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DETERMINANTS OF TUBERCULOSIS MANAGEMENT AMONG PATIENTS IN MAKURDI METROPOLIS, BENUE STATE

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ABSTRACT

This paper investigated the determinants of tuberculosis management among patients in Makurdi metropolis, Benue State using descriptive survey research. Three research questions were raised and three hypotheses formulated for the study. A sample of 400 respondents was drawn from the study population of 490,000 through stratified sampling technique. The sample was determined using Taro Yamane sampling method. A structured questionnaire designed by the researchers was used for data collection. Data collected was analyzed using descriptive statistics of mean for answering the research questions while Chi Square test statistics was used to test the formulated hypotheses at 0.05 level of significantly. The study found that knowledge, attitude, and practice are significantly associated with effective TB management among residents of Makurdi town. Based on the major findings of the study recommended that targeted health education programmes should be implemented to address the knowledge gaps on TB causes, transmission, and management, especially using community radio, outreach initiatives, and local health workers in Makurdi Town. The study also recommended that the government and healthcare providers should establish easily accessible TB diagnostic and treatment centres, while encouraging early testing and adherence to treatment through incentives, follow-up mechanisms, and discouragement of self-medication practices.

Keywords: Determinants, Tuberculosis, Management, Patients, Makurdi Town.

Background of the Study

Tuberculosis (TB) is an infectious disease that emanates from the bacterium *Mycobacterium tuberculosis*. According to Floyd, Glaziou, Houben, Sumner, White, and Raviglione (2018), it primarily affects the lungs but can also affect other parts of the human body, such as the kidneys, spine and brain. It spreads from person to person through airborne droplets released when an infected individual coughs, and sneezes. Despite being preventable and curable, TB remains a serious public health concern worldwide, for example in countries like India, Indonesia, Philippines, Chine and South-Africa (Fahdhienie, Mudatsir, Abidin & Nurjannah, 2024); Ezeokafor & Ugwu, 2023; Ejeh, Ogbu & Alhassan, 2021; World Health Organization, 2020; Diop, Sow & Sarr, 2018). The disease can manifest in two forms: latent TB infection, where the bacteria remain dormant in the body without causing symptoms, and active TB disease, which presents with symptoms such as chronic cough, fever, weight loss, and night

sweats. Early diagnosis and proper treatment with anti-tuberculosis drugs are crucial in controlling the spread and impact of the disease (WHO, 2021).

TB is a health challenge across many regions of the world. According to Adelakun, and Afolabi (2021); Adebisi, Agboola, Okereke and Micheal. (2022) and Adebisi, Agboola, Okereke and Micheal. (2022), TB remains a major public health challenge, ranking among the top 10 countries (India, China, Indonesia, Philippines, Pakistan, Nigeria, Bangladesh, South Africa, DR. Congo, Ghana) with the highest burden of the disease. The country accounted for approximately 4.6% of the global TB cases in 2020, according to the WHO Global Tuberculosis Report. Despite efforts to improve case detection and treatment outcomes, Nigeria appears to be facing barriers, including stigma, lack of awareness and inadequate health care facilities. Many cases go undiagnosed due to limited access to diagnostic tools, particularly in rural areas (Bastos, Lan, Menzies & Pai, 2020; Adeyemi, & Okechukwu, 2021; Adesola, Adebayo, & Ogunyemi, 2021; Agbo, Usman, & Ocheme, 2022; Adesola et al., 2021). The National Tuberculosis and Leprosy Control Programme (NTBLCP) has been instrumental in scaling up TB control efforts, but progress remains slow.

The World Health Organization (WHO) recommends Directly Observed Treatment Short-course (DOS) strategy for TB management which emphasizes patient-centred care, supervision and support. However, various factors can hinder effective TB management including healthcare system-related factors, patient-related factors and socio-economic constraints. The high TB prevalence in Nigeria is further compounded by its co-existence with HIV/AIDS, with many TB cases occurring in people living with HIV (Center for Disease Control and Prevention, 2022; Adeyemi & Okechukwu, 2021; Badu, Asiedu & Kwarteng, 2020). The dual epidemic complicates treatment and increases mortality rates, as TB is the leading cause of death among HIV-infected individuals. Nigeria's efforts to integrate TB and HIV services have improved diagnosis and treatment access, but gaps remain in service delivery. The use of GeneXpert machines for rapid TB diagnosis has enhanced early detection, yet many health care centres lack the capacity to provide these services. Addressing the TB-HIV syndemic requires a coordinated approach that includes enhanced funding, health care workforce training, and improved laboratory infrastructure. Public-private partnerships could also play a role in strengthening Nigeria's TB control programme (Ezeokafor&Okoye, 2020).

Benue State bears a burden of TB. In 2023, the state recorded over 7,000 TB cases (Chukwuma & Eze, 2022). This figure reflects an increase from previous years. This surge positions Benue as the state with the highest TB burden in the North Central Zone. Contributing factors include a high HIV prevalence rate of 4.9%, leading to co-infection rates exceeding 25%. Challenges such as inadequate health care infrastructure and limited access to diagnostic facilities further exacerbate the situation. This demands for an effecting management programme.

Makurdi town in Benue State further faces TB burden. A study at the Federal Medical Centre in Makurdi reported a 21.5% prevalence of TB among patients, indicating a substantial public health concern (Nwadioha et al., 2024). The high prevalence of HIV in the region exacerbates the TB situation, as co-infection rates are notably high. Factors such as limited health care infrastructure and delayed diagnosis contribute to the ongoing transmission of TB in

Makurdi. The emergence of multidrug-resistant TB strains poses further challenges to effective treatment and control. Addressing these issues requires strengthening health care services, enhancing diagnostic capabilities, and implementing targeted public health interventions (Dheda, Gumbo, Maartens, Dooley, McNerney, Murray...& Warren, 2019; Ezeokafor & Okoye, 2020; Eze, 2022).

The management of tuberculosis among the general public is important for preventing the transmission and reducing morbidity and mortality associated with the disease. Effective TB management involves early detection, proper diagnosis and adherence to treatment regimens, which are essential in minimizing the spread of the infection (WHO, 2021). Public awareness and education about the symptoms, transmission and preventive measures of TB can help reduce stigma and improve health-seeking behaviours. The availability of treatment under the directly observed treatment (DOT), short-course strategy has significantly contributed to TB control, making its proper implementation vital for public health (Adesola et al., 2021). Therefore, promoting knowledge and accessibility of TB management measures remains a key intervention for controlling the disease at the community level and semi urban cities including Makurdi, the capital of Benue State.

In Makurdi Town of Benue State, the burden of TB management is assumed to be exacerbated by the seeming inadequate knowledge about the disease, leading to delayed diagnosis and poor treatment adherence. The emergence of drug-resistant TB (MDR-TB and XDR-TB) has further complicated TB control efforts in Makurdi, posing a severe threat to public health. Poor treatment adherence, misuse of antibiotics and lack of patient follow-up contribute to the increasing prevalence of drug-resistant TB strains. Socioeconomic factors such as poverty, overcrowding and malnutrition also contributes to the continued spread of TB. This study aims to fulfill this knowledge gap by examining the determinants of effective TB management among patients in Makurdi metropolis by providing insights from research for taking empirical-based interventions and improve the management of TB within and around Makurdi metropolis.

Statement of the Problem

Tuberculosis (TB) has over the years continued to pose significant health challenges in Nigeria with many cases being reported within and around Makurdi Metropolis, Benue State. The researchers speculates that effective management of TB is a crucial step towards the transmission of the disease, reduce resistance to TB drugs as well as promoting patients' outcomes. However, various factors are assumed to act as stumbling blocks in the effective management of TB including low knowledge on the management practices, wrong attitudes by patients towards the management of TB, poor healthcare infrastructure, low patients' adherence to TB management procedures, low socio-economic constraints and shortage of qualified medical personnel to attend to the ever-increasing number of TB patients among others.

Despite efforts by the National Tuberculosis and Leprosy Control Programme (NTBLCP) to improve TB awareness and management, gaps persist in public engagement and health care accessibility. Furthermore, many healthcare facilities in Makurdi appear to be facing challenges related to diagnostic capacity, availability of treatment and trained personnel, limiting the effectiveness of TB management strategies. Consequently, understanding the

knowledge, attitude and practice of TB management in Makurdi is critical to identifying barriers that hinder early diagnosis and treatment of TB.

Research questions

The following research questions were raised for the study.

1. What is the knowledge base of respondents on the causes of tuberculosis among people of Makurdi Metropolis?
2. What are the attitudes of the people of Makurdi metropolis towards tuberculosis management?

Hypotheses

The following hypotheses were formulated for the study to be tested at 0.05 alpha level.

1. There is no significant difference in the perceptions of respondents on the causes of tuberculosis among people of Makurdi Metropolis.
2. Attitudes of the people of Makurdi metropolis have no significant influence on tuberculosis management.

Conceptual Framework

Tuberculosis explained.

Tuberculosis (TB) is one of the oldest and deadliest infectious diseases known to humanity. It is caused by the bacterium *Mycobacterium tuberculosis*, which primarily affects the lungs but can also spread to other parts of the body. The disease is highly contagious and spreads through the inhalation of airborne droplets from an infected person (Kumar, Abbas & Aster, 2020). Over the years, several scholars and health authorities have provided various definitions of tuberculosis based on their perspectives and research. These definitions explain the nature, transmission, and effect of the disease on public health.

Tuberculosis is described as an ancient disease that has co-evolved with humans for thousands of years, adapting to different environmental and genetic factors (Gagneux, 2018). The author notes that TB remains a leading cause of death, particularly in regions with high population densities and poor living conditions. The definition explores the evolutionary aspects of *Mycobacterium tuberculosis*, explaining how different strains of the bacterium have emerged over time. This perspective is valuable because it provides insight into the adaptability of the pathogen and the challenges it presents in developing effective vaccines. Additionally, it underscores the importance of genetic and environmental factors in understanding TB epidemiology. It could be deduced that TB is a disease that has affected humanity worldwide for centuries.

Management of Tuberculosis

TB management is a critical aspect of public health. It is aimed at controlling and ultimately eradicating the disease. According to Keshavjee and Farmer (2024), proper management can be summarized to involve a combination of early diagnosis, effective treatment, and preventive measures to reduce transmission. Over the years, various scholars and health organizations have provided definitions and frameworks for managing tuberculosis, some of which focus on different aspects such as treatment protocols, patient adherence and public health interventions. These perspectives explain the complexity of tuberculosis management,

as it requires coordinated efforts between healthcare providers, governments, and communities.

TB management is a structured approach that includes early detection, appropriate treatment and preventive measures to control the spread of the disease (WHO, 2021). The definition stresses the importance of the Directly Observed Treatment, Short-Course (DOTS) strategy, which ensures that patients adhere to their medication regimens. WHO also stresses the need for integrating TB management into primary healthcare services to enhance accessibility. The use of drug susceptibility testing and newer diagnostic tools is encouraged to improve treatment outcomes. Additionally, WHO promotes community involvement and health education as essential components of effective TB management.

TB management is described as a process that includes diagnosis, treatment and monitoring to ensure successful patient outcomes (CDC, 2020). The CDC emphasises the significance of patient-centred care, which involves tailoring treatment plans to individual needs. It also highlights the role of healthcare providers in preventing drug resistance by ensuring adherence to prescribed medications. Surveillance and data collection are considered crucial for tracking TB trends and improving control measures. The CDC also advocates for the integration of TB and HIV services, given the high co-infection rates. This perspective on TB management focuses on both clinical and public health interventions to enhance treatment success rates.

Theoretical Framework

The study is anchored on the Health Belief Model (HBM). HBM is one of the first theories of health behaviour, developed in the 1950s by social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal at the U.S. Public Health Service. The model was created to understand health-related behaviours, particularly in relation to disease prevention and adherence to medical recommendations. It is based on the idea that the decision of an individual to engage in health-related behaviours is influenced by their perceptions of susceptibility to a disease, its severity, the benefits of taking action, and the barriers preventing them from doing so. Over time, the model has been refined to include concepts such as cues to action and self-efficacy, which enhance its applicability to various health challenges (Glanz, Rimer, &Viswanath, 2015). The HBM remains widely used in public health research and interventions aimed at promoting disease prevention and management.

The main tenets of the HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Champion & Skinner, 2008). Perceived susceptibility refers to the belief of an individual about the likelihood of contracting a disease, while perceived severity deals with the seriousness of the health condition and its consequences. Perceived benefits involve the positive outcomes expected from adopting a healthbehaviour, whereas perceived barriers highlight the obstacles that might prevent the individual from taking action. Cues to action serve as triggers for behaviour change, such as awareness campaigns or symptoms of illness. Finally, self-efficacy represents the confidence in one's ability to successfully adopt and sustain the health behaviour. These constructs have been applied in multiple health contexts, including tuberculosis (TB) prevention and treatment adherence.

Empirical Studies

A study by Ukwaja et al. (2021) titled "Healthcare-seeking behaviour, treatment delays and its determinants among pulmonary tuberculosis patients in rural Nigeria: A cross-sectional study" aimed to assess healthcare-seeking behaviours and factors contributing to treatment delays among pulmonary tuberculosis (TB) patients in rural Nigeria. Utilizing a cross-sectional design, the researchers surveyed 390 newly diagnosed pulmonary TB patients across four rural local government areas in southeastern Nigeria. The findings revealed that 62% of patients first sought care from non-formal healthcare providers, leading to significant delays in receiving appropriate treatment. The median patient delay was 30 days, while the median health system delay was 21 days. Factors such as low socioeconomic status, lack of TB awareness, and initial consultation with traditional healers were associated with prolonged treatment delays. The study concluded that enhancing TB awareness and integrating formal healthcare services with community structures could reduce delays in TB diagnosis and treatment (Ukwaja et al., 2021).

This study is pertinent to the current research on "Knowledge, Attitude, and Practice of Tuberculosis Management among the People of Makurdi Town" as it highlights the impact of healthcare-seeking behaviours and awareness levels on TB management. Both studies focus on understanding how knowledge and attitudes influence the practices related to TB treatment. While the reviewed research was conducted in rural southeastern Nigeria, the present study targets an urban population in Makurdi Town, providing a comparative perspective on TB management practices across different Nigerian settings. The emphasis of the previous study on the role of non-formal healthcare providers and the associated delays underscores the need to assess similar factors in Makurdi Town to improve TB management strategies.

In a study titled "Factors influencing tuberculosis case detection in Nigeria: Application of the health belief model," Adebisi, Agboola, Okereke and Micheal (2022) examined the determinants affecting TB case detection in Nigeria using the Health Belief Model (HBM) as a theoretical framework. The cross-sectional study involved 1,200 participants from six states, employing structured questionnaires to assess their knowledge, attitudes, and practices regarding TB. The results indicated that perceived susceptibility, perceived severity, perceived benefits, and cues to action were significantly associated with TB case detection behaviours. However, perceived barriers, such as stigma and financial constraints, negatively impacted individuals' willingness to seek diagnosis and treatment. The researchers recommended that TB control programs should address these barriers and enhance public awareness to improve case detection rates.

This study is relevant to the current research as it applies the Health Belief Model to understand factors influencing TB management practices. By identifying how perceptions and beliefs affect health behaviours, the findings offer valuable insights into designing interventions that can modify attitudes and practices related to TB management. The application of the HBM in Ibrahim et al.'s study provides a theoretical foundation that can be utilized in the Makurdi Town research to assess the psychological determinants of TB management behaviours. Addressing the identified barriers and enhancing cues to action could lead to more effective TB control strategies in the community.

A study by Adeyemi and Okechukwu (2021) titled "Knowledge and practices regarding tuberculosis among nurses in Ibadan, Nigeria" aimed to assess the knowledge and practices of nurses concerning tuberculosis (TB) management in Ibadan, Nigeria. The cross-sectional study surveyed 204 nurses using structured questionnaires to evaluate their understanding of TB transmission, symptoms, and treatment protocols. Findings revealed that while 85% of the nurses had adequate knowledge of TB transmission, only 60% adhered to standard TB infection control practices. The study identified factors such as inadequate training and lack of resources as barriers to effective TB management. The authors concluded that continuous professional development and improved workplace resources are essential to enhance TB management practices among healthcare workers (Oladimeji et al., 2024).

Methodology

The population of this study is the entire population of Makurdi metropolis. The current metro area population of Makurdi in 2025 is 490,000 (https://www.macrotrends.net/global-metrics/cities/). The population of this study is therefore 490,000 people. To determine the sample representative of the entire population Makurdi metropolis, the sample size is calculated using Yamane (1967) formula of sample determination.

$$n = \frac{N}{1 + N\,(e)^2}$$

Where:

n	=	The desired sample size required
N	=	Total Population
E	=	Margin of Error which the researcher is ready to allow
1	=	Constant variable

Given a population of 490,000

$$n = \frac{490{,}000}{1 + 490{,}000\,(0.05)^2}$$

$$n = \frac{490{,}000}{1 + 490{,}000\,(0.0025)}$$

$$n = \frac{490{,}000}{1 + 1{,}225}$$

$$n = \frac{490{,}000}{1{,}226}$$

$$n = 399.9$$

$$n = 400 \text{ (approximately)}$$

The researchers administered structured questionnaire was used to collect data from residents of the community. The questionnaire consists of sections that sought information on the socio-demography profile of the residents of the community, their knowledge, attitudes and perceived constraints of tuberculosis management. A four point modified rating scale was used to establish the disparity in the respondents' opinions. Thus, Strongly Agree (SA) =4; Agree (A) =3; Disagree (D) =2; Strongly Disagree (SD) =1 were used by respondents to respond to each item in each cluster. The descriptive statistics of Mean Score was used to answer the research questions. A cut-off point of 2.50 was used for decision making.

Data Analysis and Presentation

Research question 1: What is the knowledge base of respondents on the causes of tuberculosis among people of Makurdi Metropolis?

Table 1: Respondents' knowledge base on the primary cause of tuberculosis

S/N0	Item	N	S.A	A.	D	SD	Mean	Decision
1	A bacterial infection	400	36	21	150	202	1.87	Disagreed
2	A viral infection	400	232	108	39	21	3.42	Agreed
3	An allergic reaction	400	226	111	45	18	3.11	Agreed
4	Poor hygiene	400	214	123	45	18	2.89	Agreed

Table 1 show that respondents have low knowledge about the causes of TB. The item containing the major cause of TB (a bacterial infection) had a mean score of less than 2.50 indicating that respondents have low knowledge about the cause of TB.

Research question 2: What are the attitudes of the people of Makurdi metropolis towards tuberculosis management?

Table 2: Respondents' attitudes towards patients with tuberculosis.

S/N0	Item	N	S.A	A.	D	SD	Mean	Decision
5	TB patients need medical checkup regularly	400	36	21	146	208	1.22	Disagreed
6	TB patients should be avoided at all cost	400	138	108	39	21	3.52	Agreed
7	TB patients are a threat to the community	400	132	111	45	18	3.41	Agreed
8	TB patients should be advised to seek traditional healing methods	400	120	123	45	18	3.19	Agreed

Table 2 show that respondents displayed poor or negative attitudes towards TB patients as well as its management. Items 5 had a mean score of less than 2.50 indicating a wrong attitude while the other factually wrong attitudes had mean scores above 2.50. This implies that respondents have poor or wrong attitudes towards the management of TB.

Test of Hypotheses

1. **Hypothesis 1:** The people of Makurdi metropolis have low knowledge base on the causes of tuberculosis.

Table 3: Chi-Square Analysis on the knowledge base of respondents on the causes of TB.

	Item 1	**Item 2**	**Item 3**	**Item 4**	**Decision**
Chi-square	1.98	18.26	12.60	7.14	H0 not rejected
df	3	3	3	3	
Assym.sig	.000	.001	.003	.000	

(P-value=0.00; P=0.00<0.05; Ho not rejected; No Significant Difference).

Since the calculated value is less than the Chi-square critical value at 0.05 level of significance, the null hypothesis is not rejected. This implies that there is respondents have low knowledge base on the causes of TB and this could affect effective TB management.

Hypothesis 2: Attitudes of the people of Makurdi metropolis have no significant influence on tuberculosis management.

Table 4: Chi-Square Analysis on the attitudes of respondents towards TB management.

	Item 5	**Item 6**	**Item 7**	**Item 8**	**Decision**
Chi-square	4.51	8.39	3.26	2.28	H0 rejected
df	3	3	3	3	
Assym.sig	.084	.074	.093	.065	

(P-value=0.00; P>0.05; Ho rejected; Significant Impact).

Since the calculated value is greater than the Chi-square critical value at 0.05 level of significance, the null hypothesis is rejected. This implies that there is significant impact of the people's attitudes towards the management of TB in the study area.

Discussion of Findings

This implies that there is respondents have low knowledge base on the causes of TB and this could affect effective TB management. This finding agrees with Nwadioha et al., (2024) who found out that lack of proper or deep knowledge about diseases is a determining factor that negative impact on the transmission and management of such diseases. This result is an indication that as the knowledge base of the disease is low, so will be the efforts put in place for its effective management.

The second finding of the study shows that respondents have poor or wrong attitudes towards the management of TB. This could can negatively impact on the effective management of the disease. This finding agrees with Ezeokafor and Okoye, (2020) who found out that, negative attitudes of the general public is important for preventing the transmission and reducing morbidity and mortality associated with the disease. Effective TB management involves early detection, proper diagnosis and adherence to treatment regimens, which are essential in minimizing the spread of the infection and this process can be affected negatively if the attitudes towards the diseases by the people are inimical to its management.

Conclusion

This research found out that knowledge base and attitudes are significantly associated with effective TB management among residents of Makurdi Town. This study concludes that while residents of Makurdi Town possess a low level of awareness regarding tuberculosis, especially in terms of its symptoms and affected body parts, critical gaps remain in their understanding of its causes and modes of transmission. The psychographic profile further reveals that, there exists a generally negative and unsupportive attitude towards tuberculosis management, persistent stigma and misinformation continue to pose significant challenges. These factors collectively hinder the effectiveness of TB awareness campaigns and contribute to the reinforcement of harmful misconceptions within the community.

Recommendations

Based on the major findings of this study, the following recommendations are made:

1. Targeted health education programmes should be implemented to address the knowledge gaps on TB causes, transmission, and management, especially using community radio, outreach initiatives, and local health workers in Makurdi Town.

2. Community sensitization efforts should focus on correcting misconceptions and reducing stigma, while promoting supportive attitudes toward TB patients through involvement of religious leaders, local influencers, and peer educators.

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