Original Article

# Stigmatization and Social Discrimination of Pulmonary Tuberculosis Patients in Kotamobagu City, North Sulawesi: A Qualitative Study

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## ABSTRACT

**Background**: Tuberculosis (TB) remains a significant public health challenge, particularly in developing countries, such as Indonesia. In Kotamobagu city, North Sulawesi, despite being recognized as one of Indonesia's most tolerant cities, patients with TB face persistent stigmatization and discrimination. **Objective:** This study aimed to examine the social construction of discrimination against TB patients in Kotamobagu city, focusing on how these perceptions develop and persist. **Methods**: This qualitative study employed a constructivist paradigm and utilized Berger and Luckman's social construction theory. Data were collected through in-depth interviews and direct observations of 16 informants, including patients with TB, healthcare workers, family members, neighbors, and colleagues. The analysis was conducted via NVIVO 12 Plus software following a systematic thematic approach. **Results**: The study revealed complex patterns of stigmatization and discrimination across familial, community, and workplace settings. Network analysis revealed interconnected stigmatization factors, with physical isolation emerging as a primary preventive reaction within families. Social distancing behaviors have been documented in both familial and workplace environments. This research identified multiple pathways through which stigmatization affects patients' lives, including social isolation, psychological impact, and treatment adherence. Fear of transmission has emerged as the primary driver of discriminatory behaviors, leading to various forms of social exclusion and workplace ostracism. **Conclusion**: TB-related stigma and discrimination in Kotamobagu manifest through complex social mechanisms that significantly affect patients' psychological well-being and treatment outcomes. These findings emphasize the need for comprehensive interventions that address both the structural and interpersonal aspects of stigma, particularly in workplace and family settings.

## KEYWORDS

Tuberculosis, stigmatization, discrimination, social construction, qualitative research, Indonesia

## ARTICLE INFO

Received Dec 01, 2024
Revised Dec 24, 2024
Accepted Dec 27, 2024
Online Dec 28, 2024

## EDITOR

I Made Dwi Mertha Adnyana, M.Ked.Trop., MRSTMH

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## CITE THIS ARTICLE

Akbar H., Kamaruddin S.A., and Adam A. (2025). Stigmatization and Social Discrimination of Pulmonary Tuberculosis Patients in Kotamobagu City, North Sulawesi: A Qualitative Study. *Svāsthya: Trends in General Medicine and Public Health*, 2(1): e79. https://doi.org/10.70347/svsthya.v2i1.79

Supplemental data for this article can be accessed online at https://doi.org/10.70347/svsthya.v2i1.79

## INTRODUCTION

Pulmonary tuberculosis (PTB) remains one of the world's most pressing public health challenges, with the World Health Organization reporting 10.6 million new cases and 1.6 million deaths globally in 2021, predominantly affecting developing nations [1–3]. The disease remains a significant global public health challenge, particularly in developing nations, where it poses substantial health risks to communities. The transmission of PTB occurs when patients with pulmonary TB talk without wearing a mask, sneeze or cough, and they indirectly release droplets into the air, with these sputum droplets containing approximately 3000 bacteria [4]. This airborne transmission mechanism, combined with socioeconomic factors and healthcare access disparities, creates a complex web of medical and social challenges that disproportionately affect vulnerable populations [5,6]. This transmission mechanism highlights the critical importance of understanding the medical and social dimensions of disease spread within communities. Pulmonary tuberculosis can have social and economic impacts, including stigma, discrimination, and poverty [7].

Although considerable progress has been made in medical interventions and treatment protocols, PTB is an infectious disease that can infect or be transmitted to humans, particularly in environments that are unhygienic and lack adequate airflow and lighting. Many people believe that PTB can be transmitted through sharing eating utensils, sweating, smoking, and spreading among socioeconomically disadvantaged or underprivileged communities [8]. These persistent misconceptions, despite advances in scientific understanding, represent a critical gap between medical knowledge and public perception, significantly impacting disease management strategies and patient outcomes.

Patients with PTB are shunned by society due to fear of contagion and excessive fear of contracting PTB, which can result in high levels of negative stigma and social discrimination. This stigma and discrimination not only originates from society but can also come from the family environment and may even stem from the PTB patients themselves, known as self-stigma or internalized stigma [9]. This complex interplay between social stigma and self-stigma raises critical questions regarding how societal perceptions influence patient outcomes and treatment adherence. Self-stigma occurs when patients with PTB experience social stigma in their environment. Discrimination is considered a serious social phenomenon in PTB patients [10].

The prevalence of PTB cases in 2021 in North Sulawesi Province was 5,564 cases [11]. This trend is particularly evident in Kotamobagu city, which is located in North Sulawesi Province and has a relatively high incidence of PTB cases. This is evident from the data provided by the Kotamobagu City Health Office, which indicates that the Case Notification Rate (CNR) per 100,000 population for PTB cases was 332 in 2018, increased to 342 cases in 2019, and reached 341 cases in 2020. In 2021, there was a further increase to 425 cases [12].

The primary objective of this study was to examine and understand the social construction of discrimination against tuberculosis patients in Kotamobagu city, with a particular emphasis on how these perceptions develop and persist in a reportedly tolerant community. In Kotamobagu city, some community members avoid individuals with PTB, mistakenly believing that the disease is genetic and transmissible to family members through skin contact and sweating. These misconceptions foster excessive fear and enduring discrimination, leading to high dropout rates. Data from the Kotamobagu City Regional Public Hospital indicate that the number of treatment dropouts increased from 15 cases in 2020 to 44 cases in 2021 [12].

The relevance of this research extends beyond academic interest, as it addresses a critical public health challenge in a unique sociocultural context. This phenomenon presents an intriguing subject for examination, especially in Kotamobagu, which is located in North Sulawesi Province, Indonesia, and has been recognized as one of the ten most tolerant cities in Indonesia. This assessment considers various factors, including religious and ethnic diversity as well as the community's openness to differences [13–15]. Despite the city's reputation for tolerance, certain health issues, such as tuberculosis (TB), are still associated with strong stigma and discrimination within the community. This stigma persists, with TB sufferers often being viewed as shameful, leading many to avoid seeking treatment out of fear of social ostracism. The paradox between general social tolerance and specific health-related discrimination provides a unique opportunity to examine the underlying social mechanisms that perpetuate stigma.

The theoretical foundation of this study rests on Berger and Luckman's social construction theory [16], which provides a crucial framework for understanding how health-related stigma emerges through social interaction and becomes institutionalized within communities. This theoretical lens is particularly relevant for examining TB-related discrimination in Kotamobagu, as it allows us to analyze how cultural beliefs, social norms, and institutional practices intersect to create and maintain stigma despite the city's broader culture of tolerance. This framework elucidates how societal discrimination against patients with TB in Kotamobagu arises and is constructed. Here, discrimination is a consequence of the socialization and internalization of community values, norms, and knowledge, shaping perceptions and attitudes toward the disease.

Through the application of social construction theory, this study aims to further elaborate on the mechanisms by which stigma and discrimination against TB patients are built and sustained within Kotamobagu's society. By understanding this process of social construction, this study identifies key factors contributing to the perpetuation of stigma and the ways in which this construction can be altered or reconstructed. This approach allows for a deeper analysis of the roles of the media, educational institutions, families, and religious institutions in shaping societal perceptions of TB. The findings of this study aim to reduce TB control challenges in Kotamobagu by addressing the root causes of stigma and discrimination against patients with PTB.

Understanding the social construction of this discrimination allows for the development of effective interventions such as community education to alter TB narratives, training healthcare professionals to mitigate biases and promote empathy, and public awareness campaigns to debunk myths. The application of social construction theory provides theoretical insights and a robust basis for strategies to increase TB patients' psychosocial well-being and accelerate TB control. This highlights the necessity of a multidisciplinary approach that integrates medical, social, and psychological dimensions for early detection and effective treatment.

## MATERIALS AND METHODS

### *Study design*

The research employed was qualitative research with the research paradigm of constructivism, which views the truth of a social reality as a result of social construction and the truth of a social reality as being relative [17]. This approach was specifically chosen to understand the complex social dynamics surrounding tuberculosis stigma and discrimination within the community. The type of research utilized is descriptive, examining from the perspective of the sociology of health, with a focus on the social definition paradigm employing analytical tools using the theory of Berger and Luckman. This theoretical framework enables an in-depth analysis of how social meanings and interpretations of tuberculosis are constructed and maintained within the community context.

### *Setting and timeline*

This research will be conducted over approximately six months, from April to September 2023. The extended timeline allows for comprehensive data collection and thorough analysis of the social phenomena under study. The research site was located in Kotamobagu city, North Sulawesi Province. The selection of this location was deliberately deliberate and was based on several critical factors. Kotamobagu city was chosen as the research locus on the basis of data from the North Sulawesi Provincial Health Office, indicating that it is among the cities with a significantly high incidence of tuberculosis cases. The number of PTB patients in 2021 was 425, with a considerable number of patients experiencing treatment dropout. This setting provides a unique opportunity to examine the intersection of high disease prevalence and social discrimination in a tolerant community.

### *Data sources and participant selection*

The data sources consisted of primary and secondary sources. The research employed a purposive sampling technique to ensure representation from various stakeholder groups affected by or involved in tuberculosis care and management [18]. Primary data were derived from research subjects, namely, PTB patients, families of PTB patients, neighbors of PTB patients, colleagues of PTB patients, healthcare workers at Kotamobagu City Hospital, healthcare workers at the Kotamobagu City Health Office, and healthcare workers at community health centers throughout Kotamobagu city, for a total of 16 informants. The distribution of participants across these stakeholder groups was carefully balanced to ensure comprehensive representation: four tuberculosis patients, three family members, three community members (neighbors/colleagues), and six healthcare workers from different institutional levels. This sampling strategy achieved data saturation, as evidenced by the repetition of themes and the absence of new significant insights in the final interviews. This diverse range of informants enabled the triangulation of perspectives and a comprehensive understanding of the social construction of tuberculosis stigma.

### *Secondary data collection*

The secondary data sources used in the context of this research include scholarly publications, previous research reports, data from both local and global health organizations, and relevant documents and archives concerning TB issues and the social context in Kota Kotamobagu. The selection of secondary sources followed a systematic review process, prioritizing peer-reviewed publications and official health records to ensure data reliability. The use of secondary data sources provides several strategic advantages for enriching the analysis and discussion of this research. These sources help establish the broader context of tuberculosis stigma and validate primary findings through comparisons with the literature

### *Quality assurance*

This study implemented several measures to ensure data quality and ethical integrity. These include the triangulation of data sources, member checking with participants, peer debriefing among researchers, and maintaining an audit trial of analytical decisions

### *Ethical considerations*

Ethical considerations included informed consent from all participants, confidentiality protection, and autonomy throughout the research process. This study has been declared ethically sound by the health research ethics committee (institutional review board) of the Graha Medika Institute of Health and Technology number 020/LPPM/IKT-GM/IV/2023.

### *Data processing and analysis*

This study employed a rigorous qualitative data analysis process utilizing modern technological tools to ensure a systematic and comprehensive analysis. The research data were processed via NVIVO 12 Plus software (Win, QSR International). This software was selected because of its robust ability to manage and analyze complex qualitative datasets. Data processing began by transcribing the interview results, that is, converting audio recordings into written texts. To ensure accuracy, the transcriptions were verified through multiple reviews and member checks with participants where possible. This stage is crucial and primary, as it determines subsequent data processing. The researcher subsequently entered the transcribed interview data into the NVivo 12 Plus software, followed by the coding process, which involves condensing various sets of meanings into nodes on the basis of research questions and interview inquiries and constructing a model that maps the interconnectedness between informants and research issues. The thematic analysis process identified four major theme clusters: societal perception formation, institutional influence on stigma, coping mechanisms, and barriers to treatment adherence. Each theme was validated through peer review and supporting evidence from multiple data sources to ensure analytical rigor.

## RESULTS

### *Overview of the research objective*

Kotamobagu is a city located in the northern part of Sulawesi Island, specifically in North Sulawesi Province (Figure 1). According to a publication by the Central Bureau of Statistics Kotamobagu, its area, which is based on the Regulation of the Ministry of Home Affairs No. 72 of 2019, is approximately 108.89 square kilometers and is divided into four subdistricts, 18 urban villages, and 15 rural villages. The population of Kotamobagu city in 2023, according to the population census, was 123146 people, with a percentage of population growth per year from 2020-2022 of -0.46%.


**Figure 1.** Kotamobagu city area as a research site. **Remarks:** This image was taken via Google maps®

### *Overview of the research objective*

The study involved a total of 16 informants, including one key informant, the Head of the P2P Section of the Kotamobagu City Health Office; four ordinary informants, comprising TB patients; and 11 additional informants, including TB Program Holders at Upai Primary Health Care (PHC), TB Program Holders at Bilalang PHC, TB Program Holders at Motoboi Kecil PHC, TB Program Holders at Kotabangon PHC, TB Nurse at Gogagoman PHC, TB Patient's Colleague, TB Patient's Lung TB Patient's Neighbors, TB Patient's Neighbors, TB Patient's TB Supervisor, and Health Officers at Kotamobagu City General Hospital. Information was gathered through in-depth interviews and direct observation. Detailed demographic information is presented in Table 1.

**Table 1.** Characteristics of the informants

| Initials Informant | Age | Occupation/Position | Description |
|---|---|---|---|
| HS | 44 years | Head of Section P2P Health Office Kotamobagu | Key Informant |
| GN | 42 years | TB patient | Regular Informant |
| HR | 45 years | TB patient | Regular Informant |
| RY | 39 years | TB patient | Regular Informant |
| AP | 34 years | TB patient | Regular Informant |
| WY | 40 years | TB Program Holder at PKM Upai | Additional Informant |
| EG | 35 years | TB Program Holder at PKM Bilalang | Additional Informant |
| NT | 37 years | TB Program Holder at PKM Motoboi Kecil | Additional Informant |
| NV | 31 years | TB Program Holder at PKM Kotabangon | Additional Informant |

| Initials Informant | Age | Occupation/Position | Description |
|---|---|---|---|
| MRN | 33 years | TB Nurse at PKM Gogagoman | Additional Informant |
| KRN | 34 years | Coworker of TB patient | Additional Informant |
| AD | 29 years | Neighbor of TB patient | Additional Informant |
| IK | 32 years | Neighbor of TB patient | Additional Informant |
| EM | 39 years | PMO of TB patient | Additional Informant |
| WD | 33 years | Deputy TB Supervisor Kotamobagu | Additional Informant |

## *Multilevel stigmatization patterns*

This study revealed several key findings regarding tuberculosis (TB) stigmatization in Kotamobagu. The network analysis diagram presented in Figure 2 shows the complex interconnections between various stigmatization factors and their impact on TB patients. This network visualization highlights the complex interconnections among the various aspects of TB stigmatization. Each pie chart node represents a different factor contributing to stigmatization, such as family reactions, workplace behaviors, and community responses. The connecting lines indicate how these factors influence each other, creating a web of social and psychological impacts on patients with TB. The blue nodes on the right likely represent the final outcomes or consequences of stigmatization, such as social isolation, psychological impact, and treatment adherence. The density of connections suggests multiple pathways through which stigmatization affects TB patients' lives, highlighting the complexity of the social challenges they face. The diagram effectively illustrates how TB stigmatization is not a simple linear process but rather a complex network of interrelated social and psychological factors that collectively impact patient experiences and outcomes.

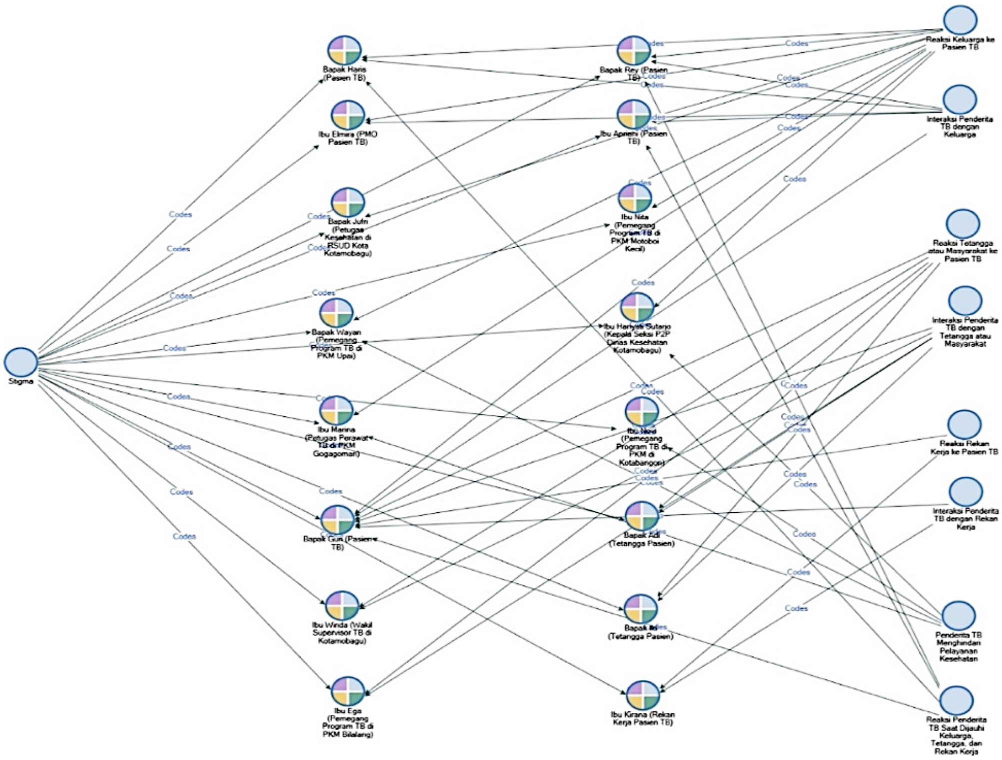


**Figure 2.** Stigmatization patterns and social dynamics surrounding tuberculosis (TB) patients in Kotamobagu. **Remarks:** Nodes with pie charts located in the center of the network represent different aspects of TB stigmatization, with pie segments showing the distribution of various factors, such as preventive reactions, anxiety levels, and social grouping behaviors. The blue circular nodes, positioned on the right side of the diagram, represent outcome variables or endpoints in the stigmatization process. The gray lines connecting various nodes show the relationships and interactions between the different aspects of stigmatization. Layout structure. The diagram uses a hierarchical layout, which flows from left to right and shows how different factors influence each other.

Physical isolation emerged as a primary preventive reaction within families, as evidenced by the HR statement regarding separate rooms and utensils. The diagram shows that this isolation factor connects to multiple other nodes, indicating its central role in the stigmatization process. Social distancing behaviors were documented both within families and workplace environments, with specific patterns of avoidance and separation clearly visible in the network structure. The analysis revealed significant workplace-related stigma, illustrated by multiple interconnected nodes in the diagram showing the impact of professional relationships. Patient KRN's testimony confirmed active avoidance behavior in professional settings, including refraining from handshakes and conversations. Network visualization demonstrates how workplace stigma connects to broader social isolation patterns through multiple pathways.

### *Discrimination against tuberculosis patients in Kotamobagu*

The network analysis diagram presented in Figure 3 illustrates the discrimination patterns against tuberculosis (TB) patients in Kotamobagu. The visualization comprises 13 primary nodes represented by pie charts, each depicting the proportional distribution of different discrimination types, connected to three terminal blue nodes that represent the ultimate societal impacts. The left-to-right flow architecture demonstrates the progression of discriminatory actions from their origins, through various social channels, to their eventual consequences. Notable in the diagram's structure is the dense interconnectivity between nodes, particularly in the central cluster, which indicates strong correlations between family-based, workplace, and community-driven discrimination.

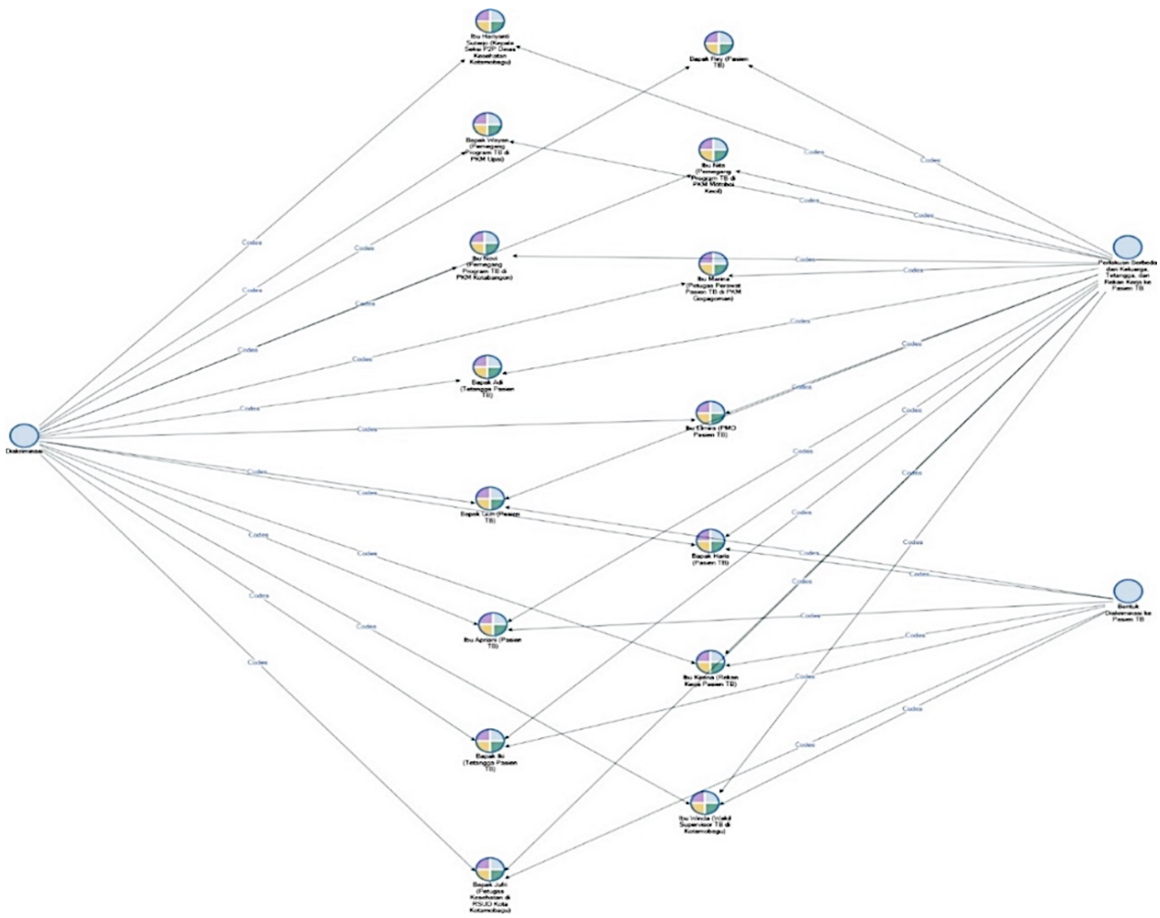

**Figure 3.** Network analysis of TB discrimination patterns in Kotamobagu. Remarks: Network visualization diagram illustrating the interconnections of TB-related discrimination. The blue circular nodes (left and right) represent source points and outcomes, whereas the pie chart nodes (center) represent a proportional distribution of discrimination types across family, workplace, and community settings. The gray connecting lines indicate the relationships and causal pathways between the different forms of discrimination. The hierarchical left-to-right layout demonstrates the progression from discriminatory behaviors to social impacts.

The systematic arrangement of the connecting lines reveals multiple pathways through which discrimination manifests and propagates throughout the social system, with each connection weighted to reflect the strength of these relationships. This network visualization effectively captures the multifaceted nature of TB-related discrimination in the community, providing clear evidence of how various discriminatory behaviors interact and create significant social and health outcomes for patients with TB. The stratified layout and color-coded elements enhanced the interpretability of the diagram, making complex social dynamics accessible for analysis and intervention planning.

## DISCUSSIONS

### *Stigmatization: Prevention Reactions, Anxiety, and Grouping toward TB Patients*

From a social and health sociology perspective, family views of family members afflicted with PTB create preventive reactions, anxiety, and grouping within society; families tend to take preventive actions to protect themselves and vulnerable family members [19]. Physical separation, isolation, and feelings of anxiety regarding transmission have become part of the social response. This is reinforced by the informant HR's statement: "*So the family is no longer surprised. I was advised to isolate in a separate room first, meal equipment must be separated, regularly receive treatment, and always wear a mask for two months. It's not that I am avoided; it's just that the family is more cautious. Because there are young children in the house.*" This statement clearly shows that the isolation and separation of equipment are forms of preventive response within the family.

Efforts in counseling and education address families' initial sensitivity toward members with PTB. Community education aims to change perceptions, enhance understanding of disease, reduce stigmatization, and alleviate transmission concerns [20]. As the NT stated, "*There are many who have been ostracized by their families. However, we educate the patient's family so that they ideally do not ostracize them, preventing stress or psychological effects on the patient*." This highlights that counseling aims to reduce social isolation and the psychological impact on patients. Families' views of PTB can cause social stigma and conflict. Misunderstanding and fear of transmission create social distancing, family conflicts, and negative psychological impacts on patients. JF noted, "*Patients cannot attend crowded events; people are afraid. When ostracized, patients feel inferior and desperate. It's not the disease they fear, but the social sanctions*." This underscores that social stigma and sanctions significantly affect patients' psychological well-being, illustrating the complex social dynamics of PTB.

The social interaction process of patients with PTB within the family environment is marked by isolation and distance to prevent disease transmission [21,22]. Health sociology explains this phenomenon as a social response to contagious diseases. EM's statement, '*I share a room with my father, but our beds are somewhat distant*,' exemplifies physical separation as a transmission-reducing strategy. Preventive measures, informed by self-awareness and social responsibility, are key to interactions with patients with TB, reflecting social dynamics and norms within the family. Vulnerable groups, such as young children and elderly parents, are particularly protected, as seen in the HR account, where separate rooms and utensils are used for infected family members. These actions align with health sociology principles, emphasizing the protection of susceptible family members.

Health sociology helps elucidate the stigma and rejection of patients with PTB within their families. This stigma stems from misunderstandings about the disease, fear of transmission, or tuberculosis-related stereotypes. Informant AP highlighted this issue, stating, "*Friends clearly avoid them, and some family members, like cousins, are afraid and keep their distance*." This highlights how social stigmatization affects familial interactions and underscores the need for health sociology to examine the social drivers of such stigma. The fear of PTB transmission fosters societal caution and distancing from patients. This stigma against contagious diseases can be analyzed from social and health sociology perspectives. Informant AD expressed, "*Honestly, I am a bit scared and worried, not just me. Other neighbors are also scared. Since TB is contagious, I rarely meet or communicate with patients to avoid infection.*" Society's perception of tuberculosis, particularly with respect to transmission, leads to the avoidance of patients and postponement of shared activities. Informant IK reinforced this, stating, "*People say this disease is contagious. Since I have a baby, I am afraid to be close to the patient, so I keep my distance*."

Awareness of the stigma against PTB patients is evident in informant GN's admission: "*I understand they keep their distance due to fear of infection, and I feel guilty about potentially transmitting it. I also feel ashamed as TB is seen as a dangerous disease*." Some patients with TB feel compelled to isolate themselves and conceal their illness to avoid societal stigma and rejection. The informant EG exemplified this: "*A patient here requests that neighbors not be informed of their illness to avoid being shunned*." The social interactions of patients with TB are influenced by the community's fear of disease transmission.

This fear leads to avoidance, as informant AD articulates: "*I'm a bit scared and worried, as are other neighbors, so I rarely meet or communicate with TB patients.*" The social interaction process for patients with TB involves stigmatization and negative societal perceptions. HR states, "*Neighbors are scared, so I stay home*," and it accounts for experiences of stigmatization when wearing a mask outside. RY added, "*Neighbors treat us like aliens, citing the contagious nature of TB*." Despite the stigma, some informants understood transmission and prevention efforts. GN acknowledges the community's distancing behavior: "*They distance themselves due to fear of infection, and I feel guilty about potentially transmitting it.*" This is echoed in the HR's preventive measure of wearing a mask when going out.

The reactions of colleagues to PTB patients tend to be marked by concern and avoidance behaviors. The fear of disease transmission has become a dominant factor in social interactions in the workplace. As expressed by KRN, one of the informants, "*I'm definitely worried. Because I know it, TB is contagious. I admit I also avoid that colleague*." Avoidance actions can create stigma and isolation in patients with TB. In addition to avoidance, colleagues also reported surprise reactions to the disclosure of PTB diagnosis. They tend to suggest rest as a form of response to uncertainty regarding the risk of transmission. GN, one of the informants, shared this experience: "*For colleagues, they suggested resting first, and I was given leave. This is because colleagues are also afraid of contagious diseases. They are more worried too*." The suggestion to rest reflects collective efforts to reduce transmission risk in the workplace.

Some patients with PTB tend to conceal information about their health conditions from their coworkers. RY, one of the informants, stated, "*I don't tell them that I have TB because if they know, I will definitely be isolated.*" The action of concealing information can be understood as an effort to avoid stigma and maintain social relationships in the workplace. However, it also reflects discomfort in sharing information about a disease, which is considered contagious and frightening. Social interaction among PTB patients in the workplace often entails both physical and social avoidance by coworkers, reflecting societal stigma and fear of disease transmission. Coworkers commonly refrain from physical contact, such as handshakes, and limit social interactions that require proximity to the patient. This avoidance behavior is exemplified by KRN, who stated, "*I refrain from shaking my hands, engaging in conversation, and participating in activities that involve close proximity to the TB patient. I admit to feeling apprehensive because TB poses significant risks*."

Fearful and cautious reactions from coworkers toward patients with PTB manifest as a high perceived risk of disease transmission. Informant KRN stated, "*Other friends are all afraid, they are also cautious, they suggest wearing masks*." This reflects collective uncertainty and fear regarding disease transmission in the workplace, leading to efforts to reduce risk by avoiding direct contact. Patients with PTB tend to hesitate to inform their coworkers about their health conditions because of the fear of social isolation. As expressed by informant RY, "*I also don't tell them that I have TB because if they know, I will definitely be isolated.*" This reflects the stigma associated with PTB, which can result in social isolation, causing patients to conceal their condition to avoid negative treatment from others in the workplace.

Patients with PTB often experience disapproval and fear of their surroundings. As expressed by the GN, "*I understand that people distance themselves for various reasons. They are also afraid of becoming infected, and I feel guilty if I transmit it to others. I also feel ashamed because people perceive TB as a dangerous disease*." This statement reflects the community's lack of understanding of the medical facts of tuberculosis and its mode of transmission. Patients with PTB have a serious impact on their psychological and social well-being. As narrated by HR, "*Yes, I once got so angry that I threw plates because family and neighbors should provide motivation, not discrimination*." Negative reactions from the environment, especially from family and neighbors, can create emotional stress that affects the mental health of patients. Workplace isolation can also lead to job losses and additional economic barriers.

In social and health sociology, medication side effects significantly impact patient engagement in healthcare services, particularly among patients with PTB. According to the informant NV, side effects, which are notably prevalent among elderly individuals, hinder consistent medication adherence. NV explains, "*Another hindrance pertains to medication side effects, though individuals under fifty experience them less*." Age and concerns regarding side effects emerged as barriers to adherence to treatment. Societal elements, including awareness of side effects, social support, and treatment efficacy perceptions, shape patient compliance with pulmonary TB medication regimens.

On the basis of the observation results and document review, researchers have reported that stigma toward PTB patients still exists in families, neighbors, or societies, as well as in patients' work environments [23–25]. Consequently, this stigma also leads patients to feel low self-esteem and despair, as they are avoided or even ostracized. Consequently, some patients rarely take medication because of a lack of support from their family, neighbors, and coworkers. On the basis of informant responses, researchers infer a discernible stigma associated with the reactions of family, neighbors, society, and coworkers toward PTB patients, characterized by a propensity for avoidance owing to apprehension of contagion. Additionally, a significant correlation emerges between the social engagement of these entities and TB patients, manifesting as constrained interactions, including segregated spaces for rest and activities, driven by similar contagion concerns.

### *Discrimination against tuberculosis patients in Kotamobagu*

In the context of supporting and educating PTB patients, it is apparent that the informant, HS, highlighted the persistence of caregivers in offering counseling and educational initiatives, despite encountering apprehension and resistance from certain familial and communal quarters. This underscores a concerted endeavor to combat stigma and augment societal comprehension of the ailment. This sentiment is further underscored by HS's affirmation: "*However, we consistently engage in community counseling and education*." HS's assertion signifies an ongoing commitment to fostering public enlightenment through counseling and educational endeavors. Fear and ostracism are among the social impacts of PTB. Informants MRN, KRN, AD, IK, EM, WD, JF, WY, NT, and NV provided an overview that the community, families, and colleagues tend to distance themselves from PTB patients due to fear of transmission. In the words of MRN, "*They must distance themselves from patients because they are afraid of transmission*." Informant MRN described fear of transmission as the main reason for distancing patients with PTB.

Patients with PTB often face isolation from their family, community, and colleagues. This is reflected in the statement of RY, "*The doctor's advice is also like that*," indicating that isolation actions are sometimes taken on the basis of advice from medical personnel or family support to protect oneself and others. Informant RY mentioned that the doctor's advice also supported isolation actions in response to PTB. The treatment of PTB patients is not homogeneous but rather involves a mixture of support, education, fear, and ostracism. Informants GN, HR, RY, and AP provided descriptions encompassing various responses from the surrounding environment. This is reinforced by the statement of informant HR that "*they're not avoided, just that the family is more cautious*." This statement indicates that the treatment of patients with PTB can encompass a combination of ostracism and caution from the family.

Social discrimination against patients with PTB is reflected in physical and social avoidance by family members, neighbors, and coworkers. Informant KRN described how people avoid shaking hands, talking, and even eating together with patients with PTB. This reflects society's fear of disease transmission and can be explained by the concept of health sociology, which highlights the formation of norms and values in social interactions. This is reinforced by informant KRN, who noted that *"other friends are all scared, they're also cautious, they avoid, they suggest wearing masks."* This phenomenon reflects the social stigma that emerges around patients with PTB, where people take steps to distance themselves to reduce the risk of transmission.

Patients with PTB often experience isolation and activity restrictions within the family environment, as conveyed by the informant GN. Families take action to limit patient interactions with other family members, provide special eating and drinking utensils, and isolate patients in a separate room. From the perspective of health sociology, these actions reflect a family's efforts to comply with social norms to protect healthy family members and avoid disease transmission. This is reinforced by informant GN, who stated that "*the family somewhat keeps their distance, and I myself realize it's dangerous if it spreads*." This shows how isolation is implemented in response to the social stigma against PTB.

Recommendations for rest and rejection are also forms of discrimination experienced by patients with PTB. Informant HR states that coworkers suggest resting and giving time off to patients. Health sociology explains that these actions reflect collective efforts to maintain public health but can also result in stigma toward individuals with infectious diseases. This is reinforced by informant HR, who stated, "*All coworkers were surprised, even though we don't smoke, don't drink alcohol. They said I should rest for six months.*" This illustrates how stereotypes about infectious diseases can influence recommendations and attitudes toward patients with PTB.

Workplace ostracism is an important aspect of social discrimination against patients with PTB. Informant JF's statement indicates that patients with PTB may experience termination of employment and isolation in the workplace. From a health sociology perspective, this can be interpreted as a reaction to collective fear of disease transmission in the workplace. This is reinforced by JF's statement, "*He was forced to quit his job and return to the village, separated from his wife here*." Workplace discrimination creates additional social pressure for patients with PTB, which can affect their psychological and social wellbeing.

Patients with PTB also face negative perceptions and stereotypes from society, as stated by the informant RY. The statement that "*neighbors deliberately spread rumors everywhere that I am suffering from TB*" reflects how inaccurate or exaggerated information can lead to negative perceptions of patients with PTB. On the basis of observational results and document reviews, researchers have found that discrimination against PTB patients still exists in family, neighboring, or community environments as well as in patients' workplaces in various forms, such as specific isolation for resting and eating places for patients, neighbors who refuse to communicate with patients, keeping their distance, avoiding shaking hands, being close to patients, and colleagues and supervisors who distance themselves from patients.

On the basis of informant responses, researchers can conclude that, with respect to the discrimination variable concerning different treatments from family, neighbors, or community members and colleagues of PTB patients, there is separation in places for rest and activities to keep a distance from PTB patients. This is directly proportional to the forms of discrimination that family, neighbors, or community members and colleagues of patients with PTB carry out, such as families who maintain their distance and company leaders and colleagues who avoid and refuse to shake their hands. Discrimination from communities that are afraid to pray congregationally close to patients with PTB

## *Sociological review of the stigmatization and discrimination phenomena*

Tuberculosis remains the deadliest infectious disease globally, with a decline in morbidity and mortality rates falling below the set targets on the basis of global data. Amidst the challenge of achieving the target of eliminating PTB, efforts to prevent and manage PTB are complicated by stigma and discrimination against patients in the community [26]. Patients with PTB are heavily stigmatized and face numerous forms of discrimination. Pulmonary tuberculosis (PTB) is a highly contagious disease that is capable of environmental transmission [27]. Misconceptions persist regarding its spread via sweat, shared utensils, smoking, and low socioeconomic status. As a result, patients face societal ostracization due to exaggerated contagious fear and stigma. This stigma, stemming from societal (social stigma), familial, and self-perception (self-stigma), may lead to discriminatory behavior toward them [24,28].

On the basis of the research findings and theoretical studies, the researcher subsequently discussed several aspects related to the processes of stigmatization, discrimination, and theoretical solutions for patients with PTB in Kotamobagu, North Sulawesi. The first is stigmatization, illustrates how certain diseases, such as PTB, can create negative stereotypes and discrimination against individuals or groups affected by the disease [21,29]. Stigma is a negative attribute attached to individuals or groups that can lead to discriminatory treatment [26]. Stigmatization is the process of marking individuals or groups with negative attributes or stereotypes, leading to feelings of inferiority or disgrace within society [20]. It typically targets those who are perceived as different from or incompatible with social norms. Stigmatization involves endowing individuals or groups with negative attributes, resulting in rejection, ostracism, or discrimination on the basis of personal characteristics, such as race, gender, sexual orientation, medical conditions, or other social factors [30,31]. Even today, stigma involves socially labeling individuals or groups with negative perceptions, leading to discriminatory actions that disregard their basic human rights [32].

Research findings from informant input on stigmatization aspects obtained via interviews, observations, and document reviews reveal diverse insights. Informant explanations during the study highlighted various reactions and experiences among patients with PTB (TB), as well as responses from their family, friends, neighbors, and coworkers. Families of patients with TB often experience fear and anxiety regarding disease transmission, leading to distancing, suggestions for isolation, separate beds, and utensils, and, in extreme cases, ostracization. Family support is pivotal, with education assisting in reducing stigma. Efforts to isolate patients at home, including separate beds and utensils, are common, although positive interactions, such as medication assistance, also occur. Young children may exhibit distancing behavior due to fear of transmission.

Neighbors and acquaintances of PTB patients fear disease transmission, often maintaining distance and avoiding physical contact. Direct conversations and social interactions may be limited, leading to patient isolation. Similarly, coworkers expressed anxiety about workplace transmission, sometimes encouraging patients to stay home and avoid contact. Even company leaders may disturb themselves. Patients experience isolation, shame, and anger due to stigma from various circles and feel guilty about potential contagion. In certain instances, inadequate familial support may disrupt consistent adherence to PTB medication [33]. Treatment refusal and a reluctance to accept a diagnosis are common among patients and are compounded by concerns over transmission and impeded recovery efforts. Thus, public education is pivotal in combating stigma and discrimination. Comprehensive support networks comprising family, friends, neighbors, and colleagues are essential for the successful treatment and mitigation of tuberculosis-related stigma.

On the basis of this research, stigmatization is a significant concern in PTB patients. The findings emphasize its pervasive nature, exacerbated by social pressures from the familial, societal, and professional spheres. This stems from societal misunderstandings, fostering fear and stigmatizing attitudes. Family dynamics are crucial, with some offering support and others leading to distancing and isolation. Educational interventions targeting families have the potential to reduce stigmatization [34,35]. Patients with PTB feel isolated and marginalized in their environment. They experience negative emotions such as shame, anger, and despair due to the negative treatment they face. Social isolation can impede the recovery process. Stigmatization and fear of transmission can hinder patients from adhering to consistent PTB treatment. Some patients discontinue treatment or refuse to accept a diagnosis of PTB, which can negatively affect their recovery [36–38]. These findings clearly indicate that education and increasing public awareness of PTB are crucial. This approach can help address stigma and discrimination involving family, friends, neighbors, and colleagues in the education and treatment process. These assumptions are based on research findings and underscore the importance of efforts to address stigma against PTB through education, awareness, and better social support in society.

Research aligns with the findings of Dodor et al. [39] in Ghana that patients with PTB become stigmatized because people without PTB are reluctant to have close contact with them. Stigmatization is a concern for most patients with PTB. Dutta et al. [22] confirmed that fear of infection is the key catalyst for PTB stigma, which aligns with prior literature. The repercussions of stigma, notably with respect to women's socioeconomic standing, are profound. Qualitative approaches eclipse quantitative surveys to assess PTB stigma. These stigma compounds delay diagnosis and treatment adherence, yet their precise impact eludes definitive determination owing to disparate study outcomes. Nevertheless, interventions aimed at reducing the stigma of PTB show promise in alleviating its effects. Similar to the findings of Chen et al. [40] who suggested that providing education related to PTB enhances the patient–doctor relationship, family support, both physically and spiritually, is also required to maintain patients' intentions and provide psychological strength against potential stigma from surrounding individuals.

Second, discrimination exists. Discrimination encompasses unfair or harmful actions toward individuals or groups on the basis of characteristics such as race, gender, religion, sexual orientation, age, disability, or other attributes [38,41,42]. They violate human rights and are often prohibited by law. Manifestations include denial of access, ostracism, harassment, unfair treatment, and restrictions on rights on the basis of specific characteristics or vulnerabilities. On the basis of the theory proposed by Fadele and Pelemo, discrimination involves behavior, particularly negative behavior directed toward individuals, because of their membership in a particular group. There are several forms of discrimination that occur in society. According to the characteristics of the group, discrimination is known by various names, such as sexism (gender discrimination), racism (racial discrimination), job discrimination, religious discrimination, and illness [41].

The emergence of discriminatory actions is caused by individuals or groups of people who are deemed incompatible with the prevailing and evolving values of life in society, one of which is discrimination against individuals with PTB. Concrete behavior analysis theories discriminate against patients with PTB, such as the refusal of health services, social isolation, or ostracism. Patients with PTB may undergo discriminatory treatment in various contexts [43]. According to the informants, patients with PTB encounter differential treatment from various societal entities, including family, neighbors, colleagues, and friends. Such treatment manifests in various forms, such as fear of transmission, avoidance of physical contact, and isolation. Families of patients may segregate their sleep arrangements, dining areas, and utensils. Negative conversations with patients with PTB are also prevalent in the environment. These discriminatory behaviors and fears can hinder the treatment and recovery of patients. Thus, fostering education and societal awareness about PTB is imperative to combat stigma and discrimination. Patients with PTB require support and understanding from their surroundings to treat and manage their disease effectively.

Improving public education and awareness of PTB is crucial for reducing stigma and discrimination against patients. Communities must understand that the condition is treatable and that treated individuals are not contagious. Support and understanding from the community are vital for successful treatment and management. Initiatives are urgently needed to decrease stigma and increase awareness, create a supportive environment for patients to live comfortably, and access the necessary support [44,45]. Research suggests that stigma and discrimination against patients with pulmonary PTB persist as significant societal challenges. Negative assumptions about pulmonary TB among communities, including families, neighbors, and colleagues, often lead to avoidance behaviors owing to the fear of transmission. This ongoing stigma hampers the treatment and recovery of affected individuals.

Discrimination and isolation can diminish patients' motivation for consistent treatment adherence and healthcare-seeking behavior. Addressing these issues requires enhanced education and societal awareness of pulmonary TB, encompassing its transmission and relevant scientific facts to dispel misconceptions. Community support and understanding are essential for patients' well-being and treatment outcomes. Stakeholders, including health authorities and nongovernmental organizations, must utilize these research findings to implement more effective strategies to combat TB-related stigma and discrimination and enhance public awareness.

This study corroborates Dhingra and Khan's research [46], indicating that individuals with PTB face familial and social discrimination due to societal stigmatization, leading unaffected individuals to avoid contact. This finding is consistent with the findings of Ali et al., who identified self-discrimination causes such as transmission fear, gossip avoidance, and anticipated discrimination. Public discrimination arises from fear of infection, perceived links with poverty and low caste, associations with misconduct, and a belief in divine punishment [47]. In addition, healthcare workers may contribute to patient discrimination.

Padmanabhan and Poornima's research [29] in India corroborated this study's findings, underscoring the ongoing societal discrimination stemming from misunderstandings and insufficient awareness. Multifaceted collaboration among governmental, nongovernmental, social, cultural, and religious entities is imperative for bolstering anti-stigma and anti-discrimination efforts [30,48,49]. Media campaigns should be used to increase public consciousness. Sex disparities persist, with women being disproportionately affected, necessitating tailored support groups for female patients with PTB. Addressing workplace discrimination mandates enhancing interpersonal communication and legislative interventions across diverse organizational contexts.

Stigma and discrimination against PTB patients manifest as societal exclusion or unfair treatment on the basis of their health status. Stigma denotes negative labeling due to TB-related attributes, whereas discrimination involves biased actions against individuals or groups, leading to rejection, ostracism, or socioeconomic disadvantage. Theoretical approaches to combating stigma and discrimination against patients with PTB require a comprehensive strategy involving governmental bodies, healthcare facilities, and societal stakeholders. These approaches encompass conceptual frameworks that aim to address these challenges. While the academic literature may not explicitly delineate "theoretical solutions," the term denotes strategies underpinned by theoretical constructs to achieve defined objectives.

In general, in academic and research contexts, theoretical solutions are closely related to conceptual ideas or frameworks used in a particular discipline to design theoretically informed solutions or approaches. These theoretical solutions may involve the application of relevant theories or theoretical concepts to solve problems or to answer research questions. Theoretical solutions represent methodological paradigms or strategies formulated on the basis of theoretical constructs or frameworks to address challenges or attain predefined objectives. Within this framework, such methodologies prioritize the employment of theoretical ratiocination and frameworks to discern, scrutinize, and rectify prevailing predicaments. The utilization of theoretical solutions manifests across diverse domains, including scientific inquiry, policy formulation, and managerial practice, among others. The operationalization of theoretical solutions facilitates the harnessing of theoretical perspicacity and profound comprehension of encountered dilemmas, thereby fostering judicious decision making and efficacious strategic maneuvers aimed at realizing predetermined goals.

Theoretical solutions may vary depending on the context and relevant discipline. They are often supported by relevant empirical evidence that validates theoretical concepts and proposed approaches. Theoretical solutions serve as the initial steps in designing more concrete and practical strategies or actions to address specific problems. They will help direct further efforts to develop more detailed solutions and their real-world implementation. The research outcomes, gleaned from informant perspectives through interviews, observations, and document analysis, yield diverse insights. Informant explanations reveal active implementation of the PTB Control Program, which positively impacts patient recovery over six months, with health centers playing an essential role. However, significant social stigma persists, which hinders efforts. The Health Office focuses on community education to alleviate stigma and aid patients with PTB , emphasizing the importance of family support for patient recovery.

Access challenges to services, namely, health centers, are the main problems in providing PTB drugs. Distance is a major obstacle, especially in pediatric patients. Community stigma regarding the transmission of PTB is also a complicating factor in the treatment process. Patients with PTB and a history of diseases such as diabetes may be more susceptible to PTB recurrence. Additionally, some patients with PTB consume nonstandard drugs. Community education is key to addressing stigma and discrimination and ensuring proper treatment adherence. PMO (medication supervisor) and family support play crucial roles in monitoring patients with PTB who consume medication regularly, particularly in the morning and evening. Patient spouses also play a role in supporting patients during the treatment process. They ensured bed separation and supervised medication consumption. However, there are issues of stigma and discrimination from some family members of patients with PTB, who distance themselves from the patient.

Neighbors are aware of the condition of patients with PTB and often make it a topic of discussion. Stigma and fear of disease transmission cause neighbors to avoid direct communication with patients; even when they meet, they greet and wear only masks. Other Friday prayer congregants also avoided proximity to patients. There is a negative reaction among neighbors, especially those with small children, who tend to stay away from patients with PTB. Patients with PTB experience various emotions, including guilt, shame, depression, and the inability to interact with others. They are aware of the contagiousness of this disease and sometimes feel distressed because they must be isolated and not allowed to work. Patients with PTB also feel humiliated, ashamed, and desperate due to the isolation they experience. Strong emotions, including anger, have also emerged in some cases. Patients with tuberculosis feel resigned and rely on God for recovery.

These findings underscore the importance of community education, social support, and efforts to reduce stigma and discrimination against PTB patients so that they can be treated effectively and overcome the emotional impact of PTB. The assumption in this study was that the PTB control program, executed with the pivotal involvement of health centers, is instrumental in the six-month treatment regimen. Despite its pivotal role in tuberculosis management, societal stigma remains a significant hurdle, hindering access to healthcare services, particularly for pediatric patients, due to geographical barriers. Transmission-related societal stigma exacerbates treatment complexity. Additionally, patients with comorbidities such as diabetes are more susceptible to tuberculosis recurrence. Noncompliance with medication standards among patients with PTB presents another challenge [50,51].

PMO and family support are pivotal for monitoring the medication intake of patients with PTB, with spouses being particularly involved in ensuring bed separation. However, stigma and discrimination against certain family members pose challenges. Neighbors often gossip about patients' conditions, leading to the avoidance of direct communication due to the fear of transmission. Patients endure emotions such as guilt, shame, depression, and social isolation, exacerbated by an awareness of contagion. Anger and resignation are also common, with patients relying on their faith for recovery. These assumptions can be used as a basis for further understanding the stigma and discrimination of PTB patients, as well as a starting point for formulating theoretical solutions or strategies to address these issues.

Potty et al. [14] This systematic review aligns with our research, encompassing patients with PTB, health workers, and communities. Psychosocial support interventions aid in the completion of patient treatment. Similarly, interventions empower health workers to better support patients, whereas community interventions mitigate stigma. Synergistic strategies targeting multiple populations are optimal. Our findings underscore the significance of stigma in national and international tuberculosis strategies, aligning with Xu Chen et al.'s study [40], which highlights persistent patient stigma. Emphasizing social support and doctor–patient communication is crucial for reducing stigma. Research by Mainga et al. [52] also suggests that stakeholders and PTB health workers in Zambia have a complex conceptualization in addressing health and mental illness because the tuberculosis treatment provided does not support the mental health needs of patients with PTB [53]. Integrating mental health services into PTB care services can be beneficial and change negative attitudes toward the stigmatization and discrimination of patients with PTB.

## Public health and clinical implications

The findings of this study have significant implications for both public health practice and clinical care. The persistent stigmatization and discrimination patterns observed in Kotamobagu highlight the urgent need for comprehensive community-based interventions. Healthcare providers and public health practitioners should implement targeted educational programs that address misconceptions about tuberculosis transmission, particularly those focused on family members and workplace environments in which stigma is most prevalent. The development of support groups and counseling services specifically designed for patients with TB could help mitigate the psychological impact of stigma and improve treatment adherence. Additionally, workplace policies need to be established to protect TB patients from discrimination while ensuring appropriate infection control measures. Healthcare facilities should integrate mental health screening and support into routine TB care services, recognizing the significant psychological burden that stigma imposes on patients. Public health campaigns should utilize culturally appropriate messages to combat misconceptions and promote the understanding of TB as a treatable condition, emphasizing that patients undergoing proper treatment pose minimal transmission risk.

### *Limitations*

This study had several noteworthy limitations that should be considered when interpreting the findings. First, the research was geographically limited to Kotamobagu, potentially limiting the generalizability of the findings to other regions with different sociocultural contexts. Second, the study's reliance on 16 informants while providing rich qualitative data may not capture the full spectrum of experiences and perspectives within the community. The absence of quantitative measures of stigma and discrimination limits our ability to assess the magnitude of these phenomena in a broader population. Additionally, the study's cross-sectional nature prevents examination of how stigma and discrimination patterns may evolve over time or throughout the course of treatment. The research also lacked direct observations of workplace interactions, relying primarily on reported experiences. Finally, this study did not include the perspectives of religious leaders and other influential community figures, who might play crucial roles in shaping social attitudes toward TB patients.

## CONCLUSIONS

This study reveals the complex and multifaceted nature of tuberculosis-related stigma and discrimination in Kotamobagu, demonstrating how these social phenomena manifest across familial, community, and workplace settings. These findings indicate that fear of transmission serves as the primary driver of stigmatizing behaviors, leading to social isolation, psychological distress, and potential treatment interruption among TB patients. This study highlights the critical role of healthcare providers in both perpetuating and potentially alleviating stigma through interactions with patients and communities. The identified patterns of discrimination, ranging from subtle avoidance to overt exclusion, underscore the need for comprehensive interventions that address both structural and interpersonal aspects of stigma. This research particularly emphasizes how workplace discrimination can create additional barriers to treatment adherence and recovery. These findings contribute to the growing body of evidence suggesting that successful TB control programs must incorporate strategies to address social stigma along with medical interventions. Future research and interventions should focus on developing and evaluating integrated approaches that combine clinical care, psychological support, and community education to create more supportive environments for TB patients throughout their treatment.

## CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## AUTHOR CONTRIBUTIONS

Conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing - original draft, writing - review & editing, visualization, supervision, project administration, funding acquisition: HA, SAK, and AA.

## FUNDING

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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