The seven Cs of the high acceptability of home-based VCT: Results from a mixed methods approach in Zambia☆

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ABSTRACT

HIV testing and counselling is a critical gateway to prevention and treatment. Yet, coverage remains insufficient, few couples are tested together and gender differences in access exist. We used an embedded mixed methods approach to investigate possible explanations for the high acceptance of home-based voluntary HIV counselling and testing (HB-VCT) in a pair-matched cluster-randomized trial in Zambia. A baseline survey included 1694 individuals in 36 clusters. Adults in 18 intervention clusters were offered HB-VCT by lay counsellors. Standard testing services were available in both trial arms. After the completion of the intervention, a follow-up survey was conducted in all trial clusters. In addition, 21 in-depth interviews and one focus group discussion were conducted with home-based VCT clients in the intervention arm. Informants favoured the convenience, confidentiality and credibility of HB-VCT. Counsellors were perceived as trustworthy owing to their closeness and conduct, and the consent process was experienced as convincing. Couple testing was selected by 70% of cohabiting couples and was experienced as beneficial by both genders. Levels of first-time testing (68% vs. 29%, $p < 0.0001$) and re-testing (94% vs. 74%, $p < 0.0001$) were higher in the intervention than in the control arm. Acceptance of HIV testing and counselling is dependent on stigma, trust and gender. The confidentiality of home-based VCT was essential for overcoming stigma-related barriers, and the selection of local counsellors was important to ensure trust in the services. The high level of couple counselling within HB-VCT may contribute to closing the gender gap in HIV testing, and has benefits for both genders and potentially for prevention of HIV transmission. The study demonstrates the feasibility of achieving high test coverage with an opt-in consent approach. The embedded qualitative component confirmed the high satisfaction with HB-VCT reported in the quantitative survey and was crucial to fully understand the intervention and its consequences.

Introduction

HIV testing and counselling (HTC) is a critical entry point into prevention, treatment and care (World Health Organization & UNAIDS, 2004). Knowledge of HIV status combined with counselling has been found to reduce sexual risk behaviour (The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000), particularly among those testing HIV positive and couples being tested and counselled together (Allen et al., 1992, 2003; Farquhar et al., 2004). Nevertheless, coverage remains insufficient, particularly among men. The proportion of adults who have received an HIV test the previous year in some of the most affected countries ranges from 9% among men in Swaziland to 38% in Rwanda (UNAIDS, 2012). Further research on approaches that can increase coverage

is thus strongly needed. HTC services are complex interventions involving social and behavioural processes, and are challenging to evaluate since all elements of the service can influence its effectiveness and some aspects may be difficult to quantify (Campbell et al., 2000, 2007). The context in which the intervention is implemented is moreover of importance for acceptability and potential transferability (Campbell et al., 2007). It is therefore particularly important to integrate qualitative methods into evaluations (Lewin, Glenton, & Oxman, 2009). A comprehensive assessment of the context in which the HTC intervention takes place, the perceptions of users and providers, and the potential negative consequences should be conducted to gain a full understanding of the intervention.

Several models for HTC delivery have been proposed and scaled up at different levels. The dominant model has traditionally been voluntary counselling and testing (VCT) (Bayer & Edington, 2009), which is guided by the '3 Cs'; confidentiality, counselling and informed consent (World Health Organization & UNAIDS, 2004). Although VCT has been scaled up in many countries, utilization has remained low (World Health Organization, UNAIDS, & UNICEF, 2007). Several barriers to VCT have been identified, such as stigma (Genberg et al., 2009; Jürgensen, Tuba, Fylkesnes, & Blystad, 2012; Kalichman & Simbayi, 2003), confidentiality concerns (Ginwalla et al., 2002), distance (Hutchinson & Mahlalela, 2006) and cost (Morin et al., 2006). VCT has been available in Zambia since the late 1980s and has been extensively scaled up.

In attempts to overcome barriers to VCT and increase HIV test coverage and treatment enrolment, WHO and UNAIDS in 2007 recommended the scale-up of provider-initiated testing and counselling (PITC) (World Health Organization & UNAIDS, 2007) in countries with generalized epidemics. Pre-test counselling is reduced or removed and an opt-out consent approach is employed within this model. Increased test rates have been documented following the implementation of PITC (Kennedy et al., 2012), including in Zambia (Topp et al., 2011). Scale-up was recommended despite limited knowledge about potential implications beyond increased test coverage (World Health Organization & UNAIDS, 2007), which raises some ethical concerns (Bayer & Edington, 2009). The wide scale-up of PITC within antenatal care and the

fact that men are less likely to seek health services in general have led to increased test coverage primarily among women and resulting gender differences in access to HIV testing (Njeru, Blystad, Shayo, Nyamongo, & Fylkesnes, 2011; World Health Organization, UNAIDS, & UNICEF, 2011). Furthermore, limited counselling of HIV negative individuals may lead to missed opportunities for prevention (Njeru et al., 2011). Because few men and couples are counselled and tested within this approach, women are commonly left with the burden of disclosure and the responsibility of recruiting their husbands for testing (Falnes et al., 2011; Larsson et al., 2012). This may be particularly challenging in African settings where decisions about seeking health care lie in the male domain. Concerns have been raised about the handling of the consent process, as women may perceive testing as mandatory (Groves, Maman, Msomi, Makhanya, & Moodley, 2010; Larsson et al., 2012; Njeru et al., 2011; Ujiji et al., 2011). However, other studies have demonstrated a satisfactory consent process within this approach (Obermeyer et al., 2012), and that clients have actually been able to opt out, even at the onset of provider-initiated testing programmes (Topp et al., 2011).

The ZAMACT trial

The ZAMACT trial was designed to investigate the feasibility and acceptance of a model for home-based VCT with a cluster-randomized trial including an embedded mixed methods approach (Fig. 1). The trial and its primary outcomes are presented in more detail elsewhere (Fylkesnes et al., 2013). Adults in the intervention arm were 1.6 times more likely than adults in the control arm to be tested for HIV following the intervention. Both among men and women in the intervention arm, the observed acceptance of counselling (84% and 86%) and testing (64% and 66%) (Fylkesnes et al., 2013) was high and comparable with what has been found in a later trial (Doherty et al., 2013) and in several observational studies of home-based VCT (Sabapathy, Van den Bergh, Fidler, Hayes, & Ford, 2012), although somewhat lower than reported in some studies (Dalal et al., 2013; Tumwesigye, Wana, Kasasa, Muganzi, & Nuwaha, 2010). There were no differences in reported negative life-events such as break-up of marriage
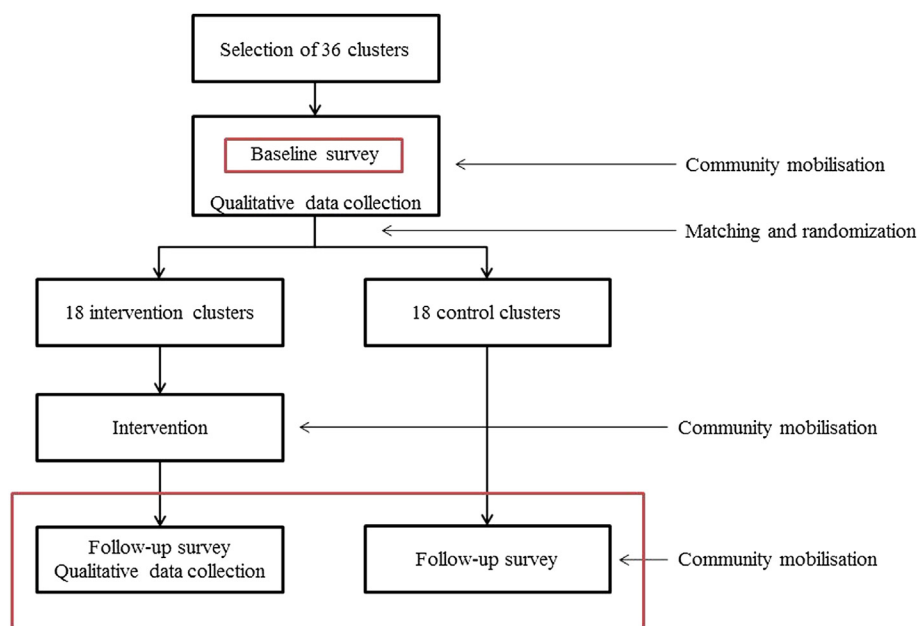

Fig. 1. Trial flowchart. Data used for this study are marked in red. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

or domestic violence between the trial arms. The high uptake of testing and counselling is encouraging, and the reasons for it need to be explored in order to inform a potentially wider scale-up. In the present study we combined survey data from both trial arms with qualitative data from the intervention arm to carry out a comprehensive evaluation of motivations for testing, possible explanations for the observed high acceptance, the experiences and perceptions of clients, and potential negative consequences.

Methods

The data stem from a cluster-randomized trial conducted in Monze district, Southern Province, Zambia (Fig. 1). In the 2007 Zambia Demographic and Health Survey, the HIV prevalence in Southern Province was found to be 16% among women and 13% among men, i.e. close to the national HIV prevalence. A total of 12% of all couples, tested anonymously for HIV as part of the survey, were found discordant. Altogether 37% of women and 23% of men reported to have ever been previously been counselled and tested for HIV and had received the result (Central Statistical Office et al., 2009).

In the present study, an embedded mixed methods design was employed (Creswell & Plano Clark, 2011). A baseline survey (May–September 2009) was conducted in 36 clusters, which were pair-matched on the basis of baseline characteristics and randomized. Approximately six months after the intervention, a follow-up survey was conducted in all clusters (November 2010–January 2011). Qualitative data were collected concurrently in the intervention arm. The trial is more comprehensively described elsewhere (Fylkesnes et al., 2013).

The intervention

In the intervention clusters, all adult household members were offered home-based VCT by local lay counsellors during the period March 2010 to May 2010. The counsellors were lay health workers selected by the local community for voluntary work at the health clinics. They received additional training on counselling principles, HIV testing, how to conduct VCT in home settings, and the core principles of the home-based VCT model. Counsellors largely worked during the day, as advised by local stakeholders. When household members were not found at home, most often due to work or farming, two return visits were made at a time likely to be more convenient. Both trial arms had access to standard clinic-based HIV testing and counselling.

Community mobilisation

Community mobilisation was conducted at all stages of the trial (Fig. 1). At baseline, participatory discussions were held with community members, village headmen and district health office leaders to ensure trust in the intervention and the study team, and to obtain information on how to approach the community in a locally acceptable manner. Before study team members entered the villages, permission was sought from the village headmen. Influential community members and community health workers were involved in organizing meetings to inform about the study. Radio was used as an information channel, including radio bulletins, dramas and radio interviews with individuals who had undergone home-based VCT.

Quantitative data collection and analysis

Structured questionnaires were administered in the local language (Tonga) by trained data collectors. The baseline questionnaire covered socio-demographic characteristics and previous HIV testing experience. The follow-up questionnaire covered the most recent testing experience. In the intervention arm, questions were asked about acceptance of home-based VCT, followed by questions on reasons for acceptance/non-acceptance. Responses were recorded according to predefined categories with the option of giving additional responses not already listed. Each participant could provide more than one response. In both arms the respondents were asked about couple counselling and testing and were requested to rate the HTC services. For the intervention arm these questions were related to the home-based VCT services, whereas in the control arm the questions were related to their last HTC experience during the previous year.

During the baseline survey hand-held computers (EpiHandy version 165.528-142 RC) were used to collect the data. Owing to software challenges, paper questionnaires were used in the follow-up survey, and data were double-entered using EpiData (version 3.1). Stata 12.1 (StataCorp, College Station, TX, United States) was used for the analysis.

Qualitative data collection and analysis

In-depth interviews were conducted with ten individuals who had received home-based VCT (Table 1). Potential informants were identified with the assistance of village headmen and research assistants involved in the study and invited by the research assistants to participate. Purposive sampling was employed aiming for variation in terms of age and gender. However, the study team subsequently found that young people and women were not adequately represented. Therefore, a second round of qualitative data collection was conducted, including in-depth interviews with another 11 individuals and one focus group discussion with six individuals who had received home-based VCT (Table 1). Young people below the age of 25 years were rarely present when the field team visited and were thus difficult to recruit. The focus group discussion included both men and women, as previous experience indicated that this was acceptable for the topic (Jürgensen et al., 2012).

The in-depth interviews were conducted using semi-structured interview guides. Open-ended questions were asked about perceptions of the counselling, the testing process, the counsellors, how confidentiality was ensured, the experienced trust in the intervention and overall experiences with home-based VCT. After the first round of data collection, the interview guides were revised and a few topics were added, e.g. experiences with the consent process and couple counselling. The interview guides were further revised during the second round of field work. The focus group discussion topic guide covered the same major topics, with a main focus on consent and couple counselling. The interviews and the focus group discussion were conducted in the local language by

Table 1
Overview of informants in the IDIs and FGD.

| IDIs (first round)	IDIs (second round)	FGD (second round)
Female 37 years	Female, 24 years	Female, 20 years
Female, 52 years	Female, 27 years	Female, 42 years
Female, 53 years	Female, 28 years	Female, 51 years
Male, 26 years	Female, 36 years	Male, 51 years
Male, 29 years	Female, 40 years	Male, 52 years
Male, 30 years	Female, 43 years	Male, 59 years
Male, 33 years	Female, 56 years	
Male, 52 years	Female, 73 years	
Male, 53 years	Male, unknown age	
Male, 64 years	Male, 39 years	
	Male, 47 years	
Total: 10 individuals	**Total**: 11 individuals	**Total**: 6 individuals
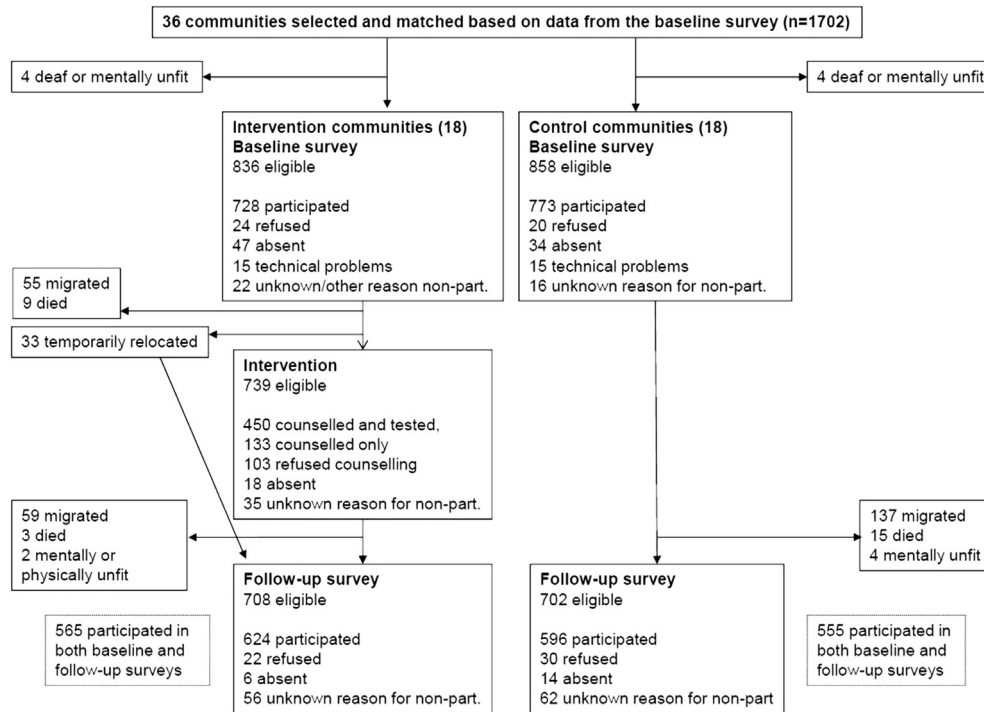
Fig. 2. Participant flow.

research assistants, who were trained and supervised by an anthropologist and a sociologist during the first round of data collection and by the sociologist and the first author of this paper during the second round. The interviews were conducted in the informants' homes or outside, depending on convenience or the informants' preference. The responses varied greatly; whereas some participants provided short answers, others elaborated enthusiastically on their experiences. The focus group discussion was conducted in a central house in one of the study villages. All members of the group participated in the active discussion.

The interviews and the discussion were recorded, translated and transcribed verbatim, and transcripts were imported into NVivo 9 (QSR International) for data management and coding. The transcripts were thoroughly reviewed and coded for identification of central themes. We aimed to reveal commonalities and patterns as well as differences, nuances or potential contradictions. The analysis was inspired by interpretive description (Thorne, Kirkham, & O'Flynn-Magee, 2004) and content analysis (Graneheim & Lundman, 2004). Although some themes confirmed our pre-understanding from the literature, several codes and themes had not been expected prior to the analysis.

Ethical considerations

The study was approved by the University of Zambia Biomedical Research Ethics Committee (007-12-08) and the Regional Committee for Medical and Health Research Ethics in Western Norway (024-09). Individuals participating in the surveys and the intervention provided written informed consent. All participants in the qualitative part of the study provided oral informed consent. Confidentiality was ensured throughout the study and no names were recorded. Individuals who were found HIV-positive were given money for transport to the nearest clinic where treatment was available. To avoid unwanted indirect disclosure, individuals who tested HIV-positive did not receive follow-up visits. The trial is registered with controlled-trials.com (ISRCTN53353725).

Results

Quantitative results

The participant flow is shown in Fig. 2. A total of 565 individuals in the intervention arm (68% of eligible individuals at baseline) and 555 individuals in the control arm (65% of eligible individuals at baseline) participated in both surveys. Loss to follow-up was mainly due to migration. The participant flow is described in more detail elsewhere (Fylkesnes et al., 2013). There were few differences between the trial arms at baseline. Mean age was slightly higher and educational levels slightly lower in the intervention arm. At follow-up, self-reported HIV testing was substantially higher in the intervention arm than in the control arm (Table 2).

The main reasons for accepting home-based VCT (HB-VCT) were the wish to know one's HIV status and the visit by a home-based counsellor. Very few had accepted HB-VCT because they felt at risk or because they felt unwell (Table 3). The main reasons for not accepting the intervention were prior knowledge of HIV status and no wish to give blood for testing. Few respondents reported that they had declined to participate in the intervention owing to lack of trust in the counsellor or because they preferred to be tested at the clinic (Table 4).

The prevalence of first time testing (68% vs. 29%, $p < 0.0001$) and re-testing (94% vs. 74%, $p < 0.0001$), and the percentage of cohabiting couples who received the test results together (70% vs. 51%, $p < 0.001$, results not shown), were significantly higher in the intervention than in the control arm (Table 5). Among those who expressed readiness to be tested at baseline, the proportion who had actually been tested during the year prior to follow-up was significantly higher in the intervention arm ($p < 0.0001$). Two thirds of those who expressed no testing intention at baseline had been tested during the year prior to follow-up in the intervention arm; the corresponding figure for the control arm was one third ($p < 0.0001$) (Table 6). In the intervention arm, a large majority of those receiving home-based VCT rated both the counselling and the

Table 2
Descriptive statistics and test rates at baseline and follow-up. Bold values signify $p < 0.05$.

Variable	Categories	Baseline				p-Value	Follow-up				p-Value
		Intervention		Control			Intervention		Control		
		n	%	n	%		n	%	n	%	
Sex	Male	398	47.2	388	45.0		255	45.1	261	47.0	
	Female	446	52.8	475	55.0	0.36	310	54.9	294	53.0	0.53
Marital status	Single	151	20.6	175	22.6		89	15.8	98	17.7	
	Cohabiting/married	483	66.0	498	64.3		397	70.4	381	68.6	
	Divorced/Widowed	98	13.4	101	13.1	0.65	78	13.8	76	13.7	0.70
Education	0–4 years	202	27.6	165	21.4		165	29.2	123	22.2	
	5–7 years	307	41.9	331	42.9		242	42.8	244	44.1	
	8 or more years	223	30.5	276	35.8	**0.01**	158	28.0	186	33.6	**0.02**
Tested for HIV the previous year	No	616	73.0	644	74.7		104	18.4	267	48.2	
	Yes	228	27.0	218	25.3	0.42	461	81.6	287	51.8	**<0.001**
Readiness to test	No	164	22.4	149	19.3		69	12.3	82	15.0	
	Yes	569	77.6	624	80.7	0.14	493	87.7	464	85.0	0.18
Age *(Mean)*		35.8		34.3		0.054	38.0		36.6		0.16

Table 3
Reasons for accepting home-based VCT (intervention arm).

	n	%
Wanted to know status	419	76.6
Visited by home-based counsellor	79	14.4
Felt at risk	13	2.4
Encouraged by partner	11	2.0
Felt unwell	9	1.6
Wanted to learn about AIDS	6	1.1
Tested after window period	3	0.5
Other	7	1.3
Total	547	100

overall services as good or very good. In the control arm, the counselling and services of the last testing experience were rated equally highly by those who had been tested during the preceding year ($p = 0.14$ and $p = 0.17$, respectively) (Table 7).

Qualitative findings – the seven Cs

The main reasons expressed by the informants for the high acceptance of home-based VCT were that they experienced it as **c**onvenient, **c**onfidential and **c**redible, that the **c**onduct and the perceived **c**loseness of the counsellors made them trustworthy, that the handling of the **c**onsent process was convincing, and that **c**ouple counselling was perceived as beneficial. Very few informants told about negative experiences with home-based VCT, but those negative experiences that were mentioned are reported below.

Table 4
Reasons for not accepting home-based VCT (intervention arm).

	n	%
Knowledge of HIV status	16	23.9
Did not want to give blood	16	23.9
Not found at home	7	10.4
Scared	5	7.5
Did not trust the counsellor	5	7.5
Didn't think a test was relevant	5	7.5
Husband not present to give consent	3	4.5
Did not have time	3	4.5
Preferred to be tested at clinic	2	3.0
Thought counsellors were satanists	2	3.0
Other	3	4.5
Total	67	100

Convenience

Many informants favoured home-based VCT because it was convenient, as their nearest clinic was far away. The cost of transport was seen as a prominent barrier to accessing VCT at the clinic, especially if they were to be tested together with their partner. Moreover, travelling to and waiting at the clinic was experienced as time-consuming. '*It is better to be tested in our homes than in the clinic. […] Because if they come to my house to test me, it won't take a long time. I won't waste time. I won't stand in any queue. I won't find busy people. You will test me quickly*' (Woman 73 years).

Confidentiality

According to the informants, assurance of confidentiality was crucial for the acceptance of HIV testing services. Stigma appeared as a prime reason for keeping away from the testing services at the clinic. '*People's eyes can kill you,*' a woman (56) explained. The informants felt there was more privacy in the home setting than at the clinic, as the counsellor would just look as a regular visitor. '*People are scared. That is why I'm saying: "Keep visiting". There is privacy at home. Because people surely fear going to the clinic*' (Woman 43 years). Since the testing was carried out inside people's homes nobody could see who was actually tested, as opposed to the clinic:

'The good thing about this home based [testing and counselling] is that after counselling and testing the counsellor leaves you to relax, but at the clinic there are a lot of people and most of them know you. You will be scared to be tested because of the people who know you. You get scared that they will tell everybody about my status

Table 5
First time and repeat testing.

	Ever tested before baseline				Not tested before baseline			
	Intervention		Control		Intervention		Control	
	n	%	n	%	n	%	n	%
Tested the year previous to follow-up	278	93.9%	207	73.9%	183	68.0%	80	29.2%
Not tested the year previous to follow-up	18	6.1%	73	26.1%	86	32.0%	194	70.2%
Total	296		280		269		274	
	$\chi^2 = 43.2$, $p < 0.0001$				$\chi^2 = 82.0$, $p < 0.0001$			

Table 6
Proportion tested at follow-up by expressed readiness at baseline.

	Ready to test at baseline				Not ready to test at baseline			
	Intervention		Control		Intervention		Control	
	n	%	n	%	n	%	n	%
Tested the year previous to follow-up	376	85.8%	255	56.2%	85	66.9%	32	32.3%
Not tested the year previous to follow-up	62	14.2%	199	43.8%	42	33.1%	67	67.7%
Total	438		454		127		99	
	$\chi^2 = 94.9, p < 0.0001$				$\chi^2 = 26.7, p < 0.0001$			

because they have seen me go in or come out of the counselling room. At home it remains a secret between me and the counsellor.'

Man 26 years

Credibility of the testing process

The informants said the openness of the testing made them trust the result. Clients were carefully informed about and shown the whole testing process, and they could read their own result. *'I trusted the result because the counsellor explained how to detect if one is positive or negative. So when we saw how our blood was moving and where it stopped, we trusted the result. We saw it with our own eyes'* (Man 33 years). This convinced them to trust that it was their own test result and that the testing had not been manipulated in any way, and thus prevented suspicions about wrong results or about the blood being used for other procedures than the test.

Counsellors' conduct

The informants held that the counsellors' characteristics and behaviour were important for establishing trust in the intervention. The ideal counsellor should be *'someone who can keep secrets'* (Man 30 years). The professional conduct and explanations of the counsellors were experienced as important for trusting that confidentiality would be maintained and accepting and believing the information given: *'From the way we were talking, I could see that this person had experience in what he was doing and he assured me of confidentiality between him and myself'* (Man 29 years). *'The way he conducted himself made me have trust in the counselling'* (Woman 53 years). The informants emphasized that trust was evoked by a polite introduction, the way the counsellor raised and discussed sensitive issues, and the ability to listen.

Closeness of counsellors

Many informants said they appreciated that the counsellors were local and known, and that this perceived closeness made them trustworthy. *'When we saw that these people come from this area we welcomed them and we were tested'* (Man 53 years). The

Table 7
How would you rate the counselling and the overall HTC services given?

	Rating of counselling				Rating of HTC services			
	Intervention		Control		Intervention		Control	
	n	%	n	%	n	%	n	%
Very poor /poor/fair	26	5.6%	10	3.4%	27	5.9%	11	3.5%
Good/very good	437	94.4%	281	96.6%	432	94.1%	300	96.5%
	p-Value = 0.17				*p*-Value = 0.14			

recognition of clinic IDs and equipment used at the clinic contributed to the feeling of familiarity and trust, as did previous experience with the counsellors: *'It was the same counsellor who tested me when I went to the clinic. (…) I never heard him telling people about my status'* (Man 26 years). Yet, one informant said that the counsellor withheld her test result because he knew her.

Couple counselling

Many informants had been tested and counselled together with their partner. This was experienced as positive. Several female informants had previously been tested alone at the antenatal clinic. Being tested at home together with their partner relieved them of being the one to disclose their HIV status and to recruit their husbands for testing. Informants held that suspicions of having been tested at the clinic without informing the partner or not telling the truth about the result would be avoided when tested at home as a couple. *'I would say I can use the word trust this time, because my wife and I have been tested and we know our status. So I can trust my wife, and my wife can also trust me'* (Man 26 years). Several informants said that after couple counselling they had a discussion about their test results and the implications for future conduct. *'The change is there because I told my wife that since we have been found like this, we should continue to be faithful to each other. We should trust each other and stick to each other at all times'* (Man 53 years). The home setting was experienced as a safe environment for discussing sensitive issues, and the woman was relieved of the challenge of introducing discussions about prevention after being tested alone at the antenatal clinics. However, although most informants reported positive experiences of couple counselling and testing, one of the female focus group participants disclosed that she had been divorced after testing positive for HIV, and there were anecdotes about other divorces among discordant couples.

Consent

Three potential sources of influence on an individuals' decision to be tested emerged, namely: the partner, the headman and the counsellor. Wives were expected to ask their husbands for permission to be tested. *'I asked my husband, because if I didn't tell him he would have suspected that I misbehaved behind his back. So it was better to ask him, so that he knows what I am about to go through'* (Woman 37 years). Most informants said they had agreed as a couple to be tested, and that it was advisable to be tested together. In several cases the female informant had been the one to suggest they should both be tested. Although the husband had to be asked for permission, there were examples of couples where the wife had been tested but the husband had refused: *'My husband was not willing [to be tested], but he gave me a go-ahead if I wanted to know my status'* (Woman 53 years). Furthermore, when asked about a hypothetical situation in which a husband did not agree to being tested, female informants held that they would still be tested themselves. Some informants also said that wives could refuse even though the husband accepted to be tested:

I: When you wanted to get tested did you ask for permission from anyone?

R: Yes, but my wives refused to get tested. Anyway, this VCT cannot be forced on people if she doesn't want to be tested. You can't force her to do what she doesn't want.

Man 64 years

The influence of the village headmen on individuals' decisions to be tested was acknowledged, but important nuances emerged in the way the informants described this. Some said that the headman had only allowed the counsellors into the village: *'The headman didn't influence us, but encouraged us to choose whether to take part*

or not to take part. It's up to an individual's feeling' (Woman 43 years). Others held that the headman had recommended people should be tested. This was experienced as influential owing to his respected position, but they emphasized that in the end it was an individual decision. However, one informant held that the headman had more or less forced his villagers to be tested: '*He [the headman] was forcing the community, although some people would not comply with his word*' (Woman 40 years).

None of the informants felt they were in any way pressured by the counsellors. Many informants described how the counsellors emphasized that testing was voluntary: '*He told us that he is not there to force us to get tested, but to encourage us to know our status. "Don't decide when your heart is not free. Decide when you are free from fear". I told the counsellor to come back the next day so that I could talk to my wife and decide what was good for us.*' (Man 33 years). One of the female informants compared her experience of the consent process during home-based VCT with her previous experience at the antenatal clinic:

I: But didn't you go [for testing] at the PMTCT?

R: I did, but that was a while ago, and at home it was of my own choice. It was not compulsory like at the antenatal clinic.

Woman 29 years

Discussion

From the informants' accounts, the following seven C's were revealed as the major factors explaining the high acceptability of home-based VCT: **c**onvenience, **c**onfidentiality, the **c**redibility of the testing process, the **c**onduct and **c**loseness of the counsellors, the **c**ouple counselling and the **c**onsent process. The main reported reason for accepting home-based VCT was the wish to know one's HIV status, while the main reasons for not being tested were reluctance to give blood and prior knowledge of one's HIV status. A high level of first-time testing, re-testing and couple counselling was observed in the intervention arm, and the home-based VCT services were rated as high as the clinic-based HCT services in the control arm.

Only half of those expressing readiness to be tested in the control arm at baseline reported that they had been tested during the year prior to the follow-up survey, indicating barriers to standard clinic-based HIV testing services. In the qualitative data, stigma was found to be an important barrier, in line with a substantial body of research on stigma and HIV testing in Zambia (Bond, 2010; Grant, Logie, Masura, Gorman, & Murray, 2008; Jürgensen et al., 2012), other parts of Sub-Saharan Africa (Genberg et al., 2009; Kalichman & Simbayi, 2003; Ostermann et al., 2011; Young et al., 2010) and other parts of the world (Ma et al., 2007; Yi et al., 2009), revealing again that HIV-related stigma remains a serious challenge for access to HIV services. Stigma has particularly affected client-initiated testing approaches, because people often suspect that those seeking testing do so either because they have behaved 'immorally' or because they are ill with AIDS. Confidentiality and privacy are therefore of immense importance to the clients. In the present study, the informants perceived confidentiality to be better ensured in the home setting. This was crucial for the high acceptance, and suggests that home-based VCT (HB-VCT) has an advantage over other models in that people outside the household cannot see who is tested. Moreover, when the community knows that every household will be visited and when the testing is initiated by the counsellors, the potential for speculation about who is being tested and their reasons is limited.

Trust in the provider and in the health care system are critical for achieving health-promoting behaviour, especially related to serious or stigmatized illnesses such as AIDS (Gilson, 2003). The finding that the counsellors were perceived as trustworthy because they were known to the community contrasts with findings from other settings (Angotti et al., 2009). Interestingly, this finding indicates that the main reason for the perceived lack of confidentiality of the clinic-based HIV testing in this context was not the counsellors, but rather the setting. In our study we believe that the selection of counsellors was important in gaining local trust. These counsellors had already been chosen by their communities for voluntary counselling work at the local clinic because they had demonstrated conduct and characteristics that evoked trust, and the informants felt reassured when they recognized their local counsellors. The selection of counsellors is therefore likely to be of importance when implementing similar programmes. The finding furthermore suggests a possible symbiosis between home-based and clinic-based approaches to HIV testing, which could open up for better referral and follow-up of HIV-positive individuals identified during home-based VCT.

A large majority of the respondents in the intervention arm accepted HB-VCT either because they wanted to know their status or because they were visited by a home-based counsellor, suggesting that convenience was an important contributor to the high test coverage, which was confirmed in the qualitative data. Two thirds of those who had said they would *not* like to be tested were actually tested during the intervention, indicating that convenience may be such a strong predictor of being tested that even people with no prior desire to be tested may accept HB-VCT if the opportunity arises. In addition, the fact that two thirds of those in the intervention arm with no testing experience were tested during the trial makes us believe that HB-VCT provides an important opportunity to reach those not previously tested.

Couple counselling has been found to decrease risk behaviour, with regard to both horizontal and vertical transmission of HIV (Allen et al., 1992; Farquhar et al., 2004). A high rate of couple counselling and testing was observed with HB-VCT, and this was positively experienced by both men and women. In contrast, couple counselling is rare within PITC and other alternative models for HTC (Byamugisha, Tumwine, Semiyaga, & Tylleskar, 2010; Katz et al., 2009; Sweat et al., 2011). The level of couple counselling reported in the control arm was surprisingly high, which could reflect the success of local clinics in involving partners in testing. However, it might also be a result of social desirability bias, as only two individuals specifically reported to have sought couple counselling when asked about type of HTC services used. Moreover, previous research has shown apparently low awareness of the possibility of couple counselling in clinics (Kelley et al., 2011) and that male participation in HIV testing at the ANC clinics is very low (Byamugisha et al., 2010; Katz et al., 2009). A high level of couple counselling is advantageous in several ways. Being tested together offers an opportunity for joint disclosure, which has been found to increase condom use (Farquhar et al., 2004). As the counselling and testing in home-based VCT is not initiated by either of the partners, fewer suspicions are likely to arise related to the reasons for testing, such as extramarital affairs, a common suspicion when one partner takes the initiative to be tested (Larsson et al., 2012). The presence of the counsellor and the comfort of the home setting provide a safe arena for an open discussion of HIV status and preventive measures in which the counsellor has the chance to clarify misunderstandings. Without the fear of others listening in or observing them, the couple is likely to experience the home as a particularly safe place to open up and discuss sensitive topics, as was confirmed by the informants. This may lower the risk of suspicions, domestic violence or other negative consequences reported after HIV testing (Medley, Garcia-Moreno, McGill, & Maman, 2004).

The extensive scale-up of routine testing within antenatal care has had several gender-related consequences. Women are more often left with the burden of disclosure and the responsibility of recruiting their husbands for HIV testing, leaving them vulnerable to potential negative consequences. They are often tested during the particularly vulnerable state of pregnancy, which may influence their ability to decline the offer to be tested. Few men are reached by PITC in antenatal care, which is not perceived as a male arena (Falnes et al., 2011), and the scale-up of PITC within antenatal care has not been matched by interventions specifically targeting men. The gender differences in access to HIV testing translate into unequal access to treatment and care. Men have poorer access to antiretroviral treatment (Muula et al., 2007), tend to be started on treatment at a later stage (Mills, Beyrer, Birungi, & Dybul, 2012), and have higher mortality during treatment (Mills et al., 2011). As the inequality in access to testing seems to be enhanced by gender differences in health-seeking behaviour linked to perceptions of masculinity and customary gender roles (Courtenay, 2000; Mane & Aggleton, 2001; Mills et al., 2012; Skovdal et al., 2011), it may seem difficult to achieve equal coverage through existing clinic-based HIV testing approaches. The ZAMACT trial shows that HB-VCT is capable of reaching men and women equally (Fylkesnes et al., 2013), and may thus contribute to closing the gender gap in testing and treatment access through the increased convenience. HB-VCT seems to be more sensitive to the gender roles for both men and women. Taking responsibility for the health of the household may actually reinforce the male gender role, whereas women are given an opportunity through couple counselling to raise issues regarding sexuality and prevention that could otherwise be difficult because of the customary female gender role.

One of the guiding principles for the home-based VCT model was to maximize autonomy. Hence, an opt-in consent approach was employed. The counsellors were particularly trained in pre-test counselling and proper handling of the consent process. The qualitative material suggests that the clients experienced no coercion from the counsellors, showing that informed consent can be secured while achieving high test coverage. The consent process is of particular importance in the home setting owing to potential coercion by influential family members, and concerns regarding the actual possibility for married women to decide for themselves could be raised. The findings show that women were able to provide independent informed consent based on counselling and a discussion with their partner. This is important in the light of the criticism of the consent process in the opt-out approach to HTC, where clients in some settings may perceive it as difficult to decline an HIV test (Groves et al., 2010; Hardon et al., 2012; Njeru et al., 2011; Ujiji et al., 2011). In addition, it is plausible that the sense of motivation for behaviour change is stronger among individuals who actively decide to be tested than among those who are tested with an opt-out approach, especially if the possibility of actually opting out is experienced as limited (Yeatman, 2007). Proper handling of the consent process is therefore vital, not only from an ethical perspective, but also from a preventive point of view.

We found no difference between the respondents' rating of the home-based VCT services in the intervention arm and the clinic-based HTC in the control arm; both groups reported a very high level of satisfaction. In the qualitative material, the informants generally expressed a high level of satisfaction with the home-based service, whereas several aspects experienced as problematic in clinic-based HTC were mentioned (visibility, queues, waiting time). The discrepancy between the quantitative and the qualitative material may partly be explained by social desirability bias in the quantitative data. The contrast demonstrates how the quantitative measures did not capture the clients' concerns about clinic-based HTC and the necessity of a more comprehensive evaluation

to fully understand the diversity of experiences with the services. Our study thus illustrates why quantitative methods may be insufficient for evaluating complex interventions (Lewin et al., 2009). However, despite the large number of trials of health interventions being conducted, very few of them integrate qualitative methods in their evaluation (Glenton, Lewin, & Scheel, 2011; Lewin et al., 2009).

This study has several limitations. In the quantitative data, first, there was a 34% loss to follow-up, which may be expected in a community trial where migration is common. However, the loss was well balanced between the arms and those lost to follow-up did not differ in baseline characteristics. Second, the answers to the questions about acceptance in the survey were recorded according to pre-defined categories. This may have influenced the type of answers obtained and potentially important answer categories may have been left out.

The first round of qualitative data was unfortunately collected without revising the interview guides during the course of the interviews. If revised during the field work, important topics could have been added at an earlier stage. The fact that informants for the qualitative interviews were recruited by the assistance of research assistants known to be affiliated with the study and village headmen could have made the informants feel pressured to participate and to communicate a positive experience with the intervention. However, as the permission of the headman was the culturally appropriate method for approaching villagers, this bias could not have been avoided. In addition, we aimed to minimize social desirability bias by ensuring that the data collection teams and the intervention team consisted of different people. We only included people who had accepted home-based VCT in the IDIs and FGD, and not individuals who had declined counselling and/or testing. We acknowledge that this is a major limitation to the study, as the latter group could have provided us with valuable information about barriers to the service. Young people below the age of 20 years were moreover not represented in our qualitative sample. This group could have added valuable information on possible influence or coercion by older family member and the youth friendliness of the intervention. However, the test coverage among young people was significantly higher in the intervention arm than in the control arm (Fylkesnes et al., 2013), suggesting that being tested at home may be more youth friendly than at the clinic.

Conclusions

In conclusion we argue that addressing stigma, gender and trust is crucial for the acceptance of HIV testing and counselling. Improved confidentiality, convenience, a high level of couple counselling and locally trusted counsellors were therefore central reasons for the high acceptance of HB-VCT. Equal access to HIV testing for women and men and the high level of couple counselling observed with HB-VCT are likely to have positive consequences for both genders. The study shows that high test coverage can be achieved with an opt-in consent approach. The embedded qualitative evaluation of the trial confirmed the high satisfaction with home-based VCT reported in the survey and was central for understanding the underlying reasons to the observed acceptance of home-based VCT, and should be included in all trials investigating behavioural outcomes.

Author contributions

KF, ChM, MJ and IFS designed the study and intervention. KF, ChM, MJ, and IFS elaborated the quantitative data collection methods and database architecture. MJ and IFS prepared the qualitative data collection tools. ChM, KF, SM, MJ, and IFS

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