

TUBERCULOSIS TREATMENT-DEFAULT AND IT'S IMPLICATIONS FOR HEALTH EDUCATION AMONG PATIENTS IN RIVERS STATE, NIGERIA.

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Abstract

This study examined Tuberculosis (TB) Treatment-Default and its Implications for Health Education among patients in Rivers State, Nigeria. The study was motivated by the persistent challenge of treatment default among TB patients and the need to strengthen health education and treatment-support strategies. Specifically, the study sought to determine the proportion of TB patients who defaulted from treatment, describe the distribution of selected socio-demographic, socioeconomic, programmatic, and TB-related knowledge, attitudes and beliefs factors among patients who defaulted, and assess the content, frequency, timing, duration, and methods of delivery of health education provided to TB patients. A descriptive cross-sectional survey design was adopted. Data were collected using a structured questionnaire administered to patients in selected TB treatment facilities in Rivers State. Total valid sum of 83 questionnaires were considered valid and used for analysis. Data were analyzed using descriptive statistic tools, principally frequencies and percentages. The findings revealed that visiting treatment facilities was very difficult. gaps were observed in reporting drug side effects, regular clinic attendance, and beliefs concerning the use of traditional remedies as a substitute for prescribed treatment. Health education was commonly provided on the nature and duration of TB treatment; however, education on drug side effects and their management was less frequently reported. The study concluded that treatment default remained a considerable challenge among respondents in the selected facilities. It recommended continuous, patient-centred health education, improved counselling on medication side effects, strengthened follow-up systems, and practical measures to address transportation and other access-related barriers to treatment completion.

Keywords: Tuberculosis; Health; Treatment-default; Treatment Support; Education; Nigeria; Rivers State.

Introduction:

Tuberculosis (TB) remains a major communicable disease and a persistent public health concern, particularly in countries with a high burden of infection and constrained access to health services. Although effective anti-tuberculosis medicines are available, treatment requires patients to follow a prescribed regimen over an extended period and to maintain contact with health services. Interruptions can compromise individual treatment outcomes, prolong infectiousness in some patients, increase the risk of relapse, and complicate public

health efforts to control transmission. The World Health Organization (WHO) continues to identify early diagnosis, appropriate treatment, patient-centred care, and health-system strengthening as central components of the global response to TB (WHO, 2023, 2024).

Nigeria remains a high-burden TB country, and the challenge of sustaining treatment is shaped by multiple interacting influences. The World Health Organization's framework for adherence to long-term therapies emphasizes that adherence is not solely an individual patient responsibility; it reflects the combined influence of social and economic circumstances, the health-care team and system, condition-related factors, treatment-related demands, and patient-related factors (WHO, 2003). For TB, these influences may include transport costs, income insecurity, competing employment responsibilities, medication-related symptoms, stigma, perceived improvement after symptoms resolve, family support, communication with health workers, and the convenience and reliability of services.

Treatment default has historically been used to describe a prolonged interruption or failure to complete prescribed TB treatment. Definitions and programme classifications have evolved, and the operational definition used in any study should be stated clearly. In this study, the dissertation operationalized default as treatment interruption of two consecutive months or more before completion, consistent with the convention described in the source dissertation. The present article therefore uses "treatment default" as the study's operational term, while recognizing that current national and WHO programme terminology may distinguish loss to follow-up and other unsuccessful outcomes.

Health education is an essential part of TB care. It can explain the disease, transmission, curability, the importance of completing treatment, the management of adverse effects, infection prevention, and the need for scheduled appointments. Effective education is more than the one-way transfer of information: it should allow patients to ask questions, explain their understanding, disclose practical difficulties, and participate in decisions about support. Patient-centred education may be especially important where patients have different literacy levels, languages, work schedules, household responsibilities, and cultural or religious beliefs. However, knowledge does not automatically translate into treatment adherence. Patients may understand that TB is curable and still experience barriers that make regular treatment difficult. A patient may recognize the importance of taking medicines but be unable to afford transportation to the clinic; another may experience side effects but hesitate to disclose them; a third may receive information only at treatment initiation and have no accessible channel for advice when difficulties arise. This means that educational content, delivery, continuity, and links to practical support need to be considered together.

Rivers State, in the Niger Delta region of southern Nigeria, includes urban, peri-urban, rural, and riverine communities. Differences in geography, livelihood, transport options, and household resources may shape patients' access to health services. The present study focuses on selected TB treatment facilities in Rivers State and considers both the distribution of treatment default in the respondent sample and the education reported by patients classified as defaulters. The intention is not to establish causation but to identify descriptive patterns that can inform service improvement and future research.

Treatment default undermines the benefits of diagnosis and treatment and can contribute to poor outcomes for patients and communities. In settings where patients must travel repeatedly to access care, transportation costs, financial strain, and service-related difficulties may compound the challenge of completing treatment. These constraints can persist even when anti-TB medicines are provided without direct charge, because indirect costs such as travel, lost work time, food, childcare, and accompanying-person expenses remain relevant.

Health education programmes may also leave important gaps if information is concentrated at the beginning of treatment, if medication side effects are not explained in practical terms, or if

patients are not encouraged to report problems promptly. Similarly, beliefs that traditional remedies alone can cure TB may conflict with prescribed treatment. Understanding these issues locally is important for tailoring communication and support to patients' actual experiences.

The dissertation underlying this article examined TB treatment default and its implications for health education in selected facilities in Rivers State. It recorded treatment-default status for 83 valid respondents and gathered additional information from the 32 respondents classified as defaulters. This article presents the findings as a descriptive facility-based analysis, with particular attention to the most frequently reported barriers, selected knowledge and belief patterns, and the reported content and delivery of TB health education.

Objectives:

The aim is to examine TB treatment-default and its implications for health education among patients in Rivers State, Nigeria. The specific objectives are to:

- i. To determine the proportion of Tuberculosis patients who defaulted from treatment in selected tuberculosis treatment facilities in Rivers State.
- ii. To describe the predominant distribution of selected socio-demographic, socioeconomic, programmatic, and tuberculosis-related knowledge, attitudes and beliefs factors among tuberculosis patients who defaulted from treatment in selected treatment facilities in Rivers State.
- iii. To ascertain the Content, Frequency, Timing, Duration, and Methods of delivery of Health Education provided to tuberculosis patients in selected treatment facilities in Rivers State.

Research Questions:

The study finds to answer the following research questions:

- i. What proportion of Tuberculosis patients defaulted from treatment in selected tuberculosis treatment facilities in Rivers State?
- ii. What selected socio-demographic, socioeconomic, programmatic, and tuberculosis-related knowledge, attitudes and beliefs factors show predominant pattern of distribution among tuberculosis patients who defaulted from treatment in selected treatment facilities in Rivers State.
- iii. What are the Content, Frequency, Timing, Duration, and Methods of delivery of Health Education provided to tuberculosis patients who default treatment in selected treatment facilities in Rivers State?

Hypothesis:

This work gathered data and materials to test the following Hypothesis:

H₀: The selected socio-demographic, socioeconomic, programmatic, and tuberculosis-related knowledge, attitudes and beliefs factors do not show predominant pattern of distribution among tuberculosis patients who defaulted from treatment in selected treatment facilities in Rivers State.

Treatment-default and Adherence in TB care:

Treatment adherence is a multidimensional behaviour shaped by the relationship between a patient and the health system. WHO's adherence framework identifies five broad categories of influence: social and economic factors, health-care team and system factors, condition-related factors, therapy-related factors, and patient-related factors (WHO, 2003). This framework cautions against treating non-adherence as simply unwillingness or lack of knowledge. A

patient may miss treatment because of transport barriers, unstable housing, competing work, fear of disclosure, a lack of social support, or difficulty reaching a provider when side effects occur.

The TB adherence literature similarly describes a combination of patient, treatment, social, and health-service influences. Munro et al. (2007), in a systematic review, highlighted the importance of understanding treatment-taking behaviour in its social and health-system context. Studies from Nigeria and other high-burden settings have reported varied barriers and outcomes across populations and treatment programmes. Differences in study design, default definitions, sampling frames, and programme context mean that estimates should not be compared without attention to their denominators and methods. In research reporting, it is important to distinguish the proportion of a sample classified as treatment-defaults from the distribution of characteristics among those treatment-defaults. The first uses all valid respondents as its denominator; the second uses only the TB treatment-defaults subgroup. For example, if 11 of 32 TB treatment-defaults are aged 19–28 years, this indicates that the age group makes up 34.4% of the TB treatment-default subgroup. It does not establish that patients aged 19–28 have a higher probability of defaulting, unless the number of all treated patients in that age category is also known and compared.

Socioeconomic and Service-access Barriers:

Transportation and financial difficulties can affect repeated attendance even when treatment itself is available without charge. The cost of travelling to a facility, the distance involved, unreliable transport, weather or riverine access conditions, and lost earnings can make attendance burdensome. Employment and informal-sector commitments may create additional tension between earning income and attending appointments. Relocation can interrupt continuity when a patient moves without a clear transfer of care. These barriers suggest that patient education should be paired with service-level strategies such as appointment planning, treatment transfer procedures, reminders, community-based support where feasible, and respectful assessment of missed visits. Health-service issues may include long waiting times, inconvenient clinic schedules, inadequate counselling, limited opportunities to ask questions, or difficulties contacting staff between appointments. Such factors are important because patients' experiences of care influence whether they return and disclose problems. A patient-centred programme therefore needs to consider how services are organized as well as what patients know.

Health Education in TB Treatment:

TB health education can include individual counselling, group discussions, demonstrations, printed materials, question-and-answer sessions, telephone communication, and community outreach. Different methods serve different purposes. Individual counselling permits discussion of private concerns and tailored barriers; group sessions can normalize treatment experiences and build peer support; printed materials can reinforce information between visits; demonstrations can clarify practical steps; and phone-based communication may support reminders and follow-up where patients consent and confidentiality can be protected. The content of education should extend beyond the meaning and transmission of TB. It should include treatment duration, adherence, what to do when a dose is missed, common and serious side effects, the importance of promptly reporting symptoms, the purpose of follow-up visits, infection prevention, stigma, nutrition where appropriate, and available social support. Health workers can use teach-back, asking patients to explain the information in their own words, to check understanding and identify misconceptions. Frequency and timing are also important. Education only at treatment initiation may not address questions that

emerge weeks or months later. Repeated short conversations at appointments can reinforce key messages, identify changes in circumstances, and provide opportunities to solve practical problems. The present study's assessment of content, frequency, timing, duration, and methods therefore provides a descriptive picture of the education respondents recalled receiving, rather than a direct measure of educational quality or effectiveness.

TB knowledge, Attitudes, and Beliefs:

Knowledge of transmission, symptoms, prevention, and curability is necessary for informed decision-making, but it may not be sufficient to sustain adherence. Understanding that TB is curable should be accompanied by clear knowledge that improvement in symptoms does not necessarily mean that TB treatment can be stopped. Patients should also know how to respond to adverse effects, which symptoms require urgent review, whom to contact, and why they should not change or stop medication without professional advice. Attitudes toward clinic attendance and reporting side effects are particularly relevant to treatment continuity. If patients believe that side effects should be tolerated silently, or fear that reporting symptoms will result in blame or interruption of treatment, they may manage symptoms without clinical guidance. Conversely, a supportive relationship with health workers may encourage disclosure and timely clinical review. Health education should explicitly invite questions and normalize the reporting of treatment difficulties. Beliefs about traditional remedies, prayer, and biomedical treatment can coexist. Health communication should not stigmatize patients' cultural or religious identities. Instead, providers can respectfully clarify that spiritual support or culturally meaningful practices do not replace prescribed TB treatment, and encourage patients to discuss any complementary remedy with qualified health workers to avoid harmful interactions or delays. Community and religious leaders may be useful partners when messages are accurate, non-stigmatizing, and consistent with public health guidance.

Theoretical Framework:

This study is anchored on the Capability, Opportunity, Motivation–Behaviour (COM-B) Model of Behaviour Change, developed by Michie, Van Stralen, and West (2011), supported by the World Health Organization's (WHO) person-centred tuberculosis (TB) care and support framework (WHO, 2025a, 2025b). The COM-B model explains behaviour through three interacting components: capability, opportunity, and motivation. Capability refers to patients' knowledge and understanding of TB, treatment duration, medication use, and possible side effects. Opportunity encompasses the social, financial, environmental, and healthcare-service conditions that facilitate or hinder treatment continuation. Motivation includes patients' attitudes, beliefs, intentions, emotions, and willingness to adhere to prescribed treatment. The model is relevant to this study because TB treatment default may reflect not only inadequate knowledge or negative attitudes but also transportation difficulties, financial constraints, stigma, medication-related concerns, and challenges accessing healthcare services. It therefore provides a comprehensive framework for examining the distribution of socio-demographic, socioeconomic, clinical, programmatic, and TB-related knowledge, attitudes, and beliefs among patients who defaulted from treatment. The WHO person-centred TB care and support framework complements COM-B by emphasizing individualized health education, counselling, social and material support, appropriate follow-up, and accessible treatment services (WHO, 2025a, 2025b). Together, these frameworks provide a basis for assessing the content, frequency, timing, duration, and methods of delivering health education in selected TB treatment facilities in Rivers State. They also inform recommendations for improving patient-centred health education and treatment adherence. Given the descriptive nature of

this study, the combined framework is used to organize and interpret observed patterns rather than establish causal relationships between the identified factors and treatment default.

Research Methods:

Study Design and Setting: A descriptive cross-sectional survey design was used, as reported in the dissertation. The study was conducted among patients in selected TB treatment facilities in Rivers State, Nigeria. Rivers State is located in the South-South geopolitical zone and contains urban, semi-urban, rural, and riverine communities. The diversity of settlement patterns and livelihoods provides a relevant setting for examining patient-reported barriers to accessing treatment and the health education delivered through routine TB services. The article refers to selected facilities rather than claiming that the sample represents all TB patients in the State: **Participants and Sample:** The source dissertation reports that 90 questionnaires were administered, 88 were retrieved, and 83 were considered valid for analysis. The overall analytic sample was therefore 83 respondents. Among these, 32 were classified as having defaulted from treatment and 51 as not having defaulted. The analysis of socio-demographic characteristics, reported reasons for default, TB-related knowledge, attitudes and beliefs, and health education practices focused on the 32 respondents classified as defaulters. Accordingly, the subgroup findings should be interpreted as descriptive findings among these 32 respondents, not as estimates of prevalence in all TB patients in Rivers State: **Instrument and Measures:** Data were collected using a structured questionnaire. The instrument covered treatment-default status, socio-demographic and socioeconomic characteristics, perceived difficulty visiting treatment facilities, reported reasons for treatment interruption, TB-related knowledge, attitudes and beliefs, and health education received. The dissertation indicates that the questionnaire was written in English and could be interpreted in local languages when needed. The article does not independently verify the translation process, psychometric properties, or whether all responses were independently checked against treatment records; these details should be clarified in the final journal submission if documentation is available: **Operational Definition of Treatment Default:** The dissertation operationally defined treatment default as interruption of TB treatment for two consecutive months or more before treatment completion. Treatment-default status was reported as based on treatment registers and treatment cards in addition to respondents' claims. Since the available manuscript does not provide a detailed adjudication protocol, future versions of the methods section should specify the exact record fields reviewed, the reference period, and how discrepancies between records and self-report were resolved: **Data Analysis:** Data were summarized using descriptive statistics, principally frequencies and percentages. The proportion classified as defaulters was calculated using all 83 valid respondents as the denominator. For analyses restricted to defaulters, percentages were calculated using 32 as the denominator unless otherwise noted. Multiple-response items, including reported reasons for default and health education content, allowed more than one response; consequently, their percentages may sum to more than 100%. No inferential statistical tests were conducted. The study therefore cannot establish statistical associations, predictors, causal effects, or the comparative risk of default across demographic groups.

Research Results:

Questionnaire Response and Treatment-default Status:

During the study, 90 questionnaires administered, 88 were retrieved (97.8%), and 83 were valid for analysis (92.2% of those administered). Of the 83 valid respondents, 32 (38.6%) were classified as having defaulted from TB treatment, while 51 (61.4%) were classified as not having defaulted. Thus, treatment default was observed in more than one-third of the analytic sample. This proportion describes the study sample and should not be treated as a population-level estimate for Rivers State because the sample was facility-based and the full sampling and selection process is not sufficiently documented in the available results.

Table 1. Treatment-default status among valid respondents

Status	Frequency	Percentage
Defaulted	32	38.6
Did not default	51	61.4
Total	83	100.0

Socio-demographic and socioeconomic distribution among defaulters:

Among the 32 respondents classified as defaulters, the largest age category was 19–28 years, comprising 11 respondents (34.4%). This was followed by those aged 39–48 years, with 6 (18.8%), and those aged 29–38 years, with 5 (15.6%). The 9–18-year and 59-years-and-above categories each accounted for 4 respondents (12.5%), while the 49–58-year category accounted for 2 (6.3%). Nineteen respondents (59.4%) were male and 13 (40.6%) were female. Fourteen (43.8%) were single. Secondary education was the predominant reported education category, accounting for 13 respondents (40.6%). Sixteen respondents (50.0%) were self-employed, and 13 (40.6%) reported monthly income below ₦50,000. These are distributions within the defaulter subgroup and do not show that any age, sex, marital, education, occupation, or income group had a higher default risk.

Table 2. Selected characteristics among the 32 respondents classified as defaulters

Characteristic	Predominant category	Frequency	Percentage
Age	19–28 years	11	34.4
Sex	Male	19	59.4
Marital status	Single	14	43.8
Education	Secondary education	13	40.6
Occupation	Self-employed	16	50.0
Monthly income	Below ₦50,000	13	40.6

Reported reasons for treatment default and access difficulties:

Transportation problems were the most frequently reported reason for default, identified by 28 respondents (87.5%). Financial difficulties were reported by 20 (62.5%), relocation by 14 (43.8%), other health-service issues by 13 (40.6%), and lack of family or social support by 11 (34.4%). Work or business commitments were reported by 8 (25.0%), drug side effects by 6 (18.8%), stigma or discrimination by 4 (12.5%), long waiting time by 4 (12.5%), forgetfulness by 2 (6.3%), and one respondent (3.1%) selected "none." Because respondents could select multiple reasons, percentages are not expected to total 100%. The dissertation also reports that 19 respondents (59.4%) described visiting the treatment facility as very

difficult. Taken together, the responses highlight the prominence of transport and financial barriers, alongside a range of service, social, and personal challenges.

Table 3. Reported reasons for treatment default (multiple responses permitted)

Reported reason	Frequency	Percentage
Transportation problems	28	87.5
Financial difficulties	20	62.5
Relocation	14	43.8
Other health-service issues	13	40.6
Lack of family/social support	11	34.4
Work/business commitment	8	25.0
Drug side effects	6	18.8
Stigma/discrimination	4	12.5
Long waiting time	4	12.5
Forgetfulness	2	6.3
None	1	3.1

TB-related knowledge, attitudes, and beliefs:

Knowledge of some core TB concepts was common among respondents classified as defaulters. Thirty-one (96.9%) correctly identified person-to-person spread of pulmonary TB, and 30 (93.8%) recognized that TB can be cured with appropriate drugs. Twenty-six (81.2%) identified TB as an infectious disease, 25 (78.1%) recognized airborne transmission, and 24 (75.0%) recognized that improper treatment interruption contributes to drug resistance. However, the responses also show a knowledge gap around the importance of completing treatment after symptoms disappear: the table reports 22 respondents (68.8%) as answering correctly, while 6 (18.8%) answered incorrectly and 4 (12.5%) did not know. The underlying source table contains a formatting error in this row ("2268.8%"); the frequency and percentage reported here are interpreted as 22 (68.8%) and should be checked against the original dataset before publication.

On treatment attitudes, 24 respondents (75.0%) considered completing TB treatment important, while 18 (56.3%) identified regular clinic attendance as important. Sixteen (50.0%) said they would inform a health worker about drug side effects, whereas 14 (43.8%) said they would not and 2 (6.3%) did not know. Six respondents (18.8%) indicated that they would stop medication when feeling completely well, while 22 (68.8%) rejected that response and 4 (12.5%) did not know. These results show that positive views of treatment completion coexisted with uncertainty or potentially unsafe responses concerning clinic attendance and adverse effects.

Belief responses revealed further areas for counselling. Twenty-three respondents (71.9%) agreed that TB can be completely cured with appropriate treatment. However, 17 (53.1%) agreed that traditional remedies alone can cure TB, 10 (31.3%) agreed that prayer alone can replace TB treatment, and 5 (15.6%) agreed that occasionally missing medicines does not matter. Twenty-five (78.1%) disagreed with the latter statement. Only 16 (50.0%) agreed that health workers provide reliable TB information, while 12 (37.5%) disagreed and 4 (12.5%) were undecided. These findings indicate that education should address not only basic factual knowledge but also treatment-related beliefs, confidence in health information, and the importance of discussing complementary practices with qualified providers.

Table 4. Selected TB knowledge, attitude, and belief responses among defaulters

Item	Response category	Frequency	Percentage
Pulmonary TB spreads person-to-person	Correct/true	31	96.9
TB can be cured with appropriate drugs	Correct/true	30	93.8
Completing treatment after symptoms disappear is important	Correct/true	22	68.8
Completing treatment is important	Yes/true	24	75.0
Regular clinic attendance is important	Yes/true	18	56.3
Would inform a health worker about drug side effects	Yes/true	16	50.0
Traditional remedies alone can cure TB	Agree	17	53.1
Prayer alone can replace TB treatment	Agree	10	31.3
Missing medicines occasionally does not matter	Agree	5	15.6
Health workers provide reliable TB information	Agree	16	50.0

Content and delivery of health education:

The most frequently reported health education topics were the duration of TB treatment, reported by 31 respondents (96.9%), and the Meaning or Nature of TB, also reported by 31. The cause of TB and also the family/community support during treatment were each reported by 30 respondents (93.8%). Nutrition and stigma/discrimination were each reported by 28 (87.5%), while transmission was reported by 28 (87.5%), signs and symptoms by 27 (84.4%), treatment interruption by 24 (75.0%), prevention and the importance of treatment completion by 22 each (68.8%), drug-resistant TB by 20 (62.5%), side effects by 18 (56.3%), and management of side effects by 16 (50.0%). The comparatively lower reporting of side-effect information and management is important given the uncertainty around reporting side effects shown in the attitude responses.

Regarding frequency, 18 respondents (56.3%) reported receiving health education only at treatment initiation, 12 (37.5%) reported education at initiation and every appointment, and 2 (6.3%) reported it once each month. The first health education session was most often reported as occurring during admission or at the start of treatment (23 respondents, 71.9%), followed by at diagnosis (8, 25.0%) and before diagnosis (1, 3.1%). Session duration was more than 20 minutes for 15 respondents (46.9%), 11–20 minutes for 9 (28.1%), and 5–10 minutes for 8 (25.0%); none reported a session lasting less than five minutes. Regarding methods, 16 respondents (50.0%) reported that all listed methods were used, 6 (18.8%) reported individual health education, 6 (18.8%) reported printed materials, and 2 each (6.3%) reported group education and demonstration. These data describe respondents'

recollections of education; they do not measure the quality, comprehension, or effectiveness of the sessions.

Table 5. Selected health education content reported by respondents (multiple responses permitted)

Topic	Frequency	Percentage as reported
Meaning/nature of TB	31	96.9
Duration of TB treatment	31	96.9
Cause of TB	30	93.8
Family/community support	30	93.8
Nutrition in TB	28	87.5
Stigma/discrimination	28	87.5
Transmission of TB	28	87.5
Signs and symptoms	27	84.4
Treatment default/interruption	24	75.0
Prevention of TB	22	68.8
Importance of treatment completion	22	68.8
Drug-resistant TB	20	62.5
TB drug side effects	18	56.3
Management of drug side effects	16	50.0

Table 6. Timing, frequency, duration, and methods of health education

Measure	Category	Frequency	Percentage
Frequency	At initiation only	18	56.3
Frequency	At initiation and every appointment	12	37.5
Frequency	Monthly	2	6.3
Timing of first education	Before diagnosis	1	3.1
Timing of first education	At diagnosis	8	25.0
Timing of first education	At start of treatment	23	71.9
Session duration	5–10 minutes	8	25.0
Session duration	11–20 minutes	9	28.1
Session duration	More than 20 minutes	15	46.9
Method	Individual health education	6	18.8
Method	Group health education	2	6.3
Method	Demonstration	2	6.3
Method	Printed materials	6	18.8
Method	All listed methods	16	50.0

Discussion of Findings:**i. Magnitude of Treatment Default in the Sample:**

The study classified 32 of 83 valid respondents (38.6%) as having defaulted from TB treatment. This finding indicates that treatment interruption was a substantial issue in the selected facility-based sample. It should be interpreted cautiously: the design and sample size do not establish the proportion of all TB patients in Rivers State who default, and the result may be influenced by the facilities selected, the recruitment approach, the study period, and the operational definition used. The estimate is therefore best understood as a sample-specific descriptive proportion rather than a state-wide prevalence estimate.

The result nonetheless supports the practical importance of understanding why treatment continuity can break down. TB treatment requires repeated engagement with services, and a sizeable number of patients in this sample had experienced interruption. The finding is consistent with the broader literature's view that adherence is influenced by multiple factors and that patient-level knowledge should not be examined in isolation from socioeconomic conditions and health-service arrangements (Munro et al., 2007; WHO, 2003).

ii. Socio-demographic and Socioeconomic Patterns:

Young adults aged 19–28 years constituted the largest age category among defaulters, followed by those aged 39–48 years. Males represented 59.4%, single respondents 43.8%, self-employed respondents 50.0%, and respondents with monthly income below ₦50,000 40.6%. These distributions may help treatment programmes consider the variety of circumstances represented among patients who defaulted. For example, people engaged in self-employment may have limited flexibility to leave work for appointments, and lower income may make repeated transportation costs more burdensome.

The observed socioeconomic pattern is relevant for designing inclusive services. Appointment scheduling that accounts for working hours, clear transfer procedures for patients who relocate, and practical assessment of transport needs may help address barriers for patients across different demographic groups. Such measures should be evaluated rather than assumed to reduce default.

iii. Transportation and Financial Barriers:

Transportation problems were reported by 87.5% of defaulters and financial difficulties by 62.5%; 59.4% also described facility visits as very difficult. These were the most prominent practical barriers in the study. The convergence of transport and financial responses suggests that access costs may be central to the experiences of this subgroup. Relocation, reported by 43.8%, may further disrupt continuity when patients move without a documented transfer or connection to another treatment facility.

These findings have direct implications for health education but also demonstrate the limits of education alone. Counselling can explain the importance of continuing treatment, help patients plan for appointments, and encourage early communication when a visit will be missed. However, it cannot by itself eliminate transport costs, lost wages, or geographic barriers. An effective adherence-support approach should link education with a practical assessment of access constraints and, where feasible, referral to community-based treatment support, appointment coordination, transport assistance, or alternative service arrangements consistent with programme guidelines.

Health facilities may also consider asking patients about expected transport costs and work commitments at the beginning of treatment and during follow-up. If a patient misses an appointment, contact should be supportive rather than punitive, with the aim of identifying

the reason and reconnecting the patient with care. Any telephone or text-based follow-up should protect confidentiality and be undertaken with patient consent.

iv. Knowledge and Attitudes: Strengths and Gaps:

Most respondents recognized that pulmonary TB can spread from person to person and that appropriate drugs can cure TB. This suggests that key messages about transmission and curability had reached many respondents. Yet the presence of treatment default among this subgroup illustrates that factual knowledge does not necessarily ensure treatment completion. The relationship between knowledge and behaviour may be affected by affordability, adverse effects, work demands, social support, confidence in health workers, and the ability to access care.

Only half of respondents stated that they would report drug side effects to a health worker, while 43.8% said they would not. This is a particularly relevant gap because untreated or poorly managed adverse symptoms may cause distress and lead some patients to stop or alter treatment without clinical guidance. Education should clearly identify whom to contact, what to do if symptoms occur, and why patients should not stop or modify prescribed treatment independently. Providers should communicate that reporting symptoms is appropriate and will lead to assessment, not blame.

Just over half of respondents identified regular clinic attendance as important. A substantial minority therefore did not express the expected positive response or were uncertain. Education should explain the purpose of scheduled visits, including monitoring, treatment support, and the opportunity to discuss emerging problems. The message should be reinforced throughout the treatment period, not delivered only once at initiation.

Beliefs about traditional remedies and prayer also require sensitive attention. More than half agreed that traditional remedies alone can cure TB, and nearly one-third agreed that prayer alone can replace treatment. These findings should not be interpreted as evidence that all respondents relied on such practices, nor do they establish that these beliefs caused default. They indicate that some patients held beliefs that could conflict with prescribed treatment. Providers should respectfully clarify that spiritual practices or other culturally meaningful support do not replace anti-TB medicines and invite patients to discuss any complementary remedies they use.

v. Content and Continuity of Health Education:

The content of health education most frequently recalled by respondents included the nature of TB, treatment duration, causes of TB, and family or community support. By contrast, information on drug side effects and management of side effects was reported less often. This difference matters because side-effect management is an actionable component of adherence support: patients need to know both the rationale for treatment and what to do when treatment becomes difficult. The relatively low reported coverage of side-effect management corresponds with the uncertainty around reporting side effects in the attitude responses, although the study cannot test whether one pattern explains the other.

More than half of respondents reported receiving education only at treatment initiation. Repeated education at appointments was reported by 37.5%, and monthly education by 6.3%. Because questions and barriers can emerge throughout treatment, education limited to the first visit may not be sufficient for sustained support. A feasible service improvement would be to incorporate a brief, structured adherence discussion into routine visits, with additional counselling for patients reporting side effects, missed doses, transport difficulties, relocation, or concerns about treatment.

The first education session was usually reported at the start of treatment. This timing is understandable because treatment initiation is an important point for explaining diagnosis and the treatment plan. However, education should be iterative. Teach-back, asking the patient to explain the plan in their own words, can help health workers identify misunderstandings. Simple written or pictorial reminders can reinforce key information, while individual counselling can address concerns that patients may be reluctant to raise in a group. Almost half of respondents reported education sessions lasting more than 20 minutes, while the remainder reported shorter sessions. Duration alone should not be taken as a measure of quality. A lengthy session may still be ineffective if the language is difficult or patients cannot ask questions, while a shorter focused session may be useful if it is interactive and repeated. Future research should assess comprehension, patient experience, retention of key messages, and the extent to which education is adapted to patients' literacy, language, and practical needs.

vi. Implications for Health Education Practice:

The findings support a shift from information-only education toward patient-centred adherence support. A practical package Should include: (1) clear explanation of TB, transmission, curability, and treatment duration; (2) explicit guidance on completing treatment even when symptoms improve; (3) clear instructions on reporting medication side effects and obtaining clinical advice; (4) respectful discussion of traditional remedies and spiritual beliefs; (5) discussion of transportation, income, work schedules, and relocation; and (6) a follow-up plan for missed appointments.

Education should be delivered in language the patient understands, with local-language interpretation when needed. Providers should avoid shame-based communication and invite patients to disclose challenges early. Families or treatment supporters can be involved with the patient's permission, especially where social support is limited. Group sessions may be useful for shared learning, but individual counselling remains important for sensitive issues such as stigma, side effects, financial hardship, and treatment beliefs.

At the service level, health education should be integrated with systems for appointment reminders, tracing missed visits, referral or transfer when patients relocate, and documenting counselling topics. Where mobile communication is used, confidentiality and patient preferences must be respected. Health workers may benefit from periodic training in risk communication, teach-back, motivational communication, and non-judgmental counselling. Programmes should also review clinic waiting times and scheduling because service barriers can undermine otherwise appropriate education.

At the policy level, the high proportion of respondents identifying transport and financial problems points to the need for TB programmes to consider indirect costs and access barriers. This does not mean that the present study demonstrates the effectiveness of any specific intervention. Rather, it identifies issues that should be assessed in local service planning and evaluated in future implementation studies.

vii. Comparison with the wider literature:

The patterns observed in this study are consistent with the broader understanding that TB treatment adherence is shaped by social, economic, patient, treatment, and health-system influences (Munro et al., 2007; WHO, 2003). The strong representation of transportation and financial problems reinforces the importance of indirect treatment costs and service accessibility in patient-centred TB care. The knowledge findings also align with the principle that information alone may not overcome practical barriers to treatment continuity. However, direct comparison with specific studies should be cautious because the current sample is

small, facility-based, and analyzed descriptively, while other studies may use different default definitions, larger programme datasets, retrospective record reviews, or multivariable models. The manuscript should avoid claiming that its estimate is higher or lower than other settings unless comparable methods and denominators are confirmed.

Strengths and Limitations:

This study contributes local descriptive information on treatment-default status, patient-reported barriers, TB-related knowledge and beliefs, and reported health education practices in selected treatment facilities in Rivers State. A further strength is that it examines the content and delivery of education alongside patient-reported access barriers, enabling discussion of education as part of a broader adherence-support system rather than as an isolated intervention.

There are important limitations. First, the valid sample comprised 83 respondents, and the detailed subgroup analysis included only 32 respondents classified as defaulters. Estimates may therefore be imprecise and may not represent patients across Rivers State. Second, the facility-based design may exclude patients who were unable or unwilling to return to care, potentially underrepresenting some forms of disengagement. Third, some data were self-reported and may be affected by recall or social desirability bias. Fourth, the available dissertation results do not fully document the sampling frame, exact study period, recruitment procedures, record-verification protocol, ethics approval, consent procedures, or instrument validation; these details need to be completed accurately before submission.

Fifth, the analysis was descriptive and no inferential tests were performed. The results cannot establish statistically significant associations, causal pathways, or predictors of default. The distribution of demographic categories among defaulters cannot be interpreted as category-specific default risk without denominators for all treated patients in those categories. Sixth, some source tables contain arithmetic or formatting inconsistencies, including the percentage for the "meaning/nature of TB" item and the row concerning completion of treatment after symptoms disappear. These values must be checked against the original dataset. Finally, the study measures reported exposure to health education, not observed educational quality, comprehension, or effectiveness. These limitations should be stated transparently rather than obscured.

CONCLUSION

In this descriptive survey of selected TB treatment facilities in Rivers State, 32 of 83 valid respondents (38.6%) were classified as having defaulted from treatment. Among these 32 respondents, transportation problems and financial difficulties were prominent reported barriers, alongside relocation, health-service issues, and limited social support. Respondents generally recognized TB transmission and curability, but gaps were observed in willingness to report drug side effects, the perceived importance of regular clinic attendance, and beliefs about traditional remedies or prayer as substitutes for prescribed treatment. Education about the nature and duration of TB was commonly reported, while education about side effects and their management was less frequently reported; more than half reported education only at treatment initiation. The findings suggest that health education should be continuous, interactive, culturally respectful, and connected to practical adherence support. Because the analysis was descriptive and the sample was small and facility-based, the findings should not be interpreted as causal or representative of all TB patients in Rivers State.

RECOMMENDATIONS

1. Provide structured, repeated TB health education at treatment initiation and during follow-up appointments, with clear messages about treatment completion, regular attendance, transmission, curability, and the consequences of interruption.
2. Strengthen counselling on medication side effects. Patients should be told whom to contact, how to report symptoms, and why they should not stop or alter medicines without professional advice.
3. Use respectful, non-stigmatizing communication to address beliefs that traditional remedies or prayer alone can replace prescribed TB treatment. Where appropriate and with patient consent, trusted family or community supports may be involved.
4. Ask patients routinely about transportation costs, income-related constraints, work commitments, relocation, and other practical barriers. Link counselling to feasible appointment planning, referral, transfer of care, or community-based support where available.
5. Incorporate patient questions and teach-back into health education sessions. Use simple language, relevant local languages, visual materials, and individual counselling for sensitive concerns.
6. Strengthen appointment reminders and follow-up for missed visits, ensuring that communication methods respect confidentiality and patient preferences. Follow-up should identify barriers and facilitate re-engagement rather than assign blame.
7. Train health workers in patient-centred counselling, treatment literacy, side-effect communication, stigma reduction, and supportive follow-up. Monitor the content and continuity of education as part of routine service quality improvement.
8. Conduct larger studies using clearly documented sampling procedures and record-based default classification. Future studies should include all treated patients in the relevant period and, where feasible, use analytical or longitudinal designs to estimate group-specific risks and evaluate the effect of interventions.

Contribution to Knowledge:

The study provides a facility-based descriptive snapshot of treatment-default status, perceived access barriers, TB-related knowledge and beliefs, and reported health education experiences among TB patients in selected Rivers State treatment facilities. Its practical contribution is to identify a set of locally reported issues (especially transport problems, financial difficulty, side-effect communication, clinic attendance, and continuity of education) that can inform service review and more rigorous future research.

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