Healthcare providers' perspective on barriers to optimal HIV index testing: an interview-based study [version 1; peer review: 1 approved with reservations]

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Abstract

**Background:** HIV testing services (HTS) and antiretroviral therapy have seen a substantial scale-up. Poorly targeted HTS have continued to miss people living with HIV who do not know their HIV status. This requires new and targeted approaches to reach undiagnosed people with HIV, such as HIV partner services. The aim of this study was to assess the barriers to optimal index testing for improved HIV testing yield in Lusaka, Zambia.

**Methods:** One-to-one interviews were conducted with index testing providers to explore provider-related and client-related barriers to testing, and document other experiences arising during the process of HIV index testing. An interview guide was utilized for consistency of information collected.

**Results:** Provider related challenges included inadequate elicitation skills among healthcare workers; low number of volunteers trained in index testing; inadequate index testing knowledge among staff; limited elicitation of index partners to only wife and husband (not eliciting all sexual partners); and limited transport for contact tracing. On the other hand, client-related challenges were mobile communities due to seasonal activities such as cross borderer trades, sex work and farming; some key populations and adolescent index clients do not have contact details for their casual relationships; provider's age or gender difference for some clients; missing details on client locator forms or wrong details provided; and limited space dedicated to conduct elicitation of index clients.

**Discussion:** The challenges identified have future implications for index partner testing. These barriers were also gender and age specific. HIV testing services need to adapt to the social context of Zambia where HIV-related stigma and discrimination is still persistent and overwhelming. As Zambia makes significant progress towards achieving HIV epidemic control, more effort is needed to reach specific high risk but hard to reach populations in HIV programs, such as men and adolescent girls and young women.
Introduction
Global HIV testing services (HTS) and antiretroviral therapy have seen a substantial scale up. About 15 years ago, only an estimated 12% of the global population who required an HIV test were tested, and only 10% of people living with HIV (PLHIV) knew their HIV status in Africa. It is now estimated that about 80% of PLHIV, and nearly 85% of PLHIV in southern and eastern Africa, know their HIV status, by the end of 2019. While this progress has been registered, poorly targeted HTS have continued to miss PLHIV who do not know their HIV status in many settings. This requires new and targeted approaches to reach undiagnosed people with HIV, such as HIV partner services.

A study conducted in Zambia revealed that index testing coupled with targeted community-led HTS are useful strategies to diagnose men living with HIV. Many studies have shown that index partner testing has the potential to increase HTS uptake, and identify and diagnose HIV infected partners (yield ranging from 35% to 62% without reported intimate partner violence). However, there are barriers to effective HIV index testing, for instance difficulties in notifying past or casual partners for both male and female index cases. Disease symptoms are a motivating factor for HIV testing for men as well as women. Studies have shown that gender determinants, such as tolerant attitudes about intimate partner violence and unequal power dynamics within relationships, have noticeable effects for men and women on deciding to get tested for HIV.

Gender-specific barriers for female index clients to successful referral include the following: women face gender roles and inequalities in relationships such as lack of education, lack of resources or ability to access services; fear of abandonment, violence or other abuse associated with partner notification. Therefore, they may need additional support to overcome challenges in the partner notification process. Antenatal care exposure makes women more likely to get tested for HIV. For men, especially those in sub-Saharan Africa, the following challenges to HIV testing and disclosure have been previously noted: stigma, gender and social roles prescribing that men should be healthy, strong, and dominant. Studies have shown that men, compared to women, underestimate their level of risk of HIV infection. However, once men are tested, they may be more likely to disclose their HIV status. Some men believe that their role of breadwinner for the family protects them from rejection when disclosing their HIV positive status.

Effective approaches to HIV testing are needed to reach undiagnosed people and link them to HIV care and treatment as part of the UNAIDS 90-90-90 goals. Understanding barriers to index testing is crucial for planning appropriate interventions to improve HIV testing yield and to provide appropriate care for both index clients and their partners. In this context, the aim of this study was to assess the barriers to optimal index testing for improved HIV testing yield in Lusaka urban district of Zambia.

Methods
Study design
An explanatory qualitative study design was used. One-to-one interviews were employed to explore index testing providers’ views on barriers and other experiences arising during the process of HIV index testing. An interview guide was utilized for consistency of information collected. The aim of this study was to assess the barriers to optimal index testing for improved HIV testing yield in Lusaka urban district of Zambia.

Study setting
The study was facility based, conducted at Matero First Level Hospital, Matero Main Clinic, and George Health Centre in Matero sub-district of Lusaka, Zambia. This study was conducted between January and March 2020.

Participants were interviewed face-to-face during their free time to avoid disruption of services.

Study population
HIV index testing providers involved in patient care and management were interviewed. A total of 18 key informant interviews were conducted with two medical officers, two head of HIV testing services departments, three health systems strengthening nurses, five index community liaison officers, and six index testing counselors. A saturation of findings was used to guide the sample size.

Eighteen participants in the qualitative component of the study were selected on a convenience basis from the index testing services providers. There are more female HTS providers than their male counterparts in Matero sub-district; therefore, one third quota was given to male participants to ensure gender representability. The index providers were selected from male and female index testing services providers who have been providing index testing for more than one year.

Index providers were selected by the principal investigator (PI) who is trained in qualitative and quantitative studies for participation in a face to face interview on a convenience basis. A rough quota was given to each facility, balancing out male and female participants, and those providers who were invited to participate, agreed and consented were interviewed.

Everyone approached to participate were interviewed. No repeat interviews were carried out. Field notes were made during and after the interviews (Underlying data). The summary was read back to the participants to ensure validation.

Data sources, variables and collection
HIV index testing providers were interviewed by the PI. It was an onsite (at the medical facilities), face-to-face interview, conducted in English, and audio-recorded using an ‘audio-recorder’ application after obtaining consent from participants. Only the participant and the PI were present during the key informant interview. An interview guide (Extended data) was used to explore the challenges and make suggestions for.
improving index contact testing outcome for HIV. The interview guide consisted of open ended questions and probes prepared for various healthcare providers.

**Characteristics of the interviewer**

The PI is a qualified male medical doctor and has a Master’s degree in Public Health. He is currently a PhD candidate, conducting research for his doctorate thesis in Public Health. The purpose of the research was explained to participant prior to the interview. Participants were provided information sheet to explain the purpose and usage of the study findings.

**Data management and analysis**

Audio-recorded interviews were transcribed verbatim on the same day by the PI. A descriptive content analysis by manual coding was performed by two independent, trained researchers (HIV/TB mentors) to generate categories or themes. These were reviewed by the PI to avoid subjective bias and strengthen interpretive credibility. Any disagreements were resolved through discussion.

**Ethics approval**

Participants gave their written informed consent to be interviewed on the understanding that data would be reported in de-identified form to prevent the identification of all key informants.

Permission to conduct research was obtained from the Lusaka Provincial Health Office before the commencement of the study. Ethical clearance was sought and obtained from the ERES Converge Zambian Institutional Review Board (IRB; Ref. No. 2019 – Nov – 009). Authority to conduct research was also sought from the National Health Research Authority.

Reporting of the methods and results comply with the consolidated criteria for reporting qualitative studies (COREQ) checklist\(^1\). A completed COREQ checklist is available here\(^4\).

**Results**

A total of 18 participants (index providers) were interviewed; 13 women and 5 men. Table 1 presents demographic characteristics of participants.

Major activities of an index testing provider in the past one year included ensuring that all newly tested HIV clients were listed, counseling was provided to them on partner notification service, elicitation of sexual contacts, contact tracing, testing of contacts and linkage of positive contacts to care.

### Table 1. Demographics of the 18 index providers interviewed.

<table>
<thead>
<tr>
<th>#</th>
<th>Facility</th>
<th>Age</th>
<th>Gender</th>
<th>Provider job title</th>
<th>Interview duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MFLH</td>
<td>42</td>
<td>Female</td>
<td>Community Liaison Officer</td>
<td>15</td>
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<tr>
<td>2</td>
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<td>38</td>
<td>Female</td>
<td>Counselor</td>
<td>15</td>
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<tr>
<td>3</td>
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<td>51</td>
<td>Female</td>
<td>Health Systems Strengthening Nurse</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>MMAIN</td>
<td>39</td>
<td>Female</td>
<td>HTS Head of Department</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>MFLH</td>
<td>28</td>
<td>Female</td>
<td>Counselor</td>
<td>18</td>
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<td>7</td>
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<td>8</td>
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<td>18</td>
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<tr>
<td>9</td>
<td>GEORGE</td>
<td>24</td>
<td>Male</td>
<td>Community Liaison officer</td>
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<tr>
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<tr>
<td>11</td>
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<tr>
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<tr>
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<td>HTS Head of department</td>
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<tr>
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<td>George</td>
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<td>Male</td>
<td>Medical Officer</td>
<td>17</td>
</tr>
</tbody>
</table>

MFLH, Matero First Level Hospital; MMAIN, Matero Main Clinic; George, George Health Centre; HTS, HIV Testing Service
“My major activities concerning index is if we find a positive, making sure that the client is indexed and elicitation is supposed to be done also. If the client says that I have got sexual contacts, I am supposed to book those sexual contacts and follow them either at home or at the facility if the client agrees to bring them”. (Participant 1)

Index testing workers worked together with other providers and implementing partners to provide index testing. Specifically, index testing providers from respective facilities worked hand in hand with program implementation partners to ensure activities were coordinated.

“For index testing to work, we need a multidisciplinary team. In working with other, being a nurse by profession, I need to work with counselors as I also provide testing. We need to identify people who are very skillful, who can spend more time with the client to get information on their contacts”. (Participant 16)

There were many successes or experiences reported by respondents arising from index testing. Providers were open to share their experiences and lessons learned while providing services.

“My experience or successful story it was one time when we had a session with a certain index client. That client was able to open up and give us 6 contacts of whom 5 tested positive and 1 negative. That person was polygamous”. (Participant 1)

“Through index testing, there was a certain man who had tested 7 years ago. When he came he was not feeling well. After we tested he said in the eyes of the public he only has one sexual partner (his wife). According to him he is a God fearing man. After eliciting we discovered that he had 3 extra girlfriends. Little by little after interacting with him those names were given to me. After that he said he may not be able to disclose to them because they will suspect that he may have infected them.....” (Participant 12)

Barriers and facilitators to effective index testing were also identified by respondents.

“The index client may give you the correct contact information. But the contact might have lied to the index client. …hard to reach clients that are out of town (Lusaka) or out of the country. …the contact, when followed, two of them have really brought up their religious believes strongly: "you are not going to test me, I cannot do an HIV test, I don't believe in HIV". (Participant 7)

“Like earlier mentioned, index testing is a concept that is new. It is a concept that was not long ego embedded in our understanding as healthcare providers. One of the barriers in delivering this service has been its acceptance among healthcare workers or among facility based workers as well as community based workers. Because we have had to ask on sexual contacts from clients that come out positive. And looking at our culture, it is one thing that we don't easily talk about to bring out sexual relations to clients. Many staff tend to bring out they traditions, they cultural beliefs, they religious believes when it comes to them getting sexual partners. It has limited the number of sexual partners that we are getting from the client…” (Participant 16)

Specific challenges related to index clients’ identification and elicitation of index contacts. Some clients did not open up easily (as this was the first time to meet a counselor) or immediately and others were not providing full contact information. This was usually resolved within two weeks of follow-up, as clients become more comfortable interacting with ART providers.

“One of the challenges of finding positives when doing index is most clients do not open up easily. Being the first time of meeting you as a counselor they can't open up just there and then. And then the other thing when it comes to elicitation, we elicit the client, you will find that when calling the sexual contacts, you are asked questions like where did you get my contact from? It is not everyone who will agree right there and then. It is not a one-day thing if I may say”.

“… elicitation on the other hand is a skill. So one big challenge is they are very few staff who are skillful when it comes to elicitation. So you will find out that if you have a client in front of you, but if you don’t have the skill and if you do not perfect this skill, the client will be in front of you but you will not be able to get out this information from them”. (Participant 16)

Specific challenges related to testing of index contacts. Various logistic challenges were noted with regards to tracing and testing of contacts.

“Number 1, transport must be readily available at all times. Number 2, … in short I can say logistics must be available at all times. If one says right now I have left my wife at home. If at all you are ready let's go together so that you can test her. You will find that we don’t have transport at the facility at that particular time. The time you will be calling the client maybe he will say this time she is not around, maybe she is busy with something else. We know these clients; they've got a lot of things to do beside accessing services from the hospital”. (Participant 1)

Perceived factors causing/contributing to sub-optimal index testing were reported as gender, age, stigma, social status, health system, facility structure, staff, and skill level.

“...when it comes to age, this is another challenge because elicitation is also age sensitive. By this I mean you cannot get a youth to elicit from a senior citizen for example who is maybe above 65. They will perceive the youth as a young boy or a young girl who has no concept of living, and they would close up on giving information.....” (Participant 16)

Discussion
In this research, barriers to accessing HTS were divided into provider- and client-related challenges.
Provider-related challenges: Inadequate elicitation skills among the newly trained community healthcare workers, treatment supporters and counsellors; trained providers such as healthcare workers not fully involved; low number of volunteers trained in index testing; inadequate index testing knowledge among staff; limiting elicitation of index partners to only wife and husband (not eliciting all sexual partners); and limited transport for contact tracing (long distances to reach contacts).

Client-related challenges: Mobile communities due to seasonal activities such as cross boarder trades (e.g., truck drivers), sex work and farming; some index clients do not live in the same district/town as the index clients; key populations and adolescents index clients do not have contact details for some of their contacts; missing details on client locator forms or wrong details provided; and limited space dedicated to conduct elicitation of index clients (lack of privacy).

These findings are in keeping with evidence from other studies, that showed that non-disclosure of HIV status (due to fear of marital discord), non-disclosure and under-disclosure of the number of sexual partners by the index clients, fear of negative consequences, difficulties notifying other partners, geography/remote partners, and risk perception were major barriers for using testing services. Key populations and people with casual partners were less able or willing to identify partners. Barriers to partner notification services also included concerns around privacy/confidentiality and intimate partner violence. Lack of awareness of risk for HIV infection/misconceptions; structural, psychological, financial, were barriers to being tested.

Following the interviews with key informants, the following were proposed as solutions to address identified challenges:

1. Peer pairing approach using experienced counselors and hand holding mentorship; Pairing treatment supporters to newly tested HIV positives clients for index testing and treatment support;
2. Training facility-based volunteers and healthcare workers (Nurses, Clinical officers, Medical officers etc.) in index testing;
3. Setting up network of counselors to reach contacts not in the same catchment as the index clients;
4. Provide transport to follow up clients (index contacts): additional vehicles needed or support transport refunds;
5. Identify and allocate dedicated space for elicitation using experienced counselors;
6. Improve appointment system: after hours, weekends and men’s clinics;
7. Ensure correct, complete and consistent documentation in all registers.

Strengths and limitations of the research
Some studies have tackled the issues of barriers to successfully referring partners for testing, but were not specific to gender or age. Alternative strategies to target and provide acceptable and accessible HIV testing services to gender and age-specific populations are addressed in this study. This study also addresses the gap of limited literature on HIV index testing in developing settings.

We used convenience sampling to explore barriers and facilitators of index testing. One other limitation was that the key informants in this research were only healthcare providers. The perspective of HIV positive clients themselves was not explored in this study to balance the information bias.

Conclusion
The challenges identified have future implications for index partner testing. These barriers were also gender and age-specific: HIV testing services need to adapt to the social context of Zambia where HIV-related stigma and discrimination is still persistent and overwhelming. HIV programs need to explore and address barriers to HIV partner testing services to maximize HIV case identification. As Zambia makes significant progress towards achieving HIV epidemic control, more effort is needed to reach specific high risk, but hard to reach populations in HIV programs, such as men, adolescent girls and young women.

Data availability
Underlying data
The underlying data for this study is the audio recordings of the participants. Since participants may be identified from their voices, the data cannot be shared in order to protect participant identity. De-identified field notes are instead provided, along with quotes in the article, as intermediary data. If readers would like to access the underlying data, they can contact the corresponding author who will facilitate access to the data. Conditions for access: submission of a proposal for how researchers will use the data.

Harvard Dataverse: Replication Data for: HEALTHCARE PROVIDERS’ PERSPECTIVE ON BARRIERS TO OPTIMAL HIV INDEX TESTING, https://doi.org/10.7910/DVN/FHNY2V.

This project contains the following underlying data:
- Field Notes

Extended data
Harvard Dataverse: Replication Data for: HEALTHCARE PROVIDERS’ PERSPECTIVE ON BARRIERS TO OPTIMAL HIV INDEX TESTING, https://doi.org/10.7910/DVN/BUXS2X.

This project contains the following extended data:
- Interview guide.

Reporting guidelines
Harvard Dataverse: COREQ checklist for ‘Healthcare providers’ perspective on barriers to optimal HIV index testing: an interview-based study’, https://doi.org/10.7910/DVN/CFZX0N.

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).
References

3. Partner and Family based Index case testing. A Standard Operating Procedure (SOP).

Acknowledgments
The author would like to thank the Lusaka Provincial Health Office (LPHO), the Lusaka District Health Office leadership, the Matero Health Management teams, and PEPFAR through the LPHO/CDC CoAg for their leadership and support during this study. Special thanks to my colleagues (medical mentors) for their support during the creation of themes. I also thank the study participants who consented and participated in this investigation. I am also grateful to Dr. Monde Muyoyeta for her supervision, guidance and support.
Chido Dziva Chikwari

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2 Biomedical Research and Training Institute, Harare, Zimbabwe

This is a useful paper that reflects some of the barriers and facilitators of index linked HIV testing which is a strategy that has potential to increase the yield of undiagnosed HIV. There are however, some comments for the Author below.

Abstract
1. Discussion section includes new findings not mentioned in the results such as variation by gender and age. May be best to move to the results section.

2. The conclusions mentioned in the abstract are not in line with the results presented in the abstract. There is a need for the two to be aligned. See comment above. Additionally, stigma and discrimination not mentioned as a barrier in the results.

Manuscript
Introduction
○ Please including timing of the study in Zambia - year.

○ There is no comparator for increasing yield of index partner testing that is reported in the introduction “Many studies have shown that index partner testing has the potential to increase HTS uptake, and identify and diagnose HIV infected partners (yield ranging from 35% to 62% without reported intimate partner violence).” Is the increase in yield from 35%-65%?

○ Reference the UNAIDS 90-90-90 goals?

○ May be useful to define index testing as this term is not very common.

Methods
○ In the data management and analysis section the author notes that any disagreements were resolved through discussion; who was this discussion with? The interviewees? Another
study staff member?

Results
- Would it be possible to summarise the demographic data provided in Table 1? Given the low number of participants from only two facilities, presenting the data in such a format could make it easy for the participants identity to be decoded.

- Were all the providers who were interviewed “index testing workers”? Are index testing workers different from Index testing providers? It may be beneficial to describe the different roles of the health workers.

Discussion
- It appears the discussion is providing results in the first two paragraphs when instead it should be providing a summary. The split between provider and client related challenges should be introduced in the results rather than the discussion where findings should be summarised.

- First two paragraphs of the discussion are listing findings. These should be discussed rather than listed. The presentation here reads more like a results section.

- Your results do not present anything about key populations; however, you mention these in the discussion as part of your findings?

- These barriers are listed in the discussion but not presented in the results. “Barriers to partner notification services also included concerns around privacy/confidentiality and intimate partner violence. Lack of awareness of risk for HIV infection/ misconceptions; structural, psychological, financial, were barriers to being tested.”

- The gender and age variations that are discussed in the conclusion are not presented on the results?

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
No
**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Epidemiology: HIV and Sexual and Reproductive Health.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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