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Assessment of TB-related stigma and Gender-Based Violence in Tanzania

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DECLARATION

I hereby declare that this thesis "**Assessment of TB-related stigma and Gender-Based Violence in Tanzania.**" submitted for the Award it of Doctor of Philosophy in Community and Social Development, I am the sole author of this project and that its contents are the result of the readings and research I have done, and that all citation from other scholars has been acknowledged.

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TABLE OF CONTENTS

Contents

TABLE OF CONTENTS iii

ACKNOWLEDGMENT viii

ABBREVIATIONS ix

EXECUTIVE SUMMARY x

1. CHAPTER ONE: INTRODUCTION 1

1.1 Background 1

1.2 Problem statement 3

1.3 Expected outcomes 3

1.4 Aim of the study 3

1.5 Specific Objectives 3

2. CHAPTER TWO: LITERATURE REVIEW 4

2.1 Epidemiological information 4

2.2 Community issues-beliefs 4

2.3 Community issues-stigma 5

2.4 Community issues-traditional norms 6

3. CHAPTER THREE: METHODOLOGY 8

3.1 Study design 8

3.2 Study areas and settings 8

3.3 Study population 8

3.3.1 People with or who had TB 8

3.3.2 Family members of PWTB 8

3.3.3 Community members 9

3.3.4 Healthcare workers 9

3.3.5 Multi-stakeholder group 9

3.4 Inclusion and exclusion criteria 9

3.5 Sampling strategy 9

Table: 1 Selected health facilities by region 10

3.6 Sample size estimation 11

3.7 Data collection procedures 11

3.7.1 People with or who had TB (PWTB) 12
3.7.2 Family members of PWTB 12
3.7.3 Healthcare workers 12
3.7.4 Community members 13
3.7.5 Multi-stakeholder group 13
3.8 Ethical consideration 14
3.9 Data management and statistical analysis 14
4. CHAPTER FOUR: RESULTS 16
4.1 Profile of participants 16
4.2 Overall demographic characteristics of the participants 16
Figure 1: Distribution of groups of recruited participants 16
Table 2: Overall demographic characteristics of the participants 17
4.3 Demographic characteristics of PWTB 18
Figure 2. Distribution of PWTB by age and gender (n = 418) 19
Figure 4: Distribution of type of TB by age (n = 418) 19
Figure 3: Distribution of self-identification in Key population by PWTB (n = 418) 19
Figure 5: Stages of TB treatment for PWTB (n = 418) 19
Table:3 Demographic characteristics of PWTB 20
4.4 Demographic characteristics of family members of PWTB 21
Figure 6: Distribution of family members by age and gender (n =73) 21
Table 4: Demographic characteristics of family members of PWTB 21
Figure 7: Distribution of family members who supported PWTB during treatment (n=73) 22
4.5 Demographic characteristics of community representatives 23
Table:5 Demographic characteristics of community representatives 23
Figure 8: Distribution of community representatives by age and gender (n=171) 24
Figure 9: Distribution of responses to the question: "How many people with or who had TB in your community do you know personally? (n=171) 24
4.6 Demographic characteristics of healthcare workers 24
Table:6 Demographic characteristics of healthcare workers 25
Figure 10: Distribution of healthcare workers by age and gender (n=79) 26
Figure 11: Distribution of healthcare workers by cadres (n=68) 26
4.7 Demographic characteristics of stakeholders 26
Figure 12: Distribution of representatives of multi-stakeholders’ group (n = 19) 27

4.8 Results and findings 28

4.9 Self-stigma in PWTB 28

Table 7: The dimension and level of self-stigma in PWTB: level of support for each statement which refers to TB, % (n= 418) 28

4.10 Factors associated with self-stigma in PWTB.. 29

Table 8: Factors associated with Self- stigma in PWTB (N=418).. 29

4.11 Experiences and consequences of TB-related stigma among PWTB 31

Table 9: Experiences and consequences of TB-related stigma among PWTB 31

4.12 Factors associated with experienced TB-related stigma among PWTB.............................. 32

Table 10: Factor associated with experienced TB-related stigma 33

4.13 Manifestations of self TB-related stigma among PWTB 34

4.14 Experiences on Gender-Based Violence (GBV) among PWTB 35

Table 11: Experienced forms of GBV along TB journey among PWTB....................................... 35

4.15 Manifestations of GBV among PWTB 36

4.16 Factors associated with GBV among PWTB 36

Table 12: Factors associated with GBV among PWTB 37

4.17 Secondary TB-related stigma in families of PWTB 38

Table 13: Dimension of secondary TB-related stigma in families of PWTB: level of support for each statement which refers living with TB patients, % (n=73) 38

4.18 Factors associated with secondary stigma in families of PWTB 39

Table 14: Factors associated with secondary stigma in family setting (N=73) 39

4.19 Experiences and consequences of secondary TB-related stigma among family members of PWTB 40

Table 15: Experiences and consequences of secondary TB-related stigma among family members of PWTB... 41

4.20 Factors associated with experienced secondary TB-related stigma among family members of PWTB 42

Table 16: Factors associated with experienced secondary TB-related stigma among family members of PWTB... 43

4.21 Manifestations of secondary TB-related stigma among family members of PWTB 43

4.22 Anticipated TB-related stigma in the communities 44

Table 17: Dimensions of anticipated stigma in the community: level of support for each statement which refers to living with TB, % (n= 171) 44

4.23 Factors associated with anticipated TB-related stigma in the community 45

Table 18: Factors associated with anticipated stigma in community (N=171) 45

4.24 Experiences and consequences of TB-related stigma in communities 47

Table 19: Experiences and consequences of TB-related stigma in communities 47

4.25 Manifestations of community TB-related stigma 48

4.26 Anticipated and experienced TB-related stigma in healthcare settings 49

Table 20: Dimensions of anticipated stigma in healthcare settings: level of support for each statement which refers to living with TB, % (n=79) 49

4.27 Factors associated with anticipated TB-related stigma in healthcare settings 50

Table 21: Factors associated with anticipated TB-related stigma in healthcare settings (N=79) 50

4.28 Experiences of TB-related stigma among healthcare workers 51

Table 22: Experiences of TB-related stigma among healthcare workers 51

4.29 Factors associated with experienced TB-related stigma among healthcare workers 52

Table 23: Factors associated with experienced TB-related stigma among healthcare workers 52

4.30 Manifestations of TB-related stigma among healthcare workers 53

4.31 Structural TB stigma in healthcare settings and media 54

4.32 Right to life and health 54

4.33 Right to be free from discrimination 56

4.34 Right to freedom from arbitrary arrest or detention and involuntary isolation 57

4.35 Right to Privacy 58

4.36 Right to food 59

4.37 Right to safe workplace 60

4.38 Right to access information 61

5. CHAPTER FIVE: DISCUSSION AND RECOMMENDATIONS 63

5.1 Discussion 63

5.2 Recommendations 66

5.3 Recommendations made by PWTB 66

5.4 Recommendations made by family's members of people with TB 67

5.5 Recommendations made by community representatives 67

5.6 Recommendations made by the healthcare workers 67

5.7 General researcher recommendations 68

5.7.1 Raising community awareness of TB-related stigma 68

5.7.2 Enhance refresher training to healthcare providers to eliminate TB-relating stigma 68

5.7.3 Establishing support programs for PWTB 68

5.7.4 Strengthening engagement of private health facilities in delivering TB services 69

5.7.5 Enhancing supports for none-free TB services 69

5.7.6 Improving TB services delivery infrastructures to promote safety and privacy 69
5.7.7 Improving provision of nutritional supplements to TB patients 69
5.7.8 Promoting media engagement in TB-related stigma elimination 70
5.8 Study limitations 70
5.9 Conclusion 70
6. FUNDER AND IMPLEMENTORS 71
7. REFERENCES 71
8. APPENDICES 75

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ABBREVIATIONS

CBO	Community-Based Organization
CRG	Community, Rights and Gender
DTLC	District TB and Leprosy Coordinator
FBO	Faith-Based Organization
FGD	Focus Group Discussion
HCWs	Health Care Workers
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
IDI	In-Depth Interview
MoH	Ministry of Health
NatHREC	National Health Research Ethics Committee
NIMR	National Institute for Medical Research
RTLC	Regional TB and Leprosy Coordinator
STP	Stop TB Partnership
TB	Tuberculosis
UNAIDS	United Nations Programme on HIV/AIDS
UNOPS	United Nations Office for Project Services
WHO	World Health Organization
ZAHREC	Zanzibar Health Research Ethics Committee

EXECUTIVE SUMMARY

Background

Many challenges and barriers exist in the path towards TB elimination. A major barrier continues to be the TB-related stigma and associated discrimination experienced by persons with or affected by TB. Stigma, discriminations, and gender-inequalities (i.e., GBV) are recognized as human rights-related barriers hindering the fight against the TB epidemic. Stigma impacts people with TB, their families and friends-personally, socially, financially and physically. Stigma is basically driven by fear of TB, and of the disastrous health, financial, personal, and social consequences of the disease on affected individuals and families. Stigma exacerbates the medical and social hardships of TB patients, and is responsible for delays in diagnosis and treatment initiation, treatment interruptions, and poor outcomes. TB-related stigma is a barrier to TB elimination, and therefore understanding its magnitude, dimensions, manifestations and associated consequences is the key to its control.

Materials and methods

The mixed-method, cross-sectional study was conducted between September, 2021 and February, 2022, to ascertain the level, manifestations, and consequences of TB-related stigma in 5 regions of Tanzania mainland and Zanzibar (Kilimanjaro, Mwanza, Njombe, Pwani, and Unguja Kaskazini). Data were collected using semi-structured questionnaire and key informant interview. Both quantitative and qualitative data analysis methods were used to analyze, summarize, and present data.

Findings

The study recruited 418 people with or who had TB (PWTB), 73 Family members of PWTB, 171 community members, 79 healthcare providers, and 19 stakeholders. The study found a moderate to high level of TB-related stigma of 40%, 37%, 57.5%, and 71.5% for PWTB, family members, community members, and healthcare providers, respectively. The level of TB-related stigma among PWTB were associated with age, level of education, type of TB, and region. The most common manifestations of TB-related stigma were isolation, rejection in social events, blamed, refusal to share eating utensils and accommodations. TB-related stigma was mainly enacted by friends, co-workers, and relatives, and mainly driven by fear of contracting TB infection, disclosure of TB status, and being suspect also have HIV. GBV was as high as 20% among PWTB and mainly took forms of being abandoned by partner, verbal abuse and harassment, refusal of sex, and family separation.

Regarding structural TB-related stigma, practices in healthcare settings and media constrain the right to health, privacy, food, and access to information.

Conclusion

There is an urgent need to establish community-based awareness campaigns to address TB-related stigma and develop supporting programs for PWTB aiming to recover and rehabilitate from their hardships and sufferings associated with TB and GBV.

1. CHAPTER ONE: INTRODUCTION

1.1 Background

Tuberculosis (TB) is an ancient infectious disease that presents a major public health concern worldwide. Before the COVID-19 pandemic, TB was the leading cause of death from a single infectious agent, ranking above HIV/AIDS (1). In 2020, World Health Organization (WHO) reported 9.9 million people got TB diseases worldwide, and 1.5 million people died from TB including 214, 000 people with HIV. (2). Disproportionately, most of these deaths happened in low-and middle-income countries in Asia and Africa including Tanzania. TB epidemic is mainly driven by poor living and working conditions, HIV infection, malnutrition, smoking, diabetes, alcohol abuse, and indoor air pollution (3). Tanzania is among the 30 countries with the highest TB burden in the world with a TB incidence rate of 253 per 100, 000 population. Moreover, in 2019, Tanzania notified 82,528, and 534 TB cases for non-resistant TB, and drug-resistant TB (MDR), respectively, however, TB notification varied significantly across the regions where 61% of cases were notified from only 10 regions while other 21 regions including Zanzibar accounted only for 39% of all notified TB cases, suggesting existing of barriers that hinder access to equitable TB services. Furthermore, HIV remains a significant factor driving TB epidemics in the country as one out of four TB cases (24%) are co-infected with HIV (4). Early diagnosis and successful treatment are essential strategies for TB prevention and control; however, delayed diagnosis and initiation of TB treatment, poor adherence, and default from treatment are not uncommon, especially in resource-limited countries (5–9).

To reach global targets under the 2025 End TB strategy, it is important to eliminate the barriers which prevent TB patients from accessing medical care services at every level: from screening for TB to the provision of care and support. Stigma is recognized as an important social determinant of health that hinders equal access to TB services (10). In 2018, the UN General Assembly high-level meeting on tuberculosis endorsed a political declaration to accelerate progress towards End TB targets in 2022, this includes eliminating stigma and all types of discrimination related to TB (11,12). In this regard, understanding and averting all forms of stigma and discrimination are vital to ensure patient-centered care, quality, affordable, and equitable TB services and care.

Stigmatization is a complex process that is shaped by institutional and community norms, interpersonal factors, and attitudes. Generally, stigmatization is a process that begins when a particular trait or characteristic of an individual or a group is identified as undesirable or disvalued, as result, the stigmatized individual adopts a set of self-regarding attitudes which include shame, disgust, and guilt which produces a set of behaviors that include hiding the stigmatized trait, withdrawing from inter-personal relations or increasing risky behaviors (13). Stigmatization differs from discrimination in the sense that the latter is characterized by socially excluding the person and violating the person's rights as a result of stigma. In 2018, US Challenge TB agency funded STOP TB partnership to produced TB stigma measurement guidance which described six type of TB-related stigma: (i) Anticipated stigma or perceived stigma-refers to the worry that one will be devalued after a TB diagnosis, and often is the result of observing others being stigmatized, (ii) Internalized or self-stigma-captures the idea that individuals endorse negative stereotypes about TB and therefore behave or think according to false portrayals and negative messages, (iii) Secondary stigma-refers to the idea that caregivers, friends, or family members may expect negative attitudes or rejection because of their association with the disease and/or TB patients, (iv) Community or public stigma-refers to negative attitudes, beliefs, and behaviors held by the wider community, either neighbors or the public, (v) enacted or experienced stigma-reflects the range of stigmatizing behaviors, messages, and effects that are either directly experienced by the person with TB or by their families and/or that drive others to acts of discrimination, rejection, or isolation in different settings (family, community, health care facility, or workplace). Enacted and experienced stigmas are two sides of the same coin, either seen from the perspective of the stigmatizer (enacted) or the stigmatized (experienced), and (vi) Structural stigma-refers to the laws, policies, media, and institutional architecture that may be stigmatizing or protective against stigma. This includes societal level conditions, cultural norms, and institutional practices that constrain the opportunities of people with TB (PWTB) (13).

Despite that TB-related stigma is common, its manifestation, associations, and impact vary in different contexts. Studies have shown that, at some point during the TB journey, PWTB, their family members, and friends experience direct or indirect rejection, hopelessness and loneliness feelings, societal shame and blame, broken relationships, self-pity, and job losses (14–16). Medical staff who provide care to PWTB also experience stigma in different manifestations including; fear of infection following confirmed TB diagnosis, avoided by other colleagues, feeling punished to work at TB clinic/wards, and preferring to see TB patients are isolated at home and in the hospitals during TB treatment (17). Due to TB-related stigma or fear of it, people avoid accessing TB services or interrupt treatment because of inadequate or a lack of care, counseling, social support, or economic assistance, and consequently can lead to delayed TB diagnosis, treatment, and unfavorable treatment outcomes (18,19). In worst-case scenarios, this loneliness, guilt, and isolation due to TB-related stigma can lead to emotional and psychological harm such as suicidal feelings (14).

Studies have documented due to gender and power disparities, women are more affected by TB-related stigma as compared to males (20–22). Manifestations of TB-related stigma can also take forms of gender-based violence (GBV) such as social isolation, loss of wages, divorce, and destroy of marriage prospects(14,23,24). Other forms of GBV that have reported due to TB-related stigma are physical assaults, verbal abuses, and psychological stress(16,25). Addressing all forms sufferings to TB patients including stigma and GBV have been recognized as the global call to reduce gender disparity in health services and attaining sustainable development(11,21,26).

1.2 Problem statement

Stigma is a significant barrier to healthcare and a factor that drives the global burden of tuberculosis (TB). However, there is a scarcity of information on TB stigma in developing countries including Tanzania. How TB-related stigma unfolds in Tanzania was largely unstudied and undocumented. In this regard, we conducted the baseline assessment of TB-related stigma and aimed to determine the level, manifestations, and impacts of TB-related stigma among people with TB (PWTB), their family members, community members, and other stakeholders in the chain of delivering TB services in Tanzania.

1.3 Expected outcomes

This research project was intended to generate recommendations derived from established research evidences that will inform interventions and programs to curb TB-related stigma and its negative impacts. Moreover, the study intended to shade light on how GBV unfolds in the context of TB treatment journey and how it fuels sufferings among TB patients and escalating inequalities and discriminatory TB services.

1.4 Aim of the study

The aim of the study was to assess the scope and impacts of TB-related stigma, and gender-based violence in accessing of TB services in Tanzania.

1.5 Specific Objectives

i. To assess the level and dimensions of self TB-related stigma and extent to which it manifests among people with or who had TB

ii. To assess the level and dimensions of secondary TB-related stigma and extent to which it manifests among family members of people with or who had TB

iii. To assess the level and dimension of community TB-related stigma and the extent to which it manifests in communities where people with or who had TB live

iv. To assess the level and dimensions of anticipated TB-related stigma which exist toward people with TB in healthcare settings and among healthcare workers

v. To assess the extent to which structural TB stigma exist in Tanzania and how could harm or protect people with or who had TB

vi. To assess the forms and manifestations of gender-based violence among people with or who had TB

2. CHAPTER TWO: LITERATURE REVIEW

2.1 Epidemiological information

Tuberculosis (TB) is the leading infectious cause of death worldwide; there were an estimated 1.4 million deaths during 2019 (2). The burden of TB remains significantly high, and the main reasons for this include delays in case detection, diagnosis, treatment seeking and poor treatment adherence. Despite all efforts to diagnose and treat TB the disease is severely underreported and it has been estimated that about 4 million TB cases were missed globally in 2017 alone (39).In medical practices, there has been overreliance on biomedical interventions without adequate consideration of the socio-cultural aspects of the community (21,40). Consequently, stigma, traditional norms, perceptions and beliefs that members of communities have about TB are important factors that help shed more light on why diagnosis may be delayed hence new infections (41).

2.2 Community Issues-Beliefs

Most of the published studies identified ignorance about tuberculosis, false communities' beliefs and fears as the reasons for tuberculosis social stigma (42) . Communities have different believes regarding tuberculosis. In Malawi for example, one study found that participants believed that TB was curable and would go for diagnosis if they had symptoms suggestive of the disease (43). Another study conducted in South Africa has revealed the strong beliefs of cultural breaking is a the main source of TB (31). Literature also has shown beliefs in non-medical causes of tuberculosis may also have an influence and discourage help-seeking in medical healthcare facilities, for example, in India more women identified supernatural and karma-related causes of TB, compared to men (44),. In some contexts, traditional beliefs about the causes of TB are closely related to gender roles (45).

In addition, studies conducted in Africa, as reported that TB patients believed that TB is caused by supernatural and physical causes (46). For example, in Kenya, TB patients attributed it to smoking, alcohol, hard work, exposure to the cold, hereditary factors, and exposure to other TB patients (46,47). In rural Uganda, TB patients, traditional healers and community leaders attributed TB to shared use of cooking and eating utensils, heavy labour, smoking, bewitchment and hereditary factors (48). In rural South Africa, TB patients and the community attributed TB to breaking cultural rules that demand abstinence from sex, environmental pollution, smoking and alcohol and eating bad food (31,49), In Morocco community, believes that you will contract a TB when entering clinic with TB patients (50) while in Mwanza, Tanzania, TB patients attributed TB to similar factors; smoking, alcohol, bewitchment, and hereditary factors (51). In a study of Filipino immigrants in the United States, causal beliefs included exposure to bacteria and viruses, smoking, alcohol, overwork, poor nutrition, colds, cough and fever, and contact with a person with TB (52).

Furthermore, a study conducted in Aboriginal populations in Canada concluded that if disease is seen as a result of an imbalance between the physical, spiritual and social aspects of self, then the patient and/or community may regard TB as a moral failure, resulting in self and community driven stigmatization (53). The association of breath with spirit in many cultures may also imply, to the patient and community, a defect for which the patient may feel, or be held, responsible (54)

2.3 Community Issues- Stigma

According to Mason, Roy, Spillane & Singh (2016) the ways in which people react to illness or disease are strongly connected to broader social and cultural processes (55). Stigma is a useful concept to analyze some of the issues facing people with diseases such as TB. Sociologist Erving Goffman, (1963) defined stigma as ‘something unusual and bad’ about someone (10,56). Stigma, as these definitions make clear, carries a connotation of deviance. Certain signs, behavioral patterns and attributes are labeled 'deviant' and negatively regarded by society while others are labeled 'normal'. Deviance, which is 'deeply discrediting,' inversely defines the 'usualness' of normality. The social relationship between deviance and normality is crucial to comprehending stigma.

Despite the availability of an effective cure, TB patients experience strong social stigma in many parts of the world, Tanzania in particular, due to the 'discrediting' status they receive from family and community because of the illness (55). The close association between AIDS and TB in many parts of the world only serves to exacerbate social stigma (57). When a person in a family is diagnosed with TB, she or he may be subjected to a form of social exclusion; that is, the illness may encourage separations in familial and social relations (58). The effects of stigma can be unpredictable and can include shame and embarrassment, fear of or actual job loss, fear of infection and social isolation (59).

In adding together, CORE Group TB Working Group, (2013) report that, the power of TB stigma has always presented a challenge, especially to outsiders and those with a purely medical approach to fighting TB (60). Throughout history (and to this day) people with TB often suffer, in addition to the illness, from insults, rejection, and food deprivation, and are sometimes cast out of their homes (60). It was concluded by Amo-Adjei, (2016) that in respect of TB, stigma can lead to unwillingness of individuals to disclose their status which arises from fear of loss of economic opportunities , loss of community respect, fear of transmission, shame, blame and judgment and questions of "how did you or did she/he get it" and even death (61).

2.4 Community Issues-Traditional Norms

Amo-Adjei, (2016) did a study in Ghana on individual, household and community level factors associated with keeping tuberculosis status secret in Ghana. Amo-Adjei's study found that it is a norm, rather than an exception for two or more nuclear families to coreside in the same house (61). In such circumstances, disclosing the status of a family member with TB can be useful for reducing or cutting further transmissions in houses and the larger community. Conversely, a TB Gender assessment report in Kenya (2018) revealed that, in Kenya under the Maasai customs, a cow has more value in the homestead than a woman, and a lactating mother cannot leave the house for six months. As such, if she contracts TB, she cannot be diagnosed in a health facility. In addition, married women in Turkana cannot remove the beads on their bodies which may make TB screening difficult (62).

TB predominantly affects men, who have 60% of reported cases and 65% of reported deaths globally (WHO, 2018). Men are less likely than women to access timely TB diagnosis and treatment (63). Similarly, traditional gender roles that grant men a higher status as the ‘breadwinner’ or the ‘pillar of the family’, cause women to be perceived as less important (44). Women’s health is therefore not prioritized, and they may receive less support for their healthcare, compared to male family members. The time constraints related to the heavy workload of women, their domestic social responsibilities and their role as caretakers can also restrict their access to healthcare. Women’s lack of independence reduced decision-making power and restricted mobility also constitute important limitations for seeking healthcare. This is illustrated by the fact that women often need to ask permission to their husbands or elders and/or be accompanied by a family member, in order to visit a healthcare provider (64).

3. CHAPTER THREE: METHODOLOGY

3.1 Study design

Across-sectional study design that deployed mixed methods; quantitative and qualitative was undertaken in the period between September 2021 to February 2022 with the aim of generating deeper understanding about TB-related stigma and gender-based violence in Tanzania.

3.2 Study areas and settings

This study was conducted in four regions of Tanzania-mainland and one region of Zanzibar. The regions are; Kilimanjaro, Mwanza, Njombe, Pwani, and Unguja Kaskazini, respectively. Moreover, data were collected in various settings including health facilities, homes, and communities based on the type and nature of required data and informant categories. On other hand, information related to structural TB stigma were collected from different stakeholders at national (Dodoma capital) and sub-national level (named above regions).

3.3 Study population

Different groups of data sources were involved in this study, namely; i) People with or who had TB (PWTB), ii) Family members of PWTB, iii) Community members who represented communities where PWTB live, iv) Healthcare workers who provided TB services to PWTB, and v) multi-stakeholder groups of Policymakers, Media, Community-Based Organizations (CBOs), and TB services coordinators (RTLC/DTLC). The purpose and a description of each study population or informant categories is given below;

3.3.1 People with or who had TB

PWTB refers to TB patients who were receiving treatment, and previously treated TB cases. This study population generated data aimed to understand the extent, dimensions, and manifestations of self-stigma and experienced TB-related stigma among PWTB. This group also provided information on forms of GBV experienced after contracting TB diagnosis.

3.3.2 Family members of PWTB

Family members represented household members or individuals who supported TB patients along the TB treatment journey. This group generated data that helped to understand the extent, dimensions, and manifestations of secondary TB-related stigma in families of PWTB.

3.3.3 Community members

In the context of this study, community members refer to individuals who represented the community where PWTB were living, and included community, and religious leaders, prominent community members, teachers, and community health workers. This population generated data which helped to understand the extent, dimensions, and manifestations of anticipated TB-related stigma in the communities.

3.3.4 Healthcare workers

The healthcare workers in this study included prescribers (i.e., physician, medical doctor, assistant medical officers, and clinicians), laboratory personnel, pharmacy personnel, and nurses who were providing services to PWTB. This group generated data that helped to understand the extent, dimensions, and manifestations of anticipated TB-related stigma in health settings.

3.3.5 Multi-stakeholder group

This group included TB regional and district coordinators, media representative, policymakers, and representatives from community-based organization (CBOs) which included CBOs representing TB survivors. This group informed the current study the practices, policy/Laws implementations, and the existing situations surround delivering of TB services in health settings and media, and assess how these dynamics could harm or protect PWTB.

3.4 Inclusion and exclusion criteria

The current study involved participants who provided consent for participation who were aged 18 years and above and belong to one of the groups of study participants described above. However, recruited PWTB included those who were either newly TB diagnosed, or was still continuing with TB treatment, or have had completed TB treatment not more than two months. Community representatives were required to be the resident in respective community for not less than six months. This study excluded TB patients who were very sick by the time of data collection and participants who failed to consent for the study.

3.5 Sampling strategy

Both random and purposive sampling approaches were used to obtain study areas, sites, and participants. Regions included in the current study; Pwani, Kilimanjaro, Mwanza, Njombe and Unguja Kaskazini were randomly sampled after dividing 26 regions of Tanzania mainland into four zones; East-coast, Northern, Western-central, and Southern-highland. Likewise, five regions of Tanzania Zanzibar formed one zone. Each zone had at least five regions, which were more alike in geo-cultural characteristics. A simple random sampling to obtain one region from each zone were done and resulted to selection of the above 5 mentioned regions. Using the 2020 TB notification data from the National Tuberculosis and Leprosy Program (NTLP), a list of health facilities providing TB services from the selected regions was created. The facilities were subsequently subdivided in urban and rural health facilities to ensure rural-urban representation. Notably, the developed list of health facilities in respective region involved top ten health facilities with high rates of TB notifications. Following that, random sampling to obtain two health facilities from each subgroup was performed. A list of four selected health facilities from each region is shown in **Table 1**, making total of 20 heath facilities for all five regions. In addition, the catchment area (community) of the selected health facility formed the primary study area/site.

Selection of participants was done purposively. The PWTB who met the inclusion criteria were identified from the TB patient register and were invited to participate in the survey. Similarly, family members were also conveniently enrolled in health facilities and home settings. In addition, community representatives who were nominated by ward / Shehia officials based on the pre-determined criteria (i.e., community or religious leader, teacher, prominent resident, and community health workers) were also invited to participate in the study. Moreover, the selection of the sub-community (ward) where the assessment of TB-related stigma was conducted was based on its contribution to the TB notification within the facility catchment area. However, representatives from multi-stakeholder groups were hired based on the fact that they were the main informers in their organizations.

Table: 1 Selected health facilities by region

Region	**Health facilities**	
	Urban	Rural
Kilimanjaro	Mawenzi Hospital	Huruma Hospital
	St joseph Hospital	Kibosho Hospital
Mwanza	Sekou Toure Hospital	Misungwi Hospital
	Nyamagana Hospital	Sengerema Hospital
Njombe	Njombe Hospital (Kibena)	Wanging’ombe Hospital
	St. Joseph Hospital (Ikelu)	Makete Hospital
Pwani	Tumbi Hospital	Kibiti Health Center
	Mkoani Health Center	Mkuranga District Hospital
Unguja Kaskazini	Kivunge Health Centre	Kidoti PHCU
	Mahonda	Kitope PHCU

3.6 Sample size estimation

The sample size of a particular group of participants was estimated based on the method used to collected data and intended objective. The assessment of TB-related stigma among PWTB was conducted through survey whereas sample size estimation was performed by using a single population proportion formula with the finite population as shown below:

sample size $\boldsymbol{n} = \frac{\boldsymbol{NX}}{(\boldsymbol{X}+(\boldsymbol{N}-\mathbf{1}))}$'', where $\boldsymbol{X} = \frac{\boldsymbol{Z}^{\mathbf{2}}{}_{\boldsymbol{\alpha}/\mathbf{2}}\boldsymbol{P}(\mathbf{1}-\boldsymbol{P})}{\boldsymbol{e}^{\mathbf{2}}}$, and $\boldsymbol{Z}$ is the critical value of a normal standard deviate to the desired confidence level of 95% (1.96), $\boldsymbol{P}$ is the proportion of TB stigma (taken as 50%), $\boldsymbol{e}$ is the margin error considered at 5%, and **N** is the population size of TB cases (in this regard, N was assumed to be 69,623 as current data for TB notifiable cases in Tanzania when this study was designed(4).

Based on the computation of the above formula, a minimum of 382 PWTB were required for the survey. The current study enrolled 418 PWTB. Regarding sample size estimation of family members, there was a minor deviation from the original plan where the study planned to make follow up of 5% of families of PWTB with a subsequent plan of enrolling 2-4 family members in each family where it was estimated to enroll up to 80 family members; however, the current study extended the follow up plan to 10% with subsequent enrollment of only one family member. The change was due to the fact that only one treatment supporter (family member) was thought enough to inform about the family attitudes, practices, and experiences regarding TB-related stigma in home setting. With such adjustment, the current study enrolled 73 family members. Similarly, the original plan was to conduct one focus group discussion (FGD) in 5 regions with up to 8 participants resulting in an estimated sample size of 40 community representatives, however, the current study conducted a survey using semi-structured interview with at least 8 community representatives resulting to 171 community members being enrolled. In addition, the study also planned to enroll two healthcare workers in each selected health facility with the goal of enrolling at least 60 healthcare providers, however, the current study enrolled 79 healthcare workers. In addition, the study planned to enroll at least 15 stakeholders from multi-stakeholder group, but ends up with 19 stakeholders.

3.7 Data collection procedures

Data collection was conducted after obtained permissions to conduct this study from all relevant authorities. To coordinate and organize data collection activities, RTLC, DTLC, ward / Shehia leaders, and TB clinic staff were involved. Data collection exercise was conducted by research team that has been trained about the purpose and objectives of the study, data collection methods, used tools, and research ethics. In general, data were collected using TB-related stigma assessment tools developed by STOP TB Partnership, which were adapted to fit Tanzania context. Data were collected using an android supported data collection system (Open Data Kit-ODK) installed on tablets. The procedures for data collection in each group of study participants are described below:

3.7.1 People with or who had TB (PWTB)

Data collection in this group was conducted at health facilities. Preliminary data collection plans were made prior to the day of assessment. Based on inclusion criteria, prospective participants were identified using health facility's TB registers. Efforts was made to contact all identified PWTB and invite them to participate in the current study. Data collection was planned on days that were not running the TB clinic to avoid interference with TB services. On the day of data collection, PWTB who turned up were approached by leaders of TB clinics who introduced the research team. Later, the research team leaders explained the purpose of the study, as well as clarifying all raised questions and issues of concerns. After ensuring that they understand the purpose of the study, they were invited for voluntary participation. Those who agreed to participate were screened for eligibility criteria. Only those who met inclusion criteria were asked to provide consent before participation. The consented PWTB were enrolled to the survey and interviewed using semi-structured questionnaires. The questionnaire contained demographic information, scale for measuring self-TB-related stigma as suggested by Van Rie, et al, questions for assessing experienced TB-related stigma, its manifestations, and consequences (27,28). The questionnaire also included GBV-related information.

3.7.2 Family members of PWTB

Data collection in this group mostly took place on the same day as data collection from PWTB. Conveniently, PWTB were asked to allow family members (treatment supporter) who accompanied them to participate in this study. In case, PWTB was not accompanied by a true treatment supporter, researchers followed them at their homes to recruit a true treatment supporter. Semi-structured questionnaire was used to collect data from family members who consented for participation. The questionnaire contained demographic information, scale for measuring secondary-TB-related stigma as suggested by A. Arcêncio, et al, questions for assessing secondary TB-related stigma, its manifestations, and consequences (29).

3.7.3 Healthcare workers

Healthcare workers who were providing TB services particularly prescribers (Physician, Medical doctor, Assistant medical officer, clinical officer), nurses, laboratory personnel, and pharmacy staffs, were approached and invited to participate in this study. Data collection was conducted only after obtaining their consents. Semi-structured questionnaire which contained demographic information, and Corrigan, et al scale to assess nine dimensions of TB-related stigma in healthcare settings, experiences of TB-related stigma and its manifestations and related consequences was used to interview this group (30,31).

3.7.4 Community members

Data collection from community members was planned and organized to be conducted in one ward which had more TB cases based on the information obtained from facilities' TB registers. Ward /Shehia leaders were involved in identifying and inviting community representatives based on the inclusion criteria and pre-determined required categories of community representatives (i.e., community and religious leaders, teachers, community health workers and influential people). The assessments were conducted at the ward / Shehia offices after obtaining consent from participants. Similarly, data collection was conducted using a semi-structured questionnaire that contained demographic information, and Van Rie, et al scale e to assess TB-related stigma in the community settings, TB-related stigma experiences, its manifestation, and related consequences(28).

3.7.5 Multi-stakeholder group

Data collection from this group involved stakeholders at sub-nation and national level. Stakeholders from sub-nation were RTLC, DTLC, and representatives from Community-Based Organizations (CBOs). At national level the study recruited National TB and Leprosy Programme (NTLP) officials, and officials from policy and planning section. In addition, media representative from Tanzania Broadcast Corporation (TBC) was recruited. Data collection from this group was achieved using key informant interviews. Upon giving consent, the interview was conducted using interview guides developed to suit the respective stakeholder. The interview guides mainly focused to understand the process of delivering TB services, the practices, law/policy enforcements how they promote or harm the opportunities and resources available for PWTB. In general, the interview sought to assess how health system and media implement basic TB patients' rights: right to life, right to health, right to be free from arbitrary arrest or detention and involuntary isolation, right to be free from discrimination, right to privacy, right to food, right to safe workplace, and right to access information. Interviews took place in a quite place and lasted for an average of one hour. The responses were recorded using voice recorders. The interview was conducted in Swahili language.

3.8 Ethical consideration

Ethical approvals for this study were obtained from the National Health Research Ethics Committee (NatHREC) and The Zanzibar Health Research Ethical Committee (ZAHREC) with reference number **NIMR/HQ/R.8a/Vol. IX/3668** and **ZAHREC/03/OCT/2021/25**, respectively. Permission to conduct the study in the regions was also sought from President's Office-Regional Administration and Local Government (PO-RALG) as well as the office of Vice President of Zanzibar. Additional permissions were sought from respective local authorities in regions, communities, and health facilities where this study was conducted. Informed written consent and/or assent was obtained from all participants before taking part in this study. Privacy and dignity was maintained throughout data collection exercise. To ensure confidentiality to the collected information, data were recorded, analyzed, and presented anonymously. The study participants were compensated TZS 5,000 for their time and effort.

3.9 Data management and statistical analysis

Before the research team leave for data collection, developed questionnaires were uploaded to Open Data collection system (ODK). Tablets with ODK application were used to collect and store survey data. Data was collected and saved in an editable ODK window during a survey so that a research team leader and data collectors could double-check the accuracy of the entered information before finalizing and submitting it to the server. On daily basis, data manager cross-checked the saved data to verify completeness and accuracy. On the other hand, voice recorders were used to collect and store data collected during interview. Before analysis, the data was exported from ODK to MS Excel which allowed easy data validation, cleaning, and management.

SPSS v.26 (IBM® Corp., Armonk, NY, USA) was used to analyze the survey data. Descriptive statistics predominated the analysis which included computation of frequency and percentages of participants' characteristics which were summarized in tables, charts, and figures. Data for assessment of TB-related stigma were collected in 5 level of agreement-Likert scale (strongly disagree, disagree, no opinion, agree, and strongly agree). Computation of the total score, mean, standard error, and level of TB-related stigma was done based on 5 level of agreement, however, the level of agreement for each statement was presented in 3 level of agreement (Agree, no opinion, and disagree) to make interpretation easier. The association between participants' characteristics and experience of TB-related stigma and GBV was established using a Chi-square (χ^2) test statistic. Factors associated with established level of TB-related stigma in respective group of participants was determined using multiple linear regression, the model which has ability to evaluate the effects of various factors simultaneously. The outputs of this model were summarized as mean self-stigma score and adjusted mean discrepancy for PWTB, and proportion of experienced stigma and adjusted mean discrepancy for family members, community members, and healthcare workers. A p-value of less than 5% was considered statistically significant.

Qualitative data analysis was performed after transcribing the interview verbatim and translated the transcripts to English language in MS Word. Transcripts were read thoroughly to get familiar with the contents, then after, codding was done manually based on the pre-determined codes based on rights of TB patients, with subsequent formation of categories and topics/themes. Generated topics/themes were presented with narratives and distinctive quotes which best describe the selected topics.

4. CHAPTER FOUR: RESULTS

4.1 Profile of participants

4.2 Overall demographic characteristics of the participants

The current study conducted in five regions of Tanzania, four regions from Tanzania mainland and one from Zanzibar. Seven hundred and sixty (760) participants were recruited, of which majority of them 653 (86%) were from Tanzania mainland. The study recruited participants from five groups ***(Figure1),*** where more than half 418 (55.5%) represent PWTB. The overall mean age ± SD of the participants was 44.22 years ±14.52. More than half of the participants 437 (57.5%) were male, over two-third 485 (65.5%) were married, and half of them 384 (51.8%) had primary education. Majority of the participants were self-employed 255(34.42%) and about one-third were farmers 244(32.93%). Over one-third of the participants 286(38.6%) had monthly income greater than TZS 138,000 equivalent to income of more than two USD per day **(Table 2).**

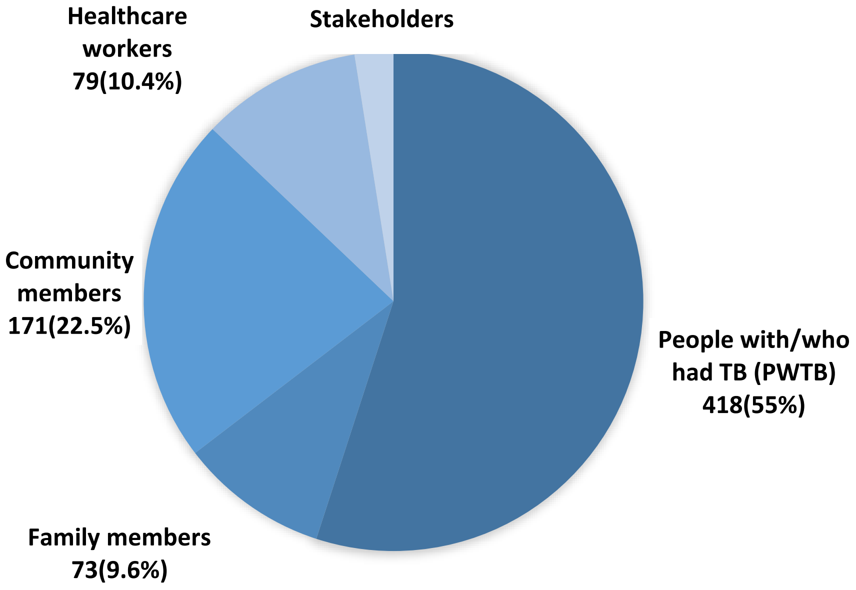

Figure 1: Distribution of groups of recruited participants

Table 2: Overall demographic characteristics of the participants

Demographic characteristic	Category	Participants
N=760		n (%)
Region	Kilimanjaro	186(24.47)
	Mwanza	120(15.79)
	Njombe	162(21.32)
	Pwani	183(24.08)
	Unguja Kaskazini	107(14.08)
	Dodoma	2(0.26)
Gender	Male	437(57.5)
	Female	323(42.5)
Age group	18-35	241(31.71)
	36- 60	409(53.82)
	>60	110(14.47)
Marital Status	Single	130(17.54)
	Married	485(65.45)
	Cohabit	10(1.35)
	Divorced	20(2.7)
	Separated	44(5.94)
	Widow/Widower	52(7.02)
Level of education	No formal education	71(9.58)
	Primary education	384(51.82)
	Secondary education	152(20.51)
	College education	105(14.17)
	University education	29(3.91)
Occupation	Not employed	79(10.66)
	Farmer	244(32.93)
	Student	12(1.62)
	Self-employed	255(34.42)
	Formal-employed	151(20.37)
Monthly income	< TZS 69,000.00	266(35.9)
	TZS 69,000 -138,000	189(25.51)
	>TZS 138,000	286(38.6)

4.3 Demographic characteristics of PWTB

This group recruited a total of 418 participants. Most of the participants 202 (48.3%) were aged between 36-60 years, of which more than half 141 (51.1%) were male ***(Figure 2).*** Over half of the participants 257 (56.7%) were married, and two-third 252 (60.29%) had primary education. The main reported occupations were self-employment 175(41.87%) and being farmer 146(34.93%). Most of the participants 191(45.69%) had monthly income of less than TZS.69,000.00. PWTB were self-identified in seven key population; rural slum dwellers 107(25.6%), people living with HIV 107(25.6%), urban slum dwellers 80(19.14%), and few of them self-identified as healthcare workers, former prisoner, people who uses drugs, and people with disability **(Table 3)**. PWTB who identified themselves in key population, 42% did not identify themselves with any of the key population, 47% identified themselves in only one key population, and 11% identified themselves in two key population ***(Figure 3).*** Of recruited PWTB, nearly half 195 (46.7%) were not aware with the type of TB they had, 187 (44.7%) had pulmonary TB with almost equal distribution between male and female (***Figure 4).*** Regarding the stage of TB treatment at the time of data collection, most 297 (71%) were still on treatment, one-third 116 (28%) had completed treatment, and 5 (1%) had recently been diagnosed and had not started treatment ***(Figure 5).***

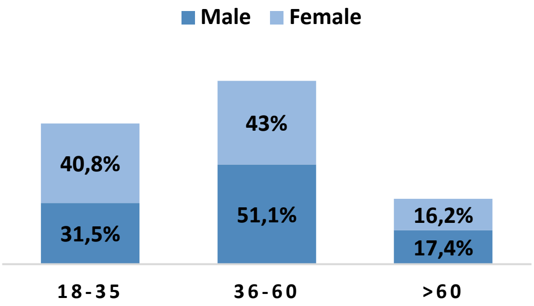

Figure 2. Distribution of PWTB by age and gender (n = 418)

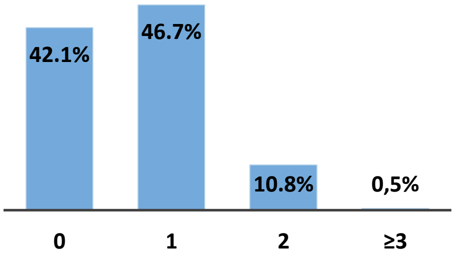

Figure 3: Distribution of self-identification in Key population by PWTB (n = 418)

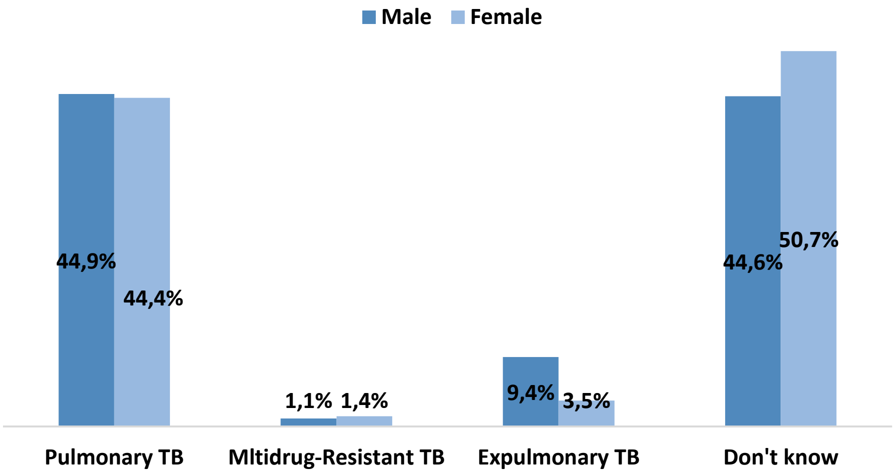

Figure 4: Distribution of type of TB by age (n = 418)

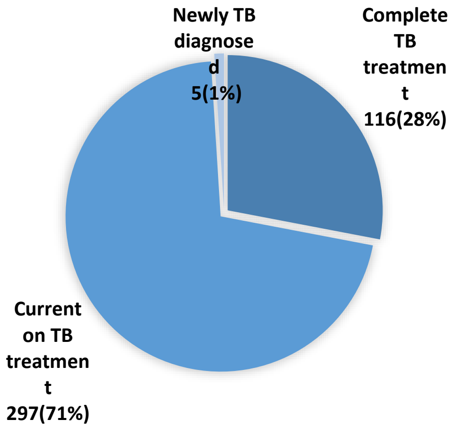

Figure 5: Stages of TB treatment for PWTB (n = 418)

Table:3 Demographic characteristics of PWTB

Demographic Characteristic	Category	Participants
N = 418		n (%)
Region	Kilimanjaro	117(27.99)
	Mwanza	67(16.03)
	Njombe	89(21.29)
	Pwani	109(26.08)
	Unguja Kaskazini	36(8.61)
Gender	Male	276(66.03)
	Female	142(33.97)
Age group	18-35	145(34.69)
	36- 60	202(48.32)
	>60	71(16.99)
Marital Status	Single	89(21.29)
	Married	237(56.7)
	Cohabit	6(1.44)
	Divorced	20(4.78)
	Separated	35(8.37)
	Widow/Widower	31(7.42)
Level of Education	No formal education	61(14.59)
	Primary education	252(60.29)
	Secondary education	82(19.62)
	College education	20(4.78)
	University education	3(.72)
Occupation	Not employed	61(14.59)
	Farmer	146(34.93)
	Student	11(2.63)
	Self-employed	175(41.87)
	Formal-employed	25(5.98)
Monthly income	<TZS 69,000.00	191(45.69)
	TZS 69,000 -138,000	125(29.9)
	>TZS 138,000	102(24.4)
Self-identification of PWTB*	Person living with HIV	86(20.57)
	Healthcare worker	8(1.91)
	Urban slum dweller	80(19.14)
	Rural slum dweller	107(25.6)
	Person who uses drugs	2(0.48)
	Person with disability	3(0.72)
	Former prisoner	5(1.2)

Demographic Characteristic	Category	Participants
	None identified	183(43.78)

* Some of the participants had multiple self-identities, total n is not equal to 418, and percentage (%) is more than 100%

4.4 Demographic characteristics of family members of PWTB

This group recruited 73 family members where majority 39(53.4%) were aged between 36-60 years, of which more than half 31(56.4%) were female ***(Figure 6).*** Majority 52(71.23%) were married, two-third 44(60.27%) had primary education, and few of them (5%) had college and university education. More than half 39(53.42%) were famers, one-third 21(28.77%) were self-employed, one-tenth 9(12.33%) were not employed, and few were students and formal-employees in the government and private sectors. Half of the participants 37(50.68) had a monthly income less than TZS. 69,000.00 **(Table 4*).*** Main family members who supported PWTB during treatment were parents 21(29%), children 17(23%), and siblings 14(19%) ***(Figure 7).***

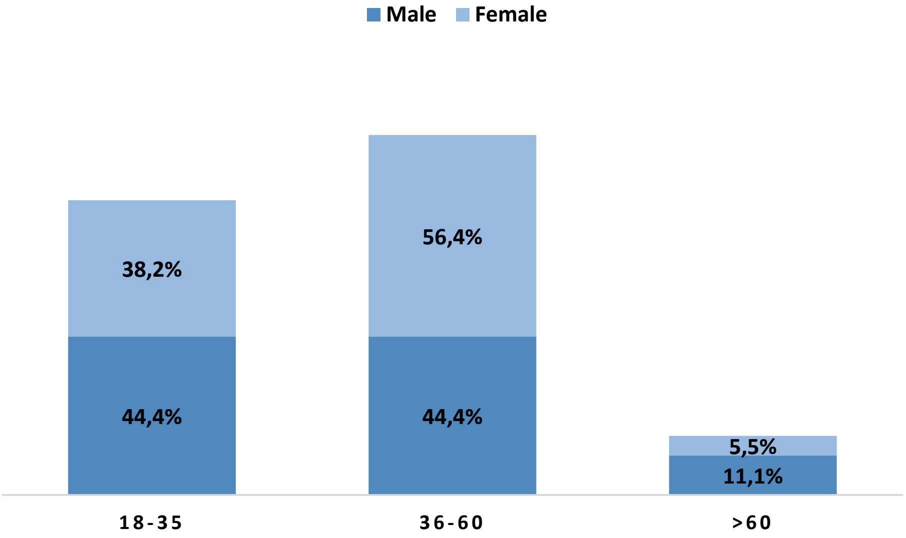

Figure 6: Distribution of family members by age and gender (n =73)

Table 4: Demographic characteristics of family members of PWTB

Demographic Characteristic	Category	Participants
N=73		n (%)
Region	Kilimanjaro	17(23.29)
	Mwanza	8(10.96)
	Njombe	20(27.4)
	Pwani	14(19.18)

Demographic Characteristic	Category	Participants
	Unguja Kaskazini	14(19.18)
Age group	18-35	29(39.73)
	36- 60	39(53.42)
	>60	5(6.85)
Gender	Male	18(24.66)
	Female	55(75.34)
Marital Status	Single	8(10.96)
	Married	52(71.23)
	Cohabit	2(2.74)
	Separated	4(5.48)
	Widow/Widower	7(9.59)
Level of Education	No formal education	9(12.33)
	Primary education	44(60.27)
	Secondary education	16(21.92)
	College education	1(1.37)
	University education	3(4.11)
Occupation	Not employed	9(12.33)
	Farmer	39(53.42)
	Student	1(1.37)
	Self-employed	21(28.77)
	Formal employed	3(4.11)
Monthly income	< TZS 69,000.00	37(50.68)
	TZS 69,000 -138,000	23(31.51)
	>TZS 138,000	13(17.81)

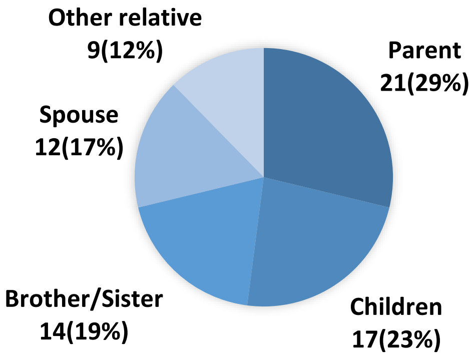

Figure 7: Distribution of family members who supported PWTB during treatment (n=73)

4.5 Demographic characteristics of community representatives

A total of 171 community representatives were recruited. Two-third of the participants 106(62%) were aged between 36-60 years, of which majority 55(68.8%) were female ***(Figure 8).*** The majority of the participants 137(80.12%) were married, and three-quarter 127 (74.27%) had primary and secondary education. Being a famer and self-employed were the main occupations of the surveyed community representatives (34.5%). Over half of the participants 92(53.81%) had monthly income greater than TZS.138, 000.00 equivalent to more than 2 USD per day **(Table 5)*.*** Majority of community representatives 113(66%) were personally acquainted with PWTB in their communities ***(Figure 9).***

Table:5 Demographic characteristics of community representatives

Demographic characteristic	**Category**	**Community members**
N=171		**n (%)**
Region	Kilimanjaro	34(19.88)
	Mwanza	33(19.3)
	Njombe	29(16.96)
	Pwani	39(22.81)
	Unguja Kaskazini	36(21.05)
Age group	18-35	33(19.3)
	36- 60	106(61.99)
	>60	32(18.71)
Gender	Male	91(53.22)
	Female	80(46.78)
Marital Status	Single	19(11.11)
	Married	137(80.12)
	Cohabit	1(.58)
	Separated	3(1.75)
	Widow/Widower	11(6.43)
Level of education	No formal education	1(.58)
	Primary education	86(50.29)
	Secondary education	41(23.98)
	College education	34(19.88)
	University education	9(5.29)
Occupation	Not employed	9(5.26)
	Farmer	59(34.5)

Demographic characteristic	Category	Community members
	Self-employed	59(34.5)
	Formal employed	44(25.73)
Monthly income	< TZS 69,000.00	38(22.22)
	TZS 69,000 -138,000	41(23.98)
	>TZS138,000	92(53.81)

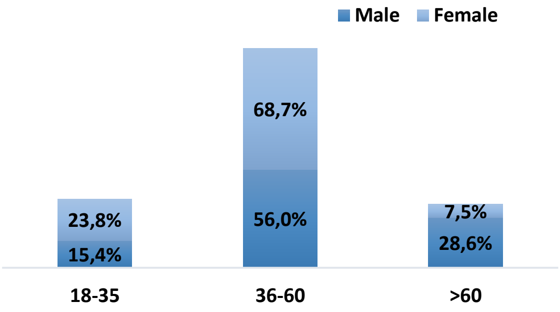

Figure 8: Distribution of community representatives by age and gender (n=171)

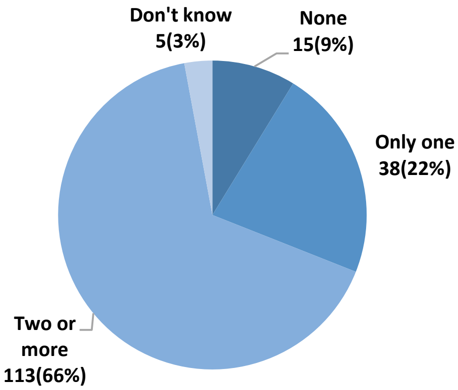

Figure 9: Distribution of responses to the question: "How many people with or who had TB in your community do you know personally? (n=171)

4.6 Demographic characteristics of healthcare workers

A total of 79 healthcare workers were recruited in this group. Two-third of the participants 48(60.76%) were aged between 36-60 years, of which majority of them 29(64.4%) were female *(Figure 10)*. About three-quarter of them 59 (74.68%) were married, two-third 50 (63.29%) had college education, and about one-fifth 14 (17.72%) had university education

(Table 6). Main recruited healthcare workers were nurses 33(41.77%), doctors 27(34.18%), and laboratory personnel 8(10.13%) ***(Figure 11).***

Table:6 Demographic characteristics of healthcare workers

Demographic characteristic	Category	Participants
N=79		**n (%)**
Region	Kilimanjaro	14(17.72)
	Mwanza	9(11.39)
	Njombe	21(26.58)
	Pwani	18(22.78)
	Unguja Kaskazini	17(21.52)
Age group	18-35	30(37.97)
	36- 60	48(60.76)
	>60	1(1.27)
Gender	Male	34(43.04)
	Female	45(56.96)
Marital Status	Single	14(17.72)
	Married	59(74.68)
	Cohabit	1(1.27)
	Separated	2(2.53)
	Widow/Widower	3(3.80)
Level of education	Primary education	2(2.53)
	Secondary education	13(16.46)
	College education	50(63.29)
	University education	14(17.72)

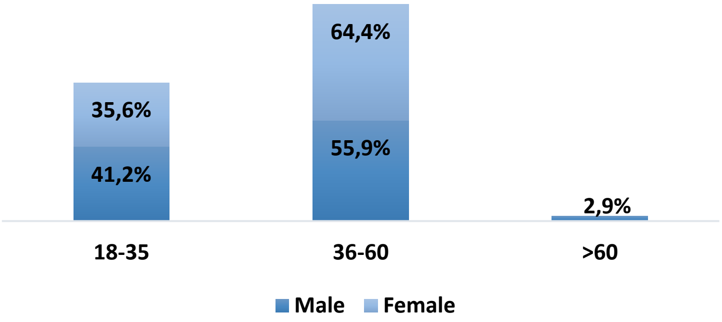

Figure 10: Distribution of healthcare workers by age and gender (n=79)

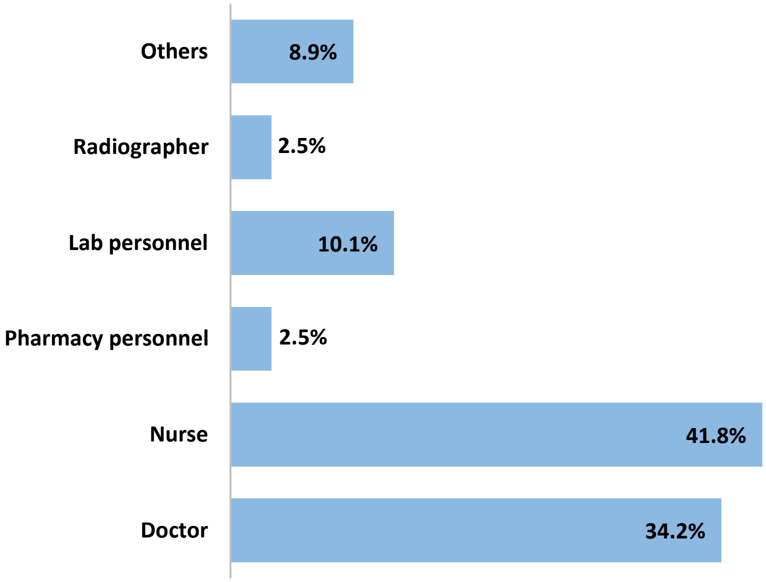

Figure 11: Distribution of healthcare workers by cadres (n=68)

4.7 Demographic characteristics of stakeholders

Nineteen (19) stakeholders from National and sub-national levels were enrolled to the study. The median age of recruited stakeholders was 48 years. Majority 18(94.74%) were male. Recruited stakeholders included district and regional TB and leprosy coordinators (DTLC and RTLC), representatives from community-based organizations (CBOs) including those representing TB survivors, media representative, and policymakers from MoH *(Figure 12).*

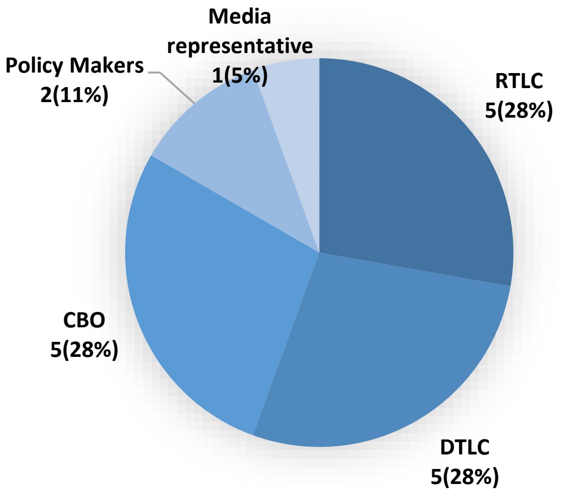

Figure 12: Distribution of representatives of multi-stakeholders' group (n = 19)

4.8 Results and findings

4.9 Self-stigma in PWTB

Self-stigma in PWTB was measured using a set of 12 statements scale describing the attitude towards social isolation, feelings of guilt, fear of HIV, TB status disclosure and so on. The total, mean ± SD, and level of self-stigma score were 7996, 19.84 ± 5.56, and 39.85%, respectively. Based on statements on the self-stigma scale, over one-third of the respondents 136(32.54%) identified with the feelings of loneliness. More than half 240(57.42%) limited social contact to prevent spread of TB by supporting the statement on keeping a distance from others to avoid spreading TB germs. About one-fifth of the respondents 125(21.9%) reported to lose friends when they share their TB status. Quarter of the respondents (25%) were guilt for burdening their family for caring them, and for their careless behaviors such as smoking and alcohol drinking which led them to contract TB. Nearly half of the respondents 196(46.89%) identified with the feeling of being hurt to see how others react after finding out that they have TB. About quarter of the respondents supported the TB and HIV associated stigma by agreeing on the statement said that they were afraid to tell others that they have TB because they may think that they also have HIV/AIDS. More than one-third 151(36.12%) agreed to the statement that they were worried to have HIV/AIDS. Fear of disclosure of the TB status to their family, and to those who are outside their family were supported by 38(9.09%), and 135(32.3%) respondents, respectively. More than half of the respondents 235(56.22%) reported that they choose carefully whom to tell about their TB status. Few of the respondents 20(4.78%) supported the statement that they were afraid of going to TB clinics because other people might see them **(Table 7).**

Table 7: The dimension and level of self-stigma in PWTB: level of support for each statement which refers to TB, % (n= 418)

Statement	Agree	No opinion	Disagree
I feel lonely	136(32.54)	8(1.91)	274(65.55)
I keep distance from others to avoid spreading TB germs	240(57.42)	6(1.44)	172(41.15)
I feel guilty because my family has the burden of caring for me	108(25.84)	9(2.15)	301(72.01)
I feel guilty for getting TB because of my smoking, drinking, or other careless behaviors	106(25.36)	11(2.63)	301(72.01)
I am worried about having HIV/AIDS	151(36.12)	5(1.2)	262(62.68)
I feel hurt how others react to knowing I have TB	196(46.89)	13(3.11)	209(50)

Statement	Agree	No opinion	Disagree
I lose friends when I share with them that I have TB	125(21.9)	11(2.63)	282(67.46)
I am afraid to tell those outside my family that I have TB	135(32.3)	9(2.15)	274(65.55)
I am afraid of going to TB clinics because other people might see me there	20(4.78)	2(.48)	396(94.74)
I am afraid to tell others that I have TB because they may think that I also have HIV/AIDS	104(24.88)	5(1.2)	309(73.92)
I choose carefully who to tell about having TB	235(56.22)	8(1.19)	175(41.87)
I am afraid to tell my family that I have TB	38(9.09)	3(.72)	377(90.19)

4.10 Factors associated with self-stigma in PWTB

Five factors were significantly associated with level of self-stigma in PWTB; region, age, level of education, marital status, and occupation. Compared to respondents from Kilimanjaro, the level of self-stigma was higher in participants from Mwanza and Pwani regions. Generally, there was no significant difference in the level of self-stigma between male and female. Participants aged 60 and above felt less stigma sentiments compared to participants aged 18-35 years. Respondents who had secondary education level, felt more self-stigma compared to those with no formal education. Widow or widower had less self-stigma sentiments compared to single respondents **(Table 8).**

Table 8: Factors associated with Self- stigma in PWTB (N=418)

Factor	Category	Sample size	Average self-stigma score (Standard error)	Mean difference [95% CI] P value
Region	Kilimanjaro	117	1.57(0.045)	ref.
	Mwanza	67	1.75(0.058)	**2.39[0.03;0.31] p=0.017**
	Njombe	89	1.62(0.045)	0.69[-0.083;0.172] p=0.49
	Pwani	109	1.72(0.042)	**2.39[0.026;0.267] p=0.018**
	Unguja kaskazini	36	1.61(0.083)	0.35[-0.14;0.2] p=0.73
Gender	Male	276	1.64(0.028)	ref.
	Female	142	1.67(0.038)	0.56[-0.07;0.12]

				p=0.573
Age	18-35	145	1.71(0.039)	ref.
	36-60	202	1.67(0.033)	-0.8[-0.14;0.06] p=0.425
	>60	71	1.47(0.046)	**-3.66[-0.37; -0.11]** **p=0.000**
Education	No formal education	61	1.57(0.05)	ref.
	Primary education	252	1.65(0.029)	1.23[-0.048;0.211] p=0.219
	Secondary education	82	1.73(0.052)	**2.1[0.01;0.317]** **p=0.037**
	College education	20	1.61(0.099)	0.35[-0.193;0.275] p=0.728
	University education	3	2.06(0.111)	1.79[-0.048;1.026] p=0.074
Marital Status	Single	89	1.73(0.485)	ref.
	Married	237	1.65(0.031)	-1.48[-0.2;0.03] p=0.139
	Cohabit	6	1.94(0.165)	1.11[-0.17;0.59] p=0.27
	Divorced	20	1.79(0.092)	0.57[-0.16;0.29] p=0.569
	Separated	35	1.59(0.076)	-1.6[-0.33;0.03] p=0.111
	Widow/widower	31	1.41(0.072)	**-3.38[-0.51; -0.14]** **p=0.001**
Occupation	Not employed	61	10(16.4)	ref.
	Farmer	146	28(19.2)	-0.52[-0.18;0.1] p=0.604
	Student	11	3(27.3)	**2.09[0.02;0.61]** **p=0.038**
	Self-employed	175	38(21.7)	0.29[-0.12;0.16] p=0.771
	Formal-employed	25	7(28)	0.52[-0.16;0.27] p=0.603
Monthly income	< TZS 69,000	191	1.63(0.035)	ref.
	TZS 69,000-138,000	125	1.72(0.038)	1.82[-0.01;0.2] p=0.07
	> TZS138,000	102	1.62(0.045)	-0.14[-0.12;0.1] p=0.887

Treatment stages	Completed TB treatment	116	1.64(0.04)	ref.
	Currently on TB treatment	297	1.67(0.027)	0.42[-0.08;0.12] p=0.676
	Newly TB diagnosed	5	1.5(0.28)	-0.66[-0.56;0.28] p=0.509

4.11 Experiences and consequences of TB-related stigma among PWTB

About one-fifth 86(20.57%) of recruited PWTB felt stigmatized because of their TB status. PWTB were stigmatized most frequently in their families, communities, and workplaces as recorded by 54(49.54%), 39(35.78%), and 11(10.09%), respectively. The reported experienced stigma had the following consequences; delaying in seeking timely care 13(16.67%), beginning treatment 21(26.92%), getting an accurate TB diagnosis 12(15.38%), and completing treatment 2(2.56%). When asked if they knew other people with or who have had TB have been stigmatized because of their TB status, also about one-fifth 79(18.9%), responded YES. The most common places where they witnessed TB-related stigma were in families 13(52%), and in communities 10(40%). Similarly, twenty-four participants (20.51%) reported that the witnessed TB-related stigma inhibited them from seeking timely care, and beginning treatment **(Table 9)**.

Table 9: Experiences and consequences of TB-related stigma among PWTB

Question		
Have you ever felt you were stigmatized because of your TB status?		
	Yes n (%)	**No n (%)**
	86(20.57)	332(79.43)
In which setting(s) do you experience stigma? (n^* = 109)		
Hospitals/clinics	3(2.75)	
Community/neighbors	39(35.78)	
Home/Family	54(49.54)	
Workplace	11(10.09)	
School/college	1(0.92)	
Church/mosque	1(0.92)	
Did the experienced stigma in the identified setting(s) above inhibit you from the following? (n^*= 78)		
	Yes n (%)	

Recognizing symptoms	11(14.10)	
Seeking timely care	13(16.67)	
Going to a DOT facility	8(10.26)	
Getting an accurate diagnosis	12(15.38)	
Beginning treatment	21(26.92)	
Adhering to treatment	8(10.26)	
Completing treatment	2(2.56)	
Getting post-treatment follow-up services	3(3.85)	
Do you know other people with or who haver/had TB being stigmatized because of their TB status?		
	Yes n (%)	**No n (%)**
	79(18.9)	339(81.1)
In which setting(s) were they stigmatized? (n^* = 25)		
	Yes n (%)	
Hospitals/clinics	1(4.0)	
Community/neighbors	10(40)	
Home/Family	13(52)	
Workplace	1(4)	
School/college	-	
Church/mosque	-	
Did the experienced stigma in the identified setting(s) above inhibit them from the following? (n^*= 117)		
	Yes n (%)	
Recognizing symptoms	9(7.69)	
Seeking timely care	24(20.51)	
Going to a DOT facility	18(15.38)	
Getting an accurate diagnosis	14(11.97)	
Beginning treatment	24(20.51)	
Adhering to treatment	13(11.11)	
Completing treatment	10(8.55)	
Getting post-treatment follow-up services	5(4.28)	

n^* represents number of response frequencies in the specific question

4.12 Factors associated with experienced TB-related stigma among PWTB

Recruited PWTB from Mwanza and Njombe felt more stigmatized compared to the participants from other regions. Participants who were older than 60 years and those with no formal education experienced less TB-related stigma. PWTB who had pulmonary TB experienced TB-related stigma compared to their counterparts **(Table 10).**

Table 10: Factor associated with experienced TB-related stigma

Factor N=418	Category	Sample size (N)	Experienced TB-related Stigma n (%)	P- value
Region	Kilimanjaro	117	15(12.8)	**0.0112**
	Mwanza	67	23(34.3)	
	Njombe	89	21(23.6)	
	Pwani	109	21(19.3)	
	Unguja kaskazini	36	6(16.7)	
Gender	Male	276	56(20.3)	0.8411
	Female	142	30(21.1)	
Age	18-35	145	33(22.8)	**0.0212**
	36-60	202	47(23.3)	
	>60	71	6(8.5)	
Education	No formal education	61	5(8.2)	**0.0204**
	Primary education	252	53(21)	
	Secondary education	82	22(26.8)	
	College education	20	4(20)	
	University education	3	2(66.7)	
Marital Status	Single	89	21(23.6)	0.1677
	Married	237	43(18.1)	
	Cohabit	6	2(33.3)	
	Divorced	20	8(40)	
	Separated	35	8(22.9)	
	Widow/widower	31	4(12.9)	
Occupation	Not employed	61	10(16.4)	0.7153
	Farmer	146	28(19.2)	
	Student	11	3(27.3)	
	Self-employee	175	38(21.7)	
	Formal-employed	25	7(28)	
Monthly income	< TZS 69,000	191	33(17.3)	0.0878
	TZS 69,000-138,000	125	34(27.2)	
	> TZS138,000	102	19(18.6)	
Treatment stages	Completed TB treatment	116	29(25)	0.2195
	Currently on TB treatment	297	57(19.2)	

Factor N=418	Category	Sample size (N)	Experienced TB-related Stigma n (%)	P- value
	Newly TB diagnosed	5	-	
Type of TB	Pulmonary TB	187	51(27.3)	**0.0184**
	Multidrug resistant TB	5	-	
	Extrapulmonary TB	31	5(16.1)	
	Don't know	195	30(15.4)	

4.13 Manifestations of self TB-related stigma among PWTB

During the survey, PWTB were asked to describe their experiences regarding TB-related stigma, and it appeared that stigma was common among families and communities. Stigmatizing behaviors were further fueled by the fear of contracting TB, and people around them such as relatives and friends were reported to be the main perpetrators of the stigma. The most common manifestations of TB-related stigma were social isolation, verbal abuse, gossip, blame, avoiding sharing the eating utensils, and discrimination as revealed in the quotes below;

> *"After being diagnosed with TB I noticed people were isolating me… my friends and relatives refused to come and see me because they feared I could infect them with TB, some relatives said, I was about to die because I had TB"* ***(Male, 52 years, PWTB)***
>
> *"… I used to eat at the restaurant in the place where I work and noticed that I was served by the same utensils. One of them was a broken cup for tea which was given to me all the time I visited that restaurant and the day I asked them why I was always given the same broken cup, the response was; that was the cup they set aside for me after realizing that I was suffering from TB.* ***(Male, 25 years, PWTB)***
>
> *"The first time I was diagnosed with tuberculosis, my aunt scolded me for being sick with tuberculosis, more often she used abusive language, and isolated me".* ***(Male, 22 years PWTB)***
>
> *"Since I was diagnosed with TB I have been through a lot, I remember being scolded by my bosses. They told me to stop working for two months, some said I should wear a mask all the time at work. Sometimes my co-workers run away from me every time I entered the ward. …at home my brothers complaining that I had become a burden to them because of my TB status".* ***(Male, 41 years, PWTB)***
>
> *"My neighbors used to gossip about me, that I had no TB, but rather I had HIV/AIDS. They said don't you see how he is wasted, always people in the streets,*

> *when they see someone lost weight, they will just conclude you are HIV/AIDS patient because the community members do not know that, not everyone who has TB also has HIV/AIDS, they know if you have one, then you probably have both"* ***(Male 46 years, PWTB)***

4.14 Experiences on Gender-Based Violence (GBV) among PWTB

One-fifth of PWTB 84(20%) reported to experience at least one form of GBV along the TB journey. The most experienced forms of GBV were being isolated 36(18.27%), scorned 33(16.75%), blamed 26(13.2%), insulted 19(9.64%), and avoided by others 16(8.12%) **(Table 11).**

Table 11: Experienced forms of GBV along TB journey among PWTB

Category and form of GBV	Yes n (%)
Physical	
Pushed	2(1.02)
Kicked	4(2.03)
Beaten by object	2(1.02)
Psychological	
Isolation	36(18.27)
Insulted	19(9.64
Threatened	13(6.6)
Scorned	33(16.75)
Mocked	11(5.58)
Blamed	26(13.2)
Economical related violence	
Dismissed from work	3(1.52)
Prohibited to go to work	8(4.06)
Denied to use family income	1(0.51)
Taking away your properties	1(0.51)
Social violence	
Divorced	5(2.54)
Refused to attend community events	4(2.03)
Avoided by others	16(8.12)
Family separation	10(5.08)
Chased from home	1(0.51)
Refused to share room/bed with your partner	2(1.02)

4.15 Manifestations of GBV among PWTB

Being abandoned by partners, verbal harassment, family separation, refused sex and refused sharing bed were other forms of GBV described by PWTB as portrayed in the following quotes;

> *"After I got sick, my wife run away and I had no one to take care of me until my relatives came and took me to the health facility to start TB treatment…"* **(Male, 53 years, PWTB)**
>
> *"After I contracted TB and became very ill, my wife run away and left me with children, because she thought I had also contracted HIV…"* ***(Male, 46 years, PWTB)***
>
> *"After being diagnosed with TB, my husband left me alone at home without any help until I finished treatment that is when he returned back…"* ***(Female, 32 years, PWTB)***
>
> *"I witnessed to my neighbors, after a woman being diagnosed with TB, her husband started harassing her verbally and later he chased her away from home"* **(Female, 38 years,)**
>
> *"My wife thought I was HIV positive because of TB symptoms and started accusing me for infidelity and denied me sex…"* **(Male, 52 years, PWTB)**
>
> *"When I started losing weight, my husband told me I was HIV positive and he decided to isolate me and even refused to share bed with me"* **(Female, 23 years, PWTB)**
>
> *" My wife annoyed me several times, she didn't want me to stay at home when I was sick and sometimes, she forced me to go and seek casual works so that we can have money for our living despite being very sick…"* **(Male, 52 years, PWTB)**

4.16 Factors associated with GBV among PWTB

Four factors were significantly associated with GBV; region, age, education, and TB-related stigma experience. Participants from Njombe, Mwanza, and Pwani experienced more forms of GBV by 30%, 24%, and 22%, respectively. Respondents aged 18-35 years and 36-60 years experienced more forms of GBV compared to participants aged above 60 years. Participants who had primary education experienced more forms of GBV compared to other level of education. People with TB who had ever experienced stigmatization because of their TB status had significantly GBV experience compared to those who had never stigmatized **(Table 12).**

Table 12: Factors associated with GBV among PWTB

Factor	Category	Sample size (N)	Experienced GBV n (%)	P- value
Region	Kilimanjaro	117	14(11.97)	**0.0057**
	Mwanza	67	16(23.88)	
	Njombe	89	27(30.34)	
	Pwani	109	24(22.02)	
	Unguja kaskazini	36	3(8.33)	
Gender	Male	276	52(18.84)	0.372
	Female	142	32(22.54)	
Age	18-35	145	32(22.07)	**0.0103**
	36-60	202	47(23.27)	
	>60	71	5(7.04)	
Education	No formal education	61	7(11.48)	**0.0017**
	Primary education	252	58(23.02)	
	Secondary education	82	13(15.85)	
	College education	20	3(15)	
	University education	3	3(100)	
Marital Status	Single	89	20(22.47)	0.3631
	Married	237	39(16.46)	
	Cohabit	6	2(33.33)	
	Divorced	20	5(25)	
	Separated	35	9(25.71)	
	Widow/widower	31	9(29.03)	
Occupation	Not employed	61	10(16.39)	0.738
	Farmer	146	32(21.92)	
	Student	11	2(18.18)	
	Self-employee	175	33(18.86)	
	Formal-employed	25	7(28)	
Monthly income	< TZS 69,000	191	36(18.85)	0.4163
	TZS 69,000-138,000	125	30(24)	
	> TZS138,000	102	18(17.65)	
Treatment stages	Completed TB treatment	116	26(22.41)	0.764
	Currently on TB treatment	297	57(19.19)	
	Newly TB diagnosed	5	1(20)	
Type of TB	Pulmonary TB	187	39(20.86)	0.952
	Multidrug resistant TB	5	1(20)	

Factor	Category	Sample size (N)	Experienced GBV n (%)	P- value
	Extrapulmonary TB	31	7(22.58)	
	Don't know	195	37(18.97)	
Ever felt stigmatized because of TB status	Yes	86	55(63.95)	**0.000**
	No	332	29(8.73)	

4.17 Secondary TB-related stigma in families of PWTB

Secondary TB-related stigma in the families of PWTB was measured using a set of 10 statements scale describing attitudes and feelings of family members about living with TB patients. The total, mean ± SD, and level of secondary stigma score were 1082, 15.64 ± 5.35, and 37.12 %, respectively. The secondary stigma in families of PWTB predominated with fear of being infected and status disclosure. About 40% of the surveyed family members were worried about contracting TB*.* Over a quarter of the respondents 20(27.4%) affirmed that, their families asked them to keep their TB status hidden from the community, and the same proportion avoided using the word TB during conversations with their friends. One in every seven respondents (15%) felt ashamed to see one of their family members had TB. Few respondents 3(4.11%) identified with the feeling of fear to be seen at the health care clinic where their relative were receiving treatment **(Table 13).**

Table 13: Dimension of secondary TB-related stigma in families of PWTB: level of support for each statement which refers living with TB patients, % (n=73)

Statement	Agree	No opinion	Disagree
My family member asks me to keep the TB a secret	29(39.73)	1(1.37)	43(58.9)
I feel ashamed because my family member has TB	11(15.07)	0(0)	62(84.93)
I hide the fact that my family member has TB from the community	28(38.36)	0(0)	45(61.64)
My family member hides his/her TB diagnosis from the community	20(27.4)	3(4.11)	50(68.49)
I avoid talking about TB in the presence of other family members or neighbors	17(23.29)	3(4.11)	53(72.6)
I'm afraid that someone will see me at the health care clinic where my relative is being treated	3(4.11)	0(0)	70(95.9)
I substitute another word for TB in conversations with my family members	18(24.66)	2(2.74)	53(72.6)
I substitute another word for TB in conversations with my friends	20(27.4)	3(4.11)	50(68.49)

Statement	Agree	No opinion	Disagree
I've noticed changes in my family members since the TB diagnosis	22(30.14)	3(4.11)	48(65.75)
I am worried about becoming infected	30(41.1)	1(1.37)	42(57.53)

4.18 Factors associated with secondary stigma in families of PWTB

Family members of PWTB from Tanzania mainland regions of Kilimanjaro, Mwanza, Njombe, and Pwani felt less secondary stigma compared to those from Unguja Kaskazini (Zanzibar). Though was not statistically significant, males, aged above 60 years, those with at least primary education, those with monthly income ranged between TZS 69,000-138,000, and those who were not in marriage by the time of data collection felt less secondary stigma compared to their counterparts **(Table 14).**

Table 14: Factors associated with secondary stigma in family setting (N=73)

Factor	Category	Sample size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P value
Region	Kilimanjaro	17	3(17.6)	-1.74[-0.72;0.05] p=0.087
	Mwanza	8	2(25)	-0.73[-0.64;0.3] p=0.47
	Njombe	20	5(25)	-1.73[-0.69;0.05] p=0.087
	Pwani	14	-	-1.88[-0.78;0.02] p=0.064
	Unguja kaskazini	14	3(21.4)	Ref
Gender	Male	18	3(16.7)	-0.13[-0.31;0.27] p=0.897
	Female	55	10(18.2)	ref.
Age	18-35	29	6(20.7)	Ref
	36-60	39	6(15.4)	0.64[-0.18;0.34] p=0.524
	>60	5	1(20)	-1.42[-0.88;0.15] p=0.16
Education	No formal education	9	2(22.2)	ref.
	Primary education	44	7(15.9)	-0.739[-0.523;0.24] p=0.462

Factor	Category	Sample size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P value
	Secondary education	16	2(12.5)	-1.045[-0.66;0.21] p=0.3
	College education	1	1(100)	-0.504[-1.38;0.82] p=0.616
	University education	3	1(33.3)	1.785[-0.08;1.32] p=0.079
Marital Status	Single	8	1(12.5)	ref.
	Married	52	10(19.2)	0.58[-0.83;0.88] p=0.954
	Cohabit	2	0	-0.44[-0.5;0.32] p=0.662
	Separated	4	1(25)	-0.75[-0.91;0.41] p=0.454
	Widow/widower	7	1(14.3)	-1.24[-0.91;0.21] p=0.221
Occupation	Not employed	9	1(11.1)	ref.
	Farmer	39	7(17.9)	0.04[-0.39;0.4] p=0.966
	Student	1	1(100)	0.67[-0.75;1.5] p=0.505
	Self-employee	21	3(14.3)	0.12[-0.4;0.45] p=0.905
	Formal-employed	3	1(33.3)	1.71[-0.1;1.3] p=0.091
Monthly income	<TZS69,000	37	8(21.6)	ref.
	TZS 69,000 - 138,000	23	3(13)	-0.19[-0.31;0.25] p=0.85
	>TZS138,000	13	2(15.4)	1.96[-0.01;0.67] p=0.054

4.19 Experiences and consequences of secondary TB-related stigma among family members of PWTB

About one-fifth 13(17.81%) of the surveyed family members of PWTB felt were stigmatized because of their family member's TB status. This kind of stigma mainly occurred in their families and in the communities as recorded by 10(58.82%), and 7(41.18%), respectively. None of the stigmatized family members experienced stigma in hospitals, workplaces, schools, or church settings. Delaying in seeking timely care, adhering to treatment, going to a DOT facility, and beginning treatment were the reported consequences associated with secondary stigma to family members. When the surveyed family members were asked if they had ever seen or heard other families being stigmatized because of their family member's TB status, over one-third 27 (37 %) responded "YES", where such kind of stigma was mainly witnessed in the community and in the family as recorded by 19(47.5%), and 16(40%), respectively. The witnessed secondary stigma in other family led to delays in seeking timely care 9(12.33%), beginning treatments 9(12.33%), and getting an accurate TB diagnosis 8(10.96%). The other reported consequences were delaying in going to a DOT facility 6(8.22%), adhering to treatment 5(6.85%), and completing treatment 2(2.74%) **(Table 15).**

Table 15: Experiences and consequences of secondary TB-related stigma among family members of PWTB

Question		
Have you ever felt you were stigmatized because of your family member's TB status? n =73		
	Yes n (%)	**No n (%)**
	13(17.81)	60(82.19)
In which setting(s) do you experience stigma? n*= 17		
	Yes n (%)	
Hospitals/clinics	-	
Community/neighbors	7(41.18)	
Home/Family	10(58.82)	
Workplace	-	
School/college	-	
Church/mosque	-	
Did the experienced stigma in the identified setting(s) above inhibit you from supporting your family member with TB on the following? n* = 6		
	Yes n (%)	
Recognizing symptoms	-	
Seeking timely care	2(33.33)	
Going to a DOT facility	1(16.67)	
Getting an accurate diagnosis	-	
Beginning treatment	1(16.67)	
Adhering to treatment	2(33.33)	
Completing treatment	-	

Getting post-treatment follow-up services	-	
Have you seen or heard other families being stigmatized because of their family member's TB status? n =73		
	Yes n (%)	**No n (%)**
	27(36.99)	46(63.01)
In which setting did you see/hear any other family being stigmatized? n^* = 40		
	Yes n (%)	
Hospitals/clinics	3(7.5)	
Community/neighbors	19(47.5)	
Home/Family	16(40)	
Workplace	1(2.5)	
School/college	1(2.5)	
Church/mosque	-	
Did the experienced stigma that you have seen/heard from other families inhibit them from supporting their family member with TB on the following? n^* = 44		
	Yes n (%)	
Recognizing symptoms	5(6.85)	
Seeking timely care	9(12.33)	
Going to a DOT facility	6(8.22)	
Getting an accurate diagnosis	8(10.96)	
Beginning treatment	9(12.33)	
Adhering to treatment	5(6.85)	
Completing treatment	2(2.74)	
Getting post-treatment follow-up services		

n^* represents number of response frequencies in the specific question

4.20 Factors associated with experienced secondary TB-related stigma among family members of PWTB

Due to the small number of observations, none of the factors demonstrated significant association with secondary experienced TB-related stigma. However, family members from Mwanza and Njombe regions experienced higher secondary stigma than participants from other regions. Female respondents experienced secondary TB-related stigma to a lesser extent compared to males. Those aged 18-35 encountered higher secondary stigma compared other age groups. Family members who had no formal education experienced higher level of secondary stigma compared to those with primary or secondary education. In addition, respondents whose main occupation was farming experienced more secondary stigma compared to those who were self-employed. Those who had monthly income of less than TZS 69,000 experienced more secondary stigma compare to those who had higher monthly income **(Table 16).**

Table 16: Factors associated with experienced secondary TB-related stigma among family members of PWTB

Factor N=73	Category	Sample size (N)	Experienced TB-related Stigma (%)	P- value
Region	Kilimanjaro	17	3(17.7)	0.3863
	Mwanza	8	2(25)	
	Njombe	20	5(25)	
	Pwani	14	-	
	Unguja kaskazini	14	3(21.4)	
Gender	Male	18	3(16.7)	0.8840
	Female	55	10(18.2)	
Age	18-35	29	6(20.7)	0.8448
	36-60	39	6(15.4)	
	>60	5	1(20)	
Education	No formal education	9	2(22.2)	0.2272
	Primary education	44	7(15.9)	
	Secondary education	16	2(12.5)	
	College education	1	1(100)	
	University education	3	1(33.3)	
Marital Status	Single	8	1(12.5)	0.9302
	Married	52	10(19.2)	
	Cohabit	2	-	
	Divorced	4	1 (25)	
	Separated	7	1(14.3)	
Occupation	Not employed	9	1(11.1)	0.2342
	Farmer	39	7(18)	
	Student	1	1(100)	
	Self-employee	21	3(14.3)	
	Formal-employed	3	1(33.3)	
Monthly income	< TZS 69,000	37	8(21.6)	0.6782
	TZS 69,000-138,000	23	3(13)	
	> TZS138,000	13	2(15.4)	

4.21 Manifestations of secondary TB-related stigma among family members of PWTB

During the survey, family members were asked to describe more about the secondary TB-related stigma which they had ever seen or heard, where social-isolation and fear of disclosure of TB status were the main manifestations of secondary stigma. Furthermore, fear of contracting TB was reported as the key driver of most stigma experiences as transpired in the quotes below;

> *"Some years ago, we were living with our uncle and he contracted TB, our neighbors stopped visiting us …and one day my elder brother went to the funeral event and he was prevented to touch anything because they thought he might also have TB like our uncle…"* ***(Female, 40 years, Family member)***
>
> *"When my neighbor's husband who had TB and HIV died, some children refused to play with her children fearing that they might also contract TB …"* ***(Male, 61 years, Family member)***
>
> *"…I witnessed one of neighbor's family who refused to participate in wedding ceremony because their father had TB…"* (***Female, 34 years, Family member***)
>
> *"My family members stopped me to tell others that I have TB for fear of being embarrassed by the community if they knew that they had a TB patient"* **(Female, 36 years, *Family member*)**

4.22 Anticipated TB-related stigma in the communities

Anticipated community TB-related stigma was measured using a set of 10 statements scale describing attitudes and feelings about TB patients. The total, mean ± SD, and level of community stigma score were 4892, 26.5 ± 4.52, and 71.52 %, respectively. Generally, anticipated stigma was high among the surveyed communities, and mainly manifested by limiting contacts with TB patients to avoid infection. Majority of the surveyed community representatives (91.23%) felt they were uncomfortable being near TB patients. The majority of respondents (81.87%) were inclined to think that some PWTB were disgusting, and 88.3% supported the statement that they were afraid of those with TB. Most of the respondents were inclined to keep distance, refusing to eat and drink, talk, touch, and let their children to play with PWTB. Most of the respondents were likely to have a long-term negative attitude towards PWTB, with 81.29% agree that if a person ever had TB, some community members will continue treating him or her differently for the rest of their lives **(Table 17).**

Table 17: Dimensions of anticipated stigma in the community: level of support for each statement which refers to living with TB, % (n= 171)

Statement	Agree	No opinion	Disagree
Some people might not want to eat or drink with friends who have TB	143(83.63)	1(.58)	27(15.79)

Some people feel uncomfortable being near those who have TB	156(91.23)	2(1.17)	13(7.6)
If a person has TB, some community members will behave differently towards that person for the rest of their life	139(81.29)	1(.58)	31(18.13)
Some people do not want those with TB playing with their children	149(87.13)	2(1.17)	20(11.7)
Some people keep their distance from people with TB	150(87.72)	2(1.17)	19(11.11)
Some people think that people with TB are disgusting	140(81.87)	1(.58)	30(17.54)
Some people do not want to talk to others with TB	120(70.18)	3(1.75)	48(28.07)
Some people are afraid of those with TB	151(88.3)	1(.58)	19(11.11)
Some people try not to touch others with TB	135(78.95)	6(3.51)	30(17.54)
Some people may not want to eat or drink with relatives who have TB	115(67.25)	6(3.51)	50(29.24)

4.23 Factors associated with anticipated TB-related stigma in the community

Community representatives from Mwanza and Njombe regions had negative prejudice towards TB patients compared to those in Unguja Kaskazini. On the other hand, Participants who were women, who at least had a primary education, who at least had an income-generating activity, and those who had a monthly income of more than TZS 69,000 were less inclined to negative attitudes towards TB compared to their counterparts; however, their differences were not statistically significant **(Table 18).**

Table 18: Factors associated with anticipated stigma in community (N=171)

Factor	Category	Sample size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P Value
Region	Kilimanjaro	34	19(55.88)	0.99[-0.105;0.316] p=0.324
	Mwanza	33	28(84.85)	**2.34[0.039;0.463] p=0.021**
	Njombe	29	24(82.76)	**2.59[0.068;0.507] p=0.011**
	Pwani	39	25(64.1)	1.7[-0.028;0.378] p=0.09
	Unguja kaskazini	36	12(33.33)	ref.

Factor	Category	Sample size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P Value
Gender	Male	91	55(60.4)	Ref
	Female	80	53(66.2)	-0.26[-0.155; 0.119] p=0.79
Age	18-35	33	20(60.6)	ref.
	36-60	106	69(65.1)	0.39[-0.14;0.21] p=0.701
	>60	32	19(59.4)	1.2[-0.09;0.36] p=0.233
Education	No formal education	1	1(100)	Ref
	Primary education	86	57(66.3)	-0.65[-1.2;0.6] p=0.514
	Secondary education	41	21(51.2)	-0.83[-1.29;0.52] p=0.407
	College education	34	22(64.7)	-0.97[-1.35;0.46] p=0.335
	University education	9	7(77.8)	-0.84[-1.34;0.54] p=0.403
Marital Status	Single	19	13(68.4)	ref.
	Married	137	85(62)	-0.33[-0.26;0.18] p=0.744
	Cohabit	1	0	0.06[-0.9;0.95] p=0.955
	Separated	3	2(66.7)	1.16[-0.23;0.88] p=0.25
	Widow/widower	11	8(72.7)	-0.06[-0.35;0.33] p=0.954
Occupation	Not employed	9	5(55.6)	ref.
	Farmer	59	36(61)	-0.24[-0.36;0.28) p=0.815
	Self-employed	59	41(69.5)	-0.61[-0.42;0.22] p=0.543
	Formal-employed	44	26(59.1)	-0.33[-0.38;0.27] p=0.745
Monthly income	<TZS 69,000	38	28(73.7)	ref.
	TZS 69,000-138,000	41	33(80.5)	-0.91[-0.29;0.11] p=0.366

Factor	Category	Sample size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P Value
	>TZS 138,000	92	47(51.1)	-1.22[-0.28;0.07] p=0.226

4.24 Experiences and consequences of TB-related stigma in communities

Two-third of the interviewed community representatives 108(63.16%) confirmed that they had witnessed a community member with TB being stigmatized because of his or her TB status. The most common places where they witnessed TB patients being stigmatized were at hospital and at workplace as recorded by 63(42.86%), and 56(38.1%), respectively. Patients with TB often were stigmatized in their communities, schools and churches. The witnessed stigma in the above settings associated with delays in seeking timely care 30(20.13%), going to DOT facilities 28(18.79%), beginning treatment 25(16.78%), adhering to treatment 19(12.75%), and completing treatment 10(6.71%) **(Table 19).**

Table 19: Experiences and consequences of TB-related stigma in communities

Question		
Have you seen or heard a member in your community who has TB being stigmatized because of his or her TB status? N = 171		
	Yes n (%)	**No n (%)**
	108(63.16)	63(36.84)
In which setting(s) were they stigmatized? n* = 147		
	Yes n (%)	
Hospitals/clinics	63(42.86)	
Community/neighbors	14(9.52)	
Workplace	56(38.1)	
School/college	8(5.44)	
Church/mosque	6(4.08)	
Did the experienced stigma in the identified setting(s) above inhibit them from supporting their community member with or who had TB on the following? n* = 149		
	Yes n (%)	
Recognizing symptoms	15(10.07)	
Seeking timely care	30(20.13)	
Going to a DOT facility	28(18.79)	
Getting an accurate diagnosis	14(9.4)	
Beginning treatment	25(16.78)	
Adhering to treatment	19(12.75)	

Completing treatment	10(6.71)
Getting post-treatment follow-up services	8(5.37)

n* represents number of response frequencies in the specific question

4.25 Manifestations of community TB-related stigma

Community representatives who participated in this study were asked to share their experiences of TB-related stigma, where family rejection, social isolation, discrimination, refusal to share accommodation, refusal to share eating utensils were the most reported manifestations of TB-related stigma. Furthermore, stigma was further linked to the fear of contracting TB.

> *"I witnessed my neighbor who was infected with TB starving for a long time because some of his relatives were afraid to send him food due to fear of contracting TB. Only his son was sending him food, when the son was not around, he was not given food by any other relatives"* ***(Male, 38 years, Community representative)***
>
> *"I witnessed my grandmother being stigmatized with my fellow family members where her room and utensils were separated from others. The family members also avoided the mat that was used by the grandmother for fearing to be infected with TB".* ***(Male, 43 years, Community representative).***
>
> *"My brother contracted TB away from home. When our father was told that his son is suffering from TB, he completely refused to return home… so his sister transported him to her home and took care of him for nine months. After recovering he returned to his parents but four months later, he contracted TB again and his father expelled him from home. The patient returned to his sister where he was treated and so far, he is doing quite well".* ***(Female, 46 years, Community representative)***
>
> *"When I was in my grocery, I witnessed my client being stigmatized by other customers, they did not want to sit next to him and even the glass he was using to drink beer other customers did not want to use it afterward. Also, they wanted me to throw away the glass used by that man because they thought they might become infected with TB"* ***(Female, 37 years, Community representative)***
>
> *"The man was running a restaurant business, when customers found out he was taking TB drugs, they stopped eating from his restaurant, as a result, this led to the closure of the business"* ***(Male, 48 years, Community representative)***
>
> *"… When my younger sister had TB, she was hated by her family members, they set her a room, she was also given her own food utensils, and they did not want to*

> *approach her for fear that she would infect them. Some members of the community also began to isolate her, and as she approached them, they were running away from her for fear that she might infect them with TB"* ***(Woman, 39, community representative)***

4.26 Anticipated and experienced TB-related stigma in healthcare settings

Anticipated TB-related stigma in healthcare settings was measured by using a set of nine statements scale describing attitudes and feelings of healthcare providers about TB patients. The total, mean ± SD, and level of anticipated TB-related score were 1495, 18.54 ± 4.75, and 52.57 %, respectively. In general, healthcare workers believed that there was prevailing anticipated stigma related to TB among medical staffs. About half of them (49.37%) reported that were avoiding treating TB patients, 32.91% did not like helping TB patients, two-third (63.29%) regard TB patients as dangerous, and half of them (48.1%) were keeping distances from TB patients. Healthcare workers were inclined to show more pity than angry feelings towards TB patients as recorded by 89.87% and 25.32%, respectively. About one-fifth of healthcare workers (17.72%) think developing TB was the person's fault. More than half of healthcare workers (54.43%) thought it would be best for TB patients to be isolated during the intensive phase of treatment, and 88.61% preferred TB treatment should be forced **(Table 20)**

Table 20: Dimensions of anticipated stigma in healthcare settings: level of support for each statement which refers to living with TB, % (n=79)

Statement	Agree	No opinion	Disagree
Some health care workers are nervous about treating TB patients	39(49.37)	-	40(50.63)
Some health care workers feel pity for TB patients	71(89.87)	1(1.27)	7(8.86)
Some health care workers don't like helping TB patients	26(32.91)	1(1.27)	52(65.82)
Some health care workers stay away from TB patients	38(48.1)	-	51(51.9)
Some health care workers think developing TB is the person's fault	14(17.72)	2(2.53)	63(79.75)
Some health care workers feel angry towards TB patients	20(25.32)	5(6.33)	54(68.35)
Some health care workers think it would be best for TB patients to be isolated during the intensive phase of treatment	43(54.43)	2(2.53)	34(43.04)
Some health care workers feel TB patients are dangerous	50(63.29)	-	29(36.71)

Some health care workers think taking TB treatment should be forced if necessary	70(88.61)	1(1.27)	8(10.13)

4.27 Factors associated with anticipated TB-related stigma in healthcare settings

Healthcare workers from Unguja Kaskazini had fewer stigmatizing attitudes compared to those from Njombe region. Doctors had higher prejudice about TB patients compared to nurses. There were no significant differences of stigmatizing attitudes among surveyed healthcare workers based on their gender, age group, and education level (**Table 21).**

Table 21: Factors associated with anticipated TB-related stigma in healthcare settings (N=79)

Factors	Category	Sample Size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P value
Region	Kilimanjaro	14	3(21.4)	-1.47[-0.62;0.09] p=0.146
	Mwanza	9	2(22.2)	0.3[-0.35;0.47] p=0.765
	Njombe	21	7(33.3)	ref.
	Pwani	18	4(22.2)	-1.08[-0.51;0.15] p=0.284
	Unguja Kaskazini	17	1(5.9)	**-2.25[-0.72; -0.04] p=0.027**
Gender	Male	34	4(11.8)	0.98[-0.12;0.36] p=0.33
	Female	45	13(28.9)	ref.
Age	18-35	30	6(20)	ref.
	36-60	48	11(22.9)	0.62[-0.17;0.32] p=0.54
	>60	1	-	1.02[-0.53;1.62] p=0.312
Education	Primary education	2	-	ref.
	Secondary education	13	1(7.7)	0.35[-0.65;0.93] p=0.731
	College education	50	13(26)	0.7[-0.49;1.01] p=0.484
	University education	14	3(21.4)	1.33[-0.26;1.31] p=0.188

Factors	Category	Sample Size (N)	Experienced TB Stigma n (%)	Mean difference [95% CI] P value
Marital Status	Single	14	1(7.1)	ref.
	Married	59	15(25.4)	1.373 [-0.52; 0.522] p=0.174
	Cohabit	1	1(100)	**2.059 [0.04; 2.19] p=0.043**
	Separated	2	-	-0.141 [-0.84; 0.73] p=0.888
	Widow/widower	3	-	0[-0.661; 0.661] p=1
Cadre	Doctor	27	6(22.2)	**2.7[0.09;0.62] p=0.009**
	Nurse	33	8(24.2)	ref.
	Pharmacy personnel	2	1(50)	1.4[-0.22;1.25] p=0.167
	Lab personnel	8	1(12.5)	-0.41[-0.48;0.32] p=0.682
	Radiographer	2	-	1.1[-0.33;1.14] p=0.277
	Others	7	1(14.3)	-0.28[-0.48;0.36] p=0.79

4.28 Experiences of TB-related stigma among healthcare workers

One-fifth of surveyed healthcare workers 17(21.52%) felt stigmatized because their work involves interacting with PWTB, where, 11(55%) stigmatized in hospitals or clinics where they work, 8(40%) stigmatized in their communities, and one (5%) was stigmatized in family setting. When respondents were asked if they had ever seen or heard if their fellow healthcare workers being stigmatized because their work involved interacting with people with or who have had TB, seven (8.86%) respondent "YES", with, 5(71.43%) and 2(28.57%) having such experiences in hospital and community settings, respectively **(Table 22).**

Table 22: Experiences of TB-related stigma among healthcare workers

Question		
Have you ever felt you were stigmatized because your work involves interacting with people with or who had TB?		
	Yes n (%)	No n (%)

	17(21.52)	62(78.48)
In which setting(s) did you experience stigmatization? n* =20		
	Yes n (%)	
Hospitals/clinics where you work	11(55)	
A community where you live	8(40)	
Family/relatives	1(5)	
Have you seen or heard a member of your fellow healthcare workers being stigmatized because their work involves interacting with people with or who have had TB?		
	Yes n (%)	**No n (%)**
	7(8.86)	72(91.14)
In which setting(s) were they stigmatized? n* = 7		
	Yes n (%)	
Hospitals or clinics where they work	5(71.43)	
A community where they live	2(28.57)	
Their family or relatives	-	

n^* represents number of response frequencies in the specific question

4.29 Factors associated with experienced TB-related stigma among healthcare workers

Due to the small number of observations, none of the modeled factors showed significant association with experienced TB-related stigma. However, healthcare workers from Njombe experienced TB-related stigma than participants from other regions. Female respondents experienced more TB-related stigma compared to their male counterparts. Healthcare workers aged 36-60 years old encountered higher TB-related stigma compared other age groups. In addition, nurses encountered more stigma compared to doctors **(Table 23).**

Table 23: Factors associated with experienced TB-related stigma among healthcare workers

Factors **N= 79**	**Category**	**Sample size (N)**	**Experienced TB-related stigma n (%)**	**P- value**
Region	Kilimanjaro	14	3(21.4)	0.3790
	Mwanza	9	2(22.2)	
	Njombe	21	7(33.3)	
	Pwani	18	4(22.2)	
	Unguja kaskazini	17	1(5.9)	
Gender	Male	34	4(11.8)	0.0667

	Female	45	13(28.9)	
Age	18-35	30	6(20)	0.8308
	36-60	48	11(22.9)	
	>60	1	0	
	Primary education	2	0	0.4549
	Secondary education	13	1(7.7)	
	College education	50	13(26)	
	University education	14	3(21.5)	
Marital Status	Single	14	1(7.1)	0.1226
	Married	59	15(25.4)	
	Cohabit	1	1(100)	
	Separated	2	0	
	Widow/widower	3	0	
HCWs cadre	Doctor	27	6(22.2)	0.8115
	Nurse	33	8(24.2)	
	Pharmacy personnel	2	1(50)	
	Lab personnel	8	1(12.5)	
	Radiographer	2	0	
	Others	7	1(14.3)	

4.30 Manifestations of TB-related stigma among healthcare workers

Healthcare workers who participated in this survey when asked to describe their experiences of TB-related stigma, some reported were isolated by colleague at workplace and some in the community. The main reason for such stigma is due to fear of contracting TB as described in the quotes below;

> *"Here at the health facility some of my fellow nurses are afraid to be near me, as they think I will infect them because I work with TB patients* ***(Female, 37 years, HCW)***
>
> *"The community members were isolating me, they said I should stay away from them because I work in the TB ward, thinking that probably I am infected with TB but I have not started showing symptoms yet…"* ***(Female, 32 years, HCW)***
>
> *"Some healthcare workers isolate me due to factor that I stay with TB patients especially those with resistant TB, …sometimes even when I get a normal cough my co-workers tend to avoid me"* ***(Male, 58 years, HCW)***

> *" Some community members had been afraid to be near me fearing that I may infect them simply because I take care of TB patients"* ***(Female, 45 years, HCW)***
>
> *"...for the first time when allocated to work at TB clinic, some healthcare workers approached me and told me that it was like a punishment and asked me to refuse since I could be infected with TB ..."* ***(Female, 47 years, HCW)***

4.31 Structural TB stigma in healthcare settings and media

Structural TB stigma was assessed through conducting interview with multi-stakeholders. The interview aimed to analyze how the process of TB services delivery, practices, and architecture of healthcare settings and media if structurally they promote or prevents TB-related stigma by constraining resources and opportunities of PWTB. The findings emerged in this assessment are presented under the following emerged seven themes;

4.32 Right to life and health

These rights emphasize lives and health of citizens including PWTB are protected by ensuring access to testing, treatment, and preventive services. Five things that were likely to constrain resources and opportunities of PWTB were assessed: i) availability of TB services law enforcement, policy, and guidelines, ii) access of TB services between public and private health facilities, iii) access of TB services in high-and-low-level health facilities, iv) cost sharing on access of TB services, v) access of TB services to vulnerable population.

The current study found that provision of health services including TB services in Tanzania is guided by law, policy, and guidelines. For instance, Tanzania constitution establish the right to life as explicitly states "Every person has the right to live and to the protection of his life by the society in accordance with the law". Similarly, the current Tanzania national health policy 2007 also recognize the right to health as it states "Everyone has the right to receive health services regardless to his or her gender, tribe, and position in the community".

During interview, informants explained that the architecture of delivering TB services is well defined and organized from central (ministerial-level) to the community level where services is provided. Basically, TB services are delivered in both public and private health facilities, however, it was reported that TB services are mainly offered in public health facilities resulting in unequal access of TB services in general public as explained below;

> *"...Very few private facilities provide TB services, most of the TB services are provided in public owned health facilities. This is because most of the private*

> *facilities are for profits while TB services are offered free, so they don't give priority to TB patients…"* ***(Male, 52 years, RTLC)***
>
> *"…regarding distribution of TB services, all facilities, public and private are providing TB services but coverage of TB services to private health facilities is low …as the policy directs TB services to be free…private facilities face numerous challenges to abide to this policy since TB services are associated with additional costs which the government does not subsidize".* ***(Male, 52 years, Policymaker MoH)***

TB services were also reported to vary between high- and low-level health facilities. For instance, TB diagnostic equipment such as Gene-Xpert machines and X-ray are commonly not available in primary healthcare facilities, making patients sometimes to travel long distance to seek such services as voiced below;

> *"In our region, most of the X-ray and Gene-Xpert services are available at high-level health care facilities particularly at district and referral hospitals. There are very few lower-level health facilities such as dispensaries and health centers that offer these services, and these centers are the ones that serve large number of people…. So, if you are interested to know about coverage of TB services, surely, I can say we still have a large population not reached by these services and patients are forced to seek such services at high-level facilities".* ***(Male, 32 years, RTLC)***

In addition, informants revealed that cost sharing hinder access of TB services. It was reported sputum test for TB and TB drugs are the only services that are offered free of charge in facilities that are providing TB services. Patients are required to pay for all other services including X-ray and laboratory investigations particularly biochemical tests which are required for monitoring of TB treatment. For patients who are unable to afford such costs tend to seek alternative care and can leads to delay or interruption of the treatment as echoed below;

> *"…one of the major challenges is the issue of cost sharing, for example, patients are required to pay for registration and laboratory investigations apart from TB sputum test that sometimes make patients to stay home or look for alternative care such as buying cough remedies, going to traditional healers, or going to pastors for prayers… So, all of these contribute to delays to seek for care in our facilities."* ***(Male, 52 years, RTLC)***
>
> *"Regarding the cost of TB treatment there are still challenges. According to the guidelines TB services which are free of charge are sputum testing and TB drugs for the entire duration of treatment. But other tests that will be performed during the treatment period patient has to pay, as a result patients delays to be diagnosed and start treatment for TB".* ***(Male, 32 years, RTLC)***

Furthermore, informants revealed that preventive TB services largely do not reach the vulnerable groups despite being at greater risk of contracting TB. Some groups such as drug users and local brew-drinkers are usually criminalized in community, rendering them structurally less willing to join TB preventive services such as community TB screening as portrayed below;

> *"...drug user and local-brew drinkers have been termed as criminal and often don't want to turn up for community TB screening, even if when you follow them in their places they tend to shun away because they think you are spying them..."* (***Male 50 years, CBO representative)***

4.33 Right to be free from discrimination

This right aim to ensure people with TB are protected against discrimination in both the public and private spheres, including health care settings. The current study revealed that National health policy 2007, explicitly recognizes the aim of providing health services on the basis of human rights without discrimination as it states that "*the Government will ensure that health care providers adhere to human rights when serving the public*" also "*the government in collaboration with other stakeholders will provide guidelines to eliminate stigma in health care delivery"*. Implementers of this policy in service delivery settings acknowledged to work in a non-discriminatory manner as voiced below;

> "*Policies that prohibit discriminatory health services exist, and direct TB patients not to be discriminated and to be treated like other patients...*" ***(Male, 57year, DTLC)***
>
> *"... guidelines and policies are in place and applicable. We are directed not to provide health care in a discriminatory manner. We usually educate service providers as we believe if they understand better, they will avoid providing stigmatizing and discriminatory services..."* ***(Male, 32 years, RTLC)***

Despite presence of non-discriminatory law and policy, incidents of discriminations and stigma towards TB patients and healthcare providers who are providing care to TB patients were reported to occur in service delivery areas. Similarly, the failure to allocate specific area for provision of TB services or lack of specific personnel for TB services in service delivery areas were reported to be among the elements of discrimination and stigmatization of TB services as described below;

> *"Stigma exists to some extent; forexample, when patients arrive at the hospital they are initially not stigmatized...except when they are diagnosed to have TB, that's where the caregiver starts taking obvious precautions to protect themselves and staying away...****(Male, 35 years, DTLC)***

> *"...In 2018 I witnessed a healthcare worker being stigmatized by his colleagues when he was diagnosed with TB and caused that employee being transferred to another health facility..."* ***(Male, 32 years, RTLC)***
>
> *"...In some facilities, TB patients are stigmatized. For example, you may go to the facility and find TB services are provided but there is neither special area nor healthcare workers dedicated for providing TB services ..."* ***(Female, 45 years, DTLC)***
>
> *...it is true that, not only patients who are stigmatized but even us healthcare providers we are stigmatized... our colleagues usually do not like to be near us as they usually wave hands to us at a distant...* ***(Male, 45 years, DTLC)***

Besides, dilapidated condition of TB care facilities in many service delivery areas was interpreted as element of stigmatization and discrimination of TB services. This situation was thought to increase public fear that TB is dangerous and fearful. On the other hand, the isolation and peripheral location of TB clinics in service delivery areas was not seen as a discriminatory element but rather a measure to reduce infections as narrated below;

> *"We have many old and unattractive TB clinics, and in some places even to get a room for TB services is a challenge, as you may find TB clinic is shifted from one room to another making people to think that TB services are neglected ..."* ***(Male, 47 years, RTLC)***
>
> *"...lack of attractive TB clinics buildings is one of the reasons why this TB disease is feared in the community..."* ***(Male, 32 years, RTLC)***
>
> *"... I do not think if TB clinic location is a problem because TB clinics are located aside and away from other buildings for the purpose of Infection Prevention and Control..."* **(Male,** ***48 years, Policy maker MoH)***

4.34 Right to freedom from arbitrary arrest or detention and involuntary isolation

Ideally, this right emphasizes that people with TB have a right to freedom from arbitrary arrest, including detention and involuntary isolation of individuals with TB disease excluding exceptional instances as stipulated by legislation requisite to what is absolutely necessary and following the application of less restrictive and punitive measures used to fulfil the lawful goals of public health (e.g., to prevent the risk of infection in other people in cases when a person with TB refuses treatment and all other reasonable means of treatment provision have failed. People with TB should not be detained at non-medical facilities for not following treatment guidelines.

Informants reported, Tanzania public health Act of 2009 gives power to enforce compulsory treatment, isolation, or detention to patient with an infectious disease who refuse treatment while is regarded as threat to the public. However, in regular practices, it was noted that more often TB treatment are provided without coercion. Patients usually consent verbally to start TB treatment after being informed about relevant information related to TB treatment including treatment duration, doses and frequency, expected drug side effects, and benefits of adhering to treatment. If TB patient refuses treatment, usually are traced back and counseled about the benefits of completing treatment for him/her and public at large and helped to overcome or resolve any existing obstacle(s). For those who keep refusing treatment usually are persuaded by involving community leaders such as village leaders and/or religious leaders. However, if these measures fail reasonable force is applied and patient can be involuntary isolated, detained or forced to start or continue treatment. Non-cooperative TB patients are referred to Kibong'oto hospital for isolation and treatment.

> *"...according to public health Act, any person with infectious diseases should be handled according to human rights to get this treatment and to protect others..., If refuse treatments of course is supposed to be forced, but not in a brutal way..."* ***(Male, 52 years, RTLC).***
>
> *".. If a patient refuses TB treatment, efforts are often made, and sometime by involving Village or Ward leaders and bring the patient for counselling and help him or her to determine the consequences of refusing treatment. They often understand us and return to treatment..."* ***(Male 57 years, DTLC)***

4.35 Right to Privacy

The right calls for all of the private information on TB treatment to be kept confidential, stored safely and under no circumstanced should be provided to third parties, except in the following cases (1) when such transfer of data was approved by a qualified medical professional, (2) under strict conditions as stipulated by law, (3) including cases when third parties need to be protected to prevent grievous harm and immediate risk of infection and (4) in cases of exchanging patient data between the medical care providers in the process of delivering TB care.

Informants described the privacy and confidentiality of patient information are considered as an important component of TB care delivery. It was reported healthcare providers are encouraged to consider privacy as they provide TB services to patients. However, some health facilities have limited space in consultation rooms or wards a situation that poses a challenge in maintaining privacy. It was also reported that many health facilities use physical files and electronic record systems to collect and store patient information. Electronic record systems were reported to be more controlled compared to physical files using passwords. also, it was revealed that some health facilities do not have a special place to keep medical records and thus allow patient files to be kept in an open place such as on a table or in unclosed cabinets, which does not guarantee confidentiality of patient's information. Additionally, it was reported that if a person needs access to patient information, they are advised to seek approval from the relevant authorities.

> *"…The issue of privacy is challenging. Our service delivery facilities and its infrastructure are not enough to have enough space and be independent to protect the privacy and confidentiality of customers. You may find many services are still provided in congested areas, so, you can't say that privacy is considered at all percentages…"* ***(Male, 32years, RTLC)***
>
> *"Confidentiality of patient information is maintained at our service delivery areas. In this program we have various tools for storing customer information such as; patient ID, treatment card, treatment register, and presumptive register, and we also have an electronic system called electronic TB and leprosy register. All of these data collection and storage systems are properly protected and managed by service providers entrusted with these responsibilities"* ***(Male, 32 years, RTLC)***
>
> *"Providers have a responsibility to ensure that customer information is confidential. At different times they are reminded of this obligation even though some service providers violate the obligation. In case someone need to use patient data we usually tell him or her to seek permission from relevant authorities before providing that information".* ***(Male, 57years, DTLC)***

4.36 Right to food

This right calls for states to ensure everyone under their jurisdiction can access minimum essential food that is sufficient, nutritious, and safe, with priority consideration given to disadvantaged groups including PWTB with malnutrition.

It was reported that many health facilities do not buy and do not provide nutritional supplements to patients. Also, food services are provided mainly to admitted patients who do not have adequate support from their families or relatives, and such food is often reported to be inadequate and non-nutritious. Nutritional supplements such as F-75 and F-100 which are provided to malnourished patients are generally not available in many health delivery facilities. Few hospitals such as Kibong'oto were reported to provide nutritional supplements to malnourished TB patients. In addition, TB patients receiving TB treatment at home were also reported to be facing food shortages to the point of begging money from healthcare providers as many of them lose their jobs and income after contracting TB. Inadequate food was also reported to be a barrier to effective TB treatment adherence.

> *"…Nutrition-supplements are provided in our hospitals, but there are serious challenges to its availability and supply. For patients with resistant TB who are at the National Infectious Diseases Hospital (Kibong'oto) they are given nutritional supplements… There is a great challenge of accessing these nutritional supplements to hospitals other than Kibong'oto…"* ***(Male, 32 years, RTLC)***

> *"The issue of access to nutritional supplements is a major challenge in our healthcare facilities. We are fortunate that we have never had a TB patient with severe malnutrition but we have been instructing health facilities to make sure they set aside a budget in order to have those supplements…"* ***(Male, 57 years, DTLC)***
>
> *"Once the patient is diagnosed with TB when you visit the patient at home you face a lot of complains from the patient…. ooh I have no food to eat, these drugs are very strong, what I am going to do…"* ***(Male, 48 years, CBO representative)***
>
> *"When it comes to the issues about availability of food in general, including nutritional supplements, it has often been a challenge. Sometimes providers donate our own money to help the patient get food, but we cannot do this every day and thus makes the issue of nutrition very sensitive to TB patients receiving treatment and therefore this needs to be seriously addressed …"* ***(Male, 45 years, DTLC)***

4.37 Right to safe workplace

This right ensures employees including healthcare workers have the right to safe workplace which is reasonably free from health risks and the employer is responsible for implementing measures aimed at reducing the occupational TB risk.

In a recent study participants reported that most health care providers know how to protect themselves from TB infection in the workplace. However, it was reported that some service areas were overcrowded and under-ventilated, thus increasing the risk of contracting TB. On the other hand, the issue of access to protective equipment in the workplace was not mentioned as a major concern. It was further reported that, many health care providers, especially in the private and informal sector, are at greater risk of losing their jobs when they contract TB.

> *"…Many health providers have been trained to prevent TB infection transmission in the workplace… It is important to consider the presence of adequate air and light inside the service building, and to consider the correct position between the client and the service provider".* ***(Male, 48 years, CBO representative)***
>
> *"…In many places TB services are provided in small buildings where there is no enough space and good ventilation. This issue is still a challenge that shows us there is still a lot of work to be done to improve infrastructure to be friendly and safe"* ***(Male, 57 years, DTLC)***
>
> *"…most of the time employees do not know their right when they contract TB at workplace … the situation is worse in private sector as the employers wants you to always be healthy so that you can work. You may find as soon they know the employee has TB can be fired from wok"* ***(Male, 44 years, Media representative)***

4.38 Right to access information

This right emphasizes people with TB need to have access to basic information about the disease, ways of transmission, effective preventive measures, treatment options and regimens, including treatment duration, names and types of the medication used, possible side effects and the risks involved in not following the treatment guidelines. In the current study we assed access of health information to PWTB in healthcare settings and general public through media.

It was reported that in healthcare settings, TB information is primarily provided by healthcare providers; however, the information and messages provided depend on the patient's condition, needs, and ability to understand the message. In some healthcare facilities, posters and leaflets which prepared in simple and understandable language are also used to convey the message of TB such as information about what TB is, the types of TB, how TB is transmitted, how TB is treated or how you can prevent TB.

> *"...If you are at TB clinics you will see providers providing information about medication, duration of treatment, the importance of completing the treatment and attending the clinic to monitor the patient's condition and progress. Sometimes a patient may be instructed by more than one provider, and the information is repeated every time he or she comes to the clinic when providers see the need to do so"* ***(Male, 48 years, CBO representative)***
>
> *"...health information to patients and clients attending our health facilities is delivered in different ways including health education which is provided to patients who attend clinic, or outpatient department... some health facilities deliver health educations through video, posters, flyers and burners..."* ***(Male, 41 years, DTLC)***

On the other hand, the current study assessed how media contributes to delivering TB information to the public. It was reported that contribution of media in provision of public health education including TB-related information was generally low. Media programs on TB are often produced in special events such as World TB Day, however, TB information covered in such programs miss more details and are given limited air time. The reported reasons for low media coverage of public health education were inadequate budget, limited sponsorship, lack of specialized personnel in medical journalism, and inadequate engagement of media during planning and implementation of health-related interventions and programs.

> *"... generally, you will find these media running few public health education programs and it is rare to find specific TB session unless it on a special day like World TB Day where experts (medical doctors) may be invited to provide public awareness and clarifying pressing issues related to such commemoration..."* ***(Male, 44 years, Media representative)***

In addition, it was reported that public health information provided through the media rarely aimed at advocating important issues and the rights of vulnerable people who are often at high risk of contracting TB such as; people living with HIV, slum dwellers, industrial workers, and those working in mining areas as shown in the quotations below;

> *"... many media have not done enough in this matter (reaching out to vulnerable people) due to budget constraints and possibly due to lack of awareness of the sensitivity of these groups. For example; It is rare to hear health information in the media about the benefits of better housing in preventing TB, given that many Tanzanians live in slums in urban and rural areas ... in mining areas there are also large gatherings, but education about TB which is provided is inadequate. Therefore, there is a need for programs in the media that will highlight the challenges of these groups and ensure that education is sustainable, then the contribution of the media to these groups will be seen ..."* ***(Male, 44 years, Media representative)***
>
> *"...It is generally uncommon to find public health education programs in the media that inform and clarify patients' rights and responsibilities, not only for TB patients but also for other diseases..."* ***(Male, 44 years, Media representative)***

5. CHAPTER FIVE: DISCUSSION AND RECOMMENDATIONS

5.1 Discussion

The current study found PWTB had a moderate level of self-stigma score (40%) dominated by feelings of self-doubt, guilt, shame, and loneliness. Such feelings lead them afraid to disclose their TB status. Non-disclosure of TB represents a major challenge in TB control as it risks others contracting TB particularly contact persons in the households, social gatherings, and in workplaces. Moreover, non-disclosure of TB status restricts access to support during illness. Compared to other regions, the estimated level of TB-related stigma among TB patients in this study was similar to results from Wolaita Sodo, Ethiopia (42.4%) (32), rural China (45.3%) (33), Ukraine (47%) (34), and lower than those in Northeast China (50.4%) (24), India (51.2%)(35), pastoralist community in Kenya (73.6%) (23), and urban Zambia (82%) (36). These variations may be attributed to differences in stigma measurement tools, sample sizes, study areas and participant characteristics. Interestingly, it was also revealed that PWTB not only had high self-stigma sentiments but also were actually stigmatized. One in every five (21%) of PWTB at one point during TB treatment journey experienced really TB-related stigma because of their TB status which in part manifested as social isolation, judgement, blame, verbal abuse, gossip, and discriminations. Besides, such stigmatization was largely perpetuated by people around them including relatives and friends. The involvement of relatives and friends in perpetuating stigma behaviors gives the impression of poor participation in supporting TB patients during treatment. The similar pattern and manifestations of TB-related stigma also have been documented elsewhere (22,37,38).

As reported in other studies (22,39,40), it was further evident in this study that, TB-related stigma negatively affected health seeking behaviors, engagement in care, adherence to treatment, and treatment outcomes, where; 17%, 27%, 10%, and 3% of PWTB experienced delays in seeking timely care, beginning treatment, adhering to treatment, and completing treatment, respectively. These findings suggest TB-related stigma contributes to late diagnosis, severity and disease complications, and interruption of TB treatment which consequently promotes further community spread of TB, long treatment, and development of drug resistant TB.

Community TB-related stigma manifested as social isolation, refusal eating and drinking together with TB patients, and avoided sharing accommodation, and were largely driven by exaggerated fear of contracting TB just by casual contacts. This unrealistic fear of contracting TB has been reported in different studies (22,35,37), and documented as presumed underlining cause of TB-related stigma, reflecting poor understanding of how TB is transmitted and its biological and environmental dynamics, as it seems TB is more contagious rather than airborne diseases, and thus, calls for public health education aimed at providing accurate information to the public and addressing misconceptions about TB transmission.

Besides, our current data showed PWTB who had secondary school education had more self-stigma sentiments compared to those with no formal education. These results can be explained by the fact that, TB is widely regarded as a disease of the lower social class and therefore, people who believe they belong to a higher social class such as educated ones are likely to endorse a negative image about themselves when infected with TB. This implies that there is a knowledge gap about the risks of contracting TB that can predispose people to TB disease regardless of their social status such as HIV, Diabetes, occupational exposures that affects lungs (e.g., asbestosis), and cigarette smoking (41,42), and thus, this unawareness needs to be addressed to the general public.

In addition, the present study has shown GBV was common among PWTB by 20%. Nonetheless, experience of TB-related stigma was significantly associated with GBV. These results suggest that apart from their TB-related illness, PWTB were going through a lot of suffering which can results to social, psychological, and economical consequences, where some of PWTB experienced isolation, insults, prohibited going to work, rejection from community, abused and divorced. These desolations can further limit compliance to TB treatment, and therefore, deliberate efforts to prevent TB-related stigma should be combined with the efforts to address other social determinants of health including gender-based violence.

It was also revealed that, PWTB families had moderate level of TB-related stigma sentiments (37%) which dominated by feelings of shame and fear of disclosure of TB status. In addition, significant number (18%) of PWTB family members' experienced secondary stigma from the community. These findings indicate that stigma-related effects extend to other person who associates with stigmatized people, and therefore posing a threat to the level of motivation and willingness to support their family members with TB during TB treatment journey and consequently constrain treatment compliance because the roles of treatment supporters in TB treatments has been document to be far more important including insuring that the patient takes the TB drugs regularly, on schedule, for the full duration of the treatment, to listen and encourage the patient, provision of support for feeding (when there is no food or means of eating), and support for provision of transportation cost to visit TB clinic when the need arises (43–45).

It was observed that, TB-related stigma was high among communities by 63%. Similarly, majority of community representatives had high level of stereotypes and prejudice regarding TB. These findings could explain why PWTB and their families were hesitant to disclose TB status, and thus, suggesting that, if community TB-related stigma can be controlled, ultimately, can have a significant impact in both self and secondary TB-related stigma reduction. High magnitude of community TB-related stigma of 70%, and 73% has been reported in Ukraine and India, respectively (34,46).

Interestingly, the current study also found a high level of TB-related stigma among healthcare providers (53%), with more prejudice toward TB patients among doctors compared to nurses. Findings like these alarming the understanding, attitudes, motivation, and quality of care provided by healthcare providers to PWTB as it was seen that, about half of surveyed healthcare workers regarded TB as a dangerous disease, and majority did not like to help, treat, and even being near to TB patients. On the other hand, healthcare workers experienced stigma in their workplaces and communities, while working in a TB clinic was seen as a punishment. Similar findings have been reported in the study conducted in Takoradi Metropolitan district in Ghana (17), where, healthcare workers expressed fear of infection when interacting with TB patients; such that they shunned, avoided, maltreated, blamed, and advocated the segregation of TB patients at home and in the hospitals. The same study also revealed posting to TB units/wards is viewed as a punishment, with majority indicating refusal to work there or be trained as TB nurse/doctor. Such findings, call for need to awareness creation regarding TB among healthcare providers, and develop measures to resolve these negative attitudes so that they can provide friendly, reflective, and patient-centered care.

The study further revealed that, there is inadequate involvement of private health facilities in delivering of TB services compared to public health facilities, however, quantification of the level of involvement was beyond the scope of the current study. This discrepancy implies that significant number of TB clients who seek care in private health facilities are denied opportunities to access TB services conveniently and timely. This ultimately can lead to increase chance of missing TB cases and contributing to delays in diagnosis and treatment of PWTB, thus, efforts should be made to address the setbacks and bottlenecks associated with inequalities in accessing TB services in both public and private health facilities.

Cost-sharing was observed to be an important barrier to access TB services as were noted elsewhere (47–49). Moreover, in the current study, about half of PWTB were living below the poverty line (less than one USD per day). In addition, TB patients were reported to lose their job and income while undergoing TB treatment. On that basis, cost-sharing can act as a structural barrier in accessing TB services which could be the reason for delays in seeking care or opting for alternative treatment which in turn can escalate further community transmission of TB and affecting TB treatment outcomes.

Shortage and dilapidated condition of TB service delivery buildings were viewed as elements of neglecting and stigmatization of TB services. Nevertheless, inadequate spaces in TB services delivery areas were observed to constrain privacy, confidentiality, and safety in workplaces. These findings indicate that TB services are provided in un-motivating, unfriendly, and unsafe services delivery environments which facilitates stigma, breach of privacy, and risk of TB transmission, underscoring efforts to improve health services infrastructures.

Malnutrition and low Body Mass Index (BMI) to TB patients are associated with poor treatment outcomes (50,51). In the current study, it was found that, many health facilities do not buy and do not provide nutritional supplements to TB patients. In this regard, most of malnourished TB patients seems to be partially managed. In addition, it was noted that TB patients who were receiving TB treatment at home also were facing food challenges. These findings suggest shortage of food and nutritional supplements could be structural barrier to treatment adherence which could compromise the treatment outcomes.

The current study found contribution of media in the provision of public health education including TB-related information was generally low, contrary to enormous benefits observed in other studies (52,53). Inadequate budget and low engagement of media in health-related programs and interventions were reported amongst the reasons for under-contribution. These findings imply that, there is missing opportunities to share correct information regarding TB and counteracting the misconceptions and myths of TB in the general public through media outlets. Therefore, deliberate efforts to bridge those gaps are urgently needed to ensure wider media coverage of TB-related information.

5.2 Recommendations

The participants who took part in the current study were able to provide recommendations on eliminating TB-related stigma. Recommendations made by participants in respective groups are presented below which also includes general recommendations developed by the research team.

5.3 Recommendations made by PWTB

PWTB mainly emphasized that education regarding TB and associated stigma should be provided to the community. TB survivors should be involved in educational campaigns to assist in providing testimony that TB is curable and will help to dismiss the misconception about TB disease. Many PWTB also appealed to healthcare workers to use descent language and communicate clearly, to be attentive when talking to patients, and ensure are providing TB services to PWTB with sympathy and respect. In addition, privacy, confidentiality, and non-disclosure of patient status were also stressed. Furthermore, PWTB requested food supports and exemption of none-free TB-related services during TB treatment such as follow up X-ray and biochemical tests.

5.4 Recommendations made by family's members of people with TB

Most family members of PWTB also presented the need of community education about TB and associated stigma as they would like to see their communities are supportive and friendly to TB patients. Some called for the healthcare providers to educate them on how to live with TB patients with reduced or minimal risks of contracting TB. Moreover, some of family members would like to see that, their family members with TB are treated with dignity at health facilities. Some wanted to see TB patients especially the elderly, pregnant women, and children are provided with subsistence support during TB treatment period because most of them are incapable of working and earning income. Some would like establishment of law to protect TB patients and ensure that severe punishment is given to those who stigmatize TB patients.

5.5 Recommendations made by community representatives

Community representative wanted to see large scale community awareness campaigns about TB and stigma. They appealed for awareness campaigns to be inclusive, continuous, and focused. Such campaigns should focus to provide understanding about TB symptoms, how is transmitted, and how can be prevented. Community education should be wide and involving health facilities, school, community and religious gatherings, and media outlets. False traditions and misconceptions about TB should be discouraged, and community informed how they can reach out TB services in their locality. Some of respondents wanted to see establishment of TB club where TB patients would be able to meet together and share information and challenges, they are going through and help each other figure out how to solve them. It was also stressed that healthcare workers should be equipped with necessary knowledge and skills to ensure that they have positive attitudes and capable to provide friendly and humane- services. Some respondents called the community should have good morals and love, and should avoid stigmatizing TB patients and instead should be ready to take care of them. Some community representatives stressed the need of providing food to TB patients so that their health can improve quickly.

5.6 Recommendations made by the healthcare workers

Healthcare workers also stressed the need of large-scale community education regarding TB. The medical community believed that TB-related stigma was mainly due to inadequate information about TB and existing misconceptions and myths. They recommended Ministry of Health (MoH) should launch national TB awareness campaigns. However, they wanted to see that, on TB service delivery infrastructure are improved to prevent infection, and to protect the privacy and confidentiality of TB patient information. They also appealed for continuous refresher course to update TB knowledges and skills as well as counselling skills which can enable them to offer TB services appropriately and confidently.

5.7 General researcher recommendations

5.7.1 Raising community awareness of TB-related stigma

In order to address the TB-related stigma and associated effects that have largely been shown to be fueled by low awareness, misconceptions, and myths about TB, the community should have sufficient understanding about TB disease especially on how TB is transmitted and how can be prevented. This awareness should be delivered through community-based awareness campaigns that need to be well coordinated, inclusive, creative, and sustainable. Furthermore, awareness campaigns should also use different approaches that target individuals (i.e., PWTB), families, and key vulnerable groups. Nonetheless, awareness campaigns should take place in various settings such as religious gatherings, schools, markets, and at village assembly or local meetings. These campaigns should ensure that they engage different stakeholders such as TB survivors, healthcare providers, social workers, community health workers, and community leaders to inculcate community-ownership. Different platforms also should be used such as media outlets, community-lectures, conferences, music concerts, drama, movies, posters, brochures, leaflets, and drawing arts.

5.7.2 Enhance refresher training to healthcare providers to eliminate TB-relating stigma

The MoH should launch a campaign to eliminate TB-relating stigma in healthcare settings. This campaign first, should ensures that healthcare workers have deeper understanding about TB disease. Areas of focus in the training should be to understand how TB is transmitted, risk factors for getting active TB, and how is prevented, and to ensure this knowledge is communicated effectively to the receiver of care. In addition, the campaign should focus on building the capacity to offer TB services without stigma, and ensuring that the care provided protects the dignity, respect, and health needs of the patient. Similarly, health care workers should be empowered to provide counseling to TB patients, and / or their treatment supporters, by avoiding the use of stigmatizing and discriminative language. Furthermore, health care providers should be educated on how to prevent infection in the workplace and ensure maintenance of patient’s privacy and confidentiality to their health information and disease status.

5.7.3 Establishing support programs for PWTB

In order to ensure TB patients are helped to recover fully from TB ailment, emotional, and psychological afflictions encountered during TB treatment journey, MoH should guide establishment of supporting programs at TB services delivery facilities. Supporting programs could operate like TB clubs where, medical providers, social workers, and psychotherapist will be involved to continue helping TB patients to recover from trauma and damages occurred along the TB treatment journey such as stigma and GBV experiences. These supporting programs will provide avenue for TB patients to come together and share their experiences and challenges and help themselves to overcomes difficulties encountered during TB treatment journey.

5.7.4 Strengthening engagement of private health facilities in delivering TB services

MoH should conduct comprehensive assessment to understand the dynamics of low engagement and contribution of private health facilities in delivering TB services. Challenges and bottlenecks that structurally constrains opportunities and resources of PWTB to access TB services in private facilities should be identified and addressed to ensure equity of provision of TB services among public and private health facilities. However, low government supports and shortage of human resources were parts of the reported reasons for low engagement of private health facilities in the provision of TB services, and thus, also needs attentions.

5.7.5 Enhancing supports for none-free TB services

Evidence from this study supported the need of supporting TB patients who fails to afford none-free TB services such as X-rays and biochemical tests which are required to monitor TB treatment. MoH should ensure effective implementation of free TB treatment policy in order to address the structural barrier which results from cost-sharing policy which constrain the opportunities of accessing TB services. Moreover, full exemption for TB services should be thought, else, reliable supporting mechanism for supporting none-free TB services should be introduced in health services delivery areas to ensure and promote right to health for PWTB.

5.7.6 Improving TB services delivery infrastructures to promote safety and privacy

In order to avoid none-stigmatizing TB services delivering areas, and to encourage safety, and, privacy in workplaces, MoH in corroboration with partners and stakeholders should strive to improve TB services delivery infrastructures through renovating the existing buildings, or building new ones, and ensure such buildings have adequate spaces for good ventilation and light that ensure infection prevention and control at workplace. Besides, TB services delivery infrastructures must be installed with controlled medical records systems that will guarantee privacy and confidentiality of TB patients' information.

5.7.7 Improving provision of nutritional supplements to TB patients

MoH and partners should ensure availability and supply of nutrition supplements particularly to malnourished TB patients in TB services delivery facilities. Budget for nutritional supplements should be introduced or increased so as to meet the demands and ensure quality and patient-centered care. Nonetheless, health facilities should also budget and procure nutritional supplements to complement the MoH efforts. On the other hand, efforts should be made to put in place the mechanism to support TB patients who are facing food challenges during TB treatment in order to ensure and promote the right to food for PWTB.

5.7.8 Promoting media engagement in TB-related stigma elimination

MoH through ICT department should scale up the use of social media platforms such as Facebook, Twitter, and Instagram. Simple and focused innovative messages be designed and utilized to penetrates information aimed at addressing TB misconception and stigma. These platforms must be used to communicate with the public TB-related issues, and to advocate stigma reduction. Moreover, media outlets such as television, radio, and newspapers should be used to inform, educate and advocate the needs, challenges, and pressing issues that constrains opportunities, resources, and wellbeing of PWTB. Furthermore, media could be the voice to the marginalized and vulnerable population who are at higher risk of contracting TB and suffer from TB-related stigma.

5.8 Study limitations

Despite the important evidences presented in the current study, our study was limited in a number of ways: first, the study involved only 5 out of 31 regions which may have underrepresented the geo-cultural differences regarding the patterns and scope of TB-related stigma in Tanzania. Secondly, small sample size was used to characterize the patterns and estimate the extent of TB-related stigma among family members, community members, and healthcare workers which could have missed pertinent associations and true estimations. In addition, conveniently recruitment of study participants could have caused under or over estimates of the level of TB-related stigma and therefore limit generalizability of these findings. Furthermore, the current study did not cover the legal environment assessment of structural TB stigma, as well as limited exploration of GBV-related dynamics.

5.9 Conclusion

The current study regarding TB-related stigma have showed moderate to high level of stigma among PWTB, families of TB patients, communities, and healthcare workers which was most driven by fear of contracting TB and disclosure of TB status. The TB-related stigma also manifested in forms of GBV characterized by social isolation, rejection, blaming, and family separation. Clinical consequences related to TB-related stigma includes delays in seeking care, beginning, adhering, and completing TB treatment. Furthermore, cost-sharing, inadequate and dilapidated TB services delivery areas, low engagement of private health facilities, and inadequate supply of food and nutrition supplements were recognized to constrain access and quality of TB services. These findings call for urgent interventions and measures to reduce the burden of TB-related stigma and GBV and ensure availability of resources and opportunities to promote access to TB services in Tanzania.

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8. APPENDICES

Appendix 1: Description of indicators in the TB stigma

Indicator	Description	Method	Results
PWTB self-stigma level (n=418) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 12-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 12 (number of questions)	40%
Family Secondary Stigma Level (n=73) (0-100%)	10 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; secondary stigma experienced by the family of PWTB at the time of diagnosis — tool Arcencio TB Stigma Scale, Public Health Action 2014	**numerator:** total score in the 10-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 10 (number of questions)	37%
Community/Neighbours Perceived Stigma Towards PWTB (n=171) (0–100%)	10 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; tool adapted from Van Rie TB Community Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 10-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 10 (number of questions)	72%
Healthcare Workers Perceived Stigma towards PWTB (n=79) (0–100%)	9 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma;	**numerator:** total score in the 9-item questionnaire within the general sample;	53%

	tool adapted from Corrigan 9 Stigma Domains (AQ-9)	**denominator:** number of respondents x 4 (points) x 9 (number of questions)	
SUB-ANALYSIS OF LEVEL OF TB-RELATED STIGMA FOR PWTB IDENTIFIED IN VULNABLE GROUPS			
PWTB not identified with any vulnerable group (n=183) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 12-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 12 (number of questions)	40%
PWTB identified as TB-HIV Co-infection (n=86) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 12-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 12 (number of questions)	44%
PWTB identified as urban slum dweller (n=80) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 12-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 12 (number of questions)	45%
PWTB identified as rural slum dweller (n=107) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma;	**numerator:** total score in the 12-item questionnaire within the general sample;	41%

	the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**denominator:** number of respondents x 4 (points) x 12 (number of questions)	
PWTB identified as healthcare workers (n=8) (0–100%)	12 item questionnaires with a scale from 0 to 4, where the higher score indicates higher stigma; the tool adapted from Van Rie TB Patient Stigma Scale, Tropical Medicine and International Health 2008	**numerator:** total score in the 12-item questionnaire within the general sample; **denominator:** number of respondents x 4 (points) x 12 (number of questions)	45%