HIGH POSITIVITY YIELD OF HIV INDEX CASE TESTING IN MAMFE HEALTH DISTRICT, SOUTH WEST REGION, CAMEROON

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ABSTRACT

Background: Index testing (IT) is a voluntary process whereby after obtaining consent, sexual partners of HIV seropositive clients are offered HIV testing services. IT has been associated with high HIV positivity. The aim of this study is to determine the positivity rate and factors influencing IT yield among sexual partners (SP) of newly diagnosed Index client (IC) at Mamfe Health District, Cameroon.

Methods: At Mamfe District Hospital, the main district HIV care and treatment center, records of all newly diagnosed HIV positive clients with an outcome for IT between July and September 2021, were reviewed retrospectively. Data including age and gender of the IC and their partners, method of referral and notification of partners, HIV test results of partners and linkage status of new HIV positive partners were collected using a chart abstraction template from the IT registers. Analyses were done using the R Software Package version 4.0.4. Chi-square was used to test association between different groups at a significance level of $p<0.01$.

Results: Records of 133 consecutive newly diagnosed IC, 48.1% males vs 51.9% females and their 156 listed SP, 50.6% males vs 49.4% females were reviewed. Mean ages of IC and SP were 39±10 and 37±11 years respectively and a majority of IC (39.9%) and SP (42.9%) were in the 35-44 years age group. 37.2% (58/156) of partners tested positive for HIV and were all linked to antiretroviral therapy. All SP were notified using provider referral method. HIV results of both male and female partners were not significantly associated with age group ($p>0.05$). HIV positivity rate of 42.9% (33/77) in female partners was not significantly higher than 31.6% (25/79) in male partners ($p>0.05$)

Conclusions: The positivity rate of IT among the SP of new IC was high with no significance in gender difference. Most of the IC and SP were aged 35-44 years and essentially in heterosexual relationship. Prioritizing and sustaining IT to partners of new IC using provider referral is a veritable strategy and need to be implemented with fidelity to increase case finding in order to boost ART uptake especially in the 35-44 years age group.

Key words: Case identification; Index testing; Sub-Saharan Africa; Cameroon

CHAPTER I
INTRODUCTION

Achieving the UNAIDS vision 95-95-95 target to end HIV/AIDS by 2030 requires that 95 percent of those living with HIV are identified and offered Anti-Retroviral Therapy (ART). In other to achieve this, the approach to testing must be strategic and be able to identify high-risk groups such as sexual partners of index positive clients (1, 2). Strategically identifying and offering HTS to sexual partners of index PLHIVs is important to reduce new infection rates toward ending HIV/AIDS in 2030 (3, 4). Without targeted identification and offering of HTS to priority population groups including sexual partners of index Persons Living with HIV (PLHIV), it will be difficult to end HIV/AIDS in 2030 (5).

Cameroon adopted the 95-95-95 strategy as part of the National Strategic Plan to end HIV/AIDS by 2030 which calls for: identifying 95% of people living with HIV (PLHIV); initiating and retaining on antiretroviral therapy (ART) 95% of PLHIV identified; and achieving 95% viral suppression for ART patients. To achieve the first 95, the identification of PLHIV through HIV testing is key. In order to achieve this, the Government of Cameroon supports a scheme funded by the US President's Emergency Plan for AIDS Relief (PEPFAR), implemented by the Cameroon Baptist Convention Health Services to demonstrate HIV epidemic control in South West, North West and West Regions. PEPFAR Cameroon in their 2019 country operational plan advocates for scale up of approaches proven to improve case finding such as quality index testing and will discontinue non-targeted testing (6).

At the regional level, the South West Region has a prevalence ranging between prevalence 2.74 to 4.06 with over 60,590 people estimated to be living with HIV among whom 42% (25,289) are receiving ART (CAMPHIA). The preliminary report for South West Region at the end of Q4, FY21 period shows a total yield of 3.7% in the program from community and facility based HTS. This was after testing 124,892 people in the communities and health facilities with only 4600 identified positive clients. By index case testing, 9292 contacts were tested identifying 1333 new positives with a yield of 14.35%, with 29.3% contribution to HTS positive (CBCHS, DAMA, 2021).

This indicates that the HTS approach using Provider Initiated Testing and Counseling (PITC), outreaches and community testing alone may not provide an optimal yield without focusing on high risk persons such as sexual partners of positive index clients. It is therefore important to deploy efficient and acceptable interventions to identify and estimate previously undiagnosed cases of HIV infections among sexual partners of HIV positive clients in Cameroon as previously demonstrated by studies carried out in other countries

JUSTIFICATION

The prevalence of HIV among populations in South West region prior to the socio-political crisis was at 3.6% (DHIS 2011). The crisis which has persisted since 2018 has had untold impact on the gains to ensure epidemic control. The fall out is displacement of people internally as well as refugees to other countries. Many PLWHA have moved without a follow-up treatment plan. Some have found refuge in new make-shift settlement with little or no access to health care services, health prevention and promotion. Consequently, unsafe sexual practices are likely to perpetuate thereby potentially causing further spread of the virus. Some have migrated to other towns abandoning their treatment.

In the last couple of years, several research studies have explored contact tracing and partner counseling and referral services (PCRS) in reaching the high risk population which includes sexual partners of HIV positive patients. Previous studies showed consistently across different settings that PCRS in can increase uptake of HIV clients into care and treatment (7-10)

The body of available evidence has shown that ICT with partner notification by health workers has successfully increased the chances of identification of high-risk populations for HIV testing and counseling (11-16). Therefore we sought to apply this strategy in our setting in order to expand testing coverage so as to achieve epidemic control.

STUDY OBJECTIVES

- To determine the positivity yield from index testing in Mamfe Health District
- To identify factors influencing the yield from index testing strategy in Mamfe District Hospital.
- To establish the rate of linkage of positives to ART

CHAPTER TWO
LITERATURE REVIEW

Index testing, including partner notification services (PNS) is a key strategy to identify and support those most at risk of acquiring HIV: sexual contacts, needle-sharing partners, and biological children of newly diagnosed HIV+ individuals (7). Its implementation is critical to controlling the HIV epidemic and meeting the UNAIDS target that 95% of people living with HIV will know their status (8).

Index Case testing (ICT) is a voluntary process where trained health workers, and lay providers, ask people diagnosed with HIV about their sexual partners or drug injecting partners and, with the consent of the HIV-positive client, offer these partners voluntary HIV testing (9). The sexual partners and drug injecting partners of people diagnosed with HIV infection have an increased probability of also being HIV-positive. Index testing services does not always require disclosure to the partner and may be anonymously conducted. These services are an efficient and effective way to diagnose people with HIV, link persons to HIV care, and identify partners in need of HIV prevention services (9). Index testing has been an important public health approach in infectious disease case detection and control for decades. This strategy has also been a part of programs for sexually transmitted infections and tuberculosis but has not previously been routinely implemented for HIV program (10).

Index testing increases uptake of HIV testing services among partners of people with HIV. It results in high positivity yield, increased linkage to treatment and care among partners of people with HIV. Other benefits of index testing include mutual support to access HIV prevention, treatment and care services, improved adherence and retention on treatment, increased support for the prevention of mother-to-child transmission and prioritization of effective HIV prevention for sero-discordant couples such as condom use, antiretroviral therapy, and pre-exposure prophylaxis for HIV-negative partners (10). This innovative strategy increases access to HIV testing services for populations currently underserved including adolescent girls and young women, adolescent boys and young men, partners of women tested in antenatal clinics and key populations amongst others. Index testing ensures that the partners of HIV positive clients

benefit from opportunities to learn their HIV status and commence ART if tested HIV positive. Therefore, index testing has a role to play in achieving optimum ART coverage and epidemiological control. Partner referral methods could either be passive referral, where index clients are encouraged to disclose their status and suggest HIV testing to their partner(s) on their own; contract referral, where index clients enter into a contract with the provider to refer their partner(s) to HIV testing within an agreed time period, after that the provider contacts the partner(s) directly and offers HIV testing, while maintaining the anonymity of the index patient; provider referral, where providers directly contact partners of index patients to offer HIV testing; or dual referral where the provider accompanies the index patient when they disclose their status and offers HIV testing to their partner(s) (11).

Prevalence of HIV among sexual partners

A study carried out in Malawi shows that HIV prevalence ranged from 48.1% to 66.7% among sexual partners of HIV positive clients who were tested. Contact Tracing was found to be an attractive case-finding approach relative to HCT when few HIV-infected individuals are aware of their status (11-14).

Another study in Cuba shows that from the contact tracing data of 4091 HIV infected persons detected by the beginning of 2002, 1221 (30%) were detected through contact tracing. In the same vein, a study done in Eastern China shows that from 398 HIV-infected individuals who served as index cases, a total of 1,403 contactable sexual contacts were identified, of whom 320 (22.8%) received HIV testing and 125 (39.1%) tested positive for HIV (15). Similarly, Cairns et al. reported that out of 2470 index positive clients, 3211 sexual contacts were at risk with 1399 people (52%) coming in for HIV tests and 293 people (21%) turning out to be infected (16).

In several observational studies, assisted partner notification was associated with increased uptake of HIV testing services (HTS) among identified partners compared to passive referral (17-20). The proportion of partners of index patients who tested HIV-positive ranged from 20 to 72% in both passive and assisted arms of the four trials. Among the observational studies, the highest proportion of partners testing HIV positive was 86%.

In one study in Nigeria, the HIV positivity rate among partners of index clients was 20%. The HIV positivity rate in partners of male index clients (26.9%) was significantly higher than in

partners of female index clients (15.5%) (21). In another study, out of a total of 1277 index cases counseled and interviewed 879 index clients agreed to disclosure, giving a disclosure rate of 68.3%. 888 sexual partners were identified from the interviews and traced 870 (97.9%) sexual contacts. A total of 741 (85.2%) of 870 sexual contacts traced were tested for HIV, out of which 378 (51%) tested positive for HIV (5).

CHAPTER THREE
MATERIALS AND METHODS

3.1 STUDY DESIGN

The study is a retrospective review of all newly diagnosed.

3.2 STUDY PERIOD

Data for all newly diagnosed HIV positive clients within Mamfe District with an outcome for index testing in Mamfe District Hospital between July 2021 to September 2021, was reviewed.

3.2 STUDY SETTING

The study was conducted in Mamfe Health District. Mamfe is one of the towns in the English-speaking part of Cameroon affected by the socio-political crisis and its public health fallouts since 2016. The exercise was a facility-led community venture, providing index testing services to the highest number of persons living with HIV (PLHIV) in localities of Mamfe Health District, South West Region, Cameroon from July to September 2021.

3.3 STUDY POPULATION

The population involved in this study included all newly diagnosed HIV positive clients and those already enrolled and commenced on ART prior to July 2021 in Mamfe District Hospital, but with an outcome for index testing between July to September 2021, identified from source registers in the host facility. Their sexual partners were the population targeted in this study for HTS. Those who were unwilling to disclose their sexual partners were excluded from the study. Data source was the facility index case testing register.

The inclusion criteria:

- All index clients and their sexual (casual and spousal) partners identified from July 2021 to September 2021.

The exclusion criteria:

- Excluded were index clients who were unwilling to disclose

3.4 SAMPLE SIZE

133 consecutive HIV-infected clients were conveniently considered over the specified period.

3.5 STUDY PROCEDURE

HIV diagnosis was made following the national HIV serial testing algorithm with rapid test kits. Records of a total of 133 consecutive HIV-positive index clients (with their partners, n=156) who received index testing services during the period of study were reviewed. Data were retrieved from the index testing registers using an excel chart abstraction template which contained columns for all relevant information necessary for the study. Omitted information in the register was sought from other program registers.

Information collected included age and gender of the index clients and their partners, method of referral and notification of partners, HIV test results of partners and linkage status of new HIV positive partners. Partner notification methods were; (i) index method, where index clients were encouraged to disclose their status and suggest HIV testing to their partner(s) on their own; (ii) contract method, where index clients entered into a contract with the provider to refer their partner(s) to HIV testing within an agreed time period, after which the provider contacts the partner(s) directly and offers HIV testing, while maintaining anonymity of the index patient; (iii) service provider notification method, where providers directly contact partners of index patients to offer HIV testing; and (iv) dual referral where the provider accompanies the index patient when they disclose their status and offers HIV testing to their partner(s) (Cameroon index testing working tool).

3.6 DATA MANAGEMENT AND ANALYSIS

Collated data were reviewed and checked for completeness. Data entry and analysis were done using the R Software Package version 4.0.4. Chi-square was used to test association between different groups at a significance level of $p<0.01$.

3.7 ETHICAL ISSUES

Confidentiality was enforced in this study by using codes in the place of names. Data was transcribed directly from register into excel sheets and summarized for analysis.

CHAPTER FOUR
RESULTS

4.1 CHARACTERISTICS OF THE STUDY POPULATION

Between July 2021 and September 2021, 133 HIV-infected index patients were consecutively sampled as participants and all enrolled into the study. All (156) of the partners were notified using the service provider method.

4.11 AGE

The mean age of the index clients was 39±10 years, while the mean age of the partners was 37±11 (Table 1). The majority of the index clients (39.9%) and partners (42.9%) were in the 35-44 years age group.

4.12 GENDER

Sixty nine (51.9%) of the index clients were females (60.6%), while 79 of their partners were males (50.6%) indicating predominantly heterosexual (92.9%, n=79) and few homosexual (lesbian) relationships (7.1%, n=6) (Table 1).

4.13 HIV POSITIVITY

The HIV positivity rate among partners of index clients was 37.2% (58/156), and they were all initiated on ART (100% linkage) The HIV results of both male and female partners were not significantly associated with age group (p>0.05). The HIV positivity rate of 42.9% (33/77) in the female partners was not significantly higher than 31.6% (25/79) in the male partners (p>0.05) (Table 2).

Similarly, the HIV positivity rate of 42.6% (32/75) in partners of male clients (who were not all females, n=2) was not significantly higher than the rate of 32.1% (26/81) among partners of female index clients who were mostly but not all males (p>0.05) (Table 3).

Table 1: Age group and gender distribution of HIV-positive index clients and partners

Age group years)	Index clients			Partners		
	Male	Female	Total	Male	Female	Total
<15	0	0	0	0	0	0
15-24	1	6	7	2	5	7
25-34	8	29	37	16	27	43
35-44	28	25	53	31	36	67
45-54	22	8	30	27	8	35
55-64	4	1	5	3	1	4
≥ 65	1	0	1	0	0	0
Total	64 (48.1)	69 (51.9)	133	79 (50.6)	77 (49.4)	156
Mean			39±10			37±11

Table 2: HIV status of partners in relation to age group and gender

Age groups (years)	Partner					
	Male		Female		Total	
	Num. Tested	Num. positive for HIV	Num. Tested	Num. positive for HIV	No tested	Num. positive for HIV
<15	0	0	0	0	0	0
15-24	2	0	5	3	7	3
25-34	16	4	27	11	43	15
35-44	31	11	36	16	67	27
45-54	27	10	8	3	35	13
55-64	3	0	1	0	4	0
≥65	0	0	0	0	0	0
TOTAL	**79**	**25* (31.6)**	**77**	**33* (42.9)**	**156**	**58 (37.2)**

*HIV positivity rate in female partners was not significantly higher than in male partners (p=0.2) and there was no significant difference in HIV positivity rate in relation to age group (p=0.5)

Table 3: HIV status of partners of index clients in relation to age group

Age group (years)	No of partners of male index client	No positive for HIV (%)	No of partners of female index client	No positive for HIV (%)	Total no of partners of index client	Total no positive for HIV (%)
<15	0	0	0	0	0	0
15-24	4	3	3	0	7	3
25-34	25	10	18	5	43	15
35-44	36	16	31	11	67	27
45-54	9	3	26	10	35	13
55-64	1	0	3	0	4	0
≥65	0	0	0	0	0	0
Total	**75**	**32* (42.6)**	**81**	**26* (32.1)**	**156**	**58 (37.2)**

*HIV positivity rate among partners of male index client was not significantly higher than the positivity rate among partners of female index client (p=0.2)

CHAPTER FIVE
DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 DISCUSSION

This study examined the outcome of index testing (IT) services in Mamfe Health District among PLHIV clients enrolled in Mamfe District Hospital.

Age distribution among index clients

The mean age of the index clients was 39±10 years; none of them were < 15 years of age. Majority (39.8%) of the clients were in the 35-44 years group, with 78.9% (105/133) being in 25- 49 years, while 15.0% were 50 years and above. This is consistent with the findings in north central Nigeria where no client in the study was <15 years with majority of the clients between 25-49 years (69.5%), while 17.1% were above 50 years of age (22). Similarly, in another study in Ondo state-south west Nigeria, about 0.5% of the index clients were < 15 years of age. Again, majority (34.6%) of the clients were in the 35-44 years group, with 75.4% being in 25- 49 years, and 16.9% above 50 years (21). These findings may be due to higher prevalence of HIV infection among the adult population, and challenges associated with access to IT services among adolescents.

HIV positivity and gender distribution among index clients

The gender distribution of the index clients in this study shows 51.9% females and 48.1% males suggesting female HIV dominance. This characteristic was also observed in studies in south west Nigeria where 60.6% were females and 39.4% males (21). However, the reverse of the findings was observed in north central Nigeria where 60% of the index clients were males and 40% females (22). It may also indicate the health seeking behavior of women in the Mamfe Health District who may be more proactive and willing to access index testing services.

The fact that 51.9% of the HIV positive index clients were females while 50.6% of their partners were males indicates predominantly heterosexual (92.9%) relationship with few homosexual (lesbian) relationships (7.1%). This finding was also observed in studies south west Nigeria where 60.6% of the HIV positive index clients were females while 58.4% of their partners were males suggesting a predominantly heterosexual (96.4%) relationship with few homosexual (lesbian) relationships (3.6%) (21).

Partner notification

All (156) of the partners were notified using the service provider method. This is similar to findings in Nigeria where majority of the referral method was by service provider; 56% provider referral in one (21) and 68.5% in another (22). This underscores the effectiveness of the service provider notification method in increasing uptake of index testing services.

HIV positivity and linkage

The HIV positivity rate for this study was 37.2% and all identified HIV positive partners were linked to ART treatment (100% linkage). The positivity rate is higher than that in one study in south west Nigeria (20%), though the linkage rate is consistent with findings from same studies (21). The linkage rate seems to be better than that reported from a study in Lesotho where 92% of clients were linked to ART (23). In north central Nigeria, the linkage rate was also 92% but there was a higher HIV positivity rate of 51%. This may be due to the higher HIV prevalence in northcentral Nigeria compared to Mamfe Health District.

HIV positivity among partners

In one study, the only factor associated with HIV positivity rate in the partners was gender, with significantly higher rate in female (28.7%) than male partners (13.8%) but there was no association with age group (21). This is inconsistent with our findings as there seemed to be any association of HIV positivity in the partners to neither age nor gender.

Comparing the HIV positivity rate in partners of male index clients who were predominantly females (42.6%) and the HIV positivity rate in partners of female index clients who were mostly but not all males (32.1%), there was no statistical difference in the two. This shows a balance in the infectivity from male to female and vice versa. However, contrasting findings

were observed in studies in south west Nigeria (21) where the HIV positivity rate in partners of male index clients who were all females (26.9%) was significantly higher than the HIV positivity rate in partners of female index clients who were mostly but not all males (15.5%) suggesting that male HIV positive clients are more likely to infect their female partners than female HIV positive clients infect their male partners.

5.2 CONCLUSION AND RECOMMENDATION

This study reports 37.2% HIV positivity yield among partners of clients who accessed HIV index testing services in Mamfe District Hospital with 100% linkage of all identified HIV-positive partners. The positivity rate among the partners of male index clients was not significantly higher than the positivity rate among partners of the female index clients. Due to the high positivity yield among partners of the index clients in this study, index testing proved to be a veritable strategy to increase HIV case detection and linkage to ART. Hence, proper deployment of index testing will be critical to improving case identification leading to better ART coverage and achieving epidemiological control.

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