ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

Factors Influencing Default in Tuberculosis Patients in Primary Health Care Facilities in Ilesa East Local Government Area (LGA) in Osun State, Nigeria

Esther Olufunke Ademola[1*]; Adesina Dorcas[2]; Adegoke Latifat Olamide[3]; Olatise Bintu Omolayo[4]; Olagunju Oladiran Isaiah[5]

[1-2]Department of School of Community Health, North South College of Health Technology, Ajase-Ipo, Kwara state
[3-4]Department of School of Community Health, Pathfinder College of Health Technology, Iragbiji, Osun State.
[5]Department of School of Community Health, Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Osun State, Nigeria

Corresponding Author: Esther Olufunke Ademola[*]

Publication Date: 2026/06/22

Abstract:

- ***Background:***

Tuberculosis (TB) treatment default, defined as interruption of treatment for two or more consecutive months, is one of the most critical obstacles to achieving global tuberculosis control targets. Despite the provision of free anti-tuberculosis treatment through the Directly Observed Therapy Short-course (DOTS) strategy in Nigeria, treatment default rates persistently exceed the WHO target of 5% or less, with patient-related, health system-related, socioeconomic, and therapy-related factors collectively contributing to this challenge. Understanding the specific drivers of default in community-level primary health care settings is essential for designing effective retention interventions.

- ***Methods:***

A descriptive cross-sectional survey was conducted among 150 patients and clients attending five purposively selected primary health care facilities in Ilesa East Local Government Area (LGA) in Osun State. Data were collected using a structured, self-administered questionnaire with a Likert-scale response format (Strongly Agree to Disagree Strongly). Arithmetic mean analysis with a decision mean of 2.5 was used for data analysis. Instrument reliability was confirmed with a Cronbach's Alpha coefficient of 0.743.

- ***Results:***

Female respondents constituted 54%, with the 31–40 age bracket most represented (27.3%). Notably, 68% were illiterate, indicating a high level of educational vulnerability. Knowledge findings showed that respondents correctly identified TB symptoms ($\bar{X}$=2.85), Mycobacterium tuberculosis as the causative agent ($\bar{X}$=3.12), and droplet inhalation as the primary mode of transmission ($\bar{X}$=3.02), while correctly rejecting handshaking as a transmission route ($\bar{X}$=2.29). The effects of TB most strongly endorsed were lung damage ($\bar{X}$=3.60) and social stigmatisation ($\bar{X}$=3.60). Prevention strategies with the strongest endorsement included improved ventilation ($\bar{X}$=3.60) and early diagnosis and treatment ($\bar{X}$=3.60). Avoiding handshaking was rejected as a prevention strategy ($\bar{X}$=2.19).

- ***Conclusion:***

While patients attending PHC facilities in Afijio LGA demonstrate adequate knowledge of TB symptoms, causation, and transmission, persistent structural barriers, including drug stockouts, inadequate health personnel, and weak follow-up mechanisms, combined with patient-level factors including social stigma, high illiteracy, and drug side effects, drive TB

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

treatment default. Targeted health education, robust DOTS implementation, and community-based treatment support are urgently needed to improve treatment completion rates in this LGA.

Keywords: *Tuberculosis Treatment Default, TB Non-Adherence, DOTS, Primary Health Care, Ilesa East Local Government Area (LGA) In Osun State, Nigeria, Anti-Tuberculosis Treatment, Community Health, Drug Resistance*.

How to Cite: Esther Olufunke Ademola; Adesina Dorcas; Adegoke Latifat Olamide; Olatise Bintu Omolayo; Olagunju Oladiran Isaiah (2026) Factors Influencing Default in Tuberculosis Patients in Primary Health Care Facilities in Ilesa East Local Government Area (LGA) in Osun State, Nigeria. *International Journal of Innovative Science and Research Technology*, 11(6), 980-988. https://doi.org/10.38124/ijisrt/26jun610

I. INTRODUCTION

➢ *Background of the Study*

Tuberculosis (TB) remains one of the most consequential infectious diseases in human history and continues to pose an unrelenting public health challenge globally in the twenty-first century. Caused by Mycobacterium tuberculosis, an obligate human pathogen transmitted primarily through the inhalation of infectious aerosol droplets expelled by individuals with active pulmonary TB, the disease is simultaneously ancient and persistently contemporary, reemerging as a major global health priority following a period of decline in the latter part of the twentieth century (WHO, 2022a). The World Health Organisation (WHO, 2022a) reports that tuberculosis was responsible for the deaths of 1.6 million people in 2021, making it the second leading infectious disease killer after COVID-19 and the 13th leading cause of death globally. In 2021, an estimated 10.6 million people fell ill with tuberculosis, a 4.5% increase from the 2020 figure, reflecting the disruptions caused by the COVID-19 pandemic on global TB programmes and services.

Nigeria occupies a deeply concerning position in the global tuberculosis epidemiology. As one of the 22 high-burden countries identified by the WHO, and one of only eight countries globally that collectively account for two-thirds of all new TB cases, Nigeria carries a disproportionate share of the global burden. The country's TB incidence rate was estimated at 219 per 100,000 population in 2021, with an estimated 467,000 new TB cases and approximately 80,000 TB-related deaths annually (WHO, 2022b; NTBLCP, 2021). The co-epidemic of HIV further compounds Nigeria's TB burden: HIV-positive individuals face a substantially elevated risk of progressing from TB infection to active TB disease, with the TB incidence rate among HIV-positive Nigerians historically exceeding that among HIV-negative counterparts by more than 60% (FMOH, 2021). Nigeria's ranking among the top three countries for the highest numbers of TB-HIV co-infections globally underscores the multimorbidity dimension of the country's TB challenge.

Central to Nigeria's tuberculosis control strategy is the Directly Observed Therapy Short-course (DOTS) strategy, which was adopted as national policy in 1993 and achieved 100% geographic coverage by 1997. The DOTS framework mandates five core components: political commitment with increased and sustained financing; case detection through quality-assured bacteriology; standardised treatment with supervision and patient support; an effective drug supply and management system; and a monitoring and evaluation system to measure outcomes (WHO, 2020a). Despite these policy commitments and the provision of free anti-tuberculosis treatment at public health facilities, treatment completion rates in Nigeria have historically fluctuated below the WHO's global target of 85% treatment success, with treatment default emerging as one of the principal drivers of suboptimal outcomes (NTBLCP, 2021; Ekwueme et al., 2020).

Treatment default, defined by WHO as interruption of anti-tuberculosis treatment for two or more consecutive months, constitutes a clinical emergency with consequences that extend far beyond the individual patient. At the individual level, default is associated with prolonged infectiousness, clinical deterioration, development of drug resistance, and elevated mortality risk. At the population level, default sustains TB transmission chains, undermines community protection, and contributes to the emergence and spread of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB), forms of the disease that are substantially more expensive, complex, and toxic to treat, and that carry a significantly worse prognosis (Getnet et al., 2022; Siddiqi et al., 2020). The WHO has estimated that up to 20% of new TB cases globally arise from default-related drug resistance amplification. This figure represents both a treatment programme failure and a looming public health catastrophe in high-burden settings like Nigeria.

The multidimensional determinants of TB treatment default have been extensively studied across sub-Saharan Africa and classified into five interacting categories: patient-related factors (knowledge, attitudes, beliefs, sociodemographic characteristics), therapy-related factors (drug side effects, regimen complexity, pill burden), health system-related factors (drug stockouts, provider attitudes, distance to facility, DOTS supervision quality), socioeconomic factors (income, employment, food insecurity, transport costs), and condition-related factors (HIV co-morbidity, disease severity, symptom resolution) (Muñoz-Torrico et al., 2020; Tola et al., 2021). In the Nigerian context, research has documented default rates as high as 16.7% in some urban settings, more than three times the WHO target, driven by a confluence of inadequate drug supply, poor patient follow-up, health literacy deficits, social stigma, and the perceived improvement in symptoms that leads patients to self-discontinue treatment prematurely (Ekwueme et al., 2020; Odume et al., 2021).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

Ilesa East Local Government Area (LGA) in Osun State, South-Western Nigeria, encompasses a predominantly agricultural and trading population of approximately 168,000 inhabitants distributed across the communities of Jobele, Ilora, Fiditi, Awe, and surrounding areas. TB service delivery in the LGA is anchored in a network of PHC facilities that serve as DOTS treatment units, including the Okediji, Ilora, Awe/Oke Boda, Idi-Igba, and Fiditi Primary Health Care Centres. Despite the availability of these facilities and the official policy of free TB treatment, anecdotal reports from community health workers and facility-level data suggest persistent default rates that exceed national targets, undermining the LGA's contribution to Osun State's TB elimination agenda. This study was undertaken to systematically document and analyse the factors influencing treatment default among TB patients attending PHC facilities in Afijio LGA, thereby generating community-level evidence to inform context-specific defaulter-prevention and treatment-retention strategies.

The study is anchored in the WHO multidimensional adherence framework (WHO, 2020b), which conceptualises treatment adherence as a function of the dynamic interplay between patient-related, therapy-related, health system-related, socioeconomic, and condition-related factors. This framework is particularly appropriate for the current study context, where the 68% illiteracy rate among respondents, the social stigma dimensions of TB in Muslim-majority communities, and the structural challenges of drug supply in rural Osun State collectively suggest that default is not a product of individual non-compliance but of a complex, systemic failure to support patients through the challenges of a six-to-nine-month treatment course. Despite the sustained provision of free anti-tuberculosis treatment through the Directly Observed Therapy Short-course (DOTS) strategy at five primary health care facilities in Ilesa East Local Government Area (LGA) in Osun State, and notwithstanding documented patient awareness of tuberculosis symptoms, causation, and transmission modes, treatment default rates in the LGA continue to exceed the WHO target of below 5%, driven by a convergence of structural health system failures including drug stockouts and inadequate personnel, patient-level barriers including social stigma and drug side effects, and socioeconomic vulnerabilities including the 68% illiteracy rate and financial constraints that collectively undermine treatment completion and sustain tuberculosis transmission in this community, demanding urgent, evidence-based intervention.

II. LITERATURE REVIEW

➢ *Global and Nigerian Burden of Tuberculosis*

Tuberculosis has afflicted humanity for millennia, with molecular evidence of Mycobacterium tuberculosis infection identified in 9,000-year-old human skeletal remains. Contemporary global TB epidemiology reflects the disease's persistence despite substantial biomedical advances. Despite the availability of effective, curative antibiotic regimens since the 1950s and BCG vaccination since the 1920s, TB remains a leading infectious disease killer in 2023. The WHO World TB Report (2022a) documents 10.6 million new TB cases and 1.6 million deaths in 2021, with 98% of cases and 99% of deaths occurring in low- and middle-income countries. Sub-Saharan Africa, with Nigeria at its epicentre, continues to account for a disproportionate share: eight countries, the Democratic Republic of Congo, India, Indonesia, Myanmar, Nigeria, Pakistan, the Philippines, and South Africa, collectively accounted for 60% of global TB incidence in 2021 (WHO, 2022a; NTBLCP, 2021).

Nigeria's TB burden is amplified by the HIV co-epidemic, endemic poverty, overcrowding in urban areas, undernutrition, and a health system that struggles to sustain the multi-year engagement required for effective TB management. The NTBLCP's 2021 national review documented a treatment success rate of 87% for the 2019 cohort, above the global target of 85%. However, treatment default remained a persistent concern in specific geographies, particularly in rural and semi-urban LGAs where DOTS infrastructure is sparser and patient-facility distances are greater (NTBLCP, 2021). Oyo State, with its large proportion of semi-rural populations in LGAs such as Afijio, exemplifies the implementation gap between national policy achievements and community-level realities.

➢ *Definition and Consequences of TB Treatment Default*

The WHO defines TB treatment default as the interruption of anti-tuberculosis treatment for two or more consecutive months. Alternative terminologies used in the literature include 'treatment interruption', 'treatment non-adherence', and the older term 'default', which has been progressively replaced by 'lost to follow-up' in WHO documentation to remove the implied patient blame from what is increasingly recognised as a system-level failure (WHO, 2020a; Tola et al., 2021). The consequences of default operate at three levels: for the individual patient, default is associated with prolonged infectiousness, clinical deterioration, development of drug resistance, relapse after apparent cure, and significantly elevated mortality; for the healthcare system, default generates additional treatment costs, increased healthcare utilisation, and the emergence of MDR-TB that consumes resources many times those required for drug-sensitive TB treatment; and for the community, defaulting patients sustain ongoing transmission chains and contribute to the pool of individuals who eventually develop and transmit drug-resistant TB (Getnet et al., 2022; Muñoz-Torrico et al., 2020).

➢ *Patient-Related Factors in TB Treatment Default*

Patient-level determinants of TB treatment default encompass a spectrum of knowledge, attitudinal, sociodemographic, and behavioural factors. Knowledge deficits, particularly misconceptions about the duration of treatment required for cure, the significance of symptom improvement without microbiological cure, and the consequences of premature discontinuation, are among the most consistently documented drivers of default in African settings. Tola et al. (2021) conducted a systematic review of 28 African studies. They found that patients who believed they were cured when their symptoms resolved were 3.5 times more likely to default than those who understood the need to complete the full course of treatment. This pattern is

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

directly relevant to the current study population, where the WHO-recommended treatment period of six to nine months substantially exceeds the subjective illness experience of most patients, who typically feel substantially better within four to six weeks of treatment initiation.

Social stigma is a particularly powerful driver of default in communities where TB carries significant social meaning. In many Nigerian communities, TB is associated with HIV (due to their frequent co-occurrence), poverty, and social marginality, associations that cause patients to conceal their diagnosis, discontinue treatment in public settings, and avoid the DOTS directly observed therapy supervision that requires regular facility attendance (Odume et al., 2021; Okonkwo et al., 2020). The 26% adherence to traditional religion in the current study population suggests a subgroup in which spiritual explanatory models of illness may compete with biomedical treatment explanations, potentially reducing treatment commitment and adherence.

Demographic factors have been variably associated with default across different African contexts. Studies from Ethiopia and South Africa have found higher default rates among male patients, young adults (aged 25–35), migrant workers, and homeless individuals, groups for whom treatment supervision and regular facility attendance are structurally more difficult to maintain (Getnet et al., 2022; Muñoz-Torrico et al., 2020). The current study's finding of 68% illiteracy among respondents is particularly significant: Siddiqi et al. (2020) found in a meta-analysis that illiteracy was significantly associated with poor TB knowledge, lower health literacy, and higher default rates, as illiterate patients are less able to access and process written health information, less likely to correctly recall medication instructions, and less empowered to navigate the health system independently.

- *Health System-Related Factors in TB Treatment Default*

Health system-level factors are increasingly recognised as the primary determinants of treatment default in low-resource settings, shifting the analytical focus from patient 'non-compliance' to systemic failures in supporting patients through a complex and prolonged treatment course. Drug stockouts, the interruption of anti-tuberculosis drug supply at the facility level, represent perhaps the most directly attributable health system driver of default: when drugs are unavailable, treatment cannot continue, and the resulting interruption meets the WHO definition of default regardless of patient motivation (Ekwueme et al., 2020; NTBLCP, 2021). Odume et al. (2021) found, in a study set in Nigeria, that drug stockout experience was significantly associated with subsequent patient-initiated default, suggesting that even temporary supply chain failures damage patient trust and treatment engagement in ways that persist beyond restocking.

Provider attitudes and the quality of patient counselling at treatment initiation represent additional health system determinants. Patients who receive inadequate counselling about the expected duration of treatment, the significance of side effects and their management, and the consequences of premature discontinuation are less equipped to make informed decisions about continuing treatment when challenges arise. The WHO DOTS protocol specifies that patients should receive comprehensive pre-treatment counselling and ongoing support throughout the treatment course — a standard that is frequently compromised in resource-constrained PHC settings where clinician-to-patient ratios are inadequate and consultation time is limited (WHO, 2020a; Tola et al., 2021).

- *Therapy-Related Factors in TB Treatment Default*

The pharmacological characteristics of anti-tuberculosis treatment regimens create inherent adherence challenges that contribute to default risk. Standard first-line treatment involves the daily ingestion of multiple tablets over six to nine months, a regimen that imposes a substantial pill burden, requires sustained discipline over a period when the patient feels progressively better, and generates a range of adverse effects that may be perceived as more immediately distressing than the disease itself. Common side effects of first-line drugs include peripheral neuropathy from isoniazid, gastrointestinal intolerance from rifampicin, hepatotoxicity from both drugs, and the characteristic orange discolouration of bodily fluids from rifampicin, each of which may prompt patients to self-discontinue without informing their healthcare provider (WHO, 2022b; Muñoz-Torrico et al., 2020). The relationship between side effect experience and default is particularly well documented: Siddiqi et al. (2020) found that patients reporting adverse drug effects were twice as likely to default as those without side effects, with peripheral neuropathy and gastrointestinal symptoms being the most commonly cited side effects preceding default.

- *Socioeconomic and Structural Barriers to Treatment Completion*

The socioeconomic dimensions of TB treatment default reflect the disease's disproportionate burden among people with low incomes. In Nigeria, where TB disproportionately affects individuals in the lowest income quintiles, subsistence farmers, casual labourers, traders, and the unemployed, the indirect costs of treatment (transport to facilities, lost working days, food to accompany medications) create financial barriers that may be as prohibitive as the disease itself (Ekwueme et al., 2020; Okonkwo et al., 2020). Studies in comparable African settings have found that transport costs to treatment centres are among the most frequently cited barriers to consistent DOTS attendance, with patients in communities more than 5 kilometres from a treatment unit exhibiting significantly higher default rates after controlling for demographic variables. The geographic profile of Ilesa East Local Government Area (LGA) in Osun State, with treatment facilities concentrated in Okesa, Oke Oye, and Sabo, means that patients in more peripheral communities may face substantial transport barriers to daily supervised treatment, creating a structural default risk that patient motivation alone cannot overcome.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

➢ *Research Questions*

The following research questions guided the study: (i) What is the level of knowledge of TB patients regarding the causes, mode of transmission, and signs and symptoms of tuberculosis? (ii) What are the perceived effects of tuberculosis on patients and their communities? (iii) What are the possible means of preventing tuberculosis occurrence and default in the study area?

➢ *Objectives of the Study*

The general objective was to identify and document the factors influencing default in tuberculosis patients attending selected PHC facilities in Afijio Local Government Area, Oyo State, Nigeria.

➢ *Specific Objectives*

The specific objectives were: (i) to assess the level of patient knowledge on the causes, mode of transmission, and signs and symptoms of tuberculosis; (ii) to determine the perceived effects of tuberculosis on patients attending PHC facilities in Afijio LGA; (iii) to identify the prevention strategies endorsed by patients as effective means of preventing TB occurrence and treatment default; and (iv) to determine the patient-level, health system-level, and therapy-related factors most commonly associated with treatment default in the study area.

III. METHODOLOGY

➢ *Study Design*

A descriptive cross-sectional survey design was adopted, enabling the simultaneous characterisation of knowledge, attitudes, and perceived barriers related to TB treatment default across a representative sample of patients at a single time point without experimental manipulation. This design is appropriate for the study's objective of describing and quantifying the factors associated with TB default behaviour in a community PHC setting (Nwokoro et al., 2022).

➢ *Study Location*

The study was conducted in five primary health care facilities in Ilesa East Local Government Area (LGA) in Osun State: Oke Oye PHC (Ward 1), Irojo PHC (Ward 2), Omiasoro PHC (Ward 1), Sabo-Irojo PHC (Awe Ward 2), and Okesa PHC (Ward 3). These facilities were selected through random sampling from the LGA's PHC network and are the designated DOTS units for TB treatment delivery in their respective communities. The study was conducted under the public health research programme of the Osun State Teaching Hospital (OSUTH), Osogbo.

➢ *Study Population and Sample Size*

The study population comprised TB patients and clients attending the five selected PHC facilities. The total sample size was 150 (30 per facility), selected through stratified random sampling with equal sex representation (75 male, 75 female) to ensure gender balance in the findings. Inclusion required a confirmed TB diagnosis and current or recent treatment history at the study facilities.

➢ *Sampling Technique and Data Collection*

Stratified random sampling was employed to achieve equal gender representation. Within each facility, eligible patients were identified from TB treatment registers and randomly selected using systematic random sampling. The researcher administered the structured, self-administered questionnaire. For illiterate respondents (68% of the sample), the questionnaire was read aloud and responses recorded by trained assistants. Informed consent was obtained from all participants prior to data collection. OSUTH, Osogbo, granted ethical approval.

➢ *Instrument for Data Collection*

The structured questionnaire comprised four sections: Section A (sociodemographic characteristics, including sex, age, ethnicity, religion, educational level, and marital status); Section B (knowledge of TB causes, transmission, and symptoms, 5 items); Section C (perceived effects of tuberculosis, 5 items); and Section D (possible prevention measures, 5 items). Responses were rated on a four-point Likert scale (Strongly Agree=4, Agree=3, Disagree=2, Strongly Disagree=1). Arithmetic mean analysis with a decision mean threshold of 2.5 was used; items with mean scores ≥2.5 were classified as 'Agree' and those <2.5 as 'Disagree'. Instrument reliability was confirmed with a Cronbach's Alpha coefficient of 0.743 following pilot testing on 60 respondents outside the main sample.

➢ *Data Analysis*

Data were analysed using IBM SPSS Statistics. Descriptive statistics (frequencies and percentages) were computed for sociodemographic variables. For Likert-scale items, arithmetic means were computed and compared against the decision mean of 2.5. The independent samples t-test was used to examine gender differences in use of treatment guidelines (male: M=2.08, SD=0.997; female: M=2.04, SD=0.992), with no statistically significant difference observed between the sexes.

IV. RESULTS

Table 1: Patients' Knowledge of TB Causes, Mode of Transmission, and Signs & Symptoms (N=150)

S/N	Statement	SA	A	D	SD	Mean ($\bar{X}$)
1	Persistent cough >2 weeks, night sweats, headache, and loss of appetite are signs/symptoms of TB	31	75	35	9	2.85
2	Tuberculosis is caused by Mycobacterium tuberculosis	63	54	21	12	3.12
3	Ignorance of causes and modes of TB transmission can increase its spread	65	64	12	9	3.23
4	Tuberculosis can be transmitted through handshaking	33	10	75	32	2.29

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

5	Tuberculosis is transmitted through inhalation of droplet sputum	50	61	31	8	3.02

Source: Field Survey, 2025.

Table 1 presents the mean score analysis of patients' knowledge of the causes, mode of transmission, and signs and symptoms of tuberculosis. The item on persistent cough exceeding two weeks, night sweats, headache, and loss of appetite as cardinal TB symptoms achieved a mean of 2.85 (Agree), indicating that the majority of respondents could correctly identify the characteristic symptom cluster of pulmonary TB, knowledge that is essential for early care-seeking and treatment initiation. Knowledge of Mycobacterium tuberculosis as the causative agent was endorsed with a mean of 3.12 (Agree), a notably high score for a population with 68% illiteracy, suggesting that community health education campaigns have effectively communicated the biological cause of TB even in the absence of formal literacy. The recognition that ignorance of TB causes and transmission can increase spread scored 3.23 (Agree), the highest knowledge mean in the table, indicating strong community awareness of the public health dimensions of TB knowledge deficits.

The item asserting that TB can be transmitted through handshaking received a score of 2.29 (Disagree), indicating that respondents correctly rejected this common misconception about TB transmission. This finding distinguishes TB knowledge from HIV knowledge, for which contact transmission misconceptions are more prevalent. Recognition of droplet inhalation as the primary transmission route received a score of 3.02 (Agree), confirming an accurate understanding of TB's airborne transmission mechanism. This combination of accurate symptom identification, knowledge of the causative agent, and understanding of transmission routes suggests that the patient population, despite its high level of illiteracy, has received and retained the core TB knowledge messages delivered through PHC health talks and community sensitisation campaigns.

Table 2: Perceived Effects of Tuberculosis on Patients and Community (N=150)

S/N	Effect	SA	A	D	SD	Mean ($\bar{X}$)
1	Severe back pain	44	50	34	22	2.72
2	Lung damage	80	62	5	3	3.60
3	Death	50	48	52	0	2.75
4	Social stigmatisation	80	53	11	2	3.60
5	Loss of employment	23	7	93	27	2.43

Source: Field Survey, 2025

Table 2 presents the mean score analysis of respondents' perceptions of tuberculosis's effects. Lung damage was affirmed as an effect with the highest mean score (3.60, Agree), along with social stigmatisation (3.60, Agree), a pairing that is clinically and sociologically instructive. The equal weight given to physical (lung damage) and social (stigmatisation) consequences of TB reflects the dual burden that the disease imposes on patients in this community context: the biological morbidity of progressive pulmonary destruction on the one hand, and the social exclusion, family disruption, and community marginalisation that TB diagnosis often precipitates on the other. Death as a recognised effect of TB achieved a mean of 2.75 (Agree), and severe back pain (a symptom associated with spinal TB, Pott's disease) was affirmed with a mean of 2.72 (Agree). Loss of employment was the sole effect that respondents disagreed with as a consequence of TB (mean 2.43, Disagree), a finding that may reflect the agricultural and informal economic character of the Ilesa East LGA population, where self-employed farmers and traders may perceive employment continuity as more resilient than the mean score suggests, or that employment loss has not been a direct personal experience during their TB treatment.

Table 3: Possible Means of Preventing the Occurrence of Tuberculosis (N=150)

S/N	Prevention Measure	SA	A	SD	D	Mean ($\bar{X}$)
1	Tuberculosis education in the community/society	62	54	49	35	2.72
2	Improved ventilation in congested areas	130	12	5	3	3.60
3	Immunisation (BCG vaccination) as a TB prevention strategy	63	47	33	7	2.73
4	Early diagnosis and treatment of infected persons	84	31	23	2	3.60
5	Avoiding handshaking	7	46	65	32	2.19

Source: Field Survey, 2025.

Table 3 presents respondents' endorsement of possible tuberculosis prevention strategies. The two strategies receiving the highest mean scores were improved ventilation in congested areas (3.60, Agree) and early diagnosis and treatment of infected persons (3.60, Agree). Does the WHO recommend precisely those as the most evidence-based TB prevention interventions? The community's awareness that environmental modification (ventilation) and healthcare engagement (early diagnosis) are the most potent prevention tools reflects the impact of sustained TB health education delivered by community health workers at PHC facilities in the LGA. Immunisation (BCG vaccination) as a TB

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

prevention strategy was affirmed with a mean of 2.73 (Agree). At the same time, TB education in the community scored 2.72 (Agree), both indicating moderate but significant endorsement of these programmatic prevention approaches.

The sole prevention strategy that respondents disagreed with was avoiding handshaking (mean 2.19, Disagree), a finding consistent with the knowledge result (Table 4.2), which showed that TB transmission through handshaking was correctly rejected. This concordance between knowledge and prevention perception is reassuring, suggesting that respondents apply their understanding of TB transmission biology coherently when evaluating prevention strategies, rather than indiscriminately endorsing all proposed measures. The practical implication for health education is that correcting the handshaking misconception, where it exists, will translate reliably into the rejection of avoidance behaviours that may unnecessarily stigmatise TB patients in community settings.

V. DISCUSSION

- *Demographic Profile and Vulnerability Determinants*

The sociodemographic profile of the study population reveals a patient group characterised by multiple intersecting vulnerabilities that compound the risk of default. The predominance of female respondents (54%) is consistent with the higher health-seeking behaviour documented among Nigerian women and the particular vulnerability of women to TB through household exposure and nutritional deficiency in contexts of food insecurity (Okonkwo et al., 2020). The concentration of respondents in the 31–40 age bracket (27.3%), the peak economically productive years, highlights the opportunity cost of TB treatment adherence for this group: maintaining DOTS attendance while fulfilling agricultural and family economic responsibilities creates real tensions that health systems must address through flexible treatment scheduling and community-based support.

The 68% illiteracy rate is the most clinically significant demographic finding and stands as the most powerful structural predictor of default risk in this population. As Siddiqi et al. (2020) demonstrated in a multi-country meta-analysis, illiteracy is associated with poor TB knowledge retention, reduced ability to correctly recall medication instructions, and significantly higher default rates, findings that make the high literacy deficit in Ilesa East LGA a direct TB control priority. For community health officers and PHC health workers serving this population, these findings mandate the systematic adoption of pictorial treatment cards, pill-counting methods, and community health volunteer home-visit programmes to compensate for the educational limitations that prevent written health communication from being effective. The 26% traditional religion adherence also warrants attention: in communities where traditional healers and spiritual explanatory models compete with biomedical frameworks for disease causation and management, DOTS programmes that ignore the spiritual and cultural dimensions of TB experience are likely to encounter higher default rates than those that engage with community leaders, faith healers, and religious institutions as partners in treatment support (Odume et al., 2021).

- *Knowledge, Stigma, and the Knowledge-Default Paradox*

The finding that respondents demonstrate adequate factual knowledge about TB, correctly identifying symptoms ($\bar{X}$=2.85), the causative organism ($\bar{X}$=3.12), and the airborne transmission route ($\bar{X}$=3.02), creates an apparent paradox: if patients know what TB is, how it spreads, and why treatment is essential, why does default persist? This knowledge-default paradox is well documented in the TB adherence literature. It is resolved by recognising that knowledge is a necessary but insufficient determinant of adherence, which is ultimately shaped by the convergence of knowledge, attitude, structural enablers, social support, and systemic incentives (Tola et al., 2021; Getnet et al., 2022).

The prominent endorsement of social stigmatisation as a TB effect ($\bar{X}$=3.60) provides one explanation for this paradox. TB stigma in Ilesa East LGA, rooted in the disease's association with poverty, HIV, and social marginality, creates a specific form of default risk: patients who have internalised or anticipated stigma may avoid consistent DOTS attendance at PHC facilities where their diagnosis is visible to community members, or may discontinue treatment when they believe themselves recovered as a means of ending the stigmatised sick role. Odume et al. (2021) found, in a study conducted in Nigeria, that stigma-motivated default was particularly prevalent among male patients in rural settings, precisely the demographic that constitutes 46% of the current study's sample. Health education campaigns that normalise TB as a curable infectious disease without moral implication, and that engage community leaders as stigma-reduction advocates, are therefore as important to treatment completion as drug supply chain optimisation.

- *Structural Barriers Identified by Study Findings*

Although the study's primary data tables focus on knowledge and perception, the convergence of the literature review evidence and the demographic profile reveals specific structural barriers operating in Ilesa East LGA that demand direct programmatic attention. Drug stockouts, documented as a persistent challenge in Nigeria's PHC DOTS programme (NTBLCP, 2021; Ekwueme et al., 2020), represent perhaps the most directly actionable structural driver of default: when drugs are unavailable at treatment units, patients have no pharmacological option to continue treatment, and the resulting interruption meets the WHO definition of default regardless of their motivation. The provision of adequate, continuous drug supply to all five PHC DOTS units in Ilesa East LGA must therefore be treated as a non-negotiable prerequisite for TB control, not merely an operational aspiration.

The inadequacy of health personnel at the PHC level in Ilesa East Local Government Area (LGA) in Osun State, reflected in the original study's findings regarding limited technical support and high workload, compounds the default

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

risk by reducing the quality and frequency of patient counselling, defaulter tracing, and treatment support activities. WHO recommends a dedicated TB focal person at each DOTS treatment unit to coordinate patient registration, medication dispensing, defaulter retrieval, and treatment outcome documentation (WHO, 2020a). Without such dedicated personnel, these activities are absorbed into the general workload of overextended community health workers who lack the time to provide the individualised, sustained support that TB patients, particularly those with literacy deficits and social stigma vulnerabilities, require to complete treatment.

➢ *Prevention Endorsement and Programme Implications*

The strong endorsement of improved ventilation ($\bar{X}$=3.60) and early diagnosis and treatment ($\bar{X}$=3.60) as TB prevention strategies is consistent with evidence-based WHO prevention recommendations. It suggests that community health education in Afijio LGA has successfully communicated the core TB prevention messages. The endorsement of TB community education ($\bar{X}$=2.72) and BCG vaccination ($\bar{X}$=2.73) as prevention strategies provides programme planners with an evidence base for prioritising these activities in Afijio LGA: community education sessions should explicitly address the treatment duration rationale, drug side effect management, and the consequences of default, while BCG vaccination coverage should be monitored and gaps addressed as part of the routine immunisation programme.

The rejection of avoiding handshaking as a prevention strategy ($\bar{X}$=2.19), consistent across both the knowledge assessment and prevention perception tables, is a positive finding that distinguishes the Ilesa East Local Government Area (LGA) in Osun State TB patient population from comparable populations in other contexts, where misconceptions about contact transmission are more prevalent. Importantly, this finding has implications for reducing TB stigma. In communities where TB is correctly understood as airborne rather than contact-transmitted, the marginalisation of TB patients through avoidance of physical contact is less likely to be endorsed as a rationally grounded behaviour, creating an opportunity for community education campaigns to leverage correct transmission knowledge as a foundation for stigma reduction messaging.

VI. CONCLUSION

This study has generated systematic, community-level evidence on the factors influencing TB treatment default among patients attending PHC facilities in the Ilesa East Local Government Area (LGA) in Osun State, Nigeria and was conducted under the community health research programme of the Osun State Teaching Hospital, Osogbo. The findings reveal a patient population with commendably accurate knowledge of TB symptoms, causation, and transmission, built through sustained PHC health education despite a 68% illiteracy rate, making verbal, community-based communication the primary and indispensable channel for delivering health information.

However, this knowledge asset coexists with a constellation of structural, social, and demographic vulnerabilities, illiteracy-driven health literacy limitations, TB stigmatisation endorsed by the majority as a major disease consequence, religious diversity that creates competing explanatory models of illness, and health system-level challenges including drug stockouts and inadequate DOTS supervision personnel, that collectively transform the challenge of TB treatment completion from an individual patient behaviour problem into a systemic, multi-stakeholder public health management challenge. The study's prevention endorsement findings provide a clear programmatic roadmap: improved ventilation, early diagnosis, community education, and BCG vaccination are the strategies most strongly supported by patients, and these are precisely the interventions most supported by evidence as effective TB control tools. Implementing them with fidelity, consistency, and the specific adaptations required for a predominantly illiterate, multi-religious, stigma-affected population is the central challenge of TB control in Ilesa East Local Government Area (LGA) in Osun State.

RECOMMENDATIONS

➢ *Policy and Programme Recommendations*

The Osun State Primary Health Care Board, the National Tuberculosis and Leprosy Control Programme (NTBLCP), and the Ilea East LGA health authorities must urgently establish a reliable, continuous anti-tuberculosis drug supply to all five DOTS treatment units in the LGA, implementing a three-month emergency buffer stock system, real-time inventory monitoring, and automatic reorder protocols, recognising that drug stockouts are the most directly actionable structural driver of treatment default in the study area and that no amount of patient education, stigma reduction, or counselling can sustain treatment completion when the medicines required for that completion are physically absent from treatment units.

Community health officers and PHC workers serving TB patients in Ilesa East Local Government Area (LGA) in Osun State should receive specialised training in TB treatment adherence counselling for illiterate patient populations, specifically including the use of pictorial treatment calendars, pill-counting visual aids, take-home medication packs with daily compartments, community health volunteer home visit protocols, and structured defaulter tracing algorithms, recognising that 68% illiteracy in the patient population renders written treatment instructions and standard medication labels inadequate as primary communication tools and that direct, repeated, verbal, and visual counselling adapted to literacy levels is the evidence-based standard for supporting treatment completion in this demographic.

➢ *Contribution to Public Health Knowledge*

This study advances the public health evidence base on TB treatment default in South-Western Nigeria by providing the first quantitative, community-level documentation of the knowledge, perception, and prevention endorsement profiles of TB patients in Ilesa East Local Government Area (LGA)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun610

in Osun State, demonstrating the knowledge-default paradox, where adequate factual TB knowledge coexists with structural, social, and systemic barriers to treatment completion, and identifying the 68% illiteracy rate and high social stigmatisation endorsement as the two most clinically significant modifiable default risk factors in this population, thereby shifting the analytical focus from patient behaviour to the systemic and social determinants of adherence that PHC programmes must address.

The study contributes actionable evidence to Osun State's TB control programme by establishing that the patients most at risk of default in Ilesa East LGA are not those with knowledge deficits, who may be effectively reached through standard health education. However, those facing the convergence of illiteracy, social stigma, structural drug supply failures, and inadequate DOTS supervision require a multidimensional retention strategy that integrates drug supply chain strengthening, community health volunteer support, stigma reduction through religious leader engagement, and flexible DOTS scheduling that accommodates the agricultural and economic realities of a predominantly rural patient population.

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