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Factors associated with HIV testing among traditional healers and their clients in rural Uganda: Results from a cross-sectional study

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Abstract

Uptake of HIV testing is suboptimal in Uganda, particularly in rural communities. Reaching UNAIDS 95-95-95 goals requires strategies to increase HIV testing among hard-to-reach populations. This cross-sectional study sought to characterize engagement with HIV testing among traditional healers and their clients in rural Uganda. We enrolled 175 traditional healers and 392 adult clients of healers in Mbarara District. Primary outcome for this study was having received an HIV test in the prior 12 months. Most clients (n=236, 65.9%) had received an HIV test within 12 months, compared to less than half of healers (n=75, 46.3%) who had not. In multivariate regression models, male clients of healers were half as likely to have tested in the past year, compared with females (AOR=0.43, 95% CI=0.26–0.70). Increasing age negatively predicted testing within the past year (AOR=0.95, 95% CI=0.93–0.97) for clients. Among healers, more sexual partners predicted knowing ones serostatus (AOR=1.6, 95% CI 1.03–2.48). Healers (AOR=1.16, 95% CI 1.07–1.26) and clients (AOR=1.28, 95% CI 1.13–1.34 for clients) with greater numbers of lifetime HIV tests were more likely to have tested in the past year. Traditional

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healers and their clients lag behind UNAIDS benchmarks, and would benefit from programs to increase HIV testing uptake.

INTRODUCTION

Sub-Saharan Africa has more than half of the world's population living with HIV. (1)In Uganda, the HIV prevalence among adults aged 15–64 is ~6.2%, with women having higher prevalence than men (7.6% versus 4.7%, respectively).(2) Uganda has increased efforts to reduce this burden by committing to HIV epidemic control guided by the Joint United Nations Programme on HIV/AIDS (UNAIDS) benchmarks.(3) The first goal of this program is that 95% of people living with HIV will know their status by 2030.

Uptake of HIV testing is the critical entry point into HIV treatment,(4) as earlier diagnosis of HIV enables patients to initiate antiretroviral therapy (ART) sooner, inhibiting further transmission.(5) Most recently, expanding engagement with HIV testing has focused on scaling up HIV services at existing health facilities.(6) Voluntary counselling and testing (VCT) is the primary approach to deliver HIV testing services in Uganda. Unfortunately, despite scaling up of VCT, the majority of sexually active adults have not received an HIV test within the prior 12 months.(2, 7) These data suggest that facility-based HIV testing services may fail to reach a significant part of the population: patients who utilize informal healthcare providers such as traditional healers.

Throughout sub-Saharan Africa, many people regularly receive healthcare services from traditional healers.(8–12) Traditional healers are ubiquitous providers in these regions. It is estimated that there is one traditional healer for every 700 Ugandans, compared with the doctor-to-population ratio of 1:8547. As such, healers frequently serve as the first line of healthcare services for their communities. (13, 14) Additionally, prior research shows that healer use is strongly correlated to delayed HIV diagnosis among people living with HIV. (15, 16) Traditional healers also have strong influence on subsequent healthcare-seeking behaviors among their clients.(17, 18) As such, traditional healers should be considered significant stakeholders in HIV control programs.

Unfortunately, little is known about HIV testing engagement among healers and their clients. To address these gaps in knowledge, we conducted a cross-sectional study in Mbarara District, Uganda to describe current uptake of HIV testing among traditional healers and their clients. Our findings can guide development of effective HIV testing strategies in this and other endemic regions where traditional healers are frequently utilized.

METHODS

Study Design and Setting

This cross-sectional study was conducted between January and June 2018, as part of a longitudinal mixed methods study on adults who utilize traditional healers in southwestern Uganda. The study site of Mbarara is a rural district ~275 km southwest of the capital city of Kampala. It is the administrative center of southwestern Uganda with a small commercial township where the regional referral hospital and university are located. No-cost HIV testing services are available throughout the District at government-run health centers. HIV prevalence in Mbarara exceeds the national average (7.9% versus 6.2%)(2) and as in much of sub-Saharan Africa, both traditional and biomedical modalities of healthcare coexist. In Uganda, healers practice four distinct specialties: herbal medicine (herbalist), spiritual healing (spiritualists), prenatal care, labor and delivery (birth attendants), and treatment of broken bones (bonesetters). Spiritualists attribute their powers to African ancestral spirits, and do not identify with Christian or Islamic beliefs.

Sampling and Eligibility

From January through June 2018, we conducted a population-based survey of traditional healers practicing in Mbarara District. We predetermined a six-month period for data collection in order to capture increases in patient volume during the rainy season (March to May), when malaria and respiratory illnesses cases tend to surge, and traditional healer patient volumes are the highest. Guided by the WHO Guidelines, we defined healers as 1) persons recognized by the local community as healers; 2) having regular patient attendance; and 3) having space to receive and treat patients.(14) Healers were identified through the National Council for Traditional Healers and Herbalists Association (NACOTHA) membership registry, as well as by in-person visits to practices which advertised services through visible signage. Additional healers were identified through snowball sampling, inquiring from healer or client participants regarding the location or names of other healers practicing in the area. Study sample size for healers was determined by the number of healers practicing in the District during the six-month period of data collection.

Recruitment of healers preceded recruitment of patients. After all healer sites had been visited in May 2018, we began recruitment of patients who received care at visited healers' locations. We continued stratified enrollment across all healer sites to recruit additional male participants, with the goal of enrolling an approximately equal number of clients from each of the four healer specialties and ensure that approximately one-half of all participants were male. Sample size for clients of healers was not predetermined for statistical significance. Healers and clients were considered eligible for the study if they were 18 years of age, sexually active (reported ever having had sexual intercourse), and able to provide informed consent.

Recruitment and Enrollment

Recruitment took place at healer locations throughout Mbarara District. Potential participants were recruited by Ugandan Research Assistants who informed potential participants of the purpose of the study, study procedures, potential risks and benefits

of participation, and principles of confidentiality. Study information and written informed consent were provided in Runyankole, the local language. Consent documents were read aloud by the research assistants to facilitate understanding for those with potentially limited literacy. Healer clients were recruited following completion of their visits, to avoid the impression that treatment would be contingent upon study participation. All who were eligible and invited to participate consented to be enrolled in the study. Upon survey completion, participants received 10,000 Ugandan Shillings-worth (~$2 US Dollars) of household soap as remuneration.

Data Collection

We administered a 75-item survey which included demographic and socio-economic information, self-reported history of HIV services utilization, and sexual behaviors. Additionally, we included validated scales to assess HIV knowledge(19) and HIV-related stigma.(20) Survey completion took approximately 15 minutes. Scale items were translated from English into Runyankole for the purposes of this study. Research assistants verbally administered the surveys in Runyankole in-person, and in private locations to maintain confidentiality of responses. Participants were assigned a study ID at time of enrollment, and no identifying information was collected. Responses were recorded on electronic tablets linked to de-identified study ID numbers, and stored on a secure server.

Data Analysis

Descriptive statistics were generated using Stata 14 (College Station, TX).(21) The primary outcome for this study was having received an HIV test in the prior 12 months, defined as "knowing ones HIV status" based on Ugandan Ministry of Health testing guidelines.(22) Univariate and multivariate logistic regression explored variables significantly associated with the study's primary outcome. We calculated HIV knowledge and stigma scores for each participant using the approaches described in Carey & Schroeder (2002)(19) and Hargreaves et. al. (2018). (20) respectively. In evaluating variables associated with the primary outcome, we excluded participants who reported being previously diagnosed with HIV (n=47). We conducted a separate regression analysis to assess if prior HIV testing characteristics were associated with the primary outcome, excluding participants who have never previously received an HIV test.

Multivariable prediction models were generated using backward elimination with a threshold for retention of p=0.05. The initial model contained all candidate predictors associated with recent testing in unadjusted analysis. Variables were eliminated one at a time based on the highest p-value in the model, and the model was re-run without that variable. This process was continued in successive iterations until the final model retained only significant predictors of HIV testing within the prior year. Crude and adjusted odds ratios were generated with the 95% confidence interval. A p-value 0.05 was set as the level of significance for all the analyses.

Ethics Approval

This study was approved by the Weill Cornell Medicine Institutional Review Board (Protocol 18-03019105), the Mbarara University of Science and Technology Institutional

Review Board (Protocol 16-/01-17), and the Ugandan National Council on Science and Technology (Protocol SS-4338).

RESULTS

Characteristics of Participants

Table 1 presents participant characteristics. Among the 175 healers and 392 clients enrolled in the study, participants were typically married, Christian, and completed some primary school. Most healers in Mbarara District identified as spiritualists (n=64, 36.6%) and female (n=111, 63.4%), with an average age of 57 years, and median monthly income of 100,000 Ugandan Shillings (UGX, ~$27 US Dollars). Among our sample of clients, average age was 35 years, and median monthly income was 135,000 UGX (~$37 US Dollars). Half of clients were unemployed or day laborers. Most clients received healthcare services from healers three or more times per year. The majority of participants had tested for HIV at least once before; however, 13% of healers and 6% of clients reported never previously tested. Seven percent of healers and eight percent of clients identified as living with HIV.

HIV Testing and Acquisition Risk among Traditional Healers and Their Clients

Table 2 describes prior HIV testing engagement and relevant sexual risk behaviors, excluding those who self-reported prior HIV diagnosis. Among those who have previously tested for HIV, most clients received an HIV test in the previous 12 months, with lower rates of testing among men compared with women (58.3% vs 74.3%). In contrast, less than half of traditional healers had tested for HIV in the last 12 months, with female healers having lower rates of testing compared to males (41.6% vs 54.1%).

Among those previously tested in both participant groups, the majority received their most recent HIV test at a biomedical clinic or hospital. Most traditional healers received their last HIV test during routine biomedical care (50.4%); among clients, concern for an unfaithful sexual partner was the most common reason for their most recent HIV test (30.1%). A small proportion of healers and their clients reported two or more sexual partners over the prior 12 months (12.3% and 19.3%, respectively). Among healers, men were more aware of their partner's HIV status compared to women (85.2% vs 51.5%); this proportion was roughly equivalent between genders among clients. Condom use was generally low among both groups. Nearly half of male healers and one-third of clients were circumcised.

Factors Associated with HIV Testing in the Prior 12 Months

Among study participants, after multivariate adjustment, younger age was significantly associated with having received an HIV test in the prior 12 months among both traditional healers and their clients. Among clients only, gender and marital status was also associated with recent testing. Among healers only, a higher number of sexual partners were associated with having received an HIV test in the prior 12 months. Adjusted odd ratios (AOR) along with 95% confidence intervals (CI) are shown in Table 3.

Our analyses demonstrate that as age increases, odds of having received an HIV test significantly decreases among both traditional healers (AOR=0.96, 95% CI=0.94–0.99,

p<0.01) and their clients (AOR=0.95, 95% CI=0.93–0.97, p<0.01). Additionally, male clients of healers were significantly less likely to receive an HIV test (AOR=0.43, 95% CI=0.26–0.70, p<0.01), compared to female counterparts. Our results also indicate that clients of traditional healers who were married or cohabiting were over three times more likely to have received an HIV test in the prior 12 months (AOR=3.65, 95% CI=2.16–6.18, p<0.01). Finally, among healers only, we found that a higher number of sexual partners was associated with having received an HIV test in the prior 12 months. (AOR=1.6, 95% CI=1.03–2.48, p=0.03).

In our sample of traditional healers, we did not find significant association between HIV testing within the last 12 months and gender, highest level of education, religious affiliation, income, marital status, healer specialty, years since last biomedical facility use, or stigma score. Among our sample of clients, we did not identify any significant association between HIV testing in the prior 12 months and type of healers visited, frequency of healer visits, number of sexual partners, employment status, highest level of education, income, religious affiliation, years since last biomedical facility use, or stigma score.

We also performed an analysis restricted to healers (n=144) and clients (n=335) who have received at least one previous HIV test. The factor significantly associated with having received an HIV test in the prior 12 months among both healers and clients was the number of previous HIV tests. Among clients only, age and marital status continued to be correlated with having received recent testing. Results of the regression analyses are shown in Table 4.

A higher number of prior HIV tests was significantly associated with having received an HIV test in the prior 12 months among both traditional healers (AOR=1.16, 95% CI=01.07–1.26, p<0.01) and clients (AOR=1.28, 95% CI=1.13–1.34, p<0.01). Older age also correlated with having tested, but only among clients of traditional healers (AOR=0.96, 95% CI=0.94–0.98, p<0.01). Similarly, being married/cohabiting remained strongly associated with recent HIV testing among clients of healers (AOR=2.24, 95% CI=1.24–4.05, p<0.01). For both healers and clients, in addition to previously considered variates, the location or reason for one's most recent HIV test was not associated with having received an HIV test within the prior year.

DISCUSSION

Traditional healers provide healthcare services for a significant number of adults in HIV endemic regions(23) but previously, little was known about HIV testing uptake among traditional healers or their clients. Our study indicates the majority of adults receiving care from healers have received an HIV test in the past 12 months. In contrast, a minority of healers have undergone recent HIV testing. We also observed that ~7% healers and ~9% of clients are living with HIV. Having received an HIV test in the prior 12 months was associated with increasing age among both healers and clients. When considering only participants who have previously tested, higher numbers of prior HIV tests were strongly associated with having recently received a test.

Our findings demonstrate that traditional healers and their clients are well below the HIV testing benchmark set by UNAIDS, where 95% of sexually active adults should receive an HIV test every 12 months. Compared with the general Ugandan population, more clients in our sample had received an HIV test within the prior 12 months (65.9% versus 41.7% nationally). In contrast, testing rates among traditional healers are similar to those described nationally.(2) The relatively high rates of testing in our sample of adults receiving care from traditional healers may be attributable to availability of HIV testing facilities located throughout the District.(24) In our sample, clients of healers generally received HIV testing at biomedical facilities, rather than from mobile or community-based testing outreach. It has been suggested that scale-up of routine antenatal screening and provider-initiated HIV testing has improved uptake of facility-based HIV testing.(25) Our results highlight the fact that people frequently receive care from both biomedical and traditional healthcare resources, rather than exclusively use one or the other; in this study, 99% of clients and 95% of healers report prior use of biomedical services. Therefore, patients receiving biomedical care are likely to be have concurrent use of traditional remedies, a fact which is frequently overlooked by biomedical providers.

Male clients of healers were significantly less likely to have received an HIV test in the prior 12 months compared to female clients. This finding in our sample is congruent with other studies' findings that men engage less with HIV testing services.(26–28) Female healers received HIV testing less frequently than male healers – though this association was not statistically significant in multivariate analysis. Low uptake of HIV testing among healers is problematic, as research has shown that healers in some areas of sub-Saharan Africa may have higher prevalence of HIV than the general population.(29, 30) Further, they are at increased risk of HIV acquisition and transmission due to occupational practices using unsterilized instruments, having exposure to bodily fluids, and lack of person protective equipment.(31) Our findings suggest that targeted outreach is needed among traditional healers to increase uptake of HIV testing in this high-risk population.

We found that married/cohabiting clients were 2–3 times more likely to have received HIV testing within the prior 12 months, compared with single or separated/widowed clients. As married or cohabiting couples are likely to have children together, this association may reflect the effectiveness of couples VCT programs to increase uptake HIV testing. (32, 33) Alternatively, married or cohabiting couples may be motivated to test because of perceived transmission risk, as suspecting an unfaithful partner was reported as the most common reason for seeking out HIV testing among clients, and may therefore increase one's likelihood of receiving an HIV test.(34, 35) Among our sample, however, this association was not statistically significant in multivariate analysis. Among traditional healers, we found that higher number of sexual partners within the past 12 months predicted knowing ones HIV serostatus. This finding aligns with data suggesting that risky sexual behavior may motivate HIV testing through increasing perceived risk of HIV acquisition. (36, 37) Our finding that being of younger age increased odds of having tested for HIV has been described in previous studies in Uganda.(38) This may reflect that HIV/AIDS testing campaigns often target youths due to more frequent short-term relationships and age-disparate relationships that may increase risk of transmission.(39–42)

Among both healers and their clients who have previously tested, higher numbers of prior HIV tests increases the odds of having recently tested. Higher perceived risk, vulnerability, and risk behavior may motivate repeated HIV testing.(43–45) he strong association suggests that HIV testing begets additional testing, and illustrates the importance of expanding testing to those who have never tested or infrequently test. Among our sample, 8% (n=44) had never received an HIV test; this proportion is greater than the fraction of participants who have never utilized biomedical care (n=13, 2.5%). Therefore, those who have never tested have interfaced with biomedicine, but either declined HIV testing, or have not been offered testing. These individuals may be unwilling to seek out HIV testing due to stigma, or low perceived need for testing.(46) Further work is needed to understand barriers to testing uptake among those who have never or infrequently test for HIV in order to inform effective programs to reach those who may otherwise not receive HIV testing.

Our study has some limitations. Our cross-sectional study only identifies associations among participants and does not address causation. While we conducted a population level survey of traditional healers in the District, clients were recruited through convenience sampling and therefore may not be representative. Finally, social desirability bias may result in underreporting of number of sexual partners, high-risk sexual activity, or previous HIV diagnosis.

CONCLUSION

Increasing uptake of HIV testing is essential to ending the epidemic by guiding entry into HIV prevention, care and treatment. This cross-sectional study demonstrates that traditional healers and their clients in Uganda have suboptimal uptake of HIV testing and identifies factors associated with having received an HIV test in the past 12 months. Traditional healers have poor engagement with HIV testing services and would likely benefit from targeted outreach to improve uptake. Additionally, given the ubiquity of traditional healers as informal, community-based healthcare providers, they may be uniquely situated to support engagement with HIV testing services among their clients in order to make progress towards UNAIDS 2030 targets.

REFERENCES

1. UNAIDS. PREVENTION GAP REPORT. Geneva, Switerland: Joint United Nations Programme on HIV/AIDS (UNAIDS); 2016.

2. MOH. Uganda Population-based HIV Impact Assessment (UPHIA) 2016–2017: Final Report. Kampala, Uganda: Ministry of Health; 7 2019.

3. UNAIDS. Fast-Track: Ending the AIDS epidemic by 2030. Geneva, Switizland: UNAIDS. ; 2014.

4. MOH. National HIV Testing Services Policy and Implementation Guidelines UGANDA. Kampala, Uganda: Ministry of Health; 2016.

5. Giordano TP. The HIV Treatment Cascade—A New Tool in HIV Prevention. JAMA Internal Medicine. 2015;175(4):596–7. [PubMed: 25706538]

6. Leclerc-Madlala S, Green E, Hallin M. Traditional healers and the "Fast-Track" HIV response: is success possible without them? African Journal of AIDS Research. 2016;15(2):185–93. [PubMed: 27399048]

7. Nabukenya AM, Matovu JKB. Correlates of HIV status awareness among older adults in Uganda: results from a nationally representative survey. BMC public health. 2018;18(1):1128-. [PubMed: 30223821]

8. Bodeker G, Kabatesi D, King R, Homsy J. A regional task force on traditional medicine and AIDS. Lancet. 2000;355(9211):1284. [PubMed: 10770339]

9. Homsy J, King R, Balaba D, Kabatesi D. Traditional health practitioners are key to scaling up comprehensive care for HIV/AIDS in sub-Saharan Africa. AIDS. 2004;18(12):1723–5. [PubMed: 15280784]

10. King R, Balaba D, Kaboru B, Kabatesi D, Pharris A, Homsy J. The Role of Traditional Healers in Comprehensive HIV/AIDS AIDS AIDS AIDS Prevention and Care in Africa: Untapped Opportunities. 2009. p. 301–32.

11. Sundararajan R, Mwanga-Amumpaire J, King R, Ware NC. Conceptual model for pluralistic healthcare behaviour: results from a qualitative study in southwestern Uganda. BMJ open. 2020;10(4):e033410–e.

12. Hooft A, Nabukalu D, Mwanga-Amumpaire J, Gardiner MA, Sundararajan R. Factors Motivating Traditional Healer versus Biomedical Facility Use for Treatment of Pediatric Febrile Illness: Results from a Qualitative Study in Southwestern Uganda. The American journal of tropical medicine and hygiene. 2020;103(1):501–7. [PubMed: 32458776]

13. WHO. WHO Traditional Medicine Strategy 2002–2005. In: Organization WH, editor. Geneva, Switzerland; 2002.

14. WHO. WHO Traditional Medicine Strategy 2014–2023 In: Organization WH, editor. Geneva, Switzerland: World Health Organization; 2013.

15. Audet CM, Blevins M, Rosenberg C, Farnsworth S, Salato J, Fernandez J, et al. Symptomatic HIV-positive persons in rural Mozambique who first consult a traditional healer have delays in HIV testing: a cross-sectional study. J Acquir Immune Defic Syndr. 2014;66(4):e80–e6. [PubMed: 24815853]

16. Moshabela M, Bukenya D, Darong G, Wamoyi J, McLean E, Skovdal M, et al. Traditional healers, faith healers and medical practitioners: the contribution of medical pluralism to bottlenecks along the cascade of care for HIV/AIDS in Eastern and Southern Africa. Sexually transmitted infections. 2017;93(Suppl 3):e052974. [PubMed: 28736393]

17. Audet CM, Blevins M, Moon TD, Sidat M, Shepherd BE, Pires P, et al. HIV/AIDS-related attitudes and practices among traditional healers in Zambézia Province, Mozambique. Journal of alternative and complementary medicine (New York, NY). 2012;18(12):1133–41.

18. Peters EJ, Immananagha KK, Essien OE, Ekott JU. Traditional Healers' Practices and the Spread of HIV/AIDS in South Eastern Nigeria. Tropical Doctor. 2004;34(2):79–82. [PubMed: 15117130]

19. Carey MP, Schroder KEE. Development and psychometric evaluation of the brief HIV Knowledge Questionnaire. AIDS Educ Prev. 2002;14(2):172–82. [PubMed: 12000234]

20. Hargreaves JR, Krishnaratne S, Mathema H, Lilleston PS, Sievwright K, Mandla N, et al. Individual and community-level risk factors for HIV stigma in 21 Zambian and South African communities: analysis of data from the HPTN071 (PopART) study. AIDS (London, England). 2018;32(6):783–93.

21. StataCorp. Stata Statistical Software: Release 14. College Station: TX: StataCorp LP.; 2015.

22. ICF UBoSUa. Uganda Demographic and Health Survey 2016. Kampala, Uganda and Rockville, Maryland, USA: UBOS and ICF.; 2018.

23. Hughes GD, Puoane TR, Clark BL, Wondwossen TL, Johnson Q, Folk W. Prevalence and predictors of traditional medicine utilization among persons living with AIDS (PLWA) on antiretroviral (ARV) and prophylaxis treatment in both rural and urban areas in South

Africa. African journal of traditional, complementary, and alternative medicines : AJTCAM. 2012;9(4):470–84.

24. Nangendo J, Katahoire AR, Armstrong-Hough M, Kabami J, Obeng-Amoako GO, Muwema M, et al. Prevalence, associated factors and perspectives of HIV testing among men in Uganda. PLoS One. 2020;15(8):e0237402. [PubMed: 32764820]

25. Byamugisha R, Tylleskär T, Kagawa MN, Onyango S, Karamagi CA, Tumwine JK. Dramatic and sustained increase in HIV-testing rates among antenatal attendees in Eastern Uganda after a policy change from voluntary counselling and testing to routine counselling and testing for HIV: a retrospective analysis of hospital records, 2002–2009. BMC Health Serv Res. 2010;10:290. [PubMed: 20946632]

26. Cornell M, McIntyre J, Myer L. Men and antiretroviral therapy in Africa: our blind spot. Tropical Medicine & International Health. 2011;16(7):828–9. [PubMed: 21418449]

27. UNAIDS. Addressing a blind spot in the response to HIV—Reaching out to men and boys. Geneva, Switizerland; 2017.

28. Mills EJ, Beyrer C, Birungi J, Dybul MR. Engaging men in prevention and care for HIV/AIDS in Africa. PLoS Med. 2012;9(2):e1001167. [PubMed: 22346735]

29. Audet CM, Gobbo E, Sack DE, Clemens EM, Ngobeni S, Mkansi M, et al. Traditional healers use of personal protective equipment: a qualitative study in rural South Africa. BMC Health Services Research. 2020;20(1):655. [PubMed: 32669101]

30. Audet CM, Ngobeni S, Mkansi M, Wafawanaka F, Aliyu MH, Vermund SH, et al. An unrecognized key population? Traditional treatment practices associated with HIV risk among traditional healers in rural South Africa. Aids. 2020;34(15):2313–7. [PubMed: 33048882]

31. Pallangyo P, Nicholaus P, Mayala H, Kabeho A, Nkinda A, Janabi M. Human immunodeficiency virus infection acquired through a traditional healer's ritual: A case report. Journal of Medical Case Reports. 2017;11.

32. Golub SA, Gamarel KE. The impact of anticipated HIV stigma on delays in HIV testing behaviors: findings from a community-based sample of men who have sex with men and transgender women in New York City. AIDS patient care and STDs. 2013;27(11):621–7. [PubMed: 24138486]

33. Byamugisha R, Åstrøm AN, Ndeezi G, Karamagi CA, Tylleskär T, Tumwine JK. Male partner antenatal attendance and HIV testing in eastern Uganda: a randomized facility-based intervention trial. J Int AIDS Soc. 2011;14:43. [PubMed: 21914207]

34. Fiorillo SP, Landman KZ, Tribble AC, Mtalo A, Itemba DK, Ostermann J, et al. Changes in HIV risk behavior and seroincidence among clients presenting for repeat HIV counseling and testing in Moshi, Tanzania. AIDS Care. 2012;24(10):1264–71. [PubMed: 22375699]

35. Nannozi V, Wobudeya E, Matsiko N, Gahagan J. Motivators of couple HIV counseling and testing (CHCT) uptake in a rural setting in Uganda. BMC Public Health. 2017;17(1):104. [PubMed: 28114968]

36. Stein JA, Nyamathi A. Gender differences in behavioural and psychosocial predictors of HIV testing and return for test results in a high-risk population. AIDS Care. 2000;12(3):343–56. [PubMed: 10928212]

37. Aluzimbi G, Lubwama G, Muyonga M, Hladik W. HIV Testing and Risk Perceptions: A Qualitative Analysis of Secondary School Students in Kampala, Uganda. J Public Health Afr. 2017;8(1):577-. [PubMed: 28878868]

38. Wandera SO, Kwagala B, Maniragaba F. Prevalence and determinants of recent HIV testing among older persons in rural Uganda: a cross-sectional study. BMC Public Health. 2020;20(1):144. [PubMed: 32005198]

39. Bershteyn A, Klein DJ, Eckhoff PA. Age-targeted HIV treatment and primary prevention as a 'ring fence' to efficiently interrupt the age patterns of transmission in generalized epidemic settings in South Africa. International Health. 2016;8(4):277–85. [PubMed: 27008897]

40. Mittler JE, Murphy JT, Stansfield SE, Peebles K, Gottlieb GS, Abernethy NF, et al. Large benefits to youth-focused HIV treatment-as-prevention efforts in generalized heterosexual populations: An agent-based simulation model. PLoS Comput Biol. 2019;15(12):e1007561. [PubMed: 31846456]

41. Abdool Karim Q, Baxter C, Birx D. Prevention of HIV in Adolescent Girls and Young Women: Key to an AIDS-Free Generation. J Acquir Immune Defic Syndr. 2017;75 Suppl 1:S17–s26. [PubMed: 28398993]

42. Gottert A, Pulerwitz J, Siu G, Katahoire A, Okal J, Ayebare F, et al. Male partners of young women in Uganda: Understanding their relationships and use of HIV testing. PLoS One. 2018;13(8):e0200920. [PubMed: 30096147]

43. Obare F, Fleming P, Anglewicz P, Thornton R, Martinson F, Kapatuka A, et al. Acceptance of repeat population-based voluntary counselling and testing for HIV in rural Malawi. Sexually transmitted infections. 2009;85(2):139–44. [PubMed: 18927181]

44. Bradley H, Tsui A, Kidanu A, Gillespie D. Client Characteristics and HIV Risk Associated with Repeat HIV Testing Among Women in Ethiopia. AIDS and Behavior. 2011;15(4):725–33. [PubMed: 20644989]

45. Matovu JK, Gray RH, Kiwanuka N, Kigozi G, Wabwire-Mangen F, Nalugoda F, et al. Repeat voluntary HIV counseling and testing (VCT), sexual risk behavior and HIV incidence in Rakai, Uganda. AIDS Behav. 2007;11(1):71–8. [PubMed: 17016759]

46. De Anda S, Njoroge A, Njuguna I, Dunbar MD, Abuna F, Macharia P, et al. Predictors of First-Time and Repeat HIV Testing Among HIV-Positive Individuals in Kenya. J Acquir Immune Defic Syndr. 2020;85(4):399–407. [PubMed: 33136736]

Table 1.

Demographic characteristics of traditional healers and their clients (n, %)

Demographics	Traditional healers, n=175	Healer clients, n=392
Age (mean, SD, in years)	57.3(14.8)	35.05(13.2)
Male gender	64(36.6%)	197(50.3%)
Marital status		
Single	4(2.3%)	64(16.3%)
Married/Cohabiting	105(60%)	286(73%)
Separated/widowed	66(37.7%)	42(10.7%)
Highest level of education		
None	40(22.9%)	35(8.9%)
Primary school	97(55.4%)	189(48.2%)
Secondary school	23(13.1%)	116(29.6%)
Diploma/Univ. degree	15(8.6%)	52(13.3%)
Specialty of healer/enrollment site		
Birth attendant	49(28%)	96(24.5%)
Bonesetter	25(14.3%)	95(24.2%)
Herbalist	37(21.1%)	115(29.3%)
Spiritualist	64(36.6%)	86(21.9%)
Christian	135(77.1%)	346(88.3%)
Monthly income (median, IQR in UGX)	100,000 (50,000–375,000)	135,000 (60,000–300,000)
Employment status	N/A	
Day laborer/unemployed		196(50%)
Employed/business owner		196(50%)
Frequency of healer visits	N/A	
<1 time per year		73(18.6%)
1–2 times per year		53(13.5%)
>3 times per year		266(67.9%)
HIV serostatus based on last HIV test		
Unknown/Never tested	21(12.6%)	23(5.9%)
HIV Positive	13(7.4%)	34(8.7%)
HIV negative	141(80%)	335(85.5%)

Table 2.

Frequency of HIV testing history and sexual behavior by gender of traditional healers and clients, excluding those previously diagnosed with HIV infection.

	TRADITIONAL HEALERS			TRADITIONAL HEALER CLIENTS		
	Total (n=162)	Male (n=61)	Female (n=101)	Total (n=358)	Male (n=187)	Female (n=171)
HIV test in the last 12 months	75 (46.3%)	33 (54.1%)	42 (41.6%)	236 (65.9%)	109 (58.3%)	127 (74.3%)
Number of lifetime HIV tests	4 [2–7]	4 [2–6]	4 [2–8]	5 [3–10]	4 [2–6]	6 [3–12]
Ever Tested for HIV (lifetime)	141 (87.0%)	53 (86.9%)	88 (87.1%)	335 (93.6%)	170 (90.9%)	165 (96.5%)
Days since last HIV test	315 [91–946]	187 [91–581]	398 [91–1232]	181 [62–455]	243 [86–518]	124 [61–335]
Reason for most recent test						
Routine medical care	71 (50.4%)	20 (37.7%)	51 (58.0%)	76 (22.7%)	39 (22.9%)	37 (22.4%)
Antenatal care/couples testing	20 (14.2%)	14 (26.4%)	6 (6.8%)	95 (28.4%)	35 (20.6%)	60 (36.4%)
Concern for unfaithful partner	35 (24.8%)	13 (24.5%)	22 (25.0%)	101 (30.1%)	45 (26.5%)	56 (33.9%)
Personal risky behavior/ exposure	15 (10.6%)	6 (11.3%)	9 (10.2%)	63 (18.8%)	51 (30.0%)	12 (7.3%)
Place of last HIV Test						
Biomedical facility/ Hospital	119 (84.4%)	43 (81.1%)	76 (86.4%)	294 (87.8%)	150 (88.2%)	144 (87.3%)
Mobile/community testing	22 (15.6%)	10 (18.9%)	12 (13.6%)	41 (12.2%)	20 (11.8%)	21 (12.7%)
Biomedical facility use ever	154 (95.1%)	57 (93.4%)	97 (96.0%)	353 (98.6%)	184 (98.4%)	169 (98.8%)
Days since last biomedical facility use	107 [45–366]	121 [59–338]	93 [45–366]	90 [31–212]	121 [43–290]	61 [28–123]
Circumcision (males only)	N/A	28 (45.9%)	N/A	N/A	59 (31.6%)	N/A
Number of sexual partners in prior 12 months	1 [0–1]	1 [1–2]	0 [0–1]	1 [1–1]	1 [1–2]	1 [1–1]
2 or more sexual partners in prior 12 months	20 (12.3%)	19 (31.1%)	1 (1.0%)	69 (19.3%)	61 (32.6%)	8 (4.7%)
Uses commercial sex worker	1 (0.6%)	1 (1.6%)	0 (0%)	10 (2.8%)	10 (5.3%)	0 (0.0%)
Has a casual sex partner	6 (3.7%)	5 (8.2%)	1 (1.0%)	35 (9.8%)	31 (16.6%)	4 (2.3%)
Ever had sexual intercourse	161 (99.4%)	61 (100%)	100 (99.0%)	347 (96.9%)	182 (97.3%)	165 (96.5)
Age at first sex encounter	18 [16–20]	20 [18–22]	18 [15–20]	19 [17–21]	20 [17–22]	18 [17–20]
Aware of partner's HIV status	104 (64.2%)	52 (85.2%)	52 (51.5%)	265 (76.4%)	141 (77.5%)	124 (75.2%)
Condom use at last intercourse	9 (5.6%)	6 (9.8%)	3 (3.0%)	52(15.0%)	32 (17.6%)	20 (12.1%)
Stigma score	1.1 [0.8–1.5]	1.1 [0.9–1.5]	1.1 [0.7–1.5]	0.9 [0.5–1.3]	0.9 [0.5–1.3]	0.8 [0.4–1.3]

Data are presented as no. (%) or median (IQR)

Table 3.

Factors associated with HIV testing in the prior year among traditional healers and clients.

Characteristics	TRADITIONAL HEALERS (n=162)				HEALER CLIENTS (n=358)			
	Unadjusted OR (95% CI)	P-value	Adjusted OR* (95% CI)	P-value	Unadjusted OR (95% CI)	P-value	Adjusted OR* (95% CI)	P-value
Age (per year increase)	0. 95 (0.93–0.98)	< 0.01	0.96 (0.94–0.99)	< 0.01	0.96 (0.94–0.98)	<0.01	0.95 (0.93–0.97)	< 0.01
Male gender	1.66 (0.87–3.14)	0.12			0.48 (0.31–0.76)	< 0.01	0.43 (0.26–0.70)	< 0.01
Married/Cohabiting (ref: single/divorced)	2.51 (1.30–4.84)	0.01			2.74 (1.70–4.42)	< 0.01	3.65 (2.16–6.18)	< 0.01
Higher educational attainment^	1.45 (0.99–2.10)	0.050			1.24 (0.95–1.62)	0.12		
Healer/healer visited (Ref: Trad. birth att.)								
Bonesetter	2.02 (0.69–5.94)	0.22			0.26 (0.13–0.52)	< 0.01		
Spiritualist	1.68 (0.69–4.09)	0.37			0.38 (0.19–0.76)	0.19		
Herbalist	0.87 (0.38– 2.02)	0.11			0.58 (0.29–1.15)	0.38		
Christian	0.62 (0.29–1.31)	0.21			0.82 (0.41–1.63)	0.57		
Monthly income (per 100k increase)	1.09 (1.00–1.19)	0.03			1.00 (0.96–1.04)	0.98		
Employment status (ref: unemployed)	n/a				1.2 (0.77–1.86)	0.41		
Days since last biomed. facility use^	0.96 (0.92–1.00)	0.01			0.94 (0.88–1.00)	0.04		
Higher frequency of healer visits^	n/a				1.65 (0.96–2.82)	0.07		
Number of sexual partners	2.04 (1.31–3.16)	< 0.01	1.6 (1.03–2.48)	0.03	1.05 (0.90–1.23)	0.52		
Casual sex partner (ref: No)	> 999	< 0.01			1.33 (0.62–2.86)	0.47		
Stigma score	0.23 (0.70–2.27)	0.43			0.96 (0.66–1.39)	0.82		

^ *Highest level of education* (none, primary, secondary, diploma/university) was entered as an ordinal variable with higher values indicating higher educational attainment. *Days since last biomedical facility use* was set equal to the participant's age in years multiplied by 365 days/year for those who never visited a biomedical facility to avoid biasing analyses by excluding those who never visited such a facility. *Frequency of healer visits* (Less than 1 per year, 1–2 times per year, or Every few months) was entered as an ordinal variable with higher values signifying more frequent visits.

* Multivariable prediction models were generated using backward elimination with threshold for retention of p=0.05. All variables in Table were entered into the model and eliminated one at a time based on the highest p-value in the model. The model was re-run after eliminating that variable. This process was continued in successive iterations until the final model retained only significant predictors of having received an HIV testing within the prior 12 months.

Table 4.

Factors associated with repeat HIV testing in the prior year among traditional healers and clients.

Characteristics	TRADITIONAL HEALERS (n=141)				HEALER CLIENTS (n=335)			
	Unadjusted OR (95% CI)	P-value	Adjusted OR† (95% CI)	P-value	Unadjusted OR (95% CI)	P-value	Adjusted OR† (95% CI)	P-value
Age (per year increase)	0. 96 (0.94–0.99)	< 0.01			0.96 (0.94–0.98)	<0.01	0.96 (0.94–0.98)	< 0.01
Male gender	1.81 (0.90–3.62)	0.09			0.54 (0.33–0.86)	0.01		
Married/Cohabiting (ref: single/divorced)	2.28 (1.13–4.58)	0.02			2.48 (1.49–4.13)	< 0.01	2.24 (1.24–4.05)	< 0.01
Higher educational attainment^	1.22 (0.82–1.81)	0.34			1.10 (0.83–1.46)	0.52		
Healer/healer visited (Ref: Trad. birth att.)								
Bonesetter	3.12 (0.90–10.76)	0.10			0.29 (0.14–0.60)	<0.01		
Spiritualist	1.92 (0.75–4.92)	0.49			0.35 (0.16–0.75)	0.12		
Herbalist	0.99 (0.41–2.38)	0.10			0.56 (0.27–1.18)	0.49		
Christian	0.55 (0.24–1.26)	0.16			0.77 (0.36–1.65)	0.50		
Monthly income (per 100k increase)	1.11 (1.00–1.24)	0.04			0.99 (0.96–1.03)	0.67		
Employment status (ref: unemployed)	n/a				1.03 (0.65–1.65)	0.90		
Day since last biomed. facility use^	0.97 (0.93–1.01)	0.14			0.94 (0.89–1.00)	0.07		
Higher frequency of healer visits^	n/a				1.65 (0.96–2.82)	0.07		
Number of sexual partners	1.92 (1.20–3.08)	< 0.01			1.32 (0.98–1.77)	0.07		
Casual sex partner (ref: No)	> 999	< 0.01			2.22 (0.83–5.99)	0.11		
Stigma score	1.60 (0.82–3.10)	0.17			1.05 (0.71–1.58)	0.80		
Number of lifetime HIV tests	1.16 (1.07–1.26)	< 0.01	1.16 (1.07–1.26)	< 0.01	1.27 (1.17–1.39)	< 0.01	1.28 (1.13–1.34)	< 0.01
Reason for last HTV test (Ref: routine care)								
Prenatal/Couples	0.58 (0.21–1.59)	0.21			1.21 (0.61–2.38)	0.25		
Concern for infidelity	1.30 (0.57–2.96)	0.29			0.96 (0.50–1.86)	0.95		
Personal risky behavior	0.99 (0.33–3.03)	0.88			0.71 (0.35–1.44)	0.18		
Last HTV received at biomedical facility	2.26 (0.88–5.78)	0.09			2.06 (1.06–4.01)	0.03		

^ "Highest level of education" was entered as an ordinal variable with higher values indicating higher educational attainment. "Days since last biomedical facility use" for participants who reported never having visited a biomedical facility, the value was set equal to their age in years multiplied by 365 days/year. "Frequency of healer visits" responses were collected as "Less than 1 per year," "1–2 times per year," or "Every few months." In logistic models, this variable was recoded on an ordinal scale ranging from 0 to 2, with higher numbers signifying more frequent visits.

†Multivariable prediction models were generated using backward elimination with threshold for retention of p=0.05. All variables in Table were entered into the model and eliminated one at a time based on the highest p-value in the model. The model was re-run after eliminating that variable. This process was continued in successive iterations until the final model retained only significant predictors of having received an HIV testing within the prior 12 months.