RESEARCH ARTICLE

Prevalence and determinants of stigma among a sample of patients with pulmonary tuberculosis in Baghdad, Iraq, 2023

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ABSTRACT

Introduction: A few studies have highlighted the negative impact of stigma and discrimination associated with tuberculosis on the care and control of the disease. Stigma often leads to the social isolation of TB patients, both within and outside their families. Patients may experience avoidance by former friends and acquaintances and may be forced to eat and sleep separately.

Objective: To determine the prevalence and types of TB-associated stigma and its potential factors among pulmonary TB patients in Baghdad, Iraq, 2023.

Methods: In this cross-sectional study, we collected data through face-to-face interviews with pulmonary patients aged 18 years and above who agreed to participate. The study was conducted at the National TB Institute and Baghdad Chest and Respiratory Disease Consultant Clinics. A questionnaire was developed to collect sociodemographic information. The UNICEF Stigma Assessment Questionnaire was used to assess the levels and types of stigma.

Results: The total number of the studied sample was 206. The prevalence of stigma was 80.6% (166/206). Among the patients who experienced stigma, they reported feeling the following effects: 98% felt loneliness and experienced hurt, 96% lost friends and experienced hesitancy to share information, 93% maintained a safe distance, and 92% felt guilty because their family had the burden of caring for me. Factors significantly associated with stigma included poverty ($p < 0.0001$) and a history of imprisonment ($p = 0.003$). Logistic regression analysis revealed poverty (OR=10.9, 95% CI: 4.9-24.2, p-value=0.000) and a history of imprisonment (OR=0.37,95%CI: 0.15–0.9, p-value=0.02) as significant independent risk factors for TB stigma.

Conclusion: The prevalence of TB-associated stigma among Iraqi patients is high. Considering stigma in TB management, raising awareness, and promoting activities to combat the stigma effect can enhance early detection and treatment, ultimately reducing the TB burden.

Key words: Pulmonary tuberculosis, stigma, prevalence, determination, Iraq.

INTRODUCTION

Tuberculosis (TB) is an infectious, preventable, and curable illness that significantly burdens impoverished nations.[1-3] Globally, in 2021, the World Health Organization (WHO) estimated a TB incidence of 134 per 100,000 population with about 1.6 million deaths, and in the Eastern Mediterranean Region (EMR), 82,900 TB patient deaths.[4-6]

By 2030, an estimated 43 million individuals will have TB, resulting in an additional 6.6 million deaths from the disease, 234 million years of life lost with a handicap (DALYs), and a worldwide economic cost of US$1 trillion.[7]

The WHO defines stigma as "a mark of shame, disgrace or disapproval, which results in an individual being rejected, discriminated against and excluded from participating in several different areas of society" and has referred to stigma as a disease's undetected

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burden.[8,9] TB-related stigma refers to the perception and internalisation of negative attitudes within a community or among families towards individuals affected by TB, influenced by prevailing social norms. Stigma occurs at several levels, including the individual, family, and society, as well as at the system level in health, education, social services, law, and policy.[10]

TB-related stigma disproportionately affects vulnerable populations such as the poor, women, ethnic minorities, migrants, and refugees. Its consequences can include isolation, lack of support, and loss of employment, which may vary depending on the community's cultural context and level of awareness.[11-14] Stigmatisation affects women more than men. There has been anecdotal evidence of young married women being forced to leave their homes or being divorced as a result of TB. Men are more concerned about salary loss and reduced job capability.[15]

A few studies have highlighted the negative impact of stigma and discrimination associated with tuberculosis on the care and control of the disease. These effects are particularly pronounced in developing countries. Besides affecting the patient's quality of life, stigma is one of the key barriers to the early detection and treatment of unidentified TB cases, as well as treatment adherence.[16-20] Thus, it is a significant social determinant of health that can eventually contribute to TB morbidity, mortality, and health inequities.[21]

In 2018, the United Nations General Assembly adopted a political declaration on combating tuberculosis as part of its first high-level meeting on the issue, which was reaffirmed in the second high-level meeting held in 2023.[22,23] In both meetings, ending TB-related stigma and discrimination are recognised as one of the goals in the fight against TB.[22-25]

Iraq faces the challenge of low TB case detection despite its high prevalence, compounded by vulnerable social backgrounds. According to the Republic of Iraq Ministry of Health Annual Statistical Report,[26] despite a large number of TB cases (6687 in 2022, with a prevalence rate of 16 per 100,000 population), the low TB detection rate (55%), and the vulnerable social background of the Iraqi population, only one study was found that covered the problem of stigma among TB patients which was conducted in Hilla, Iraq.[27]

This study assessed the prevalence and factors associated with TB stigma experienced by patients with pulmonary tuberculosis in Baghdad, Iraq, in 2023. Identifying the risk factors associated with stigma can inform healthcare workers so that their stigma reduction interventions are targeted at those who are more likely to experience it. Eventually, reducing stigma will play a crucial role in better disease control and outcomes.

METHODS

Setting and study design: A cross-sectional study with analytic elements was conducted at the National TB Institute, Al-Rusafa, and Al-Karkh Chest and Respiratory Disease Consultant Clinics (CRDCCs) in Baghdad, Iraq, in 2023.

Ethical consideration: Verbal consent was obtained from all participants. Data were used for this research, and all personal information was kept confidential. Ethical approval from the Centre of Training and Human Resources Development was granted. The official agreement was obtained from the National TB Institute.

Sample population: The targeted population consisted of patients diagnosed with pulmonary tuberculosis at the National TB Institute and Al-Rusafa and Al-Karkh CRDCCs in Baghdad in 2023 who were 18 years of age and above, resided in Baghdad, and received their medication from these institutes. The diagnosis of tuberculosis at these institutes was made clinically and confirmed bacteriologically based on WHO definitions in 2013.[28] We excluded patients who were severely ill or refused to participate.

Data Collection Tool: Two questionnaires

were used in face-to-face interviews with PTB patients. The Tuberculosis-Related Stigma Scale was developed in 2008 by Van Rie et al. as part of the Stop TB Partnership (STP) Stigma Assessment questionnaires.[29] The Spearman correlation coefficient of the scale for test-retest reliability was 0.738-0.853,[30,31] with excellent internal consistency, and Cronbach's alpha coefficient was 0.82-0.91.[29-32] There have been English, Thai, Malay, Portuguese, Mexican, and Turkish versions.[33] The authors translated the draft, and some experts from the national TB centre in Baghdad revised the Arabic draft. The Self-Stigma Scale (Van Rie) consists of 12 questions that focus on TB patients and assess self-stigma elements, including shame, guilt, and blame.[34,35] The scale's responses were graded on a five-point scale of how strongly you disagree or agree with each of the following assertions, where "0" means you "Strongly Disagree," "1" means you "Disagree," "2" means you "Have No Opinion," "3" means you "Agree," and "4" means you "Strongly Agree." The questionnaire item scores were averaged and ranged from 11 to 48.[10] A sociodemographic and Health-related factors questionnaire was developed to collect the remaining data.

Pilot study: The questionnaire was tested on ten randomly selected PTB patients at the National Tuberculosis Institute before starting the formal data collection process to test the data collection form's feasibility and estimate the time needed to complete the interview and fill out the form.

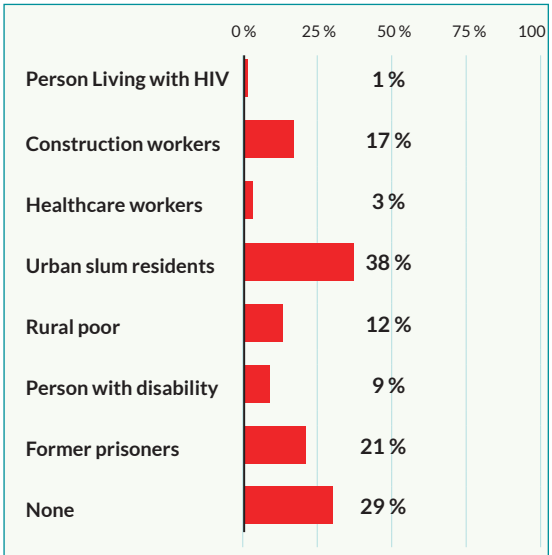
Study variables and definitions: Age group classified as 18-24, 25-44, 45-64, 65 or older; level of education classified as illiteracy, primary, secondary, and college education; marital status classified as married, single, widow, and divorce; residence classified as rural and urban "All people and homes that fall under the umbrella of Municipal programs and services";[36] occupation classified as: housewife, unemployed, employee, and student), poverty is defined according to the international poverty line which equals US$1.90 per day per capita.[37] Smoking status is classified as a non-smoker, ex-smoker, or current smoker. Ex-smoker is defined as someone who has quit smoking in the past 28 days but has smoked more than 100 cigarettes throughout their life".[38] A Current smoker is an individual who has smoked at least 100 cigarettes in their lifetime and who smoked at the time of the study either every day or sometimes",[39] and alcohol-drinking is classified as yes or no.

Urban slum resident: a group of people living under the same roof who don't meet one or more of the following criteria are said to be living in a slum family: improved access

Table 1 | Distribution of the study group by sociodemographic and HRFs characteristics.

Sociodemographic and HRFs characteristics		N (206)	%
Age groups (years)	18-24	**44**	**21.4**
	25-44	63	30.6
	45-64	73	35.4
	65+	26	12.6
Gender	Female	101	49
	Male	105	51
Level of education	Illiterate	78	37.9
	Primary	105	51
	Secondary	13	6.3
	College	10	4.9
Marital status	Married	127	61.7
	Single	44	21.4
	Widow	22	10.7
	Divorce	13	6.3
Residence	Rural	35	17
	Urban	171	83
Occupation	Housewife	86	41.7
	Unemployed	65	31.6
	Freelancer/Employee	41	19.9
	Student	14	6.8
Poverty	No	40	19.4
	Yes	166	80.6
Smoking status	Non-smoker	116	56.3
	Ex-smoker	35	17
	Current smoker	55	26.7
Alcohol-drinking	No	169	82
	Yes	37	18
Comorbid illness*	No	111	53.9
	DM	79	38.4
	Hypertension	37	18
	CVD	13	6.3
	Other	15	7.3
Household contact	No	168	81.6
	Yes	38	18.4
Type of TB treatment	SD-TB	199	96.6
	DR-TB	7	3.4

* Total may not add up to 100% due to a respondent having more than one comorbid illness.



Note: The total may not add up to 100% because a respondent can have more than one determinant factor.

Figure 1 | The proportion of people with TB among some determinant factors

to water, sanitation, enough living space, long-lasting housing, and tenure security,[40] classified as no and yes. Rural poor: those residing in economically disadvantaged areas that are frequently remote and sparsely populated and whose household income is below the federal poverty line,[41] classified as no and yes; person living with HIV classified as no and yes; construction workers classified as: no and yes, health care worker classified as: no and yes, former prisoner classified as: no and yes, and person with disability: any physical or mental impairment that makes it harder for the person with the impairment to engage in particular activities and interact with the environment around them,[42] classified as: no and yes.

Comorbid illnesses are "conditions that last one year or more and require ongoing medical attention or limit activities of daily living or both"[43] and are classified as: diabetes mellitus (DM),[44] hypertension (HT),[45] cerebrovascular disease (CVD),[46] other, and no. Household contact" is a person who shared a home with an index patient for at least three months before the index patient was diagnosed with

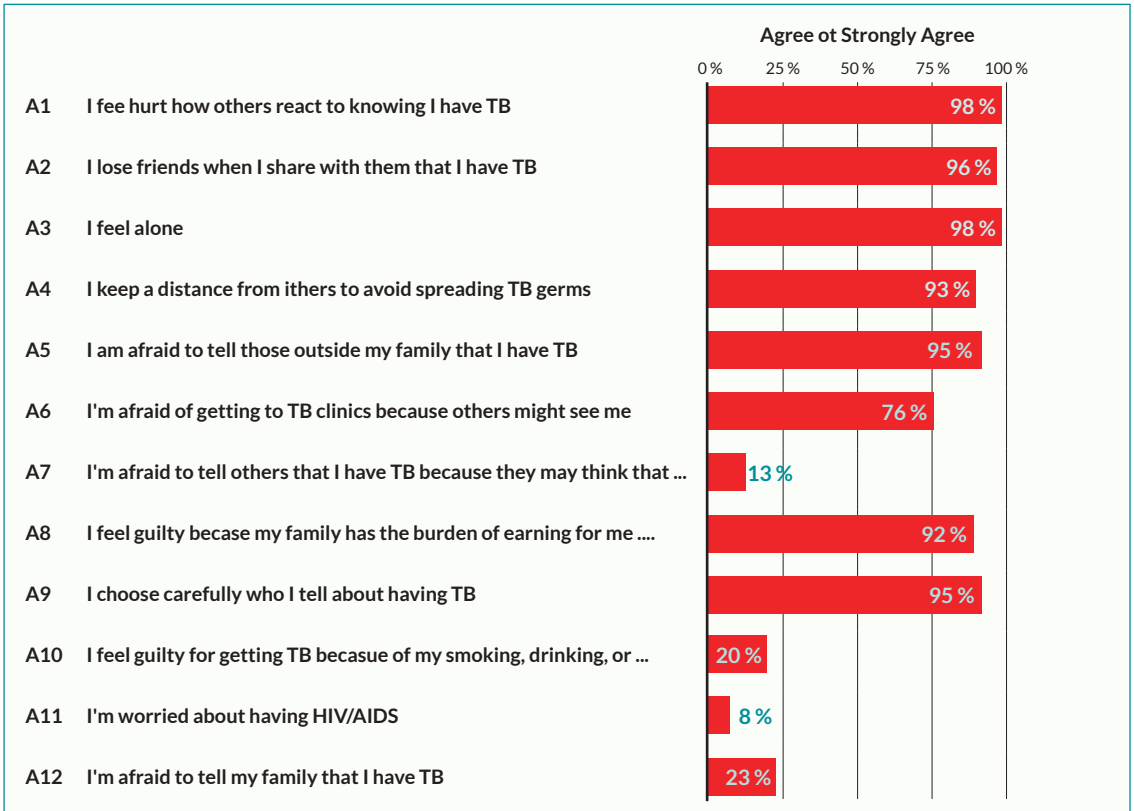


Figure 2 | Percentages of those answering agree and strongly agree to the questions measuring stigma for TB.

TB"[47] classified as no and yes, and type of TB treatment is classified as susceptible drug TB(SD-TB) "A 6-month treatment regimen composed of four first-line TB medicines, namely isoniazid, rifampicin, ethambutol, and pyrazinamide",[48] and drug-resistant TB(DR-TB)" TB caused by mycobacterium tuberculosis (MTB) strains that are resistant to at least both rifampicin and isoniazid".[49]

Statistical analysis: The data entry and analysis were conducted using Microsoft Excel, version 13, and the statistical package for social sciences (IBM SPSS, version 26). The chi-square test was used to analyse categorical data, while the t-test was used for quantitative data. A p-value of <0.05 was used to assess the level of significance.

RESULTS

Characteristics of the Study Participants: A total of 206 patients with tuberculosis (TB) aged 18 years and above, diagnosed with pulmonary tuberculosis (PTB), were included in this study. All were recorded at the National TB Institute and CRDCCs in Baghdad, with the majority from Al-Rusafa district (181, 88%).

Their mean age ± standard deviation (SD) was 42.7(±17.3) years. Around 66% were aged 25-64 years with a male-to-female ratio of nearly 1:1; 83% lived in urban areas, 51% had primary education, 41% were homemakers, 61% were married, 26.7% were smokers, and 18% were alcohol drinkers. When it comes to health-related factors (HRFs), the proportion of patients with TB who had chronic diseases was 46.1%, with the highest prevalence for diabetes mellitus (DM) at 38.4%. Household contact

Table 2 | Distribution of the study group by experienced stigma and sociodemographic variables.

Variables		No Stigma	With Stigma	Total	P-value
Total		N=40 (19.4%)	N=166 (80.6%)	N=206 (100%)	
Gender	Female	14(35%)	87(52%)	101(49%)	0.054*
	Male	26(65%)	79(48%)	105(51%)	
Age groups (years)	18-24	6(15%)	38(23%)	44(21.4%)	0.347*
	25-44	13(32.5%)	50(30%)	63(30.6%)	
	45-64	18(45%)	55(32%)	73(35.4%)	
	65+	3(7.5%)	23(15%)	26(12.6%)	
	Mean age(±SD) years	43.55(±14.6)	42.45(±17.85)	42.7(±17.3)	0.68**
Marital status	Married	28(70%)	99(60%)	127(61.7%)	0.234*
	Single	4(10%)	40(24%)	44(21.3%)	
	Widow	5(12.5%)	17(10%)	22(10.7%)	
	Divorce	3(7.5%)	10(6%)	13(6.3%)	
Residence	Rural	9(22.5%)	26(15.6%)	35(17%)	0.348*
	Urban	31(77.5%)	140(84.4%)	171(83%)	
Level of education	Illiteracy	10(25%)	68(41%)	78(37.9%)	0.255*
	Primary	25(62.5%)	80(48%)	105(51%)	
	Secondary	3(7.5%)	10(6%)	13(6.3%)	
	College	2(5%)	8(5%)	10(4.8%)	
Occupation	Housewife	13(32.5%)	73(44%)	86(41.7%)	0.059*
	Unemployed	12(30%)	53(32%)	65(31.5%)	
	Freelancer/Employee	14(35%)	27(16%)	41(20%)	
	Student	1(2.5%)	13(8%)	14(6.8%)	
Poverty	No	26(65%)	23(14%)	49(23.8%)	0.0001*
	Yes	14(35%)	143(86%)	157(76.2%)	
Smoking Status	Non-smoker	20(50%)	96(58%)	116(56.7%)	0.511*
	Ex-smoker	9(22.5%)	26(15.6%)	35(17%)	
	Current smoker	11(27.5%)	44(26.4%)	55(26.7%)	
Alcohol drinking	No	34(85%)	135(81%)	169(82%)	0.655*
	Yes	6(15%)	31(19%)	37(18%)	

*Chi squire. ** T-test

Table 3 | Distribution of people with TB by stigma and some determinant factors.

Variables		No Stigma	With Stigma	Total	P-value*
	Total	N=40 (19.4%)	N=166 (80.6%)	N=206 (100%)	
Household contact	**No**	34(85%)	134(80.7%)	168(81.6%)	0.653
	Yes	6(15%)	32(19.3%)	38(18.4%)	
Type of TB treatment	**SD-TB**	38(95%)	161(97%)	199(96.6)	0.623
	DR-TB	2(5%)	5(3%)	7(3.4%)	
Former Prisoner	**No**	24(60%)	137(82.5%)	161(78.2%)	0.003
	Yes	16(40%)	29(17.5%)	45(21.8%)	
Person with Disability	**No**	No	39(97.5%)	163(98%)	0.381
	Yes	1(2.5%)	3(2%)	4(2%)	
Health Care Worker	**No**	39(97.5%)	162(97.5%)	201(97.6%)	1.00
	Yes	1(2.5%)	4(2.5%)	5(2.4%)	
Urban Slum Resident	**No**	29(72.5%)	98(59%)	127(61.7%)	0.147
	Yes	11(27.5%)	68(41%)	79(38.3%)	
Rural Poor	**No**	36(90%)	145(87%)	181(88%)	0.791
	Yes	4(10%)	21(13%)	25(12%)	
Construction workers	**No**	30(75%)	142(85.5%)	172(83.5%)	0.152
	Yes	10(25%)	24(14.5%)	34(16.5%)	
Person Living with HIV	**No**	39(97.5%)	163(98%)	202(98%)	0.581
	Yes	1(2.5%)	3(2%)	4(2%)	
Comorbidities					
Diabete Millitus	**No**	23(57.5%)	104(62.7%)	127(62%)	0.589
	Yes	17(42.5%)	62(37.3%)	79(38%)	
Hypertension	**No**	32(80%)	137(82.5%)	169(82%)	0.819
	Yes	8(20%)	29(17.5%)	37(18%)	
Cardiovascular Diseases	**No**	37(92.5%)	156(94%)	193(94%)	0.72
	Yes	3(7.5%)	10(6%)	13(6%)	
Others	**No**	37(92.5%)	154(93%)	191(92.7%)	1.00
	Yes	3(7.5%)	12(7%)	15(7.3%)	

* Measured by Chi squire.

was 18.4%, and DR-TB was 3.4%, see Table 1. About 38% of PTB patients were residents of urban slums, and 21% had a history of being prisoners, Figure 1.

Characteristics of Patients Who Experienced Stigma: The proportion of patients who experienced stigma was 166 (80.6%); out of these 166 stigmatised patients, 142 (85.5%) were from the Al-Rusafa district and 24 (14.5%) from Al-Karkh.

Out of 206 PWTB who are 18 years old and above, 166 (80.6%) patients experienced stigma and scored higher than 11 on the Self-Stigma Scale developed by Van Rie. Out of 166 individuals, about 98% (162) suffer loneliness. Furthermore, 96% (159) revealed losing friends after disclosing their illness and keeping a distance from others. Approximately 95% (157/166) reported feeling both sad and afraid to tell outside their families about their TB; in the same way, they carefully choose whom to inform about their TB. Additionally, 92% (153/166) felt guilty about causing their families to worry, see Figure 2.

Their mean age was 42.5 (±17.9) years. Around 63% were aged 25-64 years with a male-to-female ratio of 0.9:1, 84.3% were residents in urban areas, 48.2% were primary education, 44% were housewives, 59.6% were married, 26.5% were smokers, and 18.7% were alcohol drinkers. The distribution of PWTB by experiencing stigma and the sociodemographic variables was not statistically significant except for poverty (p-value = 0.0001), as in Table 2.

The distribution of PWTB by experiencing stigma and determinant factors were studied, and none was statistically significant except for Former Prisoners, p-value=0.003, Table 3.

Table 4 | Logistic regression analysis for predicting stigma in People with TB.

Variables	Odd's Ratio	P-value	CI 95%	
Poverty	**10.9**	**0.000**	**4.9**	24.2
Former Prisoner	**0.37**	0.02	0.15	0.9

Logistic regression analysis was done to assess the independent risk factors affecting stigma among PWTB. The statistically significant determinants in the univariate analysis were included in the model. The only two factors that were statistically significant and independent were being poor (OR = 10.9, p-value = 0.000) and being in prison (OR = 0.37, p-value = 0.02), See **Table 4**.

DISCUSSION

The present study revealed that nearly half of the patients were below 45 years old, with an equal distribution between genders. These findings align with a previous long-term study by Zhang et al.,[50] which reported a similar percentage of TB patients below and above 45 years. However, a study in Ethiopia by Hussein et al.[51] showed a notable difference, with 90% of the patients being below 45 years old. One possible explanation for this discrepancy could be the variation in data sources. In the Ethiopian study, many patients were recruited from rural areas, which may have contributed to the higher proportion of patients under 45 years old. Rural areas often face distinct socioeconomic conditions, limited access to healthcare, and unique demographic characteristics, which can impact disease patterns and patient demographics.

The current study found that around 80.6% of the patients experienced stigma. This finding aligns with similar studies conducted in Bangladesh, where 85% of patients reported experiencing stigma.[52] As well as the Urban Zambia population, which showed 83% of patients had a stigma for TB.[53] On the other hand, a study conducted in Hilla, Iraq, showed that 61.5% of patients experienced TB-related stigma.[27] In contrast, another study by Datiko et al. in Ethiopia showed that only one-third of patients experienced TB-related stigma.[54] Another study from India showed that almost 50% experienced some form of stigma.[55] Another study from India included newly diagnosed TB patients; also 50 % of them experienced TB stigma,[56] and stigma was found among 65% of patients in Thailand.[57] These variations in the prevalence of stigma among TB patients might be explained by the difference in patients' characteristics across different studies, the influence of cultural context and community awareness, and the use of different methods to measure stigma. In addition, Factors such as education, access to information, and societal beliefs about TB can significantly impact the level of stigma experienced by individuals.[58]

The distribution of PWTB by experiencing stigma and the sociodemographic variables was studied, and none was statistically significant except for poverty and history of imprisonment.

We found that individuals from lower socioeconomic backgrounds are more likely to experience stigma associated with tuberculosis. This finding aligns with studies conducted in Nepal and India, which also demonstrated a strong correlation between poverty and the development of TB-related stigma.[59-61] TB itself is a disease of poverty.[62] The association between poverty and TB-related stigma underscores the interconnectedness of socioeconomic factors and public perceptions. Disadvantaged individuals may face additional challenges in accessing healthcare, experiencing discrimination, and receiving support.[52] Also, lack of knowledge about TB and its transmission is associated with higher levels of stigma.[63] Thus, false beliefs held by the public might include considering TB a personal responsibility of the poor due stereotypes associated with poverty such as poor hygiene, lack of commitment to treatment, and irresponsible behavior in general.

On the other hand, a history of imprisonment was negatively associated with stigma. Individuals with prior experience of being in prison experience less TB-related stigma when diagnosed with TB. This could be due to the social stigma associated with incarceration

itself superseding that of TB. As there is already a societal stigma associated with being a former prisoner, people who have been incarcerated often face negative stereotypes, discrimination, and marginalisation upon their release that might mask the discrimination faced solely due to TB.

Our study found that many participants reported certain feelings and behaviours associated with self-stigma. Specifically, 98% of participants reported feeling alone. This feeling of isolation can be a consequence of the stigma surrounding TB, which may lead to social exclusion and a lack of support from friends, family, and the community. The stigma associated with TB can make individuals feel isolated and disconnected, impacting their overall well-being and mental health.[64] Stigma and discrimination often lead to the social isolation of TB patients, both within and outside their families. Patients may experience avoidance by former friends and acquaintances, and within the family, they may be forced to eat and sleep separately.[65,66]

Furthermore, 98% of participants reported feeling hurt by how others react to knowing they have TB. This indicates that individuals with TB are sensitive to the negative reactions and judgments they may encounter from others upon disclosing their diagnosis. Such negative reactions can range from avoidance and discrimination to the misconception that TB is solely the result of personal behaviour or character flaws.[67] For unmarried women with TB, getting married can be challenging due to discrimination from prospective husbands and their families. Likewise, married women may face the risk of divorce if their TB status or history is revealed. These discriminatory attitudes and actions perpetuate the stigmatisation of TB and create barriers to social integration and support for individuals affected by the disease.

Additionally, 93% of PWTB reported keeping a distance from others to avoid spreading TB germs. This behaviour can be seen as a result of the fear of transmitting the infection to others and reflects the internalised stigma that individuals with TB may experience. They may feel a sense of responsibility for preventing the spread of the disease and consequently isolate themselves from others to avoid potential harm.[68] To protect others and avoid uncomfortable situations such as being shunned or becoming the subject of gossip, TB patients often isolate themselves. This isolation can significantly affect various aspects of their lives, including employment and employment prospects. Individuals who are either current patients or have a history of TB may face discrimination that hinders their ability to find or maintain employment.

These findings shed light on the emotional and behavioural effects of self-stigma experienced by PWTB. The fear of spreading TB, feelings of loneliness, and the emotional impact of others' reactions can significantly affect individuals' psychological well-being, adherence to treatment, and overall quality of life.

Understanding the independent risk factors for stigma among PWTB is crucial for developing targeted interventions and policies to address and reduce stigma. Efforts should be focused on tackling poverty-related stigma and providing support to individuals with a history of imprisonment. By addressing these risk factors, it is possible to promote a more inclusive and supportive environment for PWTB and mitigate the negative consequences of stigma on their health and well-being.[69]

It is crucial to address TB-related stigma comprehensively, as it hinders early detection, treatment adherence, and overall disease control efforts. Raising awareness, implementing educational campaigns, and promoting inclusive policies can help reduce stigma and its negative consequences for TB patients.[70,71]

This study had several limitations. Specifically, it focuses on PTB-related stigma in terms of negative experiences among TB patients rather than the general public, which may limit the generalizability of our findings. The study included patients who had access to a health centre and excluded those who did

not undergo follow-up exams to compare the participants' status before and after treatment. This study was cross-sectional in Baghdad, and the results cannot be generalised to other provinces in Iraq. Additionally, the absence of a control group makes it difficult to compare and evaluate the results.

CONCLUSION

We can conclude that almost four of every five PTB patients experienced stigma. Among all those who experienced stigma, they have reported feelings of loneliness, loss of friendships, sadness, and reluctance to discuss their TB condition beyond their immediate family. Poverty displayed a notable impact on the likelihood of encountering stigma.

Based on these findings, we propose a few recommendations. First, raise awareness about TB through educational campaigns and training healthcare providers to provide patient-centred care, focusing on empathy, dignity, confidentiality, and respect for patients' rights. Second, strengthen support systems for TB by establishing counselling services and peer networks and promoting collaboration among the health, education, employment, and social welfare sectors for a holistic approach. Third, implement the national poverty reduction programs and ensure equitable access to quality healthcare services for all individuals, particularly in low socioeconomic neighbourhoods where TB-related stigma is prevalent. Fourth, conduct further research to understand the factors influencing TB-related stigma, its impact on treatment adherence, health outcomes, and overall well-being, and develop effective interventions.

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Abbreviations list: Cerebrovascular disease (CVD), Chest and Respiratory Disease Consultant Clinics (CRDCCs), Diabetes mellitus (DM), Disability-Adjusted Life Year (DALYs), Drug-resistant TB(DR-TB), Eastern Mediterranean Region (EMR), Health-related factors (HRFs), Hypertension (HT), Patient with Tuberculosis (PWTB), Standard deviation (SD), Statistical package for social sciences (SPSS), Stop TB Partnership (STP), Susceptible drug TB(SD-TB), Tuberculosis (TB), World Health Organisation (WHO) .

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