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Adherence to Current HIV Testing Protocols in the Northwest Region of Cameroon: Facilitators and Barriers

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Abstract

Prior to the release of the current HIV testing recommendation on retesting for verification (RFV), the Cameroon Baptist Convention Health Services (CBCHS) established 0.5% misdiagnosis and inappropriate ART treatment among ART clients in Northwest and Southwest regions. This study aimed at assessing adherence to HIV testing guideline and issues involved. This cross-sectional study was conducted at 27 purposefully selected sites where participants consented and anonymously completed a questionnaire containing questions on their knowledge and practice on RFV, challenges and facilitators. Records of clients who tested HIV positive in 2021 were reviewed to confirm RFV. Data was analysed for frequencies and proportions. A total of 25(93.6%) facilities had the minimum two laboratory staff, most (93.8%) had a minimum training at diploma level and had two or more years of work experience (91.7%). The staff knowledge was averagely 81% accurate on HIV testing algorithm, 79% on RFV and 63% on practice. The main facilitators of RFV were availability of rapid test kits (46%) and trained staff (10%) while bottlenecks were limited test kits (34%) and refusals (28%). Second event testing was performed for 92.5% (1525) of cases, of whom 93.4% was by another tester. Most independent testers knew the results of the first event test before conducting the second event test. Cases of documentation of second event testing without conducted it were reported. Staff were trained and knowledgeable on RFV, but the practice was low. More training and supervision are required for improvement on adherence to protocols for RFV.

Keywords*: ART, Adherence, Misdiagnosis, Retesting for verification, PMTCT.*

Introduction

HIV testing services embodies the full range of services that should be provided and includes counselling (brief pre-test information and post-test counselling); linkage to appropriate HIV prevention, care and treatment services and other clinical and support services; and coordination with laboratory services to support quality assurance. HIV testing services are the critical gateway to accessing HIV-related care and treatment for those diagnosed as HIV positive and as a means to accessing prevention services for those testing HIV negative [1]. Several individual level factors facilitate HIV testing while others are barriers. The desire to be healthy and live longer from knowing one's status inspired by the anticipated support from loved ones, faith in a supreme being, influence and trust in the medical authority, encouraged HIV testing. Men also demonstrated their masculinity by testing, thus portraying themselves as positive role models for other men. Meanwhile, the overwhelming burden of facing both TB and HIV simultaneously, influenced by the fear of disclosure of results, harmful gender norms and

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practices, fear of stigma and discrimination, and misconceptions surrounding HIV/AIDS deterred HIV testing [2]. Other factors that play on the uptake of HIV counselling and testing are concerns about confidentiality and privacy during the counselling sessions due to inadequate and limited space, the absence of specific accredited training curriculum that leads to a formal registration of staff, and some lay counsellors work without training, carrying the burden of work and with majority of them work for many years without remuneration and recognition. Additionally, the high workload in the district hospitals' lab, which leads to long waiting times for HIV test results, thus contributing to failure to return for results [3].

There are a growing number of reports indicating poor quality HIV testing, some of which result in the misdiagnosis of HIV status. Misdiagnosis of HIV status refers to an incorrectly reported outcome of a testing process, i.e., incorrectly identifying someone who is HIV-infected as HIV-uninfected or vice versa [4]. Poor quality HIV testing can result from a number of factors including: not following the national HIV testing algorithm, poor product performance, improper transport or storage of test kits and supplies, Clerical or transcription errors, not following the test kit manufacturer instructions; user errors in performing the test and/or interpreting the test result, lack of tester training, improper use of the testing strategy and/or algorithm, lack of supportive supervision and training, lack of standard operating procedures (SOPs) and no documentation and record-keeping practice [5].

The guidelines for HIV testing continue to evolve with changes in testing technology and strategies to reach persons who can benefit from these services [6]. The 2015 WHO guidelines recommended retesting of all newly diagnosed persons with a second specimen before ART initiation, to rule out potential misdiagnosis [7]. In 2016, Cameroon adapted this guideline and recommend the use of two different rapid test kits in a serial testing algorithm for persons aged 18 months and above for the purpose of diagnosis but the repeat tests which should follow the same algorithm should be with the same sample and by a different technician [8]. In the case of blood transfusion, a parallel testing algorithm using both the first and the second HIV test concomitantly is used.

According to audits in some settings there is substantial level of false-positive diagnoses [9]. Before the 2015 release of the WHO recommendation for retesting for verification, misdiagnosis and inappropriate treatment was reported at various levels in countries across the world. Misdiagnosis has been reported at the 0.3% in studies conducted in South Africa [10], 0.6% in study carried out in Swaziland [11] and 1% in another study carried in Zimbabwe [12]. In 2016, it was established that with the current HIV testing performance at programme level, about 2,395 (0.49%) ANC-1 attendees would be wrongly receiving a positive HIV result, indicating unnecessary enrolment on lifelong ART due to diagnostic errors, while 3,113 (0.38%).

HIV-infected pregnant women would be wrongly declared HIV-negative and thus not enrolled on ART for PMTCT, due to diagnostic errors, which in turn suggest ongoing risks of HIV vertical transmission [13]. According to programmatic data collected from 28 ART treatment sites in the Northwest and Southwest of Cameroon, 0.5% of clients were misdiagnosed and they were inappropriately receiving treatment, with significantly higher proportions (1.8%) at PMTCT sites than at care and treatment sites (0.3%).

In the absence of yearly refresher courses on the HIV counselling and testing processes, primary healthcare facilities in Cameroon adhere poorly to the recommended guidelines. Between 25% and 50% of facilities possess displayed SOPs and national algorithms for HIV testing and less than 10% of them completely adhere to the recommended process for HIV counselling and testing [14]. Even under the current recommendation which involves HIV retesting

for verification, without good level of adherence to standard operating procedures, levels of misdiagnosis may not reduce. This study aims at evaluating the level of adherence to HIV retesting for verification starting with adequacy of staff, their level of formal training, and knowledge on and practice of retesting for verification.

Methods

Study Design

A cross-sectional evaluation design was used. Using a non-probability sampling technique, the assessment of the implementation of retesting for verification, all clients tested positive at all the 27 study sites in 2021 were included in the study. The assessment of knowledge and practice of retesting for verification and its facilitators and bottlenecks targeted all laboratory staff involved in HIV testing at the study sites.

Participants completed a questionnaire which contained questions on their training and years of experience, the type of HIV rapid tests used in their laboratories, HIV testing algorithm, their knowledge and practice of retesting for verification and the challenges and facilitators of retesting for verification which they experience.

The data of all HIV positive cases diagnosed in 2021 was abstracted to a form that was designed and information collected from registers to confirm whether or not they were retested for verification and if so whether the test was done by an independent laboratory staff.

Study Setting

The study was conducted in the Northwest, which is one of the 10 regions of Cameroon. The region has an estimated land area of 17,812 km² and a population of about two million inhabitants that are predominantly Anglophones. The region comprises of 7 divisions: Bui, Boyo, Donga-Mantung, Menchum, Mezam, Momo, and Ngo-Ketunjia and 34 sub-divisions [15]. The capital of the region is Bamenda with an urban population of over 550,000 inhabitants.

The inhabitants in the region comprise both the natives and immigrants from other regions and neighbouring Nigeria with the majority residing in the rural areas. The main economic activities are largely small-scale farming and livestock which together with the public service serve as sources of employment. The region together with the Southwest region is currently in political crisis which is causing a lot of internal displacement as the population looks for safer areas.

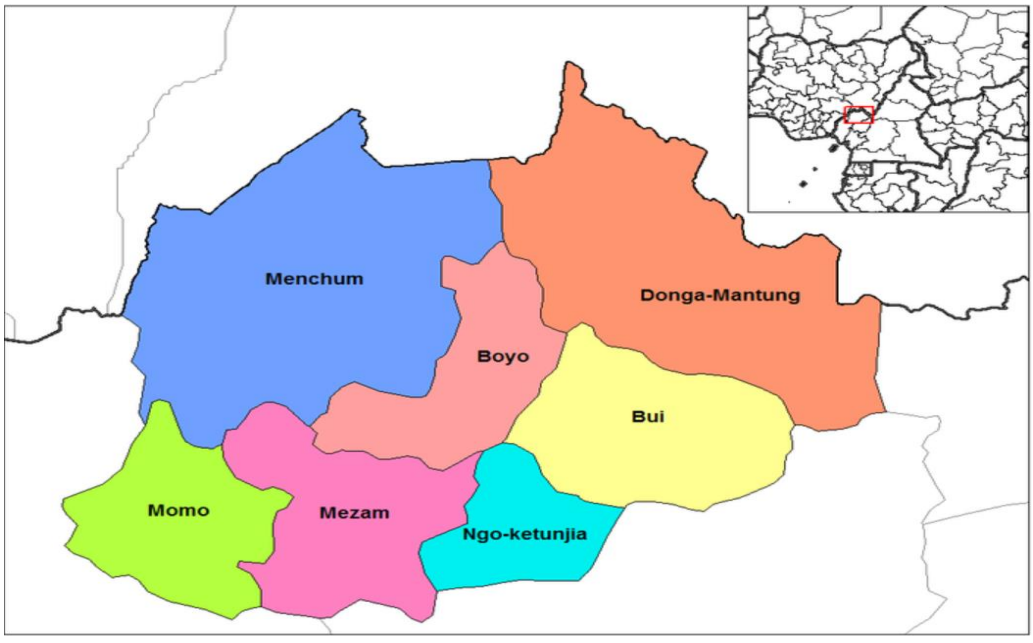

Figure 1. Map of Northwest Region of Cameroon showing the Divisions

The health system of the region is under the leadership of regional delegation of public health that supervise the health districts, and each health district oversees health activities of a number of health areas. The region has 20 health districts with 244 health areas and a total of 420 health facilities which include the public, private, and confessionals [16]. Additionally, there is a large network of traditional health care practitioners. All the facilities carry out HIV testing.

Study Sites

A total of 27 Health facilities were purposively selected for the study including 5 high volume sites (>2000 ART clients), 4 medium volume sites (1000 to 2000 ART clients) and 18 low volume sites (<1000 ART clients).

Data Collection and Analysis

The data sources were the HIV quality assurance register and the questionnaire completed by the laboratory staff. Information on HIV retesting for verification by another laboratory staff for HIV positive cases diagnosed in 2021 was abstracted by trained data collectors to a designed data abstraction sheet. Under the guidance of the trained data collectors, the laboratory staff that consented, completed a questionnaire that was designed to include questions on the training/experience of the laboratory staff, their knowledge and practice of retesting for verification and the challenges and facilitators they encounter during retesting for verification.

The data from the data abstraction sheet and the questionnaires were entered by the data collectors in an excel sheet that was designed, and their frequencies and proportions were analysed in the same software.

Ethical Considerations

The extraction of patient information and completion of questionnaire were both done anonymously. The data entered in the software did not contain any patient identifying information. An administrative authorization was obtained from the Regional Delegation of public health in the Northwest while the study protocol was approved by the Cameroon Baptist Convention Health Board Institutional Review Board (IRB study number: IRB2021- 74).

Results

A total of 25 (93.6%) of the 27 sampled facilities had the minimum required number of two laboratory staff needed for retesting for verification. Most 61(93.8%) of the laboratory staff who consented to the questionnaire had a minimum training for a diploma in laboratory sciences and majority (91.7%) had two or more years of experience in laboratory work. Table 1. Presents the details on capacity of laboratory staff. The average accuracy rate of the staff knowledge on HIV testing algorithm was 81%. Very low levels of knowledge on HIV testing algorithm we observed around the third test. Table 2 below presents the details of the knowledge of laboratory staff on HIV testing algorithm.

Table 1. Staff Capacity for HIV Retesting for Verification

Characteristic/Level	**N**	**%**
Number of facilities by lab staff	**n=27**	**100.0%**
One	2	7.4%
Two or More	25	93.6%
Qualification	**n=65**	**100.0%**
Diploma	34	52.3%
Degree	27	41.5%
Others	4	6.2%

Years of experience	n=65	100.0%
<2	8	12.3%
2-5	25	38.5%
>5	32	49.2%

The average accuracy rate of participants on HIV retesting for verification was 79%, with extremely low levels in some of the processes. Table 3 contains the details on participants' knowledge and practice of retesting for verification. Of the HIV positive clients whose records were reviewed, there was documentation confirming that HIV retesting for verification was done for 92.5% and that 93,4% was done by another laboratory technician. Table 4 below presents the details of confirmation of retesting for verification.

The main facilitators of HIV retesting for verification were the availability of rapid test kits, trained and collaborative staff. Table 5 has the detail of the aforementioned. On the other hand, the implementation of HIV retesting for verification is hindered by limited rapid test kits, refusal, availability of staff on duty, etc. Table 6 presents more details on the bottlenecks.

Table 2. Knowledge on HIV Testing Algorithm

Step of HIV testing algorithm	Accurate	
	N	%
If test 1 is non-reactive, report HIV negative	59	91%
If test 1 is non-reactive, carry out test 2	64	98%
If test 2 is reactive, report HIV positive	56	86%
If test 2 is non-reactive, carry out test 3	41	63%
If test 3 is reactive, report HIV positive	48	74%
If test 3 is non-reactive report HIV negative	46	71%
Average knowledge on HIV test algorithm	**314**	**81%**

Table 3. Knowledge and Practice of Retesting for HIV Verification

Date Element	Knowledge		Practice	
	N	%	N	%
Is done for persons who test HIV positive as in Table 2	60	92%	47	72%
Is a repeat of Table 2 steps	63	97%	46	71%
The same sample of the first event HIV test is used	29	45%	34	52%
The second HIV test is done by another lab tech	59	91%	38	58%
The second lab Tech know the results of the first test before conducting the second test	9	14%	48	74%
If the results of the two technicians agree, conclude that the patient is HIV positive	64	98%	34	52%
If the results of the two technicians are discordant, collect another sample from the patient on the same day, and repeat steps 1 and 2	54	83%	33	51%
If the results of the two technicians are still discordant, refer the patient to a reference health facility	60	92%	38	58%

If test results are inconclusive or invalid or indeterminate, repeat the test 3 to 4 weeks later or refer to a reference laboratory if accessible	64	98%	48	74%
Average Practice of HIV testing for verification	**462**	**79%**	**366**	**63%%**

Table 4. Record Review of Retesting for Verification by Another Laboratory Technician

Data Element	**Second event Test**		**Use of another Lab Tech**	
	N=1658	**%**	**N=1425**	**%**
Confirmed	1525	92%	1424	93%
Not confirmed	133	8.1%	98	6.4%
No information	0	0.0%	3	0.2%

Table 5. Facilitators of HIV Retesting for Verification

Facilitators	**N=65**	**%**
Availability of RTKs /reagents	28	46%
Availability of trained staff	10	17%
Collaboration among staff	9	15%
Proper counselling	8	13%
Easy to use test	2	3%
Others (active referral, job aids, trusted staff, use of same sample)	4	7%

Table 6. Bottlenecks of HIV Retesting for Verification

Bottlenecks	**N=65**	**%**
Limited RTKS	23	34%
Refusal by clients	19	28%
Staff availability on duty	8	12%
insufficient counselling	4	6%
Community testing/many facility testing points	4	6%
Confidentiality	2	3%
Known positive	2	3%
stigma	2	3%

Discussion

Our study revealed that the laboratories of facilities are reasonably staffed (93.6%) with well trained (93.8%) and experience (91.7%) staff. This is a marked improvement from the deficit of 70% and 49% respectively in Laboratory Technicians and Health Technicians of laboratories of Integrated Health Centers and Maternal and Child Health centers, 86% for laboratory engineer in District Hospitals, and 94% for biologists in CHs and Regional Hospitals as was revealed in the 2004 laboratory situational analysis [17].

On average, the laboratory staff were 81% knowledgeable about HIV testing algorithm and 79% of HIV retesting for verification. HIV retesting for verification was done for 92% of all positive cases that were diagnosed and 93% of the second event tests were done by another laboratory technician. This level of knowledge on HIV retesting for verification is slightly lower than the 83% that obtained among trained laboratory technicians in facilities in Douala in the Littoral region of Cameroon [18].

The main facilitators of HIV retesting for verification were the availability of rapid test kits, trained and collaborative staff while key

bottlenecks were limited rapid test kits, refusal and non-availability of staff on duty. These client and health system facilitators and barriers of HIV retesting for verification are consistent with the findings that obtained in a study on the implementation of repeat HIV testing during pregnancy in Kenya [19].

The main limitation of this study is that it depended only on documentation in the quality assurance register to confirm the conduct of HIV retesting for verification and by an independent laboratory staff. The possibility of having good documentation that HIV retesting was done and by another laboratory staff when it was not the case can not completely be ruled out.

Conclusion

Ineffective implementation of HIV of retesting for verification allows for some false-positive HIV diagnosis that result to unnecessary initiation of life-long antiretroviral therapy (ART) and the potential for stigma, discrimination and criminalization. It limits the full offer of interventions to prevent HIV infection and may also harm community and family relationships. If the results are subsequently found to be incorrect it may reduce the credibility of test results and the trust in health services. Additionally. incorrectly initiating ART wastes scarce resources, including stocks of medicines, clinic and staff time, and ART monitoring by viral load and other laboratory tests [20]. When retesting for verification is implemented, the savings in unnecessary ART were $125, $43, and $75 per person initially diagnosed, for LICs, LMICs, and UMICs, respectively [21]. Providing more training to staff, ensuring regular/ adequate supply of HIV rapid test kits, and conducting regular supervision are required for improvement on adherence to protocols for HIV RFV, thus eliminating misdiagnosis and inappropriate ART treatment.

Conflict of Interest

The authors declare no competing interests.

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