

Willingness Towards VCT and Associated Factors among Tb-Infected Patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

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ABSTRACT

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Keywords: Willingness; VCT; TB; Public Hospitals; Addis Ababa

Background: Voluntary counseling and testing for human immunodeficiency virus have been carried out in many places with excellent results; it is cost-effective and a gateway to most HIV-related services, including the provision of antiretroviral drugs. With the global spread of HIV/AIDS, voluntary counseling and testing have become an integral part of HIV prevention and control efforts.

Objective: To assess the willingness towards CVT and associated factors among TB-infected patients at Public Hospitals in Addis Ababa, Ethiopia; 2023.

Method: A facility-based cross-sectional study was conducted at Public Hospitals in Addis Ababa from the 1st to the 30th of March 2023 with a sample of 235 study participants using a systematic sampling method. Data were collected by trained data collectors using a pretested data extraction tool. Variables with P-values less than 0.25 in bivariable analysis were entered into multivariable analysis, and variables having P-values less than 0.05 in multivariable logistic regression were declared statistically significant.

Result: The prevalence of willingness towards VC among TB-infected patients at Public Hospitals in Addis Ababa was 78.3% (95%CI: 72.8, 83.4). Attending primary education (AOR: 6.32; 95%CI: 1.65, 24.25), being a government employee (AOR: 5.85; 95%CI: 1.78, 19.22), being a private employee (AOR: 3.35; 95%CI: 1.12, 10.01), good Knowledge of VCT (AOR: 3.12; 95%CI: 1.36, 7.16), perceived risk (AOR: 6.58; 95%CI: 2.44, 17.73) and perceived stigma (AOR: 14.95; 95%CI: 4.98, 44.91) were statistically significant factors associated with willingness towards VCT

Conclusion and Recommendation: Even though the proportion of TB-infected patients who are willing to VCT was higher than in the studies conducted before, it is lower than the UNAIDS target for 90% of people to know their HIV status. In addition, level of education, occupation, knowledge, perceived risk, and perceived stigma were independent factors associated with willingness to engage in VCT.

Introduction

Background

World Health Organization (WHO) estimates that one-third of the world's population is infected with *Mycobacterium tuberculosis*, resulting in an estimated nearly 8.7 million incident cases of tuberculosis (TB) and 1.4 million deaths [1]. Tuberculosis (TB) is the most common cause of death among people living with HIV/AIDS (PLWHA) [2].

HIV is the main reason for failure to meet TB control targets in high HIV settings because HIV infection has contributed to a progressive decline in immune response and pathogenesis of TB, increasing the risk of co-infection and leading to more frequent extrapulmonary disease [3]. The risk of reactivating TB infection in HIV-infected persons is 7- 10% per year compared with a 10% lifetime risk in those serum-negative persons [4]. To control TB in high HIV settings, the Stop TB strategy needs collaborative TB/HIV activities in the country [3, 5].

Worldwide, only 20% of people living with HIV know their status and only one in four people estimated to be living with HIV and TB is detected and treated for both diseases [6]. In December 2013, the UNAIDS set the 90-90-90 targets, which called for 90% of people to know their status, among whom 90% should be linked to care and 90% should be virally suppressed [7].

Voluntary counseling and testing (VCT) for human immunodeficiency virus (HIV) has been carried out in many places with excellent results; it is cost-effective and a gateway to most HIV-related services, including the provision of antiretroviral drugs [8]. With the global spread of HIV/AIDS, voluntary counseling and testing (VCT) has become an integral part of HIV prevention and control efforts [9].

In this approach, the primary conditions of confidentiality, consent and counseling apply, and the standard pretest counseling used in VCT is adapted to ensure informed consent without complete education and counseling

([10]. To be able to provide informed consent, patients need to know (i) the clinical and prevention benefits of testing, (ii) the right to refuse, (iii) the follow-up services that will be offered, and (iv) the Sharing results with a partner is essential in case of positive results [11].

Counseling and testing for HIV present opportunities for prevention and treatment of HIV infection and care for HIV patients; additionally, at the counseling and testing visits, there is a significant need for TB-HIV co-management [12]. Information about HIV prevalence among TB patients is essential to address the increasing need to provide HIV/AIDS care and support, including antiretroviral therapy (ART), to HIV-positive TB patients [3].

Testing all patients routinely for HIV in settings with generalized HIV epidemics as the benefit of diagnosing the infection early and thereby preventing morbidity, mortality and sustained transmission through the initiation of cotrimoxazole prophylaxis and timely antiretroviral treatment (ART) [13]. The WHO, the Joint United Nations Program on HIV/AIDS (UNAIDS) and the International Standards for Tuberculosis Care recommend providing counseling services and HIV testing for every TB patient in countries with high HIV infection prevalence, or >1% of the general population [14].

Statement of the problem

WHO has incorporated routine counseling and testing as a component of TB/HIV collaborative efforts [15]. Globally, there are 1.4 million HIV-positive tuberculosis (TB) cases [2]. In Ethiopia, TB is the leading cause of morbidity, one of the three major causes of hospital admission, and the second killer next to malaria [14]. The rate of TB/HIV co-infection in Ethiopia ranges from 40–70 % [16, 17].

HIV co-infection with TB increases morbidity and mortality and worsens prognosis considerably [4]. Therefore, all TB patients need to be allowed to undergo voluntary counseling and Testing (VCT) on the first visit to a health

facility [4]. Patients' willingness to undergo VCT helps in early and prompt diagnosis and subsequent treatment of the disease [18].

In Sub-Saharan Africa, many people still do not know their HIV status [8]. Some treatment programs have reported high early mortality in patients receiving antiretroviral therapy because of late presentation [19]. Therefore, early detection of HIV infection is not only helpful in preventing further infection but also part of the strategy to improve treatment outcomes.

Subsequently, the National TB and HIV guideline in Ethiopia recommends HIV counseling and testing as routine care for TB patients [20]. However, the acceptability of this approach has not been studied. Assessments on the acceptability of VCT among patients and the general population gave mixed results [21]. Currently, willingness toward VCT among TB patients varies from place to place [3]. In Ethiopia, the willingness towards VCT may be influenced by different associated factors like fear of stigma and discrimination associated with having TB and HIV, socio-demographic characteristics, knowledge related to TB/HIV, the general perception of HIV infection, and attitude towards VCT may affect the willingness and understanding of TB patients [13, 17, and 18]. VCT is one of the main intervention areas to fight against failure to meet TB control targets in areas where HIV prevalence is high, particularly for co-infected patients with TB and HIV [13].

Nowadays, data regarding routine HIV testing and counseling of TB patients are weak; reliable data need to be obtained. Strengthening the routine data by periodic surveys has been suggested as an option [22]. In many countries, the HIV prevalence among TB patients is a reliable indicator of the spread of HIV into the general population. Therefore, this study aimed to assess the willingness towards VCT among TB patients at Public Hospitals in Addis Ababa.

Significance of the study

The study's findings will be used by hospitals to determine the willingness and associated factors of VCT among TB-infected patients. By

identifying the associated factors, this determination helps to alarm health institutions to appropriate prevention and treatment of HIV among TB-infected patients.

In addition, the study's results will be used as input for local program implementers at regional and zonal administrations to design evidence-based intervention strategies to identify the determinants and tackle the problems of VCT among TB-infected patients. This study will also be used as baseline information for other researchers.

Literature Review

Overview of VCT among TB patients

About 34 million people (0.5 % of the world population) were living with HIV/AIDS in 2010 (estimates range from 30.9 to 36.9 million) [23]. Sub-Saharan Africa remains the most heavily affected region, accounting for 71 % of all new HIV infections in 2008[24]. However, only 10 % of men and 12 % of women had been tested for HIV, implying that the majority of HIV- infected persons in this region are unaware of their sero status [24, 25]. With an estimated 1.1 million people living with HIV, Ethiopia is one of the 22 most affected countries in the world [26].

The Government of Ethiopia set a national HIV/AIDS policy in 1998 to create an enabling environment to fight the pandemic [27, 28]. However, most HIV-infected patients globally, particularly in resource-poor settings, are currently unaware of their HIV status due to various reasons [29]. Among all types of HIV testing, provider-initiated HIV testing and counseling (PITC) has been identified as a priority intervention to increase access to treatment, care, and support for HIV-infected individuals [29, 30].

Provider-initiated HIV testing and counseling is an HIV testing and counseling service recommended by healthcare providers to clients attending health facilities as a standard component of medical care [29]. Previously, it was given at the outpatient department (OPD) for patients with possible signs of HIV

infection. Still, now, as per WHO recommendation, the service is provided to all clients as a standard component of medical care so as not to miss HIV-positive individuals seeking medical care [31].

After the introduction of the service, PITC refusal among adult patients at OPD was 5–25 % in different African countries [32]. However, a study conducted in our country, even with the possible signs of HIV infection, showed that its refusal was about 32 % [33]. Thus, the government of Ethiopia has been using different strategies to encourage people to be tested for HIV. These include escalating static and mobile voluntary counseling and testing (VCT) sites, strengthening prevention of mother-to-child transmission (PMTCT) service, conducting campaigns for HIV testing, enrolling HIV-positive individuals in care and treatment programs free of charge, etc. [30].

Willingness towards VCT among TB patients

A study conducted in the Shandong district, China, mentioned that 69% of TB patients expressed willingness to utilize VCT [34]. A study conducted in East Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared that the prevalence of HIV among tuberculosis (TB) patients in the study area was 33.7% [1]. Another cross-sectional study conducted in South Ethiopia mentioned that 73% were willing to be tested [35]. Similar research conducted in North West Ethiopia mentioned that the uptake of HIV testing among TB patients in the study health facilities was 70.6 % [36]. In addition, a study conducted in the Oromia region revealed that 98% were offered HIV counseling and testing [37], and a survey conducted in Gahana mentioned that 66.0% of tuberculosis patients were willing to be tested [38].

Prevalence of HIV among TB patients

A study conducted in East Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared that the prevalence of HIV among tuberculosis (TB) patients in the

study area was 137 (33.7%) (1). A similar study conducted in South Ethiopia mentioned that 20.6% of the TB patients were HIV positive [35]. Another study conducted in the Oromia region revealed that, among those patients who accepted for testing and were tested for HIV, 32.2% tested positive [37].

Factors associated with VCT among TB patients

• Socio demographic characteristics

A study in the Oromia region revealed that urban residents and the 25-64 age group were more generally associated with a willingness toward VCT [37]. A study conducted in East Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared educational status (AOR: 3.51, 95% CI: 1.13,10.91) [1]. Similarly, a study conducted in North West Ethiopia mentioned that TB patients who had formal education were more likely to be willing toward VCT among TB patients [AOR: 2.35, (95%CI: 1.33, 4.13)] [36]. Another study conducted in South Ethiopia mentioned that women were more likely to be HIV infected [35]. Another study conducted in South Ethiopia mentioned that unemployment was associated with a willingness towards VCT among TB patients (AOR: 2.6; 95%CI: 1.3, 5.5) (35).

• Self-perception and related characteristics

Another study conducted in South Ethiopia mentioned that a high risk of HIV infection was associated with willingness toward VCT (AOR: 5.0; 95%CI: 1.1, 22.4) [35]. Another study conducted in East Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared that self-perceived risk was associated with a willingness towards VCT (AOR: 2.93, 95% CI: 1.12,7.66) [1]. In addition, a study conducted in Shandong district, China, mentioned that the desire to get help if diagnosed as HIV positive, the ability to imagine life after an HIV positive diagnosis, and perceived support for VCT from peers,

managers, and family members were factors associated with willingness towards VCT [34].

- **Knowledge status and related characteristics**

A study conducted in East Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared that knowledge of transmission of HIV/AIDS is significantly associated with willingness towards VCT (AOR: 7.56, 95% CI: 1.14, 40.35) [1]. Another cross-sectional study conducted in North West Ethiopia mentioned that patients with high awareness about the benefits of HIV counseling and testing have threefold higher odds of being willing towards VCT [AOR: 3.14, 95%CI: 1.77, 5.50][36]. Similarly, a study conducted in East

Wollega Administrative Zone, Oromia Regional State, Western Ethiopia, declared that knowledge about HIV was associated with a willingness towards VCT (AOR: 3.22; 95% CI: 1.3,7.97) [1]. Similarly, A study conducted in Shandong district, China, mentioned that knowledge about VCT was associated with willingness towards VCT [34].

- **Conceptual framework**

The figure below shows the effect of independent variables on the outcome variable, willingness towards VCT. These variables will, directly and indirectly, impact willingness towards VCT, whose significance of association is to be identified.

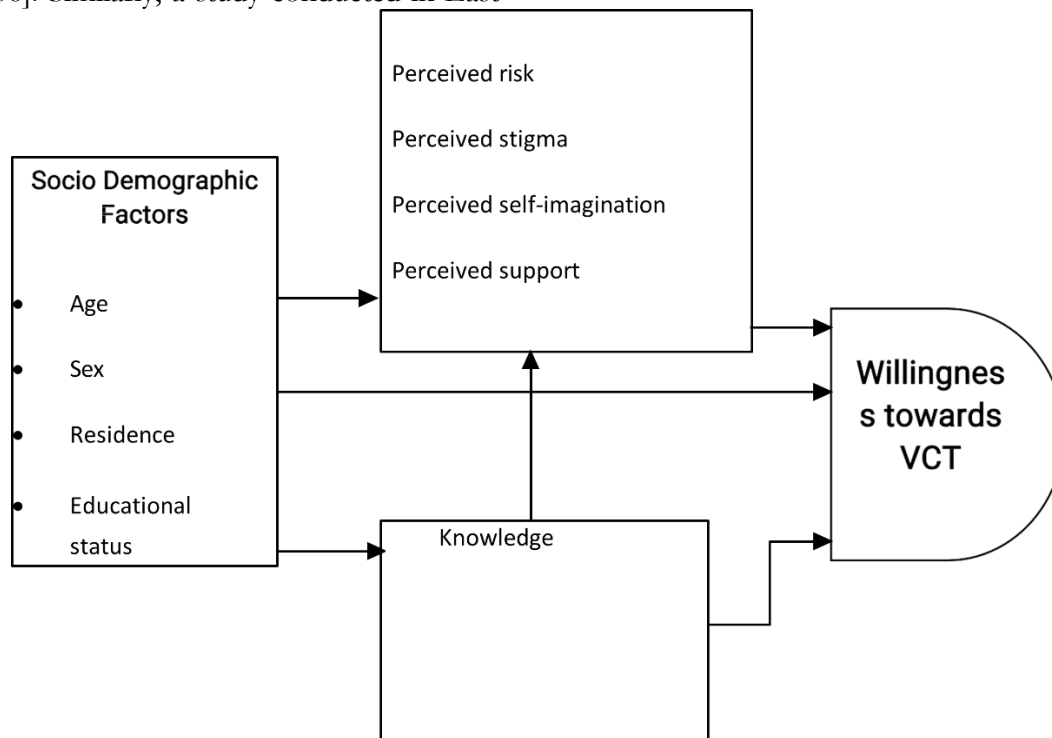


Figure 1: Conceptual framework developed from the literature review for a Study on willingness towards VCT among TB patients at Public Hospitals in Addis Ababa, Ethiopia; 2023(39-42)

Objectives

General Objective

To assess the willingness towards VCT and associated factors among TB patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Specific objective

To determine the proportion of TB patients who are willing to have VCT at Public Hospitals in Addis Ababa, Ethiopia, 2023

To identify factors associated with willingness towards VCT among TB patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Methods and Materials

Study area and period

The study was conducted at public Hospitals in Addis Ababa, Ethiopia's capital city. Addis Ababa has a population of 2,738,248 million with an annual growth rate of 2.1. The city is divided into eleven sub-cities and 99 kebeles (The lowest-level administrative unit in the town). This study will focus on 12 public hospitals in Addis Ababa. The hospitals are Tikur Anbessa Specialized Hospital, St. Peters Hospital, Alert Hospital, St. Paul Hospital Millennium Medical College, Zewditu Memorial, Yekatit 12, Minilik II, Ras Desta Damtew Hospital, Tirunesh Bejing Hospital, Dejazmach Balcha Hospital, Torhailoch Hospital, Police Hospital and Gandhi Memorial Hospital. The study was conducted from the 1st to the 30th of March, 2023.

Study design

A facility-based cross-sectional study was conducted.

Populations

- **Source population**

All TB-infected patients at public Hospitals in Addis Ababa were the source populations.

- **Study Population**

All the randomly selected TB-infected patients at public Hospitals in Addis Ababa were study populations.

Eligibility criteria

- **Inclusion criteria**

All TB-infected patients at public Hospitals in Addis Ababa were included in the study.

- **Exclusion criteria**

TB-infected patients who were unable to communicate, seriously ill, and pregnant women were excluded from the study.

Sample size determination and sampling procedure

- **Sample size determinations**

The sample size for the first objective was calculated using a single proportion formula, taking the following assumption.

- “p” is assumed to be proportion level, 73% has been taken (35)
- 95% confidence level and 5% degree of precision
- d=margin of error (0.05)
- $Z_{\pm\alpha/2}$ the standard normal value at a 95% confidence level (1.96). Fitting into the formula, the final sample size was

Using the formula for sample size n:

$$n = \frac{(Z_{\alpha/2})^2 \cdot p(1-p)}{d^2}$$

Where:

$Z_{\alpha/2}=1.96$ (for a 95% confidence level)

$p=0.73$ (assumed proportion)

$d=0.05$ (margin of error)

Substituting these values:

$$n = \frac{(1.96)^2 \cdot 0.73(1-0.73)}{(0.05)^2}$$

Calculating:

$$(1.96)^2 = 3.8416$$

$$0.73(1-0.73) = 0.73 \cdot 0.27 = 0.1971$$

$$(0.05)^2 = 0.0025$$

$$n = \frac{3.8416 \cdot 0.1971}{0.0025} = \frac{0.7581}{0.0025} \approx 303.24$$

Since the total population is less than 10,000, we apply the correction:

$$n_i = \frac{n}{1 + \frac{n}{N}}$$

Where $N = 710$

$$\begin{aligned}
 n_i &= \frac{303}{1 + \frac{303}{710}} \\
 &= \frac{303}{1 + 0.4268} \\
 &= \frac{303}{1.4268} \\
 &\approx 212.55
 \end{aligned}$$

Rounding gives:

$$n_i \approx 213$$

Adding 10% for non-response:

$$\text{Non-response} = 0.10 \times 213 = 21.3 \approx 22$$

$$\text{Final sample size: } n_{\text{final}} = 213 + 22 = 235$$

Initial sample size $n \approx 303n$

Adjusted sample size $n_i \approx 213n$

Final sample size $n_{\text{final}} = 235n$

- **Sampling procedure**

The five governmental hospitals found in Addis Ababa Menilik II referral Hospital, Ras Desta Hospital, St. Paul Hospital Millennium Medical College, Yekatit 12 Hospital Millennium Medical College and St. Peter Hospital) were selected using a simple random sampling method. The sample size was calculated proportionally for each Hospital chosen. Finally, the study participants were selected using a systematic sampling method. The

sampling fraction was determined using the formula.

$$k = \frac{N}{n}; \text{ which yields } k = \frac{470}{235} = 2.$$

The first sample was taken using simple random sampling, and the remaining samples were determined by adding the sampling fraction 2.

- **Sampling Procedure Overview**

Study Setting: The study was conducted in five governmental hospitals in Addis Ababa:

Menilik II Referral Hospital

Ras Desta Hospital

St. Paul Hospital Millennium Medical College

Yekatit 12 Hospital Millennium Medical College

St. Peter Hospital

- **Sampling Method**

Selection of Hospitals: Hospitals were selected using simple random sampling.

Proportional Sample Size Calculation: Each selected hospital's sample size was calculated proportionally.

Total sample size (N): 470

$$(k): \text{ Calculated as } k = \frac{N}{n} = 2$$

Sampling fraction (k): Calculated as k

- **Participant Selection**

The first participant was selected using simple random sampling.

Subsequent participants were selected systematically by adding the sampling fraction ($k = 2$) to the previous selection.

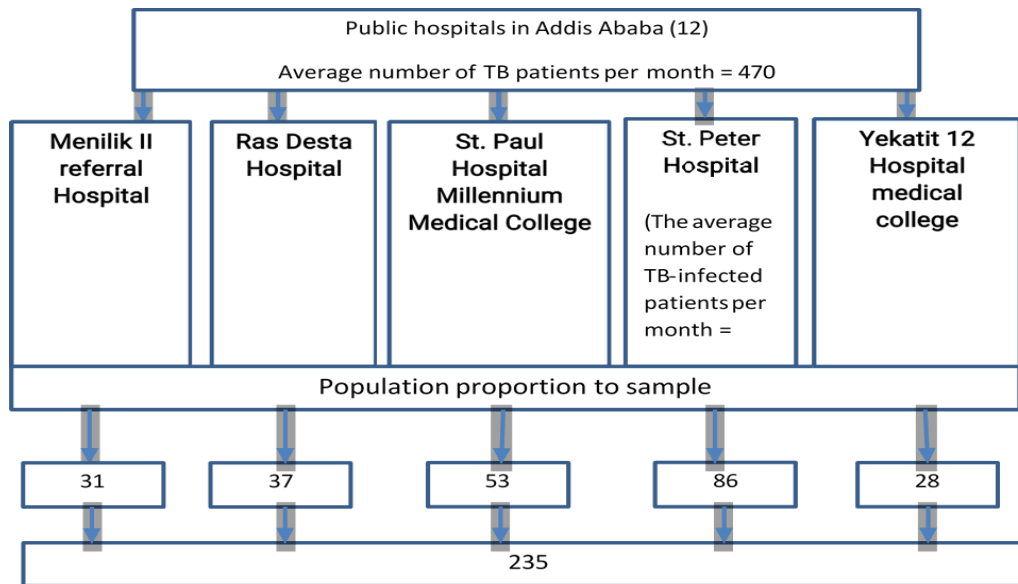


Figure 2: Schematic presentation of the sampling procedure for the study on willingness towards VCT and associated factors among TB-infected patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Variables

- **Dependent variables**

Willingness towards VCT (Yes, No)

- **Independent variables**

- **Socio demographic factors**

- Age
- Sex
- Residence
- Educational status
- Occupational status

- **Self-Perception**

- Perceived risk
- Perceived stigma
- Perceived self-imagination
- Perceived support
- Knowledge towards VCT

Operational definitions

Good knowledge: The mean of correct answers was computed, and those who scored a value greater than or equal to the mean were considered knowledgeable.

Poor knowledge: The mean of correct answers was computed, and those who scored a value

lower than or equal to the mean were considered knowledgeable.

Data collection tool and procedures

Data were collected by face-to-face interviews using pretested structured questionnaires. The questionnaire was developed by reviewing various relevant literature with reasonable modifications. First, it was prepared in English, translated to Amharic, and then returned to English to ensure consistency. Data were collected by using six diploma nurses and two public health officers as supervisors who were fluent in Amharic. The face-to-face interview technique was cascaded based on the questionnaire at the study participants' house after providing proper orientation for each participant on the purpose and usefulness of the study and after getting verbal consent.

Data Quality Assurance

A data collection tool was prepared after an intensive review of relevant literature and similar studies to ensure the data quality. A properly designed data collection instrument was provided after translation into Amharic, and appropriate training for data collectors and

supervisors. Intensive training that lasted two days was provided for both data collectors and supervisors by the principal investigator, which focused on the aim of the study, procedures, data collection techniques, the art of interviewing, ways of collecting the data, and clarification on how to manage the data collection process. Pretesting of the questionnaire was carried out in 5% of the samples at Zewditu Memorial Hospital one week before the data collection period. All necessary corrections were made based on the pretest result to avoid confusion and to better complete the questions. The collected data was reviewed and cross-checked daily for completeness and relevance before data entry.

Data Processing and Analysis

Data were coded, cleaned, and entered by Epi-data version 3.0.1 and exported to the statistical package for social science (SPSS) version 25.0. They were recorded, cleaned for inconsistency and missing values and finally analyzed. Descriptive statistics like frequency distributions and the mean were computed. A total of four questions, with "Yes" and "No" responses, were included in the questionnaire regarding the knowledge of the Study subjects about VCT.

Bivariate analysis was done primarily to check which independent variables have an association with that of the dependent variable. Bivariate and Multivariable logistic regression analysis was performed to identify the factors associated with a willingness towards VCT at a significance level of p-value <0.25 with 95% CI of COR and <0.05 with 95% CI of AOR, respectively. Finally, adjusted odds ratios (AOR) with 95% CI were determined factors associated with a willingness towards VCT and statistically significant variables were declared at a p-value < 0.05.

Ethical Considerations

Ethical clearance was obtained from Addis Ababa Health Bureau after ethical approval from Yanet College's ethical review board. The data was collected after obtaining informed consent from the Hospital's chief executive officer. All the necessary measures were taken to maintain and ensure confidentiality and the benefit of all patients. In the data collection form, no mention was made of the patients' names, addresses, telephone numbers, the names of the providers or anything related to the study.

Moreover, an anonymous questionnaire ensured the confidentiality of the information, and the data was kept secure. On the other hand, the study's findings were believed to benefit the patients indirectly by improving the health care system, which will maximize the benefit and minimize the harm.

Dissemination plan

The study's final report will be presented and submitted to Yanet College. The result will also be communicated to the Addis Ababa Health Bureau, respective health departments, and the hospitals with documentation and possibly a presentation. Efforts will be made to present this study in different symposiums, and the paper will be sent for peer-reviewed publication.

Results

Socio demographics characteristics

This study was conducted with a total of 235 study participants, which yields a response rate of 100%. The minimum and maximum age of the study participants was 23 and 45 years old, respectively, with a mean of 33+7 years old. More than half (128, 54.5%) of the study participants have aged below the mean age, and 173(73.6%) of the respondents were males. Most study participants (96, 40.9%) were college students and above; a small number (21, 8.9%) had no formal education.

Table 1: Socio-demographic characteristics of TB-infected patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Variables	Category	Frequency (n)	Percentage (%)
Age (in years)	Below average	128	54.5
	More than average	107	45.5
Sex	Male	173	73.6
	Female	62	26.4
Level of education	No formal education	21	8.9
	Primary	54	23.0
	Secondary	64	27.2
	College and above	96	40.9
Occupation	Government employee	65	27.7
	Private employee	82	34.9
	Student	42	17.9
	Merchant	46	19.6

Self-perception and related characteristics

In considering self-perception, 160(68.1%) of the study participants have a perceived risk of acquiring HIV infection and 118(50.2%)

perceived stigma if HIV became positive. Similarly, 171(72.8%) of the respondents have self-imagination, and 186 (79.1%) perceived they need support if HIV is positive.

Table 2: Self-perception and related characteristics of TB-infected patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Variables	Category	Frequency (n)	Percentage (%)
Perceived risk	Yes	160	68.1
	No	75	31.9
Perceived stigma	Yes	118	50.2
	No	117	49.8
Perceived self-imagination	Yes	171	72.8
	No	64	27.2
Perceived need support	Yes	186	79.1
	No	49	20.9

Knowledge on VCT

Most of the study participants, 227(96.6%), have information about VCT. In this study, 133(56.6%) participants scored more than the mean score of the knowledge assessment questions. Therefore, the proportion of TB-infected patients with good knowledge of VCT was 56.6% (95%CI: 50.2, 62.6). Among the respondents, (85, 36.2%) responded HIV testing is given with counseling, and 26(11.1%)

responded HIV test is conducted voluntarily. Similarly, 32(13.6%) of the study participants know where VCT is provided, and 19(8.1%) of the respondents reply that VCT is essential for preventing and controlling HIV.

Willingness towards VCT

In this study, 184(78.3%) TB-infected patients were willing to undergo VCT. Therefore, the prevalence of willingness toward VC among

TB-infected patients at Public Hospitals in Addis Ababa was 78.3% (95% CI: 72.8, 83.4).

Factors Associated with willingness towards VCT

The odds of the likelihood of having willingness towards VCT among TB-infected patients who were studied primary education was sixfold higher than those who have no formal education (AOR: 6.32; 95%CI: 1.65, 24.25). Government-employed TB patients were 5.85 times more likely to be willing to engage in VCT than merchants (AOR: 5.85; 95%CI: 1.78, 19.22). Similarly, willingness towards VCT was 3.35 times higher among private employee TB-infected patients than merchants (AOR: 3.35; 95%CI: 1.12, 10.01). In addition, students were

3.71 times more likely to be willing towards VCT than merchants (AOR: 3.71; 95%CI: 1.10, 12.49). The odds of the likelihood of having willingness towards VCT among patients who have poor knowledge of VCT was threefold higher than that of their counterparts who have inadequate knowledge (AOR: 3.12; 95%CI: 1.36, 7.16). TB-infected patients who have perceived risk were 6.58 times more likely to be willing towards VCT as compared with those who have no perceived risk (AOR: 6.58; 95%CI: 2.44, 17.73). In addition, the odds of the likelihood of being willing towards VCT among TB-infected patients who have perceived stigma was 15 times higher than that of their counterparts who have no perceived stigma (AOR: 14.95; 4.98, 44.91).

Table 3: Factors associated with willingness towards VCT among TB-infected patients at Public Hospitals in Addis Ababa, Ethiopia; 2023

Variables	Category	Willingness towards VCT		COR (95%CI)	AOR (95%CI)
		Yes	No		
Sex	Male	141	32	1.95(1.01, 3.78)*	2.16(0.98, 4.75)
	Female	43	19	1	1
Level of education	No formal education	11	10	1	1
	Primary	44	10	4.0(1.34, 11.99)*	6.32(1.65, 24.25)**
	Secondary	54	10	4.91(1.65, 14.61)*	2.44(0.67, 8.87)
	College and above	75	21	3.25(1.21, 8.68)*	2.58(0.78, 8.56)
Occupation	Government employee	54	11	2.62(1.08, 6.36)*	5.85(1.78, 19.22)**
	Private employee	70	12	3.11(1.31, 7.37)*	3.35(1.12, 10.01)**
	Student	30	12	1.33(0.54, 3.29)	3.71(1.10, 12.49)**
	Merchant	30	16	1	1
Knowledge on VCT	Poor	70	32	1	1
	Good	114	19	2.74(1.45, 5.21)*	3.12(1.36, 7.16)**
Perceived risk	Yes	132	28	2.09(1.10, 3.95)*	6.58(2.44, 17.73)**

	No	52	23	1	1
Perceived stigma	Yes	79	39	4.32(2.12, 8.78) *	14.95(4.98, 44.91) **
	No	105	12	1	
*Indicates variable having P-value<0.25inbivariateanalysisand **indicates variables having-value<0.05inmultivariableanalysis					

Discussion

Voluntary Counseling and Testing (VCT) is proven to be one of the most potent weapons in halting the spread of HIV/AIDS. It is known to be an essential component of HIV/AIDS prevention strategies. Even though various studies have shown low utilization of VCT services, particularly in developing countries, this study tried to look into the level and associated factors of willingness towards VCT among TB patients.

The proportion of TB-infected patients with good knowledge of VCT was 56.6% (95%CI: 50.2, 62.6). A comparable report was found in Ethiopia [43]. Though the degree of awareness varies, reports from Nigeria and Tanzania indicated good knowledge about VCT [44-46]. However, community-based research from China showed a significant level of lack of knowledge about HIV and VCT on HIV [42]. This might be due to the difference in the study participants' socio-demographic characteristics, especially the educational level.

The prevalence of willingness towards VC among TB-infected patients at Public Hospitals in Addis Ababa was 78.3% (95% CI: 72.8, 83.4). This study finding was higher than in Tanzania (30.3%) [39]. This proportion falls far short of the UNAIDS target of 90% of people knowing their HIV status. Studies have shown that VCT services could be more utilized in many developing countries despite the growing knowledge of the benefits of testing [47, 48].

Level of education was found to be a factor associated with willingness towards VCT among TB patients. The odds of the likelihood of having willingness towards VCT among TB-infected patients who were studied primary education was sixfold higher than those who

have no formal education (AOR: 6.32; 95%CI: 1.65, 24.25). Government-employed TB patients were 5.85 times more likely to be willing to engage in VCT than merchants (AOR: 5.85; 95%CI: 1.78, 19.22). This finding is consistent with the study conducted in Zambia that suggests that educated women may be more knowledgeable about VCT and understand the benefits of testing for HIV [49]. This finding reaffirms the results from other Sub-Saharan African countries

This shows that TB-infected patients with a secondary education level or above will likely be more knowledgeable about VCT [41, 50]. Furthermore, studies on the utilization and acceptability of VCT showed that many TB patients decline HIV testing due to a poor understanding of VCT [40, 41, 51].

Occupation was identified as a factor associated with willingness towards VCT. Willingness towards VCT was 3.35 times higher among private employee TB-infected patients than merchants (AOR: 3.35; 95%CI: 1.12, 10.01). In addition, students were 3.71 times more likely to be willing towards VCT than merchants (AOR: 3.71; 95%CI: 1.10, 12.49). This might be related to the mandatory testing during employment, which would force job applicants to know themselves as they are living with HIV/AIDS or who have the potential to be diagnosed as HIV positive [52]. In addition, information regarding HIV was better disseminated to employees and students at school. The knowledge gained encourages TB-infected patients to be willing to undergo VCT. Knowledge was found to be a factor associated with willingness towards VCT. The odds of the likelihood of having willingness towards VCT among patients who have a poor understanding of VCT was threefold higher than that of their

counterparts who have inadequate knowledge (AOR: 3.12;95%CI: 1.36, 7.16). This study aligned with the survey conducted in North West Ethiopia [53]. This finding is supported by the assumption that VCT users could have more exposure/information/knowledge regarding HIV/AIDS before they came to VCT centers [15]. Again, this may indicate that the information disseminated through health education and counseling sessions may benefit from including such topics during the respective sessions and continuous mass media activity.

Perceived risk was identified as a factor associated with willingness to undergo VCT among TB patients. TB-infected patients who had perceived risk were 6.58 times more likely to be willing to undergo VCT than those who had no perceived risk (AOR: 6.58; 95% CI: 2.44, 17.73). This finding was consistent with the study conducted in North West Ethiopia [53]. The odds of the likelihood of being willing towards VCT among TB-infected patients who have perceived stigma was 15 times higher as compared with their counterparts who have no perceived stigma (AOR: 14.95; 4.98, 44.91). This finding aligned with the study conducted at National Hospital Ambulatory Medical Care [54]. Potentially, this might be related to people who may be reluctant to test because the discovery of a positive HIV test result may lead to the loss of friendship, family ties, employment and housing, dismissal from school, and denial of health/ life insurance and health care [55]. Apart from the consequences of a positive test result, the decision to test for HIV can lead to stigmatization [56]. The decision to avoid testing for HIV, therefore, allows people to prevent the stigmatization associated both with testing and a positive test result.

Limitations of the Study

The study was cross-sectional by its nature, so it may not indicate the cause-and-effect

relationship. Similarly, since it was a facility-based study, it may be limited to community members.

Conclusions and Recommendations

Conclusion

Even though the proportion of TB-infected patients who are willing to VCT was higher than in the studies conducted before, it is lower than the UNAIDS target for 90% of people to know their HIV status. In addition, level of education, occupation, knowledge, perceived risk, and perceived stigma were independent factors associated with willingness to engage in VCT.

Recommendations

The government should work to achieve the WHO standard for testing to know the HIV status of patients.

Strategies are required to deliver information to those with a lower education level.

Health professionals should work to deliver knowledge on VCT at both static and outreach programs.

TB patients who have a lower level of education should have to test themselves for HIV.

Acronyms and Abbreviations

- AIDS Acquired Immune Deficiency Syndrome
- AOR Adjusted Odd Ratio
- ART Antiretroviral therapy
- HIV Human Immune Virus
- PITC Provider Initiated HIV Testing and Counseling
- PLWHA Peoples Living With HIV/AIDS
- PMTCT Prevention of Mother-to-Child Transmission TB Tuberculosis
- OPD Outpatient Department
- UNAIDS United Nations Programme on HIV/AIDS
- VCT Voluntary counseling and testing
- WHO World Health Organization

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