HIV self-testing: Knowledge and attitude of healthcare workers towards its recommendations in Ethiopia

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ABSTRACT

Background: Effective Human Immunodeficiency Virus (HIV) prevention strategies require healthcare workers (HCWs) to understand and recommend HIV Self-Testing (HIVST) to patients. However, there is limited evidence on HCWs' knowledge and attitudes toward HIVST in Ethiopia. Thus, this study aimed to assess knowledge and attitude towards HIVST and associated factors among HCWs in public hospitals of the North Shewa Zone, Oromia Region, Ethiopia.

Methods: A facility-based cross-sectional study was conducted in the North Shewa Zone, Oromia Regional State, Ethiopia, from March 01 to April 01, 2023. A simple random sampling technique was used to select a total of 413 participants. Data were collected using self-administered questionnaires. EpiData version 3.1 was used for data entry, and SPSS version 24.0 software was used for data analysis. A p-value of less than 0.05 was considered statistically significant in multivariable binary logistic regression.

Results: A total of 413 participants enrolled in this study with a response rate of 97.8%. Overall, 54.5% (95% CI: 49.4–59.8) of the participants had high knowledge and 54.2% (95% CI: 49.4, 59.1) had good attitude towards HIVST recommendations. In addition, ever tested for HIV/AIDS (AOR = 3.1, 95% CI: 1.3–7.2) and received training in the area of HIV/other STIs (AOR = 1.5, 95% CI: 1.01–2.3) were significantly associated with the knowledge of HIVST. While knowledge of HIVST (AOR = 2.3, 95%CI: 1.5–3.3) and received training in the area of HIV/AIDS/, other STIs (AOR = 2.0, 95%CI: 1.3–2.9) were significantly associated with the attitude towards the recommendation of HIVST.

Conclusions: The knowledge and attitudes of HCWs regarding HIVST were found to be comparably low. It is essential to develop and implement comprehensive training programs for HCWs that cover HIVST procedures, benefits, and counselling techniques.

Keywords: HIV/AIDS, Self-testing, Knowledge, Attitude, Healthcare workers

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BACKGROUND

HIV/AIDS (acquired immunodeficiency syndrome) remains a significant global health challenge, with approximately 38 million people living with the virus worldwide as of 2023 (1). the prevalence of HIV among adults in Ethiopia is estimated to be around 0.9%, and over 700,000 individuals living with the virus (1). Despite advancements in antiretroviral therapy (ART) and prevention strategies, the epidemic continues to exert profound impacts on individuals, families, and communities (2). The consequences of HIV/AIDS are multifaceted, encompassing physical health issues, mental health challenges, stigma and discrimination, and socio-economic disruptions (3). Notably, the disease disproportionately affects vulnerable populations, including women, young people, and key populations such as men who have sex with men and female sex workers (2).

In response to the ongoing epidemic, -HIVST has emerged as a vital tool in expanding access to HIV testing. HIVST allows individuals to test themselves for HIV in a private setting, which can significantly decrease barriers to testing, such as fear of stigma or discrimination, and improve early diagnosis and linkage to care (4). The World Health Organization (WHO) recommends HIVST as an important strategy, particularly for populations that may face challenges in accessing traditional testing services, including adolescents, young adults, and marginalized groups (5,6). HIVST refers to a process in which a person collects their specimen (oral fluid or blood) using a simple rapid HIV test and then performs the test and interprets their result, privately (5,6). It is approved as a safe, accurate, and effective approach to reach people who might not test, and it can be performed by lay users reliably, accurately, and comparably to that of trained healthcare personnel (6).

HIVST is a creative and inspiring way to help achieve the first of the United Nations 95-95-95 treatment targets, which calls for 95% of all people living with HIV/AIDS (PLHIV) should know their status to receive treatment by 2030 (7). the WHO recommended HIVST for people from key populations, men, and young people in 2016 (6). Despite this, according to united nation AIDS (UNAIDS) program, an estimated 6.1 million people lived with HIV without being aware of it in 2021 (8). Self-testing and assisted testing could increase the rates of HIV diagnosis (9).

HCWs are a key target group for starting and sustaining HIV testing programs. Therefore, it is a good idea to think about using more HCWs to help these programs work better and reach more people (10). On the other hand, although different studies have been conducted in other populations, there is little information on HIVST among HCWs. For instance, a study conducted in Brazil reported that 47.1% of HCWs were willing to provide HIVST (11). In Kenya, 89% of HCWs stated they would recommend HIVST to other HCWs. Moreover, 73% of HCWs who accepted HIVST and had partners gave the kits to their partners so that they could test themselves (12).

Substantial efforts have been made in Ethiopia to respond to the HIV testing gap of the first 90% target. Currently, the Ethiopian Ministry of Health has approved the implementation of HIVST to create demand and close the gaps in case finding in the country (13–15). HIVST is considered as a low-cost, high-impact intervention to reach population groups that do not undergo testing. It can help identify PLHIV, facilitate early treatment and link those to who test negative to appropriate HIV prevention services in the country (15).

Making HIVST available to users will improve their ability to learn more about their HIV status in a private and non-threatening setting, free from concerns about discrimination (7). Therefore, the attitudes and concerns of HCWs may hinder the spread of HIVST or improve access to it. For example, 50% of HCWs in Kenya expressed concern about the potential for HIVST

abuse (12). Only 28.7% of HCWs in Brazil also indicated that they believed access to HIVST could reduce high-risk sexual behaviors (11). Resolving these issues is crucial to allowing greater HIVST accessibility in health systems.

Despite the stated relevance of HCW's knowledge and attitude on HIVST in HIV/AIDS prevention and control, no previous studies have been carried out in Ethiopia. In addition, it remains especially unknown among HCWs at the public hospitals of the north Shewa Zone, Oromia Region. Therefore, this study aimed to evaluate knowledge about HIV self-testing, attitude towards its recommendation, and associated factors among HCWs in the North Shewa Zone, Oromia Region, Central Ethiopia.

METHODS

Study area, design and period

This study was conducted in the public hospitals of North Shewa Zone, Oromia Regional State of Ethiopia. The zone has 14 districts and two city administration. In the zone, there are five public hospitals, 64 health centers, and 270 health posts. According to the 2022 statistics obtained from the zone health office, the total number of healthcare workers working in the zone are 1,865. A facility-based cross-sectional study design was conducted from March 01 to April 01, 2023. HCWs working in the selected public hospitals in the North Shewa Zone were the study population.

Inclusion and exclusion criteria

All HCWs who were permanently working at public hospitals in the North Shewa Zone and who were present at work post during the time of data collection were included. However, HCWs who were on annual and maternity leave were excluded from the study.

Sample size determination

The sample size was calculated using the formula for estimation of a single population proportion in EpiInfo STAT CALC version 7.2 with the assumptions of 95% confidence level (CL), margin of error (d) of 0.05, and prevalence (P) of both HIVST knowledge and attitude towards its recommendation taken at 0.50 since there was no prior study conducted in a country. Considering a 10% non-response rate, the final sample size was 422.

Sampling procedure

Four hospitals in the North Shewa Zone were selected out of the six public hospitals find in the zone by simple random sampling technique. The selected hospitals were Salale University Comprehensive Specialized Hospital, Kuyu General Hospital, Muka Turi General Hospital, and Chancho General Hospital were included in this study. The total number of healthcare workers was obtained from each selected hospital to proportionally allocate to each selected hospital in the Zone. Then, the number of HCWs in each selected hospital was listed followed by random selection (Fig 1).

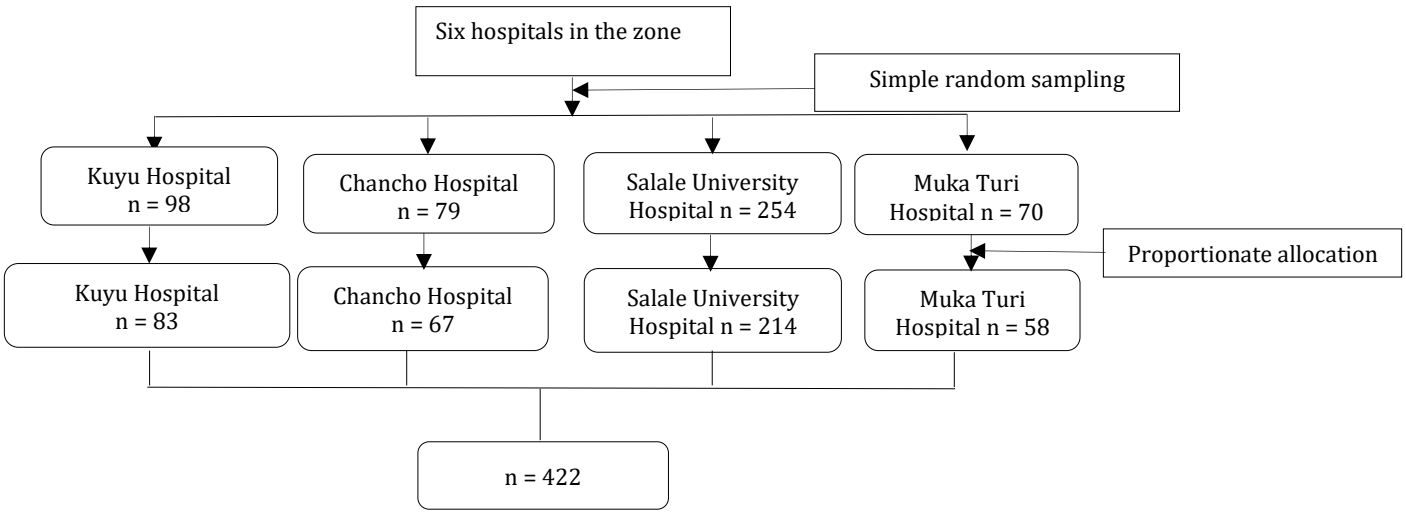

Figure 1: Schematic representation of sampling technique for the selection of the required number of HCWs

Data collection tool, and procedures techniques

Data were collected using a structured, pretested, self-administered questionnaire to capture information on socio-demographic factors, HIV-related factors, individual-level factors, knowledge, and attitude towards HIVST provision. To ensure the reliability of the survey items measuring knowledge and attitudes, towards the recommendation of HIVST, Cronbach's alpha was employed. A Cronbach's alpha value exceeding 0.804 was deemed indicative of high internal consistency. Four trained nurses on HIVST and work in ART clinics collected the data. Additionally, the data collection procedure was supervised by the investigators.

Ten questions were used to measure knowledge of HIVST. For each correct response, the score was 1 point and incorrect/non-response was scored 0 points. The overall score ranged from a minimum of 0 to a maximum of 10. Participants with a median and higher score were considered to have a high knowledge of HIVST, while those with a score below the median were considered to have a low knowledge of HIVST (3). Attitude toward HIVST recommendation was assessed by dichotomized questions that structured according to the following question: "Would you offer self-testing for the service client?" (No, Yes). The questions were asked following the reason for refusal of HIVST (11,16)

Data processing and analysis

The completed questionnaires were coded and entered into Epi Data Version 3.1, then exported to SPSS Version 24.0 for data cleaning and analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) summarized the data, presented in tables and graphs. Binary logistic regression assessed the relationship between independent and dependent variables, considering those with p-values ≤ 0.25 for multivariate analysis. Multivariable logistic regression evaluated the independent influence of variables. Multi-collinearity among the independent variables was not detected using the variance inflation factor (VIF) with a threshold value of ten. The Hosmer and Lemeshow test indicated a good model fit for knowledge and attitude towards HIVST (p-values = 0.329 and 0.141). The final results included AORs with 95% confidence intervals (CIs), with $p < 0.05$ indicating statistical significance.

Data quality control

Training was provided to data collectors and supervisors on the objective, data collection methods, and ethical issues of the study. A pretest was also conducted on 10% of the sample size at Fiche health centers to check the clarity and consistency of the questionnaires before the main study. Necessary modifications were made accordingly after the pre-test. Each reliability test was done and Cronbach's alpha > 0.7 was taken for actual data collection, giving training to data collectors and pretesting the questionnaire for clarity and consistency.

RESULTS

Sociodemographic characteristics

A total of 413 participants took part in this study with a 97.8% response rate. Two-thirds, 66.3% of the participants were males. The median (IQR) age was 30 (7) with the minimum and maximum ages of 22 and 50 respectively. More than three-fourths, 75.1% of the participants' education level were degree. The median (IQR) year of experience was 5 (5) (Table 1).

Table 1: Socio-demographic characteristics of healthcare workers of the North Shewa Zone public hospitals, Oromia Regional State, Ethiopia, 2023

Variable	Category	Frequency	Percent
Sex	Male	274	66.3
	Female	139	33.7
Age category	Below 30	159	38.5
	Above and equal to 30	254	61.5
Marital status	Single	163	39.5
	Married	234	56.7
	Divorced	16	3.9
Education level	Diploma	62	15.0
	Degree	310	75.1
	Master	41	9.9
Professional background	Clinical nurse	72	17.4
	BSC nurse	153	37.0
	Midwifery	41	9.9
	Medical doctor	44	10.7
	Public health	18	4.4
	Medical laboratory	44	10.7
	Others *	41	9.9
Year of experiences	Below and equal to 5	212	51.3
	More than 5	201	48.7

**druggist/pharmacy, adult health nursing, anesthetist, radiologist, psychiatrist*

HIV-related characteristics

The majority of the participants, 93.0% had ever been tested for HIV. The median (IQR) of the most recent HIV test was 6 (9) months. The majority, 95.3% of the most recent test was reported negative by the participants. Moreover, about 45% of the participants had received training on HIV and other STI themes. The median (IQR) of the duration since the last training session was 12 (18) months. Subsequently, 76.3% of the participants reported that they had obtained training, various information materials, and courses/updates on HIVST.

Individual level characteristics

Of the total participants, 63.9% stated that they were willing to inform the users about the existence of HIVST. Additionally, about 55.0% of the participants responded that they would use an HIVST for HIV on themselves. In contrast, about 45.0% of the participants responded that they would not use the HIVST for HIV on themselves. The major reasons for not using HIVST for themselves include; not knowing how

to use kits (47.3%), preferring other testing modalities (38.7%), not trusting the effectiveness of the HIVST (17.7%), fear of colleagues knowing the result (16.1%), afraid of dealing with a possible positive result alone (10.8%), and absence of the test kits (2.0%). Moreover, the participants suggested that the main advantages of HIVST include; Privacy/anonymity/confidentiality (88.4%), empowering/taking charge of one's health (42.6%), and Saving time/ no waiting in queues (43.3%).

Knowledge of HIVST

Overall, 54.5% (95% CI: 49.4, 59.8) of the participants had a high knowledge score based on the ten-item tool (Table 2).

Table 2: Knowledge of HIVST among healthcare workers of the North Shewa Zone public hospitals, Oromia Regional State, Ethiopia, 2023

Items	Responses		
	Yes (%)	No (%)	I do not know (%)
HIVST is done using blood	195 (47.2)	174 (42.1)	44 (10.7)
HIVST is done using fluid from the mouth	206 (49.9)	161 (39.0)	46 (11.1)
A person can perform the HIVST on herself/himself	281 (68.0)	72 (17.4)	60 (14.5)
It takes 20-40 minutes to get results from the HIVST	258 (62.5)	55 (13.3)	100 (24.2)
The result of HIVST can be negative if the HIV infection is less than three months	250 (60.5)	72 (17.4)	91 (22.0)
A person needs to re-test after three months if the HIVST result is negative	287 (69.5)	74 (17.9)	52 (12.6)
A person needs to be counselled by a healthcare professional before taking the HIVST	347 (84.0)	32 (7.7)	34 (8.2)
A person needs to be counselled by a healthcare professional before taking the HIVST	322 (78.0)	70 (16.9)	21 (5.1)
If the result of HIVST is positive it should be confirmed by other HIV testing services	247 (59.8)	74 (17.9)	92 (22.3)
It is legal to use HIVST kits for high-risk groups in Ethiopia	200 (48.4)	98 (23.7)	115 (27.8)

Attitude towards counselling and recommendation of HIVST

Of the total participants, 54.2% (95% CI: 49.4, 59.1) stated that they would recommend HIVST to users of the service. The major reasons for refusal to recommend it include suicide risk in case of positive result (55.0%) and people with positive results can attack themselves or other people (54.5%) (Figure 1).

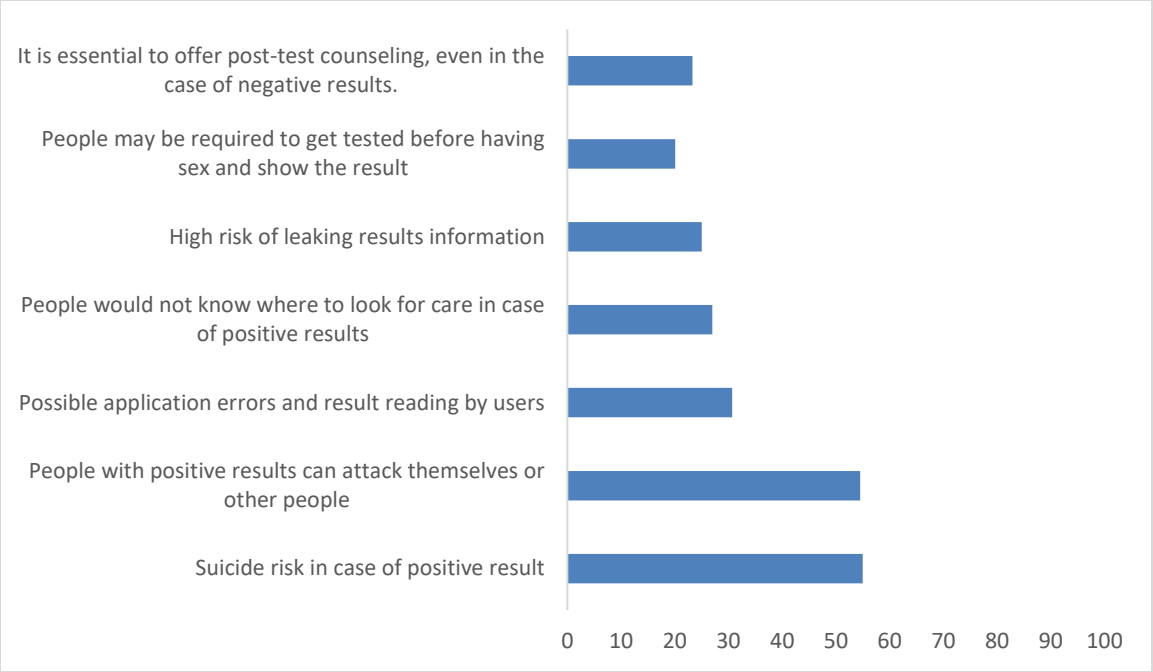

Figure 2: Reasons for refusal to counsel and recommend HIVST for the service users

Preferences of HIVST

Of the participants who had high knowledge scores, about 43.1% (95% CI: 36.9, 49.8) prefer assisted HIVST as the most effective way for the user to use HIV self-testing, while 56.9% (95% CI: 50.2, 63.1) prefer unassisted HIVST.

Factors associated with knowledge of HIVST

In a multivariable binary logistic regression, ever tested for HIV/AIDS and having received training in the area of HIV/AIDS/other sexually transmitted infections (STIs) were significantly associated with the knowledge of HIVST. Accordingly, the odds of high knowledge of HIVST were more than three times higher among the participants who have ever been tested for HIV/AIDS than their counterparts (AOR=3.06, 95% CI: 1.29, 7.23). Additionally, those participants who received training in the area of HIV/AIDS/other STIs had higher odds of high knowledge of HIVST than those who did not receive training in the same areas (AOR=1.52, 95% CI: 1.01, 2.29) (Table 3).

Table 3: Multivariable analysis of factors associated with knowledge of HIVST among healthcare workers in the North Shewa Zone public hospitals, Oromia, Ethiopia, 2023.

Variable	Category	HIVST knowledge		COR (95%CI)	AOR (95%CI)
		High (%)	Low (%)		
Sex	Female	82 (36.4)	57 (30.3)	1.3 (0.50–1.5)	0.88 (0.57–1.4)
	Male	143 (63.6)	131 (69.7)	1	1
Age category	< 30	97 (43.1)	62 (33.0)	1.5 (1.03–2.30)	1.2(0.72–1.8)
	>= 30	128 (56.9)	126 (67.0)	1	1
Level of education	Master degree	13 (5.8)	28 (14.9)	0.46 (0.20–1.1)	0.46 (0.20–1.1)

	BSc. degree	181 (80.4)	129 (68.6)	1.4 (0.81–2.4)	1.5(0.87–2.7)
	Diploma	31 (13.8)	31 (16.5)	1	1
Ever tested for HIV/AIDS	Yes	217 (96.4)	167 (88.8)	3.4 (1.5–7.9)	3.1(1.3–7.2) *
	No	8 (3.6)	21 (11.2)	1	1
Received training on HIV/AIDS/other STIs	Yes	112 (49.8)	74 (39.4)	1.5(1.03–2.3)	1.5 (1.01–2.3) *
	No	113 (50.2)	114 (60.6)	1	1
Year of experience	<=5 years	124 (55.1)	88 (46.8)	1.4(0.95–2.1)	1.2 (0.73–2.1)
	>5 years	101 (44.9)	100 (53.2)	1	1

** Significant at p-value <0.05, HIV-Human immunodeficiency virus, STIs-sexually transmitted infections, CI-confidence interval, AOR-adjusted odds ratio, COR-crude odds ratio*

Factors associated with attitude towards HIVST recommendation

In a multivariable binary logistic regression, knowledge of HIVST and training in the area of HIV/AIDS/other STIs were significantly associated with attitude towards recommending HIVST. Accordingly, the odds of attitude towards HIVST counselling and recommendation were more than twice as high among the participants who have higher knowledge of HIVST than their counterparts (AOR=2.19, 95% CI: 1.47, 3.28). Additionally, those participants who received training in the area of HIV/AIDS/other STIs had two times higher odds of attitude towards HIVST counselling and recommendation than those who did not receive training in the same areas (AOR=1.95, 95% CI: 1.30, 2.92) (Table 4).

Table 4: Multivariable analysis for factors associated with attitude towards HIVST recommendation among healthcare workers in the North Shewa Zone public hospitals, Oromia Regional State, Ethiopia, 2023.

Variable	Category	Attitude towards HIVST recommendation		COR (95% CI)	AOR (95% CI)
		Favorable (%)	Unfavorable (%)		
Knowledge of HIVST	High	143 (63.8)	82 (43.4)	2.3(1.6–3.4)	2.2 (1.5–3.3) *
	Low	81 (36.2)	107 (56.6)	1	1
Age category	< 30	92 (41.1)	67 (35.4)	1.3(0.85–1.9)	0.78 (0.51–1.2)
	>= 30	132 (58.9)	122 (64.6)	1	1
Level of education	Master degree	26 (11.6%)	15 (7.9)	2.0(0.88–4.4)	2.2 (0.96–5.1)
	BSc. Degree	169 (75.4)	141 (74.6)	1.4(0.79–2.4)	1.4(0.77–2.4)
	Diploma	29 (12.9)	33 (17.5)	1	1
Ever tested for HIV/AIDS	Yes	212 (94.6)	172 (91.0)	1.8(0.81–3.8)	1.2(0.52–2.7)
	No	12 (5.4)	17 (9.0)	1	1

Received training on HIV/AIDS /other STIs	Yes	119 (53.1)	67 (35.4)	2.1(1.4–3.1)	2.0(1.3–2.9) *
	No	105 (46.9)	122 (64.6)	1	1

** Significant at p-value <0.05, HIVST-Human immunodeficiency virus self-test, , CI-confidence interval, AOR-adjusted odds ratio, COR-crude odds ratio*

DISCUSSION

This study aimed to assess HIV self-testing (HIVST) knowledge, attitudes towards its recommendation, and associated factors among healthcare workers (HCWs). The study revealed that 54.5% (95% CI: 49.4, 59.8) of the participants had high HIVST knowledge scores. Compared to a previous study conducted among healthcare providers in Brazil, where 79% had high HIVST knowledge, the current finding is lower (11). This difference could be attributed to variations in the healthcare settings, as the Brazilian study was carried out in specialized HIV care services, while the current study enrolled HCWs in public hospitals. This suggests that the level of HIVST knowledge may be influenced by the type of healthcare facility and the specific services provided.

Furthermore, the current finding was also lower than a study conducted among medical students in Tanzania, where 67.9% had high knowledge of oral HIVST (17). This discrepancy can be explained by the difference in the outcome assessment, as the Tanzanian study only evaluated knowledge of oral HIVST, whereas the current study measured knowledge of both oral and blood HIVST. This indicates that assessing a broader range of HIVST knowledge may lead to lower overall knowledge scores compared to studies focusing on a specific HIVST modality.

The implications of these findings suggest that there is a need to strengthen HIVST knowledge among HCWs, particularly in public hospital settings, to ensure they are adequately equipped to recommend and support HIVST services. Targeted training and educational interventions may be necessary to address the identified knowledge gaps and improve the overall understanding of HIVST among HCWs.

In contrast, the current study reports a higher knowledge of HIVST than the studies conducted among Namibian college students, who had a knowledge score of 23.7% (18), and Nigerian university students, who scored 41.9% (19). The variations in study populations, sampling procedures, data collection techniques, and sample sizes may have contributed to these disparities. Notably, the higher percentage of knowledge among HCWs compared to these student groups suggests that facility-based HIVST is a cost-effective strategy for increasing the overall rate of HIV testing (20).

On the other hand, the current study suggests that 54.2% (95% CI: 49.4, 59.1) of the HCWs will counsel/recommend HIVST to the service users. This finding is higher than the study conducted in Brazil (47.1%) (11). This can be explained by the time variation and the presence of the HIVST guideline in Ethiopia – increasing the willingness to provide it (15). In general, it has been stated that a range of HIVST distribution strategies are effective in increasing HIV testing. HIVST distribution by sexual partners, web-based distribution, as well as health facility distribution strategies should be considered for implementation to expand the reach of HIV testing services (21).

The study also revealed that HCWs who had ever tested for HIV/AIDS possessed greater knowledge of HIVST. The previous study from Zimbabwe also confirmed this finding (22). This is because HIV testing provides a way for everyone to access further prevention and care services. Besides, this study also showed that HCWs with prior training in the field of HIV/AIDS or other STIs had increased knowledge of HIVST. This is because being trained in such broader and related domains will increase the likelihood of getting exposed to HIVST information. Furthermore, this finding discloses the opportunity that training will bring on HIVST guidance and application (23).

Another interesting finding of this study was, that HCWs with high HIVST knowledge had a favorable attitude toward HIVST counselling and

recommendations. This finding is supported by a study from Kenya, where HCWs who attended the pre-HIVST information session were more likely to recommend HIVST than those who did not (24). Additionally, the likelihood of having a favorable attitude toward HIVST counselling and recommendation increased if the person had ever received training in the area of HIV/AIDS or other STIs. This is recommended for HCWs since they continually require additional HIVST orientation, training, and knowledge to give proper support and promote linkage to further testing, prevention, and treatment (25).

Strengths and limitations of the study

Even though this study includes HCWs from several departments and is multicentered, which could improve the generalizability of the findings, the following limitations are to be considered. To begin with, using a single binary option item to assess attitudes towards HIVST, recommendations might overlook the predicted outcome. Additionally, the presence of a limited number of literatures that measured HIVST among HCWs made it difficult to facilitate the comparison in different settings.

CONCLUSION

HIVST knowledge and attitudes towards its recommendation were found to be comparable, though both were relatively - low. A significant association was observed between HIVST knowledge and attitude toward its recommendation. Additionally, receiving training on HIV/AIDS /other STIs was independently associated with attitude toward HIVST recommendation. Furthermore, ever testing for HIV/AIDS and receiving training on HIV/AIDS /other STIs were significantly associated with knowledge about HIVST. As a result, developing and implementing comprehensive training programs for HCWs that cover HIVST procedures, benefits, and counselling techniques is essential as this will improve their knowledge of HIVST and their attitude towards its recommendations. Additionally, a mixed-method study is beneficiary to better understand professionals' views on HIVST and pinpoint the precise areas that require training in the future.

Abbreviations and Acronyms

AOR-Adjusted odds ratios; ART-antiretroviral therapy, AIDS-Acquired Immunodeficiency Syndrome; CI-Confidence Interval; COR-Crude odds ratios; HIVST-HIV self-testing; HCWs-Health care workers; PLHIV-People living with HIV; VCT-Voluntary counselling and testing; PITC-Provider-initiated counselling and testing; WHO-World Health Organization

Declarations

Ethical consideration

This study was provided by Salale University Institution Research Ethical Review Committee (SlU-IRERC) with reference number IRB/878/15. The study was performed per the Declaration of Helsinki on medical research. Written informed consent was obtained from the study participants after the study objectives and procedures were explained to the participants. The confidentiality of the information was ensured through deanonymizing the information collected from each participant. The interviews were privately conducted in an area separated from the others. Only authorized individuals were given access to the raw data.

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Consent for publication: Not applicable

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Author contributions

DH and DGT were involved in the writing of the proposal, designed the study, participated in the coordination of the study, analyzed the data, and drafted and finalized the manuscript. HDD, ESM, HZA, LAG, MZS, BTO, MA, FB and GF conceived

the study and participated in all stages of the study and revision of the manuscript. All the authors read and approved the final version of the manuscript.

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