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Tuberculosis-Associated Knowledge, Stigma, and Health Seeking Behavior Among Traders in Onitsha Main Market, Anambra State, Nigeria

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Abstract

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The utilization of tuberculosis (TB) health care services in a Nigerian state has not been optimal. Many residents do not utilize available health care resources when they experience symptoms of TB. Although much is known about the determinants of health seeking behavior (HSB), there is a gap on how TB knowledge and TB related stigma among traders in one main market contribute to HSB. This study examined the effect of TB knowledge and TB related stigma on HSB among traders. The health stigma and discrimination and health belif models served as the theoretical foundation. A quantitative cross-sectional analytical survey design was implemented on a convenient sample of 230 traders at the main market. Results of a binary logistic regression model showed a statistically significant relationship between TB knowledge and HSB (*OR* = 3.30, 95% CI [1.56, 6.97], $p = 0.002$). Based on multiple variable logistic regression, adjusting for stigma (attitude) strengthened the observed relationship between TB knowledge and HSB (adjusted *OR* = 3.77, 95% CI [1.71, 8.35], $p < 0.001$), and further adjusting for sociodemographics (age, gender, marital status and level of education) reduced the magnitude of the relationship slightly (adjusted *OR* = 3.32, 95% CI [1.20, 8.72], $p = 0.02$) but increased variability in both cases. The social change implication for this study and its findings is that, by implementing policies and strategies that specifically address TB knowledge and stigma, policymakers and National Tuberculosis and Leprosy Program in the state may increase HSB among traders at this populated market and thus advance TB control and prevention efforts.

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Dedication

You made all the delicate inner parts of my body and knit me together in my mother's womb. You called me from the womb; from the bowels of my mother, you made mention of my name. You have made my mouth like a sharp sword; in the shadow of your hand, you hid me and made me a polished shaft; in your quiver, you hid me. Thank you for making me so wonderfully complex! Your workmanship is marvelous--how well I know it. You watched me as I was being formed in utter seclusion as was woven together in the dark of the womb, you saw me before I was born. Every day of my life was recorded in your book. Every moment was laid out before a single day had passed. How precious are your thoughts about me, O God!

My mother's radical faith was a spiritual force that pulled the manifestation of God's power upon my life. She was a voice that God used to shut the mouth of death that came to swallow me up at the age of 5; the doctor at the local community hospital where I came from advised that I should be taken home to die because my condition deferred all medical care and treatments. It is my joy to dedicate this dissertation to Almighty God for his mercy and grace upon me AND to my darling mother Mrs. Elizabeth Ezeobi (Record Umuagbara) in appreciation for making herself available and for standing in a gap for me when I could not.

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God used a lot of people for my accomplishment in life. To Ms. Comfort Ekwueme, my mentor who taught me what it takes to make a life as a woman and who has inspired me to do great things. May your soul continue to rest in the bosom of God Almighty. Your strength and resilience inspired me to persevere despite the obstacles I faced. To my husband and my son Prince Chike Ezeosim. My sincere thanks to you both for being a wonderful family. They went aboard to help me bring this dissertation to completion. I do not know how I would have done this without you both. You both have been my backbone. Your love and support have given me the will to do more. I love you always. I wish to thank Dr. Ndetan Harrison, my dissertation chair, for patiently guiding me through the dissertation. You were always lovingly nudging me on to continue progressing with the dissertation journey. Your excellent, experienced, and timely feedback ensured that I advanced with my work as fast as I could. I also wish to thank Dr. Debo I. Awosike-Olumo, my committee member, for his thoroughness in reviewing my work and for providing timely feedback to me. Also, my appreciation goes to my Walden family, who always provided useful feedback to me and ensured that my work was returned within the stipulated time frame.

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Chapter 1: Introduction to the Study

Nigeria was one of the eight countries acounting for two-thirds of the people who developed Tuberculosis (TB) in 2020 (World Health Organization [WHO], 2021). Anambra State, Nigeria, has the highest TB rate in the southeast zone of Nigeria and ranked 26th in the country in terms of the number of cases notified (National Tuberculosis and Leprosy Control Program [NTBLCP], 2020). Ugwu et al. (2021) ranked Onitsha north and south first and second respectively on the highest TB spot in Anambra State.

Despite the high burden of TB in Anambra State and the availability of efficacious treatment for the disease, many residents of the State do not utilize available health care resources when they experience symptoms of TB (Adebayo et al., 2020). This inability to utilize available health resources in the State has been attributed to the health seeking behavior of the people. Nwaokoro et al. (2020) noted that there is a heavy reliance on traditional medicine among TB patient in Anambra State.

Poor knowlegde about TB and TB-associated stigma, perpetuated by myths and misconceptions about TB, are also thought to contribute to the poor health seeking behavior with regards to TB (Kane et al., 2019). Specifically, Onitsha main market is overcrowded and has very poor ventilation, factors that favor the high transmission of TB. There is no study to my knowledge that has been conducted to determine how the heath seeking behavior of traders along with myths and misconception concerning TB contribute to the high prevalence of TB in Onitsha. I used a validated stigma measurement scale to quantify how stigma and knowledge of TB contribute to the health seeking behavior among traders in Onitsha main market, Anambra State, Nigeria.

Background of the study

TB is a chronic infectious disease affecting mainly the lungs, but it can also affect other parts of the body (WHO, 2017). About one third of the world's population is infected with TB, but only 5 to 10% of those infected go to develop in 2 to 5 years (Carranza, 2020; WHO, 2019). Over 10 million new cases of TB are reported annually, with the largest numbers in developing countries of the world (WHO, 2021). The WHO (2021) reported that about 1.3 million died from the disease in 2020. Nigeria is one of the five countries that contributed to the global gap in TB case detection (WHO, 2021). The WHO (2021) estimated that about 452,000 persons developed TB in Nigeria in 2020, with 128,000 deaths. Anambra State, where Onitsha is situated, is ranked 6th in terms of the number of TB cases reported in Nigeria in 2019 (NTBLCP, 2020).

Despite the high prevalence of TB globally and in Nigeria, TB can be cured (Lewinsohn et al., 2017). Treatment for TB focuses on multiple anti-TB drug therapies, which are used to lower the bacterial load, thereby reducing the amount of TB bacilli in individuals with TB, making it less transmissible (Lewinsohn et al., 2017). If detected early and managed properly with standard anti-TB drugs with the right dosages and the correct duration of treatment, individuals with TB can be cured (Lewinsohn et al., 2017). Early TB case detection and adequate treatment is, therefore, critical to reducing the transmission of TB in society (Houben & Dodd, 2016; Lewinsohn et al., 2017). To ensure early case detection, awareness about TB in the general population is important. For instance, TB testing increases awareness of latent TB carriers and reduces the risk of becoming actively TB infected (Chukwudi et al., 2020).

To ensure early case detection, Ali et al. (2019) opined that knowledge about TB prevention strategies, linkage of diagnosed cases to care, administration of anti-TB drugs, and proper follow-up of the patient on treatment will contribute to the reduction in the burden of TB. Such measures are necessary to prevent the development of drug-resistant TB by those already diagnosed with the disease (Chukwudi et al., 2020). Addressing the various cultural and social factors related to stigmatization and poor knowledge about TB should promote early TB case detection and reduction in the development of unfavorable outcomes of TB treatment (Ali et al., 2019). Balogun et al. (2019) revealed that stigmatization and lack of TB knowledge contributes to high TB burden.

The current high TB burden in many countries is thought to be due to the many misconceptions about TB and the stigmatization of the persons suffering from TB (Chakrabartty et al., 2018). In a study carried out in the southeast of Nigeria, researchers found that inadequate knowledge of TB, misconceptions about the disease, and stigmatization of TB patients are major factors for poor outcomes in persons with TB (Onyedum et al., 2017).

For public health to mitigate the poor outcomes among patients with TB, appropriate measures must be instituted to decrease the burden of stigma that often increase the burden of TB disease (Rao et al., 2019). One of these measures is proper education of TB patients about the disease. Stangl et al. (2019) found that TB patients who are knowledgeable about the disease respond better and faster to TB treatment than those less knowledgeable about the disease.

Stigmatization is complex and results when an identifiable group of individuals are discriminated against. The multifaceted attributes of stigmatization can affect individual attitudes as well as those of an institution and community. Because of its complexity, stigmatization often poses challenges in the development of effective de-stigmatization-focused public health interventions (Stangl et al., 2019). Stigma has been associated with a lack of knowledge about the disease spread and transmission. Balogun et al. (2019) noted that poor knowledge of TB could contribute to the high burden of TB due to patients' poor health seeking behavior and inappropriate care. Stigmatization instills a sense of fear and anger towards the person or persons affected by certain diseases, including TB. Because of the fear of being stigmatized, people feel guilty, depressed, and shame, and as a result may withdraw themselves from relationships. These destructive behaviors can put a stigmatized person at risk of delay in a health-seeking behavior, psychological stress, as well as a worsening health condition (Stangl et al., 2019). Oladimeji et al. (2021) reported that poor knowledge of TB illness can adversely influence health and impede patients' recovery.

Addressing the lack of knowledge of TB and the perception of TB-associated stigma within the Anambra community is critical because stigma and lack of knowledge can prevent timely diagnosis and treatment for already compromised and marginalized individuals (Nyblade et al., 2018; Nyblade et al., 2019). This can be done through a public health community TB awareness campaign and TB-related de-stigmatization educational interventions (Geter et al., 2018).

Studies on increasing the use of modern TB centered in Anambra State have tended to concentrate on TB knowledge and practice among medical staff and the infrastructure (Adebayo et al., 2020). Studies focusing on knowledge and attitudes towards TB in Anambra State included those of Ndubisi et al. (2016) and Nwaokoro et al. (2019). Eliciting the community knowledge and TB associated stigma could provide insight into poor health seeking behavior among the community. This is essential as it could provide information necessary to address TB-associated stigma awareness, unfounded fear of TB transmission, and societal attitude toward those affected with TB to the goal towards TB elimination (Ali et al., 2019). Both individual and structural levels of stigma are rooted in behavior; intervention to address it must target both the affected individual and the community/society (Ikeda at al., 2019). This research study aligned with Walden University's mission of social change with marginalized individuals who are at risk of disease and disease-related comorbidities.

Included in this chapter are several sections: problem statement, purpose of the study, significance of the study, background of the study, framework (conceptual or theoretical), research questions and the hypotheses, nature of the study, possible type and sources of data, limitations, challenges or barriers, and summary.

Problem Statement

TB infection continues to be a global challenge (Knight et al., 2019), with Nigeria being classified among the most burdened nations in the world (WHO, 2019). In particular, the Onitsha area in Anambra State, Nigeria, has very high TB prevalence (Oladimeji et al., 2021; Ugwu et al., 2021). While early care-seeking, early diagnosis, and

treatment have been known to help mitigate the impact of the disease (Oladimeji et al., 2021), and despite the concerted and documented efforts by Nigerian authorities to make modern TB treatment available to its people, residents of Anambra State and Onitsha seek health care or treatment for TB at a low rate based on WHO standards (Adebayo et al., 2020), with an overreliance on traditional medicine (Nwaokoro et al., 2020). In this study, I aimed to identify factors that may be responsible for such poor health seeking behavior in this community.

The Onitsha region is popular for its trading activities, being the largest market in West Africa and pulling together a large crowd of people consistently; overcrowding has been known to favor the spread of TB (Sitanggang, 2020). However, poor knowledge of TB and TB-associated stigma have been a barrier to healthcare delivery and utilization, mainly due to societal, community, and individual attitudes, beliefs, perceptions, misconceptions, or myths that negatively impact the health seeking behavior of individuals affected with TB (Ndubisi et al., 2016; Onuka et al., 2018). This behavior impedes the prevention, diagnosis, treatment, and management of TB (Ndubisi et al., 2016; Onuka et al., 2018). Although poor knowledge about TB and TB-associated stigma are thought to be a major problem in Anambra, perpetuated by myths and misconceptions about TB, no clear association has been established between these and their TB-related health seeking behaviors, particularly among traders who operate frequently in conditions that tend to favor the spread of TB. Hence, I sought to document evidence linking the knowledge about TB infection and stigma to TB-related health-seeking behavior among the Onitsha main market traders in Anambra State, Nigeria.

Purpose of the Study

The main purpose of this quantitative study was to examine the existence of an association of TB-related knowledge and stigma to health seeking behavior among traders of the Onitsha main market, Anambra, Nigeria, while controlling for sociodemographic factors such as gender, age, marital status, and level of education. The research was embedded in the social constructivist paradigm. With this model, I mathematically quantified the knowledge the study participants had about TB and the stigma they had experienced or had towards people affected with TB and how these might have influenced their health seeking behavior for this infection. Information emanated from this study may help inform future plans by responsible authorities such as the NTPLCP in Anambra State in designing and implementing evidence-driven advocate communication and social mobilization activities to control TB in this unique community.

Research Questions and Hypotheses

The following research questions are created to guide the research study:

Research question (RQ1): What is the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders?

$H_0$1: There is no significant association between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

H_a1: There is a relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

RQ2: Does TB-related stigma affect the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders?

$H_0$2: TB-related stigma does not affect the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

H_a2: TB-related stigma affects the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

RQ3: Does the further controlling of sociodemographics (age, gender, marital status, and level of education) affect how knowledge and stigma affect health-seeking behavior in relation to TB among Onitsha main market traders?

$H_0$3: Further controlling of sociodemographics (age, gender, marital status, and level of education) does not affect how knowledge and stigma affects health-seeking behavior in relation to TB among Onitsha main market traders.

H_a3: Further controlling of sociodemographics (gender, marital status, age, and level of education) does affect how knowledge and stigma affects health-seeking behavior in relation to TB among Onitsha main market traders.

Theoretical and Conceptual Framework

The theories that grounded this study included the health stigma and discrimination framework by Stangl. The theory came out of the quest to modify the historical theories of stigma and to incorporate other factors with the aim of improving stigma outcomes (Barlosius & Phillipps, 2015; Longdon & Read, 2017; Misir, 2015; Sikorsk et al., 2015; Tomiyama, 2014). This theory, developed in 2019, has found application in quantitative studies where in-depth interviews were employed to

understand stigma through broader social, cultural, political, and economic structures. An assumption of the theory is that certain factors drive or facilitate health-related stigma (Stangl et al., 2019). The core of the theory is that the key constructs – driver and facilitator, stigma "markings," and stigma manifestation -- are central in influencing a range of outcomes, not only on the individual affected by the disease but the organization and the institution.

Rosenstock (1974) health belief model (HBM) also supported this study. The HBM has been used in all aspects of health promotion and prevention research that involves behavior and uptake of health-related care (Shmueli, 2021). Poor knowledge has increasingly been a barrier to healthcare delivery and utilization, mainly due to societal, community, and individual attitudes, beliefs, perceptions, misconceptions, or myths that negatively impact health seeking behaviors of individuals affected with TB (Ndubisi et al., 2016; Onuka et al., 2018). Poor knowledge impedes the prevention, diagnosis, treatment, and management of TB (Ndubisi et al., 2016; Onuka et al., 2018). A person's behavior is largely influenced by the belief and understanding that HBM constructs are crucial to improve knowledge about TB and TB preventive actions

Nature of the Study

In this study, I examined if TB knowledge and stigma were associated with health seeking behavior among traders in the Onitsha main market. The independent variable was the TB knowledge and TB-related stigma. The dependent or outcome variable was health seeking behavior. Age, gender, marital status, and level of education. The nature of the research was quantitative. The study design was cross sectional as none of the

variables were manipulated, and there was no control group. The dataset from the Onitsha main market was documented in Microsoft excel and then transferred to SPSS for analysis. The health seeking behavior was calculated by the number of patients who would seek help when confronted with TB symptoms. TB knowledge and TB-related stigma were reported as yes or no, with the numerical sign of 1 for yes for good TB knowledge and good attitude towards TB and people affected with TB, and 0 for no for those with poor TB knowledge and poor TB attitude/stigma respectively. Age was measured as continuous but categorized in three groups (18-34, 35-64, 65+). Gender was reported by male or female (1 for male and 2 for female). Marital status was presented as single = 1, married = 2, widow/widower = 3, and separated/divorced = 4 while level of education was presented as no education = 1, primary education = 2, secondary education = 3, and above secondary education = 4. I performed binary logistic regression analysis on the data to determine if TB knowledge was a significant predictor outcome for health seeking behavior. I used binary logistic regression analysis because it is an appropriate test for a variable that takes two possible outcomes. I performed multiple logistic regression analysis to examine if TB-related stigma affects the relationship between TB knowledge and health seeking behavior and also if further controlling of sociodemographic factors (age, gender, marital status, and the level of education) affect how TB knowledge and TB-related stigma affect health seeking behavior. A multiple logistic regression analysis test is appropriate when there is a single dichotomous outcome variable and more than one independent variables (see Salkind, 2010).

Possible Types of Sources of Data

Primary data from this study came from the responses of traders in the Onitsha main market in Anambra State, Nigeria. Permission was obtained from the Anambra State Ministry of Health to conduct the research using the information obtained. The data were deidentified to conceal the identity of the traders who participated in the study. Also, per the Institutional Review Board (IRB) approval process at Walden University, the participants indicated their consent to participate in the study by filling out the survey. Secondary data were examined along with existing literature on health seeking behavior. This was important for comparison in other states in Anambra, Nigeria, and other countries of the world.

Definitions of Terms

Anticipated stigma: Expectations of being devalued by others if a stigmatized health condition is known (Quinn &Chaudoir, 2009).

Associative stigma: Ill or devalued experience encountered as a result of a relationship or service one rendered to a person with a stigmatized condition (Holzemer et al., 2009).

Health seeking behavior: Any action undertaken by a victim of an undesirable health condition towards finding a cure (Ward et al., 1997).

Internalized stigma: A subjective perception of devaluation, marginalization, secrecy, shame, and withdrawal felt by a victim of a stigmatized condition toward self (Rao et al., 2012).

Knowledge: This refers to information and facts acquired to widen someone's understanding (Schiavo, 2007). In particular, TB-related knowledge is appropriate information needed to engage in a positive attitude towards TB and its treatment (Kigozi et al., 2017).

Onitsha Main Market: One of the largest markets in West Africa ((Ochia & Ochia, 2022).

Perceived barrier: The individual's perceptions of the costs and sacrifices towards adopting recommended actions (Schiavo, 2007).

Perceived benefit: The individual's perceptions of the usefulness of a recommended action towards reducing disease severity (Schiavo, 2007).

Perceived severity: The subjective feeling of brutality of the disease toward self (Schiavo, 2007).

Perceived stigma: Feeling or belief that stigma will occur due to one's health condition (Zelaya et al., 2012).

Perceived susceptibility: The individual's feeling of whether they could be affected by the disease (Schiavo, 2007).

Stigma: This is prejudice that devalues, discounts, discredits, and discriminates against individuals and groups, further driven by inequality based on gender, sexual orientation, and race (U.S. Department of Health and Human Services Health Resources and Services Administration HIV/AIDS Bureau, 2011).

Tuberculosis: A serious infectious disease caused by the *mycobacterium tuberculosis,* affecting mostly the lungs and characterized by the growth of nodules

(tubercles) in its tissues. The bacteria are spread when an infected person coughs or sneezes. Infected persons are mostly asymptomatic (with no symptoms) and do not require treatment. However, symptomatic patients typically experience cough (sometimes with blood), weight loss, night sweats, and fever, requiring a long course multiple antibiotics treatment (Sharma & Sarkar, 2018)

Tuberculosis-related stigma: This is a situation where an individual or group of individuals are identified as being undesirable or devalued as a result of having or being exposed to TB infection (Lucas & Phelan, 2012)). It could manifest in various ways, including; stereotypes, prejudice, stigmatizing behaviors and discriminatory attitudes (Stanly, 2019).

Assumptions

In this cross-sectional analytical study, I employed a survey design on traders at the Onitsha main market in Anambra, Nigeria, to assess how their TB-related stigma and TB knowledge influenced their behavior in relation to seeking care for their TB infection. This required me to administer a structure questionnaire to traders. Based on the constructs of the HBM, I assumed that the practice of TB testing and seeking care among the traders was influenced by barriers to TB testing and health seeking behaviors as their stigmatizing attitude and personal knowledge of discriminatory practice towards people living with TB (see Shmueli, 2021; Stangl et al., 2019). I assumed that traders who were not well informed about the infection or who experienced stigma would not seek medical care if infected by TB (Ali et al., 2019; Chrisman, 2019). This was the main assumption that underlined the investigation, and I sought to document evidence. It was also assumed

that there was a high spread of the TB in the market due to overcrowding (see Ugwu et al., 2021). I also assumed that sociodemographic variables such as age, gender, marital status, and level of education may also impact the likelihood of traders' health seeking behavior (see Balogun et al., 2019; Datiko, 2020; Kurti et al., 2014). Moreover, I assumed that the traders would be willing to participate and be open to share personal health information, beliefs, and behaviors with me. I further assumed that enough study participants would enroll in the study to ensure the statistical power of at least 80%.

Delimitation and Limitations

The collection for this study occurred every day for a period of 12 days in December 2022 during the early hours to avoid interrupting busy hours with customers. The study was limited to only traders who operated in shops at Onitsha main market, thus limiting the generalizability of the results to other traders. I used a cross-sectional analytical design on a convenience sample of traders. Cross-sectional designs are limited in the ability to establish claims related to causality because they capture data only at one point in time and temporality is not ascertained (Frankfort-Nachmias & Leon-Guerrero, 2008). The use of a convenience sample limited the generalizability of the study findings. Survey designs also have limitations in association with recall bias as not everyone is able to recall everything associated with the study. Traders may be concerned about being stigmatized because of a lack of knowledge or having had experience with the disease. As such, they may have not been truthful in their answers to the survey questions, affecting the integrity of the data. The individual participant may have given information they deemed acceptable by society rather than a true answer, thereby affecting the

validity of the result (see Singleton & Straits, 2005). Ensuring the participant of the confidentiality and anonymity of their information, not being judgmental about their beliefs, and providing freedom to exit the study at any time may have helped mitigate this problem.

Significance

In this study, I addressed TB prevention and treatment by focusing on factors that impact health seeking behavior among traders in the Onitsha main market in Anambra State of Nigeria. Onitsha traders operate in conditions that favor TB spread, thereby exposing others in the community and State to TB. The increase of TB spread in the State poses challenges in achieving the WHO mandate of reducing TB by 85% by the year 2025 (WHO, 2018). Poor health seeking behavior has a consequential effect on the already compromised health system of the State (Ugwu et al., 2021). Health seeking behavior among patients with TB symptoms is critical to obtaining good TB patient outcomes, which are manifested through decreased morbidity and mortality rates due to TB (Adejumo et al., 2016; Naidoo et al., 2013; Wen et al., 2014). Health care seeking behavior could also enhance the attainment of set goals and targets by National TB Programs (NTPs). The study contributes to knowledge about TB and DE stigmatization of people affected with TB among Onitsha market traders. Findings from this study may contribute to TB intervention and prevention efforts among this vulnerable community. Also, insights from this study may encourage policy and advocacy group decision makers to make policies and decisions that promote health seeking behavior related to TB to mitigate the TB spread. TB spread and transmission can be mitigated if patients and those

suspected with TB are placed on anti-TB drugs early (Zegeye et al., 2019). It is essential that people be aware of how TB is transmitted, controlled, and treated, thus addressing a significant public health challenge given the high morbidity and mortality associated with TB infection (Njelita et al., 2019). The effect of not seeking early care during TB symptoms is seen in increased mortality and morbidity rates due to TB and the development of drug-resistant TB (Khan et al., 2019; Oluwasanu et al., 2020). Health education has been identified as one of the pillars of TB prevention and control (Siuki et al., 2018). Therefore, further exploration of health seeking behavior in relation to TB may provide insight on how to design or tailor health education, including factors to target, to mitigate TB spread among the traders who operate in conditions that favor TB spread, resulting in a positive social change of a reduction in suffering and death associated with TB in the community.

Social Change Implications

In 2020, about 452,000 persons developed TB in Nigeria, with 128,000 resulting in deaths. Anambra State, where Onitsha is situated, is ranked 6th in terms of the number of TB cases reported in Nigeria in 2019 (NTBLCP, 2020). The reduction in TB spread may improve this statistic and better the health indices of Nigeria. This study's findings may help appropriate authorities and researchers in Anambra and Nigeria to design appropriate interventions to address the effect, if any, of stigmatizing attitudes and personal knowledge of discriminatory practice towards TB and people affected with TB on health seeking behavior. This may impact the social system by increasing the numbers of Onitsha main market traders who seek health care when confronted with TB

symptoms, which many studies have shown is the key to TB prevention, treatment, and control (Ali et al., 2019; Sterling et al., 2020; Ugwu et al., 2021). Also, the social system is positively impacted when there is a reduction in funds spent by the government on the control of the TB epidemic in Anambra State and Nigeria. These funds can be diverted to other social events in the State and country.

Summary

As TB continues to mount challenges in Anambra State along with its compromising the health of the community, the people of Anambra State have sought health care at a low rate when confronted with TB symptoms (Nwaokoro et al., 2020). Ugwu et al. (2021) posited that TB continues to rise among people in the Onitsha area of Anambra State and consequently poor health seeking behavior results in a high morbidity and mortality rate in that community. The goal of this study was to examine if TB knowledge and TB-related stigma affected health seeking behavior among traders in the Onitsha main market. The health seeking behavior was determined by the ability of the traders to seek health care when confronted with TB symptoms. I provided an overview of the study in this chapter. The introduction to the study topic, the background of the study, the problem statement, the study purpose, RQs and hypotheses, the theoretical framework, the nature of the study, definitions of key terms, assumptions of the study, the significance of the study, and social implication of the study were all included. In Chapter 2, I review current literature related to the effect of TB knowledge, TB-related stigma, and some relevant sociodemographic factors on health seeking behavior among the

traders. The introductory information in Chapter 1 provided a foundation for identifying and reviewing the relevant current literature for this study.

Chapter 2: Literature Review

Introduction

In this chapter, I provide deeper insights into issues already highlighted in the previous chapter. Various aspects of the research topic are explored in-depth. The review of current literature provides an extensive investigation into the research about TB and TB perceptions in Anambra State of Nigeria. This chapter comprises various sections that give an opportunity for retrieving articles that are important in filling the study gap and to provide justification for the research. I start by explaining the strategy used in securing material needed for the study. This is followed with an analysis of the theoretical foundation supporting the study and then the overview and classification of TB. Both the global and local burden of TB is explained. Also included in the chapter is an explanation of TB and TB management in general as well as the control of TB. TB treatment and guidelines in Anambra State are also be explored. The knowledge, attitude, and behavior of TB infection and treatment among individuals in Anambra State including the health seeking behavior are assessed. These provide evidence for the independent variables (knowledge of TB and TB associated stigma), which was the focus of this research. Analysis of various quantitative studies regarding the knowledge of TB and TB-associated stigma is also included. Lastly, the summary and conclusions of the literature review are provided. Organizing the search following these guidelines assisted me in proper arrangement and coverage of relevant information.

The complex nature of TB infection makes TB a disease of public health interest. Over 10 million cases of TB according to WHO (2017) are being reported yearly.

Prevention and treatment of active TB is critical if WHO End TB strategy and effort to eliminate TB will be achieved. TB can be treated and cured by the administration of multiple anti-TB medications. TB case finding and an effective initiation of multiple anti-TB drugs early can reduce the rate of TB transmission, decrease complications, and increase chance of survival (Lewinsohn et al., 2017). The WHO (2017) recommended that essential drugs (first-line), anti-TB treatment start immediately for adults and children exposed or infected with TB; otherwise, complications, including multidrug resistance TB, can emerge. Adherence to the recommendations and the developed national TB guidelines put in place by countries to improve diagnosis and management of TB is the key to better TB management outcome (Balogun et al., 2019). Nonadherence to these guidelines and recommendation will impede the effective care of TB control, leading to poor TB outcomes (Balogun et al., 2019).

To improve the diagnosis and treatment of TB, patients with symptoms of TB should be seen, diagnosed, and treated early (Balogun et al., 2019; WHO, 2019). Early diagnosis and treatment have been found to mitigate the spread of TB to family, community, and society (Ohamaeme et al., 2019; WHO, 2019). Poor knowledge, stigma, and attitudes towards individuals with TB create challenges in TB control in most African countries, especially Nigeria (WHO, 2018). Those who have good knowledge of TB and perceive TB as a serious disease seek care early (Adejumo et al., 2016; WHO, 2019). Poor knowledge and stigma towards TB deprive patients with TB symptoms an opportunity to seek medical care and treatment early (Dorji et al., 2020). Delay in seeking

care makes the patient's state worse and decreases the patient's chances of survival from TB disease (Bolajoko et al., 2020; Kendall 2021).

Some of the factors responsible for poor health seeking behavior include (a) poor knowledge and poor attitude and behavior towards TB infection and spread, (b) belief of the efficacy of prayer dynasties for healing, (c) looking at TB symptoms as a spiritual attack or from the goddess, and (d) fear of being stigmatized and attributing TB symptoms to malaria or other cold symptoms (Khan et al., 2020; Nwafor et al., 2019). Although poor knowledge about TB and TB-associated stigma are thought to be a major problem in Anambra, perpetuated by myths and misconceptions about TB, no clear association has been established between these and their TB-related health seeking behavior, particularly among traders who operate frequently in conditions that tend to favor the spread of TB. This study was the first to use validated stigma measurement scales to quantify the stigma and knowledge in association to health-seeking behavior among the Onitsha main market traders in Anambra State, Nigeria. The information elicited through their responses can help the NTBLCP in Anambra State design and implement evidence-driven advocate communication and social mobilization activities as its mandate to control TB in Anambra State. With this in mind, I examined the existence of an association between TB-related knowledge and health seeking behavior and the potential effect of stigma on health seeking-behavior among traders of Onitsha main market, Anambra State of Nigeria.

In this study, research was embedded in the social constructivist paradigm. With this model, I mathematically quantified the stigma and knowledge the study participants

had about TB and the people affected by TB and how that influenced health seeking behavior. The participants were also further categorized by gender, age, marital status, and level of education, and then I extracted and quantified common knowledge and perceived stigma from their responses. The study participants were asked to answer the questions in the questionnaire about their health-seeking behavior, TB knowlegde and awareness, and TB attitudes and stigma. The evidence-based research studies, book chapters, reports and meetings that provided the theoretical and the methodological frameworks for the study were examined as well.

Literature Search Criteria

The key terms used to search databases included a combination of key concepts of my RQs for the systemic review and retrieving of accurate results. The keywords used in retrieving the literatures were *tuberculosis, early treatment and management, delay in seeking care, perceptions of TB, TB burden in Anambra State, modern and traditional care, clinical guidelines, overcrowdedness,* and *health belief model*. The articles published in the English language from 2018 to 2023 were used for the literature review; articles older than 5 years were only used in typical situations, for instance, in theoretical frameworks. The databases used included the Walden University library, CINAHL Plus full text, Cochrane library, MEDLINE with Full Text, ProQuest, Google Scholar, PsychINFO, PubMed, EBSCOHOST, American Lung Association, scientific articles, books, and dissertations. The WHO and Centers for Disease and Control and Prevention (CDC) webpages were other internet sources used for this literature review. The search

revealed several technical reports, meetings, proceedings, abstracts, and theses that were cardinal to the study.

Global Burden of TB

TB in humans can be dated back to 9,000 years ago in Atlet Yam, a city off the coast of Israel. The organism *Mycobacterium tuberculosis* that causes TB infection was founded by Koch in 1882, and since then, TB has continued to pose a public health challenge leading to increased morbidity and mortality globally (Balogun et al., 2019). It is the fourth leading cause of death, and according to Churchyard et al. (2021), it is the fifth leading cause of premature death among all people living in high-burdened countries. TB is the second leading cause of death from infectious disease after HIV/AIDS (Mousquer et al., 2021). Roughly, 1.8 billion people are infected with TB globally (Loddenkemper et al., 2018). About 10 million new cases and 1.5 million death occur from TB each year (WHO, 2018).

Globally, countries are working to adopt and implement natural TB strategies and programs, but there is still a large gap between policy and practice due to financial and human factors and constructs. With the application of public health infection control with administrative, environmental, and personal protective measures, contact tracing, and treatment of infected individuals, TB disease is declining in many countries (Loddenkemper et al., 2018; Mousquer et al., 2021; WHO, 2020). The advent of HIV/AIDS, socioeconomic factors, human factors, and rise of drugs resistant to TB makes TB a major public health issue in many developing countries of the world, especially in Asia and African countries (WHO, 2018). Blanco et al. (2018) noted that

poor knowledge of TB infection is a major reason for delay in seeking TB treatment and for the increased prevalence of TB in developing countries compared to that of the developed countries of the world. Hassan et al. (2017) attributed progress made in TB control in recent years to important public health programs that increase individual understanding and knowledge of TB, TB management, and the intensity of TB infection and how it spreads. The poor knowledge of TB, however, threatens and undermines all efforts made by the government and other stakeholders in TB control (Balogun et al., 2019; Pengpid & Pettzer, 2019).

TB Transmission

TB is an airborne disease that is transmissible through droplets containing mycobacterium TB bacilli. Interrupting the chain of TB transmission and mitigating the effect of TB in the community is key in reducing TB incidence required to meet the End TB target (Khan et al., 2019). The main organ attacked by the *mycobacterium tuberculosis* is the lungs (Khan et al., 2019). However, other parts of the body (extrapulmonary TB) such as the abdomen, meninges, genitourinary tract, joints, lymph nodes, skin, and bones can also be affected (Khan et al., 2019). In 2016, Africa accounted for 23% of 918.011 extrapulmonary TB cases nationwide (WHO, 2018). A person infected by TB can transmit TB to others as they cough, sign, talk, and sneeze and release the droplet nuclei in the air (Khan et al., 2019; Ugwu et al., 2021). The droplet nuclei containing *mycobacterium tuberculosis* if inhaled can subject one to TB infection, especially if one's immunity is compromised (Khan et al., 2019; Ogbo et al., 2018). The infected nuclei released by the TB patient can get encapsulated in the lungs of a person

with strong immunity and will not develop active infection. About 10 to 15% of those with inactive (latent) TB will develop TB in their lifetime (Chukwudi et al., 2020; Ugwu et al., 2021; WHO, 2017). Those with compromised immune system such as those with HIV/AIDS, diabetes, and cancer, and those on certain medications have a higher rate of contacting TB (Lange et al., 2018; Ogbo et al., 2018).

Risk Factors for Developing TB

Several risk factors can put one at risk to TB infection. The density or concentration of TB bacilli harbored by an individual can determine if infection can result. Those who are in close contact with the TB patients (household, social contacts, coworkers) are at most risk of contracting a TB infection (Hlet et al., 2018; Xu et al., 2019). Adane et al. (2020), in their prevalence study in Ethiopia, found that TB prevalence was higher among the households. Environmental factors such as close and limited air space, poor lightening, and humidity increase the risk of TB (Mamahlodi, 2019; Mathema et al., 2017). Host related or individual factors are age, poor nutrition, HIV/AIDS, chronic conditions such as diabetes and cancer, and other conditions that compromise one's immunity as well as being a health care worker (Achanta et al., 2013; Adejumo, 2016; Akolo et al., 2021). Andre et al. (2018) found that testing the TB patient for HIV and screening the HIV patients for TB led to a decline in the TB death rate each year, increased TB cure rates, improved case detection, and increased identification and treatment of drug-resistance. TB is highly contagious, and a patient with TB can infect on average 10 to 15 persons, making family members and others in close proximity highly susceptible to TB infection (Jiamsakul et al., 2018; Khan et al., 2019; WHO, 2018). Mave

et al. (2017) found that over half of newly diagnosed TB patients had diabetes or prediabetes while smoking and alcohol intake rather than age and sex were found by Melsew et al. (2018) to be risk factors for TB. They did not find demographic characteristic such as age and sex as a significant risk factors for TB.

Studies have pinned socioeconomic and behavioral factors to vulnerability to TB infection (Jiamsakul et al., 2018; Saunder & Evans, 2020). Mitku et al. (2016) reported that unemployment, poor education, low income, poverty, smoking, and alcohol use were important risk factors associated with TB. They showed that certain individuals in sub-Sahara Africa have risk factors that influence the high prevalence of TB more than others, suggesting that individual factors and socioeconomic development play a great role in TB control. Ugwu et al. (2021) cited overcrowdedness as a risk factor for TB transmission. Duarte et al. (2018) summarized the effects of socioeconomic determinants and comorbidities (including HIV) on TB infection and disease; they commented that socioeconomic determinants have an effect on the degree of exposure, risk behaviors and access to health care. Without proper identification of these risk factors, TB control will be difficult (Saunder & Evans, 2020). Public health and others who have a stake in TB control should target the risk factors to address the issue of the high burden of TB. Improving the risk factors and interventions that would break the chain of TB transmission will go a long way in reducing the high burden of TB.

Clinical Presentation of TB

TB clinical manifestation is often at times nonspecific. The cardinal presentations of TB are cough for more than 2 or 3 weeks, sputum production, loss of appetite, fever, weight loss, night sweat, and hemoptysis (Chee, 2022). Extra pulmonary TB symptoms present according to the part of the body involved (Lyon & Rossman, 2017). Care must be taken when dealing with symptoms of TB to avoid a missed diagnosis of TB. Proano et al. (2018) found a correlation between coughing and disease extent but did not find cough as evidence for TB transmission. About 50% of persons diagnosed with TB according to Cudahy and Shenoi (2016) had no history of cough. Boardman et al. (2021) found that the majority of immigrant detainees with confirmed pulmonary TB disease were asymptomatic. Moreover, Lange et al. (2018) found that diabetes can adversely affect the clinical presentation of TB. In addition, Patterson and Wood (2019) speculated that a frequently coughing patient may be more infectious. Therefore, caution must be taken and further review is needed on the guidelines that portray coughing as main indicator for TB infection (Patterson & Wood, 2019).

Diagnosis of TB

The End TB strategy will not be achieved without proper management and control of TB cases. Guidelines for TB case findings and effective treatment of TB start with early diagnosis. Early diagnosis of TB set motion and map towards creating polices and monitoring for TB infection with the view of the End goal TB cure and elimination. Diagnosis is not possible if the patients affected by TB infection do not access modern health centers (Balogun et al., 2019). Andre et al. (2018) poised that proper diagnostic

processes should be followed to avoid an erroneous result (false positive or false negative). This would pose challenges to exposing the patient to treatment that is not needed or a patient not being treated when it is necessary.

Overall, the TB goal of elimination of TB can only be possible if TB cases are diagnosed early, and the contact tracing of people exposed to TB are followed (Alemu et al., 2017). Patients affected by TB infection are often being stigmatized (Ali et al., 2018). Poor knowledge and perceived TB-related stigma has been found to influence TB patients' exposure of their symptoms (Nwafor et al., 2019). Stangl et al. (2019) reported that patients sometimes do not disclose their disease status due to fear of being stigmatized and thus delay seeking healthcare. Getnet et al. (2019) investigated the possible effect of delay on infectiousness of patients at diagnosis in a Somali pastoralist area in Ethiopia and found that delay in diagnosis of pulmonary TB remained high and increased the infectiousness of patient. This is in line with the findings by Alemu et al. (2017) that delays in seeking care and delayed diagnosis fueled by stigma lead to an increased infectious pool of TB in Ethiopia, suggesting that improving early access to care would improve the patient's outcomes and reduce TB transmission. TB awareness and de-stigmatization measures are needed to ensure that the patients affected by TB infection access healthcare early. This would aid early diagnosis and early placement of patients with appropriate treatment.

The two main diagnostic tools for latent TB infection (LTBI) are tuberculin skin test (TST) and Interferon-Gamma Release Assays (IGRA). Cost made TST more preferable method that IGRA (Sharma et al., 2017). Sharma et al. (2017) point that

neither TST nor IGRA predicts significant development of active TB. Other diagnostic tools for TB are sputum microscopy, chest X-ray, rapid molecular tests, nucleic acid amplification test (NAATs), sputum culture, breath analysis of volatile organic compound and histopathological examination.

The presence of mycobacterium tuberculosis (MTB) in body fluid or secretion such as sputum, bronchoalveolar lavage or plural fluid or tissue can be a diagnosis of TB (Datta et al., 2017). Sputum microscopy are the most frequent used TB diagnostic tool globally (Datta et al., 2017). Though it is less expensive, without the sputum exceeding 10,000 per ml for MTB to be detected (Datta et al., 2017). Liquid culture still remains a gold standard for diagnosis of TB as it has capability of detecting both MTB and non-TB microbial (NTM) (Lopes & Voliati, 2017). Three sputum submission collected with eight hours apart is needed for the confirmation of TB (Datta et al., 2017). Therefore, it requires that patient pay more than one visit to the center. Again, it takes longer time for MTB to isolate from sputum. A condition that might lead to delay in diagnosis (Datta et al., 2017). Sputum culture has a greater sensitivity than microscopy (Datta et al., 2017). Without proper quality, missed TB diagnosis can result (Datta et al., 2017). Datta et al. (2017) found that TB diagnosis were substantially increased by either pooled collection or by providing instruction on how to produce a sputum sample taken at any time of the day. Public health professional and others that have stake in TB control need to outline proper TB diagnosis and implement measures that would improve early access and mitigate delay in TB diagnosis.

Chest X- Ray

Apart from bacteriological confirmation of TB which include sputum-smear, microscopy, culture or a molecular test, diagnosis of TB can also base on clinical diagnosis that include assessment and chest X-ray. X-ray has been widely used tool for dictating TB. Because chest X-ray can dictate abnormalities in the lung that can prompt the provider to look further or order other confirmatory diagnosis, is offers a fast diagnostic tool for TB (Alema et al., 2020). However, low specificity and significant interobserver variation, poor access to high-quality radiography equipment and expert interpretation make x-ray use alone as TB diagnosis challenging. Khan et al. (2020), found that x-ray meet WHO recommendation for minimal sensitivity and specificity as pulmonary TB triage tools. Khan et al. (2020) emphasized that x-ray should be done as a triage test and will not be used alone for TB diagnosis to avoid overdiagnosis or missed diagnosis. WHO (2017) recommends that bacteriological test must be performed for TB confirmation following abnormality detected with chest X-ray.

GeneXpert Machine

Public health continues to sort for new affordable TB diagnostic tools that aim at reducing diagnostic period. The Xpert MTB/RIF is an automated, cartridge-based NAAT that can simultaneously detect MTBC and RIF resistance within 2 hours. Its' sensitive and specific for diagnosis of PTB and Rifampicin resistant makes more preferable than sputum microscopy (Horne et al., 2019). Study done by Raizada et al. (2018) in India showed that Xpert yielded more valid results with high rate of TB detection. Horne et al. (2019) found that the combination of Xpert MTB/RIF and Xpert Ultra provided more

accurate result in diagnosing pulmonary TB and multi-drugs resistant TB in HIV positive patients. Kolia et al. (2019) noted Xpert MTB/RIF Ultra had the highest sensitivity of 100% of TB. Its short diagnostic period of 48 hours makes it more cost effective than sputum microscopy due to its ability to eliminate further diagnostic testing. Mertaniasih et al. (2019) in their study to evaluate the implementation of Xpert for the determination of pulmonary TB (PTB) and extrapulmonary TB (EPTB) in adults and children found that in adults and children with PTB and EPTB, the Xpert assay achieved a low positivity detection rate for micro bacteria TB complex in samples from new or previously treated TB cases. In a retrospective study by Sieiro et al. (2018) on the use of the Xpert MTB/RIF assay at primary health care clinics in the city of Rio de Janeiro, found that the Xpert MTB/RIF assay result was positive (detectable levels of M. TB) in 131 (16%) of 852 cases of suspected TB in adolescents, rifampin-resistant strains being identified in 3 (2%).

Attitude, Belief, Stigma, and Perception of TB in Anambra, Nigeria

Anambra local belief about TB include attribute of bad behavioral consequences as well as superstitious (Ugwu et al., 2021). There are numerous opinion people have about TB and TB transmission. Some feel that it is just one of tropical disease like malaria, not serious while to other TB is serious and dangerous. While TB in most of developed countries like USA is under control, in developing countries of African including Nigeria it is a bigger public health challenger (Ugwu et al., 2021).

Developed countries like USA are more open discussing about their health issues but in Nigeria people are very sensitive in discussing health conditions like TB and HIV

for the fear of being stigmatized or singled out. This is because of the attitude people have towards TB in association with HIV based on what they hear about AIDS in media and other broadcasting medium (Oluwasanu et al., 2020). People often feel embarrassed and anxious if they are asked to test TB or HIV. Both diseases are *nminwu*, meaning the disease that sucks life out of someone.

According to Erving Goffman, a Canadian sociology stigma occurs when an individual is disqualified (Goffman, 1963). He went further to articulate stigma process centering on difficulties stigmatized individual faces in management of social interaction (Stangl, 2019). Various studies have shown the relationship between lack of knowledge of TB and TB-associated stigmatization. Factors such as socioeconomic status, poverty, malnutrition have been found to also associate with TB associated stigma ((Deko-Gyeke, 2018). El-Masry & Muzaheed (2022) attributed belief on how TB can be transmitted negative attitudes about others. The shame, rejection, discrimination and neglect people affected with TB faced in the community have never changed. Recently, there was correlation between immigrants and burden of TB. The influx of merchandize from all within and outside Nigeria to Onitsha main market for commercial purposes are often blamed for the spread of TB in Anambra State (Ugwu et al., 2021). When Ugwu et al. (2021) studied Geospatial spot for TB in Anambra state, they found that certain areas of Onitsha have highest TB burden, which calls for preventive measures around those areas. These preventive steps contribute to the perception that Onitsha north, Onitsha south, ogbaru and Idemili north are at-risk groups; therefore, this contributes to stigma (Ugwu, et al., 2021).

Access to Healthcare

The sequential nature of health seeking behavior, as described by Chrisman (2019) provides a useful key to understanding the different pathways and experiences patients follow in seeking diagnosis and treatment. According to Chrisman (2019) health seeking behavior has five different stages that patients go through during their illness. These stages include the 'symptom definition' stage which deals with how patients perceive the physical changes produced by the disease; 'illness-related shifts in the role behavior' which refers to the way in which the evolution of symptoms influence how patient relate to their peers; 'treatment actions' which refers to the activities undertaken by patients to remove the burden of the illness; the 'lay consultation' stage refers to the exploring of peer's opinion about patient symptoms and suggestions for dealing with them; 'adherence' means those activities taken by patients for following treatment and medical advice. Understanding the way in which the patients interpret the TB symptoms, as well as the behavior and treatment actions they adopt, are important in developing strategies for controlling an infectious disease like in the case of TB. This is because the main contributing factor to TB transmission is the presence of untreated patients in the community (Khan et al., 2019; Oluwasanu et al., 2020; Ayalew et al., 2020). Studies have shown that delays in seeking TB treatment prolong the infectiousness of the disease and therefore, early diagnosis of TB and rapid initiation of treatment is a prerequisite for the control of TB (Oluwasanu et al., 2020).

Kleinman (1980) work on patient and healers in the context of culture, recognizes illness and disease as a social construction that is heavily influenced by the culture and

beliefs of the community. He acknowledges that the health care system has multiple players and that people's cultural beliefs and practices influence their health seeking practices. According to Kleinman, health care system has three sectors that closely overlap and are important in the study of sociocultural issues in health care. These include the professional, folk, and the popular sectors. The professional sector refers to the institutionalized health care system that we all recognize while the folk sector refers to the alternative medicine that includes sacred and secular forms of treatments. The popular sector refers to the individuals and community beliefs and practices. According to Kleinman, healthcare system includes people's beliefs and practices which are mainly governed by their culture. People or actors from the three sectors of health care system interpret the same symptoms of illness differently and are likely to act differently in the quest to manage the symptoms. For infectious diseases, like it is in case of TB this may lead to delayed diagnosis and treatment which prolongs the infectiousness of the disease in the community.

Many authors have defined prolonged delay as weeks to months (Kalan et al., 2018). One month is quite a long time to have a TB patient coughing and releasing the disease microbes to the air hence infecting others (Khan, 2019). In the present study, prolonged patient delay will be defined as having symptoms for at least one month prior to seeking treatment while prolonged health care system delay will be defined as starting anti-TB treatment at least one week after the visit to the health care provider. Depending on the origin or the one causing TB delays, there are different forms of delays. According to Jaramillo, misinterpretation of symptoms can lead to actions that hinder timely

diagnosis and treatment of disease (Jaramillo, 2017). The misinterpretation of the symptoms can either be by the patients who may associate prolonged cough to something else other than a serious disease requiring formal health care or by health workers who may treat a TB patient with antibiotics before making the right diagnosis which in both cases results in delays in diagnosis and treatment (Ebrahimi et al., 2018). Delays in TB treatment and diagnosis have, therefore, been categorized into either patient delay, health care system delay or both together. Where patient delay is defined as the number of days between onset of TB symptoms and the first contact with a professional, health care provider, while system delay is defined as the number of days between patient visit to the health facility and initiation of anti-TB treatment (Ebrahimi et al., 2018)

Early detection is one of the key challenges faced in the TB control program. In a systematic review of 39 studies, with data from 45 countries, the researchers found that the median time interval between the onset of symptoms suggestive of pulmonary tuberculosis (PTB) and the patient's first contact with a health care provider was 31.7 days. Delays at the level of the health system were also reported, with 28.4 days median time interval between the first health consultation and diagnosis. In a study conducted in Lagos, patient delay (greater than one month before seeking treatment after onset of symptoms) was reported in 83% of patients and the median patient delay was eight weeks.

Late detection of TB increases the risk of transmitting the disease to others, having poor health outcomes, or experiencing distress and economic hardship from the

disease (Ayalew et al., 2020). Improved diagnostic methods have resulted in more rapid and more accurate detection of TB and drug resistance. Recent recommendations of rapid molecular diagnostic tests as a first-line TB screening test, even in resource-constrained countries has increased reporting of DR-TB in resource-limited settings as well as shortening diagnosis to treatment time. In HIV-infected patients, the test has a rate of case detection that is increased by 45%, as compared with smear microscopy. In 2019, there were about 366 Gene Xpert point-of-care (POC) machines for molecular diagnosis, distributed across Nigeria (Gidalo et al., 2019). Sputum culture and drug sensitivity testing is still the gold standard for diagnosis of TB. The use of solid culture had been the norm as it is cheaper, albeit time-consuming and labor-intensive. An automated liquid culture media (BACTEC Mycobacterium Growth Indicator Tube (MGIT) 960 has been introduced into most reference TB laboratories in Nigeria. Studies conducted in Nigeria revealed higher sensitivity of BACTEC-MGIT-960 over Lowenstein-Jensen (LJ) solid medium but there was a high degree of agreement between the two systems. The disadvantage of the liquid medium is that it is more costly and prone to contamination and this was observed in the Nigerian study.

Patient's health-seeking behavior is key in determining delays in TB diagnosis. A patient who visits the right health care providers consistently may allow for further investigation and proper diagnosis and thus fewer diagnostic delays. Different factors ranging from social, demographic, cultural, and economic predisposes TB patients to diagnostic delays (Gagare et al., 2017). It is important to address the attitude, behavior,

knowledge and social barriers as it affects TB case finding and early access to modern TB care and treatment for people affected with TB (Nwafor et al., 2019).

Early access to care among TB patients is related to knowledge of TB and TB-associated stigma (Nwafor et al., 2019). Stigma is an important social determinant of health and can tremendously impede individual and community health seeking behavior, engagement in care and adherence to treatment (Craig, 2017; Stangl et al., 2019). People with TB symptoms hide it from their relations for fear of being isolated and stigmatized (Miller et al., 2017). In a study done by Nwaokoro et al. (2019) in Anambra West LGA found that 120 out of 200 respondents reported stigma as a barrier to TB control and treatment. Most of the respondent perceived traditional medicine as a cure for TB prevention and cure (Ayalew et al., 2020; Nwaokoro et al., 2019). Community norm, interpersonal relationship and culture play an important role in stigmatization (Deko-Gyeke, 2018).

Lack of Knowledge of TB

Lack of knowledge about TB has led to numerous misconceptions about its transmission. For instance, Ali et al. (2019) conducted a cross-sectional study using 1487 adults, 15 years and above who were randomly selected to respond to questions to assess delay in diagnosis of pulmonary TB in Anambra State. Questionnaires were administered to the participants to identify reasons for the delay. Their result showed that 20.5% of TB patients that delay in accessing healthcare was as a result of poor knowledge of the cause, means of TB spread, prevention and treatment of TB. Other studies conducted in Malawi,

China and Pakistan were in agreement with this finding (Ali et al., 2019; Chimbatata et al., 2017; Yin et al., 2019). Nwafor et al. (2019) reported that poor community knowledge influenced the attitude and perception of community members towards people with certain disease. Perceived TB-associated stigma could come from the fact that TB co-existence with HIV (Njelita et al., 2019).

HIV is abhorred in the society because people associate HIV with sexuality. To avoid being devalued and isolated, people hide their symptoms only to access care at the late stage of the disease or in more complicated condition (Ayalew et al., 2020; Oladimeji et al., 2018).

More than a third of Ethiopians high scores TB-related stigma was associated with low educational status, poverty and lack of awareness about TB (Datiko et al., 2020). Noe et al. (2017), speculated that good knowledge of TB is associated with age, marital status, education, employment, a good TB attitude and practice. Bisallah et al. (2018) study to evaluate the effectiveness of health education in improving knowledge, attitude, and practice regarding TB among HIV patients in Minna, found that education and being employed was associated with good knowlegde, attitude and health seeking behavior regarding TB. This is in line with other studies done by researchers in different part of the country (Adane et al., 2017; Balogun et al., 2019; Hassan et al., 2017).

Treatment for TB

Treatment of TB has historically been a public health major problem even with the 1940s invention of anti-TB drugs. The organism resistant to drugs was almost abrupt.

It results as the organism build a resistance structure around itself that drugs are rendered ineffective as they thick wall will prevent penetration (Rodulfo et al., 2019). This is the major reason for high morbidity and mortality rate among those affected with TB (Herrera-Rodulfo et al., 2021). MDR-TB is possible when doses are missed or patient not completed the full course of treatment, when a healthcare-providers prescribed the wrong treatment, wrong dose or wrong length of time for taking the drugs, effective drugs are not available, and the drugs are of poor quality (Tibeir et al., 2017). Countries are affected differently when it comes to MDR-TB or XDR-TB. Nigeria has a TB incidence rate of 219 per 100,000 population with estimated incidence of MDR-TB was 12 per 100,000 (Oluwasanu et al., 2020; WHO, 2018) while TB incidence rate in USA in 2020 was 2.2 per 100,000 with even lesser of patient with MDR-TB (Deutsch-Feldman et al., 2021).

A review of recent literature reveals that the treatment of TB is crucial to decreasing number of bacterial loads in a person and lowers the spread of the infection. Treatment of TB starts with identifying those who are affected with TB and place them on appropriate anti-TB therapy. Research also reveals that latent TB infectious (LTBI) patient who has not received treatment has 60% risk of developing active TB as compare someone with LTBI who does not receive the treatment (Akolo et al, 2010; WHO, 2017). Pradipta et al. (2020) found that short term medication regimen will favor adherence to treatment and completion of TB medication therapy. Multiple anti-TB drugs has been recommended for the purpose of achieving TB treatment objectives, targeting various stages of TB development, minimaxing toxicity and increasing the chances for

the patient completing the treatment (Ndubisi et al., 2017). The overall management plan for TB infection is to apply approaches that would ensure that patients adhere to the TB treatment regimen (Tibeir et al., 2017). An intensive initiation of the four first-line drugs; Isoniazid (INH), Rifampicin (RIF), Pyrazinamide (PZA) and Ethambutol (EMS) for the first two months followed by four months of INH and RIF is appropriate regimen for treating TBI in adult (Ndubisi et al., 2017).

Best outcome for treatment of TB happen when TB patients adhere to the medication. Zegeye et al. (2019) in their study found that early monitoring of the side effects and other reasons which account for missing medication may increase medication adherence in patients with TB in Ethiopia. Qiu et al. (2019) poise that TB-related stigma affects both medication adherence and quality of life of patients with TB. Yan et al. (2018) agreed that Patients when they are stigmatized, have a tendency to conceal their symptoms, withdraw and isolate themselves from people to avoid negative attitude of the society and this could affect medication adherence. They concluded that Social and psychological interventions that combat stigmatization and depression in TB patients should be adopted and optimized to improve medication adherence.

Drug-Resistance TB

DR-TB for decade has remain a major public health challenge in TB control globally. This is mainly as a result of improper management and misused of TB treatment (Oluwasanu et al., 2020; Zegeye et al., 2019). When a TB patient taking treatment stops or do not complete the regimen, mutant strains of TB organism that are resistant to any of

the potent conventional (isoniazid/rifampin) TB drugs emerge (Onyedum et al., 2017). Though rarely, the extensive drug resistance TB (XDR-TB) can occur when the resistant become evident both to isoniazid and rifampin and in addition to fluoroquinolone and any of the three injectable second-line drugs (amikacin, kanamycin, or capreomycin) (Zegeye et al., 2019).

Globally, 4.6% of patients with TB have multidrug-resistant TB (Onyedum et al., 2017). 206,030 DRTB were detected and notified in 2019, a 10% increase compared to 2018. Despite this increase when compared to 2018, the cases only reflect a 38% of the estimated number of people who developed DRTB in 2019. 86% of the notified cases were commenced on chemotherapy. In Nigeria, there is an increase in DRTB notification. The NTP registered a 5% increase from 2017 to 2019. 2384 DRTB were notified in 2019, and this represents 11% of the estimated number of DRTB cases in Nigeria for 2019. 65% of the listed patients were commenced on chemotherapy, 7% died, 7% refused treatment, 12% could not be traced. The last two groups of patients have continued to contribute to the increasing DRTB cases and mortality as well as serve as reservoir for dissemination (Onyedum et al., 2017).

WHO Strategy to End TB

In 2014, WHO passed a resolution End TB strategy as newly sustainable approach to end global TB epidemic. The End TB strategy serve as an outline for countries to reduce TB incidence by 80%, TB deaths by 90%, and to eliminate hinderance caused by costs for TB affected household by 2030 (WHO, 2018). The

strategy focuses on serving populations highly vulnerable to TB infection and poor health care access. The vision framework was for a world free TB and zero death, diseases and suffering due to TB (WHO, 2018).

The three major component of the strategy incorporated government, society, institutions, patients and researchers to scale-up winning global fight of eliminating TB (WHO, 2018). Carvalho and collogue had a supporting evidence in their report that collaboration among various sectors involved in TB control and measures is needed to achieve End TB Strategy in Brazil. End TB Strategy is within the framework of the United Nation Sustainable Development Goals (SDGs) whose design was to reduce the transmission of TB to 20 new cases of TB per 100,000 population and the TB deaths by 90% by the year 2030 (WHO, 2018). The ultimate goal of the SDG is also for TB care and control (Pradipta et al., 2020)

Burden of TB in Anambra State, Nigeria

Burden of TB remains a major public health challenge all over the world specially the developing countries (WHO, 2017). TB is the 2nd highest cause of death caused by infectious disease (Mousquer et al., 2021). About 1.8 billion people are affected with TB globally (Loddenkemper et al., 2018). According to WHO (2019), 10 million new cases of TB are reported in 2018 with over 1.2 million of them resulted in death. About 208,000 of those death were people living with HIV. Africa contributes 25% of the new cases (WHO, 2021). Out of 10 million cases, 2.9 million are missing.

Nigeria is 6th among the WHO list of 30 high TB burden countries and 1st in Africa (NTBLCP, 2019). Nigeria contributed 4.4% within the 8 countries that accounted for two-thirds of the new cases worldwide in 2019 (Zumla et al., 2021). The estimated TB burden in Nigeria in 2019 was 440,000. The National case notification rate is 60/100,000 population. 27 percent were diagnosed and notified to the National TB program (USAID, 2021) leaving 320,432 cases as missing cases. These missing cases lead to mortality and also serve as reservoir for continuous transmission. One infectious TB case infects about 15-20 persons per year if left un-notified and untreated (Kiazyk & Ball, 2017). This underscores the need to find the missing cases.

Anambra state is among the high burden states in Nigeria and the highest in south east region of Nigeria for HIV and TB (Oluwasanu et al., 2020) and has a case notification rate of 41/100,000 population. A total of 2441 cases of drug susceptible TB cases were notified by Anambra state to the NTP in 2019. Onitsha north (414), Onitsha south (171) were the 1st and 2nd LGAs respectively with highest case notification rate per 100,000 population (Ugwu et al., 2021). Other high burden LGAs are surrounding LGAs of Idemili North and Ogbaru (see figure 1).

TB is usually transmitted by inhalation of aerosolized TB particle just as in many other communicable diseases such as SARS-CoV-2 (Okpala, Dim, et al., 2021). About 10% of people with latent TB have the risk of progression to active TB following reinfection with M. TB (Ugwu et al., 2021). Active patients have symptoms such as coughing, fever, weight loss and diagnosis is usually through clinical assessment,

radiological investigation as well as laboratory investigations such as using GeneXpert machines.

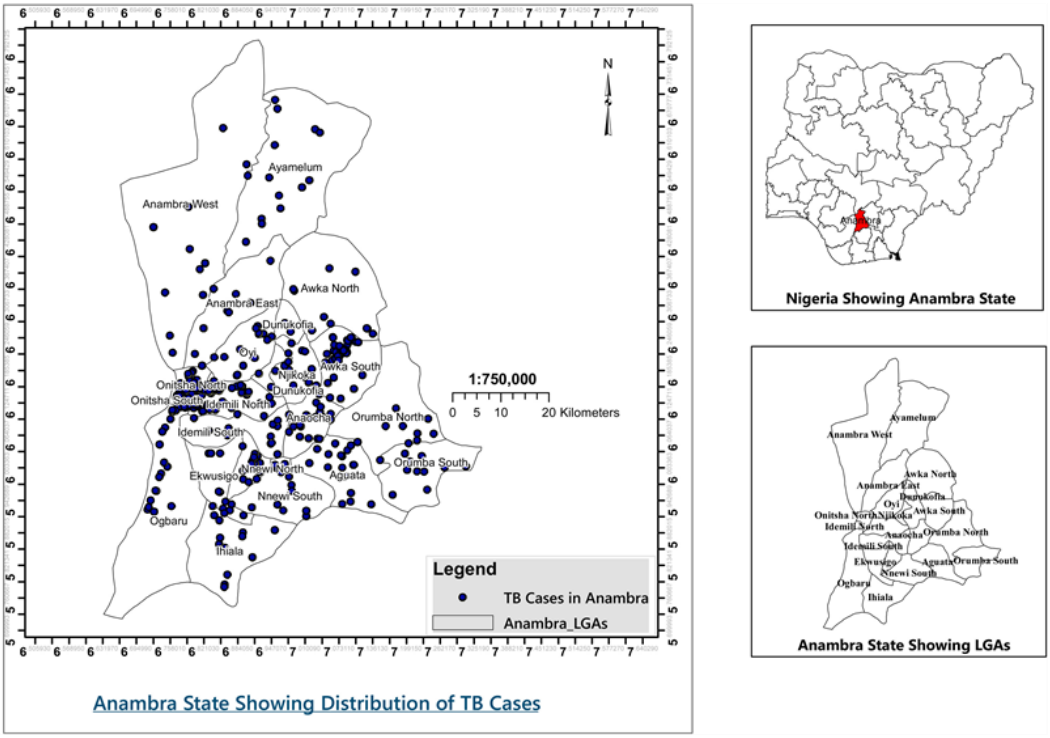
There are three GeneXpert machines in Onitsha LGA; General Hospital Onitsha, St., Charles Borromeo Specialist Hospital and ONC healthcare and Pharmaceutical. These three centers provide diagnostic services for the entire Onitsha area and its surroundings. There are 690 health facilities that provides TB DOT services in Anambra state (Anambra Govt), with 64 of these DOTS centers in Onitsha. 77.3% of the DOTS centers in Onitsha area belong to private health institutions and organization. Onitsha is known to have many private owned health institutions and engaging more of these hospitals has shown to improve TB surveillance and consequently increase TB notification (Kusimo, Ugwu, Uduh & Okoro, 2020). The DOT sites provide DOT services which aims at ensuring treatment adherence and prevention of developing treatment resistance (Tibeir et al., 2017). Oluwasanu et al. (2020) reported that weak health system is a major challenge in controlling TB in Anambra State. Developing resistance to the routine drugs for treatment of TB is on the rise, this could be attributed in part to previous use of anti TB drugs (Lang et al., 2019) and sale of substandard drugs which is not uncommon in Onitsha where sale of substandard drugs had been reported (Fatokun, 2016; Shankar, 2014).

Despite the strides made in TB program in pursuit of the End TB strategy goal of WHO which aims at reducing TB Death by 75%, reducing TB incidence rate by 50% and elimination of the catastrophic costs due to TB by 2025 (Adebayo et al., 2020; Ugwu et al., 2021; WHO, 2018), there is still lot of missing cases of TB in Nigeria and Anambra

State (Kusimo et al., 2018). These missing cases could be attributed to poor understanding of TB diseases (Hassan et al., 2017), superstitions, stigmatization, perception of the disease and underreporting of TB due to large private health sector in Anambra, health system and surveillance gaps (Grzemska, 2017). Therefore, it is important to study the knowledge and perception of TB- associated stigma among traders in Onitsha main market towards TB as the area has factors that influence TB such as overcrowding, poor environmental condition, increase HIV prevalence and malnutrition as well as those that encourage missing TB cases. Figure 1 represents a visual dot map of TB cases notification in Anambra State in 2019.

Figure 1

Presentation of Anambra State TB Case Notification Rate as Applied to the Study



Note. From "Geo-Spatial Mapping in Tuberculosis Burden in Anambra State, South-East Nigeria" by C. I. Ugwu, U. Chukwulobelu, C. Igboekwe, N. Emodi, J. U. Anumba, C. S. Ugwu, V. Ibeziako, G. U Nwakaogor, 2021, *Journal of Tuberculosis Research*, 9, 51-62. https://doi.org/10.4236/jtr.2021,91004.

TB Control and Treatment in Anambra State, Nigeria

A period of many years of effective public health initiatives including effective treatment has brought TB under control in many developed countries of the world. Studies have shown that TB infection is still on its rise in many countries of Africa including Nigeria (Loddenkemper et al., 2018; Mousquer et al., 2020, WHO, 2020). The mission of public health TB control is to provide measures to prevent TB in the communities with the overall goal of total elimination of TB in the world-zero free TB (Adebayo et al., 2020; Ugwu et al., 2021; WHO, 2018). The interview with Dr. Chukwudebelu, the TB program Director for Anambra State on Oct. 2021 revealed that several measures are already in place in Anambra State as strategies to control and eliminate TB. There are several established media platforms used to sensitize and create TB awareness to the public in the State. TB administrators in each clinic according to Chukwulobelu are being hold accountable for staff and patient education on TB and TB treatment therapy including goal in Anambra State. Staffs mentorship services are offered by the supervisors as they visit the TB clinics. Dr. Chukwudebelu went ahead to inform that Anambra State as an established system mandate all government or private owned hospitals, community pharmacy and Faith based (Religious) clinics to screen all the patients that comes in for TB. TB questionnaire are offered to reveal symptoms of TB for

appropriate referral. Despite the free of charge TB screening, Diagnosis and treatment in Anambra State, lesser number of patients with TB symptoms access TB care (Nwaokoro et al., 2019). Poor access could be due to poor knowledge of TB and perceived TB-associated stigma.

TB Risk at Onitsha City and Main Market

Onitsha main market started in the sixteenth century as a market that operated once in four days (Igbo market day of Nkwo) but later grew to operate on daily basis. The market is bounded by the river Niger to the west; which receives tons of shipping consignments from Lagos and other parts of the world annually and Osumaru road from the east. It is usually patronized by traders from all parts of the country, the neighboring ECOWAS countries and other continents of the world. It hosts both importers and exporters of different commodities. The market is divided into sections: clothing and foot wears, electronic market, food and drinks, vehicle spare parts, timber and pharmaceuticals, and lots more. It is estimated that the market receives over 5million visitors with over 12 million transactions daily, this translates to an annual volume trade in excess of 3 billion dollars (Onitshacitymarathon.com).

Onitsha main market is located in Onitsha city, a town located at the eastern bank of River Niger in Anambra state of Nigeria. The town was originally known as Onitsha ado na idu and it is predominantly inhabited by the Igbo ethnic group of Nigeria. Onitsha is located on longitude 6^{o} 47' E, and latitude 6^{o}10' N with elevation of 55.449 and covers an area of 52 km^2. Onitsha is made up of 17 communities which have been broadly

divided into two local government areas (Onitsha North and south) with a population of about 348,100 (Anambra State-Nigeria Population Statistics).

The economic activities in the main market have increased the population density of Onitsha town and the surrounding LGAs, attracting migrants from other parts of the country. This has placed huge challenges to the standard of living in the city. Onitsha town faces huge housing problems as 36% of its population live in slums with single room accommodation (UN Habitat, 2012). About 49% of persons have no access to adequate water supply and good sanitation. Onitsha is also highly burdened with HIV/AIDS as well as TB which makes Anambra state has the highest TB prevalence in the southeast region of Nigeria (Ugwu et al., 2021). Onitsha South and North, Idemili North and Ogbaru have been reported to be among the high TB burden areas in the state following a geo-spatial mapping study of TB in Anambra state (Ugwu et al., 2021).

Theoretical Framework

The basis for this study and the associated literature review is founded on two theoretical frameworks to explain the widespread failure of people to participate in programs to prevent or detect disease and need for intervention guided development, measurement, research policy that will mitigate the negative consequences of health-related stigma. The key constructs of HBM: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers to taking positive health action, and health stigma and discrimination are well suited for grounding this study's theoretical framework study. The historical development of the theory and conceptual framework will be explained.

HBM

The HBM is a theory of behavior that has been applied in various patient's counseling to promote understanding, and change knowledge, attitude and behavior of individuals about disease conditions (Champion & Skinner, 2008; Cutts et al., 1992). Rosenstock and Kegels in (1974) used HBM to explore the reason for the lack of success in free TB health screening. The change in health behavior according to the authors of HBM often occurs when the individuals involved see the condition as being serious and threatening to their life, that accepting such behavioral change is beneficial to them and that such benefits balances of the potential difficulties (Becker et al.,1977; Janz & Becker, 1994; Strecher & Rosenstock, 1997).

Foundation of the HBM

The theory was developed by a group of social psychologists who worked with the U.S. Public Health Service in the 1950s with focus on TB, dental diseases and cervical cancer. Their focus was to understand individual behavior towards accepting preventive measures. They further carried studies in various infectious disease such as influenza and polio, eliciting why individual would decline vaccines even when it is to their protection (Rosenstock et al., 1959). Through their study, it was found that the driving force for individual decision to accept or not accept preventive/protective intervention to disease are based on their perceived that they are going to contact the disease (susceptibility), how serious the outcome of the disease can be, and their belief that the preventive measures recommendation would be beneficial.

The key constructs of the theory are that three main components, individual perceptions (personal benefit, barrier and threats), modifying factors, and likelihood of actions influences behavior (Becker et al.,1977; Strecher & Rosenstock, 1997). The model has been used widely to strategize programs such as immunization and health preventive screening such as cancer screening to healthy individuals that might be asymptomatic at the time of procedure (Glanz & Bishop, 2010).

There are various know risk factors to contacting TB, I employ HBM because it notes that individual can make intelligible decision to opt for health-related intervention such as vaccination and screening to prevent disease if they know the risk. An understanding of the HBM is essential to eliciting perceptions of the Onitsha market traders towards early health seeking behavior in Anambra State of Nigeria.

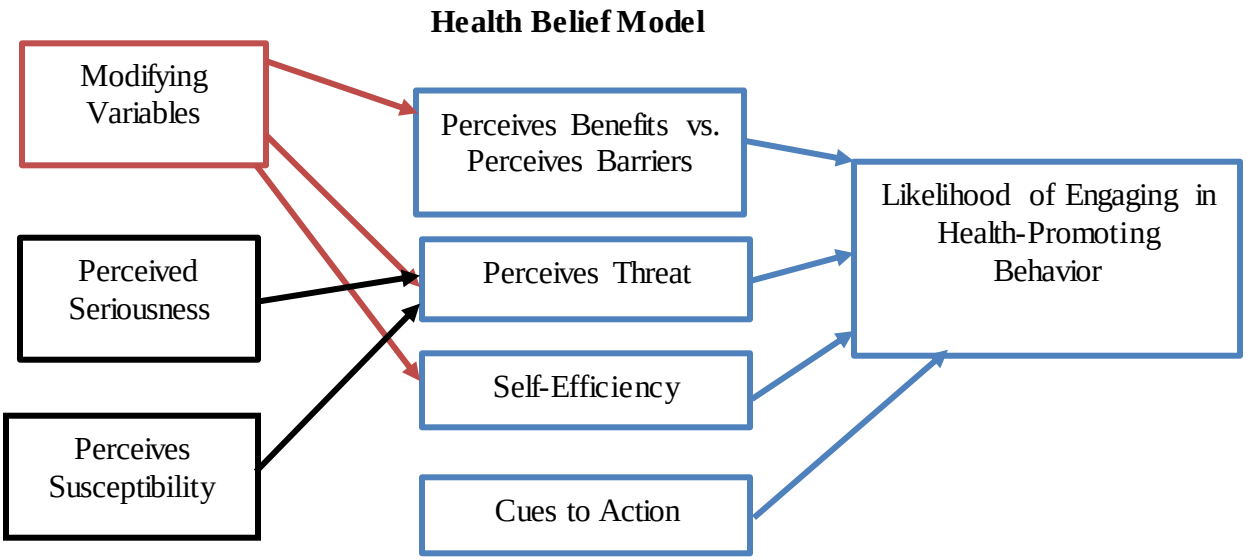
Rosenstock et al. (1958) found that extent to which individual believes that he is susceptible to a disease, determines his decision to accept preventive measure to abate the condition. Hochbaum (1958) believes that individual who believes he is susceptible to a disease will act on his feelings when he also believes becoming ill would have serious negative impact on his life. His 1958 study on individual susceptibility and early dictation found that 82% of individuals that belief they are susceptible to TB and see a benefit of early detection volunteered to x-ray compared to 21% of those that neither belief in susceptibility nor benefit. Orji et al. (2012) poise that whether an individual beliefs undesirable health outcome will have a significant impact or that it can create a great difficulty in his life, will determine if change in behavior will occur.

Perceived barrier to preventive program can influence change in behavior. Janz & Becker (1984) found that factors to reduce perceived barrier will also motivate the individual acceptance of the preventive measure to a condition. Subjective evaluation of difficulty or hinderance an individual pose over target behavior irrespective of the benefits determines whether the action of change will be performed (Jones et al., 2014; Orji et al.,2014; Rosenstock, 1966).

Moghadam et al. (2020), using a cross-sectional study explored the power of the HBM to explain water conservation behavior in Northeastern Iran. They found that perceived susceptibility, perceived benefits, and cue to action accounted for approximately 41% of the variance in farmers' water conservation behavior. Moreover, the perceived benefit was the strongest predictor of water conservation behavior, while perceived severity, perceived barriers, self-efficacy, and general beliefs not significant on behavior. These results confirmed the practicability and effectiveness HBM for examining water conservation behavior among farmers in Iran. Figure 2 represents a visual rendering of the health belief model.

Figure 2

Schematic Representation of the Health Belief Model as Applied to This Study



Note. From "The Role of Health Beliefs and Health Literacy in Women's Health Promoting Behaviours Based on the Health Belief Model: A Descriptive Study" by M. Ghorbani-Dehbalaei, M. Loripoor, and M. Nasirzadeh, 2021, *BMC Women's Health, 21*(1), p. 421 (https://doi.org/10.1186/s12905-021-01564-2). Copyright under the Creative Commons Attribution 4.0 International License.

Rosenstock (1966) posit that objective of HBM was to improve people's acceptance of preventive measure to promote public health. The HBM deals with ability to inform an individual about health risks, and behaviors that might control those risks (Pechmann, 2001). Knowledge is a hallmark of HBM. The target audience are brought to awareness of condition through educational approach (Andreason, 1995). Some authors argue that HBM alone does not infer a strategy for change (Andreasen, 1995; Rosenstock & Kirscht, 1994). Patients who will engage in healthy behavior need to be aware that

behavior depends on value placed by an individual belief on a particular goal (Maiman & Becker, 1974). Individuals attempt to perform a behavior if there is no constrains attached (Ajzen, 1991: Glanz & NCI, 2005). Barrier to performing a particular behavior in other words, the cost/benefit analysis, negative side effect, unpleasant or painful and time-consuming or unpleasant should be costed (Ajzen, 1991; Ajzen, 2004). Rosenstock (1974) noted that energy that fuel action comes from combined level of how one believes he is susceptible to the condition, how severe he believes the disease negatively impacted his life, what benefit will result from taking the positive action and not having barrier to perform it.

Theoretical Application of the HBM

Using the HBM key variables, perceived susceptibility, severity, benefit, and barrier, the researchers were able to elicit that one variable or a combination of variables were critical in predicting the likelihood that the patient would perform a specific action to prevent a disease (Ghaffari et al., 2018).

The modified theoretical model based on the HBM will be used to explain the relationship between knowledge about TB and TB associated stigma in influencing health seeking behavior. Studies conducted using the HBM variables (perceived susceptibility, severity, benefit, barrier) include Oga-Omeka et al. (2021), Balogun et al. (2019), Blanco et al. (2018), and Yoshitake et al. (2019). The authors found that perceived variables played an important role in whether an individual would seek public health preventive measures. Addison et al. (2014) study in Ethiopia, did not support the idea that perceived behavioral control influenced the participant's treatment seeking behavior rather that

attitude and behavior intention played a key role in individual determination to perform a particular behavior. This is in contrary to Schellart et al. (2013) that did not find that behavior intension is a key to decision to perform a designed task. Again, Gagnon et al. (2015) also supports that attitude will predict the performance of a behavior. Perceived susceptibility, severity, barrier and benefit are the most essential key of the HBM in predicting individual performance of a behavior but cue to action and self-efficacy can be critical to performance of a behavior in certain settings.

MTB is a bacterium transmitted to individual through airborne droplet of the bacillus from person to person. Therefore, it has a unique distinctive feature that are amendable to the HBM framework given the presence of bacillus in an environment. TB bacillus can affect the lungs, intestines or other parts of human body or animal. This means that susceptibility to TB bacillus exposure is a universal risk to all human. It is well known and documented that TB infection can be severe and cause high rates of morbidity and mortality. Early detection and treatment of TB infection has been a hallmark in controlling, treating and reducing the spread and transmission of TB infection. HBM is effective in understanding individual health-seeking behavior, including decisions about BCG immunization and skin test for TB. In this study, the multiple-step antibiotic provided evidence of treatment/curable measures of TB.

Justification for Selection of HBM

The HBM was preferred for the study, in place of others because the key variables in HBM best elicit the attitude of Onitsha market traders towards the health seeking behavior. Previous studies have found that individual beliefs were the main factor

affecting TB compliance (Kurniasih et al., 2020). The HBM has been successfully applied to understand the patient's belief towards TB care and treatment (Yoshitake et al., 2019). The HBM would enable an in-depth study of the RQs using various shared responses by the Onitsha main market traders on TB disease, TB treatment and management of TB. That would help to gain insight into the perceptions of susceptibility, severity, benefits, barriers, of the traders as it concerns health seeking behavior.

Health Stigma and Discrimination Framework

The health stigma and discrimination frameworks are modified theory of stigma that have been applied successfully to various health conditions focusing on mitigating factors to stigmatization processes (Stangl, 2019). Goffman (1963) defines stigma as an attribute that is "discrediting" and ultimately deny the individual/group full acceptance in the society.

The key construct of the theory are drivers and facilitators, stigma "marking," and stigma manifestations. The theory postulates that certain factors drive or facilitate health-related stigma (Stanly et al., 2019). The stigma "marking" depends on these drivers and facilitators and once applied, it manifests in a range of stigma experiences (lived realities) and practices (beliefs, attitudes and actions) (Stangl et al., 2019). Stangl (2019) posit that these domains influence the health outcomes not only among those affected with the disease but also to the organizations and institutions that eventually impact health and society. An understanding of the key constructs of the theory is central to eliciting the perception of TB-associated stigma among Anambra community as well as organizations

and institutions, that ultimately impact health of those affected with TB in Anambra State.

Macq et al. (2008) in their five-health system study in Nicaragua found that the determinants of stigma were the content and channels of information and issues of domination and power. According to Ransing et al. (2020), stigmatization is easier when there is an influencer such as social inequalities (no awareness about one's right due to low education, poverty and already existing discrimination), belief (religious, cultural or supernatural belief about TB infection), lack of regulation (unenforced protective laws regarding key population) such as arresting people for breaching quarantine (Clissold et al., 2020; Logie & Turan, 2020), and social media and media (infodemics, insufficient knowledge). Stangl et al. (2020) argue that facilitators may be positive or negative influencers.

Carrasco-Escobar and colleague in their 2020 study in Lima Peru, found that high TB incidence was associated with High poverty index. Quillian & Pager (2001) posit that stereotype of an individual or group often entail images (markings) of being with a condition society abhors. Beker (1963) argued that markings may become a master status for the person affect, in other words, the negative markings attached to a person may override other attributes a person may have. Hargreaves et al. (2015) found that individuals with condition often are marked according to specific health condition as well as perceived differences such as race, class, gender, occupation, geographical location (intersecting stigma). Women and poor or less-educated in the society are often at higher

risk for health inequalities. TB stigma may, therefore, worsen among these individuals with preexisting disparities.

The social interaction of "normal" people and stigmatized individuals according to Goffman (1963) are often uneasy, embarrassing, ambiguous, and intense. Stigma markings influences individual development as it has a capacity to trigger stigmatization in a setting (Paternoster & Iovanni, 1989). They argue that the person experiencing a condition may feel no impact on him as long as it is kept secret from friends, family and community. But if institutions, authorities, community and society are notified of it, it can trigger exclusion, reactions by other individuals and community members towards the affected. Those with condition tend to internalize their perception of their devalued status, resulting in low self-worth (Kaplan & Johnson, 1991).

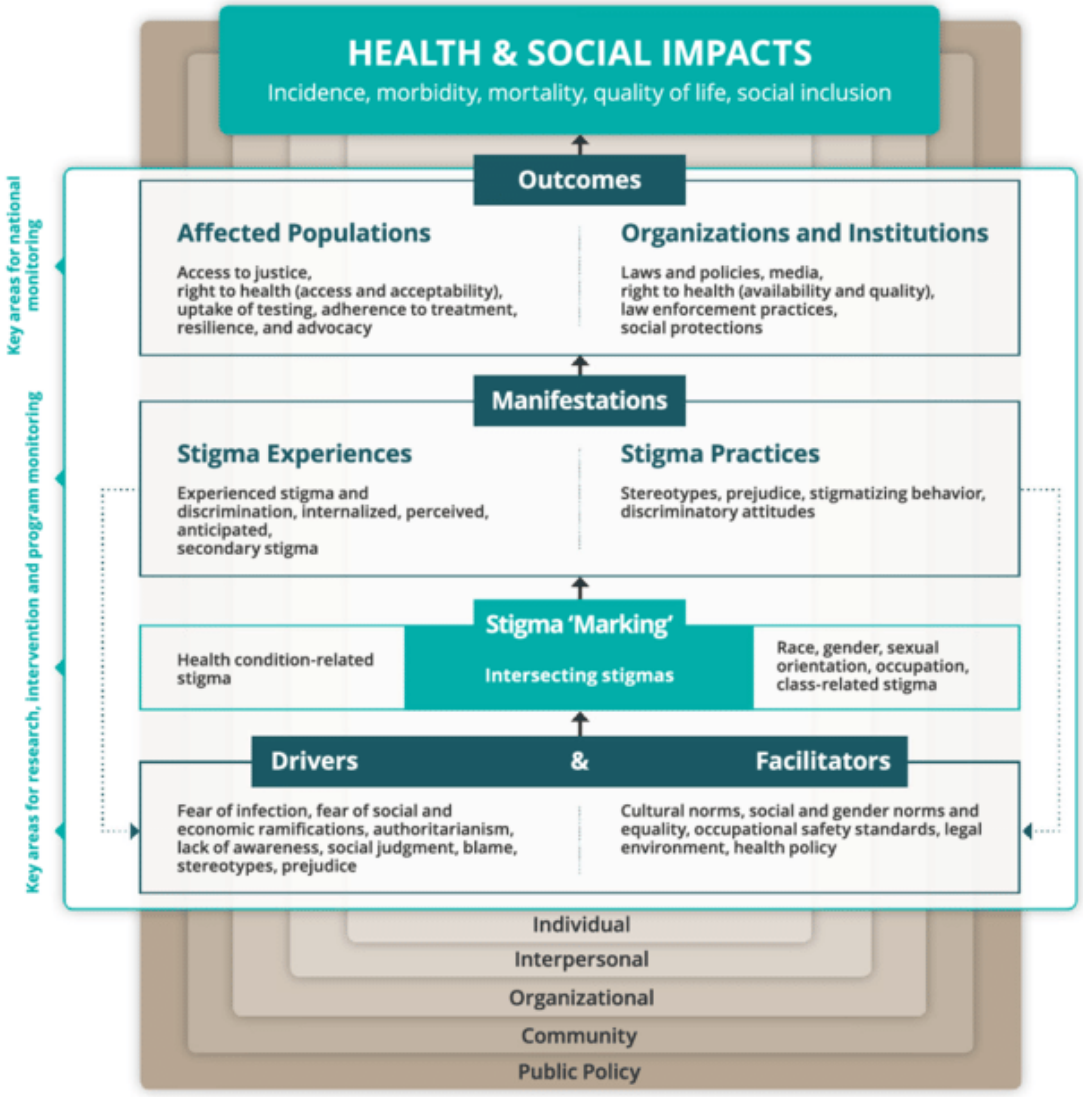
Stigma manifestation occurs once stigma is applied. It can result in a range of stigma experience and practices. Stigma experience can fall into several categories;

1. Discrimination can occur within the purview of law such as refusal of some amenities such as housing and also outside the purview of law such as abuse and gossips.
2. Internalized or self-stigma can occur as a result of the mental ill consequences and devaluing the person with condition goes through as a person internalizes the feeling.
3. Perceived stigma: The societies sees people with certain disease different from others and treat them as being worthless (public stigma). This is perception about the individuals with condition at treated.

4. Anticipated stigma: Condition of fear or uneasiness people feel that might occur to them if their ill condition is made known to others.
5. Associative or secondary stigma: Family or friends of the stigmatized victim faces devaluing attitude from the society as a result of their association with the person with stigmatized conditions. Figure 3 is the visual presentation of health stigma and discrimination model.

Figure 3

Schematic Representation of the Health Stigma and Discrimination as Applied to This Study



Note. From "The Stigma and Discrimination Framework: To Inform Research, Intervention Development and Policy on Health-Related Stigma" by A. L. Stangl, A. Earnshaw, C. H. Logie, W.V. Brakel, L. C. Simbayi, and I. Barre, 2019, *BMC Medicine*, *17*, p. 31 (https://doi.org/10.1186/s2916-019-1271-3). Copyright under the Creative Commons Attribution 4.0 International License.

Theoretical Application of the Health Stigma and Discrimination Framework

TB stigma is driven by several factors, including; (a) fear of infecting others, (b) fear of social discrimination, and (c) social norm enforcement, since TB risk is related to a range of socially stigmatized behavior especially those connected to HIV positive that devalue them (Said et al., 2017).

The risk factors that facilitated TB stigma ranges from laws that quarantine TB patients, poverty, gender to lack of universal protective supplies in health care facility. Key populations for TB infections include poor, those living with HIV, children and female (Said et al., 2017).

Said et al. (2017) reported a range of stigmatizing experiences of TB victims from others as social rejection, exclusion, gossips and poor healthcare. Lang et al. (2019) found that the outcomes of stigma for people affected with TB infection include engagement in greater TB risk behaviors, lower rate of TB teaching, poor retention and engagement in TB care, and worse initiation, adherence to TB medication and increase in MDR TB. The institution outcome includes stigmatizing policies such as those that socially isolate or quarantine those with TB infection and prohibiting those with positive TB from travelling.

Justification for Selection of Health Stigma and Discrimination Framework

The health stigma and discrimination framework are preferred for the study, in place of others because its key variables best elicit the experience and practice of Anambra community towards those affected with TB. Previous studies have found that individual beliefs were the main factor affecting TB compliance (Kurniasih et al., 2020).

The health stigma and discrimination framework have ability to work across a range of health conditions and pinpointing the roadmap to common health-related stigma providing important factors for research studies, intervention and monitoring geared towards addressing poor health outcome (Stangl et al., 2019). Other theories used in the studying the perception include the Social cognitive theory (Bandura, 1977), Theory of reasoned action (Ajzen and Fishbein, 1980) and the HBM. Health stigma and discrimination framework will enable an in-depth study of the RQs using various shared responses by the Onitsha main market traders on TB disease, TB treatment and management of TB. That would help to gain insight into the knowledge and perception of TB-associated stigma in Anambra State.

Summary

The burden of TB is a major public health objective (WHO, 2018). Generally, health seeking behavior is poor in Anambra State (Nwaokoro, 2020). The objective of the study aims to address gap in health seeking behavior that impede TB control in Anambra State. Although poor knowledge about TB and TB-associated stigma are thought to be a major problem in Anambra, perpetuated by myths and misconceptions about TB (Nwaokoro, 2020; Ugwu et al., 2021), no clear association has been established between these and their TB- related health seeking behavior, particularly among traders who operate frequently in conditions which tend to favor the spread of TB, The body of literature emphasizes how Knowledge about TB and TB associated stigma might relate to health seeking behavior.

However, the study was the first to use validated stigma measurement scales to quantify the stigma and knowledge in association to health-seeking behavior among the

Onitsha main market traders in Anambra Nigeria. The Health Belief Model and Health Stigma and Discrimination framework were used to explain the unknown relationship. The study proposes to fill the gap by further understanding the role of gender, age, marital status and level of education then extracts and quantify common knowledge and perceived stigma from the participants responses. In Chapter three, I reintroduced the research questions and the hypotheses for this study. The methods and variables selected to answer the research questions were described as well as the discussion of the statistical aims that was used to test the hypotheses.

Chapter 3: Research Method

Introduction

The objective of this cross-sectional analytical study was to assess whether TB-related knowledge and stigma affect the health seeking behavior related to TB exposure among traders of the Onitsha main market, Anambra State, Nigeria. With this, I sought to establish an association between two independent variables (TB-related knowledge and stigma) and an outcome or dependent variable (healthcare seeking behavior for TB) and whether the association could explain poor health seeking behavior among traders in the Onitsha main market. The high burden of TB and poor health seeking behavior among communities in Anambra State present a significant and urgent public health concern in this region and in Nigeria at large, and the trend remains a focus for public health research.

In this chapter, I address the research design used to answer the RQs. This includes a rationale for the design, a description of the variables of interest, target population and sampling procedures, power analysis, threats to validity and reliability, informed consent and ethical considerations associated with the research, as well as the application of the statistical analysis that link the key underlying variables to answer the RQs.

Research Design and Rationale

Quantitative research instruments (interviews, questionnaires, and experiments) are necessary and capable of providing a numerical interpretation of study data that might be about the thoughts, feelings, and/or attitudes of the study participants on the subject of

interest (Saunders et al., 2016). The quantitative research method is good for examining relationships (Saunders et al., 2016). It uses numerical data to explore potential relationships between the variables (Ma & Zhang, 2019). Brown et al. (2017) found that many researchers use the quantitative method. The quantitative method is good for analyzing data gathered through surveys (Zyphur & Pierides, 2019). My research was on testing hypotheses about whether relationships exist between variables, which I achieved by collecting numerical data from my study participants, making a quantitative method the correct choice for this study.

A cross-sectional design is used to capture data at one single point in time for exploratory studies (Frankfort-Nachmias & Leon-Guerrero, 2018). This is not the best in the hierarchy of study designs, but it is suitable for exploratory studies in a resource limited setting (Davidson et al., 2013). Experimental designs or clinical trials are gold standards, but it would be abhorrent or unethical to intentionally expose humans to disease conditions simply to gain knowledge. Next in that hierarchy is a prospective analytical design, such as a cohort study. However, this requires a follow-up of the subjects exposed to the conditions under investigation (in this case, good/poor knowledge related to TB hierarchically embedding high/low stigma among those who had TB) and then a follow up over a specified period to see if they develop the outcome of interest (in this case, whether they have good healthcare seeking behavior for their condition). Although this would not warrant exposing the study participants to any condition, my study was limited by time constraints as this was part of a doctoral study that must be completed within a short period of time.

A retrospective analytical design such as a case-control design or case-control nested with in a cohort also lends more credence with respect to establishing claims. However, that requires attaining those who are cases (poor health seeking behavior for this study) and those who are control cases (good health seeking behavior for this study). That means obtaining prior information about the medical records of the study participants. which was not available as I had no information about them (not yet recruited); moreover, Africa has a challenge of keeping good medical records. Although cross-sectional study designs are limited in how much value they contribute to research, this would have been best to use here given the circumstances and for exploratory studies such as this (see Davidson et al., 2013).

Apart from providing clarity, surveys can also be informative and illustrative. Babbie (2020) noted that surveys are typically used for descriptive, explanatory, and exploratory purposes. Surveys can be used to gather quantifiable data from a large sample size easily, with lesser cost and being less time consuming (Jones et al., 2013). I used a structured paper survey to capture the required information. While each method contains its own unique advantages and disadvantages, a structured paper survey was the most appropriate based on the population of interest I intended to reach. It provided data that were easily analyzed and measured on social and scientific levels. Electronic surveys would have been preferable so that the data could automatically be entered into the database, thereby avoiding human errors in data entry. However, Onitsha is a rural community, the availability of modern technology and proper use of it by the

participants who may not had these exposures could be challenging. Data were instead captured through paper surveys and were double-entry verified to avoid errors.

Operationalization of Variables

To examine the existence of an association of TB-related knowledge and stigma with health seeking behavior among traders at the Onitsha main market in Anambra, Nigeria, while controlling for the sociodemographic characteristics of the study participants (traders), the study had one dependent variable, two independent variables and four covariates (the sociodemographics). The outcome or dependent variable was health-seeking behavior. The two independent variables were TB-related knowledge and TB-related stigma. The sociodemographic factors that served as covariates in this study included age, gender, marital status, and level of education.

Data were captured related to the above variables and then operationalized (scored and recoded) during data manipulation and defined as follows:

Health seeking-behavior was measured using survey questions on the willingness to go to a health facility and a plan for a timely visit to a health facility if the respondents thought they had TB symptoms. This was scored and coded into a binary categorical variable with 1 representing good and 0 representing poor health seeking-behavior.

TB knowledge was defined using survey questions about TB symptoms, TB transmission, ways to avoid getting TB, risks of acquiring TB, whether TB can be cured and how, and the cost of TB treatment within Onitsha. Responses to each of these questions were scored as “correct” coded as 1 and “incorrect” or “do not know” coded as 0. These was summed into a knowledge score and further coded into a binary categorical

"knowledge" variable using the mean score of the study population as a cut-off, with 1 (representing "good" knowledge of TB) for those with a knowledge score equal to or above the mean score of the study population and 0 (representing "poor" knowledge of TB) for those with a knowledge score below the mean score of the population.

Stigma or attitude towards TB was assessed using survey questions that questioned participants about their understanding that TB can affect anyone, a favorable reaction if found to have TB, who they would be willing to talk to if found to have TB, and a desire to help people with TB. Survey responses were scored similarly (as in knowledge) and used to define a binary categorical stigma variable coded as 1 representing a favorable attitude or less stigma and 0 representing an unfavorable attitude or more stigma.

Sociodemographic variables of interest captured included gender (male and female), age in years categorized into 18 to 34, 35 to 64, and 65 and above years, four levels of marital status (single, married, widow/widower, and "separated/divorced), and level of education (no primary education, primary education, secondary school and above secondary), all coded as 1, 2, 3, and/or 4, as needed. Table one below shows that study variables and their measurements.

Table 1

Variables and Levels of Measurement

Variables	Levels of measurement
Independent variables	
TB knowledge	Nominal categorical (Binary)
TB associated stigma	Nominal categorical (Binary)
Dependent variable	
Health seeking behavior	Nominal categorical (Binary)
Control variables/Covariate variables	
Age	Ordinal categorical (3-levels)
Gender	Nominal categorical (Binary)
Marital status	Nominal categorical (4-levels)
Level of education	Ordinal categorical (4-levels)

Methodology

Population

The study population was traders of the Onitsha main market, Anambra State of Nigeria. It is estimated that the market receives over 5 million visitors with over 12 million transactions daily; this translates to an annual volume trade in excess of 3 billion dollars (Onitshacitymarathon.com). Onitsha was chosen because this area has the highest burden of TB in Anambra State (Ugwu et al., 2021), and traders in the Onitsha main market operate in overcrowded conditions as well as other environmental conditions that

tend to favor the spread of TB (Chukwudi et al., 2020). I measured the knowledge the traders had about TB and the stigma they had about TB and people affected with TB. The participants answered questions designed to determine their health seeking behavior. Because the target population was the traders of Onitsha in Anambra State, the study population was selected based on the following criteria.

Inclusion Criteria

The study included traders who operated in shops (either owned or worked at) in the Onitsha main market, those who were aged 18 and above, and those who were residents of Anambra State.

Exclusion Criteria

Traders who did not own or operate a shop in the Onitsha main market, those below age 18, and those who did not live in Anambra State were not included in the study. The inclusion and exclusion criteria made it easy for me to leave the questionnaire with the participant and to come back to pick them up at a later time. In addition, being above 18 years did not require parental consent.

Sampling and Sampling Procedures

I have lived in Onitsha and have visited the Onitsha main market for over 30 years, so I had good understanding of the market. As such, it was easy to move across lanes and sections in a huge market like the Onitsha main market. By selecting the participants, I did not know, I expected to reduce the potential social desirability of information, where participants provide information they perceive as socially acceptable (see Larson, 2019). I gained access to the participants by visiting the Onitsha main

market in the early hours of the day to avoid interrupting their busy hours with their customers.

I recruited the participants by speaking to them privately inside their shops and asking if they wanted to participate in the survey. I then left the survey written in both English and Ibo (Anambra local dialect) with them to complete at their convenience. They were asked to read the survey, and if they fully understood the survey and were willing to voluntarily participate, they could complete the survey as an indication of their consent (implied consent was approved by IRB). The participants were informed that I would return at the later time to pick the survey up.

A convenience sample of 230 traders (aged 18 and above) from the Onitsha main market of Anambra State Nigeria voluntarily participated in this study. The questionnaire consisted of 19 questions that focused on knowledge, attitude or stigma, and health seeking behavior. Full details regarding the study questions can be found in Appendix A. In this study, I assumed that the reason for poor health seeking behavior in this population was due to a lack of knowledge about TB and stigma or poor attitude towards TB and people affected with TB.

The questionnaire was distributed for period of 12 days in December 2022 at the convenience of the traders' shops. Out of 500 questionnaires distributed, 263 were received back, and 230 of the total number were completely filled out and used for the study. To maintain confidentiality and anonymity, the participants' names were not used. Participants who were surveyed were identified with codes that I assigned to the traders. Only I could identify the participant with the assigned codes. The names or identifying

information of the participants were not included in the questionnaire paper. While I had implied consent from the participants who filled out the survey, respect and anonymity were instilled (see Ross et al., 2018). The following codes were used to identify the participants: Participant 1 was coded as (MMT1), Participant 2 was referred to as (MMT2) and so on. While in the past, I had bought goods from some of the traders, I did not have a personal relationship with any of the participants. I established a relationship with the participants based on trust by answering questions, being transparent about the research purpose, and reassuring them of the utmost confidentiality and untraceable nature of their information. Freedom was given to any participant who chose to exist the study without penalty.

Statistical Power

This study utilized a convenience sampling method. Traders who were easily accessible and available at the market at the time of administering the survey were selected. Convenience sampling was preferable because it provided quick, easily available data (Bernard, 2014; Levin & Fox, 2003). The traders in the market would not be easily subjected to any other scientific study such as randomization due to some short coming and moral reasons as stated above. Only those that were within the inclusion parameters (as align above) were selected.

Sample Size Calculation

Field (2013) poise that the reliability of a research findings can be determined by power, effect size and significance level of the statistical analysis. While the effect size measures the magnitude of the observed effect between the independent and dependent

variables (Field, 2013; Martin & Markus, 2017), the power is the ability of not committing type 2 error by accepting null hypothesis when it is false. In other word probability that the given test will find an effect (Field, 2013). Field (2013) noted that a power of .8, or 80% chance of detecting an effect is generally used in quantitative studies.

The researcher performed power analysis to determine the requisite sample to ensure the study will have enough statistical power to assess the association under investigation (Arend & Schäfer, 2019). Using the G*Power 3.1.9.2 software (Faul et al., 2009), power analysis was performed based on the RQ #1 that seeks to examine the existence of association between TB-related knowledge and health seeking behavior among traders at Onitsha main market in Anambra, Nigeria. The outcome (dependent variable) in this relationship was healthcare seeking behavior, defined as binary categorical and the predictor or independent variable, was TB-related knowledge, also defined as binary categorical. The appropriate statistical approach to examine the association of that RQ was binary logistics regression analysis. Based on findings reported in a nation-wide cross-sectional survey on knowledge, attitude, and practice towards TB in Gambia, (Bashorun et al., 2020), I hypothesized a reasonable 100% increased odds that those with good knowledge will have good health seeking behavior compared to those with poor knowledge (Odds ratio = 2.0). And assuming that over 80% of those who seek healthcare for this condition actually have good knowledge then at a type I error rate of 5%, the requisite sample will range between 88 to 148 for statistical power between 80% and 95% as highlighted in Figure 3 a &b below. Factoring 10% correction for missing data and/or invalid responses brings these figures to 163. The

researcher passed out 163 surveys. The sample was obtained by convenience sampling for all traders who operate in shops at the Onitsha main market, based on the inclusion and exclusion criteria outlined above (under population). The power was applied here as a function of the population effect size (crude odds ratio of 2.0) denoting a likelihood that null hypothesis will be rejected, achieving statistically significant level (α) of 0.05 alpha. Fisure 4.1 and 4.2 below show the visual presentation of G* calculation.

Figure 4

The G Power Calculation for the Population Size to Achieve Statistical Power of 80%*

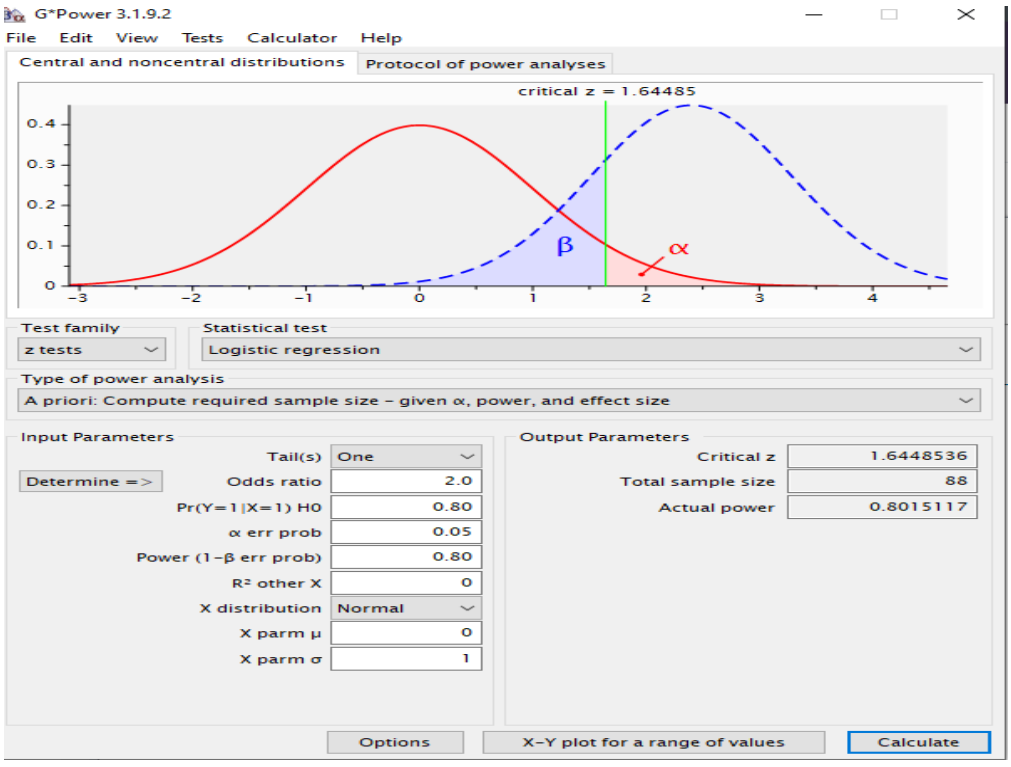
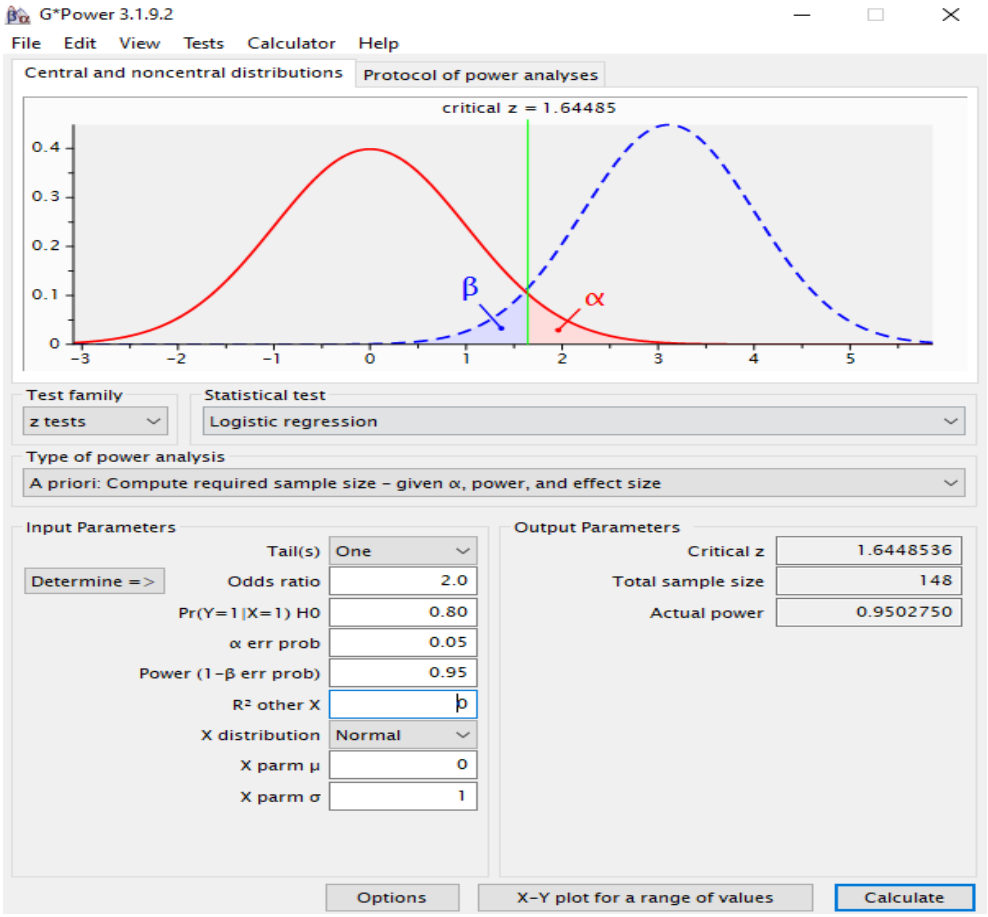


Figure 5

The G Power Calculation for the Population Size to Achieve Statistical Power of 95%*



Data Collection Strategies and Research Instrumentation

Following ethical approval to conduct research from both Walden University IRB and local IRB Ethical committee at Ministry of Health Anambra State, the researcher administered the survey by visiting traders at their shop very early in the morning when they just opened, and it is less busy to avoid distracting them from their customer. This was done each day for 12 days in December 2022. The researcher asked to speak to the

traders inside their office shop to ensure that no customers or other traders were in hearing distance. The study description and the instructions about the study was privately presented to each trader. Once indicated willingness to participate, they were handed over the survey and were asked to complete the survey at their convenience. This was to provide them with privacy and not be distracted from their customers. They were to read the survey and if fully understand the survey and want to willingly volunteer should complete the survey as an indication of their consent to participate.

Among the information in the form was that the participants were at the liberty to participate in the study and can withdraw at any time without penalty. The purpose of the study and how their information would be handled and secured with utmost confidentiality were spelled out. Since not all traders were able to read or write English due to their level of education, the local dialect version of the survey was included. The participants were not given an incentive for volunteering in the study. The survey was placed in individual participant's envelope with labels identifying the location (Onitsha main market) and research participant by number and that number was placed on the survey (MMT1, 2 and so on). Completed survey was placed in data collection envelops and sealed by participant and handed over to the researcher at later time. Completed data from the paper survey was entered (and double entry verified) into the SPSS (version 27) spread sheet for data management and analyses.

Instrumentation and Administration

Data for the study was captured using a structured modified Gambian Survey of TB Prevalence (GAMSTEP) questionnaire. The questionnaire was divided into following

sections: Socio-demographics, health-seeking behavior, TB knowledge, and TB attitudes and stigma. The period of the data collection was defined (12 days). GAMSTEP is self-report measure for control of TB developed in Gambia for better understanding of community-level knowledge, attitude and practice (KAP) related to TB. Development of GAMESTEP began in Gambia in 1990 (Ifedayo et al., 2012). And was the first instrument that once provided an accurate measures of TB burden in Gambia. The survey instrument was published by multi-Health system (MSH) in 1990; The Medical Research Council Gambia Unit and the Gambian Ministry of Health and Social Welfare. The GAMSTEP was based on multistage cluster TB prevalence survey given by the joint ethics committee of the Gambian Government and Medical Research Council. Research was conducted over one-year period with more than 43,000 respondents to access the reliability and validity of GAMSTEP (Bashorun et al., 2020). It is the most popular measure used for assessing KAP (Bashorun et al., 2020). GAMSTEP questionnaire was designed based on WHO hand book on TB prevalence survey and I conducted a pilot study to adapt it to local context (Bashorun et al., 2020) The modified version (with very slight modification) is attached as Appendix A.

Data Analysis Plan

Kaliyadan & Kulkarni (2019) poise that descriptive statistics makes distribution across a possible range of data values understandable and makes their normality clearer. Apart from descriptive statistics (n (%) and appropriate charts such as bar graphs and/or pie chart, since all variables are categorical), inferential statistics was performed based on the specific RQs as follows:

RQ1: Binary logistic regression was used to assess the likelihood that traders at the Onitsha main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, reporting crude odds (OR) ratio and 95% Confidence interval (CI)

RQ2: Multi-variable logistic regression was used to assess the likelihood that traders at the Onitsha main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, while controlling for stigma, reporting adjusted odds (AOR) ratio and corresponding 95% Confidence interval (CI)

RQ3: Multi-variable logistic regression was used to assess the likelihood that traders at the Onitsha main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, while controlling for stigma, as well as the socio-demographics (age, agenda, marital status and educational status), reporting adjusted odds (AOR) ratio and corresponding 95% Confidence interval (CI). Statistical significance was assessed in each of the above analysis based on the 5% level of significance.

Threats to Validity

While in qualitative study, reliability means consistent and reliable of the data (Creswell, 2009; Trochim, 2008). In quantitative research, the reliability of an instrument is established by demonstrating that it yields the same results each time that it is applied repeatedly to the same object (Babbie, 2020). Extent or degree to which an instrument employed by a researcher in a study measured what it is purported is the validity of that

instrument (Camargo et al., 2018). There are two types of validity that can be of a concern in a quantitative study (Yilmaz, 2013) and can impact as well this study findings. These are internal and external validity.

Internal Validity

The researcher's ability to draw true inferences from the data about the study population can be impacted by treatment used, technique applied and the research's skills (Creswell & Creswell, 2018; Yilmaz, 2013). Internal validity of an instrument has an ability of excluding alternative possibilities that may affect observed relationship or findings between the independent and dependent variable in a result (Flannelly et al., 2018). In this study, confounding factors or covariate variables of age, gender, marital status and level of education can impact the findings of this study by interacting with relationship between the main predictor variables (TB knowledge TB & TB associated stigma) and the outcome variable (health seeking behavior). In this study, the covariate variables collected on primary data was adjusted and controlled for in the multiple logistic regression model thereby mitigating their negative effects on the predictor and outcome variables.

The increased sample size can compensate for non-use of simple random sampling method technique (NPC & ICF international, 2014). Social desirability bias, a situation where the study participants could have responded to the survey in a manner, they deemed socially desirable (Fisher, 1993), was mitigated by assuring the participant freedom to exit the study at any point without penalty. Construct and face validity of the instrument was established by three experts in health and physical education department

at Nnamdi Azikiwe University Awka. Prior to the main study, the questionnaire was piloted and standardized as well as practiced on key words translations in the Ibo language (the local language in Anambra State), so as to ensure consistency. A pilot study was conducted to make sure the volunteers taking the survey understood all the direction and questions being asked. Ten copies of the instrument were given to ten respondents who are at Ochanja market Onitsha who were not part of the population used for the study. They were later asked how long it took them to complete the survey and if they had issue understanding any of the questions. This helped to determine the clarity of the study instrument direction and the estimated time frame to complete the instrument both for those who understands English language and those that speaks local dialect. The pilot study Participants were the same demographic group as the final study participants. This helped to test the utility and appropriateness of the survey instrument. See chapter four for more details.

External Validity

The study made use of convenience sampling method and therefore were exposed to threat to external validity. This can become evident when non simple random method was not used. The external validity is threatened when the extent to which the result of the study findings cannot be applied to the general population outside the studied participants (Creswell & Creswell, 2018; Lesko et al., 2017). The population of this study was the traders in Onitsha main market in Anambra State, Nigeria. While the study was of a large enough sample that can justify external validity that allows the generalization

of its finding to a relevant population (Armstrong, 2019; Vasileiou et al., 2018), one cannot infer causality due to its cross-sectional design (Iyun et al., 2018).

Treatment of Discrepancies

Discrepancies, defined as two or more statements or results that cannot both be true, may be a signal of problems with reporting (Graham et al., 2015). In this study, the researcher reported how many discrepancies were detected by the questionnaire report. Frankfort-Nachmias & Nachmias (2015) poise that Researchers should seek out negative or discrepant or deviant cases and reflect on the information those discrepant provided. These were traders who's their answer was contrary or opposed to the major themes generated from the study (Creswell, 2013; Frankfort-Nachmias & Nachmias, 2008). I analyzed the information provided by these participants with the view of finding out if their answer helped in gaining a broader perspective of the central phenomenon of the study.

Data Cleaning and Screening Procedures

Data reduction, cleaning, entry, data transformation for missing values or data and verification of participants' responses for analysis was performed using SPSS version 27 and by multiple imputation procedures. Generally, the data entry was programmed to flag impossible values, thus providing an instant check (Crosby, 2013).

Ethical Procedures

Highest standard is required when carrying out research that involve human subject (Walden University Institution Review Board [IRB]. 2008). Therefore, I obtained approval for this study from Walden University IRB (11-04-22-0379248) and the Ethical

Committee of Anambra Ministry of health (MH/AWK/M321/409) before embarking on actual data collection.

Informed Consent

Participants was full informed about the study. This included the method of data collection, how the date will be analyzed, and assurance of the confidentiality of their information, why the research findings were important, and the persons/institutions that will have access to the findings of the study in the consent form. An implied informed consent form written in both English language and Ibo (the local language) was given to each participant. The consent form contained information on potential risk of participating to the study and instructions for completing the study. Discussing about TB might pose psychological risk for some individual therefore, participants were given the contact information of Anambra State tuberculosis, Buruli ulcer & leprosy control program, public health department, Ministry of Health for help. The participants were asked to go through the survey at their convenience. They were as to indicate their consent by completing the survey if they fully understand it and were willing to volunteer.

Confidentiality

The confidentiality of each participant will be protected in accordance with Walden University IRB and local Ethical Committee and Ministry of Health Anambra State IRB guidelines. The researcher will secure both the informed consent and a personal information in a save box that will be stored under lock and key system generated that only the researcher will have access to. The implied consent used and

completed survey will be maintained in the researcher's office and stored for the period not more than five years. At the end of five years, forms pertaining to the study will be shredded.

Summary

The quality and adequacy of the findings of academic quantitative research are dependent on the rigor in which the methods for the study is designed and applied. In this chapter, the purpose of the study as well as the research design and rationale were clearly outlined. The RQs and the role of the researcher in conducting the study were also presented. The study methodology, data analysis plan, issues of reliability and validity was addressed, and ethical procedures applied in the study were also succinctly discussed. The independent variable and the dependent variables of the study were drawn from the dataset. The difference between groups and relationship between the variables was addressed using binary logistic regression and multi-variable logistic regression in chapter 4. The two main predictor variables to consider were knowledge about TB and TB associated stigma and were used to test the study hypotheses and answer the RQs in the study. The four covariate variables used in the study were also discussed. The strength and limitations were discussed. The researcher presented the result of the study in the coming chapter.

Chapter 4: Results

Introduction

The purpose of this study was to examine the relationship between TB knowledge (as well as TB associated stigma) and health seeking behavior among traders in the Onitsha main market, Anambra State of Nigeria. To address this purpose, three RQs were constructed, and a cross-sectional design using a structured paper survey was implemented in the winter of 2022. In the section that follows, I first restate the three RQs for my study, summarize the data collection approach and operationalization of variables, highlight the key underlying assumptions of the statistical model used in answering the RQs, and present the complete results of the analysis, starting with a description of the study samples and analytical output that answers the RQs.

Pilot Study

Prior to the actual data collection for this study, a pilot study was conducted to test the feasibility of collecting data using the survey instrument and in the study location (the Onitsha Main Market). This was to ensure the appropriateness of the RQs and to detect possible bias prior to carrying out the main study (National Population Commission [NPC] [Nigeria] & ICF International, 2014). Ten surveys were passed out to traders who volunteered to participate. This survey was handed to them on December 2, 2022 with promise that I would return to collect the completed surveys the following week. Upon returning, I was only able to collect three validly completed surveys out of the 10 handed out. Of the remaining six, one trader returned the survey unanswered with

the comment that she was too busy to complete the survey. Three others stated that they had forgotten the survey at home and even though I returned twice later, they were either not there or still were not able to remember to bring them. I was not able to meet the remaining two traders in their shops each time I passed by. Therefore, the response rate for the valid survey was 33%. Among those who completed and handed back the survey during this pilot phase, all questions were well answered. They were two males and one female with a mean age of 48 years. One had no education, one primary, and the other had some college education. They each demonstrated understanding of the questions and showed great interested in the study.

The main lesson learned from the pilot study was that I needed to pass out more surveys at least three times more than my anticipated sample size.

Data Collection

I drew the sample for this study on the association between TB knowledge (and TB-related stigma) and health seeking behavior. To conduct the research study, I used primary data from traders in the Onitsha main market, Anambra State of Nigeria. The traders in the Onitsha main market were chosen because Onitsha has the highest TB burden in the State, and the traders tend to trade in conditions and environments that may favor TB spread. Their participation in the study was voluntary.

Before data were collected and loaded into Excel and SPSS version 27, I obtained IRB approval from Walden University (approval number 11-04-22-0379248) and the local IRB from the Anambra State of Nigeria Ministry of Health (approval number MH/AWK/M/321/409). The questionnaire datasets relating to demographic data of the

participants were collected. The datasets collected contained all variables of interest: health seeking behavior, constituents of the independent variables of TB knowledge, TB-related stigma, and covariates (age, gender, marital status, and level of education).

Based on the sample sized prediction using the G* power analysis and accounting for 10% incomplete or inappropriately completed questionnaires, the requisite sample for this study was 163. However, upon conducting the pilot study that allowed me to test the study protocol, only 3 of the 10 surveys I initially passed out were returned (33%). Thus, in implementing the actual study, instead of passing out the exact 163 surveys, I passed out a total of 500, which I did within 2 weeks (12 business days) in December 2022. While some were completed on the spot and returned to me immediately, I had to return every day for 3 weeks to collect the rest. I was able to collect 263 completed surveys, among which 230 were validly completed and suitable for inclusion in the study. Thus, my study had a valid response rate of 46%. As noted in Chapter 3, the surveys were given out to willing participants privately in their shops to complete at their convenience, and I collected their responses at a later time. I used convenient sampling.

The study was planned for the traders of the Onitsha main market who were above the age of 18 and who lived in Anambra State. I omitted traders who were outside this age range and did not live in Anambra State. Among the invalid surveys eliminated were those who indicated an age under 18. Both the incomplete questionnaire and the completed questionnaire were placed in a personal lock and kept in case they are needed to be reviewed later. These will be shredded after 5 years.

The Onitsha main market is a large market with several sections (lanes), and these lanes are almost homogenous in setting. For instance, exchange lanes are mainly men between 30 and 50 years of age, and textile lanes are mainly men in their upper 50s as well as importation and exportation lanes. Used cloth and food sections are mostly women. To obtain a sample representative of the population, I visited several sections to collect the survey. My assumption was that the primary data that I collected from traders in Onitsha main market were reliable. Because the main market is a very large, using the simple random sampling technique on a sample frame was not feasible. Therefore, a convenience sampling design was appropriate for this study because of its cost and feasibility (see Bhardwaj, 2019). Nonuse of randomization in the sampling technique might pose threat to the generalizability of this study (see Etikan & Bala, 2017).

Statistical Assumptions

Validity and appropriateness of the study results from statistical analysis can be jeopardized if the associated assumptions are violated (Millsap & Maydeu-Olivares, 2009). The study employed binary logistic regression and multiple logistic regression to answer the RQs. First, before conducting the logistic regressions, some fundamental presumptions must have been true, including the independence of errors, the linearity of the logit for continuous variables, the absence of multicollinearity, and the absence of outliers with a significant impact. The apriori tests of the collected data showed that all these conditions were met. A statistical assumption of multiple logistic regressions assumed little or no multicollinearity among independent variables. The two independent variables in this study were categorical and therefore met the assumption. Additionally,

no detection of outliers was essential for the same reason. Other assumptions such as that the dependent variable should be dichotomous and that the observations should be independent from each other were also met.

Descriptive Statistics of the Study

The complete description of the study sample ($N = 230$) is presented according to the key underlying variables and is summarized in separate tables. The sociodemographic characteristics are summarized in Table 2. The study had slightly more men ($n = 123$, 53.5%) completing the survey compared to women ($n = 107$, 46.5%). The mean age was 45.66 years, with a standard deviation of 11.64. For the purpose of analysis, this was categorized into three groups, as depicted in Table 2, with most ($n = 173$, 75.2%) being between the ages of 35 and 64. Most were married ($n = 135$, 58.7%) with secondary education ($n = 123$, 53.5%).

Table 2

Sociodemographic Characteristics of Survey Respondents at the Onitsha Main Market, Anambra State, Nigeria

Characteristics	*n* (%)
Gender	
Male	123 (53.5)
Female	107 (46.5)
Age (Years)	
18 – 34	40 (17.4)
35 – 64	173 (75.2)
65+	17 (7.4)
Marital status	
Married	135 (58.7)
Single	35 (15.2)
Widow/widower	39 (17.0)
Separated/divorced	21 (9.1)
Educational status	
No education	9 (3.9)
Primary	31 (13.5)
Secondary	123 (53.5)
Above secondary	67 (29.1)

Note. $N = 230$. Age: Mean (standard deviation) = 45.66 (11.64) years.

The key independent variable for the study was TB knowledge. This was defined based on various variables as depicted in Table 3. This included whether the respondent had heard about TB, including where they first heard it from. The sources were grouped into news outlets/bulletin boards (98.7%), healthcare professionals (71.7%), and other people, including family/friends/teachers (46.1%). These were all standalone sources, and respondents might have indicated more than one. Respondents had to state how serious they regarded TB, for which the most appropriate response was that it "can be dealt with in five days or more." This response was indicated by only 42 (18.3%). The most

common TB symptoms and signs identified correctly by the respondents was that the "cough that lasts for two-three weeks," noted by 204 (88.7%). Over 82% correctly specified that "living with a TB patient" is one of the modes of TB transmission, among others. Washing hands after touching items in public places was the most popular mode of prevention identified (n = 177, 77.0%), with 149 (64.8%) noting that anybody can be infected with TB. While a substantial proportion (60%) of the study participants agreed that TB can be cured, most (83.9%) would resort to herbal remedies or traditional healer for cure. Scoring the responses from all these factors and recoding as described under operationalization of variables (Chapter 3), the overall TB knowledge was defined as "good knowledge" by 146 (63.5%) respondents.

Table 3

TB Knowledge of Survey Respondents at the Onitsha Main Market, Anambra State, Nigeria

Factors	n (%)
Had heard about TB from	
News outlets and bulletin boards	227 (98.7)
Healthcare professionals	165 (71.7)
Other people including family/friends/teachers	106 (46.1)
How serious respondent regarded TB	
Life threatening, requiring immediate attention	123 (53.5)
Can be dealt with in 2-4 days	7 (3.0)
Can be dealt with in 5 days or more	42 (18.3)
Common TB symptoms and signs	
Cough that lasts for 2–3 weeks	204 (88.7)
Bloody sputum	138 (60.0)
Weight loss	134 (58.3)
Fever	128 (55.7)
Chest pain	124 (53.9)
Difficulty breathing	148 (64.3)
Mode of TB transmission	
By sharing dishes, plates, cups and spoons	90 (31.9)
Through air when a person with TB cough or sneezes	137 (59.6)
By living with a TB patient	189 (82.2)
Through smoking cigarettes or drinking alcohol	168 (73.0)
Mode of prevention	
Covering mouth and nose when coughing or sneezing	146 (63.5)
Avoid sharing dishes, spoons and cups	100 (43.5)
Washing hands after touching items in public places	177 (77.0)
Who can be infected with TB	
Anybody	149 (64.8)
TB can be cured	
Yes	138 (60.0)
How someone with TB can be cured*	
Using drugs specifically for TB	155 (67.4)
Herbal remedies/Traditional healers	193 (83.9)
Prayer/Fasting	143 (62.2)
Good nutrition	146 (63.5)
Overall TB knowledge	
Poor	84 (36.5)
Good	146 (63.5)

Note. $N = 230$. *Although herbal remedies/traditional healers, prayer/fasting and good nutrition are reported here as way to cure TB, they were not included as good knowledge.

The other independent variable or covariate of this study was TB stigma or attitudes, also defined/operationalized based on several constructions shown in Table 4. The constructs included whether the survey respondents thought that they could ever contract TB, of which 4.8% said yes, their feelings if they were found to have TB (the most popular of which were hopelessness, 53.9%, and embarrassment, 38.7%), who they would talk to about their illness if they had TB (with a spouse, 53.5%, and child, 46.5%, ranking high), and their feelings about people with TB (where 20.9% thought they would treat them like they would other people). All the responses were similarly scored and recoded as overall TB stigma (attitudes), for which 12 (5.2%) respondents had a favorable attitude.

Table 4

TB Stigma (Attitudes) of Survey Respondents at the Onitsha Main Market, Anambra State, Nigeria

Factors	*n* (%)
Think you can get TB	11 (4.8)
Feeling if you were found to have TB?	
Fear	6 (2.6)
Surprise	6 (2.6)
Shame	37 (16.1)
Embarrassment	89 (38.7)
Sadness	6 (2.6)
Hopeless	124 (53.9)
Happiness	1 (0.4)
Who would you talk to about your illness if you had TB?	
Landlord	8 (3.5)
Health worker	99 (43.0)
Spouse	123 (53.5)
Neighbor	0 (0.0)
Parents	65 (28.3)
Child	107 (46.5)
Family member	19 (8.3)
Close friends	29 (12.6)
No one	19 (8.3)
Feelings about people with TB	
Try to help	22 (9.6)
Treat them like I treat other people	48 (20.9)
Help them while maintaining distance if possible	36 (15.7)
Overall attitude (Stigma)	
Unfavorable	218 (94.8)
Favorable	12 (5.2)

Note. $N = 230$.

The dependent variable for this study was healthcare-seeking behavior (HSB) or practice. As summarized in Table 5, this is described in terms of what the respondents would do if they had TB symptoms (with expected responses being "go to the health facility or pharmacy" identified correctly by 25.2% and 58.7% of the respondents,

respectively, but to which 71.3% and 66.5%, respectively, responded that they will go to a traditional healer and pursue self-treatment, including herbs). The other component of HSB was a question about "at what point will they go to the health facility if they develop TB symptoms," with the most popular response being "When treatment on my own does not work," indicated by 168 (73.0%), although the most appropriate response, "Go immediately," was specified by 18 (7.8%) of participants. Responses from these factors were also similarly scored as the HSB (or practice) variable and coded as poor HSB (n = 175, 76.1%) and good HSB (n = 55, 23.9%).

Table 5

TB Health Seeking Behavior (Practices) of Survey Respondents at the Onitsha Main Market, Anambra State, Nigeria

Factors	*n* (%)
What you would do if you had TB symptoms	
Go to the health facility	58 (25.2)
Go to pharmacy	135 (58.7)
Go to traditional healer	164 (71.3)
Go to religious leader	131 (57.0)
Pursue self-treatment	153 (66.5)
At what point will you go to the health facility if you develop TB symptoms?	
Not go anywhere as long as the symptoms don't get worse	133 (57.8)
When treatment on my own does not work	168 (73.0)
When symptoms that suggest TB last for 3-4 week	77 (33.5)
Not go to a health care facility at all	59 (25.7)
Go immediately	18 (7.8)
Overall health-seeking behavior (practice)	
Poor	175 (76.1)
Good	55 (23.9)

Note. N = 230.

I noted that a majority of the survey respondents exhibited poor HSB, the reported reasons of this poor HSB is summarized in table 6, the key of which included being too expensive for which they cannot afford the cost (n=63, 36%). Finally, when asked "How expensive they thought TB diagnosis/treatment is in Anambra State", while abysmal 21.7% correctly stated that it is free of charge, the majority (57.7%) restated the claim that it is very expensive.

Table 6

Reasons for Poor TB Health-Seeking Behavior (Practices) Reported by Survey Respondents at the Onitsha Main Market, Anambra State, Nigeria

Factors	*n* (%)
Reason responded would not want to go to a health care facility if you had the symptoms of TB	
Not clear that the symptoms are serious	10 (5.7)
Not sure where to go	53 (30.3)
Too expensive/cannot afford cost	63 (36.0)
Transportation difficulties	35 (20.0)
Do not trust medical workers	20 (11.4)
Do not like the attitude of medical workers	23 (13.1)
Do not want to find out that something is really wrong	20 (11.4)
How expensive respondent think TB diagnosis and treatment is in Anambra State	
Free of charge	38 (21.7)
Affordable	1 (0.06)
Moderately expensive	29 (16.6)
Very expensive	101 (57.7)

Note. N = 175.

Results

Findings for RQ1

RQ1 was as follows: What is the relationship between knowledge and health-seeking behavior relation to TB among Onitsha main market traders? Binary logistic regression was used to assess the likelihood that traders at the Onitsha main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, reporting crude odds (OR) ratio and 95% Confidence interval (CI) and the corresponding p-value.

By fitting this model, it was observed that 7.2% of the variation in health-seeking behavior (practice) was explained by the TB knowledge (Nagelkerke R-square = 0.072) which is indicative of a well-fitted model. As summarized in Table 7, the result from binary logistic regression showed a statistically significant relationship between TB knowledge and HSB (OR = 3.30, 95% CI [1.56, 6.97], *p=0.002*). According to this result, the null hypotheses (Ho 1) that there is no relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders is rejected, holding that the alternative (Ha 1) that there is indeed statistically significant relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

Findings for RQ2

RQ2 was as follows: Does TB-related stigma affect the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders? Multi-variable logistic regression was used to assess the likelihood that traders at

the Onitsha main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, while controlling for stigma, reporting adjusted odds (AOR) ratio and corresponding 95% Confidence interval (CI) and the corresponding p-value.

By fitting this model, it was observed that by adding stigma (attitude) in a model that already contains TB knowledge and HSB, 14.5% of the total variation in HSB (practice) was explained by both TB knowledge and stigma (Nagelkerke R-square = 0.145), indicative of a well-fitted model. Similarly, Table 7 shows that, based on multiple-variable logistic regression, adjusting for stigma (attitude) in the relationship between TB knowledge and HSB, strengthens the observed relationship (by increasing magnitude of the effect measure while preserving statistical significance but increasing the variability (Adjusted OR = 3.77, 95% CI [1.71, 8.35], $p < 0.001$). Accordingly, the null hypothesis ($H_0$2) that TB-related stigma does not affect the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders is rejected holding to the alternative (Ha 2) that states TB-related stigma affects the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders.

Findings for RQ3

RQ3 was as follows: Do the further controlling of socio-demographic (age, gender, marital status and level of education) affect how knowledge and stigma affect health-seeking behavior in relation to TB among Onitsha main market traders? Multi-variable logistic regression was used to assess the likelihood that traders at the Onitsha

main market in Anambra, Nigeria, with "good" knowledge of TB would also have 'good' health seeking-behavior compared to those with "poor" knowledge of TB, while controlling for stigma, as well as the socio-demographics (age, agenda, marital status and educational status), reporting adjusted odds (AOR) ratio and corresponding 95% Confidence interval (CI) and corresponding p-value.

By fitting this model, it was observed that by adding the socio-demographic variables (age, agenda, marital status and educational status), in a model that already contains TB stigma (attitude), knowledge and HSB, 30.7% of the total variation in HSB (practice) was explained by TB knowledge and stigma as well as age, agenda, marital status and educational status (Nagelkerke R-square = 0.307), indicative of a well-fitted model. Education made the greatest contribution in the model as it explained 13.5% of the variation in HSB (Nagelkerke R-square = 0.135). In the same vain, table 7 depicts that, based on multiple-variable logistic regression, further adjusting for socio-demographics (age, gender, marital status and level of education) reduced the magnitude of the relationship between TB knowledge as well as stigma and HSB slightly while preserving statistical significance but increasing variability as well (*Adjusted OR* = 3.32, 95% CI [1.20, 8.72], *p=0.02*) . As such, the null hypothesis (Ho 3) that further controlling of socio-demographic (gender, marital status, age and level of education) does not affect how knowledge and stigma affected health-seeking behavior in relation to TB among Onitsha main market traders is rejected holding on its alternative (Ha 3) that further controlling of socio-demographic (gender, marital status, age and level of education) does affect how knowledge and stigma affected health-seeking behavior in

relation to TB among Onitsha main market traders.

Table 7

Likelihood That Traders of Onitsha Main Market in Anambra State, Nigeria, Who Reported Good Knowledge Related to TB Will Also Report Good Health-Seeking Behaviors or Practices While Adjusting for Reported Stigma and Sociodemographics

Factors	Unadjusted		Adjusted for all the variables	
	OR (95% CI)	*p*-value	AOR (95%CI)	*p*-value
Knowledge				
Poor	1		1	
Good	3.30 (1.56, 6.97)	0.002	3.32 (1.20, 8.72)	0.02
Attitude (Stigma)				
Unfavorable	1		1	
Favorable	7.28 (2.10, 25.22)	0.002	17.63 (4.05, 76.76)	<0.001
Gender				
Male	1		1	
Female	0.95 (0.51, 1.74)	0.86	1.22 (0.56, 2.64)	0.62
Age (Years)				
18 - 34	1		1	
35 - 64	3.36 (1.13, 9.95)	0.03	4.14 (1.26, 13.68)	0.02
65+	2.77 (0.60, 12.71)	0.19	2.58 (0.45, 14.93)	0.29
Marital status				
Married	1		1	
Single	0.55 (0.24, 1.25)	0.15	0.46 (0.17, 1.25)	0.13
Widow/widower	1		1	
Separated/divorced	1.09 (0.41, 2.90)	0.86	1.04 (0.33, 3.30)	0.94)
Educational status				
No education	0.51 (0.14, 1.89)	0.32	0.37 (0.08, 1.67)	0.19
Primary	1		1	
Secondary	0.52 (0.08, 3.43)	0.50	0.68 (0.07, 6.26)	0.73
Above secondary	0.64 (0.12, 3.32)	0.59	0.52 (0.08, 3.43)	0.50
	2.84 (0.55, 14.68)	0.21	2.25 (0.33, 15.39)	0.41

Note. $N = 230$.

As, it is made obvious, statistical significance was assessed in each of the above analysis based on the 5% level of significance.

Summary

I presented the frequency of the dependent and independent variables as well as the covariates that were categorical variables. I also presented the descriptive statistics of the independent variable as well as the covariates. I finally reported results from binary and multivariable logistic regression analyses that investigate the relationship between TB knowledge and health seeking behavior (RQ1) and while adjusting for TB stigma (RQ2) and hierarchically for age, gender, marital and educational status RQ3). Before reporting the results from these analyses, I first reported important pieces of information regarding the model specific/fit of the corresponding models (Nagelkerke R-square). Essentially, the result from binary logistic regression, RQ1, showed a statistically significant relationship between TB knowledge and HSB (*OR* = 3.30, 95% CI [1.56, 6.97], *p=0.002*). Based on multiple-variable logistic regression, adjusting for stigma (RQ2) strengthened the observed relationship between TB knowledge and HSB (*Adjusted OR* = 3.77, 95% CI [1.71, 8.35], *p<0.001*), and further adjusting for socio-demographics (age, gender, marital status and level of education, RQ3) reduced the magnitude of the relationship slightly (*Adjusted OR* = 3.32, 95% CI [1.20, 8.72], *p=0.02*) while preserving statistical significance but increasing variability in both cases. Assessing these outcomes based on the 5% level of significance, I rejected the null hypotheses associated with each RQ, holding on their alternatives.

In the next chapter, I will discuss the implications of the reported findings in the context of existing literature on this topic and theoretical framework, social change implications which making some recommendations for future studies before drawing my final conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of the study was to examine the relationship between TB knowledge and TB-related stigma toward health seeking behavior among traders in the Onitsha main market, Anambra State of Nigeria. I also examined the effect of age, gender, marital status, and level of education as covariates to the relationship between TB knowledge and TB-related stigma to health seeking behavior as an outcome. The design of the study was a quantitative, cross-sectional survey using primary data.

I conducted a binary logistic regression analysis to examine the relationship between TB knowledge and health seeking behavior. The results showed that the traders with good knowledge of TB were statistically significantly more likely to seek health care when confronted with TB symptoms than those with poor TB knowledge (*OR* = 3.30, 95% CI [1.56, 6.97], $p = 0.002$). Multiple logistic regression analysis was conducted to examine the effect of stigma on the relationship between TB knowledge and health seeking behavior. The results showed that there was a statistically significant effect of stigma on the relationship between TB knowledge and health seeking behavior HSB (adjusted *OR* = 3.77, 95% CI [1.71, 8.35], $p < 0.001$). Furthermore, I conducted a multiple regression logistic analysis to examine the relationship between TB knowledge and TB-related stigma on health seeking behavior controlling for the effects of age, gender, marital status, and level of education as covariates. The results showed that there was statistically significant relationship between TB knowledge and TB-related stigma to

health seeking behavior controlling for the effects of age, gender, marital status, and level of education (adjusted *OR* = 3.32, 95% CI [1.20, 8.72], *p* = 0.02).

Interpretation of the Findings

RQ1 was as follows: What is the relationship between knowledge and health-seeking behavior relation to TB among Onitsha main market traders? I conducted a binary logistic regression analysis to examine the relationship between TB knowledge and health seeking behavior. The results showed a statistically significant relationship between TB knowledge and health seeking behavior. This finding is consistent with evidence found in the studies associating TB knowledge to health seeking behavior (see Ali et al., 2019; Balogun et al., 2019; Bisallah, 2018; Blanco et al., 2018; Hassan et al., 2017). Nwaokoro et al. (2019) found that 44% of their participants in another area of Anambra state had good knowledge of TB. In this study, I found that 63.5% of the participants had good knowledge of TB, closely aligned with a study in the West Africa country of Gambia, which found that 68.9% in their study had good knowledge. The increase in my findings in Anambra may be associated with mandatory TB education and checklists in health centers in Anambra State (see NTBLCP, 2019). This requires that all patients visiting health centers be educated on TB symptoms, answer TB-related questions, and be counseled about the importance of knowing TB symptoms and mode of transmission (NTBLCP, 2019). The mandatory TB education and counseling provision may have impacted the traders' awareness and health seeking behavior. General knowledge on TB is has been found to be determined by the level of one's education (Westaway, 1989). The HBM poises that people who believe they are at risk for disease

understand the benefit of preventive health services to avoid the disease and will take action geared toward preventive measures (Rosenstock, 1996; Rosenstock et al., 1988). The binary logistic regression analysis found that 7.2% of variances in health seeking behavior is attributed to TB knowledge among the traders in the Onitsha main market (Nagelkerke *R* square = 0.072; $p < 0.05$).

RQ2 was as follows: Does TB-related stigma affect the relationship between knowledge and health-seeking behavior in relation to TB among Onitsha main market traders? Introducing TB-related stigma into the model using multiple logistic regression analysis to evaluate how it affects the relationship between TB knowledge and health seeking behavior in relation to TB among traders in the Onitsha main market showed that a 14.5% variance of health seeking behavior is explained by TB-related stigma and knowledge (Nagelkerke *R* square= 0.145, $p < 0.05$). The resulting association of TB knowledge with seeking behavior after adjusting for stigma was statistically significant (*AOR* = 3.77, 95% CI (1.71, 8.35), $p < 0.001$). In fact, TB-related stigma was found to have a statistically significant relationship with health-seeking behavior on its own both in the crude (*OR* = 7.28, 95% CI (2.10, 25.22), $p = 0.002$) and adjusted model that controls for TB knowledge and sociodemographics (*AOR* = 17.63, 95% CI (4.05, 76.76), $p < 0.001$), showing a higher likelihood of good health-seeking behavior for TB among those with favorable attitudes (low stigma) towards TB compared to those with unfavorable attitudes or high stigma. This result is in line with Khan et al. (2020), who found a determined level of stigma and discrimination towards TB patients. Their study revealed that fear of being stigmatized affected health seeking behavior among the

population in Pakistan. Similarly, Datiko et al. (2020) found that more than one third of Ethiopia high scores TB-related stigma was an association with poor knowledge. The poorer the attitude towards TB, the more the health seeking behavior decreases. To increase health seeking behavior in relation to TB, myths and misconceptions people have about TB should improve. This study was consistent with Balogun et al. (2019) in a Gambian study that showed that stigmatization contributes to a high burden of TB and that improving attitude about TB will ultimately lead to higher rate of TB detection and treatment. They found 80% of the rural dwellers had unfavorable attitude towards TB. This is in line with Ali et al. (2019) in their study in Pakistan that found a need for improved TB-related education among the communities by decreasing the unfavorable attitude towards disease and people affected with disease.

RQ3 was as follows Does the further controlling of sociodemographics (age, gender, marital status, and level of education) affect how knowledge and stigma affect health-seeking behavior in relation to TB among Onitsha main market traders? Furthermore, controlling for selected sociodemographics (age, gender, marital status, and level of education) as well as TB-related stigma in the relation to TB knowledge and health-seeking behavior still results in a statistically significant association ($p = 0.02$). This result aligns well with the findings of similar relation in Gambia (see Bashorun et al, 2020); however, the associations of the individual covariates (except age) with health seeking behavior were not statistically significant even when adjusted for TB knowledge and TB-related stigma. This finding is contrary to those by Bashorun et al. (2020), who found statistical significance with education and marital status but not with age, the

complete opposite. It is noteworthy that while this is the case with the crude models, one cannot actually make this claim with the adjusted model as the number of variables controlled were not exactly the same. Apart from age, gender, education, and marital status (similar to this study), Bashorun et al. also adjusted for employment and residence. While statistical significance was not observed for these individual covariates, it is worth noting some consistency in the direction of effects. For example, it was observed in my study and by Noe et al. (2017) as well as Bashorun et al. in their respective studies that being educated was associated with increased odds of good health seeking behavior compared to not being educated (though not statistically significant in this study). The finding in this study may relate to the fact the myths and misconceptions that are rooted in culture are not influenced by one's age, gender, marital status, or level of education. Kleinman (1980) poised that infectious diseases such as TB have a social construct that is heavily influenced by culture and belief system of a community.

Interpretation of the Study Findings and Theoretical Framework Context

The stigma and discrimination and the HBM were the two theoretical frameworks for this study. The perceived barrier was the construct of the HBM that applied to this study. I found that traders with negative attitudes were less likely to seek health care when confronted with TB symptom than those with good attitudes. Negative attitudes and discriminatory practices towards persons affected with TB have been documented as some of the barriers that prevent individuals from seeking healthcare services or engaging in preventive health care services or engaging in preventive health activities that will protect their health (Stangl et al., 2019). Those with stigma and discriminatory attitudes

against other persons with TB perceive that they will be stigmatized or discriminated against if they are found to have TB. Therefore, it becomes a barrier for them to seek health care when confronted with TB symptoms (Stangl et al., 2019). Srivastava (2022) also confirmed that people tend to portray negative attitudes toward those with disease.

According to HBM, when individuals understand the benefit of engaging in preventive behavior such as TB prevention, it facilitates their engagement in seeking care (Rosenstock, 1996; Rosenstock et al., 1988). The assumption that the practice of seeking healthcare among traders will be influenced by barriers to seeking health care such as stigma and discrimination was supported by the finding of this study. The finding showed that both poor knowledge about TB and the stigmatizing attitude of traders towards TB and people affected with TB predicts their healthcare seeking at alpha = .005. *p*-value < .005 and with an *OR* greater than 1 (1.232). This may be because the traders do not understand the benefit of seeking healthcare when confronted with TB symptoms. This difficulty in engaging in preventive behavior is in line with the perceived benefit constructs of the HBM. The government of Anambra State in addition with other donor supports (such as the Global Fund) have spent a huge amount of funds for the containment of the TB epidemic, which made it possible to provide free TB testing and linkage to care in Anambra State (NTBLCP, 2021), but a lack of TB knowledge and poor attitude about TB may have impacted the traders in health seeking decisions.

Limitations of the Study

Understanding factors related to TB influencing health seeking behavior is crucial in epidemic prevention (Oluwasanu et al., 2020). Poor health seeking behavior among

those affected with TB symptoms is of great concern in controlling TB in Anambra State (Ugwu et al., 2021). In this study, I was able to establish that in as far as the geographical area in Onitsha main market where the study was conducted, TB knowledge and TB relation stigma is a risk factor for poor health seeking behavior, which is similar to the studies conducted by Adebe (2010) in Ethiopia and Balogun et al. (2019) in Nigeria.

In addition, I found that sociodemographics of age, gender, marital status, and level of education only slightly affect the relationship between knowledge and TB-related stigma to health seeking behavior. In particular, each of these variables on their own does not associate with health-seeking behavior. The finding is in contrary to the study conducted by Zhao et al. (2017) in China and Wura et al. (2017), who concluded that age, gender, and level of education has an association with health seeking behavior.

This study highlighted some of the constructs to understand the possible relation between TB knowledge and TB-related stigma to the health seeking behavior. Once I completed this study, I found many remaining limitations.

While this study further enhances research with regard to the use of the HBM in predicting knowledge of TB and health seeking behavior among traders in the Onitsha main market, a further explanation of those relationships is required to develop comprehensive interventions applicable to the norms of today's society.

The study population in this study was not representative of the population of traders in Onitsha with TB; thus, results cannot be extrapolated to the general TB population in Onitsha. Participants were from limited geographic areas, only traders in the Onitsha main market. Thus, the limited geographic study area poses a threat to the

external validity and limits the generalizability of the results (see Babbie, 2020; Creswell, 2009). Therefore, the risk factors for delay in health seeking behavior in this study could not be applied to traders in other markets in Onitsha.

Another limitation of this study included the convenience sampling frame. This could lead to a misinterpretation of the findings and inconclusive results that can affect the ability to apply the finding to others (see Andrade, 2021). However, this potential limitation denotes a need to conduct another study using larger sample size of traders to develop a better program that includes strategies to improve the health outcomes of TB cases in Anambra State.

Another limitation was a lack of diversity in the background of study participants as I focused on traders who owned stores. This group tends to be more educated than the general market traders. In this study only 3.9% had no primary education, and a majority (over 82%) had secondary education and above. That is not typical of the general trader's population. In future studies, it is recommended to study more diverse traders from other markets in Onitsha. It is essential and beneficial to have a diverse perspective on health conditions that is progressively rising.

Again, the accuracy of the information provided by the traders cannot be established or ascertained. The traders may have been concerned about being victimized because of a lack of knowledge or having experience with the disease. As such, they may not have been truthful with their answers to survey questions, hence affected the integrity of the data. Researchers have shown that the information given by participants in a survey might be what participants deemed acceptable by the society (Singleton & Straits,

2005) rather than a true answer, thereby affecting the validity of the results. Furthermore, the questionnaire was handed out to the traders, and they were given a set time to answer all the questions on the questionnaire. However, the trader may not have answered all the questions truthfully, and they may have felt uncomfortable answering certain questions about TB knowledge and stigma. This may have resulted in data that either under- or over-estimated participants' knowledge and attitude towards TB. Again, because they were to complete the questionnaire at their convenience, the genuineness of the participant's responses and whether they were the one who completed the questionnaire may be questioned.

The study was the first done using traders in relation to TB in Anambra State and Nigeria; therefore, there are no prior studies for comparison. It is my hope that the results from this study can be used to foster more program activities aimed at improving knowledge and reducing stigma and other barriers to health seeking behavior among TB patients in Anambra State.

Assumed responsiveness of this study was based on passing the survey in different selected sections of the market. Therefore, this survey's findings will not be generalized to the population of traders in other markets in Anambra State. The cross-sectional design of the study does not make it feasible to establish causality between the independent variables and dependent variable (see Frankfort-Nachmias & Leon-Guerrero, 2018). All the covariates identified by other researchers that may confound the relationship of the study variables were not exhaustibly addressed in this study, and, as a result, limited the study.

Logistic regression gives a measure of how relevant an independent variable (TB knowledge and TB-related stigma) is and tells about the direction of the relationship (Frankfort-Nachmias & Leon-Guerrero, 2018), whether positive or negative. Although the statistical test (logistic regression analyses) used assumed linearity between outcome (health seeking behavior) and predictor variables (TB knowledge and TB-related stigma), it is highly unlikely that the observations are linearly separable.

Recommendation for Future Research

The department of Health Anambra States were upmost delighted to approve this research study because it was in their research agenda to tackle issues of poor health seeking behavior in relation to TB in Onitsha local Govt, Area of the state. Though the conclusion of this study cannot be generalized because of the limited geographical area covered, however, the result of the study can provide a bench mark information for further investigation in matters related to TB in Anambra State. Based on the result of the analysis, the following suggestion can be made in order to increase number of persons who seek healthcare in the state when confronted with TB symptom thereby reducing the high burden of TB in Onitsha area of the state.

This study addresses the gap in literature about the relationship between TB knowledge and TB related stigma to health seeking behavior in Onitsha. One aspect of the market in Onitsha was used. Further inquiry needs to include other trader from other markets in Onitsha to determine the effect of TB knowledge and TB related stigma to health seeking behavior in Onitsha. This will give a broader view of the general population of Onitsha.

The two theoretical framework I used for this study were stigma and discrimination and HBM has been applied in various patient's counselling to promote understanding, and change knowledge, attitude and behavior of individuals about disease conditions (Champion & Skinner, 2008, Cutts et al., 1992). As noted in Chapter I, various factors on the difference levels of influence were responsible for Health seeking behavior. Exhausting other variables is recommended in this study.

The finding that TB knowledge and TB related stigma significantly affect health seeking behavior has a tremendous potential to affect social change. On the individual level, increasing TB knowledge and reducing negative attitude to TB and towards people affected with TB will improve Health seeking behavior, improve TB case finding and better TB treatment outcome. The change at the intuitional level will affect the TB better outcome in other levels as well. Persons seeking care for TB treatment will have more trust in the practitioner because of the efficiency in TB mitigation. On the community level, there will be more trust in giving care to TB patient. On the policy level, TB care will be funded by policy makers because of increased efficiency in mitigating TB. I also recommend further studies using a larger sample size to predict trader's personal knowledge about TB, TB associated stigma and health seeking behavior.

Implications for Social Change

TB is currently a public health big challenge in developing countries of the word that is driven by poverty, stigma, misconception and lack of political will (Shh et al., 2021). Onitsha north and south represent a growing proportion of the population infected with TB in Anambra State (Ugwu et al., 2021). One of the targets of the sustainable

development goals by WHO is to eliminate TB as a public health problem by 2025 (WHO, 2018). The target aimed at having 80% of people who has TB to be identified and be placed on multiple anti TB drugs. Those who have their bacterial load reduced have minimal risk of transmitting TB bacterial to others, Therefore, treatment with multiple anti TB drugs are used as a prevention and treatment measure. About 452,000 persons developed TB in Nigeria in 2020, and 128, 00 of them resulted in TB death (WHO, 2021). Anambra State ranked 6th in terms of number of TB cases notification in Nigeria in 2019 (NTBLCP, 2020). Onitsha north and south have highest TB incidence rate in Anambra State (Ugwu et al., 2021). Anambra population seek TB care at rate lower than WHO set rate (Adebayo et al., 2020). Poor health seeking behavior impedes early TB case detection and adequate treatment of TB cases (Houben & Dodd, 2016). Further research was warranted to quantify how TB knowledge and TB related stigma influence health seeking behavior among traders in Onitsha main market, particularly considering challenges of trading in conditions and environments that favor TB spread.

About 99% of traders in my study heard about TB via media and bulletin board which also is in-line with Gambia study by Bashorun et al. (2020) that showed a statistical significance in the use of TV in disseminating TB information. Message from mass media can play a major role on the way people understands and control TB (Sokol et al., 2003). Therefore, it is my goal to see to disseminate the information from this study through Anambra broadcasting radio station to help improve the lives of all affected with TB in Anambra State. To the institutional/organizational level, I will disseminate the data to the Director of NTBLCP Anambra State. The study can be used to reshape future TB

program activities. The NTBLCP could use the information in this study to incorporate more evidence-based activity program toward traders in Onitsha main market who operate in conditions and environment that favor TB spread to improve TB outcome in Anambra State. Both my study and Nwaokoro et al. (2019) study in Anambra West at 63.5% and 44%, respectively, were below WHO 85% set standard for TB knowledge in the nation, therefore, there is need for enhanced awareness and education campaign in the entire region. Supporting organizations such as NTBLCP and Anambra ministry of Health by way of program initiatives aimed at buffering the effects of the challenges faced by this population and increasing TB knowledge may be critical to increasing health seeking behavior and controlling TB in Nigeria and Anambra State.

My study showed that 99% of the participants would talk to the health care worker about their TB symptoms. This also is supported by the Gambian study (Bashorun et al., 2020) that showed that 95.4% participant will speak to the health care worker. My result can be used to expand resources offered to engage and train healthcare workers embark on health education campaign about TB in the local communities. For instance, the Anambra State NTBLCP where the study took place can use it to apply for government funding that would assist in educating the traders and encourage them, support health care facilities and install new innovative strategies to help meet the need of TB outcome improvement in the State. It could also be used to affect policy change around education and training as it relates to TB prevention and treatment. Again, it can also be used to advocate and sort funds for programs that aimed at reducing TB related stigma that is a barrier to care for TB patients.

Conclusion

This study examined the effect of TB knowledge and TB stigma to health seeking behavior in relationship to TB among traders aged 18 and above in Onitsha main market Anambra State Nigeria. These variables have been reported by others to impact negatively on TB control and migration in Anambra State. The impact of TB knowledge and TB related stigma was confirmed to affect health seeking behavior in this study. The sociodemographic (age, agender, marital status, and level education) only slightly impact the relationship between TB knowledge and TB-related stigma to health seeking behavior. A bigger simple size is recommended by the searcher for further exploring other covariate that might impact health seeking behavior towards Onitsha main market trader.

In chapter 5, I presented the results of the study based on the elicited RQs and hypothesis. I prescribed also need for further studies on other factors that might impede TB control in Anambra State. I also provided impact on social change on different levels. I believe that this study will form a bench mark for further research on how to develop TB programs that will be more effective to help mitigate TB in Anambra State and Nigeria as a whole.

Research regarding TB knowledge and TB associated stigma exist in literature for many different populations. Literature regarding the nature of this variables to predict health seeking behavior among the traders in Onitsha main market in Anambra State, Nigeria is scarce but worthy of studying, considering conditions and environments traders operate in that may favor TB spread. Myth and misconception about TB are known for

delay in health seeking behavior among people affected with TB symptoms. In Anambra State, TB are often associated with HIV and other conditions that communities or societies abhor. As a result, devalue faced by TB infected persons impact their ability to seek health care. This study examined the effect of TB knowledge, TB related stigma and health seeking behavior among traders in Onitsha main market, Anambra State of Nigeria. Attitude and knowledge have been reported by others to impact negatively on health seeking behavior among individuals affected with TB symptoms (Datiko et al., 2020; Nwaokoro et al., 2019; Neo et al., 2017 & Bisallah et al., 2018).

The theoretical framework for this study, Health Stigma & Discrimination (Stanly, 2019), and HBM (Rosenstock, 1996; Rosenstock et al., 1988) was used to exhibit the critical role of TB knowledge and TB related stigma to health seeking behavior. The theories guided research pertaining to topics that enhance and inhibit health seeking behavior of persons affected with TB symptoms, particularly for traders in Onitsha main market.

The reported impact of knowledge about TB and TB associated stigma on health seeking behavior was confirmed in this study. The finding of this study implies that improving the level of knowledge of TB and improving attitude to TB and towards people affected with TB can improve health seeking behavior in Onitsha main market traders. Increasing health seeking behavior rate in these traders will lead to getting higher percentage of traders confronted with TB symptoms to seek health care and take action accordingly to prevent transmission of TB to others. Health seeking behavior is the entry point for TB treatment which can be used as preventive because treatment of TB with

multiple anti TB drugs leads to reduction in bacterial load and reduction in TB transmission as such meeting the 85% target by 2030 (WHO, 2018) as well as the sustainable developmental goal of eliminating TB as public health problem can be achieved.

A bigger sample size is recommended for exploring further effect of stigmatized attitude on knowledge about TB among traders. I recommend that the study should be replicated using traders in other markets in Anambra State to have comparison. Therefore, it is recommended that NTBLCP of Anambra State should develop programs targeted at traders in Onitsha to improve their knowledge of TB, including the risk factors for contacting TB, and change their attitude to TB. The social change of improving health seeking behavior when confronted with TB symptoms should be across individuals, families, communities and country as whole. I also recommend researching the effect of COVID 19 on health seeking behavior among individuals affected with TB.

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Appendix A: Onitsha Main Market Traders TB Questionnaire

TB knowledge, Stigma and Health Seeking behavior Research Questionnaire
Individual Survey No. (MMT1).

1. Sociodemographic of the study participants:

1. Age: ___ Years
2. Gender: Male □ Female □
3. Educational qualification: No education □ Primary □ Secondary □ Above secondary □
4. Marital status: Single □ Married □ Widow/Widower □ Divorce/Separated □
5. Date:_____

2. TB knowledge

Please, check Yes, No or Don't Known (DK) for each statement below:

A. **How did you learn about TB?**

1. Newspapers and magazines	Yes □	No □	DK □
2. Radio	Yes □	No □	DK □
3. TV	Yes □	No □	DK □
4. Billboards	Yes □	No □	DK □
5. Brochures, posters and other printed materials	Yes □	No □	DK □
6. Health workers	Yes □	No □	DK □
7. Family, friends, neighbors and colleagues	Yes □	No □	DK □
8. Religious leaders	Yes □	No □	DK □
9. Teachers	Yes □	No □	DK □

B. **In your opinion, if you thought you had TB, how serious would you think it is and how soon would you seek health care services?**

1 Very serious/life threatening requiring immediate attention (not later than 1day)
Yes □ No □ DK □

2 Not life threatening or risky so can be dealt with in 2-4 days
Yes □ No □ DK □

3 Not very serious and can be dealt with in 5 days or more
Yes □ No □ DK □

C. **How would you rate TB as a problem in your community?**

1. It is a big problem	Yes □	No □	DK □
2. It exists but is not too much of a problem	Yes □	No □	DK □
3. It is not a problem at all	Yes □	No □	DK □

D. **Which of the following do you think as symptoms and/or signs of TB?**

1. Rash Yes □ No □ DK □
2. Severe headache Yes □ No □ DK □
3. Cough that lasts for 2-3 weeks or more Yes □ No □ DK □
4. Vomiting or feeling like vomiting Yes □ No □ DK □
5. Coughing up Blood Yes □ No □ DK □
6. Weight loss Yes □ No □ DK □
7. Yellow eyes Yes □ No □ DK □
8. Back pain Yes □ No □ DK □
9. Fever Yes □ No □ DK □
10. Chest pain Yes □ No □ DK □
11. Shortness of breath Yes □ No □ DK □
12. Tiredness or easy fatigability Yes □ No □ DK □

E. **In what ways can a person get TB?**

1. By sharing dishes, cups spoons, folk, plates Yes □ No □ DK □
2. Through Handshakes Yes □ No □ DK □
3. Through air as the TB patient sneeze or cough Yes □ No □ DK □
4. Living in the same neighborhood with a person with TB Yes □ No □ DK □
5. Through smoking cigarettes or drinking alcohol Yes □ No □ DK □
6. Through touching items in public places (doorknobs, walls, tables, chairs) Yes □ No □ DK □

F. **In what ways can a person avoid getting TB?**

1. Avoid shaking hands Yes □ No □ DK □
2. Covering mouth and nose when coughing or sneezing Yes □ No □ DK □
3. Avoid sharing dishes, spoons and cups Yes □ No □ DK □
4. Washing hands after touching items in public places Yes □ No □ DK □
5. Closing windows at home Yes □ No □ DK □
6. Through good nutrition/eating well Yes □ No □ DK □
7. By praying and/or fasting Yes □ No □ DK □
8. By avoiding people who appear like they have TB Yes □ No □ DK □

G. **Who can be infected with TB?**

1. Anybody Yes □ No □ DK □
2. Only poor people Yes □ No □ DK □
3. Only people who smoke cigarettes Yes □ No □ DK □
4. Only people who drink a lot of alcohol Yes □ No □ DK □
5. Only people who use hard drugs Yes □ No □ DK □
6. Only people living with HIV/AIDS Yes □ No □ DK □
7. Only people who have been in prison Yes □ No □ DK □

H. **Can TB be cured?**

1. Yes
2. No
3. I don't know

I. **How can someone with TB be cured?**

1. Marabout/Herbal remedies Yes □ No □ DK □
2. Home rest without medicine Yes □ No □ DK □
3. Eat good food Yes □ No □ DK □
4. Praying and/or fasting Yes □ No □ DK □

5. Drugs specifically for TB Yes □ No □ DK □
6. Other drugs given at the health center Yes □ No □ DK □

3. TB Stigma or Attitude

J. **Do you think you can get TB?**

1. Yes
2. No
3. DK

K**. How would you feel if you were found to have TB?**

1. Fear Yes □ No □ DK □
2. Surprise Yes □ No □ DK □
3. Shame Yes □ No □ DK □
4. Embarrassment Yes □ No □ DK □
5. Sad Yes □ No □ DK □
6. Hopeless Yes □ No □ DK □
7. Happiness (because my problem has been identified and can be treated) Yes □ No □ DK □

L. **Who would you talk to about your illness if you had TB? (Please prompt for answer and tick YES or NO for Each Option)**

1. Landlord Yes □ No □ DK □
2. Health Care worker-doctor or nurse, Yes □ No □ DK □
3. Spouse (participants wife or husband) Yes □ No □ DK □
4. Neighbor Yes □ No □ DK □
5. Parents Yes □ No □ DK □
6. Child(ren) Yes □ No □ DK □
7. Other family member Yes □ No □ DK □
8. Close friend Yes □ No □ DK □
9. No one Yes □ No □ DK □

M. Which statement is closest to your feeling about people with TB disease? (Read the following choices and check one answer)

b I try to help them
c I try to stay away from these people because they may infect me
d I act to them as towards all other people
e I will help them but stay away from them

N. In your community, how is a person who has TB usually regarded/treated? (Tick one answer)

a. Most people reject him or her.
b. Their families and friends isolate them and keep them in a separate room with separate cups, plates and spoons
c. Most people are friendly, but they generally try to avoid him or her
d. The community mostly supports and helps him or her

O. Do you think that HIV positive people should be concerned about TB? (Tick one answer)

a. Yes because person with HIV is more likely to develop TB
b. No the person with HIV is not more likely than person without HIV to develop TB
c. Do not know

4. Health Seeking behavior

P. **What would you do if you had the following symptoms-cough for 2 weeks or more, night sweats, fever and some weight loss? (Please answer by ticking Yes or NO for each option)**

1. Go to health facility Yes □ No □ DK □
2. Nothing or wait for symptoms to progress some more Yes □ No □ DK □
3. Go to pharmacy Yes □ No □ DK □
4. Go to Traditional healer/Marabout Yes □ No □ DK □
5. Go to religious leader Yes □ No □ DK □
6. Pursue Other self-treatment options (herbs, etc.) Yes □ No □ DK □
7. Stay at home and wait for the body to heal itself of the TB Yes □ No □ DK □

Q. **If you had the following symptoms, cough for 2 weeks or more, night sweats, fever and some weight loss, at what point would you go to the health facility?**

1. I would not go to the doctors as long as the symptoms don't get worse Yes □ No □ DK □
2. When treatment on my own does not work Yes □ No □ DK □
3. When symptoms that suggest TB last for 3-4 week

	Yes □	No □	DK □
4. I will not go to a health care facility at all	Yes □	No □	DK □
5. I will go immediately	Yes □	No □	DK □

R. If you choose that you would not want to go to a health care facility if you had the symptoms of TB, say why? (Tick the all that applied)

a. Not clear that the symptoms are serious
b. Not sure where to go
c. It will be too expensive/I cannot afford the cost
d. Difficult with transportation/distance to clinic
e. Do not trust medical workers
f. Do not like the attitude of medical workers
g. Do not want to find out that something is really wrong.

S. How expensive do you think TB diagnosis and treatment is in Anambra State? (Please check one)

a. It is free of charge
b. It is easily affordable
c. It is somewhat/moderately expensive
d. It is very expensive
e. Don't know

Ajuju Maka Akwukwo Ọmumu Ukwara nta 'n Onitsha Main Market

Ihe muta banyere ukwara nta, ihe nkocha gbasara ukwara nta n'omume ichoga ndi n'ahu maka ahu isike.

Onu ogugu onye nsonye: (ofu)

1. Ihe gbasara onye nsonye

(onye nsonye ga asa)

Nke mbu. Afo gi: ___ afo

Nke abua. **Udigi**: Nwoke □ Nwanyi □

Nke ato. Akwukwo ijere: □ ejeyim akwukwo □ Akwukwo isi mbido □ akwukwo colleji □ Akwukwo mahadum

Nke ano. Akara anumu di gi: Enweyi mu di ma obu nwunye □ Enwere mu di ma obu nwunye □ Di mu ma obu nwunye mu nwuru anwu □ Mu na di mu ma obu nwunye mu ebiyizii

Nke ise. Ubochi taa: 11/20/2022

2. Ihe muta ukwara nta

Biko, zaa ee, mba maobu amayim in ihe di ajujua di na mgbada:

A. Ebee ka mbụ ị mụtara gbasara ụkwara nta

1. Akwụkwọ akụkọ na magazine, Ee, Mba, Amayimu
2. Redio Ee, Mba, Amayimu
3. Igwe onyonyo Ee, Mba, Amayimu
4. bọọdụ mkpọsa Ee, Mba, Amayimu
5. Broshọ, akwụkwọ mmado na ihe ndị ọzọ ebipụtara Ee, Mba, Amayimu
6. Ndị ọrụ ahụike Ee, Mba, Amayimu
7. Ezinụlọ, ndị enyi, ndị agbata obi na ndị ọrụ ibe Ee, Mba, Amayimu
8. Ndị ndú okpukpe Ee, Mba, Amayimu
9. Ndị nkuzi Ee, Mba, Amayimu
10. Ndị ọzọ (biko kọwaa) Ee, Mba, Amayim
11. Amaghị m [ma ọ bụ echeghị m] Ee, Mba, Amayimu

B. N'uche gị, ọ bụrụ na ị chere na ị nwere ukwara nta, kedu ka ị ga-esi dị njọ na olee mgbe ị ga-achọ ọrụ nlekọta ahụike? (kpalie onye zara ajụjụ site na age na nhọrọ niile ahụ, lelee otu azịza)

1. Dị oke njọ / na-eyi ndụ egwu chọrọ nlebara anya ozugbo (ọ bụghị mgbe e mesịrị 1 ụbọchị)
2. Ọ bụghị ihe na-eyi ndụ egwu ma ọ bụ dị ize ndụ, yabụ enwere ike ime ya n'ime ụbọchị 2-4
3. Ọ bụghị nnukwu njọ ma enwere ike ime ya n'ime ụbọchị 5 ma ọ bụ karịa
4. Amaghị m

C. Kedu otu ị ga-esi tụọ ukwara nta dị ka nsogbu n'obodo gị? (Lelee otu)

1. Ọ bụ nnukwu nsogbu
2. Ọ dị ma ọ bụghị nnukwu nsogbu
3. Ọ bụghị nsogbu ma ọlị
4. amaghị m

D. Kedu n'ime ndị a ka ị chere dị ka akara na / ma ọ bụ akara nke ukwara nta?

a.	Ihe owuwu	Ee:	Mba	Amayimu
b.	Oke isi owuwa	Ee:	Mba	Amayimu
c.	Ukwara ruru izu uka abua na iti ma obu karia	Ee:	Mba	Amayimu
d.	Igbo agbuo ma bu dika ije agbo agbuo	` Ee:	Mba	Amayimu
e.	Ikwaputa obala	Ee:	Mba	Amayimu
f.	Ita ahu	Ee:	Mba	Amayimu
g.	Anya icha edoedo	Ee:	Mba	Amayimu
h.	Azu mgbu	Ee:	Mba	Amayimu
i.	Ahu oku	Ee:	Mba	Amayimu
j.	Obi mgbu	Ee:	Mba	Amayimu
k.	Ume ichu oku	Ee:	Mba	Amayimu
l.	Ike ogwugwu	`Ee:	Mba	Amayimu

E. Kedu ụzọ mmadụ nwere ike isi nweta ukwara nta?

a) Site n'ịkekọrịta ihe dị ka biros, akpụkpọ ụkwụ, cutlass, ihe ndị ọzọ na-arụ ọrụ Ee Mba Amayimu

b) Site n'itinye aka Ee Mba Amayimu

c) Site na ikuku mgbe onye nwere TB ụkwara ma ọ bụ uzere Ee Mba Amayimu

d) Site na ibi n'otu obodo / obodo ma ọ bụ agbata obi ya na onye nwere Ukwara nta Ee Mba Amayimu

e) Ekekọrịta efere, efere, iko, na ngaji Ee Mba Amayimu

f) Site na ise siga ma ọ bụ ịnụ mmanya Ee Mba Amayimu

g) Site na imetụ ihe aka n'ebe ọha na eze (mkpọchi ọnụ ụzọ, mgbidi, tebụl, oche) Ee Mba Amayimu

F. Kedu ụzọ mmadụ nwere ike isi gbanarị TB? (biko rịọ maka azịza wee pịa Ee ma ọ bụ Mba maka nhọrọ ọ bụla)

a) Zere ịma aka Ee Mba Amayimu
b) Ikpuchi ọnụ na imi mgbe ụkwara ma ọ bụ uzere Ee Mba Amayimu
c) Zere ịkekọrịta efere, ngaji na iko Ee Mba Amayimu
d) Ịsacha aka ma metụ ihe n'ebe ọha na eze Ee Mba Amayimu
e) Imechi windo n'ụlọ Ee Mba Amayimu
f) Site na ezigbo nri / iri nri nke ọma Ee Mba Amayimu
g) Site n'ekpere na ma ọ bụ buo ọnụ Ee Mba Amayimu
h) Site n'izere ndị dị ka ha nwere ukwara nta Ee Mba Amayimu

G. N'uche gị, onye nwere ike bute ukwara nta? (biko rịọ maka azịza wee pịa Ee ma ọ bụ Mba maka nhọrọ ọ bụla)

a) Onye ọ bụla Ee Mba Amayimu
b) Naanị ndị ogbenye Ee Mba Amayimu
c) Naanị ndị na-ese siga Ee Mba Amayimu
d) Naanị ndị na-aṅụ nnukwu mmanya Ee Mba Amayimu
e) Naanị ndị na-eji ọgwụ ike eme ihe Ee Mba Amayimu
f) Naanị ndị nwere nje HIV/AIDS Ee Mba Amayimu
g) Naanị ndị nọ n'ụlọ mkpọrọ Ee Mba Amayimu

H. Enwere ike ịgwọ ọrịa ukwara nta?

1. Ee
2. Mba
3. Amaghị m

I. Kedu otu onye nwere ukwara nta ga-esi gwọọ ya? (Tinye Ee ma ọ bụ Mba)

a) Maraabout / ogwu ogwu Ee Mba Amayimu
b) Izu ike n'ụlọ na-enweghị ọgwụ Ee Mba Amanyimu
c) Iri ezigbo nri Ee Mba Amayimu
d) Na-ekpe ekpere ma ọ bụ na-ebu ọnụ Ee Mba Amayimu

e) Ọgwụ kpọmkwem maka ukwara nta Ee Mba Amayimu

f) Ọgwụ ndị ọzọ enyere na ebe ahụike Ee Mba Amayimu

3 Ihe ihere ukwara nta

J. Zaa n'ichere n'iga enweta ukwara nta

a. EE

b. Mba

c. Amayimu

K. Kedu ka ọ ga-adị gị ma a chọpụta na ị nwere Ukwara nta? **(biko rịọ maka azịza wee pịa Ee ma ọ bụ Mba maka nhọrọ ọ bụla)**

a) Egwu Ee Mba Amayimu

b) Ụjọ ihe ijuanya Ee Mba Amayimu

c) Ihere Ee Mba Amayimu

d) Mwute Ee Mba Amayimu

e) Enweghị olileanya Ee Mba Amanyimu

f) Obi ụtọ (n'ihi na achọpụtala nsogbu m na enwere ike igwọ ya) Ee Mba Amayimu

L. Kedu onye ị ga-agwa gbasara ọrịa gị ma ọ bụrụ na ị nwere TB? **(biko rịọ maka azịza wee pịa Ee ma ọ bụ Mba maka nhọrọ ọ bụla)**

a) Onye nwe ụlọ Ee Mba Amayimu

b) Onye ọrụ nlekọta ahụike - dọkịta, nọọsụ, Ee Mba Amayimu

c) Agbata obi Ee Mba Amayimu

d) Nne na nna Ee Mba Amayimu

e) Ụmụaka Ee Mba Amayimu

f) Onye ezinaụlọ ndị ọzọ Ee Mba Amayimu

g) Ezigbo enyi Ee Mba Amayimu

h) Ọnweghị onye ọ bụla Ee Mba Amayimu

M. Kedu nkwupụta kacha nso na mmetụta gị gbasara ndị nwere ọrịa ukware nta? **(gụọ nhọrọ ndị a wee lelee otu aziza)**

1. M na-agbalị inyere ha aka
2. M na-agbalị ka m ghara ịnọ n'ebe ndị a nọ n'ihi na ha nwere ike ibute m
3. M na-eme ha dị ka ndị ọzọ niile
4. Achọrọ m inyere ha aka mana zere ha

N. N'obodo gị, kedu ka esi ele onye nwere ukwara nta anya? **(Tinye ofu aziza)**

1. Ọtụtụ ndị mmadụ na-ajụ ya
2. Ezinụlọ ha na ndị enyi ha kewapụrụ ha ma debe ha n'ime ụlọ dị iche nke nwere iko, efere na ngaji dị iche.
3. Ọtụtụ ndị na-eme enyi, ma ha na-agbalịkarị ịgbara ya ọsọ
4. Ndị obodo na-akwadokarị ma na-enyere ya aka

O. Ichere onye nwere oya nminwu ga eche echiche banyere ukwara nta

a. Ee maka na oney nwere nmimu nwere ikike ibute ukwara nta
b. Mba maka na onweyi ihe di iche na onye nwere oya nminwu an onye na ewneyi nmimu na ibuta ukwara nta.

4 Omume maka ichoga ndi n'ahu maka ahuike:

P. Kedu ihe ị ga - eme ma ọ bụrụ na ị nwere mgbaàmà ndị a - ụkwara ruo izu 2 ma ọ bụ karịa, ọsụsọ abalị, ahụ ọkụ na mbelata ibu? **(biko rịọ maka aziza wee pịa Ee ma ọ bụ Mba maka nhọrọ ọ bụla)**

a) Gaa na ụlọ ọrụ ahụike Ee Mba Amayimu
b) Ọ nweghị ihe ma ọ bụ chere ka mgbaàmà ga-aga n'ihu ọzọ Ee Mba Amayimu
c) Gaa na dọkịta ọdịnala / Marabout Ee Mba Amayimu
d) Gaa na ụlọ ahịa ọgwụ Ee Mba Amayimu
e) Gakwuru onye ndu okpukperechi Ee Mba Amayimu
f) Na-agbaso nhọrọ ọgwụgwọ onwe onye ọzọ (osisi, wdg) Ee Mba Amayimu

g) Nọrọ n'ụlọ chere ka ahụ gwọọ onwe ya nke TB Ee Mba Amayimu

Q. Ọ bụrụ na ị nwere mgbaàmà ndị a, ụkwara izu abuo ma ọ bụ karịa, ọsụsọ abalị, ahụ ọkụ na ụfọdụ ibu ibu, olee mgbe ị ga-aga ụlọ ọrụ ahụike? **(biko gafeta azịza wee pịa out)**

1. Agaghị m aga hu onye na hu maka ahuike ma ọ bụrụhaala na mgbaàmà agaghị akawanye njọ
2. Mgbe ọgwụgwọ n'onwe m anaghị arụ ọrụ
3. Agaghị m aga ebe nlekọta ahụike ma ọlị
4. M ga-aga ozugbo

R. Oburu n'isi na ị gaghị achọ iga ebe nlekọta ahụike ọ bụla, ọ bụrụ na ị nwere mgbaàmà masara ukwara nta **(biko lelee ihe niile metụtara)**

1. doyi mu anya na mgbaàmà ndị ahụ dị njọ
2. Amaghị ebe ị ga-aga
3. Ọ ga-adị oke ọnụ / enweghị m ike ịkwụ ụgwọ ya
4. Ihe isi ike na njem / anya na ụlọ ọgwụ
5. Atụkwasịla ndị ọrụ ahụike obi
6. Enweghị ike ịhapụ ọrụ **(oge ọrụ na-arụkọ ọrụ na oge ọrụ ụlọ ọrụ ahụike)**
7. Achọla ịchọpụta na ọ dị ihe na-ezighi ezi
8. Ndị ọzọ (biko kọwaa):

S. Kedu ọnụ ahịa ị chere nyocha na ọgwụgwọ ukwara nta na obodo a? **(biko lelee otu)**

1. Ọ bụ n'efu
2. Ọ dị mfe ọnụ
3. Ọ dị ntakịrị / dị oke ọnụ
4. Ọ dị oke ọnụ
5. Amaghị

Appendix B: Permission to Use Anambra TB Distribution TB Cases

Hello Benedeth,
Compliments of the day to you.
Thank you for reaching out to us with respect to our products.
I have reached out to the key co-authors and we have agreed to grant you permission
We expect that you will appropriately reference us as you use it, and best wishes with your doctoral research.
Kindly accept this as our approval for your request.
Truly Yours,
Dr. Chukwuebuka UGWU (lead author)
Anambra State TB and Leprosy Control Programme
Directorate of Medical Services Anambra State Ministry of Health

Appendix C: Permission Document to Use Survey Instrument (GAMSETP)

To: ngozi ezeosim <XXX@hotmail.com>
Subject: RE: GEMSTEP

Dear Ngozi,
Permission granted as long as you appropriately acknowledge it in your write-up.
All the best in your PhD.
Regards

From: Bashorun Adedapo Olufemi <XXX@mrc.gm>
Subject: GEMSTEP

Appendix D**:** Granted Permission to Conduct the Study in Anambra State

ANAMBRA STATE OF NIGERIA
MINISTRY OF HEALTH

JEROME UDOJI SECRETARIAT COMPLEX
P. M. B. 6002
AWKA.

Your Ref:.....
Our Ref: MH/AWK/M/321/409

30th August, 2022.

Dear Ms. Benedeth Ezeosim,

LETTER OF COOPERATION

Based on my view of your research proposal. I give you permission for you to conduct the study entitled Tuberculosis associated knowledge, stigma and health seeking behavior among traders in Onitsha main market, Anambra State of Nigeria. As part of this study, I authorize you to identify and interviewing traders in Onitsha main market Anambra State. Individual participation will be volunteering and at their own discretion.

I understand that the student will not be naming our organization in the doctoral project report that is published in ProQuest.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organizations policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,

Chukwudobelu Uzochukwu, MD.
PM, Anambra STBLCP/ Head Medical Services,
Anambra State Ministry of Health, Awka.

All replies to be addressed to the Hon. Commissioner.

Appendix E: Permission for the use of Health Stigma and Discrimination Framework.

Appendix F: Permission for the Health Belief Model Image: Attribution-share ShareAlike 4.0 International (CC By SA 4.0).

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