

Research article

Effect of home-based HIV counselling and testing on stigma and risky sexual behaviours: serial cross-sectional studies in Uganda

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Abstract

Background: A large, district-wide, home-based HIV counselling and testing (HBHCT) programme was implemented in Bushenyi district of Uganda from 2004 to 2007. This programme provided free HBHCT services to all consenting adults of Bushenyi district and had a very high uptake and acceptability. We measured population-level changes in knowledge of HIV status, stigma and HIV-risk behaviours before and after HBHCT to assess whether widespread HBHCT had an effect on trends of risky sexual behaviours and on stigma and discrimination towards HIV.

Methods: Serial cross-sectional surveys were carried out before and after the implementation of HBHCT programme in Bushenyi district of Uganda. A total of 1402 randomly selected adults (18 to 49 years) were interviewed in the baseline survey. After the implementation, a different set of randomly selected 1562 adults was interviewed using the same questionnaire. Data was collected on socio-demographic characteristics, sexual behaviour, whether respondents had ever tested for HIV and stigma and discrimination towards HIV/AIDS.

Results: The proportion of people who had ever tested for HIV increased from 18.6% to 62% ($p < 0.001$). Among people who had ever tested, the proportion of people who shared HIV test result with a sexual partner increased from 41% to 57% ($p < 0.001$). The proportion of persons who wanted infection status of a family member not to be revealed decreased from 68% to 57% ($p < 0.001$). Indicators of risk behaviour also improved; the proportion of people who exchanged money for sex reduced from 12% to 4% ($p < 0.001$), who used a condom when money was exchanged during a sexual act increased from 39% to 80% ($p < 0.001$) and who reported genital ulcer/discharge decreased from 22% to 10% ($p < 0.001$).

Conclusion: These data suggest that HBHCT rapidly increased the uptake of HCT and may have led to reduction in high-risk behaviours at population level as well as reduction in stigma and discrimination. Because HBCT programmes are cost-effective, they should be considered for implementation in delivery of HIV services especially in areas where access to HCT is low.

Keywords: HIV counselling and testing; sexual behaviour; stigma and discrimination.

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Background

Recent studies have highlighted the importance of massively increasing knowledge of HIV serostatus and providing anti-retroviral therapy (ART) in order to significantly reduce HIV transmission [1–3]. Realization of the public health benefit of ART will depend on demonstrating that HIV-positive persons can be identified on a large scale without increasing stigma and discrimination that may be associated with HIV counselling and testing (HCT) [4–7]. Other potential limitations to this approach include availability/feasibility of ART and appropriate monitoring, willingness of individuals to take medications and potential offset of benefit though accompanying increases in risky sexual behaviour [4].

A large, home-based HIV counselling and testing (HBHCT) programme had previously been implemented in Bushenyi district of Uganda [5]. This programme that tested people for HIV in their homes had a very high uptake and acceptability. Sixty-three per cent of all the homes in the district were visited, and 94% of the people who were at home accepted

testing and received HIV results. Other reports have also found that HBHCT has very high uptakes [6].

In high HIV prevalence settings, for example, in Uganda, and many other countries in sub-Saharan Africa, providing HCT on community-wide basis in order for the adults to know their HIV status would have multiple benefits for HIV prevention. First, it may help to reduce stigma that can be associated with HIV testing [5,6]. Second, because large sections of the population are educated about HIV, the community may be empowered to take charge of its own health [7]. Third, if people knew their HIV status, the efficacy of prevention messages (of abstinence, be-faithful and use of condoms) may be increased by making them specific depending on one's HIV status. HIV-negative people may be encouraged to adopt safer sexual practices to stop getting infected [8,9]. HIV-positive people may also be encouraged not to spread the infection through positive prevention aimed at providing treatment, care and support that includes giving advice on avoidance of transmission [8–11].

To assess whether widespread HBHCT had an effect on trends of risky sexual behaviours and stigma/discrimination towards HIV, we measured population-level changes in knowledge of HIV status, stigma and HIV-risk behaviours before and after the implementation of district-wide door-to-door voluntary counselling and testing (VCT) in Bushenyi district.

Methods

Design

Serial cross-sectional surveys were carried out in 2004 and 2007 in Bushenyi district. A baseline (before) survey was conducted in November and December 2004 before the implementation of HBHCT. HBHCT programme was started in January 2005 and ended in February 2007. A follow-up (after) survey was immediately conducted in March and April of 2007.

Setting

The study was based in Bushenyi district of south-western Uganda (boundaries as of 2009 before it was split into five districts of Nsiika, Rubirizi, Sheema, Bushenyi and Mitooma). At the time of the study, the projected population of the district was 738,355 people, where 95% lived in rural areas with subsistence agriculture as the main source of income. The district spreads over an area of 5396 km². Administratively, Bushenyi district was divided into 5 counties, 29 sub-counties (third-level local councils; LC3), 170 parishes (LC2s), 2034 villages (LCIs) and 142,832 households. The district was served by 3 hospitals (one public and two non-governmental organisations (NGOs)), 49 health centres, many private clinics and 215 immunisation posts. At the time of HBHCT programme, facility-based HCT was available at 15 health units (11 public, 2 faith-based NGOs and 2 not-for-profit NGOs).

HBHCT programme

The implementation of HBHCT lasted about 2 years and offered HBHCT to all adults and children at risk of HIV infection (mother infected or dead). The programme targeted 142,832 households in 2034 villages of Bushenyi district. Details for the implementation of HBHCT have been described elsewhere [5]. In summary, the programme provided HBHCT, and those tested positive were referred to local care providers offering basic preventative care, palliative care and anti-retroviral treatment. The programme also provided an extensive community mobilization and education, including education visits to local communities, and made use of the mass media (radio) to educate communities in issues related to HIV. HIV-negative population were educated on how to remain negative by encouraging adoption of appropriate preventive behaviours. HIV-positive people were educated on how not to spread the infection by encouraging adoption of safer sexual practices. Preventive messages were also strengthened within the population including those who had not tested. Ongoing support and counselling through programme's psycho-social support groups and referral targeted mainly HIV-positive people but also couples who were in discordant sexual partnerships to reduce the risk of transmission and social harm such as

marital breakdown, domestic violence and neglect. During the time of HBHCT implementation, facility-based HCT, including provision of services for prevention of mother-to-child transmission of HIV, was available at 15 health units. Provision of ART was available at five health units, and CD4 cell count testing was available at one health unit [5].

Statistical issues and sample size

The sample size used in this study was based on that needed to determine the difference in proportion of people having risk behaviour such as having sex with a non-regular partner. The proportion used in this study was estimated at 10% from the 2000/2001 Uganda Demographic and Health Survey (UDHS) [11]. It was assumed that after the implementation of HBHCT, this proportion would reduce to about 5%. At 90% power and a 95% confidence interval (CI), the sample size required to detect this reduction according to Epi Info Version 6 Statcal (CDC, Atlanta, GA, USA) for cross-sectional studies is 620 in the baseline survey and 620 in the follow-up survey. This sample size was adjusted by about 10% non-response to 700. Because of the cluster design, a design effect of 2 was applied to come up with a minimum sample size of 1400.

Sampling

Thirty clusters (villages) were selected from a listing of all the villages in the district using a table of random numbers. Then, 50 households were randomly selected from a listing of all the households in the village. In the home, one person who was interviewed was randomly selected from all people in the household aged between 18 and 49 years. If the person to be interviewed was not at home, the household was revisited at least two times. If still the person was not around, a neighbouring home was included. The need for revisiting was necessary only in less than 5% of the households, and the need for substituting a household was necessary in less than 0.5% of the households.

Measures

In the baseline survey, study participants who were randomly selected using cluster sampling were questioned about their socio-demographic characteristics and whether they ever tested for HIV. Sexual behaviour was assessed by analyzing whether the person had sex in the previous 12 months, type of partner (regular or non-regular), whether the person had sex at the last sexual encounter in the past 12 months, whether the person paid for or received money at the last sexual encounter in the past 12 months, whether a condom was used at the last sexual encounter in the past 12 months and whether a condom was used at the last sex encounter where there was exchange of money. The respondents were also asked about self-reported symptoms of sexually transmitted infection (STI) of genital ulcer and/or discharge and whether they sought treatment for the STI in the past 12 months. Measures of stigma and discrimination used in this study were adapted from those used by UNAIDS [12], and these included respondents' views on the hypothetical questions of whether respondents would buy vegetables from an HIV-positive vendor, whether they would wish to disclose HIV status in the home and whether they thought

that disclosure of HIV increased respect of the person disclosing. In the follow-up survey, the sampling methodology was repeated and applied in the same way. Study participants responded to the same questionnaire that was used in the baseline survey. The households visited in the follow-up survey were different from those in the baseline survey.

Data management and analysis

Data was checked for any missing or inconsistent information immediately after collection while still in the field. It was then double-entered using Epi Info Version 2000. SPSS Version 12 (SPSS Inc., Chicago, IL, USA) and STATA 9 (Intercooled Stata 9.2 for windows, StataCorp LP, College Station, Texas, USA) softwares were used for analysis. The analysis took account of the complex survey design. The analysis compared the change in the proportion of people who have ever tested for HIV before and after the programme. Additional comparisons were between indicators of stigma/discrimination and of sexual behaviour. For all the analyses, a 95% CI was used. A Yates corrected chi square with $p < 0.05$ was used as a test of significance for categorical data. Median and inter-quartile range (IQR) were used for continuous data.

Quality control

Procedures for double entry and query solving were used. Questionnaires were checked at the end of each day for omissions and inconsistencies. The questionnaires were administered by trained research assistants supervised by the principal investigators and were pre-tested to ensure clarity, logical sequence and that there are adequate responses to questions. Furthermore, the questionnaires were translated in the commonly used language (*Runyankole*) and back into English.

Ethical issues

The study protocol was approved by the institutional review board of Makerere University, Institute of Public Health and the Uganda National Council for Science and Technology. Participants in the study provided informed consent.

Results

Demographic characteristics

A total of 2964 individuals were interviewed, 48% in the baseline survey and 1546 in the follow-up survey. Of those interviewed, 1545 (52%) were women. The median age of people interviewed in the total sample was 31 years with an IQR of 23 to 41 years. The sample before the implementation of district-wide HBHCT was similar to the sample after the implementation of HBHCT ($p > 0.05$) in terms of sex, education status, age structure and household composition (see Table 1). Twelve people (0.8%) refused participating in the baseline survey, and 14 (0.9%) people refused participating in the follow-up survey. The major reason for refusal was lack of time to complete the interview.

HIV testing and disclosure of test results

The proportion of people who had ever undertaken an HIV test increased more than three times from 18.6% to 62%

Table 1. Demographic characteristics among the samples before and after the implementation of district-wide HBHCT in Bushenyi district.

Variable	Before (N = 1402)		After (N = 1562)	
	n	%	n	%
Female	708	50.9	837	51.8
Married or cohabitating	926	66.1	1053	67.8
Never attended school	182	13.0	243	15.6
Median age (IQR)	30 (23 to 38)	–	32 (25 to 41)	–
Median household size (IQR)	5 (3 to 7)	–	4 (3 to 6)	–

HBHCT, home-based HIV counselling and testing; IQR, inter quartile range.

($p < 0.001$). Significant increases were also seen in the proportion of people who disclosed HIV test results (whether positive or negative) to sexual partners, friends and relatives ($p < 0.001$). However, a higher proportion of people shared their results in a psycho-social support group before the implementation of district-wide HBHCT, compared with the status after the implementation of the programme ($p < 0.001$). Positive trends of improved disclosure and sharing of HIV results were observed among persons who said that they were HIV positive for all the indicators (Table 2). There was a statistically significant increase in proportion of people disclosing HIV positive results to sexual partners ($p = 0.003$). However, disclosure of HIV positive results to friends, to relatives and in a psycho-social support group was not statistically different ($p > 0.05$). The lack of statistical significance was probably due to the small numbers of HIV-positive people involved.

Stigma and discrimination

All indicators assessed for stigma and discrimination were favourable after the implementation of district-wide HBHCT (Table 3). The proportion of people who said that disclosure of HIV results increases respect increased from 40% to 75%, people who said they would buy vegetables from an HIV-positive vendor increased from 70% to 82% and persons who wanted infection status of a family member not to be revealed decreased from 68% to 57%. It is interesting to note that all these changes in indicators for stigma and discrimination were statistically significant (CIs of after HBHCT do not overlap with those of before HBHCT and $p < 0.001$).

Sexual behaviour and experience with STIs

The data in Table 4 shows that after the district-wide implementation of HBHCT, the proportion of people who paid or received money for a sexual encounter decreased from 12% to 4% ($p < 0.001$), who used the condom when the sexual act involved exchange of money increased from 39% to 80% ($p < 0.001$), who reported symptoms of a STI decreased from 22% to 10% ($p < 0.001$), who were with symptoms of a STI and seeking care increased from 70% to 81% ($p = 0.025$), who said that women can refuse sex if partners has a STI increased from 71% to 79% ($p < 0.001$) and

Table 2. HIV testing and disclosure of HIV results before and after the implementation of district-wide HBHCT in Bushenyi district

Characteristic	Before (N = 1402)		After (N = 1562)	
	n	% (CI)	n	% (CI)
Ever tested for HIV	261	18.6 (16.6 to 20.7)	969	62.1 (59.6 to 64.4)***
Disclosure of test result (whether positive or negative) among those ever tested				
Shared HIV result	196	75.1 (69.6 to 80.1)	783	80.8 (78.3 to 83.2)**
With sexual partner	106	40.6 (34.8 to 46.7)	559	57.7 (54.6 to 60.8)***
With friend	37	14.2 (10.3 to 18.9)	234	24.1 (21.5 to 26.9)***
With relative	27	10.3 (7.1 to 14.5)	242	25.0 (22.3 to 27.8)***
In HIV support group	139	53.3 (64.2 to 76.8)	350	36.1 (33.1 to 39.2)***
Disclosure among the HIV positive				
Said they were HIV +	37/261	14.2 (10.3 to 18.8)	110/969	11.4 (9.4 to 13.4)ns
Shared HIV result	28	75.7 (60.0 to 87.4)	91	82.7 (74.8 to 89.0)ns
Shared with sexual partner	8	21.6 (10.6 to 37.0)	57	51.8 (42.3 to 61.0)ns
Shared with friend	12	32.4 (18.9 to 48.6)	41	37.3 (28.6 to 46.6)ns
Shared with relative	9	24.3 (12.6 to 40.0)	43	39.1 (30.3 to 48.4)ns
Shared in support group	11	29.7 (16.7 to 45.8)	49	44.5 (35.5 to 53.9)***

CI, 95% confidence interval; HBHCT, home-based HIV counselling and testing.

*** $p < 0.001$; ** $p < 0.01$; ns $p > 0.05$.

Table 3. Stigma and discrimination before and after the implementation of district-wide, home-based HBHCT in Bushenyi district

Indicator	Before (N = 1402)		After (N = 1562)	
	n	% (CI)	n	% (CI)
Disclosure of HIV status increases respect (agrees)	651	46.4 (43.8 to 49.1)	1171	75.0 (72.8 to 77.1)***
Would buy vegetables from HIV-positive vendor	983	70.1 (67.7 to 72.5)	1279	81.9 (79.9 to 83.7)***
Would want to not revealed if family member is HIV positive	952	67.9 (65.4 to 70.3)	888	56.9 (54.4 to 59.3)***

CI, 95% confidence interval; HBHCT, home-based HIV counselling and testing.

*** $p < 0.001$.

Table 4. Sexual behaviour and experience with STIs before and after the implementation of district-wide HBHCT in Bushenyi district

Variable	Before (N = 1402)		After (N = 1562)	
	n	% (CI)	n	% (CI)
[§] Had sexual intercourse	1205/1402	85.9 (81.2 to 87.8)	1308/1562	83.7 (82.2 to 85.8)ns
[§] Condom use at last sex	158/1205	13.1 (11.2 to 15.0)	204/1308	15.6 (13.6 to 17.6)ns
[§] Sex with non regular partner at last sex	143/1205	10.9 (9.1 to 12.7)	137/1308	9.4 (7.8 to 11.0)ns
[§] Paid or received money for last sex	145/1205	12.0 (10.2 to 3.8)	54/1308	4.1 (3.0 to 5.2)***
[§] Used condom for last sex when money was exchanged	57/145	39.3 (31.6 to 37.4)	43/54	79.6 (67.1 to 88.2)***
[§] Had genital ulcer and or discharge	259/1205	21.5 (19.2 to 23.9)	136/1308	10.4 (8.8 to 12.1)***
[§] Sought care for genital ulcer or discharge	181/259	69.9 (64.1 to 75.2)	110/136	80.9 (73.6 to 86.8)*
Women can refuse sex if spouse has STI	990/1402	70.6 (68.2 to 73.0)	1232/1562	78.9 (76.8 to 80.4)***
Women can insist on condom if spouse has STI	830/1402	59.2 (56.6 to 61.8)	1266/1562	81.0 (79.1 to 82.9)***

CI, 95% confidence interval; HBHCT, home-based HIV counselling and testing; STIs, sexually transmitted infections.

[§]Refers to the past 12 months.

*** $p < 0.001$; * $p < 0.05$; ns $p > 0.05$.

who said that women can insist on condom use if partner has a STI increased from 59% to 81% ($p < 0.001$). However, there were no significant changes in the proportion of people, who had sexual intercourse in the past 12 months ($p = 0.10$), who used a condom at last sexual encounter in the previous 12 months ($p = 0.086$) and who had sex with a non-regular partner ($p = 0.25$).

Discussion

In this district-wide HBHCT programme (one of the first of its kind in the world), we report a marked increase in uptake of HCT, reduction in stigma and discrimination and reduction of some high-risk sexual behaviours (such as reduction in sexual encounters where money is exchanged) within the population. All these positive attributes have a bearing on transmission of HIV and on its prevention, care and treatment.

The increase in the proportion people who have ever tested for HIV from 18% to 62% in a period of 2 years was indeed a remarkable achievement [5,13]. We have previously discussed the reasons for this increase as removal of almost all known barriers for HCT in a home-based programme [5,14]. The 62% of the population that have ever tested for HIV in this study area is much higher than the 25% for Uganda [15]. According to our survey, the proportion of people who had ever tested in Bushenyi district (of 18.6%) before the implementation of district-wide HBHCT was similar to the UDHS one (of 18.5%) in south-western Uganda (where Bushenyi is located).

It has been previously reported that the HBHCT reached about 63% of the population in Bushenyi district [5]. This indicator was estimated using programme data. It is very interesting that the 62% of people having ever tested estimated by the follow-up survey in this report is in agreement with the previous figure derived from programme data. This agreement indicates that the two measures were reliable and suggests that most of the increase in HCT in the district could be attributed to HBHCT.

Stigma and discrimination

UNAIDS describes stigma and discrimination as one of the greatest barriers to dealing effectively with the HIV/AIDS epidemic. Stigma deters individuals from finding out about their status and inhibits those who know they are infected from sharing their diagnosis and from seeking treatment and care for themselves. Thus, bringing HIV/AIDS under control requires overcoming stigma and discrimination [16–18]. However, there is knowledge gap on what works best in reducing stigma and discrimination [19,20]. Studies are needed to understand what drives stigma, why stigma persists in spite of increased visibility of AIDS in sub-Saharan Africa and how to better design and implement stigma-reducing interventions at community and national levels [21]. Our data suggests that one way of reducing stigma and discrimination for HIV/AIDS at population level is increasing access of HCT through programmes such as HBHCT.

High-risk sexual behaviours

Our results showing a reduction in high-risk sexual behaviour at population level after district-wide HBHCT are largely consistent with what has been observed in various

settings among individuals and couples that have undergone VCT [22]. Previous studies suggest that HCT of individuals and couples is a cost-effective primary HIV prevention strategy [23–27]. For HIV-positive adults, knowledge of HIV status has been associated with a 63% reduction in risk behaviour [22], and in HIV-discordant couples, HIV testing and condom provision has been associated with an 80% reduction in HIV transmission [23]. Our results complement these observations and suggest that the benefits observed at individual and sexual partnership levels in previous studies [23–27] may extend to a population level when a high proportion of people within the population are aware of their HIV status. Indeed the finding that the prevalence of self-reported symptoms of STI decreased over programme duration is interesting. Possible reasons for this decrease could be that there were fewer incidences of STI due to reduction in risky sexual behaviour and/or because more people sought care for these symptoms as shown in the data.

Study limitations

It is important to interpret these data in context. The lack of a comparison group makes it difficult to attribute the observed benefits solely to the implementation of district-wide HBHCT. Moreover, because most of the data were derived from interview, it is possible that respondents could have given socially desirable answers. However, the comparison of our data with that of the UDHS (2006) and interpreting our findings alongside those of previous studies in other settings [22–27] lend credibility to our observations and suggest that the observed benefits in our study could have largely accrued from the district-wide HBHCT. Another reason why these data may be credible is that about a half of married or cohabiting people in HBHCT programme tested and received results as couples [5]. This could have led to higher proportions of people disclosing HIV test results, thereby reducing stigma and discrimination [17,21]. Counselling and testing as couples rather than individuals is much higher in home-based programmes [28] and can also reduce risky sexual behaviours [5,9].

Conclusions

These data suggest that HBHCT rapidly increased uptake of HCT and led to reduction of high-risk behaviours at population level as well as reduction in stigma and discrimination. Because HBHCT is cost-effective [28] and other approaches to HIV testing have failed to achieve wide-spread population-based coverage [29,30], HBHCT should be considered for implementation in delivery of HIV services especially in areas where access to HCT is low. A particularly useful approach to use with widespread HCT is “prevention with positives,” which is likely to have a big impact in reducing the HIV epidemic from epidemiological, public health and programmatic perspectives than preventive interventions focused on HIV-negative individuals [10,11]. Furthermore, our findings expand our limited knowledge base on the social impact of HBHCT and help to alleviate fears of some policy and programme planners about the social impact of HBHCT as has been observed in other home-based programmes [31].

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

FN contributed to the study concept and design, analysis of the data and writing and editing of the paper. SK contributed to study design, collection and analysis of the data and writing and editing of the paper. GW contributed to analysis and writing of the paper. EM contributed to collection and analysis of the data and writing of the paper. ET contributed to the study concept, analysis of the data and writing of the paper. All authors read and approved the final manuscript.

Abbreviations

ART, anti-retroviral therapy; HBHCT, home-based HIV counselling and testing; HCT, HIV counselling and testing; STI, sexually transmitted infection; UDHS, Uganda Demographic and Health Survey; VCT, voluntary counselling and testing.

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