

Acceptability And Adherence to the Concept of Home Screening for Sexually Transmitted Infections in Cameroon.

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ABSTRACT

Background: Despite government sensitization, sexually transmitted infections (STIs) remain a major public health issue in Cameroon, leading to severe complications including infertility, ectopic pregnancy, cervical cancer, and death. STIs such as HIV, gonorrhoea, syphilis, and *Chlamydia* are highly prevalent. For instance, HIV affects about 4.5% of the adult population, and studies show alarming rates among specific groups, such as female university students. This study proposes introducing home screening for STIs as an alternative approach to reduce the high prevalence. This method aims to offer a convenient, accessible, and less stigmatizing way for individuals to assess their health, potentially increasing screening rates.

Methods: Prior to implementation, a survey was conducted to gather perceptions from three key groups: (1) policy makers (ministry officials), (2) implementation stakeholders (physicians, pharmacists, laboratory personnel), and (3) the general public. The study sought policy makers' opinions on regulatory provisions, while stakeholders provided insights on structural barriers, their experiences with STI treatment, and concerns. Public participants were surveyed on their likelihood to use home testing.

Statistical Analysis: Data were entered into an Excel database and analyzed using descriptive and inferential statistical methods to interpret the data, ascertain perceptions, uncover patterns, and forecast outcomes.

Results: Policy makers identified the mobile health segment of Cameroon's health system as a suitable framework for home testing, noting it was established to address medical deserts. The majority of implementation stakeholders expressed a favourable opinion, with 7 in favour and 3 against. Among the 70 public participants, most had a university education and were aged 15-35. While 54.28% had previously been screened for an STI, 46.72% had never been tested. A significant majority (58 participants) were in favour of home testing, with only 17.14% opposed.

Conclusion: Given the significant social stigma associated with STIs and the population's reluctance to visit treatment centres, home testing presents a promising solution. The study concludes that leveraging technology for home-based STI screening has the potential to revolutionize healthcare delivery in Cameroon by improving access, efficiency, and the quality of services

KEYWORDS: STIs, home testing, barriers to accessing healthcare stigmatisations, telehealth

INTRUDUCTON

Statistics from the Cameroon 2018 Demographic and Health Survey revealed that nationally, 2.7% of adults aged 15-49 are HIV positive, with a higher prevalence among women (3.4%) than men (1.9%) [1]. For curable STIs like *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum*, and *Trichomonas vaginalis*, the true nationwide epidemiology is unclear. This lack of clarity is primarily due to the asymptomatic nature of these infections, which occurs in approximately 70% of females and 20% of males. However, studies from the South West region of Cameroon have reported a seroprevalence of about 90% for *Chlamydia*

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trachomatis among women of reproductive age in a semi-urban health district, indicating widespread exposure to the infection [2]. In another study in 1994, gonorrhoea and chlamydia prevalence among female sex workers in Cameroon ranged from 10 to 13% [3]. Other prior studies found 34.5% [4] and 21% [5] of female sex workers in Cameroon reported never having had an STI. Data collected using Spectrum software revealed that only 506,443 people across the country were aware of their HIV status [6]. Due to the stigma attached to STIs, many Cameroonians with recognizable symptoms are generally reluctant to visit treatment centres. Equally, people that actually visit treatment centres are reluctant to discuss their sexual activities and histories due to the culture surrounding sexual intercourse. This is especially the case with female sex workers, men who have sex with men, and transgender people [7].

Hesitancy about revealing sexual activity is not limited to Cameroonians. In the US, Emily Scheinfeld examined the relevance of the stigma of STI testing and treatment alongside increased opportunities for uncommitted (casual) sexual intercourse. Her results showed that emerging adults were uncomfortable disclosing their STI status to their parents, friends, and even sexual partners due to the fear of being treated differently [8]. Also, Nayaza et al investigated the reluctance of sub-Saharan Africans in Spain to have their blood tested. Their sample included 1338 sub-Saharan Africans living in Spain between 2006 and 2009. Their results showed that the reluctance may be explained by cultural differences, mistrust towards the healthcare professionals, and lack of information about the health care system [9].

Considering the fact that sub-Saharan Africans (SSA), bear 40% of the global burden of STIs, with approximately 60 million new infections with gonorrhoea, chlamydia, and trichomoniasis annually [10], we think that the conventional screening methods are not always adapted to the socio-cultural context of the populations and individuals without symptoms might assume they do not have the disease, which is not always true, since up to 80% of women and 10% of men are asymptomatic [11]. The only way to reduce the likelihood of an STI epidemic and reduce social stigma is to encourage screening through using the alternative new concept of "Let get tested at the comfort of our home" with the help of eHealth and mHealth.

We believe that health care should not be accompanied by certain constraints that prevent the populations from flourishing, hence the home testing may be designed to allow everyone to make their choice, freely control their actions and have free and affordable access to social services.

The hypothesis we tested is that home testing is a unique service that enhances access to healthcare by providing STI testing solutions to African doors, allowing citizens to keep their medical information and other health information private. Home testing has already proven useful in many other countries around the world. Hence, we sought to assess whether it can be impactful in Cameroon taking into account the socio-economic context and challenges. As part of the implementation of home testing in Cameroon, ascertaining an institutional point of view in a first instance was crucial to determine if the concept aligns with the government's aspirations and official practices. We then proceeded with the collection of opinions and perceptions of the various stakeholders, which included the general population, clinicians (doctors and pharmacists), managers of approved medical laboratories.

SUBJECTS, MATERIALS, AND METHODS

Subjects.

Our subjects for the investigations were the administrative authorities (Ministry of Public Health and Ministry of Scientific Research and Innovation) and implementation stakeholders including physicians and pharmacists who consult patients and administer treatments; managers of medical laboratories who undertake various diagnostics analysis; and members of the general population who will request this type of test.

Materials, And Methods

1) Administrative Authorities

Questionnaires were designed and administered to collect opinions about relevant regulatory provisions which may facilitate the home testing. At the Ministry of Health, the questionnaires were administered to those working at the Division of Operational Research and the Directorate of the Organization of Health Care and Sanitary Technology. At the Ministry of Scientific Research and Innovation, the questionnaires were administered to researchers at the Institute of Medical Research and Studies of Medicinal Plants (IMPM).

2) Implementation Stakeholders and Members of the Public

Questionnaires were designed to gather information about their experiences, opinions, and perceptions. For the populations, we also enquired if they have ever had STIs; whether they have undergone treatment; if there were procedural cost constraints; if they are ready to adhere to the concept of home testing; if yes why and if not why. For implementation stakeholders, it was

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necessary to determine the extent to which they are ready to adopt and implement a home testing approach. About fifteen medical laboratories were contacted and around 70 members of the public interviewed.

Statistical Analysis

The collected data was entered in an Excel database, which offers a range of tools for descriptive statistics and hypothesis testing. Excel's built-in statistical functions enabled us to keep the data structured in rows and columns; sort, filter, and clean the data; and avoid confusion when handling the large sets of responses. Charts below show how we visualized the opinions to make insights clear.

RESULTS

Administrative authorities: Institutional and political context for implementing home testing

From the surveys carried out with officials at the Ministry of Public Health (known by French acronym, MINSANTE) and the Ministry of Scientific Research and Innovation (known by French acronym, MINRESI) the following were expressed by the participants:

Officials at the Department of Health Care Organization and Health Technology of MINSANTE noted that the official health system is divided into 7 components, namely: i) Health centres ii) integrated health centres; iii) health districts; iv) departmental hospitals; v) regional hospitals; vi) general hospitals and vii) mobile health areas. The mobile health areas were created due to accessibility problems in rural areas and sub-urban districts. The mobile health programme allows health professionals to be deploy in the field in order to be able to take care of the populations (mobile vaccination campaigns, mobile screening, population awareness, etc.) and implementation stakeholders believe home testing can very well find its place in the mobile health programme

1. Medical Laboratories

We contacted fifteen medical laboratories and seven responded to the survey. Some declined and others did not return the questionnaires on time. The laboratories that were included in the city of Yaoundé were: The Lac Laboratory (LL) of the administrative quarter, The Sion Laboratory at the Ngousso neighbourhood (SLN), The Medical Analysis Unit (MAU) of the Institute of Medical Research and Studies of Medicinal Plants (IMPM) of the Ministry of Scientific Research and Innovation (MINRESI); The Sion Laboratory at the Melen neighbourhood (SLM); The EATMS Application Laboratory (LA EATMS); The Sainte Bernadette Medical Centre in Ekounou (SBCM), and the Saint Charles Clinical Laboratory (SCLC).

Among the seven laboratories, four expressed an unfavourable opinion about home testing. These were MAU, SCLC, SBCM and LA-EATMS, while among the three laboratories which expressed a favourable opinion, two expressed reservations (SLN and SLM), and only one endorsed the idea of home testing without reservation (Figure 1).

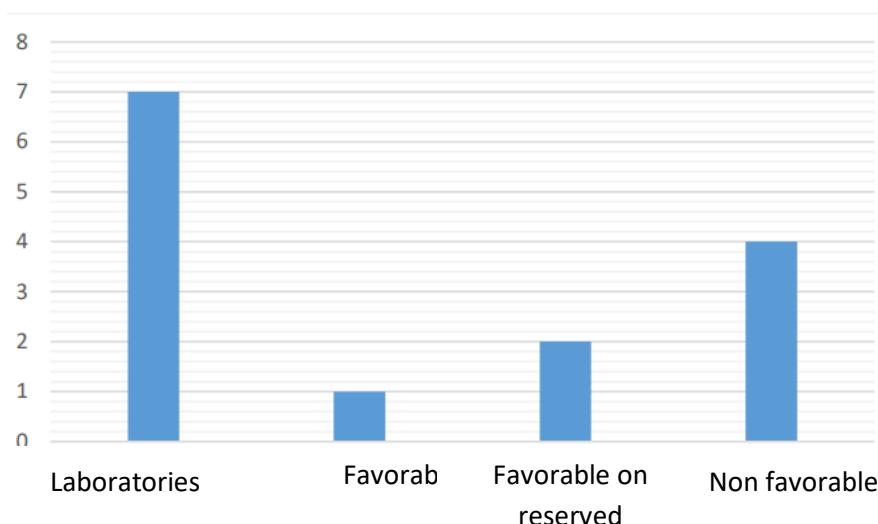


Figure 1: Different opinions of surveyed laboratories

Several problems were identified by managers of the laboratories that expressed an unfavourable opinion about home testing. They noted that, where individuals perform diagnostic or screening tests themselves, results are less likely to be reliable or credible. The fear is that if samples are collected in unsanitary toilets or homes, the likelihood of contamination of the samples is extremely high thereby distorting the results. It is also possible that some dishonest customers may try to fake the samples for purposes unacknowledged. The Saint Charles Clinical Laboratory (SCLC) also warned that most lay people do not have the requisite

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skill and experience for collecting vaginal samples collections. The SCLC also mentioned that laboratory results sometimes require “counselling” to prepare the patients psychologically, something that is not incorporated in the home-testing paradigm. The Medical Analysis Unit (MAU) of the Institute of Medical Research and Studies of Medicinal Plants (IMPM) also warned that samples may deteriorate during transportation or due to the poor education of the populations that would carry out these tests., This may seriously affect the reliability of the samples that are delivered to the laboratory. The Sainte Bernadette Medical Centre in Ekounou (SBCM) was categorical that patients must be physically present in the laboratory for effective sample collection.

Among the laboratories that expressed a favourable opinion, the Sion Laboratory at the Ngousso neighbourhood (SLN) mentioned that home test kits are generally expensive for the average Cameroonian and will necessarily have increase the already high cost of access to healthcare.

Doctors and Pharmacists

Six doctors and four pharmacists returned completed questionnaires. Among them, seven expressed a favourable opinion about home testing while three expressed an unfavourable opinion (Figure 2).

Among those who expressed a favourable respond, some recognized that in the organization of national health system, there are mobile health areas which correspond to the implementation framework of home testing.

Some of them expressed reservations regarding obtaining the endorsement of the Government in order to successfully carry out this type of activity on a large scale. The reservations were also with the fear that the likelihood of contamination of samples is high where individuals perform diagnostic tests at home.

Participants who expressed an unfavourable response stated there was an ethical problem due to the unsuitability of the African environment for such a relatively sophisticated project. They also asked if patients provided unreliable samples, who will be responsible in case there is a false negative or false positive? For example, if a result is not reliable, we would not be able to identify the cause if it the patient collected a bad sample or there was late delivery of the sample or if it was the laboratory that led a botched analysis.

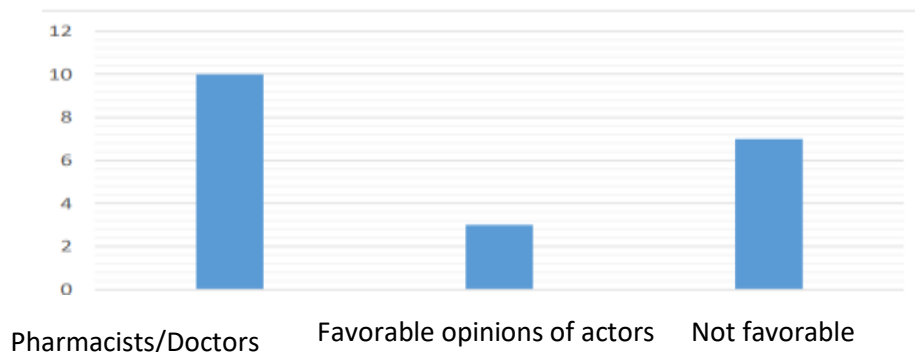


Figure 2: Different opinions of pharmacists/doctors surveyed

2. Members of the Public

4.1. Level of education

From the 70 persons who responded to this questionnaire, the majority (56) attended university, followed by secondary school (11). while only 1 or 2 persons had only primary or elementary education or no schooling at all (Figure 3). This may be explained by the fact that Yaoundé is the second biggest city in Cameroon with high intellectual activity of the populations.

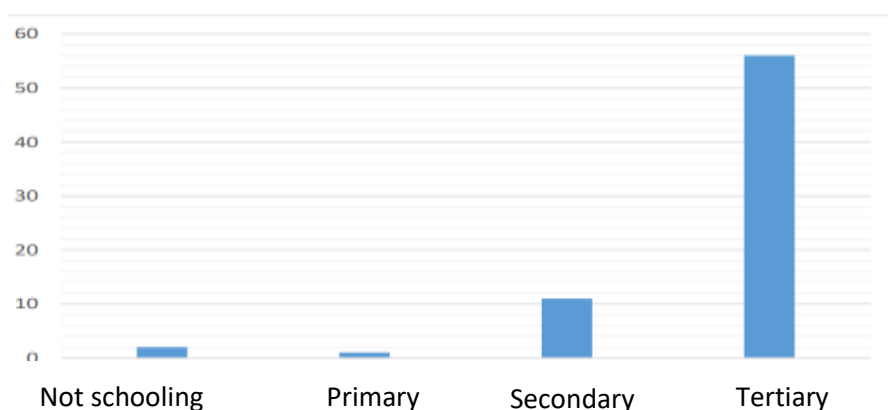


Figure 3: Different levels of education of the population

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4.2. The population surveyed

The population surveyed was relatively young. 38.57% and 45.71% were between 15-25 and 26-35 years old respectively. Only 7.14 % and 8.5% were between 36-45 and 46 and above years old. (Figure 4). A majority of these participants were students or young people with an active sexual life. We also noted among them: teachers, researchers, lawyers, unemployed, housewives, building technicians, and office assistants. This is the proportion of the population that was most sexually active.

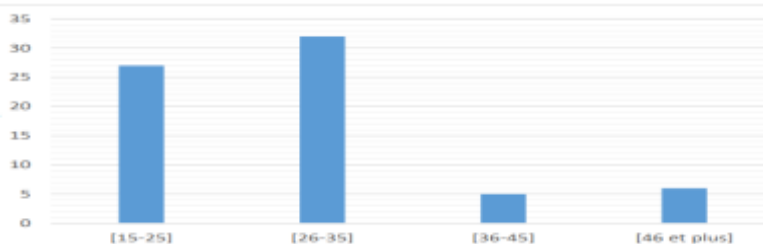


Figure 4: Different age groups of the surveyed population

4.3. Distribution of the population according to gender

As for gender, Figure 5 shows that the number of women who responded (36) was not significantly different from the number of men (34)

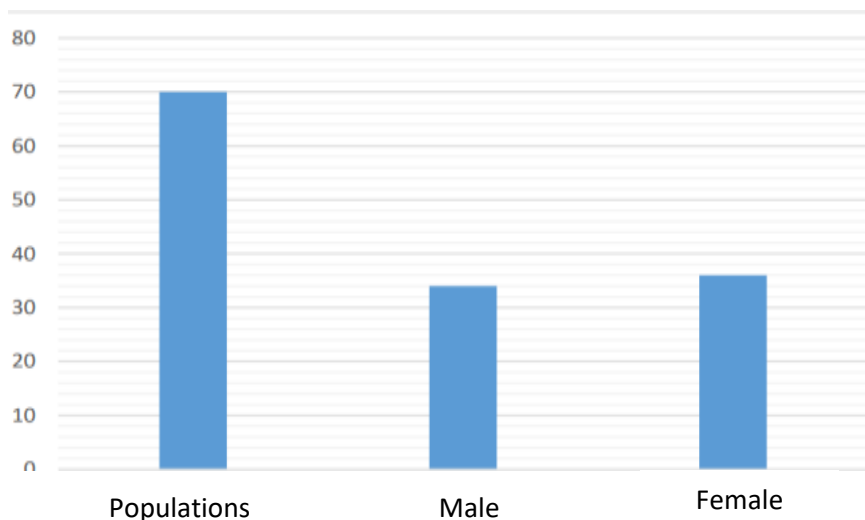


Figure 5: Population distributions according to gender

4.4. Frequency of STI diagnosis

Of the 70 people that responded, 38 (i.e. 54.28%) admitted to having already been screened for STIs, while 32 (46.72%) admitted that they had never taken an STI test. This rate of 46.72% is relatively high and represents almost half of the population. The main reasons given for not doing an STI test was that many people would avoid going to the hospital to be examined for STIs and would resort to self-medication either through traditional therapies or drug hawkers on streets. (Figure 6).

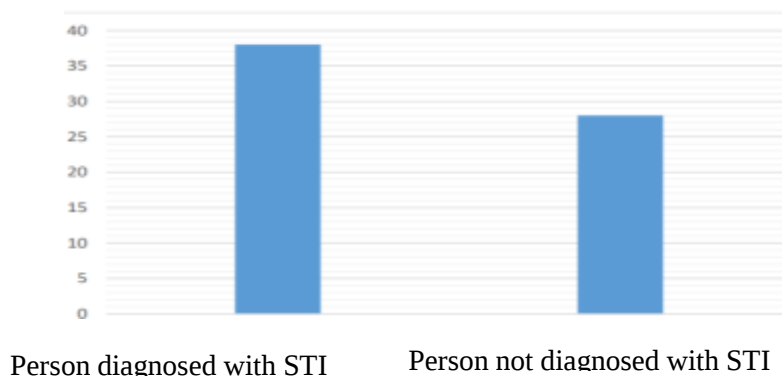


Figure 6: People who have or have not been diagnosed with an STI

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4.5. Types of STIs recognized by populations

Nine (9) types of STIs were recognized by members of the public: HIV/AIDS, syphilis, chlamydia, gonorrhoea, hepatitis, mycoplasma, herpes, candidiasis, and gonorrhoea. The most recognised STI was HIV/AIDS with a percentage of 70% followed by syphilis, chlamydia, gonorrhoea and hepatitis with respective percentages of 42.85; 31.42; 20 and 30%. Other diseases like mycoplasma, herpes, candidiasis and gonorrhoea, were recognised by just 2.85% (Figure 7). In general, these percentages reflect the degree of knowledge of these diseases in the Cameroonian population. Indeed, several campaigns raising awareness particularly on HIV/AIDS, chlamydia, syphilis, gonorrhoea and Hepatitis are regularly organized by the Government and local non-governmental organizations.

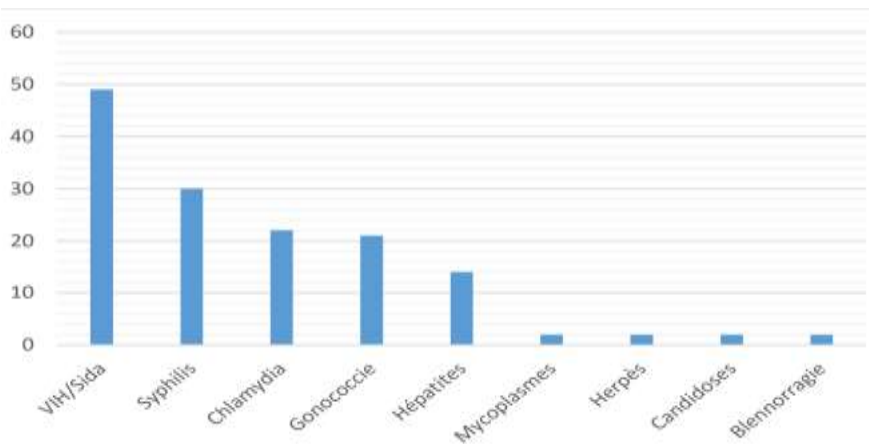


Figure 7: STIs recognized by the population

4.6. Opinions About Home Testing

One of the most anticipated responses focused on the opinions of members of the public about home testing. Of the 70 people interviewed, 58 expressed a favourable opinion while 12 or 17.14% expressed an unfavourable opinion (Figure 8). The reasons given by those who expressed an unfavourable opinion provided reasons that were similar to those provided by managers of laboratories, doctors, and/pharmacists. These include fears about the reliability of the samples. They were also suspicious of kits used to collect samples and whether there was no ulterior motive for collecting the samples of unwitting members of the public.

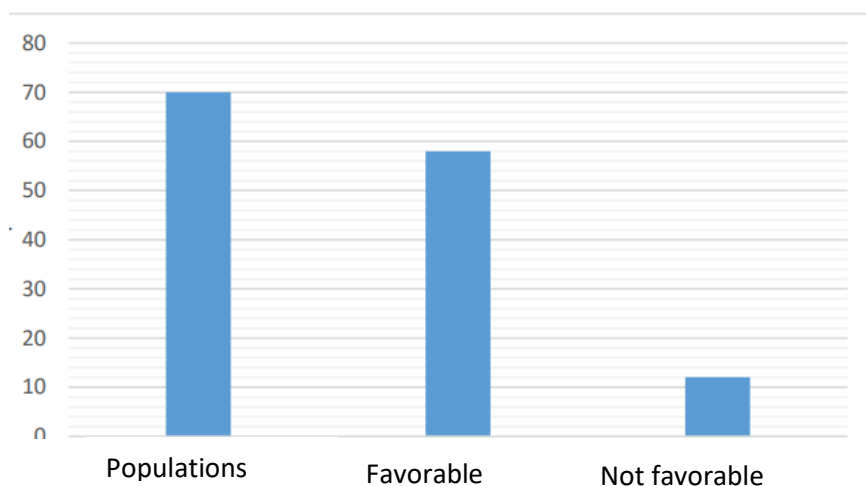


Figure 8: Population rate favourable to the let get tested concept

4.7. Opinions About Individuals Performing Diagnostic Tests at Home

15 people out of the 70 respondents did not think they were capable of performing diagnostic tests at home without the need for a healthcare professional regardless of whether the test kits were accompanied by a detailed manual. This rate of 21.42% of the population is not negligible and can contribute to reducing participation in a home testing project.

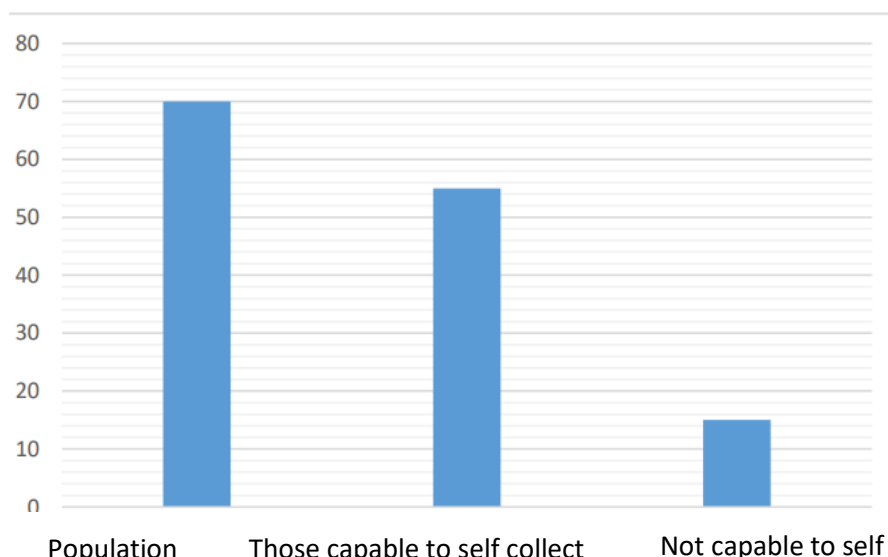


Figure 9: Opinions of the population on their ability to self-collect biological samples

DISCUSSION

The majority of respondents expressed a favourable opinion about home STI screening using digital technologies. Some expressed worries and doubts about home testing in the Cameroon context and in light of their fears and recommendations, we content that a home testing program must be modified as follows ;(1) we decided not to import the STI home kits as initially planned but to partner and work with the local public and private hospitals and laboratories, (2) we also decided to recruit certified technicians who will be tasked with going to people's homes to collect samples and then immediately transport the samples to the laboratories for analysis,(3) we decided to adopt the telehealth paradigm and incorporate online consultations in the home testing programme, whereby participants are able to connect online with a medical doctor ; the consultations will still done from the confort of their homes, hence they will feel free and comfortable while communicating with the medical doctor ,(4) we determined that it as imperative to first obtain ethical clearance from the relevant national ethical comity board as well as authorisation to work with public and private hospitals and conduct tests on the population, (5) we determined that itw as important to ensure that the collected samples were transported according to the norms of transportation of medical samples (6) we determined that itw as important that a vehicle was provided with a security agent to transport the technician to the homes of customers for purposed of sample collection or performance of diagnostic tests (7) we determined that it was important to establish a physical office with a permanent secretary to receive and make calls to customers, reminding them of the time the healthcare professional is to come for their sample collection and/or to give their results.

The home testing concept aligns with the work of some few other similar organizations like:

- Giftedmom**, whose mission is to bring about a world free of maternal and infant deaths using technology [9]. They offer health information and monitor services provided by specialists to pregnant women and nursing mothers [9].
- Waspito**, they connects patients to doctors, laboratories, and pharmacies [10].
- WellCam**, their mission is to connect patients with doctors on demand, bridge barriers to access health, and reduce costs for quality healthcare [11].
- Mondocteur237**, their mission is to facilitate patients' access to care, manage online medical appointments, and find the nearest hospital, laboratory, and pharmacy [12].
- Keafon**: it seeks to use innovative and strategic ways to improve access to healthcare in rural and semi-urban communities [13].
- Pharmafast**: They operated for a few years, but according to their Facebook page, they shut down their services due to some mistakes. However, it seems they are currently being restructured and will be available soon [14]. This app assists patients with locating nearby pharmacies, including pharmacies that have the prescribed medications at a given price, and pharmacies that are open at late hours [14].
- **MedAfrica**, a Kenyan mobile app that works as a mobile clinic for people in rural areas to diagnose and monitor symptoms of their ailment, provide directories of doctors and hospitals and give advice on treatment [15].
- Mama app project**, a mobile and web-based application created by four Ugandan students to improve the uptake, follow-up and reporting of Sexual Reproductive Health (SRH) services. It also has as goal to reduce maternal and prenatal mortality and morbidity [16].

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-The South Africa mobile health strategy document with vision to deliver health related services to its population via information and communication technology (eHealth) [17].

-The Tiba Yako' program which uses mobile technology to break access and awareness barriers to treatments for hypertension and diabetes in Nairobi, Kenya. [18].

The mobile healthcare apps and online doctor consultation services listed above have not been endorsed by the authors of this paper. We have not downloaded or used any of these apps or online doctor consulting services, but we note that their models, which are backed by experiential data, are aligned with the home testing concept.

CONCLUSION

Given the stigma attached to STIs, most people with recognizable symptoms are generally reluctant to visit treatment centres. Equally, people that actually visit treatment centres are reluctant to discuss their sexual activities and histories due to the culture surrounding sexual intercourse. Therefore, the adoption of the home testing concept has the potential to revolutionize healthcare delivery in Cameroon by improving access, efficiency, and quality of services at the doorsteps of the population thereby reducing the stigma attached to STIs. While challenges exist like the limited access to reliable internet connectivity, concerted efforts from various stakeholders can overcome these obstacles and ensure a brighter future for home testing in Cameroon.

LIMITATIONS

The only limitations we encountered was that manager of some medical laboratories were vehemently against the home testing concept and believed it should be illegal.

ACKNOWLEDGMENT

We will like to thank the administrative authorities including the Ministry of Public Health and Ministry of Scientific Research and Innovation for letting us survey their employees and obtaining their opinions about relevant regulatory provisions that could facilitate home testing thank the implementation stakeholders (physicians and pharmacists) for giving us their perceptions on home testing, the health professionals and members of the public that completed the questionnaires.

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CONFLICT OF INTEREST

The authors declare that they have and are not aware of any conflict of interest.

ABBREVIATIONS

STIs	- Sexually Transmitted Infections
PCR	- Polymerase Chain Reaction
CHU	- Centre Hospitalier Universite
IMPM	- Institute of Medical Research and Medicinal plants Studies
MINSANTE	- Ministries of Public Health
MINRESI	- Ministry of Scientific Research and Innovation
LL	- Lac laboratory
SLN	- Sion laboratory
MAU	- Medical Analysis Unit
SLM	- Sion laboratory at the Melen
SCLC	- Saint Charles Clinical laboratory
eHealth	- Electronic Health
mHealth	- Mobile Health
USSD	- Unstructured Supplementary Service Data

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