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HIV self-testing in Iran: first implementation and feasibility study

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Abstract

Introduction: A vast group of people carrying human immunodeficiency virus (HIV) is unaware of their HIV status. HIV self-testing (HIVST) is a key tool to achieve better expanding of testing by helping patients to be identified, but it faces its' challenges, which need to be carefully discussed. We aimed to introduce and debate the best options and strategies required to maximize the benefits of HIVST in Iran.

Material and methods: The authors investigated the above-mentioned question based on a review of 32 articles published between 2007 and 2018 on HIVST. Moreover, focus group discussions (FGDs) and interviews were conducted within 20 people from key populations, with six experts involved.

Results: A road map for actualizing HIVST program can be characterized in three major steps, which include: 1) HIVST training and preparing each component by healthcare team; 2) HIVST-assisted and facility-based programs in selected centers, in the presence of supportive consultant assisting each tested person; 3) public access to HIVST kits through pharmacies, internet, and cyberspace.

Conclusions: It seems that the dangers and detriments of HIVST are extremely constrained in comparison with its' advantages. Overall, it can be considered as a feasible and effective approach in achieving the goal of identifying an increasing number of potential HIV-positive patients and support healthcare system.

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Introduction

Human immunodeficiency virus (HIV) have emerged a few decades ago as a significant threat to human health, inflicting significant adversities to people and economies [1]. Even though it is still a major public health concern, it is not included anymore in the top 10 causes of death worldwide; however, HIV claimed 1.0 million lives in 2016 based on the World Health Organization (WHO) global health estimates [2]. Scientific progress and effective implementation of HIV control programs were able to change the attitude of HIV from a lethal disease to a chronic controllable infection [3]. However, the number of infected individuals mounted up to 37.9 million people worldwide, with 23.3 million having access to antiretroviral treatment, account-

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ing for 62% of the infected population, according to global health survey performed by the WHO in 2018 [4, 5]. Although, due to proper infection management, the incidence of mortality caused by HIV has largely declined in high-income countries, a significant percentage of patients have either not yet been identified or placed within the care system in developing countries [6].

Considering the goals of the United Nations 90-90-90, one of the main problems in controlling this infection is the lack of suitable identification [7]. However, only one third of young generation around the globe is aware about their HIV status [8]. Therefore, about 25% of patients in the world are yet to be identified [9]. Social stigma and insufficient knowledge about this infection could be the main causes of the above-mentioned problem. Several solutions have been suggested by scientific communities, international executive committees, and experts to help promote the rate of identification. One of these methods is HIV self-testing (HIVST). In July 2012, the FDA approved first-ever rapid HIV home test [10]. HIVST is a process, in which a person collects his/her specimen (oral fluid or blood), performs a test, and interprets the result, often in a private setting, either alone or with someone trusted [11].

HIVST can be classified into two groups, including directly assisted HIVST and unassisted HIVST. Directly assisted HIVST indicates an approach, in which trained providers or peers provide an in-person demonstration before or during HIVST on how to perform the test and interpret the result. Unassisted HIVST refers to self-management during HIV self-testing using HIVST kit according to manufacturer-provided instructions [12, 13].

Self-testing is not a new idea, as this way has already been used to detect and track other diseases and medical conditions, including sampling and measuring of blood glucose level or diagnosis of pregnancy.

This method can enhance the autonomy of individuals in conducting an HIV test and enables to access a ready result [14]. Few countries have implemented HIVST in their HIV national plans, and many nations are reviewing their implementation practices [15]. The Islamic Republic of Iran is also among the countries that have considered HIVST as a good pathway to better identify HIV-positive individuals.

Therefore, considering these fundamental factors, the ultimate goal of this study was to provide a road map for HIVST in Iran. We also aimed to assess various aspects of HIVST before public access and the onset of operational phase, taking into account specific cultural, economic, and social conditions of Iran. Determining the target population, initial investigation of possible benefits and risks, evaluating feasibility and effectiveness, and disclosing available resources to raise awareness about HIVST, were the most important aspects to be considered in the current study.

Material and methods

The following brief report was based on a review of 32 articles on HIVST among different groups, explaining common key points of these articles. In general, random sampling is not the best research strategy in qualitative studies, making impossible to achieve goals and collect necessary information, and is exactly different from quantitative research. Therefore, we used a purposive sampling method in this study. We have attempted to conduct the sampling from various groups of people with experiences related to the main subject of the research, or have concerns about different experiences. Heterogeneity of the subjects was provided by using this strategy. Population of interest was investigated by two experts from AIDS control office, an infectious diseases specialist, a physician from a private addiction treatment clinic, a director of positive club, and a psychologist working at voluntary counseling and testing (VCT) center. The views of these six experts were documented in six interviews. Community of key populations was studied, and included six men who have sex with men (MSM), ten injection drug users (IDUs), and four female sex workers (FSW) referring to the voluntary counseling and testing (VCT) center of Imam Khomeini Hospital. Their comments were recorded through three focus group discussions (FGDs), which lasted for 90 minutes on average. These people were selected with the approval of main study committee. Written informed consent was obtained from all participants.

Since this investigation was a qualitative study, twenty key populations and six experts were interviewed. In qualitative studies, participants are recruited gradually until group discussions become saturated. Therefore, in this study, group discussions become saturated with six expert participants. Owing to the diversity of key populations, twenty participants were recruited. Saturated group discussions mean commends and viewpoints of participants become repetitive, and no more points or a new code could be added to the study. At the beginning of FGDs and interviews, the participants were asked to complete a demographic questionnaire. Probe questions were designed for leading the meeting. During the interview, the investigators, with the help of a trained facilitator, verified the accuracy of participants' interpretations in some questions. In addition, the investigators carefully monitored non-verbal communications, such as body language and facial expressions during FGDs and interviews. The participants were asked to clarify their remarks with examples, if necessary. The researchers recorded all the interviews and discussions with prior permission granted, and then, FGDs and interviews were transcribed accordingly. The main criteria for qualitative research are credibility, dependency, conformability, and transferability. To increase the credibility of the study, 20 people were selected as FGDs participants. Data of this study consisted of the participants' viewpoints and their reactions, agreements, and disagreements with other opinions. Data were gathered via interviewers and focused group discussions. Data were obtained through voice recording, written texts from conversations, and a summary of findings. Content analysis was the methodology of this study. After carefully reading of written texts, data gathering and encoding were performed. Essential en-

codes consisted of parts of texts, which contained specific information or conception. Then, essential encodes were combined to form more comprehensive topics, and in each topic's content of statements were determined. In order to minimize dependency and prevent biases, more than one analyst encoded each transcript. In addition, the accuracy of coded statements was evaluated and confirmed by the participants. Conformability was increased by providing a clear description of the research path, with enough time to complete each step, using multiple data sources for a better understanding of participants' statements, discussing controversial data to reach a consensus, and requesting an opinion of other experts. Transferability referred to a degree, of which the results could be generalized to other contexts or settings, and as such, FGDs and interviews were analyzed by the content analysis.

Results

Summary of the interviews and focus group discussions with experts and key populations about HIV self-testing

According to MSM's opinion, one of the acceptable reasons for HIVST is that this test will resolve concerns about the disclosure of illness and lack of confidentiality. Therefore, people are encouraged to do the test, especially if they are provided with free access to kits. Gained awareness is fundamental for preventing disease transmission.

"One of the benefits of this test is that, if a person gives a chance for the disease, he or she will be evaluated sooner, and will not postpone doing the test due to the fear of people's reaction".

It is necessary to organize cultural creation and proper social conditions in this field. As everyone may be affected by the disease unwittingly, HIVST should be recommended to anyone, though there is more need for information in some groups, like MSM.

"I think that all people should do this test, not considering a particular group. Everyone may be at risk of this infection".

This need in men's population is much higher than in females. The participants reported that after exclusively performing the test, in the first step, they informed their sex partners and suggested to do it also. Trainers should be literate and trustworthy people, such as physicians or consultants working in specialized clinics related to the topic. The prominent role of the Internet and cyberspace can be a potential opportunity as a distance education tool, and can further encourage people to conduct the test. Social networks and websites can use extensive media features to play a very effective role in educating, with easy access to information on how to conduct the test [16].

"Now, with the virtual world, it is taught with a click. Advertising and visual training are much more impressive".

People can go to pharmacies, health centers, and clinics to obtain test kits. Test result will be safer and more accurate using fingertip blood sample. Even though the result of this test is based on self-report technique, the presence of a knowledgeable expert helps to process better the test. Useful information required for connecting people to treatment can be achieved through brochures, or psychologist and director of the clinic.

Most people, who have had a history of injecting drug use, agreed that it is necessary to receive face-to-face training and advice on how to perform the test and actions required after receiving the result. They think that consulting a professional is necessary in this field, as information in the brochure may not be read or noticed. According to some participants, performing this test by themselves can be accompanied by disastrous consequences if not informed with proper notification and advice before testing. Several participants believed that it is possible to use the experience of volunteers and infected people to build motivations to encourage people to assess, attend follow-up treatment, and continue to communicate with VCT centers. Ultimate goal or referral of patients to receive and adhere to treatment will not be possible if the informed and easy access is not available to individuals. Most participants tended to receive the kits in places where informed counseling was available.

"It is better to provide health centers, for example, if I want to do the test myself, I may not refer if the test is positive. Maybe I will do everything that I like to do, such as unprotected sexual contact, infect too many others, but health centers are better, people can be treated there; they have psychologists and psychiatrists, they help a lot".

The implementation of this item was not feasible in pharmacies and was rejected. Many agreed on the fact to offer these kits periodically in public places with a significant population, with the presence of well-informed advisor for providing useful information. In this way, people with anonymous identity receive necessary information about the kit and test at one place, such as a shelter or a tent.

"For the football, a few days ago, a van was going to do HIV testing as free of charge, I do not know if this plan was done or not, but it is very good! Previously, they were mobile cars, they were good!".

All participants believed that free testing could be a motivator for voluntary participation, especially for at-risk groups, such as IDUs, according to conditions of people in our country. At the beginning, it is best to provide these tests in prisons, drug addiction camps, and triangular clinics, and then, in the next step, for their sexual partners.

"Students, people aged 30 to 40 years, drop-in centers (DICs), shelters, camps, methadone therapy clinics, triangular clinics (...) they are very large in size in the community (...)".

Many participants believed that, at first, their partner should not be aware of the test. But if the test result is positive, counselors at VCT centers should help him to inform sex partner and encourage to take the test also.

FSWs stated that they are willing to do HIV self-testing for maintaining health, staying away from social harm, not transmitting the disease to others, and to identify and ensure health of their partners. In general, there is not a good social

attitude towards HIV-positive people, and they are among rejected communities in Iran.

"If people understand that we or anyone have this disease, they will not let us attend their gatherings and they will deal badly with us, like a giant, will look at the disease (…)".

Marriage brings about the benefit of HIVST in testing of a sexual partner, which is a necessary task and it is better to do this test by skilled people.

"Have a group to educate how it should be done by ourselves; an educated person is much better (…). Trained people".

These people are trained and experienced in places, such as DICs, small health centers in villages, clinics, and dormitories. Kits in places, like pharmacies, mobile clinics, DICs, and dormitories should be available and provided for free, so everyone can use it.

"These kits would be better available at mobile clinics, pharmacy of doctors without borders, Internet, dormitories, and pharmacies as free, and if people pay for it, it will prevent this test".

HIVST is preferred to be performed before sexual contact and under the supervision of trained experts.

According to experts' ideas, earlier notification of the disease status and providing increased access to testing are the advantages of using self-testing. Probability of non-linkage to VCT centers occurs after being positive, especially in the absence of an appropriate strategy to connect to VCT centers. Certain key populations have the priority in self-testing.

"For example, a section could be for sexual partners of key populations (…)".

The Ministry of Health, educators (peers or counselors), media, associations of people at risk, training at communities of people at risk, and telephone lines are the top people and places to advertise the necessity for HIVST. It is best to perform testing at the beginning of attending healthcare centers, including VCT centers, DICs, methadone treatment centers, addiction camps, health centers, pharmacies, therapeutic clinics, women's clinics, hospitals, and barracks. It would be best to have the kits for testing free of charge for key populations, whereas 50,000 IRR would be a suitable price for the test if not for free.

"With a price of about 50,000 IRR (such as the price of a pregnancy kit) (…)".

It would be better to perform the test with the assistance of a health worker or peer, or a trained person.

"That is precisely why we should be assisted in our society now, because awareness of this infection is low, and as awareness increases, it is possible to use non-assisted option (…). Peers can be very helpful and even more accessible (…)".

Performing self-testing could be better if done using saliva, but many people may trust the result of a blood test much more. There are many ways to provide self-testing information to people, such as VCT centers, video clips, and animation, brochure and pamphlets, training classes, audio and video media, newspapers, and lectures by healthcare staff in schools and universities. Promoting high level of culture and knowledge on HIV within community members, and availability of contact numbers in VCT centers and brochures on self-testing, are substantial strategies for linkage to care and treatment centers.

"I think that for those who are reactive, perhaps the most important thing now is that you give the basic information in the brochure, clip, etc. (…) you have to explain that this is the initial diagnosis, if you are positive, and for a definitive diagnosis, you should do the confirmatory tests in VCT centers (…)".

Test target population

Ultimately, HIVST must be available to all those who are willing to be tested [17], but some sensitive and exposed groups of population can be prioritized. This includes people with high-risk sexual behavior, IDUs, prisoners, residents in camps, homeless people, pregnant women, healthcare providers, and sex partners of the above-mentioned groups [18].

Benefits and risks

The benefits of HIVST should be clarified, especially for high-risk groups, in order to encourage its utilization. On the other hand, there are some dangers and detriments for HIVST, which are restricted in comparison to its' benefits [19]. Benefits and risk of HIVST are presented in Table 1.

Table 1. Benefits and risks of HIV self-testing (HIVST)

Benefits of HIVST	Risks of HIVST
Immediate knowledge of individuals about their disease status [20]	Failure to record test results properly in healthcare centers
Reducing anxiety and refraining from conducting an HIV test	Absence of a proper linkage strategy, so people will not be visited if the test is positive [21]
Secondary prevention and reducing the incidence of new cases [21]	Inappropriate use without an indication in the absence of adequate education
Increasing access that encourages further testing [22]	Suicide attempting, beatings, and slander as improper and dangerous behaviors when tested positive [20]
Helping to accelerate the achievement of the 90-90-90 target of UNAIDS in 2020	Depriving people who present high-risk behaviors, but evaluated negative from getting advice on risk reduction due to lack of referral

Discussion

Feasibility and effectiveness

HIVST in Iran has a good operational capability through a coherent program with participation and coordination of responsible organizations, health providing services, and people involved. In the trajectory of implementation of this program, some facilitatory tips may be considered. Training should be comprehensive and adequate, concerning HIVST and HIV infection itself. All capacity of human resources should be included, such as healthcare providers, volunteers, and most importantly, peers. Due to poor economic status and importance of high-risk populations, a free kit should be considered to facilitate and increase testing and case detection. But for other groups, it may be possible to consider a maximum cost of a kit of 50,000 IRR. Last but not least, program implementation should be permanently monitored.

Undoubtedly, this program can play a very effective role in identifying new cases and their treatment, and also provide a secondary prevention of the disease, considering the benefits of its aid to discover new HIV-positive cases and referring them to counseling centers for further management. In other words, the program should likely be cost-effective.

Monitoring and evaluation (M&E)

Monitoring of the correct implementation of this program should be continuous from the beginning to its full implementation in the country and even afterwards. All organizations involved in the Fourth National HIV Control should cooperate, following a specific surveillance program and procedures. The main indicators to be considered in monitoring are:

- number of distributed kits;
- quality of kits used to reduce false positive and negative cases;
- increasing amount of tests conducted in general as well as in terms of key and high-risk populations;
- review of the results of tests performed;
- number of identified patients after initial positive results;
- number of tested patients connected to counseling centers for diagnosis confirmation, and receiving care and treatment.

Advantages and disadvantages

As it is true with other tests, HIVST has several advantages favoring its use, whilst disadvantages may reduce its' overall effectiveness. We should try to seize the opportunity to exploit the advantages and resolve the disadvantages, as much as possible [14]. Table 2 highlights some of the most important examples of advantages and disadvantages of HIVST.

Strategies

Strategies used in the program:

1. Training on two main axes should include all aspects related to HIV infection and HIVST. The Ministry of Health (MOH) provides the necessary content as the most important instructor in this area. Additionally, all relevant organizations should participate in education. Issues to be considered in this section include training of professional counselors and mass media using. Also, the involvement of community-related associations, explanations, and identification of the most important educational content titles, play significant roles in increasing technical and general information of individuals. The most important titles to be clarified at least should be HIV/AIDS and HIVST.

2. Preparation and distribution of test kits.

3. Continuous monitoring and evaluation to manage problematic issues and upgrading the program.

4. Promoting community culture relevant to HIV in order to reduce stigma and discrimination as well as raising the level of knowledge of the society and people about the facts related to HIV, such as existence of effective treatment and importance of early detection.

Table 2. Advantages and disadvantages of HIV self-testing (HIVST)

Advantages of HIV self-testing	Disadvantages of HIV self-testing
Confidentiality, convenience [11], and satisfaction [23]	Longer window period than lab-based screening tests [18]
Cost-effectiveness	Potential false-negative and false-positive test results, fallacious reassurance if during acute infection period [14, 18]
Highly accurate [12, 18, 23], acceptable, and trustworthy [18, 21]	Limitation of accessibility and price [18, 24]
Empowers users and decreases stigma [18]	Inadequate required consultations, probability of delaying seeking care [14, 18]
Time-saving	Failing to seize opportunity of STI screening [18]
Easy to use and interpret [14, 25]	Risk of compulsion [18, 20]
Privacy, anonymity, and safety [18, 23]	Not well-labeled, absence of cohesion in test components
Accessibility [18, 26-33]	Possibility of wrong test execution [14]
	Fears, anxiety, depression, and social stigma

Table 3. Steps of HIV self-testing (HIVST) program implementation

Step 1. Educating about HIVST and preparing each component	Step 2. HIVST-assisted and facility-based programs	Step 3. Public access to HIVST
Trusted, knowledgeable educators for training executive workforce	Implemented in specific centers	HIVST kits available in public places
Holding community mindfulness raising projects	Presence of a consultant along with the tested person	No need for the presence of a consultant
Involvement of affiliations related to key and high-risk populations		

Recommendations

The road map for actualizing the HIVST program can be characterized in the following advances (Table 3):

Step 1. Educating about HIVST and preparing each component

As the first stage, the person should be managed in light of information disclosed in the strategy section. Trusted, knowledgeable educators, including infectious disease specialists, AIDS therapists, and specialized counselors, such as psychologists identified by the AIDS Control Office, will be responsible for the training of executive workforce in a specific program. In the meantime, community mindfulness raising projects related to this disease ought to be strengthened. Affiliations associated with key and high-risk populations should be involved with the program.

Step 2. HIVST-assisted and facility-based programs

This step should be implemented in selected centers mentioned earlier. In this step, a consultant should be present alongside the person to ensure the success of implementation and correct advancement of the program. This trained counselor can be a healthcare worker, lay counselor, equal person, or even volunteer from the general population taking into account diversity that exists in the above-mentioned centers.

Step 3. Public access to HIVST

In this final stage, in addition to testing in the specific centers, HIVST kits should be available through places and platforms with high public accessibility of which, pharmacies, Internet, and cyberspace would be suitable candidates. At this stage, the consultant will not necessarily be with the person.

In all of the above steps for monitoring and controlling are ought to be conducted by the AIDS Control Office, affiliated with CDC, with coordination of the organizations responsible for implementation of the National AIDS Control Program.

Regarding HIVST kits, complementary recommendations can improve the outcomes. It is recommended that both salivary and blood kits are available, with salivary kit as a priority, if there is only one possibility for kit provision. The test kits should be valid and properly identified and administered by MOH. Brochures, and if possible, audio and video clips containing all necessary information should be included in the package in a comprehensible manner. Information should contain the way the test should be performed, how to deal with positive and negative responses as well as contact information of VCT centers. The existence of a special consultant telephone line can also be helpful. The poor economic status of high-risk populations and maximum price suggestion of about 50,000 IRR for other groups, as discussed earlier, should be taken into account.

Conclusions

By reviewing the opinion of other articles and interviewing certain groups, we concluded that HIVST usage represent many benefits, with substantially limited disadvantages. This allows us to act through careful strategies, which would lead to even more beneficiary outcomes of our community, especially in high-risk populations. Overall, HIVST can be considered as a feasible and effective approach in achieving the goal of identifying an increasing number of patients who might be suffering from HIV, and assist health-care system. Ultimately, we encourage other researchers to offer their road map based on the needs and status of their own country and culture.

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Conflict of interest

The authors declare no conflict of interest.

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