

## ORIGINAL ARTICLE

# Knowledge, attitudes, and practices of healthcare workers regarding human immunodeficiency virus index testing in 2021, Burkina Faso

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**Abstract.** Although knowing one's HIV status is a necessary step in initiating antiretroviral treatment, more than a quarter of Burkinabe who are HIV-positive do not know their status. To reach the target of screening at least 95% of people living with HIV (PLHIV), the country has opted for HIV index testing (screening of sexual partners, children and partners of intravenous drug users). This study assessed the knowledge, attitudes and practices of health workers on HIV index testing. A cross-sectional study was conducted among health workers on index testing pilot sites in Burkina Faso. We constructed scores of health workers' knowledge, attitudes and practices regarding HIV index testing. A total of 132 health workers were surveyed, 62.8% of whom were female. Regarding profiles, 44.7% of the participants were nurses and 5.3% were midwives; physicians and psychosocial counselors accounted for 16.7 and 33.3%, respectively. Most of the participants worked in public health centers (60.6%). Overall, the majority of the participants had poor or average knowledge (85.6%) of the index testing strategy and harmful or inadequate practices (87.1%). Less than half (40.9%) had favorable attitudes toward the strategy. Our study showed that the knowledge of health

workers was generally average, their attitudes were not very favorable and their practices were mostly inadequate with regard to HIV index testing. In order to increase the chances of reaching the first 95% of UNAIDS, trainings on the topic must be designed for health workers.

## Introduction

The infection by Human Immunodeficiency Virus (HIV) remains a major public health concern. In fact, the number of people living with HIV (PLHIV) was estimated at 38.4 million in 2021, of whom about 5.9 million did not know their status (1). HIV screening is the first step in accessing the disease treatment, therefore crucial. In 2014, the UNAIDS set a worldwide goal of 90-90-90 : 90% of PLHIV know their serological status, 90% of these have started a antiretroviral therapy (ART), 90% of those under ART are virally suppressed in 2020 (2). Remarkable progress has been made in order to reach these goals, knowing that HIV screening and treatment are now available to many more people (3). However the performance on the first 90 remained below the target, reaching 84% worldwide (3). This poor performance in reaching the first 90 can compromise the capacity of reaching the second and the third 90. Besides, the late diagnosis of HIV has disastrous consequences, since it causes a delay in starting ART, leads to higher morbidity and mortality (4,5), and increases the risk of HIV transmission (6,7). Despite the fact that many countries were hardly reaching the first 90, the UNAIDS increased its ambitions and assigned to each country the obligation of targeting the goal of 95-95-95 in order to speed up the elimination of HIV/AIDS by 2030 (8). Therefore, it is indispensable to find new approaches to speeding up HIV screening.

A meta-analysis on data published between 2007 and 2018 concerning technics of speeding up the achievement of

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UNAIDS' goal of 90-90-90 highlighted several approaches to accelerating the completion of the first 90%. A common strategy is the employment of community-based workers, non-professional workers or peers were employed in order to realize screenings at home, sensitize and orient target groups to health centers for screening. In some cases, couple-based HIV screening and counseling are preferred to individual ones. Sometimes, combined interventions were used. For example, there was screening combined to door-to-door visit, screening and advices on HIV during prenatal visits, group education, the use of mobile trucks in rural zones where populations do not have access to healthcare centers. Other approaches were also used such as those based on networks to boost the screening of people at risk, communication campaign seeking a change in behavior including messages on screening via several means (9). Recently, approaches such as index testing (screening sexual partners, partners of intravenous drug users and children of seropositive people), and self-diagnosis allowed to reach people with higher risk of contracting HIV as well as men and people less inclined to use health care or community based centers (10).

Although the knowledge of one's seropositivity is a necessary step in the process of initiating ART against HIV, more than a quarter of seropositive Burkinabe do not know their HIV status. In 2020, 73% of PLHIV knew their serological status, a 17% gap compared to the 90% target (11). Given this poor performance, the country will not be able to reach the new target of 95% unless adequate actions are taken. The index testing is a valuable approach that allows the identification of seropositive people who are ignorant of their HIV status (12-14). Nevertheless, there is a lack of data on how healthcare workers do appropriate the strategy since its introduction in 2019 in Burkina Faso through pilot health centers.

This study assessed the knowledge, attitudes, and practices of healthcare workers on HIV index testing in Burkina Faso two years after the onset of the approach. The results of the study could point out the needs for training healthcare workers and contribute to elaborating a new strategy to expand index testing to every health centers in Burkina Faso.

## Material and methods

*Type and period of study.* We conducted a cross-sectional descriptive study on knowledge, attitudes, and practices of healthcare workers regarding index testing. This study was conducted between July 15th 2021 and March 15th 2022 in Burkina Faso.

*Study sites.* The study was conducted on treatment centers for PLHIV. Overall, the country had 125 treatment centers for management of PLHIV. The survey was conducted on treatment centers that implemented the pilot phase of differentiated approaches to care services to PLHIV. The characteristics of pilot sites included local epidemiologic features (area of high prevalence rate of HIV compared to national average that was 0.7% in 2018), the important number of PLHIV under ART, the availability of laboratory, the care and follow up of PLHIV belonging to a specific group (men who have sex with men, sex workers, persons living with handicap, displaced populations) and the accessibility of the center for supervision and

data collection. Overall, 31 of the 125 treatment centers for PLHIV were selected for the pilot phase of differentiated approaches including HIV index testing. The pilot sites were managing about 60% of PLHIV countrywide and included 18 public health centers, 10 non-profit health centers, and 3 religious based health centers. Before the project start, 181 health professionals assigned to the 31 centers (pilot sites) were trained on various approaches including index testing. During the period of implementation, the sites received supervision teams every three months. The training and supervision of health workers were performed by agents of the sectorial program responding to AIDS and sexually transmitted infections within the Ministry of Health.

*Study population.* The study population was the healthcare workers in the 31 treatment centers identified as pilot sites for the implementation of index testing in Burkina Faso. Workers who were on site during the days of survey were enrolled in the study. Those who were doing their internship were excluded from the study.

*Study variable.* Table I shows the variables that were collected in the process of the study. There were 5 socio-demographic variables, 9 variables regarding knowledge, 9 variables reflecting on attitudes, and 5 variables linked to the practices of health workers regarding the index testing.

*Data collection.* Individual interview was the technique used for data collection. The tool for data collection was a questionnaire made available on tablets using the software KoboCollect© and administered to health workers. Interviewers surveyors were trained to the use of KoboCollect©.

*Data treatment and analysis.* Two levels of treatment were applied to our data. At the first level, control parameters were defined on the tablets in order to minimize errors and improve data quality. At the second level, data were downloaded and exported on Excel sheets for complementary treatment before being analyzed. The collected data were analyzed using the Excel software in its version 2016. The analysis consisted in a description of quantitative variable in terms of means and standard deviations; the qualitative variables were expressed in terms of numbers and percentages.

We considered nine questions on knowledge in order to assess the global level of knowledge. Each question received a grade « 1 » for good answer and « 0 » for wrong answer. The global grade on knowledge was the sum of grades from all nine questions. Therefore, the score range went from 0 to 9. The global knowledge was categorized 'Poor' for knowledge scores below 50% of right answers, 'Average' for scores between 50 and 80%, and 'Good' for scores above 80%.

In order to globally assess attitude, we took into account all nine questions on attitude. We gave 1 point for right attitude and 0 for wrong attitude toward a given statement. Afterward a score for attitude was generated by adding the points from the 9 responses to questions on attitude. The global attitude was judged 'undesirable' for attitude scores below 50% of expected answers, 'Wishful' for scores between 50 and 80%, and 'Favorable' for scores above 80%.

Table I. Variables of the study.

Variables
Sociodemographic variables
<ol style="list-style-type: none"> <li>1. Type of health center</li> <li>2. Age (years)</li> <li>3. Level of instruction of the healthcare worker</li> <li>4. Marital status of the healthcare worker</li> <li>5. Qualification of the healthcare worker</li> </ol>
Variables linked to knowledge
<ol style="list-style-type: none"> <li>1. Have you ever heard of index testing?</li> <li>2. Have you ever been trained on index testing?</li> <li>3. The index testing is suggested to those who tested positive for HIV</li> <li>4. What does it mean to undergo index testing?</li> <li>5. What is the number of steps in the process of index testing?</li> <li>6. One of the steps in index testing is the assessment of domestic violence in a couple</li> <li>7. What is the 5th step in the process of index testing?</li> <li>8. It is possible to give information to a sexual partner of a client on the risk of infection without the client's consent</li> <li>9. What are the different methods of notification of the partner during index testing?</li> </ol>
Variables linked to attitudes
<ol style="list-style-type: none"> <li>1. Do you think that the index testing is effective in improving the number of people screened for HIV?</li> <li>2. Do you think that all contacts should be tested?</li> <li>3. Do you think that index testing could allow early diagnosis of HIV?</li> <li>4. Do you think that index testing could increase the risk of violence?</li> <li>5. Do you think that index testing could reduce HIV transmission in serodiscordant couples?</li> <li>6. Do you think that index testing could increase the risk of refusing HIV testing?</li> <li>7. Do you think that index testing does violate confidentiality?</li> <li>8. Do you think that index testing implies an obligation to disclose one's serological status?</li> <li>9. Do you think that HIV index testing is difficult to realize?</li> </ol>
Variables linked to practices
<ol style="list-style-type: none"> <li>1. Have you ever screened a person who tested positive for HIV?</li> <li>2. Do you explain the principle of index testing to your client during pre-test?</li> <li>3. Do you set appointment with contact cases when the client does test positive for HIV?</li> <li>4. Do you evaluate the risk of violence before contacting contact cases?</li> <li>5. Do you require the consent of the client before searching for HIV contact cases?</li> </ol>

In order to globally assess practices, we gave points to each of the 5 questions on practices, namely « 1 » point for good practice and « 0 » for bad practice. Then, the global score on practices from the addition of all different questions on practices was the sum of points. The global practices were damageable when the score was below 60%, inadequate when the score was between 50 and 80%, and adequate when the score on practices was above 80%.

*Ethical aspects.* The research protocol obtained the ethical clearance from the ethics comity for research in health (CERS N°2021-11-262). During the survey, each participant gave an

informed consent prior to inclusion. The exchanges with participants were confidential and anonymous. The participants did not receive any financial compensation for participating in the study.

## Results

*Sociodemographic characteristics of study participants.* In this study, 132 health workers out of 182 were enrolled from 30 pilot treatment centers. The average age of participants was 41.6 years with a standard deviation of 9.0 years and 67.4% (89/132) were living as couple. Health workers with an education level of master and doctorate degrees represent 15.1%

Table II. Sociodemographic characteristics of study participants (N=132).

Variables	n	%
<b>Sex</b>		
Female	83	62.8
Male	49	37.2
<b>Age (years)</b>		
≤35	42	31.8
[36-45]	37	28.0
≥46	53	40.2
<b>Level of education</b>		
At most the certificate of primary education	3	2.3
At most the baccalaureate	88	66.7
At most a master's degree	20	15.1
Doctorate degree	21	15.9
<b>Marital status</b>		
Single	43	32.6
As a couple	89	67.4
<b>Qualification</b>		
Psychosocial Counsellor	44	33.3
Nurse	59	44.7
General practitioner	22	16.7
Midwife	7	5.3
<b>Type of treatment center</b>		
Private	52	39.4
Public	80	60.6

\*Standard deviation.

(20/132) and 15.9% (21/132) of the participants, respectively. The majority of the participants worked in public health centers (60.6%; 80/132) (Table II).

*Knowledge of healthcare workers on index testing.* Ninety six point two percent of healthcare workers (96.2%; 127/132) reported having ever heard of index testing and 35.6% (47/132) asserted that they had never received a training on index testing. We noticed that 87.1% (115/132) of healthcare workers did not know that index testing should be suggested to people who tested positive to HIV and 21.2% (28/132) of them declared that index testing was only used for people who belonged to a key population. (Table III). Overall, the knowledge on index testing was poor or average in 85.6% for healthcare workers (Fig. 1, Panel A).

*Attitudes of healthcare workers toward index testing.* Ninety seven percent of healthcare workers (97.0%; 128/132) thought that all contacts cases should be tested and 59.1% (78/132) believed that index testing could increase the risk of violence within couples (Table IV). The healthcare workers had favorable attitudes toward index testing in 40.9% (54/132) of cases (Fig. 1, Panel B).

*Practices of healthcare workers regarding index testing.* Seventy two percent of healthcare workers (72.0%; 95/132)

alerted all contact when the serology of the index client was positive (Table V). The practices of healthcare workers were inadequate in 82.6% (109/132) of cases (Fig. 1, Panel C).

**Discussion**

In an assessment of pilot sites for HIV index testing in Burkina Faso, the knowledge, the attitudes, and the practices of healthcare workers were evaluated. First, the study revealed that the knowledge on index testing was poor or average in 85.6% of healthcare workers. Secondly, 40.9% of workers had favorable attitudes toward index testing. Thirdly, almost 9 out of 10 healthcare workers (87.1%) had damageable or inadequate practices regarding testing by index case.

In light of recent directive from the World Health Organization (WHO) (15), which encourages differentiated approaches to care services toward PLWHIV including screening by index case, these results are timely and fill up voids in terms of mastering the required tools to respond to HIV/AIDS. The majority of previous research work focused on how testing by index case could increase the number of people screened (16-18), and on the comparison between actives approaches of screening based on index case and passive approaches (19-23). To our knowledge, this study is the first in Burkina Faso that assessed knowledge, attitudes, and practices of healthcare workers on testing by index cases while including 30 of the 31 pilot sites for differentiated approaches countrywide. This analysis will contribute to enlighten the definition of strategies toward achieving the first ‘95’ of the UNAIDS objective of ‘95-95-95’ in Burkina Faso, meaning that 95% of seropositive people know their status, 95% of those infected are involved in HIV care programs, and 95% of people under treatment are virally suppressed (8).

Up to now, Burkina Faso has difficulties achieving the first objective since several seropositive people still ignore their status. In order to boost the achievement of the first objective of 95%, the country chose to implement differentiated approaches to care services rendered to PLHIV including testing by index cases. The efficacy of programs based on the use of index cases to detect seropositive people was demonstrated (22). The underlying thought process is a basic epidemiologic principle; each seropositive person contracted HIV from a past or current contact and could transmit the disease to current or future contact. Therefore, contact of seropositive persons are more susceptible to be seropositive than people in general population (24).

In this current study, the knowledge of healthcare workers on index testing was overall poor or average. In fact, 85.6% had poor or average knowledge on index testing. In an assessment prior and after a one-day-training on competency reinforcement of healthcare workers in 36 health facilities in Malawi regarding differentiated approaches of HIV services, three pragmatic significant indicators were improved. First, the HIV index cases patient declared more potential contact cases particularly adult sexual partners. Moreover, a greater number of adult contacts consented to be screened. Lastly, the training of healthcare workers allowed to identify more seropositive adult contacts (24). The average global knowledge of healthcare workers on index testing in our study could be explained by insufficient or inadequate training. The fact that index testing is newly implemented within our health system

Table III. Distribution of healthcare workers in pilot centers that implement index testing according to knowledge on index testing for the human deficiency virus in 2021, Burkina Faso (N=132).

Variables	n	%
Have you ever heard of index testing?		
No	5	3.8
Yes	127	96.2
Have you ever been trained on index testing?		
No	47	35.6
Yes	85	64.4
The index testing is suggested to those who tested positive for HIV		
No	17	12.9
Yes <sup>a</sup>	115	87.1
The index testing consists		
The index testing consists in testing for only key populations	28	21.2
The index testing consists in testing the sexual partners of the index case <sup>a</sup>	124	93.9
The index testing consists in testing partners of injection drugs of the index case <sup>a</sup>	100	75.8
The index testing consists in testing pregnant women	67	50.8
The index testing consists in testing biologic kids of the index case <sup>a</sup>	121	91.7
The index testing consists in testing married men	78	59.1
What is the number of steps in the process of index testing?		
6 steps	18	13.6
5 steps	76	57.5
8 steps <sup>a</sup>	22	16.6
10 steps	16	12.3
One of the steps in index testing is the assessment of domestic violence in a couple		
No	29	22.0
Yes	103	78.0
What is the 5th step in the process of index testing?		
The 5th step of the index testing is the explanation of the test principle to the client	15	11.3
The 5th step of the index testing is the choice of the method of notification by the client <sup>a</sup>	37	28
The 5th step of the index testing is reception of consent from the index client	49	37.3
The 5th step of the index testing is the evaluation of the level of violence in the couple	31	23.4
It is possible to give information to a sexual partner of a client on the risk of infection without the client's consent		
No <sup>a</sup>	113	85.6
Yes	19	14.4
The different methods of notification to partners in index testing are:		
The notification by the client <sup>a</sup>	110	83.3
The contractual notification <sup>a</sup>	55	41.7
The notification by a contractual	24	18.2
The double notification <sup>a</sup>	56	42.4

<sup>a</sup>The right answer.

and is not taught in healthcare training schools could account for the insufficient knowledge of these workers. Another factor that should not be neglected is the movements (site mutations) of workers in a context where all workers have not been trained on differentiated approaches. For example, 35.6% of healthcare workers on surveyed sites reported to have never been trained on index testing.

Less than half of healthcare workers (40.9%) had favorable attitudes on index testing. In fact, our results do

indicate persistent wrong perceptions on HIV index testing. For example, almost 60% of surveyed people (59.1%) believed that index testing would increase the risk of domestic violence, one quarter of them thought that index testing would increase the risk of non-adhesion to HIV screening, 59.8% among them thought that the technique was difficult to implement. This state of fact can be related to the global insufficient knowledge in the manners of healthcare workers. The poor knowledge can have a negative influence on attitudes. This tendency of having less

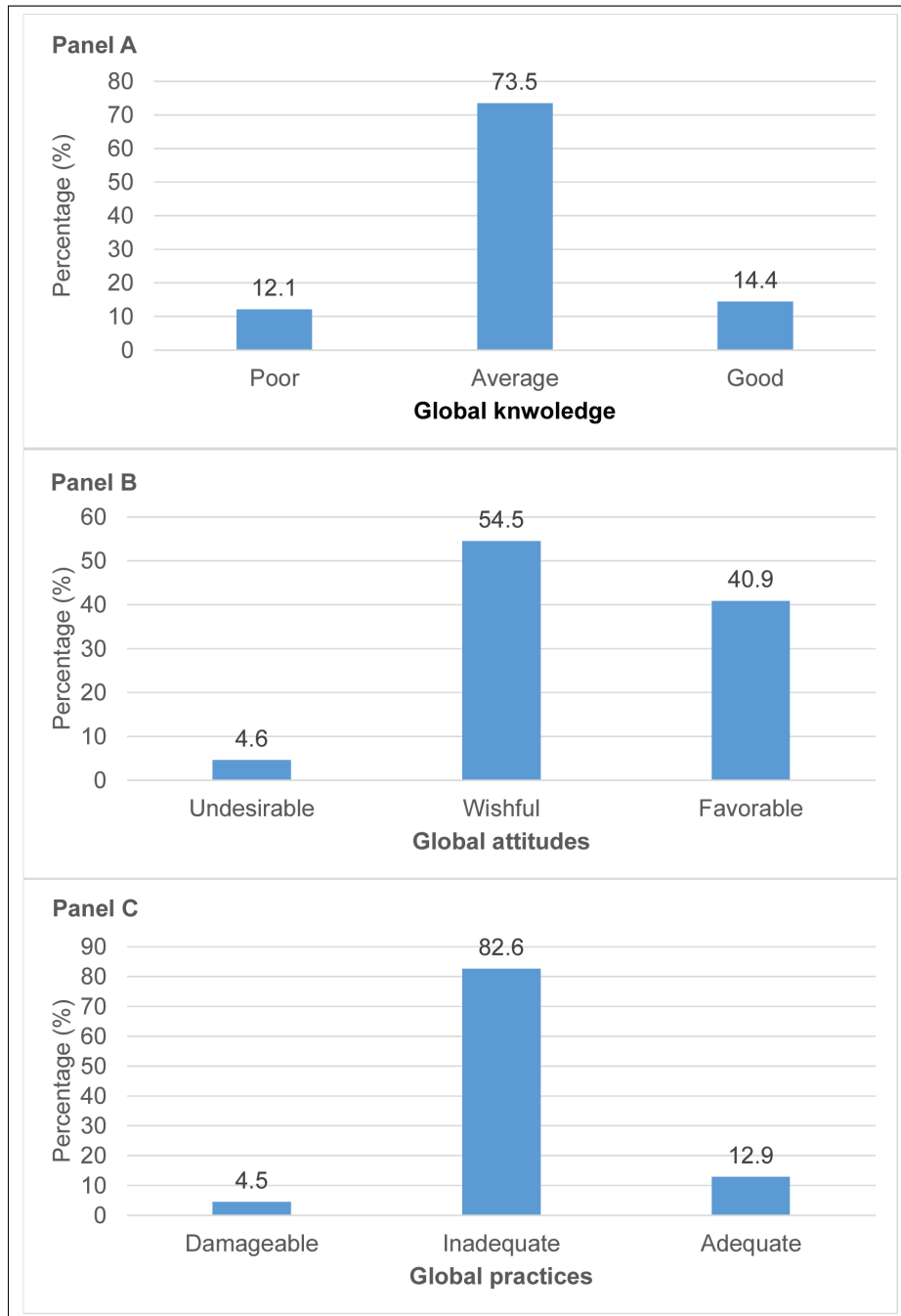


Figure 1. Global knowledge (Panel A), global attitudes (Panel B) and global practices (Panel C) of healthcare workers regarding index testing in 2021, Burkina Faso. (N=132).

favorable attitudes does confirm the results of previous studies on HIV. In fact, Nkwabong *et al*, in Cameroon, had reported negative attitudes in 60.7% of healthcare workers on the implementation of HIV prevention from mother to child (25).

Our study reports that almost nine out of ten workers (87.1%) had damageable or inadequate practices regarding index testing. This result could be explained by the average global knowledge of healthcare workers regarding index testing that was reported in our study. The average knowledge could rightly affect the auto efficacy of workers (26). Moreover, a number of attitudes toward index testing from healthcare workers could limit the suggestion of the approach to clients. In fact, 59.1% of surveyed people believed that index testing

increased the risk of domestic violence and 59.8% thought that this approach was difficult to implement. A number of practices should be changed by the means of trainings. For example, the explanation of the index testing principle during pre-test, realized by 70% of healthcare workers should be realized during the post-test when the serology is positive.

Given the cross-sectional character of our study, we were not able to continuously observe healthcare workers in order to best assess their attitudes and practices towards index testing. The healthcare workers in pediatric wards were not included in our study since the centers in which they worked were not part of the pilot centers that implemented differentiated approaches. The difficult security context due to the activities

Table IV. Distribution of healthcare workers in pilot centers that implement index testing according to attitudes on index testing for the human deficiency virus in 2021, Burkina Faso (N=132).

Variables	n	%
Do you think that the index testing is effective in improving the number of people screened for HIV?		
No	8	6.1
Yes	124	93.9
Do you think that all contacts should be tested?		
No	4	3.0
Yes	128	97.0
Do you think that index testing could allow early diagnosis of HIV?		
No	3	2.3
Yes	129	97.7
Do you think that index testing could increase the risk of violence?		
No	54	40.9
Yes	78	59.1
Do you think that index testing could reduce HIV transmission in serodiscordant couples?		
No	4	3.0
Yes	128	97.0
Do you think that index testing could increase the risk of refusing HIV testing?		
No	99	75.0
Yes	33	25.0
Do you think that index testing does violate confidentiality?		
No	107	81.1
Yes	25	18.9
Do you think that index testing implies an obligation to disclose one's serological status?		
No	110	83.3
Yes	22	16.7
Do you think that HIV index testing is difficult to realize?		
No	53	40.2
Yes	79	59.8

Table V. Distribution of healthcare workers in pilot centers that implement index testing according to practices on index testing for the human deficiency virus in 2021, Burkina Faso (N=132).

Variables	n	%
Have you ever screened a person who tested positive for HIV?		
No	6	4.5
Yes	126	95.5
Do you explain the principle of index testing to your client during pre-test?		
No	27	20.5
Yes	105	79.5
Do you set appointment with contact cases when the client does test positive for HIV?		
No	37	28.0
Yes	95	72.0
Do you evaluate the risk of violence before contacting contact cases?		
No	10	7.6
Yes	122	92.4
Do you require the consent of the client before searching for HIV contact cases?		
No	6	4.5
Yes	126	95.5

of armed terrorist groups forced us to exclude one site that was initially selected for the study. Other difficulties were also noticed during the administration of the survey. For example, some workers were unwilling to participate in the survey that appeared to them as a punishable control on their practices. However, these difficulties were minimized by measures such as the reinforcement of anonymous survey, the reassurance of healthcare workers through clear explanation of the study objective and the necessity of answering questions.

## Conclusions

This assessment of knowledge, attitudes and practices of healthcare workers on index testing in Burkina Faso showed that the workers had poor or average knowledge on index testing; the majority among them had less favorable attitudes toward index testing. More than nine out of ten workers had inadequate practice towards index testing. The survey pointed out the necessity to plan informative and educative interventions that seek to modify the knowledge, attitude, behaviors and practices of healthcare workers with regards to index testing, in order to increase the probability of achieving the 95-95-95 goal. Moreover, it is necessary to plan a study to assess the different factors that could hinder the implementation of index testing.

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## Availability of data and material

Data and materials are available by the authors.

## Contributions

SO, administration of the project, writing (original version); AK, Investigation; KBK, IR, BPCY, supervision; BPCY, validation, visualization; SO, NM, conceptualization; SO, AK, ID, NM, methods; SO, AK, software; SO, AK, ID, MS, DLD, TTED, NM, writing (proofreading and editing); ID, KBK, IR, BCPY, TTED, validation; SO, MS, NM, resources. All the authors approved the final version to be published.

## Ethical approval and consent to participate

The research protocol obtained ethical clearance from the ethics comity for research in health (CERS N°2021-11-262).

During the survey, each participant gave informed consent prior to inclusion. The exchanges with participants were confidential and anonymous.

## Conflict of interest

The authors declare no potential conflict of interest.

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