Stigma and associated sex disparities among patients with tuberculosis in Uganda: a cross-sectional study

Juliet N. Sekandi (ID)**, Trang Quach, Ronald Olum** (ID)**, Damalie Nakkonde, Leila Farist, Rochelle Obiekwe, Sarah Zalwango and Esther Buregyeya**

Abstract

Background: Tuberculosis (TB) is the leading cause of death from a single infectious agent globally. The stigma associated with TB, encompassing self, anticipated, and public stigma, has significant negative effects on treatment adherence. In Uganda, limited data exist on the prevalence of stigma and its relationship with sex among patients with TB.

Objectives: We aimed to evaluate the prevalence of three types of stigma and their relationship with the sex of patients undergoing TB treatment.

Design: Cross-sectional study.

Methods: This cross-sectional study was conducted among patients living with TB attending selected TB clinics in Kampala, Uganda, between July 2020 and March 2021. We collected data on sociodemographics and used 13 items to capture the self, anticipated, and public stigma from which we composed the dependent variables. We employed multivariable logistic regression analysis to evaluate the association between sex and the three stigma types. Additionally, we considered potential confounders such as age, HIV, and employment status. Statistical significance was defined as $p < 0.05$.

Results: In this study, we enrolled 144 participants with a mean age of 35.8 years (standard deviation = 12). Half of the participants were female, 44.4% had a secondary education, 37.5% were unemployed, and 32.6% were living with both HIV and TB. The prevalence of self-stigma was 71.1%, anticipated stigma was 75.7%, and public stigma was 41.7%. Significant factors associated with self-stigma were female sex (adjusted odds ratio (AOR): 2.35, 95% confidence interval (CI): 1.02–5.74) and unemployment (AOR: 2.95, 95% CI: 1.16–8.58). Living with HIV was significantly associated with anticipated stigma (AOR: 3.58, 95% CI: 1.38–11.23). However, none of the evaluated variables showed a significant association with public stigma.

Conclusion: Our study showed a relatively high prevalence of self, anticipated, and public stigma among TB patients. Notably, females and unemployed individuals were at a higher risk of self-stigma, while those with HIV/AIDS and TB were more likely to report anticipated stigma. To combat stigma effectively, interventions should be tailored to cater to sex-specific needs and persons living with HIV. Future research should delve further into determinants of TB-related stigma in high-burden settings.

Keywords: anticipated-stigma, public stigma, self-stigma, tuberculosis disease, Uganda

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Introduction

Tuberculosis (TB) is the leading cause of death by a single infectious disease globally.[1] In 2023, an estimated 10.8 million new cases and 1.25 million deaths were attributed to TB globally.[1] Up to 69% of TB cases and 81% of TB-related deaths were reported in Southeast Asia and the African Region.[1] Uganda is among the 30 countries designated by the World Health Organization to be a high-burden country for TB/HIV co-infection, with an incidence rate of 198 cases per 100,000 and a mortality rate of 35 per 100,000 for TB.[1] In 2023, Uganda also joined the list of the top 30 high TB burden countries.[1]

The World Health Organization End TB Strategy set ambitious goals to reduce TB deaths and incidence by 95% and 90%, respectively, and to reduce to zero the percentage of families affected by TB-related catastrophic costs by 2035, compared to 2015.[2] Achieving these goals requires expanding patient-centered interventions, fostering cross-sectoral collaborations and commitments, and financing research and innovations while upholding equity.[3] Despite progress over the decades, TB cases and deaths increased in 2021 due to the COVID-19 pandemic, causing disruptions in TB health services related to stigma and sex disparities, complicating achieving the End TB Strategy goals.[2]

Health-related stigma for people living with TB impacts the TB care continuum, including contact tracing and surveillance.[4–10] Health-related stigma is a "social process or related personal experience characterized by exclusion, rejection, blame, or devaluation that results from experience or reasonable anticipation of an adverse social judgment about a person or group identified with a particular health problem."[11] Stigma is considered a multidimensional phenomenon due to the intersection of diverse institutional and societal attitudes.[7] There are at least three types of stigma that can manifest in people living with TB.[12] *Self-stigma* is the idea that individuals may endorse negative stereotypes and behave or think according to these fake portrayals and negative messages. *Anticipated stigma* is the worry that one will be devalued post-disclosure of a TB diagnosis. *Public stigma* describes negative attitudes, beliefs, and behaviors held by the wider community or general public.[12,13]

Stigma is also a known social determinant of health, and its presence in any form among patients with TB can result in a delay in seeking care, diagnosis, and nonadherence to treatment.[7,8] Several studies have reported on the prevalence of stigma among patients with TB ranging from 20% to 82%, varying with the burden of disease, socioeconomic status, and cultural context.[9,14–18] In four lower-level urban clinics in Uganda's capital city, the prevalence of stigma among patients with TB was 52.[15] When classified by the type, perceived/anticipated stigma among patients with TB was reported at 52% in a study in Uganda,[15] 51% in Cambodia (perceived stigma),[19] and 42.4% in Ethiopia,[20] with 45.5% of patients in a study in Delhi, India, experiencing stigma from family and friends and 58.2% at the workplace.[21] Public stigma ranged from 1.4% to 25.5% in non-household settings in Zambia and South Africa and 2.3% to 27.9% in household settings.[22] Internalized stigma was reported at 16.4% in Zambia and South Africa and higher in non-household settings.[22] In Cambodia, a total of 56% of participants experienced self-stigma.

Factors significantly associated with stigma are multilevel and complex. At the individual level, age,[17] sex,[9,14,23] race,[24] level of education,[14,17,25] income levels,[14] disease knowledge,[15] perceptions,[15] severity,[14] and HIV co-infection[7,14,19] affect the experience of stigma in patients with TB. In settings with high HIV/TB burden, HIV stigma also correlates with TB stigma.[24] Family characteristics such as lower socioeconomic status, poor social support, family size, and cohesion,[7,14,16,26,27] along with community factors like myths and misconceptions of TB,[14] contribute to stigma for patients living with TB. Unfavorable religious and cultural norms that regard TB as a result of spiritual mishaps or promiscuity can also exacerbate stigma.[14] TB stigma has also been associated with substance use, intensive phase of TB treatment, pulmonary TB, and rural residency.[19,20]

Previous studies on the relationship between TB-related stigma and sex differences report conflicting findings.[14] Most studies indicated that females with TB may experience stigma at disproportionately higher levels than males.[6,7,9,16,23] In contrast, two studies from South Africa and India found that males were more likely to experience TB-related stigma than females.[28] Studies done

in Uganda,[15] Ethiopia,[20,24,27] India,[21] South Africa,[29] and Cambodia[19] did not find significant sex differences in stigma among patients with TB.[15] Gender appears to modulate TB-related stigma in multiple ways, ranging from perceptions regarding TB acquisition to the impact of the disease on their livelihoods.[14] Women often face higher levels of stigma due to societal norms that associate illness with failure to fulfill domestic roles, impacting their mental health and social interactions.[14,30] In some cultures, men may experience significant stigma as well, as TB can be perceived as a threat to their role as providers, leading to social isolation and decreased economic opportunities.[14,30]

To the best of our knowledge, none of the Ugandan studies wholly addressed the three types of stigma. This study sought to estimate the prevalence of self-, anticipated-, and public stigma and determined whether sex was associated with each type of stigma among patients with TB in Uganda.

Methods

Study design
This is a cross-sectional study of the baseline data collected from a larger intervention study that evaluated a video-observed therapy for monitoring treatment adherence among patients with TB between July 2020 and March 2021. The larger trial protocol was published.[31] The study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (Supplemental File 1).

Study setting
The study was conducted at TB treatment clinics in five health facilities in Kampala, Uganda's capital city. The health facilities included Mulago National Referral Hospital, Lubaga Hospital, Kitebi Health Center IV, Kawaala Kitebi Health Center IV, and Kisenyi Health Center IV. Mulago National Referral Hospital is the largest public hospital in Uganda and receives referrals from health facilities in the country and neighboring countries. Lubaga Hospital is one of the largest private-not-for-profit hospitals in Uganda, managed by the Uganda Catholic Medical Bureau.

Kitebi, Kawaala, and Kisenyi Health Centers IV are public primary care facilities in Kampala's major suburbs. They are managed by the Kampala City Council Authority.

Study population
The study population consisted of all patients receiving treatment for TB from the selected study sites. We included data from all 144 participants in the larger study for this analysis. The detailed sample size calculation is published in the study protocol.[31]

Inclusion criteria. Adults aged 18–65 with a confirmed diagnosis of drug-susceptible TB, either as a new or retreatment category, treated for no more than 1 month, and had provided informed consent were included. In addition, they had to be residents of Kampala for the 6-month treatment period for easy follow-up, speaking either Luganda or English.

Exclusion criteria. Participants were excluded if they were known to have any form of drug-resistant TB, were too ill to withstand the duration of the study procedures at enrollment, and had self-reported cognitive, motor, visual, or hearing disability that could hinder the proper use of the assigned intervention.

Data collection
Data were collected using a structured interviewer-administered questionnaire developed from a literature review of previous studies, translated to Luganda, and back-translated to English (Supplemental File 2). The interview was conducted by a trained research assistant. The baseline questionnaire collected information regarding the participants' TB diagnosis, sociodemographic data, phone ownership, experience with smartphones and technology, transportation, social and family support, privacy concerns, personal knowledge of TB, and community perception of TB.[31]

Key variables and definitions
Sex, measured as male or female, was the primary independent variable of interest. The dependent variables were self-stigma, anticipated stigma, and public stigma. Other variables included age,

level of education, religion, marital status, number of other household members, and HIV status at baseline.

Measurement of stigma

A 13-item instrument was constructed from USAID's TB Stigma Measurement Guidance to measure three types of stigma, including self, anticipated, and public stigma.[13] Self-stigma was conceptualized using three items; anticipated-stigma was conceptualized with three items, and public-stigma was conceptualized with seven items. First, the response questions about stigma originally captured with a four-point Likert scale (1 = "strongly agree," 2 = "agree," 3 = "disagree," and 4 = "strongly disagree") were converted to dichotomous responses. The responses "agree" and "strongly agree" were then collapsed to "Yes," while "disagree" and "strongly disagree" were collapsed to "No." A composite variable of stigma was created based on responses to the specific domain question items to determine the presence or absence of the three types of stigmas. For example, if the response was yes on any of the three questions assigned to self-stigma, the outcome was coded "1 = Yes"; if none, it was coded as "0 = No." The same data processing was repeated to create a composite outcome variable for anticipated- and public-stigma. The Cronbach alpha coefficient for the construct of stigma was 0.77, suggesting the scale we used had an acceptable internal consistency. However, only the subscale for public stigma (0.87) was acceptable, while the other two subscales, self-stigma (0.46) and anticipated stigma (0.38), were observed to be unacceptable.

Data analyses

Descriptive statistics, including frequencies, percentages, mean, standard deviation (SD), median, and interquartile range (IQR), were done. The overall prevalence for each type of stigma was estimated and then stratified by sex. To compare the distribution of the types of stigma across sex, we conducted chi-square tests. Univariate and multivariable logistic regression analyses were performed to evaluate the associations between sex with self, anticipated, and public stigma. Age, education, employment status, number of household members, and HIV status were covariates considered potential confounders of the sex and

stigma relationship. Crude and adjusted odds ratios (aOR) were presented with a 95% confidence interval (CI) and *p*-values. Associations with $p < 0.05$ were considered significant. All statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC).

Results

A total of 144 patients with TB, half of whom (50%) were females, were enrolled. The mean age was 35.8 years (SD = 12.0), and about one-third were between the ages of 24 and 34 (Table 1). Nearly half (44.4%) of participants had secondary school as the highest level of education, 45% were married, and 37.5% were unemployed. The mean number of other household members was 4.3 (SD = 2.7), with more than half (56.9%) reporting one to four other household members. Over one-third of the participants (31.9%) self-reported as HIV-positive at baseline.

Item analysis of stigma questions stratified by sex

Of the three items assessing self-stigma, the vast majority (70.1%) of participants reported feeling uncomfortable taking their TB medicine in the presence of any person from their community. Moreover, more females (75% vs 25%) than males were not comfortable taking their medication publicly than males. Additionally, 70.1% of the participants reported feeling anticipated stigma, expressed as the feeling that people in their community would not offer support if they were aware of their TB diagnosis. More women than men (76.4% vs 63.9%) anticipated getting no community social support than men. Public stigma to TB was low, ranging from 8.3% to 27.1%, as expressed through the responses to the seven items (Table 2).

Prevalence of stigma, sex differences, and associated factors

Self-stigma. The overall prevalence of self-stigma was 77.1%, and there was a significant sex difference, with females having a higher prevalence than males (87.4% vs 69.4%, $p = 0.047$; Figure 1 and Table 3). This association was established in multivariate logistics regression. Simple logistic regression analysis indicated that being female was significantly associated with reported

Table 1. Baseline characteristics of patients with TB enrolled in the study.

Variables	Sex			
	Male, *n* (%)	Female, *n* (%)	Total, *n* (%)	*p*
N	72 (50.0)	72 (50.0)	144 (100.0)	
Age in complete years (median, IQR)	35.0 (20.0)	30.5 (15.5)	34.0 (19.5)	0.074
Age category				
18–24	11 (15.3)	16 (22.2)	27 (18.8)	0.510
25–34	24 (33.3)	24 (33.3)	48 (33.3)	
35–44	14 (19.4)	16 (22.2)	30 (20.8)	
45–65	23 (31.9)	16 (22.2)	39 (27.1)	
Highest level of education				
No education or primary	25 (34.7)	30 (41.7)	55 (38.2)	0.221
Secondary	37 (51.4)	27 (37.5)	64 (44.4)	
Tertiary/University	10 (13.9)	15 (20.8)	25 (17.4)	
Religion				
Catholic	26 (36.1)	25 (34.7)	51 (35.4)	0.180
Protestant	21 (29.2)	12 (16.7)	33 (22.9)	
Muslim	15 (20.8)	17 (23.6)	32 (22.2)	
Other	10 (13.9)	18 (25.0)	28 (19.4)	
Marital status				
Married	29 (40.3)	26 (36.1)	55 (38.2)	0.281
Previously married	8 (11.1)	15 (20.8)	23 (16.0)	
Single/Never married	35 (48.6)	31 (43.1)	66 (45.8)	
Employment status				
Yes	51 (70.8)	39 (54.2)	90 (62.5)	0.039
No	21 (29.2)	33 (45.8)	54 (37.5)	
Household size	3.0 (3.0)	4.5 (4.0)	4.0 (3.0)	0.036
Categorized household size (median, IQR)				
0	2 (2.8)	0 (0.0)	2 (1.4)	0.060
1–4	46 (63.9)	36 (50.0)	82 (56.9)	
5–13	24 (33.3)	36 (50.0)	60 (41.7)	
HIV status				
Negative	48 (66.7)	50 (69.4)	98 (68.1)	0.721
Positive	24 (33.3)	22 (30.6)	46 (31.9)	
IQR, interquartile range.				

Table 2. Responses to 13-item stigma questions stratified by sex.

Variables	Total *N* (144), *n* (%)	Male (*n* = 72), *n* (%)	Female (*n* = 72), *n* (%)	*p*-Value
Self-stigma				
Do you feel afraid or ashamed of telling any family or household members about your TB diagnosis?				
No	111 (77.1)	60 (83.3)	51 (70.8)	0.113
Yes	33 (22.9)	12 (16.7)	21 (29.2)	
How would you feel if anyone in the community found out about your TB diagnosis?				
Not worried	83 (57.6)	47 (65.3)	36 (50.0)	0.092
Shame/Worry	61 (42.4)	25 (34.7)	36 (50.0)	
Would you be comfortable taking your TB medicine in the presence of any person from your community?				
No	101 (70.1)	47 (65.3)	54 (75.0)	0.275
Yes	43 (29.9)	25 (34.7)	18 (25.0)	
Anticipated stigma				
Do you think it would be difficult for you to ask your family or household members for the support and care you need because you have TB?				
No	109 (75.7)	55 (76.4)	54 (75.0)	0.980
Yes	33 (22.9)	16 (22.2)	17 (23.6)	
Don't know	2 (1.4)	1 (1.4)	1 (1.4)	
If your family or household members find out about your TB diagnosis, how do you think it will affect your relationship with them?				
No support	18 (12.5)	9 (12.5)	9 (12.5)	1.000
Support	126 (87.5)	63 (87.5)	63 (87.5)	
Do you think that people in your community would offer any needed support to you even if they know you have TB disease?				
No	101 (70.1)	46 (63.9)	55 (76.4)	0.149
Yes	27 (18.8)	18 (25.0)	9 (12.5)	
Don't know	16 (11.1)	8 (11.1)	8 (11.1)	
Public stigma				
Some people may not want to eat or drink with friends who have TB				
No	129 (89.6)	62 (86.1)	67 (93.1)	0.275
Yes	15 (10.4)	10 (13.9)	5 (6.9)	
Some people feel uncomfortable about being near a person who has had TB				
No	130 (90.3)	66 (91.7)	64 (88.9)	0.778
Yes	14 (9.7)	6 (8.3)	8 (11.1)	

(Continued)

Table 2. (Continued)

Variables	Total *N* (144), *n* (%)	Male (*n* = 72), *n* (%)	Female (*n* = 72), *n* (%)	*p*-Value
Some people do not want those with TB playing with their children				
No	121 (84.0)	61 (84.7)	60 (83.3)	1.000
Yes	23 (16.0)	11 (15.3)	12 (16.7)	
Some people keep their distance from people with TB				
No	132 (91.7)	65 (90.3)	67 (93.1)	0.763
Yes	12 (8.3)	7 (9.7)	5 (6.9)	
Some people do not want to talk to others with TB				
No	112 (77.8)	51 (70.8)	61 (84.7)	0.071
Yes	32 (22.2)	21 (29.2)	11 (15.3)	
Some people may not want to eat or drink with family members who have TB				
No	123 (85.4)	61 (84.7)	62 (86.1)	1.000
Yes	21 (14.6)	11 (15.3)	10 (13.9)	
Some people prefer not to have people with TB living in their community				
No	105 (72.9)	54 (75.0)	51 (70.8)	0.708
Yes	39 (27.1)	18 (25.0)	21 (29.2)	
TB, tuberculosis.				

self-stigma in patients with TB (crude odds ratio: 2.44, 95% CI: 1.10–5.68; Table 3). After adjusting for covariates, female patients with TB were 2.35 times more likely to report self-stigma (95% CI: 1.02–5.74) compared to their male counterparts. Unemployed patients with TB were also 2.95 times more likely to report self-stigma (95% CI: 1.16–8.58) than employed patients. While self-stigma was higher among people living with HIV (82.6% vs 75.3%), this was not statistically significant (Figure 2 and Table 3).

Anticipated stigma
Anticipated stigma was present in 75.7% of patients with TV, but this was not significantly different by sex (79.2% vs 72.2%, *p* = 0.437; Figure 1 and Table 4). At multivariable logistic regression, female patients with TB were more likely to report anticipated stigma, but this association was not statistically significant after adjusting for HIV status (adjusted odds ratio

(AOR): 1.64, 95% CI: 0.74–3.71). Living with HIV was significantly associated with anticipated stigma (AOR: 3.58, 95% CI: 1.38–11.23) after adjusting for confounding by sex (Table 4 and Figure 2).

Public stigma
Less than half (41.7%) of the patients had public stigma, with slightly fewer women having public stigma than men. However, this was not statistically significant (40.3% vs 41.7%, *p* = 0.866; Figure 1 and Table 5). Female sex (odds ratio: 0.89, 95% CI: 0.46–1.73) and HIV positivity (odds ratio: 1.30, 95% CI: 0.64–2.65) were significantly associated with public stigma in logistic regression analyses (Table 5).

Discussion
In this study, we aimed to estimate the prevalence of three types of stigma related to TB and their
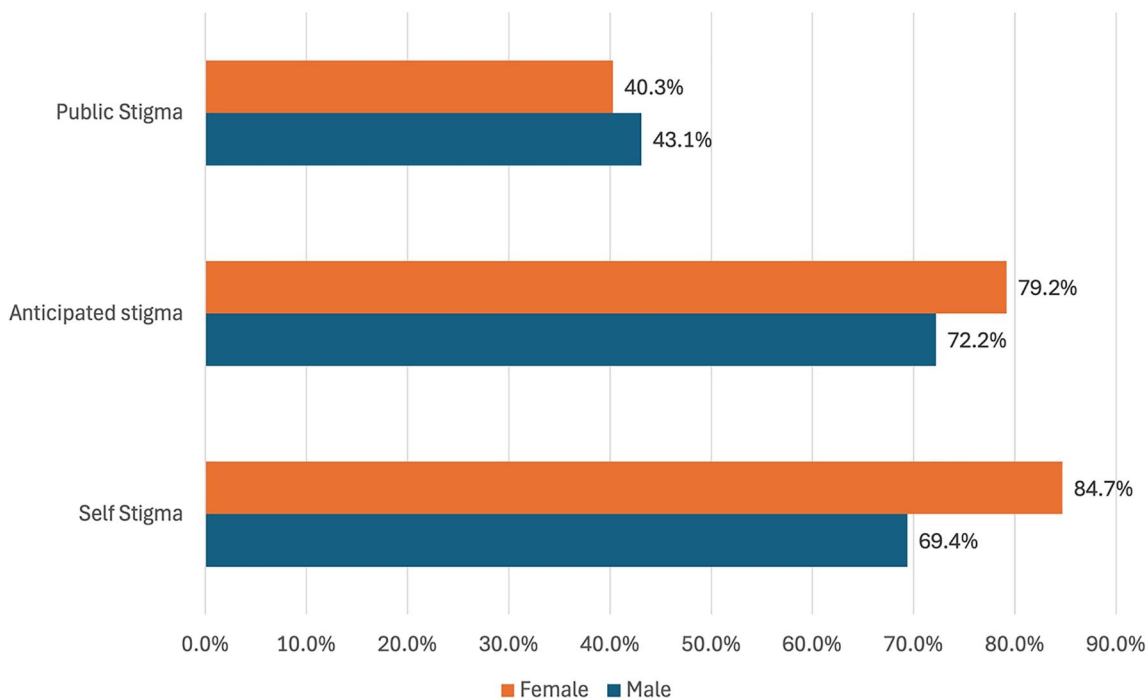
Figure 1. Prevalence of the three types of stigma stratified by sex.

association with sex among patients confirmed to have the disease in Kampala, Uganda. We found a high prevalence of self-stigma and anticipated stigma and a low level of public stigma. We also found that being female and living with HIV were significantly associated with self- and anticipated stigma, respectively. To our knowledge, this study is among the first to examine the three types of stigma among patients with TB in Uganda.

Self-stigma refers to the concept where individuals internalize negative stereotypes and adjust their behaviors or thoughts based on these inaccurate and negative representations.[12] Our study found a higher prevalence of three types of stigma in patients with TB compared to other published studies. Two studies in Zambia and Ethiopia specifically examined self-stigma among TB patients and reported a prevalence of 48.3% and 50.4%, respectively.[9,27] These levels are lower than the prevalence of 77.1% for self-stigma reported in our study. The differences in prevalence between our study and other studies could be due to variations in stigma measurement, sample size, cultural context, and settings. The study in Zambia utilized three questions adapted from the literature to assess stigma, whereas the Ethiopian study

adapted items from a generic guide by the World Health Organization.[9,27] Our results align with the 2020–2024 Uganda National Strategic Plan that highlights the need for targeted interventions to reduce self-stigma among people living with TB.[13]

Anticipated stigma, also known as perceived stigma, refers to the fear that revealing a TB diagnosis will lead to being perceived less favorably by others.[12] We found that nearly three in four patients (75.7%) with TB in Uganda experience anticipated stigma. This prevalence is higher than levels of anticipated/perceived stigma in patients with TB, which ranged from 42.4% to 52% reported in other studies done in Uganda, Ethiopia, India, and Cambodia.[15,19–21] In India, the prevalence of perceived stigma among patients with TB when dealing with family and friends was 45.5% and 58.2% when at the workplace.[21] These studies were conducted in variable settings, including both urban and rural TB clinics and community settings. They used scales different from our study to measure stigma. Some used the Van Rie Scale,[32] while others used new or adapted scales to measure anticipated stigma.

Table 3. Logistic regression analysis of factors associated with self-stigma.

Variable	No self-stigma, *n* (%)	Self-stigma, *n* (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex				
Male	22 (30.6)	50 (69.4)	1.00	1.00
Female	11 (15.3)	61 (84.7)	2.44 (1.10–5.68)	2.35 (1.02–5.74)
Age category (years)				
45–65	9 (23.1)	30 (76.9)	1.00	
35–44	11 (36.7)	19 (63.3)	0.52 (0.18–1.48)	
25–34	7 (14.6)	41 (85.4)	1.76 (0.59–5.43)	
18–24	6 (22.2)	21 (77.8)	1.05 (0.33–3.55)	
Highest level completed in school				
No education or primary	12 (21.8)	43 (78.2)	1.00	
Secondary	14 (21.9)	50 (78.1)	1.00 (0.41–2.39)	
Tertiary/University	7 (28.0)	18 (72.0)	0.72 (0.25–2.20)	
Marital status				
Married	13 (23.6)	42 (76.4)	1.00	
Previously married	4 (17.4)	19 (82.6)	1.47 (0.45–5.75)	
Single/Never married	16 (24.2)	50 (75.8)	0.97 (0.41–2.24)	
Are you currently employed				
Yes	27 (30.0)	63 (70.0)	1.00	1.00
No	6 (11.1)	48 (88.9)	3.43 (1.39–9.78)	2.95 (1.16–8.58)
Number of other household members				
1–4	20 (24.1)	63 (75.9)	1.00	
5–13	13 (22.0)	46 (78.0)	1.12 (0.51–2.53)	
HIV status				
HIV negative	24 (24.7)	73 (75.3)	1.00	1.00
HIV positive	8 (17.4)	38 (82.6)	1.56 (0.66–4.01)	1.68 (0.69–4.43)

Finally, public stigma refers to the collective negative perceptions, beliefs, and actions exhibited by the broader society or general populace toward specific groups or issues.[12] In this study, we reported a prevalence of public stigma of 41.7%. It also corroborates findings among Uganda's general population, which found that 47.0% had stigmatizing attitudes toward TB.[25] However, a study done in India reported a much higher level of 71.6% for public/social stigma.[33] The differences observed could be partly due to the differences in socioeconomic, cultural, and living conditions in the different countries and settings, in addition to the heterogeneity in the
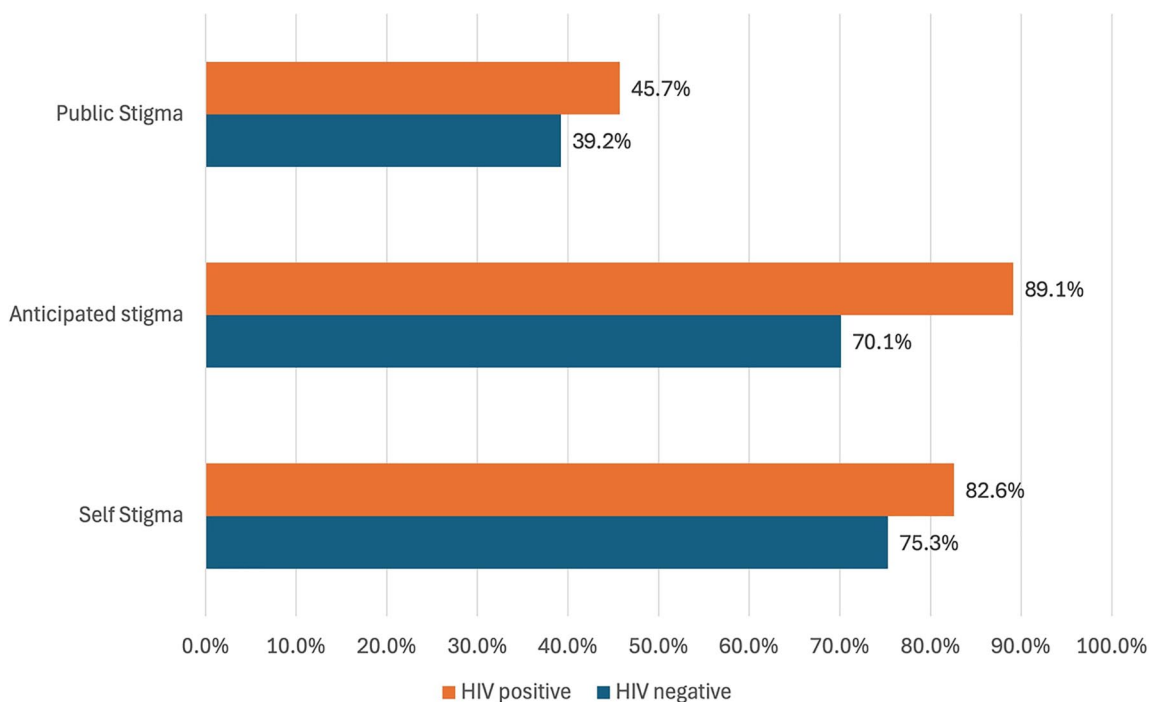
Figure 2. Prevalence of the three types of stigma stratified by HIV status.

measurement of stigma. In the Indian study, public stigma was conducted within the community using house-to-house surveys and telephone interviews. The study also utilized the eight-item stigma scale for chronic illnesses to assess public stigma, which could potentially explain the difference from our study.[33]

Most studies thus far have reported on general TB-related stigma on a numerical scale without distinguishing the specific type of stigma. In South Africa, individuals with presumptive TB had a higher stigma score than those already diagnosed with TB.[24] In Ethiopia, patients with TB had a higher stigma score compared to their families and the general population.[27] Among Kenyan pastoralists diagnosed with TB, the mean scores for experienced stigma were higher than perceived/anticipated stigma.[23] Other studies in China[16,34] and Vietnam[35] have also reported higher stigma scores among patients with TB. A higher mean stigma score has also been reported among patients with multi-drug-resistant TB in South Africa.[29] It is important to note that most studies used different tools to assess stigma, making it difficult to compare findings across studies, within and between settings. This

challenge emphasizes the need for the methods proposed in the TB stigma measurement guidance.[36]

Our study showed that females were over two times more likely to report self-stigma than males, and this association was statistically significant. Similar findings have also been reported in Zambia and China.[9,16] In Zambia, the study found that female patients with TB were 5.47 times more likely to experience overall stigma than male patients.[9] However, two studies conducted in China found that TB stigma was not associated with sex.[26,34] In two studies in Uganda[15] and South Africa,[24] no sex differences in experiences of TB-related stigma were reported. These variations could be due to the differences in the scale used to measure stigma, sample sizes, settings, and related sociocultural factors. In our study, females were likelier to anticipate being without social support than men. Women tend to internalize feelings of stigma more than men due to underlying cultural norms and gender-specific norms.[37] Unmarried females are more likely to express feelings of shame and worsened self-esteem resulting from fear that having TB will ruin their

Table 4. Logistic regression analysis of factors associated with anticipated stigma.

Variables	No anticipated stigma, *n* (%)	Anticipated stigma, *n* (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex				
Male	20 (27.8)	52 (72.2)	1.00	1.00
Female	15 (20.8)	57 (79.2)	1.46 (0.68–3.19)	1.64 (0.74–3.71)
Age category (years)				
45–65	8 (20.5)	31 (79.5)	1.00	
35–44	9 (30.0)	21 (70.0)	0.60 (0.20–1.82)	
25–34	11 (22.9)	37 (77.1)	0.87 (0.30–2.41)	
18–24	7 (25.9)	20 (74.1)	0.74 (0.23–2.40)	
Highest level you completed in school				
No education or primary	10 (18.2)	45 (81.8)	1.00	
Secondary	18 (28.1)	46 (71.9)	0.57 (0.23–1.34)	
Tertiary/University	7 (28.0)	18 (72.0)	0.57 (0.19–1.79)	
Marital status				
Married	10 (18.2)	45 (81.8)	1.00	
Previously married	3 (13.0)	20 (87.0)	1.48 (0.40–7.13)	
Single/Never married	22 (33.3)	44 (66.7)	0.44 (0.18–1.02)	
Are you currently employed				
Yes	24 (26.7)	66 (73.3)	1.00	
No	11 (20.4)	43 (79.6)	1.42 (0.64–3.29)	
Number of other household members				
1–4	20 (24.1)	63 (75.9)	1.00	
5–13	14 (23.7)	45 (76.3)	1.02 (0.47–2.26)	
HIV status				
HIV negative	29 (29.9)	68 (70.1)	1.00	1.00
HIV positive	5 (10.9)	41 (89.1)	3.50 (1.35–10.91)	3.58 (1.38–11.23)

marriage prospects.[30,38] In addition, feelings of self-stigma often occur among married females, who worry about receiving potential rejections from their spouses as well as the inability to continue their domestic role as the household's primary caregiver if they have TB.[9,39]

A large systematic review suggested that the higher prevalence of TB-related stigma is associated with sex differences in financial independence in many low-income countries.[14] Women often depend on men for financial support, including for obtaining TB care and treatment. In

Table 5. Logistic regression analysis of factors associated with public stigma.

Variables	No public stigma, *n* (%)	Public stigma, *n* (%)	Crude OR (95% CI)
Sex			
Male	41 (56.9)	31 (43.1)	1.00
Female	43 (59.7)	29 (40.3)	0.89 (0.46–1.73)
Age category (years)			
45–65	25 (64.1)	14 (35.9)	1.00
35–44	14 (46.7)	16 (53.3)	2.04 (0.78–5.48)
25–34	29 (60.4)	19 (39.6)	1.17 (0.49–2.83)
18–24	16 (59.3)	11 (40.7)	1.23 (0.44–3.38)
Highest level you completed in school			
No education or primary	37 (67.3)	18 (32.7)	1.00
Secondary	35 (54.7)	29 (45.3)	1.70 (0.81–3.64)
Tertiary/University	12 (48.0)	13 (52.0)	2.23 (0.85–5.94)
Marital status			
Married	30 (54.5)	25 (45.5)	1.00
Previously married	16 (69.6)	7 (30.4)	0.53 (0.18–1.44)
Single/never married	38 (57.6)	28 (42.4)	0.88 (0.43–1.82)
Are you currently employed			
Yes	53 (58.9)	37 (41.1)	1.00
No	31 (57.4)	23 (42.6)	1.06 (0.53–2.10)
Number of other household members			
1–4	51 (61.4)	32 (38.6)	1.00
5–13	32 (54.2)	27 (45.8)	1.34 (0.68–2.65)
HIV status			
HIV negative	59 (60.8)	38 (39.2)	1.00
HIV positive	25 (54.3)	21 (45.7)	1.30 (0.64–2.65)

some settings, gender inequity and cultural practices that treat men and women differently are still prevalent, with underlying social consequences for women who suffer from TB.[8,14,30] Although our study did not find an association between female sex and public stigma, other studies in Bangladesh and Zambia found female sex to be a significant predictor of anticipated and public stigma in patients with TB.[6,9] More

research is needed to understand the mechanisms under which gender modulates stigma experiences among patients with TB to guide the design of interventions.

Unemployed patients with TB were almost three times more likely to report self-stigma than those who were employed. Our findings are consistent with a multi-country study conducted in

Bangladesh, India, Malawi, and Colombia found that in Malawi, unemployment was more likely to be linked to a greater prevalence of stigma in females than in males.[34] The inability to work due to frequent clinic visits is associated with higher reporting of stigma.[17] Fear of job loss and reduced family income is often reported among individuals with TB.[27] One possible explanation for this observed relationship is the perception of productivity and societal contribution. In many cultures, employment is seen as a marker of societal value and self-worth.[40] Consequently, unemployed individuals may already feel marginalized or stigmatized, which may be exacerbated upon receiving a TB diagnosis. In addition, unemployment further worsens the impact of catastrophic spending among patients with TB and their families. More than half (53.1%) of Ugandan households experience catastrophic TB-related costs, primarily due to non-medical expenses like transportation, dietary supplements, and food.[41]

In our study, persons living with HIV were over 3.5 times more likely to report anticipated- stigma than patients not living with HIV. This is a key finding for Uganda since it is among the 30 high-burden countries for TB/HIV co-infection.[42] Anticipated stigma in the form of fear of disclosure is prevalent among people living with HIV.[43] In our study, one-third of participants self-reported living with HIV, and such a high level of anticipated stigma may not be surprising.[44] Our finding is consistent with several studies among people living with HIV and TB. Two studies conducted in Ethiopia found HIV status linked to increased odds of reporting perceived stigma among patients with TB.[20,45] Additional studies indicate similar findings[46] as well as a relationship between HIV status and overall stigma in patients with TB.[47] Syndemic stigma is likely underlying what we observed in our study, where two simultaneously occurring HIV and TB epidemics with their related stigmas are intertwined.[36] The linkage between the two diseases may often cause compound effects of stigma, making it difficult to distinguish between them.[7] It is important to target special efforts to support people who are living with both TB and HIV, as they are likely to mitigate the negative impacts of stigma.

Moreover, individuals living with TB/HIV and carrying feelings of anticipated stigma can possibly transmit the infection to others while remaining fearful of disclosing their diagnosis.[39] This is further exacerbated by misinformation within communities that often associate TB with HIV.[15] Community-based interventions should be of focus when setting sights on reducing anticipated stigma among individuals living with both TB and HIV. Mass media campaigns that disseminate information about TB and HIV that simultaneously dispels myths can help normalize having either diagnosis.[48] In addition, integrating TB care with less-stigmatizing health conditions such as diabetes and hypertension instead of HIV/AIDS could help reduce TB-related stigma for persons not living with HIV.[5] A larger study should be carried out to further assess other factors associated with each form of stigma, including public stigma, and the impact of each type of stigma on treatment adherence. The role of digital interventions in addressing such barriers should also be explored.[31]

Our study has several implications for TB care and public health policy in Uganda and potentially other similar settings. It reveals a concerning prevalence of self-stigma and anticipated stigma among TB patients in Kampala. The increased vulnerability of females and unemployed patients to self-stigma and those living with TB/HIV to anticipated stigma calls for tailored interventions that specifically address these susceptibilities.[49] Emphasizing gender-sensitive approaches, integrating socioeconomic support systems, and recognizing the compounded challenges of dual diagnoses become paramount. Additionally, community-based initiatives, proactive use of mass media for dispelling myths and misinformation, embracing digital health technologies, and integrating TB care with other health conditions can serve as essential strategies in mitigating stigma. Addressing these multifaceted issues is crucial for enhancing early diagnosis, improving treatment adherence, and fortifying overall TB prevention efforts in Uganda.

Strengths and limitations

Our study is among the first in the Ugandan setting to examine the relationship between sex and the various types of stigma among patients with TB. However, it is not without limitations. First, we used a cross-sectional design, which provides a snapshot of the outcome. We cannot make causal inferences about the type of stigma since it

can vary over time. Second, we used an unvalidated tool to assess the three types of stigma, as validated tools were not available. With this noted, the internal reliability was acceptable for the entire instrument and the public stigma subscale. The other two subscales require additional psychometric development and testing. As measurement tools and methodologies differ across studies, comparative analysis is challenging. Therefore, our findings should be interpreted within the specific context of this setting and methods. Third, the noticeable magnitudes and positive direction of effects that were not statistically significant could be a result of the sample size. Finally, the study participants were only drawn from public urban clinics, which limits the generalizability of our findings in Uganda.

Conclusions

Our study showed a high prevalence of self, anticipated, and public stigma among TB patients. Notably, females and unemployed individuals were at a higher risk of self-stigma, while those with HIV/AIDS and TB were more likely to report anticipated stigma. To combat stigma effectively, interventions should be tailored to cater to sex-specific needs and persons living with HIV. Future research should delve further into determinants of TB-related stigma in high-burden settings.

Declarations

Ethics approval and consent to participate
The study was approved by the Institutional Review Boards at the University of Georgia (IRB ID PROJECT00000571), Makerere University School of Public Health (Registration Number 756), and the Uganda National Council for Science and Technology (HS656ES). Participants provided written informed consent to be enrolled in the study. They were compensated for time and transportation for study visits at a flat rate of USD 5.00.

Consent for publication
Not applicable.

Author contributions
Juliet N. Sekandi: Conceptualization; Data curation; Funding acquisition; Investigation; Methodology; Resources; Software; Supervision; Validation; Writing – original draft.

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Competing interests
The authors declare that there is no conflict of interest.

Availability of data and materials

Deidentified data are available upon request and agreement to terms of data sharing and use at the University of Georgia and Makerere University.

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Supplemental material

Supplemental material for this article is available online.

References

1. World Health Organization. *Global tuberculosis report 2024*. Geneva, Switzerland: WHO, 2024.

2. Uplekar M, Weil D, Lonnroth K, et al. WHO's new end TB strategy. *Lancet* 2015; 385(9979): 1799–1801.

3. World Health Organization. *Implementing the end TB strategy: the essentials*. Geneva, Switzerland: WHO, 2015.

4. Ayakaka I, Ackerman S, Ggita JM, et al. Identifying barriers to and facilitators of tuberculosis contact investigation in Kampala, Uganda: a behavioral approach. *Implement Sci* 2017; 12(1): 33.

5. Buregyeya E, Atusingwize E, Sekandi JN, et al. Developing strategies to address barriers for tuberculosis case finding and retention in care among refugees in slums in Kampala, Uganda: a qualitative study using the COM-B model. *BMC Infect Dis* 2022; 22(1): 301.

6. Chowdhury RK, Rahman S, Mondal NI, et al. Social impact on stigma regarding tuberculosis hindering adhere to treatment: a cross sectional study carried out in tuberculosis patients at Rajshahi City, Bangladesh. *Jpn J Infect Dis* 2015; 69: 522.

7. Courtwright A and Turner AN. Tuberculosis and stigmatization: pathways and interventions. *Public Health Rep* 2010; 125(Suppl 4): 34–42.

8. Craig GM, Daftary A, Engel N, et al. Tuberculosis stigma as a social determinant of health: a systematic mapping review of research in low incidence countries. *Int J Infect Dis* 2017; 56: 90–100.

9. Cremers AL, de Laat MM, Kapata N, et al. Assessing the consequences of stigma for tuberculosis patients in urban Zambia. *PLoS One* 2015; 10(3): e0119861.

10. Thomas BE and Stephen A. Tuberculosis related stigma in India: roadblocks and the way forward. *Expert Rev Respir Med* 2021; 15(7): 859–861.

11. Weiss MG, Ramakrishna J and Somma D. Health-related stigma: rethinking concepts and interventions. *Psychol Health Med* 2006; 11(3): 277–287.

12. Van Brakel WH. Measuring health-related stigma—a literature review. *Psychol Health Med* 2006; 11(3): 307–334.

13. Meershoek A, Zwerling A, Daftary A, et al. *TB stigma measurement guidance*. The Hague, Netherlands: KNCV Tuberculosis Foundation, 2018.

14. Chang SH and Cataldo JK. A systematic review of global cultural variations in knowledge, attitudes and health responses to tuberculosis stigma. *Int J Tuberc Lung Dis* 2014; 18(2): 168–173, i–iv.

15. Ashaba C, Musoke D, Wafula ST, et al. Stigma among tuberculosis patients and associated factors in urban slum populations in Uganda. *Afr Health Sci* 2021; 21(4): 1640–1650.

16. Chen X, Du L, Wu R, et al Tuberculosis-related stigma and its determinants in Dalian, Northeast China: a cross-sectional study. *BMC Public Health* 2021; 21(1): 6.

17. Abioye I, Omotayo M and Alakija W. Socio-demographic determinants of stigma among patients with pulmonary tuberculosis in Lagos, Nigeria. *Afr Health Sci* 2011; 11(Suppl 1): S100–S104. DOI: 10.4314/ahs.v11i3.70078

18. Xu M, Markström U, Lyu J, et al. Survey on tuberculosis patients in rural areas in China: tracing the role of stigma in psychological distress. *Int J Environ Res Public Health* 2017; 14(10): 1171.

19. Teo AKJ, Tan RKJ, Smyth C, et al. Characterizing and measuring tuberculosis stigma in the community: a mixed-methods study in Cambodia. *Open Forum Infect Dis* 2020; 7(10): ofaa422.

20. Duko B, Bedaso A, Ayano G, et al. Perceived stigma and associated factors among patient with tuberculosis, Wolaita Sodo, Ethiopia: cross-sectional study. *Tuberc Res Treat* 2019; 2019: 1–5.

21. Kamble BD, Singh SK, Jethani S, et al. Social stigma among tuberculosis patients attending DOTS centers in Delhi. *J Fam Med Prim Care* 2020; 9(8): 4223.

22. Bond V, Floyd S, Fenty J, et al. Secondary analysis of tuberculosis stigma data from a

cluster randomised trial in Zambia and South Africa (ZAMSTAR). *Int J Tuberc Lung Dis* 2017; 21(11): 49–59.

23. Mbuthia GW, Nyamogoba HDN, Chiang SS, et al. Burden of stigma among tuberculosis patients in a pastoralist community in Kenya: a mixed methods study. *PLoS One* 2020; 15(10): e0240457.

24. Bresenham D, Kipp AM and Medina-Marino A. Quantification and correlates of tuberculosis stigma along the tuberculosis testing and treatment cascades in South Africa: a cross-sectional study. *Infect Dis Poverty* 2020; 9(1): 145.

25. Wynne A, Richter S, Jhangri GS, et al. Tuberculosis and human immunodeficiency virus: exploring stigma in a community in western Uganda. *AIDS Care* 2014; 26(8): 940–946.

26. Chen X, Xu J, Chen Y, et al. The relationship among social support, experienced stigma, psychological distress, and quality of life among tuberculosis patients in China. *Sci Rep* 2021; 11(1): 24236.

27. Datiko DG, Jerene D and Suarez P. Stigma matters in ending tuberculosis: nationwide survey of stigma in Ethiopia. *BMC Public Health* 2020; 20(1): 190.

28. Bajema KL, Kubiak RW, Guthrie BL, et al. Tuberculosis-related stigma among adults presenting for HIV testing in KwaZulu-Natal, South Africa. *BMC Public Health* 2020; 20(1): 1–8.

29. Naidu T, Pillay SR, Ramlall S, et al. Major depression and stigma among individuals with multidrug-resistant tuberculosis in South Africa. *Am J Trop Med Hyg* 2020; 103(3): 1067–1071.

30. Miller C, Huston J, Samu L, et al. "It makes the patient's spirit weaker": tuberculosis stigma and gender interaction in Dar es Salaam, Tanzania. *Int J Tuberc Lung Dis* 2017; 21(11): 42–48.

31. Sekandi JN, Onuoha NA, Buregyeya E, et al. Using a mobile health intervention (DOT Selfie) with transfer of social bundle incentives to increase treatment adherence in tuberculosis patients in Uganda: protocol for a randomized controlled trial. *JMIR Res Protoc* 2021; 10(1): e18029.

32. Van Rie A, Sengupta S, Pungrassami P, et al. Measuring stigma associated with tuberculosis and HIV/AIDS in southern Thailand: exploratory and confirmatory factor analyses of two new scales. *Trop Med Int Health* 2008; 13(1): 21–30.

33. Elavarasi EA, Smitha M, Manasa K, et al. Depression and stigma experience among patients with tuberculosis in urban and rural settings. *Indian J Tuberc* 2023; 71(Suppl. 2): S171–S177.

34. Yin X, Yan S, Tong Y, et al. Status of tuberculosis-related stigma and associated factors: a cross-sectional study in central China. *Trop Med Int Health* 2018; 23(2): 199–205.

35. Redwood L, Mitchell EMH, Viney K, et al. Depression, stigma and quality of life in people with drug-susceptible TB and drug-resistant TB in Vietnam. *Int J Tuberc Lung Dis* 2021; 25(6): 461–467.

36. USAID and Challenge TB. *TB stigma measurement guidance: challenge TB*, https://www.challengetb.org/publications/tools/ua/TB_Stigma_Measurement_Guidance.pdf (2018, accessed 14 October 2023).

37. Krishnan L, Akande T, Shankar AV, et al. Gender-related barriers and delays in accessing tuberculosis diagnostic and treatment services: a systematic review of qualitative studies. *Tuberc Res Treat* 2014; 2014: 215059.

38. Somma D, Thomas BE, Karim F, et al. Gender and socio-cultural determinants of TB-related stigma in Bangladesh, India, Malawi and Colombia. *Int J Tuberc Lung Dis* 2008; 12(7): 856–866.

39. Mukerji R and Turan JM. Exploring manifestations of TB-related stigma experienced by women in Kolkata, India. *Ann Glob Health* 2018; 84(4): 727–735.

40. Fujishiro K, Ahonen EQ, de Porras DGR, et al. Sociopolitical values and social institutions: Studying work and health equity through the lens of political economy. *SSM Popul Health* 2021; 14: 100787.

41. Muttamba W, Tumwebaze R, Mugenyi L, et al. Households experiencing catastrophic costs due to tuberculosis in Uganda: magnitude and cost drivers. *BMC Public Health* 2020; 20: 1–10.

42. World Health Organization. *Global tuberculosis report 2022*. Geneva, Switzerland: WHO, 2022.

43. Chan BT, Weiser SD, Boum Y, et al. Persistent HIV-related stigma in rural Uganda during a period of increasing HIV incidence despite treatment expansion. *AIDS* 2015; 29(1): 83–90.

44. World Health Organization. *Use of high burden country lists for TB by WHO in the post-2015 era: summary*. Geneva, Switzerland: WHO, 2016.

45. Mohammedhussein M, Hajure M, Shifa JE, et al. Perceived stigma among patient with pulmonary tuberculosis at public health facilities

in southwest Ethiopia: a cross-sectional study. *PLoS One* 2020; 15(12): e0243433.

46. Kipp AM, Pungrassami P, Nilmanat K, et al. Socio-demographic and AIDS-related factors associated with tuberculosis stigma in southern Thailand: a quantitative, cross-sectional study of stigma among patients with TB and healthy community members. *BMC Public Health* 2011; 11(1): 675.

47. Alao M, Ibrahim O and Chan Y. Clinical and psychosocial determinants of patients with tuberculosis/human immunodeficiency virus co-infection: a structural equation model approach. *Niger J Clin Pract* 2022; 25(1): 105–109.

48. *Joint United Nations Programme on HIV/AIDS.* Evidence for eliminating HIV-related stigma and discrimination – Guidance for countries to implement effective programmes to eliminate HIV-related stigma and discrimination in six settings. Geneva, Switzerland:UNAIDS, 2020.

49. Nuttall C, Fuady A, Nuttall H, et al. Interventions pathways to reduce tuberculosis-related stigma: a literature review and conceptual framework. *Infect Dis Poverty* 2022; 11(1): 101.

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