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Mapping risk and protective factors in tuberculosis-related stigma: a scoping review

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ABSTRACT

Despite global efforts to end tuberculosis (TB), slow declines in incidence and mortality rates persist, partly due to entrenched social and structural challenges. TB-related stigma is a critical barrier to effective TB prevention and treatment. However, existing frameworks often overlook broader structural and intersectional influences, underscoring the need for a comprehensive analysis of the social and structural factors influencing TB-related stigma. We aimed to (1) identify risk and protective factors influencing TB-related stigma and (2) examine how cultural, social, and economic determinants shape stigma experiences among people with TB. A systematic search was conducted across PubMed, SCOPUS, Web of Science, APA PsycInfo, and Sociology Source Ultimate. Studies were included if they (a) involved human participants, (b) were published in the last decade, and (c) reported stigma experiences influenced by social, economic, or environmental determinants. A total of 43 studies were included. Key determinants associated with higher TB-related stigma included lower educational attainment, rural residency, low income, gender, and specific mental health conditions. Cultural perceptions of TB, healthcare system interactions, and the dual stigma associated with HIV co-infection significantly exacerbated TB-related stigma experiences. Factors such as social support, patient-provider communication, and prior TB experience emerged as protective against stigma. Findings underscore TB-related stigma's complex intersection with social and structural determinants, highlighting gaps research, especially concerning standardised conceptual definitions and measurements. Addressing stigma is essential for improving TB care-seeking behaviours and health outcomes, particularly in low-resource settings where TB-related social isolation and discrimination are prevalent.

1. Introduction

Tuberculosis (TB), although currently preventable and curable, remains a leading cause of death from a single infectious agent (Villar-Hernández et al., 2023), affecting approximately 10.8 million people worldwide (Word Health Organization, 2024). Global TB management endeavours have been employed to end the global TB epidemic by 2030/2035, requiring sustained, multisectoral investment and political commitment to address transmission and its root causes of transmission and disease burden (Salama and Rizk, 2023). Yet, incidence and mortality rates have been decreasing rather slowly, confirming TB as a major global health threat (Villar-Hernández et al., 2023).

Major challenges hindering TB prevention and care have been identified in the literature, including: (1) Discrimination, stigma; (2) Poverty and insufficient social protection; (3) war and migration; (4) Limited multi-sectoral action on social determinants; (5) Gaps in universal health coverage; (6) Insufficient coordination on risk factors; (7) Limited research and innovations; (8) Inadequate community/civil society engagement; (9) Insufficient case finding; (10) Inadequate

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prevention; (11) Suboptimal quality of care; and (12) Drug resistance (Villar-Hernández et al., 2023). Addressing these challenges remains crucial, yet efforts remain insufficient in tackling key social determinants of health, such as discrimination and stigma, which continue to exacerbate health inequalities (Major et al., 2017; Nuttall et al., 2022). Given the cross-cultural nature of TB stigma, it is also critical to explore how cultural beliefs and practices, shape stigma dynamics, as they may result in concealment, diagnostic delay, and social isolation, while shaping the support people, thereby influencing the intensity and manifestation of experienced stigma (Courtwright and Turner, 2010; Juniarti and Evans, 2011).

TB-related stigma has a far-reaching influence, impacting people and their communities across socioeconomic, interpersonal and psychological domains, affecting quality of life and social standing, all of which can contribute to economic vulnerability (Courtwright and Turner, 2010; Mahbub et al., 2023). Economic factors, including income loss due to time away from work during treatment, high out-of-pocket costs for transportation and medical visits, significantly contribute to the onset and reinforcement of stigma. People with TB often face job-related discrimination, including dismissal or demotion, which further exacerbates their economic instability and deepens social marginalization (Mahbub et al., 2023). Poverty itself, a driver and a consequence of TB, intersects with stigma in a cyclical relationship, in which financial hardship heightens vulnerability to stigma, while stigma reinforces barriers to livelihood and economic participation (Courtwright and Turner, 2010; Mahbub et al., 2023). TB-related stigma and discrimination may also lead to psychosocial and mental health effects leading to the development of mental illnesses, with many people with TB suffering from significant psychological distress characterised by experiences of self-stigmatization, shame, guilt, risk, and "otherness" (Alselwi, 2024; Fuady et al., 2022; Juniarti and Evans, 2011; Mahbub et al., 2023). TB-related stigma also imposes significant barriers to healthcare access, reducing uptake of screening and treatment (Chang and Cataldo, 2014; Craig et al., 2017), delaying diagnosis and augmenting mortality (Kallepalli et al., 2023).

Foster et al. (2022) mapped the available literature on TB-related stigma interventions, according to five key levels of implementation: community (e.g. TB literacy educational campaigns); organizational (e.g. information based tools to address the drivers of stigma within healthcare settings, directed at healthcare workers); interpersonal (e.g. addressing stigma drivers and manifestations, including home visits, family workshops and additional support from community leaders); individual (e.g. capacity training on mechanisms to counteract negative beliefs by means of support groups); and policy, where no interventions were identified, although adapting policies and practices that sustain TB stigma was highlighted as a major component for its eradication. This review further emphasized three major hinders to implementation success: inconsistent stigma definitions, lack of standardization in stigma measurements, and difficulties in outcome measurements (Foster et al., 2022).

Similarly, Nuttall et al. (2022) aimed to evaluate the quality, design, implementation challenges, and successes of interventions for TB-related stigma, finding most initiatives to mainly consist of health education programs and psychosocial support (e.g. different support groups to discuss TB experiences, provide mutual support and encouragement throughout the illness and treatment), directed to three key populations: (1) people with TB; (2) healthcare professionals; (3) general population. Indicators such as fidelity, acceptability, and feasibility were infrequently measured or reported, and successes, when reported, could not be verified in the data presented. When it comes to the challenges, some studies mentioned geographical limitation, challenges concerning the maintenance and sustainability of the interventions, and challenges within healthcare settings, such as lack of adherence due to work related constraints, professional rank, position and social status (Nuttall et al., 2022).

Even so, no effort has been made to summarize the available data on the different determinants and factors that may be linked to higher or lower TB-related stigma experiences. This scoping review synthesises existing knowledge on the different social and structural determinants that seem to function as risk or protective factors of TB stigma experiences in an effort to respond to the following research questions: RQ1 What are the risk and protective factors that contribute to TB-related stigma? RQ2 How do cultural, social, and economic factors influence the development of TB-related stigma? Given the lack of a consensual definition of TB stigma, for the purposes of this review, we took into consideration experiences that were reported not only as stigma, but also as discrimination, prejudice or other synonyms, as long as the experience of people with TB reflected a different outcome or opportunity due to their disease.

1.1. Theoretical framework: stigma and TB

Stigma is a complex social phenomenon, marked by a heterogeneity of definitions, measurements and experiences. This heterogeneity seems to have been emphasized as early as 1986, by Stafford and Scott, who remarked that one of the most curious features of literature in regards to stigma is conceptual variability, marking several decades of knowledge production in this domain that is fractured, dispersed and weakened in its ability to structure adequate and timely responses. This may be in part due to a lack of understanding of the complexity of stigma phenomena, and to the relative simplicity of existing frameworks (Parker and Aggleton, 2003).

Numerous interdisciplinary theories have emerged to understand and respond to stigma's impact and to come closer to the reality of the stigmatization and discrimination processes associated with a certain disease or condition. Overall, most research on TB stigma seems to be inspired by Goffman's (1963) classical definition of stigma, i.e. a special kind of relationship between attribute and stereotype, where the attribute is deeply discrediting and disqualifying from full social acceptance, but recently, new efforts have been made to expanded Goffman's definition of stigma, borrowing much needed attention to the social environment and its inherent systems of power.

In the health systems context, the Health Stigma and Discrimination framework (Stangl et al., 2019) outlines the stigmatization process as it unfolds across the health socioecological spectrum, dividing stigma experiences into a series of constituent domains which influence a range of outcomes among affected populations, as well as organizations and institutions, ultimately impacting health and society. It begins with drivers (inherently negative forces such as fear of contagion, moral judgement, or authoritarianism) and facilitators (contextual factors whose presence or absence can amplify or buffer stigma, e.g., occupational-safety standards), which decide whether stigma "marking" occurs, often intersecting with race, class, or gender (Stangl et al., 2019).

Stigma manifestations encompass both stigma experiences and stigma practices, each contributing to the perpetuation of health-related stigma and its broader societal impact. Stigma experiences refer to the subjective dimensions of stigma encountered by individuals and can be classified into several forms: experienced stigma or discrimination, internalized, perceived, anticipated, or secondary stigma; while the stigma practices encompass the external enactments of stigma within society, including discriminatory attitudes and stigmatizing behaviours. These practices are often rooted in dominant social norms, media representations, institutional policies, and legal frameworks that perpetuate unequal power dynamics (Stangl et al., 2019).

Stigma is, therefore, a complex barrier that, not only impacts people's perceptions of a particular disease or condition, but also the systems and procedures in place to diagnose and treat it, influencing health-seeking behaviours, care engagement, and treatment adherence (Stangl et al., 2019). A visual guide of this framework may be consulted in Fig. 1.

Our review, aims to describe what is currently known on the domains that compose this framework, mapping out how they interact when it comes to TB-related stigma. In this sense, this review seeks to summarize

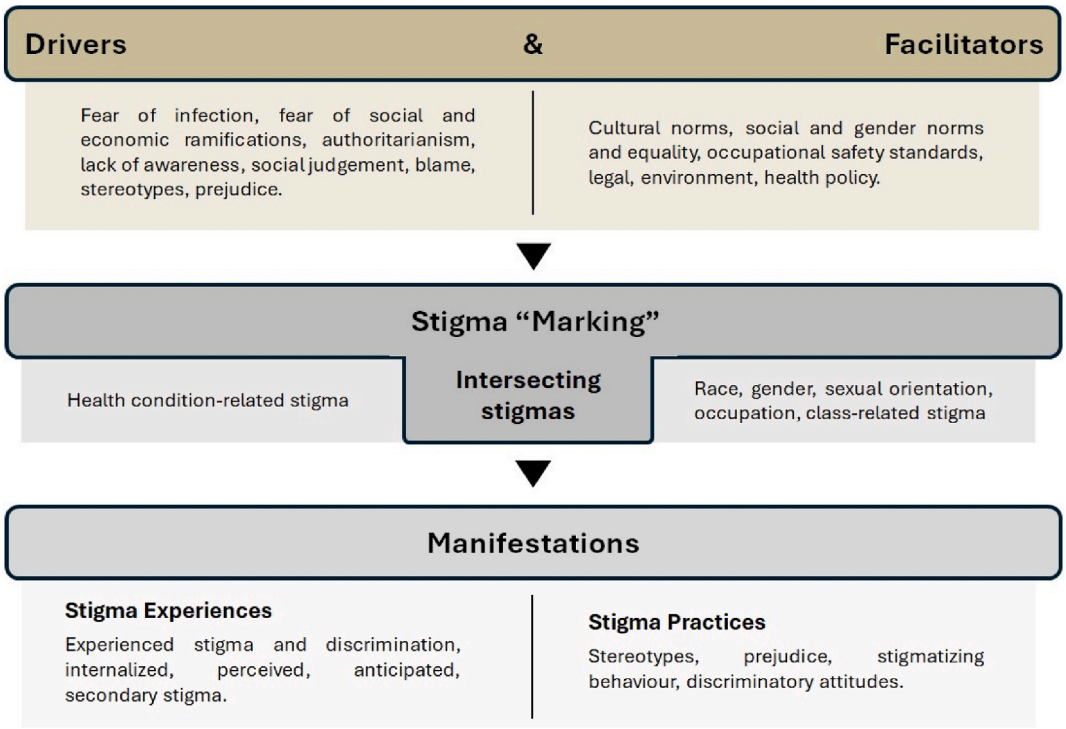

Fig. 1. TB Stigma Framework visual reference adapted from the Health Stigma and Discrimination Framework (Stangl et al., 2019).

existing knowledge on these drivers and facilitators that make up risk or protective factors to TB stigma experiences, to inform future interventions on TB stigma prevention and reduction tailormade according to the presented factors.

2. Materials and methods

Given the purpose of the current study to map the different risk or protective factors of TB stigma experiences, we followed the methodological framework for scoping reviews proposed by Arksey and O'Malley (2005), further refined by Levac et al. (2010), which suggests five stages for the development of a transparent and reliable review: (1) identification of the initial research questions; (2) identification of relevant studies; (3) study selection; (4) charting of the data, (5) collating, summarising and reporting of the results; and (6) consultation. Results are reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews - PRISMA-ScR (Tricco et al., 2018), in harmony with the JBI Manual for Evidence Synthesis on Scoping Reviews (Peters et al., 2015).

2.1. Identification of relevant studies

A preliminary search was conducted in PubMed to identify core terminology in available empirical evidence to assess potential reporting differences. The search string was thereafter developed to ensure a comprehensive retrieval of relevant literature, as it referred to articles that (a) explored TB stigma experiences of people living with the disease, (b) measured the effects of a social, economic and/or environmental determinant on TB-related stigma, and (c) reported an experience of stigma, discrimination, prejudice or other known synonyms. In terms of inclusion criteria, records had to (1) involve human participants or refer to data analysis collected from human participants; (2) be in English, Portuguese or Spanish; (3) be published in the last 10 years; (4) report the impact of a social, economic and/or environmental determinant on TB-related stigma, discrimination, prejudice or other known synonyms (5a) measure the impact of said determinants in TB stigma, or (5b) explore the impact of said determinants in TB stigma. Populations with comorbidities, such as HIV, were included when TB remained the primary focus. No exclusions were made based on study design as long as the studies were primary, as quantitative, qualitative and mixed-methods studies each provide distinct and valuable insights. Non-primary studies, such as reviews, editorials or commentaries, with objectives that aligned with the purpose of the present review were preserved for hand search of the references. No restrictions were placed on the geographical location, gender or ethnicity of the population.

Key databases that reflected not only health sciences, but also social sciences, were used to run the search strategy from August 2013 to November 2024. The decision to set the search period in 2013 was based on the intention to capture contributions that reflect the contemporary landscape of TB, particularly in relation to stigma and its implications for health outcomes. Given that stigma is a socially constructed phenomenon, highly sensitive to contextual shifts—such as changes in health policies, biomedical advancements, media narratives, and sociocultural dynamics (Earnshaw et al., 2022) —this timeframe was chosen to ensure that the review remains relevant to current debates and aligns with the state of the art. The following databases were searched PubMed, SCOPUS, Web of Science Core Collection (via Clarivate), APA PsycInfo (via EBSCO) and Sociology Source Ultimate (via EBSCO) using a combination of "tuberculosis", "stigma", "prejudice", "discrimination", "stereotype", "factors", "dimensions" and "determinants". The complete search strategies for each database are provided in Supplementary File 1.

2.2. Study selection

The search returned 3338 studies, thereafter imported to the reference management software EndNote and The Systematic Review Accelerator (Clark et al., 2020) for organisation and deduplication, respectively. A total of 2825 remained for screening of relevant studies in three phases. First, authors (Author1, Author2, Author3 and Author5) independently reviewed the title and abstract of the same thirty articles to fine tune and calibrate the pre-established inclusion criteria, with no new criterion being added. In the second stage, the deduplicated articles were divided into two distinct groups, subsequently reviewed by two

independent teams of assessors. Any disagreements were solved by a third reviewer from the opposite team, to ensure impartiality in the review process. The third phase entailed the review of 101 full-texts, by the same teams and following the same process of conflict resolution. Three of the selected articles were not publicly accessible. Although requests were submitted to the respective corresponding authors, no responses were received prior to the submission, resulting in the exclusion of these articles from the review. Therefore, twenty-six articles met all eligibility criteria. Backward and forward citation searching were conducted on included studies, through PubMed, Google Scholar, and Web of Science, given the same eligibility criteria established. This process was repeated until saturation was achieved, i.e., no new eligible records were identified for inclusion. A total of 418 articles were screened, resulting in the inclusion of 17 additional articles: seven not indexed in any of the databases searched; one that became indexed only after our final database update; and nine that had been retrieved but were conservatively excluded at title/abstract. The same procedure to the one conducted, and described, for the database search was applied. The process is outlined in Fig. 2.

2.3. Data charting

To assess the effect of each factor on TB related stigma, a structured data form was developed by the research team, for the purposes of this review. Data was extracted according to the following categories: (1) author and year of publication; (2) country where the study was conducted; (3) objectives/purpose of primary study; (4) study design; (5) study setting (e.g., primary healthcare, secondary healthcare, community); (6) study population and sample size; (7) measurement instruments/tools used to assess TB related stigma; (8) TB-related factors reported; (9) main findings related to the research question; and (10) magnitude of association for each reported factor.

Thematic analysis was conducted inductively (Braun and Clarke, 2022), with no predefined codebook. Codes and themes were developed based on the content of the included studies, after the full-text selection had been completed. Two reviewers conducted the thematic analysis independently to enhance consistency and reduce bias. Thereafter, we developed a multi-level framework to organize and map the interrelationships among determinants of TB-related stigma across multiple domains (see Fig. 3). This nested ecological model comprises four interconnected levels: individual, disease-related, community & society, and health system. The framework provided a structured lens for both data extraction and thematic analysis, ensuring comprehensive coverage of the diverse factors influencing TB stigma identified in the literature.

3. Results

The present review sought to provide an overview of the current knowledge on TB-related stigma and existing factors that are constructed as risk or protective factors in stigma experiences of people with TB (RQ1) and the manner through which identified factors interact and influence said experiences (RQ2). A synthesis of study characteristics can be found in Tables 1 and 2 summarises the factors associated with TB-related stigma, distinguishing risk versus protective influences.

3.1. Study characteristics

Of the 43 studies included, 28 followed a cross-sectional design, 9 were qualitative, integrating interviews and/or focus group discussions, 5 followed a mixed-methods approach and only 1 was a case-control (Suleiman et al., 2013). Most studies were conducted either in Asia (n = 21) and Africa (n = 19), continents where we can find the majority of the high-burden countries for TB, which include India (n = 6), Ethiopia (n = 5), South Africa (n = 4), Bangladesh (n = 3), China (n = 3), and Uganda (n = 2) (WHO, 2024). Only 2 studies were conducted outside these regions, one in North Macedonia (Nikovska and Tozija, 2014) and one in Peru (Bonilla-Asalde et al., 2021).

3.1.1. TB stigma definitions

When it comes to the operational definitions of TB related stigma, it's worthy to note that only four studies included some definition of TB stigma or TB discriminatory/stigmatizing attitudes. Chen et al. (2021a), conceptualized TB stigma according to the definitions used by Arcêncio et al. (2014) and Yang (2016) - as an experience of inner shame, prompted by a presumptive or confirmed disease diagnostic, which

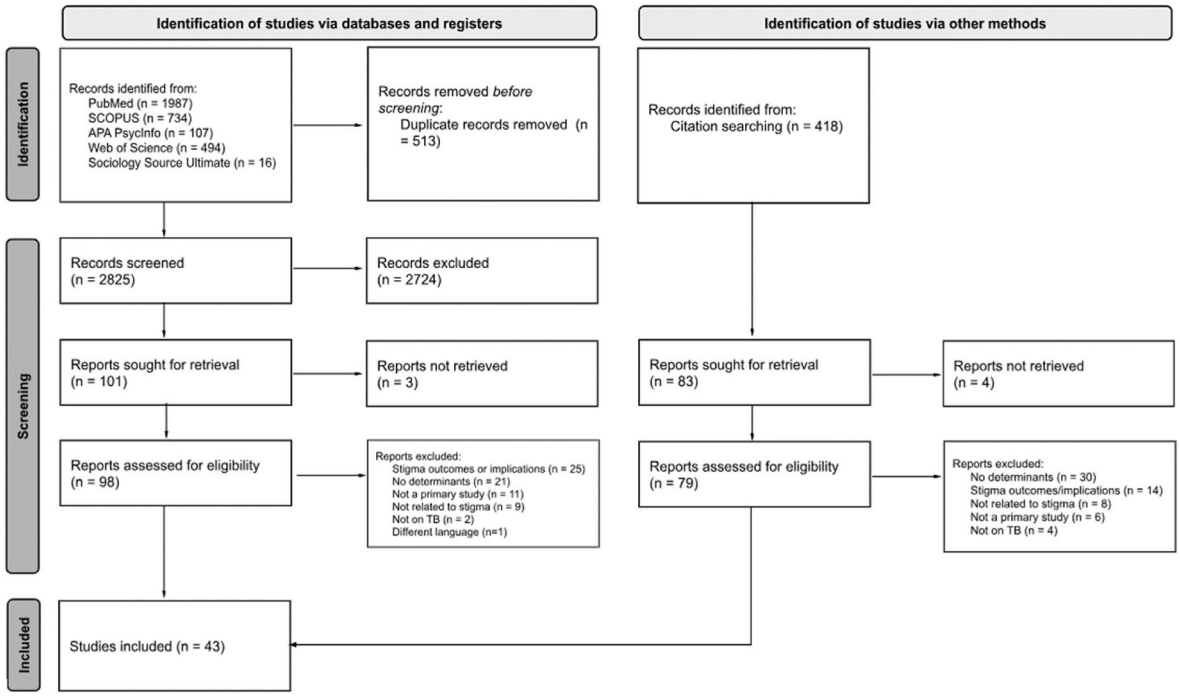

Fig. 2. PRISMA 2020 flow diagram. Source: Page et al. (2021).

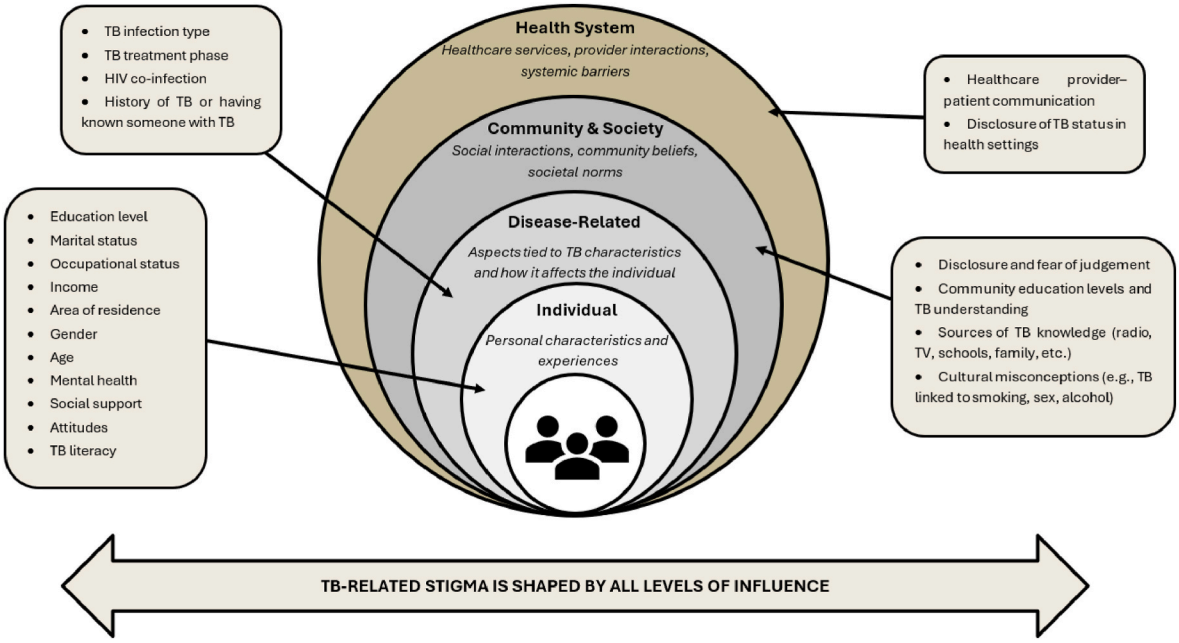

Fig. 3. Multi-level framework of TB-Related stigma influences.

embodies complex psychosocial responses. The same authors classified stigma in three main categories: (1) experienced stigma - experiences of exclusion and/or discrimination; (2) anticipated stigma - perception, expectation and/or fear of stigma; and (3) internalized stigma-loss of self-esteem, loss of dignity, fear and/or shame, following Cremers et al. (2015) definition. Chowdhury et al. (2015) provides an alternative distinction of TB stigma types, conceptualizing it as external stigma, when the experience is mainly rooted in fear and judgement of what is different, leading to blame, distancing, and discrimination; and internal stigma described as self-stigma, which is a product of the internalisation of shame, disgust, and guilt, following the rationale posited by Abioye et al. (2011).

Sagili et al. (2016) presented operational definitions for stigmatizing attitudes as an 'outlook', 'a belief' or 'a mind-set' that has the potential to influence our actions - and for discriminating attitudes, as any negative action toward an individual based on their health or social status. Another study provides a similar definition of discriminatory attitudes, describing them as a negative or unfair treatment toward an individual based on their health status (Chen et al., 2021b).

3.1.2. *Measurement of TB stigma*

Included studies employed a range of scales and tools to measure TB-related stigma across diverse settings. Most studies employed validations and adaptations of Van Rie's TB Stigma Scale (Ali et al., 2018; Bajema et al., 2020; Baskaran et al., 2023; Duko et al., 2019 Machavariani et al., 2023; Nkambule et al., 2019; Teo et al., 2020; Zakaria et al., 2022), Sert's Stigmatization Scale for Patients with Tuberculosis (Hidiroglu et al., 2019) and Yang TB-Related Stigma Scale (Bonilla-Asalde et al., 2021; Chen et al., 2021a; Yin et al., 2018). Van Rie's TB Stigma Scale is one of the most commonly used measures of TB stigma, measuring internalized, externalized, and experienced stigma through 12 items (Van Rie et al., 2008). The Stigmatization Scale for Patients with Tuberculosis (Sert, 2010; as cited in Hidiroglu et al., 2019) focuses solely on internalized stigma with 33 items, and the TB-related Stigma Scale (Yang, 2016) comprises nine items assessing negative experiences, emotional reactions and coping strategies.

Three studies used the Explanatory Model Interview Catalogue (Weiss, 1997), to assess stigma in people with TB (Oladele et al., 2020; Pryianka and Dahal, 2016; Shivapujimath et al., 2017), as one of its dimensions is set to assess the community's stigmatizing behaviours and attitudes. Other studies chose to focus on specific dimensions of stigma: perceived stigma at the community level, with Bresenham and colleagues (2020) using the Perceived Community TB Stigma Scale (Van Rie et al., 2008), and Mohammedhussein and colleagues (2020) through a modified version of the Perceived Tuberculosis Stigma Scale (Somma et al., 2008), a 11 items scale assessing perceived stigma. Stanikzai and colleagues (2024) used the Stigma Scale for Chronic Illness (Molina et al., 2013) that focus on the assessment of enacted and internalized stigma.

Some studies followed the knowledge, attitudes and perceptions (KAP) model, known for its ability to reveal misconceptions or misunderstandings on a specific topic. Some followed the WHO framework (Chen et al., 2021b; Junaid et al., 2021; Maibvise et al., 2022; Vericat-Ferrer et al., 2022; Sagili et al., 2016; Suleiman et al., 2013) while two other studies used generic versions from WHO resources. Datiko and colleagues (2020) adapted the questions pertaining to stigma and wealth to reflect internalized, externalized and experienced stigma, complemented with focus group discussions and in-depth interviews. Nikovska and Tozija (2014) used the stigma module from the World Health Survey to assess discrimination, isolation, and social exclusion experienced by people with TB.

Some authors choose to apply qualitative methods to examine TB stigma's social and psychological impacts more closely (Huq et al., 2022; Laji and Asghar, 2024), through focus groups and/or in-depth interviews (Cremers et al., 2015; DeSanto et al., 2023; Miller et al., 2017; Mukerji and Turan, 2018; Paul et al., 2019; Tadesse, 2016), Phenomenological Approach (Megerso et al., 2020; Nyasulu et al., 2018) or Grounded Theory (Hatherall et al., 2019). The study produced by Hatherall and colleagues (2019) also developed a theory of stigma's role in social relationships and marriage.

Five studies developed a questionnaire exclusively for the purposes of their study (Ashaba et al., 2021; Chowdhury et al., 2015; Eldahshan et al., 2015; Kamble et al., 2020; Wynne et al., 2014). Ashaba et al. (2021) developed a questionnaire focused on TB knowledge, practice and beliefs and HIV factors commonly associated with TB stigma. Chowdhury and colleagues (2015) developed an index to assess external and internal stigma. Eldahshan and colleagues (2015) built questions that could elicit information on the problems faced by people with TB at a family and community level, complementing it with potential stigmatizing behaviours. Wynne and colleagues (2014), employed a 17-item

Table 1
Overview of included studies.

Author, year	Location	Study Design	Setting	Population	Sample Size (Female %)	Stigma Dimensions	Measurement Tools
Ali et al., 2018	Pakistan	Cross-sectional	Outpatient clinic	Community members (>18yo)	183 (26.8 %)	Perceived	VTSS
Ashaba et al., 2021	Uganda	Cross-sectional	Public health facilities	People with TB (>18yo) registered for treatment	204 (43.1 %)	Internalized	Semi-structured questionnaire
Bajema et al., 2020	South Africa	Cross-sectional	HIV screening clinic	Non-pregnant, ART naïve adults (≥18yo)	848 (46,5 %)	Experienced Stigma Perceived	VTSS
Baskaran et al., 2023	India	Cross-sectional	Primary Healthcare	People (>18yo) with DS-TB, on treatment for at least 1 m	420 (36,4 %)	Perceived Internalized Experienced Stigma	EMIC ISMI P-SCALE V. 6.0 VTSS
Bonilla-Asalde et al., 2021	Peru	Cross-sectional	Primary Healthcare	People with TB and MDR-TB (>18yo) under treatment	110 (38,1 %)	Internalized Anticipated	Yang TSS APGAR Index – Family Function
Bresenham et al., 2020	South Africa	Cross-sectional	Public healthcare facilities	Community Members attending the health facility services other than TB (≥18yo) TB presumptive: people who screened positive for TB and submitted a sputum sample (≥18yo) People with TB (≥18yo) under treatment for at least 1 m	397 (52.6 %)	Perceived Discriminatory Attitudes	MSPSS Visser Attributable HIV Stigma Scale Kalichman HIV Stigma Scale VTSS
Chen et al., 2021a	China	Cross-sectional	Outpatient clinic	People with TB (>18yo)	601 (37.4 %)	Experienced Stigma Anticipated Internalized	Yang TSS GAD-7 SSRS
Chen et al., 2021b	China	Cross-sectional	Community	General population (12-75yo)	26246 (50.4 %)	Discriminatory Attitudes Stigmatizing Behaviours	Semi-structured questionnaire
Chowdhury et al., 2015	Bangladesh	Cross-sectional	Primary Healthcare	People with TB (≥15yo)	372 (41.2 %)	Anticipated	Stigma Index
Cremers et al., 2015	Zambia	Mixed-methods	Health Clinic	People with PTB undergoing DOT	Structured Interviews: 300 (35.7 %) In-depth Interviews: 30 (43.3 %) FGD: 30 (–)	Experienced Stigma Anticipated Internalized	Structured Interviews In-Depth Interviews FGD
Datiko et al., 2020	Ethiopia	Mixed-methods	Nationwide	People with TB (>18yo) on treatment for at least 1 m Household contacts (>18yo) who had lived in the house for at least 6 m	General Population: 1783 (53.6 %) Household Contacts: 836 (51.3 %) People with TB: 844 (42.2 %)	Discriminatory Attitudes Anticipated	FGD In-Depth Interviews WHO Questionnaire on Stigma and Wealth Index
DeSanto et al., 2023	South Africa	Qualitative	Public Health Clinic	People with TB (>18yo) Head of household of each person with TB Professionals with at least 1 m of outreach experience at a household level	People with TB: 31 (41.9 %) Household Contacts: 12 (41.7 %) Outreach Professionals: 40 (97.5 %) Community Stakeholders: 11 (–)	Anticipated Internalized	Semi-structured in-depth Interviews FGD
Duko et al., 2019	Ethiopia	Cross-sectional	TB Clinic	People with TB (>18yo)	417 (42.2 %)	Perceived	VTSS OSSS-3
Eldahshan et al., 2015	Egypt	Cross-sectional	TB Clinic	People with TB in treatment for up to 1 m	53 (22.6 %)	Anticipated Experienced Stigma	Semi-structured questionnaire
Hatherall et al., 2019	Bangladesh, Nepal, Pakistan	Qualitative	Community	People with TB Family Members Healthcare Workers	People with TB: 48 (47.9 %) Family Members: 15 (73.3 %) Healthcare	Anticipated Secondary	Grounded theory

(*continued on next page*)

Table 1 (*continued*)

Author, year	Location	Study Design	Setting	Population	Sample Size (Female %)	Stigma Dimensions	Measurement Tools
					Workers: 10 (60 %)		
Hidiroglu et al., 2019	Turkey	Cross-sectional	TB Dispensaries	People with TB who applied to TB Dispensaries	186 (59.1 %)	Internalized Experienced Stigma Perceived	SSPT
Huq et al., 2022	Ghana	Qualitative	Health Clinic Community	People with TB (>18yo) General Population (>18yo)	19 (–)	Experienced Stigma Discriminatory Attitudes Stigmatizing Behaviour	FGD
Junaid et al., 2021	Nigeria	Cross-sectional	Urban communities	Residents for at least 6 m in Surulere (>18 y)	317 (60.6 %)	Discriminatory Attitudes Stigmatizing Behaviour	WHO Advocacy, Communication and Social Mobilization for TB control Knowledge, Attitude, and Practice (adapted)
Kamble et al., 2020	India	Cross-sectional	DOTS centres	People with TB (>18yo) in treatment	270 (42.6 %)	Perceived	Semi-structured questionnaire
Laji and Asghar, 2024	India	Mixed-methods	Apatani Tribe	People with TB	106 (50.9 %)	Anticipated Discriminatory Attitudes Stigmatizing Behaviours	Semi-structured interviews
Machavariani et al., 2023	South Africa	Cross-sectional	Clinic District Hospital	People with PTB Household Contacts (>18yo)	People with TB: 143 (42.0 %) Household Contacts: 135 (76.3 %)	Perceived Secondary	VTSS PHQ-2
Maibvise et al., 2022	Eswatini	Cross-sectional	Mining communities	Mineworker, ex-mineworker or family member living in a selected household for at least 1 y (18-59yo)	163 (30.7 %)	Anticipated Discriminatory Attitudes Stigmatizing Behaviours	WHO Stop TB Partnership and UNAIDS questionnaire (adapted)
Megerso et al., 2020	Ethiopia	Qualitative	Pastoralist communities	People with TB in treatment for at least 2 m	21 (33.3 %)	Experienced Stigma	In-depth Interviews
Miller et al., 2017	Tanzania	Qualitative	Primary care Clinics	People with TB under treatment Household Members	48 (50 %)	Anticipated Internalized Discriminatory Attitudes Stigmatizing Behaviours Experienced Stigma	FGD
Mohammedhussein et al., 2020	Ethiopia	Cross-sectional	Public health facilities	People with PTB (>18yo)	410 (48.5 %)	Perceived	HADS -Depression subscale OSSS-3 Somma Perceived TB Stigma Scale
Mukerji and Turan, 2018	India	Qualitative	DOTS Clinic	Women with TB (>18yo) (1) under treatment for 6 m or (2) completed treatment within the past 6 m or more	20 (100 %)	Experienced Stigma Anticipated Internalized Discriminatory Attitudes Stigmatizing Behaviours	Interviews
Nikovska and Tozija, 2014	North Macedonia	Cross-sectional	People with TB Home	People with TB	315 (63.2 %)	Experienced Stigma	World Health Survey Stigma Module (adapted)
Nkambule et al., 2019	Eswatini	Cross-sectional	TB Hospital	People with DR-TB (>18yo) hospitalized for at least 3 days or coming for review	84 (58.3 %)	Perceived	CBM VTSS
Nyasulu et al., 2018	Malawi	Qualitative	Community	People with TB and Community Members without a diagnosis (18–49yo)	People with TB: 6 (50 %) Community Members: 18 (50 %)	Perceived	FGD In-Depth Interviews
Oladele et al., 2020	Nigeria	Cross-sectional	Community	Community members (>18yo) who lived in the community for at least 6 m	790 (49,5 %)	Stigmatizing Behaviours Discriminatory Attitudes	EMIC
Paul et al., 2019	Bangladesh	Qualitative	Peri-urban areas	People with PTB (>18yo) who completed treatment	Interviews: 22 (54.5 %) FGD:	Experienced Discrimination Internalized	In-depth Interviews FGD

(*continued on next page*)

Table 1 (*continued*)

Author, year	Location	Study Design	Setting	Population	Sample Size (Female %)	Stigma Dimensions	Measurement Tools
				Community Members (>18yo) with no previous history of TB			
Pengpid and Peltzer, 2019	Timor-Leste	Cross-sectional	Nationwide survey	General population (15-49yo)	17229 (73.1 %)	Secondary	2016 Timor-Leste Demographic and Health Survey
Pryianka 2016	Nepal	Cross-sectional	Hospital	People with TB under DOTS treatment	89 (37.1 %)	Anticipated Internalized	EMIC
Sagili et al., 2016	India	Cross-sectional	Community	General population	3823 (47.2 %)	Stigmatizing Behaviours Discriminatory Attitudes	Semi-structured questionnaire
Shivapujimath et al., 2017	India	Cross-sectional	Rural and urban clinics	People with TB on DOTS	209 (28.7 %)	Experienced Stigma	EMIC
Stanikzai et al., 2024	Afghanistan	Cross-sectional	TB Clinic	People with TB (>18yo) under treatment	603 (50.4 %)	Experienced Stigma Internalized	SSCI-8 PHQ-9 OSSS-3
Suleiman et al., 2013	Sudan	Case-control	Primary Healthcare	People with TB	Cases: 425 (38.4 %) Controls: 850 (43.5 %)	Internalized Perceived Anticipated	WHO KAP
Tadesse (2016)	Ethiopia	Qualitative	TB hospital	Healthcare professionals People with TB	Healthcare Professionals: 6 (–) People with TB: 10 (50 %)	Anticipated Discriminatory Attitudes Stigmatizing Behaviours	In-depth Interviews
Teo et al., 2020	Cambodia	Mixed-methods	Community	People with TB within 1 m of diagnosis	Cross-Sectional: 730 (46.8 %) Interviews: 31 (41.9 %)	Internalized Perceived	Semi-structured questionnaire In-depth Interviews
Vericat-Ferrer et al., 2022	Equatorial Guinea	Cross-sectional	Nationwide	Household caregivers (>18yo)	770 (53 % female)	Discriminatory Attitudes Stigmatizing Behaviours	WHO KAP
Wynne et al., 2014	Uganda	Mixed-methods	Community	Community members (>18yo)	Cross-Sectional: 359 (50.7 %) FGD: 61 (–)	Stigmatizing Behaviours Discriminatory Attitudes	Semi-structured questionnaire FGD
Yin et al., 2018	China	Cross-sectional	Nationwide	People with TB	1342 (32.6 %)	Internalized Anticipated	Yang TSS APGAR Index – Family Function National TB Epidemiological Survey of China (adapted)
Zakaria et al., 2022	Malaysia	Cross-sectional	Chest Clinics	People with TB (>18yo) under TB treatment	200 (35 %)	Perceived	VTSS BDI

Note.
General Terminology: ART: Antiretroviral Therapy; DOT: Directly Observed Therapy; DOTS: Directly Observed Therapy Short Course; DR-TB: Drug Resistant Tuberculosis; DS-TB: Drug Sensitive Tuberculosis; FGD: Focus Group Discussion; m: months; MDR-TB: Multidrug Resistant Tuberculosis; PTB: Pulmonary Tuberculosis; TB: Tuberculosis; yo: years old; WHO: World Health Organization.
Measurement Tools - BDI: Beck Depression Inventory; CBM: Caring Behaviour Measurement; EMIC: Explanatory Model Interview Catalogue; GAD-7: Generalized Anxiety Disorder; HADS: Hospital Anxiety and Depression Scale; ISMI: Internalized Stigma of Mental Illness; MSPSS: Multidimensional Scale of Perceived Social Support; OSSS-3: Oslo Social Support Scale; PH-Q2: Patient Health Questionnaire-2; P-SCALE: Participation Scale; VTSS: Van Rie Tuberculosis Stigma Scale; SSPT: Stigmatization Scale for Patients with TB; SSRS: Social Support Rating Scale; TSS: TB-related Stigma Scale.

stigma-related questionnaire complemented with open-ended questions that further explored dynamics of stigma in their sample.

Finally, Pengpid & Peltzer (2019) assess TB stigma through a single-item on whether participants would keep a family member's TB diagnosis a secret, from the Demographic and Health Survey from Timor Leste, complemented with additional items on TB knowledge, sources of information, and treatment intentions.

3.2. Sociodemographic influence on TB related stigma

3.2.1. Education level

TB-related stigma is strongly associated with education level, with lower levels correlating with increased stigma-related practices (Wynne et al., 2014) and experiences (Stanikzai et al., 2024; Zakaria et al., 2022). Illiteracy has been identified as an independent predictor of stigma, as those with no formal or only primary education report higher levels of anticipated (Chowdhury et al., 2015; Datiko et al., 2020) and experienced stigma when compared to those with higher education (Nikovska and Tozija, 2014; Stanikzai et al., 2024). Education also plays a key role in shaping discriminatory attitudes and stigmatizing behaviours, with higher education being associated with greater acceptance of people with TB (Chen et al., 2021b; Wynne et al., 2014). This pattern is observed in both TB-affected families and the general population (Datiko et al., 2020).

3.2.2. Marital status

The relationship between marital status and TB-related stigma is unclear. Most studies link higher levels of stigma experiences to people who are married (Ashaba et al., 2021; Nikovska and Tozija, 2014; Yin et al., 2018; Zakaria et al., 2022), cohabiting, formerly married, widowed, or divorced (Ashaba et al., 2021; Suleiman et al., 2013). In contrast, single individuals have been found to report moderate levels of

Table 2
Summary of factors associated with TB-Related stigma.

Domain	Factor	Direction	Supporting Evidence	Magnitude
Individual	Female Gender	Risk	Cremers et al., 2015	β = 1.70(1.51,19.88)
			Chowdhury et al., 2015	aOR = 3.22(1.21,8.55)
			Chen et al., 2021a	β = 1.19(0.38,2.01)
	Male Gender	Risk	Bajema et al., 2020	aRRR = 1.59(1.11,2.28)
			Kamble et al., 2020	p < 0.05
			Nikovska and Tozija, 2014	aOR = 2.72(1.22,6.05)
	Unmarried	Risk	Oladele et al., 2020	aOR = 3.09(1.09,8.81)
			Suleiman et al., 2013	Moderate Stigma: OR = 3.66(1.58,8.48) Mild Stigma: OR = 4.08(1.76,9.49)
	Married	Risk	Nikovska and Tozija, 2014	aOR = 3.19(1.93,10.96)
	Ethnicity	Risk	Nikovska and Tozija, 2014	Albanian: aOR = 2.44(1.02,5.81) Turkish: aOR = 1.12(1.11,7.35) Roma: aOR = 4.17(1.95,18.32)
	Older Age	Risk	Chen et al., 2021b	≥60 Towards neighbors/colleagues: aOR = 1.89(1.44,2.47)
			Pryianka and Dahal, 2016	p < 0.05
		Protective	Zakaria et al., 2022	β = -0.38(-0.52,-0.23)
	Younger Age	Risk	Kamble et al., 2020	p < 0.05
			Maibvise et al., 2022	aOR = 1.65(1.01,5.44)
			Shivapujimath et al., 2017	p < 0.05
			Stanikzai et al., 2024	aOR = 5.16(2.53,10.5)
		Protective	Oladele et al., 2020	aOR = 0.21(0.06–0.79)
			Pengpid and Peltzer, 2019	Women [25–34]: aOR = 0.74(0.61,0.91)
	Lower Education Level	Risk	Chowdhury et al., 2015	aOR = 2.98(1.09,8.12)
			Nikovska and Tozija, 2014	No formal education: aOR = 1.16(1.01–2.04) Uncompleted primary school: aOR = 1.11(1.01,2.00)
			Stanikzai et al., 2024	aOR = 5.01(2.29,10.9)
			Suleiman et al., 2013	OR = 2.47(1.21–5.05)
	Higher Education Level	Protective	Chen et al., 2021b	University Towards neighbors/colleagues: aOR = 0.69(0.57,0.84)
			Datiko et al., 2020	General Population: aOR = 0.58(0.39,0.87) Families of People with TB: aOR = 0.52(0.29,0.94) People with TB: aOR = 0.61(0.38,0.97)
			Wynne et al., 2014	OR = 0.53(0.29,0.97)
		Risk	Shivapujimath et al., 2017	p < 0.05
	Lower TB Knowledge	Risk	Ali et al., 2018	Not knowing TB is curable: cOR = 3.42(1.20,9.70)
			Bajema et al., 2020	aRRR = 1.90(1.16–3.10)
			Bonilla-Asalde et al., 2021	β = −0,32, p = 0.000
			Stanikzai et al., 2024	aOR = 11.4(3.74,35.1)
			Yin et al., 2018	β = -0.18, p = 0.0025
	Higher TB Knowledge	Protective	Bresenham et al., 2020	Mixed Understanding of TB Causes People with TB: β = −2.93(-4.92,-0.94)
			Chen et al., 2021b	TB can be cured Towards neighbors/colleagues: aOR = 0.77(0.72,0.82) TB initial symptoms Towards neighbors/colleagues: aOR = 0.84(0.79,0.90)
			Datiko et al., 2020	General Population: aOR = 0.62(0.49,0.78)
			Junaid et al., 2021	p < 0.0001
			Pengpid and Peltzer, 2019	Women: aOR = 0.75(0.71,0.80)
			Teo et al., 2020	Internalized: β = −0.88(-1.24,-0.52) Perceived: β = −0.72(-1.11,-0.34)
		Risk	Chen et al., 2021b	TB is contagious Towards neighbors/colleagues: aOR = 1.25(1.12,1.39) Towards People with TB: aOR = 1.87(1.01,3.46) TB transmission Towards neighbors/colleagues: aOR = 2.08(1.91,2.25) TB initial symptoms Towards People with TB: aOR = 1.62(1.20–2.18)
	Unemployment	Risk	Nikovska and Tozija, 2014	OR = 5.23(1.84,8.23)
	Knowing someone who died with TB	Risk	Ashaba et al., 2021	aOR = 4.42(1.69,11.50)
	Having relatives with TB	Risk	Hidiroglu et al., 2019	p = 0.006
	TB/HIV Knowledge	Risk	Ashaba et al., 2021	Similar Symptoms: aOR = 3.05(1.29,7.22)
			Bresenham et al., 2020	Knowing TB increases chances of HIV People with TB: β = 2.48(1.05,3.90) Knowing HIV increases chances of TB TB Presumptive: β = 2.48(0.02,4.94)
	Lower Socioeconomic Status	Risk	Baskaran et al., 2023	aOR = 1.7(1.0,2.8)
			Datiko et al., 2020	Families of People with TB: aOR = 1.97(1.1,3.53) People with TB: aOR = 1.93(1.05,3.57)
			Hidiroglu et al., 2019	p < 0.001
			Pengpid and Peltzer, 2019	Women [Lowest Quintile]: aOR = 1.51(1.09,2.09)
		Protective	Oladele et al., 2020	aOR = 0.27(0.09–0.81)

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Table 2 (*continued*)

Domain	Factor	Direction	Supporting Evidence	Magnitude
	Higher Socioeconomic Status	Risk	Sagili et al., 2016	DA: aOR = 2.25(1.29–3.91)
	Poor Family Dynamics	Risk	Bonilla-Asalde et al., 2021	B = −0,41, p < 0.000
			Yin et al., 2018	β = −0.29, p < 0.0001
	Occupation	Protective	Chen et al., 2021b	Government Staff Towards neighbors and colleagues: aOR = 0.79(0.65,0.97) Healthcare workers Towards neighbors and colleagues: aOR = 0.53(0.41,0.70) Industrial Workers Towards neighbors and colleagues: aOR = 0.79(0.70,0.90)
		Risk	Chen et al., 2021b	Farmers Towards People with TB: aOR = 2.43(1.49,3.95)
			Hidiroglu et al., 2019	Temporary workers: p = 0.014
	Current Substance Use	Risk	Duko et al., 2019	aOR = 1.78 (1.28, 3.17)
			Eldahshan et al., 2015	p < 0.05
			Mohammedhussein et al., 2020	aOR = 1.88(1.05,3.37)
Disease-Related	Higher Depression Scores	Risk	Bresenham et al., 2020	People with TB: β = 0.21(0.03,0.38)
			Mohammedhussein et al., 2020	aOR = 8.18(4.40,15.22)
			Stanikzai et al., 2024	aOR = 5.28(1.48,18.7)
	Higher Stress Scores	Risk	Mohammedhussein et al., 2020	aOR = 1.95(1.10,3.49)
	Higher Anxiety Scores	Risk	Chen et al., 2021a	β = 0.38(0.30,0.46)
	Higher perceived severity of TB	Risk	Chen et al., 2021a	β = 1.36(0.03,2.70)
			Stanikzai et al., 2024	aOR = 2.42(1.22,4.78)
	Lower perceived severity of TB	Protective	Teo et al., 2020	Perceived: β = −1.75(-2.84,-0.66)
	Pulmonary TB	Risk	Chowdhury et al., 2015	aOR = 7.90(3.74,16.71)
			Duko et al., 2019	aOR = 2.49(1.24, 4.87)
			Hidiroglu et al., 2019	p < 0.001
	HIV Coinfection	Risk	Duko et al., 2019	aOR = 2.49(1.24, 4.87)
			Machavariani et al., 2023	aOR = 1.88(0.16,3.59)
			Mohammedhussein et al., 2020	aOR = 5.67(2.32,13.87)
			Zakaria et al., 2022	β = 14.42(4.77,24.07)
	TB Treatment: Intensive Phase	Risk	Duko et al., 2019	aOR = 1.42(1.19, 2.58)
Community & Society	High Social Support	Protective	Bresenham et al., 2020	TB Presumptive: β = −0.07(-0.14,-0.01)
			Chen et al., 2021a	B = −0.25(−0.33,-0.17)
	Poor Social Support	Risk	Duko et al., 2019	aOR = 2.45(1.18, 5.09)
			Mohammedhussein et al., 2020	aOR = 2.41(1.06,5.48)
	Urban Residence	Risk	Eldahshan et al., 2015	p < 0.05
		Protective	Pengpid and Peltzer, 2019	Men: aOR = 0.54(0.32,0.93)
	Rural Area	Risk	Nikovska and Tozija, 2014	aOR = 6.30(2.97–13.35)
			Stanikzai et al., 2024	aOR = 3.88(1.89,7.99)
			Teo et al., 2020	Internalized: β = 1.58(0.54,2.63) Perceived: β = 1.36(0.24,2.48)
		Protective	Ashaba et al., 2021	aOR = 0.21(0.09,0.52)
			Bresenham et al., 2020	Community Members: β = −2.19(-4.37,-0.01)
	HIV Stigma	Risk	Bresenham et al., 2020	People with TB: β = 0.32(0.21,0.42)
Health System	Improved Patient-Doctor communication	Protective	Bonilla-Asalde et al., 2021	β = −0.47, p = 0.000
			Yin et al., 2018	β = −0.32, p = 0.0005
			Chen et al., 2021a	β = −0.14(−0.29,-0.00)
	TB Source of information	Protective	Pengpid and Peltzer, 2019	Family/Friends Men: aOR = 0.33(0.20,0.55) Women: aOR = 0.67(0.56,0.82) School/Workplace Women: aOR = 0.70(0.55,0.88)

Note. A: Anticipated, aOR: Adjusted Odds Ratio, aRRR: Adjusted Relative Risk Ratio, cOR: Crude Odds Ratio, ES: Experienced Stigma, ED: Experienced Discrimination, DA: Discriminatory Attitudes, I: Internalized, P: Perceived, S: Secondary, SB: Stigmatizing Behaviours.

internalized stigma (Suleiman et al., 2013). Other studies suggest that being unmarried is associated with greater perceived and experienced stigma (Bajema et al., 2020), whereas some find no significant link (Hidiroglu et al., 2019).

3.2.3. *Occupational status*

Employment appears linked to higher stigma experiences (Bajema et al., 2020; Chowdhury et al., 2015; Paul et al., 2019; Suleiman et al., 2013), as people with TB face employment difficulties (Datiko et al., 2020), income reduction (Datiko et al., 2020), and workplace neglect or discrimination (Bajema et al., 2020; Chowdhury et al., 2015; Paul et al., 2019). While most of the results found lower income to be positively associated with higher anticipated (Chowdhury et al., 2015; Datiko et al., 2020), experienced and perceived stigma (Hidiroglu et al., 2019), other results showed an association between higher experienced and perceived stigma and higher income (Bajema et al., 2020). Additionally, the results reported that people from high income groups had twice higher chances to have stigmatizing behaviours and discriminatory attitudes when compared to people from low-income groups (Sagili et al., 2016).

3.2.4. *Area of residence*

All studies seemed to note an association between the area of residence and TB stigma, as residing in rural areas is significantly associated with higher degrees of anticipated (Chowdhury et al., 2015; Datiko et al., 2020; Maibvise et al., 2022; Suleiman et al., 2013), internalized and experienced stigma (Stanikzai et al., 2024) and higher odds of being the target of discriminatory attitudes and stigmatizing behaviours (Oladele et al., 2020). Although these results may not be consensual (Machavariani et al., 2023; Oladele et al., 2020), among men, living in urban areas seems to be associated with lower secondary stigma (Pengpid and Peltzer, 2019). Not only the area of residence, but the distance between people with TB's residence and TB care seem to influence the level of experienced and perceived stigma, with people living

farther from these services presenting significantly lower risk (Bajema et al., 2020).

3.2.5. Gender

While some studies point to an association between being female and having greater levels of TB stigma experiences (Bresenham et al., 2020; Chen et al., 2021a; Chowdhury et al., 2015; Huq et al., 2022; Miller et al., 2017) and practices (Bresenham et al., 2020; Huq et al., 2022; Miller et al., 2017), other studies seemed to highlight an association between being male and having higher levels of anticipated (Eldahshan et al., 2015), perceived and experienced stigma (Bajema et al., 2020; Hidiroglu et al., 2019). Though most studies found TB-related stigma to be statistically significant among genders, one study found no statistically significant differences between experienced, internalized and perceived stigma (Hidiroglu et al., 2019).

3.2.6. Age

Most studies found that stigma is significantly associated with age, with higher degrees of stigma experiences (Chowdhury et al., 2015; Eldahshan et al., 2015; Maibvise et al., 2022; Pryianka and Dahal, 2016; Stanikzai et al., 2024; Suleiman et al., 2013) and practices (Maibvise et al., 2022; Junaid et al., 2021) in younger and middle age people when compared to older people, highlighting a decrease in perceived stigma with age (Zakaria et al., 2022). Conversely, the odds of exhibiting discriminatory attitudes and stigmatizing behaviours seems to be superior in older individuals when compared to younger ones (Chen et al., 2021b).

3.2.7. Social support

Low social support is associated with increased stigma experiences (Bajema et al., 2020; Mohammedhussein et al., 2020; Paul et al., 2019; Yin et al., 2018), while high social support correlates with lower stigma experiences (Bresenham et al., 2020; Chen et al., 2021a). Stigma experiences profoundly impact social relations (Suleiman et al., 2013), affecting family life and dynamics. People with TB reported avoiding family members due to their status (Chen et al., 2021a; DeSanto et al., 2023), while also feeling avoided, such as not sharing a house or meals (Datiko et al., 2020). These experiences also influence community interactions, with people reluctant to disclose their TB status (Chen et al., 2021a) or facing discrimination like social isolation and refusal to talk (Chen et al., 2021b; Datiko et al., 2020; Nikovska and Tozija, 2014).

People who knew someone who died of TB (Ashaba et al., 2021) or had a history of TB treatment, close relatives with TB, or acquaintances with TB in the past year had higher internalized stigma scores, and worse self-perception (Hidiroglu et al., 2019; Yin et al., 2018). While one study found prior TB treatment linked to higher internalized stigma (Yin et al., 2018), others suggested that those previously treated were less likely to experience high internalized stigma (Ashaba et al., 2021; Bresenham et al., 2020).

3.3. TB stigma and health

3.3.1. Mental health

Perceived stigma was found to be higher among those who have high perceived stress and anxiety (Chen et al., 2021a; Mohammedhussein et al., 2020), especially those with pulmonary TB (Chen et al., 2021a; Duko et al., 2019). Perceived stigma was also found to be higher among people with TB who have depressive symptoms (Mohammedhussein et al., 2020; Stanikzai et al., 2024), but higher depression symptoms were also found in people with TB, showcasing a moderate, positive correlation between stigma and depression (Stanikzai et al., 2024; Suleiman et al., 2013; Zakaria et al., 2022).

3.3.2. TB treatment phase

TB stigma experiences vary across treatment phases and are shaped by external factors. Within families, stigma experiences are more prevalent in the early stages of treatment, though stigma perceived in the workplace tends to intensify in later phases, including treatment adherence support, post-treatment and follow-up. Additionally, people with TB report stigma experiences in hospital settings while seeking care (Baskaran et al., 2023).

3.3.3. TB infection type

TB stigma also appears to vary according to the type of TB with studies revealing that TB stigma experiences were found to be significantly higher in individuals with pulmonary TB (Chen et al., 2021a; Chowdhury et al., 2015; Hidiroglu et al., 2019). Participants with previous TB treatment were less likely to have high levels of internalized stigma compared to those with no previous infection (Ashaba et al., 2021), and having a history of TB was associated with reduced perceived stigma among community members (Bresenham et al., 2020).

3.3.4. TB/HIV coinfection

The similarity between TB and HIV symptoms and the perceived higher risk of HIV from TB infection are significant risk factors for TB stigma experiences (Ashaba et al., 2021; Bresenham et al., 2020; Cremers et al., 2015; Duko et al., 2019; Machavariani et al., 2023) and discriminatory attitudes (Wynne et al., 2014; Bresenham et al., 2020). Understanding the HIV/TB relationship increases perceived stigma in those with presumptive TB (Bresenham et al., 2020). HIV stigma also heightens anticipated and internalized stigma, as both diseases evoke fear and stigma (DeSanto et al., 2023). TB is often seen as a marker for HIV, leading to anticipated and internalized stigma directed at people with TB, who are assumed to be HIV-positive (DeSanto et al., 2023). Interestingly, having an HIV-positive partner correlates with lower experienced and perceived stigma (Bajema et al., 2020). Nonetheless, co-infected people face significantly higher TB-related stigma due to compounded community discrimination, linked to the HIV-TB association (Ashaba et al., 2021; Bresenham et al., 2020; DeSanto et al., 2023; Mohammedhussein et al., 2020; Nyasulu et al., 2018; Wynne et al., 2014; Zakaria et al., 2022).

3.4. TB stigma and health systems

When it comes to the person-healthcare professional communication, the results seemed to point out an association with perceived (Nkambule et al., 2019), internalized and anticipated stigma (Yin et al., 2018). Improved healthcare profession-person communication is negatively associated with stigma experiences, as lower levels were observed in people with good communication with their healthcare professionals (Chen et al., 2021a; Nkambule et al., 2019) while higher perceived, internalized and experienced stigma scores were significantly associated with poorer person-healthcare professional communication (Baskaran et al., 2023). The results underlined instances of healthcare service's misconduct that fuel people with TB struggles, namely non-consensual disclosure of disease status, either through gossip or indirectly (DeSanto et al., 2023).

3.4.1. Healthcare seeking behaviours

TB stigma's impact in healthcare seeking behaviours is multifaceted and seems to significantly influence how and where people with TB choose to seek care. Not only does perceived stigma surrounding TB prompt some people to deny their symptoms due fear of discrimination (Megerso et al., 2020), it may also lead them to remain silent about the disease and/or avoid seeking treatment from fear of discriminatory attitudes and stigmatizing behaviours (Wynne et al., 2014), which in turn affects early TB case identification (Megerso et al., 2020).

Community perceptions of the disease seem to impact the "if", "where", "how", and "what" health services are accessed by people with TB (DeSanto et al., 2023). People reported anticipated stigma, thus avoiding care provision settings where they could be stigmatised, preferring, in one hand, care at clinics - to avoid the potential stigma

related to home treatment provided by outreach teams (DeSanto et al., 2023) - and, in the other hand, care provided by home-based services - to avoid potential stigma when accessing facility-based care (DeSanto et al., 2023).

3.5. TB stigma and knowledge, attitude and perceptions (KAP)

Higher TB knowledge and a better perception of being informed were linked to lower experienced stigma (Bajema et al., 2020; Bonilla-Asalde et al., 2021; Bresenham et al., 2020; Datiko et al., 2020; Junaid et al., 2021; Miller et al., 2017; Pryianka and Dahal, 2016; Stanikzai et al., 2024; Teo et al., 2020; Vericat-Ferrer et al., 2022) and lower discriminatory attitudes and stigmatizing behaviours (Bresenham et al., 2020; Junaid et al., 2021; Miller et al., 2017; Vericat-Ferrer et al., 2022). While knowledge of TB causes (Bresenham et al., 2020; Datiko et al., 2020; Pryianka and Dahal, 2016) or its curability (Ali et al., 2018; Cremers et al., 2015) reduces stigma experiences and discriminatory attitudes, awareness that HIV increases TB risk and accurate knowledge of transmission can raise experienced and perceived stigma (Bajema et al., 2020; Bresenham et al., 2020; Teo et al., 2020). Misconceptions related to TB appear to be linked to higher stigma experiences, especially among males (Ashaba et al., 2021; Duko et al., 2019; Eldahshan et al., 2015; Laji and Asghar, 2024).

People with TB and their households believe community education could reduce anticipated and internalized stigma by improving understanding (DeSanto et al., 2023). TB knowledge from various sources (DeSanto et al., 2023; Pengpid and Peltzer, 2019; Vericat-Ferrer et al., 2022) affects stigma. While hearing about TB from radio, billboards, and social networks lowers stigma practices, TV knowledge is linked to higher ones (Vericat-Ferrer et al., 2022). Among women, higher TB knowledge from family/friends or school/workplace reduces secondary stigma (Pengpid and Peltzer, 2019).

Discriminatory attitudes and stigmatizing behaviours were higher among those who viewed TB as more severe and infectious, or who were more knowledgeable about its transmission, symptoms, and curability (Chen et al., 2021b; Sagili et al., 2016). However, high levels of stigma practices were also present among those with general knowledge about TB (Sagili et al., 2016).

Most caregivers expressed compassion and a desire to help people with TB, though some avoided them (Vericat-Ferrer et al., 2022). Similarly, while most did not believe a family member's TB diagnosis should be kept secret, they still tended to avoid them due to stigma and fear of infection (Paul et al., 2019; Wynne et al., 2014).

Community stakeholders, caregivers, and household contacts generally had good coping attitudes toward TB (Datiko et al., 2020; DeSanto et al., 2023; Sagili et al., 2016; Suleiman et al., 2013; Vericat-Ferrer et al., 2022; Yin et al., 2018), though some expressed fear of infection (Datiko et al., 2020) and avoided contact due to the perceived risk of re-infection (DeSanto et al., 2023).

4. Discussion

For the present review, we mapped and synthesised existing evidence in scientific literature on the existing risk or protective factors related to TB stigma (RQ1), as means to provide a comprehensive view of how stigma towards and experienced by people affected by TB (RQ2), thereafter summarized in Fig. 2.

4.1. Social determinants of tuberculosis stigma

Results of this review highlight common factors linked to distinct dimensions of TB stigma. Lower educational levels are consistently associated with heightened anticipated (Chowdhury et al., 2015; Datiko et al., 2020) and experienced stigma (Nikovska and Tozija, 2014; Stanikzai et al., 2024), alongside discriminatory attitudes (Chen et al., 2021b; Wynne et al., 2014). Similarly, lower income and socioeconomic status are linked with anticipated (Chowdhury et al., 2015), and perceived stigma (Hidiroglu et al., 2019), and experienced discrimination (Datiko et al., 2020). Rural residence associates with heightened perceived (Chowdhury et al., 2015; Suleiman et al., 2013) and anticipated stigma (Datiko et al., 2020), and stigma practices (Maibvise et al., 2022). Young and middle-aged people are more susceptible to internalized and anticipated stigma (Chowdhury et al., 2015; Maibvise et al., 2022; Suleiman et al., 2013), though older or higher-income people may also exhibit stronger discriminatory (Chen et al., 2021b; Sagili et al., 2016).

TB-affected households remain economically vulnerable post-treatment, experiencing limited recovery in income, employment and educational continuity (Meghji et al., 2021). Income loss poses the greatest financial risk, as costs often occur before treatment starts (Meghji et al., 2021; Tanimura et al., 2014), demanding income replacement and other effective social support measures (Tanimura et al., 2014), that can improve employment, income and living conditions of people with TB and their households (Meghji et al., 2021).

Occupational status relates variably to TB stigma, with some studies noting higher levels of internalized and perceived stigma among employed individuals (Bajema et al., 2020; Chowdhury et al., 2015; Suleiman et al., 2013), particularly younger workers (Kamble et al., 2020). Conversely, higher experienced and anticipated stigma was observed among unemployed groups (Chen et al., 2021a; Nikovska and Tozija, 2014; Vericat-Ferrer et al., 2022). Nevertheless, stigma consistently impacts employment security, generating fear of income reduction (Datiko et al., 2020) or workplace discrimination (Bajema et al., 2020; Datiko et al., 2020), reflecting both anticipated and experienced stigma. Thus, stigma hinders sustainable employment and the well-being for people with TB, including employer and co-workers' stigmatizing attitudes and behaviours (van Beukering et al., 2022). Knowledge-shaping, attitude-changing, and people with TB support interventions may effectively reduce stigma manifestations in the workplace (Sommerland et al., 2017).

Findings regarding gender identity in TB stigma yielded mixed results. Women experience higher levels of anticipated, internalized and experienced stigma (Bresenham et al., 2020; Chen et al., 2021a; Chowdhury et al., 2015; Cremers et al., 2015; Miller et al., 2017; Shivapujimath et al., 2017), while some studies report men with greater odds of perceived and internalized stigma (Hidiroglu et al., 2019). Both genders share a psychological burden of unfulfilled social responsibilities (Atre et al., 2011; Mukerji and Turan, 2018), being worthy to note that gender seems to be an intersectional variable, modulating stigma experiences related to other risk and protective factors. Men tend to experience survival challenges and worry about economic-related problems (Johansson et al., 2000; Long et al., 2001; Miller et al., 2017), whereas women experience challenges related to social isolation and concerns about marital and societal roles (Amo-Adjei, 2016; Hatherall et al., 2019; Huq et al., 2022; Johansson et al., 2000; Miller et al., 2017; Mukerji and Turan, 2018; Shivapujimath et al., 2017; Somma et al., 2008). Thus, stigma is not only shaped by individual attitudes, but also sustained by broader structural factors such as gender norms, poverty, and institutional inequalities, which reinforce power hierarchies and limit access to care and support. The intersection of gender and poverty places disproportionate burdens on women, while failures or delays in the health system further entrench stigma and deepen social exclusion (Huq et al., 2022; Mukerji and Turan, 2018).

Although marital status findings are inconsistent (Ashaba et al., 2021; Bajema et al., 2020; Eldahshan et al., 2015; Hidiroglu et al., 2019; Nikovska and Tozija, 2014; Suleiman et al., 2013; Yin et al., 2018; Zakaria et al., 2022), it plays a significant role in shaping anticipated and internalized stigma, particularly women's marriage prospects and marital relationships, as they often face greater concern and conditional support compared to men, who are more likely to receive spousal support (Atre et al., 2011; Mukerji and Turan, 2018; Shivapujimath et al., 2017; Somma et al., 2008). People with TB, especially women,

frequently experience social isolation and discrimination within their homes and communities, with some being removed from the "marriage market," as they are rejected by their husbands and in-laws, or even divorced (Atre et al., 2011). The fear of social stigma and its impact on marriage prospects can lead to delays in seeking health care and adherence to treatment, particularly among women (Craig et al., 2017; Paul et al., 2019).

Social support appears to consistently mitigate stigma experiences (Bajema et al., 2020; Bresenham et al., 2020; Chen et al., 2021a; Mohammedhussein et al., 2020; Yin et al., 2018), discriminatory attitudes (Bresenham et al., 2020), while contributing to better quality of life of people with TB (Akhtar et al., 2023). This determinant seems to function as a protective factor (Phalasarn et al., 2021) and as a promoter of successful treatment outcomes (Kamble et al., 2020). On family support, people with TB appear to perceive the encouragement received from family members and other TB survivors in the community as pivotal in facilitating care-seeking (Teo et al., 2020). TB stigma also plays a part in family dynamics, with apparent disruptions in family life and responsibilities due to fear of infection, for instance (Chen et al., 2021a; Paul et al., 2019; Suleiman et al., 2013). Indeed, a positive diagnostic may result in multiple challenges for family members, given that they not only need to cover for the person with TB's responsibilities, but also had to provide medical care and support (Bedingfield et al., 2022).

TB stigma negatively affects social relations, as anticipated stigma may lead to reluctance in disclosing TB status to friends and neighbors (Chen et al., 2021a; Datiko et al., 2020), resulting in reduced contact, isolation, and discriminatory attitudes (Chen et al., 2021b; Datiko et al., 2020; Nikovska and Tozija, 2014). Numerous studies have reported that people with TB fear family and community rejection (Alene et al., 2018; Mbuthia et al., 2020; Paul et al., 2019), often self-isolating to reduce stigma experiences, protect their reputation and avoid transmitting TB (Juniarti and Evans, 2011; Mbuthia et al., 2020), which, in turn, significantly affects quality of life and mental health (Mbuthia et al., 2020; Mukerji and Turan, 2018) The theme of isolation is related to reduced social contact, as isolation can be the result of a person withdrawing from contact with other people, or on being shunned and no longer welcome at two different levels. On the individual level, it may be seen in descriptions of the person not having contact with other people and on a family level, isolation can be evident in the descriptions of the entire family withdrawing or being shunned (Juniarti and Evans, 2011).

4.2. Mental health and disease-related factors influencing tuberculosis stigma

This review also found links between health determinants and TB stigma, particularly perceived stress, anxiety (Chen et al., 2021a; Mohammedhussein et al., 2020), and depression, with people experiencing depressive symptoms reporting greater internalized and anticipated stigma (Mohammedhussein et al., 2020; Suleiman et al., 2013; Zakaria et al., 2022), aligning with prior research on the field (Fuady et al., 2022). Perceived stigma consistently predicts both depression and anxiety (Panibatla et al., 2024; Yogesh et al., 2024), indicating a bidirectional effect between stigma and mental health (Suleiman et al., 2013; Sutar et al., 2024).

Addressing TB stigma and mental health is crucial for improving TB programs and treatment outcomes (Panibatla et al., 2024). Mental health issues may complicate TB outcomes (Agarwal and Sarthi, 2020), emphasizing the need for timely interventions to promote mental well-being, as untreated mental illness can hinder treatment success (Ramos et al., 2023). Standardized reporting tools and research are necessary to quantify and mitigate them (Alene et al., 2021).

Multidisciplinary approaches must address TB stigma experiences across different treatment phases. Stigma appears more intense within families during the diagnostic and early treatment, while workplace stigma is more pronounced in later stages, including post-treatment and follow-up (Baskaran et al., 2023; Duko et al., 2019). Furthermore, studies indicate higher stigma in people with pulmonary TB (Chen et al., 2021a; Chowdhury et al., 2015; Hidiroglu et al., 2019), likely due to fears of contagion (Duko et al., 2019), which is a confirmed key driver of stigma across various groups (Akbari et al., 2023).

4.3. The role of TB stigma healthcare-seeking and communication

Anticipated and internalized stigma significantly affects healthcare-seeking behaviours, leading to symptom denial and treatment avoidance (Megerso et al., 2020). Delays in TB diagnosis may increase transmission (Megerso et al., 2020; Wynne et al., 2014), consistent with previous studies (Huq et al., 2022; Khan et al., 2020), driven by fear of social exclusion, discrimination, and perceived disgust, which further encourages secrecy around TB status (Makgopa et al., 2022; Retnakumar and George, 2022; Teo et al., 2020).

Anticipated and internalized stigma influences treatment preferences, with some choosing for home-based care to avoid clinic-related stigma (DeSanto et al., 2023). Fear of disclosure and stigma drives these decisions, while instances of non-consensual status disclosure in hospitals exacerbate challenges (DeSanto et al., 2023). Stigmatizing behaviours by healthcare professionals, including avoidance, segregation, and blame, stem from infection fears, which intensify post-diagnosis. Some health managers isolate TB units and fail to provide necessary resources, impeding treatment outcomes (Dodor and Kelly, 2010). A review found that fear among healthcare workers is a significant stigma driver, alongside weak workplace support, poor safety standards, and lack of infection control knowledge (Aranas et al., 2023).

Person with TB–healthcare professional communication emerged as a protective factor, with improved communication linked to lower stigma experiences and poor communication associated with higher stigma experiences (Baskaran et al., 2023; Chen et al., 2021a). Prior TB experiences, such as previous diagnosis and treatment, also seem to reduce internalized (Ashaba et al., 2021) and perceived stigma (Bresenham et al., 2020). Poor communication can negatively impact treatment outcomes, especially when it fails to foster a therapeutic relationship, explore TB-related knowledge, or support joint decision-making (Salam et al., 2024). Communication based on stereotypes and stigma further harms people with TB (Barbosa et al., 2023). Addressing improper communication is essential for engaging TB-affected communities, removing prejudiced terminology, and fostering empathy and understanding. Continuous communication between people with TB and healthcare professionals is imperative to combat stigma and improve TB knowledge (Solihin et al., 2024).

4.4. Knowledge, attitudes and perceptions on TB stigma

Results of this review also highlighted the intersection between TB knowledge and TB stigma, revealing that higher TB knowledge and perception of being well-informed are associated with lower perceived (Datiko et al., 2020; Vericat-Ferrer et al., 2022), anticipated (Pryianka and Dahal, 2016; Teo et al., 2020), and internalized stigma (Bajema et al., 2020; Bresenham et al., 2020; Pryianka and Dahal, 2016). Understanding the correct TB causes appears to reduce stigma experiences from people with TB (Bresenham et al., 2020; Datiko et al., 2020; Shivapujimath et al., 2017), though, paradoxically, some specific knowledge components, such as accurate knowledge on TB transmission and the increased likelihood of TB transmission when HIV-positive contribute to higher perceived (Bajema et al., 2020; Bresenham et al., 2020) and experienced stigma (Bajema et al., 2020; Teo et al., 2020). This suggests that content and context of the information provided must be carefully considered, as inadequate knowledge can lead to increased stigmatization (Craciun et al., 2023).

Community-level education is key to mitigate TB stigma by enhancing understanding of TB prevention and care (DeSanto et al., 2023). Different communication sources produce different levels of

stigmatization, as information from television is associated with higher levels of stigma, whereas information from sources such as radio, billboards and personal networks appear linked to lower stigma (Vericat-Ferrer et al., 2022). When it comes from personal network, from family, friends, school or the workplace, it appears negatively linked with stigma, especially among women (Pengpid and Peltzer, 2019). Enacted manifestations and drivers of TB stigma may be better addressed with information-based interventions that are implemented at the household or community level (Foster et al., 2022; Sommerland et al., 2017), to improve healthcare-seeking behaviours devoid of perceived stigma (Foster et al., 2022; Kemp et al., 2019; Miller et al., 2017; Sommerland et al., 2017).

Attitudes towards TB can be highly stigmatizing among people with general TB knowledge (Sagili et al., 2016), which may be explained by their perception of TB as highly severe and infectious, associated to their specific knowledge about TB transmission and symptoms (Chen et al., 2021b; Sagili et al., 2016), which leads them to act in fear of being infected (Vericat-Ferrer et al., 2022; Wynne et al., 2014). Along with inappropriate health education messages by the media (Alselwi, 2024; Tadesse, 2016), this seems to be the main cause of TB stigma, influencing beliefs, attitudes, actions, and behaviours of the whole community when interacting with people with TB (Dodor et al., 2008), leading to isolation and poor treatment adherence (Alselwi, 2024; Tadesse, 2016).

Personal experience (e.g. knowing someone who died of TB) is often associated with higher stigma and worse self-perception (Hidiroglu et al., 2019; Yin et al., 2018). Previous TB treatment may reduce stigma, as past patients may be less likely to experience stigma compared to those without such history (Ashaba et al., 2021; Bresenham et al., 2020). These results are consistent with other studies that suggest individuals who had previous treatment were less likely to suffer from high TB stigma and more likely to have appropriate health seeking behaviour (Abebe et al., 2010).

Misperceptions about TB transmission, such as beliefs that it can be spread through smoking, drinking alcohol, or sexual activity, appears to contribute to higher stigma (Ashaba et al., 2021). The association of TB with HIV significantly exacerbates stigma, as both diseases evoke fear and are often heavily stigmatised within communities (Ashaba et al., 2021; Bresenham et al., 2020; DeSanto et al., 2023; Wynne et al., 2014). Interestingly, having an HIV-positive partner may be linked to lower TB stigma, highlighting the complex interplay between these conditions (Bajema et al., 2020). However, TB/HIV co-infection typically result in significantly higher levels of stigma due to compounded community discrimination (Ashaba et al., 2021; Bresenham et al., 2020; Mohammedhussein et al., 2020; Nyasulu et al., 2018; Wynne et al., 2014; Zakaria et al., 2022).

Stigmatizing conceptions of TB are often linked to HIV, perceived immoral behaviour, incurability, and traditional myths about TB's aetiology (Cremers et al., 2015). Stigma surrounding HIV is sustained not only by fear of infection but also by deep-rooted moral judgments and social exclusion processes (Dessie and Zewotir, 2024). These are often connected to structural inequalities such as poverty, gender discrimination, and unequal access to health care, factors that equally apply to TB. By examining TB stigma through the lens of HIV stigma, we see shared dynamics of "blame," marginalization, and symbolic contamination (Parker and Aggleton, 2003), which reinforce barriers to care, self-disclosure, and social support. However, while HIV stigma is often explicitly moralised and associated with sexuality, TB stigma tends to be more strongly linked to poverty, contagion fears, and perceptions of incurability or weakness. Moreover, HIV-related stigma has been more extensively studied and centred in identity-based advocacy leading to targeted global interventions, policy frameworks, and rights-based advocacy efforts, resources that TB stigma efforts still largely lack, since TB affects socially marginalised populations that may lack political representation (Dessie and Zewotir, 2024; Parker and Aggleton, 2003).

4.5. Strengths and limitations

4.5.1. Methodological strengths and limitations of the review

This scoping review adopts the methodological framework proposed by Arksey and O'Malley (2005) and later refined by Levac et al. (2010), ensuring systematic coverage and methodological transparency. The use of structured search strategies across multidisciplinary databases, clearly articulated inclusion criteria, independent dual-review screening, and collaborative thematic analysis helped minimize bias at multiple stages of the review process. While citation tracking via Google Scholar was employed to expand the scope of eligible studies, given its broader, less restrictive indexing, the review ultimately excluded grey literature, as the few documents retrieved did not meet the predefined eligibility criteria.

4.5.2. Broader limitations in stigma research and interventions

Though TB stigma has gained increased attention regarding its risk and protective factors, impact, and interventions, we are still witnessing a lack of consensus on its definition (Huff et al., 2024). Only four studies reviewed presented some definition of TB stigma or discriminatory/stigmatizing attitudes (Chowdhury et al., 2015; Sagili et al., 2016; Chen et al., 2021a, 2021b). This lack of a standardised conceptualization, couple with the simplicity of existing frameworks, is limiting our understanding of these phenomena (Parker and Aggleton, 2003). Most studies provide no definition at all or rely on generic descriptions (e.g. 'a mark of disgrace', stereotyping, social rejection). A careful analysis of TB Stigma definitions may not only facilitate the clarification of what is generally meant, but also provide a consensual definition that makes use of the broad range of disciplines that have contributed to the stigma literature (Huff et al., 2024). This gap poses an additional risk as it limits academia's ability to comprehensively identify factors and determinants associated with TB stigma, but also for the development of strategies that effectively reduce its prevalence. Additionally, current research has primarily focused on high-burden, low-income countries and migrant populations in low-incidence settings, neglecting other affected groups and reinforcing harmful stereotypes.

4.6. Practical implications

TB stigma requires interventions that target not only the individual but also the societal structures that perpetuate stigma, particularly in low and middle-income countries (LMICs), where healthcare systems face resource constraints and high rates of TB/HIV co-infection rates. Context-specific, culturally sensitive education campaigns, co-designed with community leaders, can effectively combat stigma by addressing misconceptions and gender dynamics, as stigma disproportionately affects women and disrupts traditional roles.

Improving patient-provider communication is critical, as misconceptions and fear of infection significantly amplify stigma. Capacity-building training emphasizing stigma-sensitive interactions can enhance adherence to treatment, improving health outcomes and reducing economic and social impacts. Integrating these approaches into national training and quality assurance frameworks ensures lasting change.

Media representation often perpetuates TB stigma through negative portrayals. Collaborations between health authorities and media outlets are essential for responsible reporting and highlighting prevention strategies. Utilizing community-based media platforms like radio and social media can effectively reach underserved populations, promoting awareness and reducing stigma.

5. Conclusion

In this scoping review, we sought to provide an overview of the current knowledge on TB-related stigma and (1) existing factors that are constructed as risk or protective factor in stigma experiences of people with TB and (2) the influence on said factors in the individual

experiences of people with TB. Our findings underscore the multifaceted nature of TB stigma, which is shaped by diverse factors such as low education, rural residence, lower income, gender norms, and poor mental health, factors consistently associated with higher stigma, which worsens healthcare-seeking behaviour, social isolation, discrimination, and employment difficulties. Cultural and socioeconomic contexts critically influence stigma dynamics, particularly through disruptions to traditional gender roles, leading to isolation, discrimination, and reduced marriage prospects. Despite its role in hampering TB prevention and care, stigma remains underprioritized in international TB priorities. Notably, economic vulnerability and cultural stigma, rooted in moral judgment, myths, and social exclusion, are insufficiently addressed, despite their impact on disclosure, treatment adherence, and overall well-being. Stigma is often viewed through the lens of disease control rather than personal suffering, frequently intertwining with broader societal injustices and primarily assessed through qualitative research. Evidence gaps remain regarding the inconsistent influence of socio-demographic variables like gender and occupation. Future research should address these gaps and prioritize culturally tailored, intersectional interventions that view stigma not only as a public health challenge but as a symptom of broader structural inequalities. Integrating stigma-sensitive strategies into TB programs and public health systems, through participatory, rights-based approaches, is essential for improving outcomes, reducing inequalities, and promoting social justice.

CRediT authorship contribution statement

Mariana Vieira: Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Pedro Barbosa:** Writing – review & editing, Writing – original draft, Resources, Investigation, Formal analysis, Conceptualization. **João Pedro Ramos:** Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Data curation, Conceptualization. **Marta Castro:** Writing – review & editing, Writing – original draft, Visualization, Investigation. **Dulce Torres:** Writing – review & editing, Writing – original draft, Investigation, Data curation. **Raquel Duarte:** Writing – review & editing, Validation, Supervision, Project administration, Conceptualization.

Ethical statement

Ethics approval is not required as the study is a scoping review of existing research.

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Declaration of competing interest

The authors declare no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2025.118396.

Data availability

The data is published research and freely available.

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