Miller et al., 2003; Weiss et al., 2003). Another study in Brazilian mental health patients showed that disease knowledge was strongly

correlated with adherence to its medication regimen (Rosa et al., 2007). While this knowledge–adherence association is likely to be confirmed in sub-Saharan African countries in future, it actually has not been measured in sub-Saharan Africa to date. Except for South Africa, ART knowledge scores of AIDS patients or the general population are not available. This knowledge would be important to assess, since better treatment knowledge is likely to contribute to a higher ARV adherence which is so crucial to achieve for the long-term success of this treatment program.

The association between the educational level of participants and their ART knowledge score is not difficult to understand. Education has been identified in numerous studies to be associated with better health status and healthier behaviors, and our study confirms this important association. The finding that the ART knowledge score was not associated with age, gender or occupation in the multivariate analysis is consistent with the results from the Soweto study in South Africa (Nachega et al., 2005).

The study finding that only 19% of our participants reported that they had been HIV tested is of great concern as knowing one's HIV serostatus is of utmost public health importance for safe sex practice. This low level of HIV testing was surprising to us, as we had expected that the ARV roll-out associated with increased HIV testing opportunities would have resulted in a higher proportion of persons who knew their HIV serostatus. As we do not have previous data on HIV testing from the study area, we cannot compare our results with previous studies to establish a trend. To improve HIV testing coverage of the general population will have to be addressed by the Kabarole Health Department and free HIV counselling and testing has to be made more widely available in the community close to people's homes and not only in treatment centers.

There was widespread willingness in the general population to pay for ART with US$ 6 per month being the average amount individuals are willing to pay (a relatively high value given that the per capita income in Uganda is only $28). The extent to which there is such a willingness to pay reflects, in our opinion, the appreciation of the great benefits of ART to AIDS patients and their families they have experienced to date. Combining the willingness to pay with the high ART knowledge in the general population, Kabarole district seems to be receptive for intensifying the roll out of ART.

Our study has several limitations: In spite of using a standardized questionnaire, the ART knowledge score measurement is not standardized, therefore, its interpretation of the level of ART knowledge and its comparability with other studies is limited. However, the association of the ART knowledge score as measured with the other variables in our study is valid as this does not require a validated scale with defined levels of the score. Secondly, we used multistage cluster sampling. Statistical analysis specific for cluster sampling studies is provided in Stata (Stata Corporation, 2005). However, results from this type of analysis were almost identical to the conventional statistical analysis results and were therefore not separately displayed. Thirdly, we cannot exclude interview bias and/or social desirability bias, as our study dealt with a sensitive topic. We minimized it by using highly trained interviewers with local knowledge of the culture and the language.

In conclusion, we can say that the knowledge of antiretroviral therapy for HIV/AIDS is quite high in the general rural population of Kabarole surveyed. Given that knowledge enhances medical drug adherence, this is a reassuring finding for Kabarole in its ongoing ART program development efforts. In our opinion, we would encourage more assessment of the public's misconceptions that may impede long-term ART success. In addition, we are of the opinion that the low proportion of the population that is HIV tested is problematic and should be addressed. This is no longer an insurmountable problem for the Kabarole Health Department, since new rapid HIV testing procedures available can now be more easily provided in rural communities. With more of the population knowing their HIV status and with public misconceptions about ART diminished, better medication adherence is likely to be the result of this enhanced public knowledge.

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