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**ORIGINAL ARTICLE**

# Patient Delay in Seeking TB Diagnostic Services

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**Keywords**

Tuberculosis,

Patient Delay,

TB Diagnosis,

TB Symptoms,

Health-Seeking Behaviour,

**ABSTRACT**

**Background:** It has been documented that a major contributory factor to the high burden and transmission of tuberculosis (TB) is delayed presentation, which could be alarmingly prolonged from two months up to 12 months reportedly. This study explored the factors responsible for patient delay in seeking TB diagnostic services.

**Methods:** This was a descriptive cross-sectional study undertaken at selected TB centres with large annual turnover, using a pretested interviewer-administered questionnaire. The participants were TB patients accessing treatments at major TB centres, which included primary health centres, general hospitals, tertiary, and private facilities. Ultimately, 787 patients interviewed with complete records had their data analysed.

**Results:** A little less than two-thirds (63.3%) of the respondents were married, with about 7.8% of them having no form of formal education. About 54.8% of respondents reported first visiting a pharmacy or drug store after the onset of TB symptoms. The mean cough duration before medical consultation was 5.85 weeks, and 38.3% of respondents had a prolonged delay before seeking care. The identified predictors of patient delay in seeking TB diagnosis were older age, HIV seropositivity, private facility, and long facility distance.

**Conclusion:** The prevalence of prolonged delay in accessing TB diagnostic services is still generally high. Efforts must be made towards early case detection as many complications arise with late presentation. The delay can be reduced via active awareness creation, patient education, and improved engagement of private facilities in TB services to increase access to care.

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## INTRODUCTION

The burden of disease in Nigeria attributable to tuberculosis (TB) has a significant impact on the nation and human development. This health issue remains a major public health concern and cause of death. Nigeria has a weak and poorly resourced health care system that is burdened with levels of infectious diseases detrimental to its socioeconomic development. It was indicated in a health insurance study conducted in Ogun State of Nigeria that healthcare is an essential public good and a key factor in the development of a

nation.[1] Furthermore, the third sustainable development goal is to ensure healthy lives and promote well-being for all at all ages; with a specific call to end the epidemics of HIV, TB and malaria by 2030.[2] The target proposed is a 90% reduction in tuberculosis deaths and an 80% reduction in new cases by 2030. To achieve this target, it is pertinent that more tuberculosis cases are detected by the healthcare system at a very early stage of the disease.[3]

Tuberculosis accounts for more than 10% of all deaths in Nigeria, even with effective treatments being available. This is partly because Nigeria has one of the lowest rates of tuberculosis case detection in the world; the country's TB case detection rate, as contained in the most recent year report of 2019, was 27%.[4] Vassall and Mustapha reported that only 16% of all cases of tuberculosis are being notified to the National Tuberculosis and Leprosy Control Programme (NTLCP).[5] It has been documented that a major contributory factor to the high burden and transmission of TB is delayed presentation, which could be alarmingly prolonged from two months up to 12 months reportedly.[6] This study, therefore, explored the factors responsible for patient delay in seeking TB diagnostic services.

**METHODOLOGY**

This descriptive cross-sectional study was conducted on 787 patients attending TB clinics in four (4) local government areas (LGAs) selected by cluster random sampling from Ogun State's four socio-political divisions or zones as part of a PhD research work. One local government area per zone was selected to represent Egba, Ijebu, Remo, and Yewa/Awori zones respectively, as recognized by Soewu et al.[7] The study was conducted at chosen TB centers with high annual patient volumes, utilizing a pretested, interviewer-administered questionnaire adapted from a standardized instrument developed by the KNCV Tuberculosis Foundation and successfully piloted in Kenya.[8] Information elicited included socio-demographic characteristics, presenting TB-related symptoms and duration of symptoms, patient behaviour in seeking TB care, access to TB services, TB diagnostic history and treatment plan, and other relevant information. The questionnaire was translated to Yoruba Language, being the predominant language of the study area.

The participants were TB patients accessing treatments at major TB centres selected based on the volume of notified TB cases. Similar to a study conducted in Southeast Nigeria, a multistage sampling method was used.[9] There was an initial stratification of the State into four zones. This was followed with the first sampling stage which was the selection of one local government area (LGA) from each of the four zones, using cluster random sampling technique. In each of the selected LGAs, the list of TB centres was compiled using the GeneXpert/DOTS Directory from the Tuberculosis Control Unit of the State Department of Public Health.

**Table 1: Socio-demographic Distribution of Respondents**

| | Variables | Frequency | Percentage |
|---|---|---|---|
| **Name of LGA** | Abeokuta South | 200 | 25.4 |
| | Sagamu | 198 | 25.1 |
| | Ado-Odo/Ota | 195 | 24.8 |
| | Ijebu Ode | 194 | 24.7 |
| **Category of Facility** | Primary Health Centre | 507 | 64.4 |
| | General Hospital | 173 | 22.0 |
| | Private Hospital | 52 | 6.6 |
| | Tertiary Hospital | 55 | 7.0 |
| **Type of TB Centre** | Genexpert Site | 325 | 41.3 |
| | Microscopy Site | 193 | 24.5 |
| | Other DOTS Site | 269 | 34.2 |
| **Respondents** | TB Patient | 727 | 92.4 |
| | Dots Supporter/Guardian | 60 | 7.6 |
| **Age Group** | </= 5 | 18 | 2.3 |
| | 6 – 15 | 42 | 5.3 |
| | 16 – 25 | 148 | 18.8 |
| | 26 – 35 | 164 | 20.8 |
| | 36 – 45 | 201 | 25.6 |
| | 46 – 55 | 114 | 14.5 |
| | 56 – 65 | 63 | 8.0 |
| | > 65 | 37 | 4.7 |
| **Gender** | Male | 399 | 50.7 |
| | Female | 388 | 49.3 |
| **Marital Status** | Single | 271 | 34.4 |
| | Married | 498 | 63.3 |
| | Divorced | 4 | .5 |
| | Widowed | 14 | 1.8 |
| **Educational Status** | No Education | 61 | 7.8 |
| | Primary School | 83 | 10.5 |
| | Secondary School | 419 | 53.2 |
| | Ordinary National Diploma (OND) | 83 | 10.5 |
| | Higher National Diploma (HND) | 17 | 2.2 |
| | University Degree | 124 | 15.8 |
| **Currently formally employed** | Yes | 145 | 18.4 |
| | No, informal work | 420 | 53.4 |
| | On sick leave | 15 | 1.9 |
| | Retired | 39 | 5.0 |
| | School, University | 150 | 19.0 |
| | Other (including 5yrs old and below) | 18 | 2.3 |
| **Religion** | Christianity | 408 | 51.8 |
| | Islam | 379 | 48.2 |
| **Tribe** | Yoruba | 662 | 84.1 |
| | Igbo | 75 | 9.5 |
| | Hausa | 50 | 6.4 |

The centres were stratified according to the volume of their notified TB cases, and the centres with high volumes were enlisted. From the enlisted TB centres in each of the LGAs, centres that sub-serve the most TB patients were purposively selected to obtain the required patient load for the sample size. The selected centres were the major TB centres in the State and expected to represent general TB patient delay patterns. Each of the selected centres was visited during their clinic days to administer the questionnaire.

**Table 2: Distribution of TB Symptoms and Treatment Information among Respondents**

| Variables | | Frequency | Percent |
|---|---|---|---|
| Cough | Yes | 758 | 96.3 |
| | No | 29 | 3.7 |
| Cough duration | < 2 weeks | 36 | 4.7 |
| | 2 - 3 weeks | 162 | 21.4 |
| | 4 - 5 weeks | 270 | 35.6 |
| | > 5 weeks | 290 | 38.3 |
| Night sweats | Yes | 290 | 36.8 |
| | No | 497 | 63.2 |
| Night sweats duration | < 2 weeks | 27 | 9.3 |
| | 2 - 3 weeks | 76 | 26.2 |
| | 4 - 5 weeks | 155 | 53.5 |
| | > 5 weeks | 32 | 11.0 |
| Haemoptysis | Yes | 66 | 8.4 |
| | No | 721 | 91.6 |
| Haemoptysis duration | < 2 weeks | 15 | 22.7 |
| | 2 - 3 weeks | 15 | 22.7 |
| | 4 - 5 weeks | 33 | 50.0 |
| | > 5 weeks | 3 | 4.6 |
| Weight loss | Yes | 458 | 58.2 |
| | No | 329 | 41.8 |
| Weight loss duration | < 2 weeks | 27 | 5.9 |
| | 2 - 3 weeks | 68 | 14.8 |
| | 4 - 5 weeks | 223 | 48.7 |
| | > 5 weeks | 140 | 30.6 |
| Type of TB | Pulmonary | 761 | 96.7 |
| | Extra-pulmonary | 26 | 3.3 |
| Total duration of planned treatment | 6 months | 703 | 89.3 |
| | 8 months | 66 | 8.4 |
| | Other | 18 | 2.3 |
| Treatment regimen | Cat I (new PTB) | 703 | 89.3 |
| | Cat II (retreatment) | 58 | 7.4 |
| | Cat III (EPTB) | 26 | 3.3 |
| HIV status | Positive | 112 | 14.2 |
| | Negative | 675 | 85.8 |
| Investigation | Sputum test | 761 | 96.7 |
| | Chest x-ray | 16 | 2.0 |
| | Both | 10 | 1.3 |
| Previous TB treatment | Yes | 58 | 7.4 |
| | No | 729 | 92.6 |
| Completed previous TB treatment | Yes | 8 | 13.8 |
| | No | 50 | 86.2 |
| Reasons for not completing previous TB treatment | Lack of money for treatment costs | 17 | 34.0 |
| | Drug side effects | 16 | 32.0 |
| | Moved | 5 | 10.0 |
| | Distance to facility | 12 | 24.0 |

At the centres, patients were consecutively invited and interviewed, following a written informed consent, until the required sample was reached. The minimum sample size required for the study was 200, calculated using Cochrane's formula for cross-sectional studies ($n = Z\alpha^2pq/d^2$) where reliability coefficient ($Z\alpha$), level of precision (d), and prevalence of patient delay (p)

were taken as 1.96, 0.05, and 83% respectively.[10] However, the sample size was increased to 800 to accommodate additional analysis. Ultimately, 787 patients were interviewed with complete records.

Independent variables were sociodemographic characteristics such as age, gender, education, marital status, TB centre distance, type of facilities first visited after the start of TB symptoms, TB type, and HIV status, while the dependent variable was patient delay in seeking TB diagnostic service which was measured by cough duration in weeks. The data collection was carried out concurrently in the four LGAs, and data entry and analysis were done using Statistical Package for Social Sciences (SPSS) software version 21.

Proportions were calculated for categorical variables, and Chi-square was used to test for association between a dependent variable and independent variables with P-values of <0.05 considered statistically significant. Means and standard deviations were calculated for continuous variables. Logistic regression was used to control for confounding factors and to determine predictors of patient delay in seeking TB diagnostic service. Ethical approval was obtained from the Ethics Committee of the University of Ibadan, Nigeria, while local administrative approvals were also obtained to conduct the study at the selected centres in the state.

## RESULTS

### Socio-demographic distribution of respondents

Table 1 shows the sociodemographic distribution of respondents, with the largest proportion of respondents from Abeokuta South LGA (25.4%), while the least was from Ijebu Ode LGA (24.7%). The selected TB centres for the study fell into four categories, which included primary health centres having the largest proportion of TB patients (64.4%). Private facilities had the least (6.6%). Most respondents (25.6%) were in the age group 36 – 45, and the mean age was 36.96. There were slightly more male respondents (50.7%), and a little less than two-thirds (63.3%). Most respondents were married, with approximately 7.8% lacking any formal education.

### Distribution of TB symptoms and treatment information among respondents

Table 2 shows the presenting TB symptoms among the study respondents and the duration of symptoms before they sought treatment. Most respondents (96.3%) had a cough as one of their presenting complaints, and most (38.3%) had it for more than 5 weeks before seeking treatment. The least reported presenting complaint among the study respondents was haemoptysis (8.4%). The majority of the respondents (96.7%) had pulmonary TB (PTB), while the remaining 3.3% had extrapulmonary TB (EPTB). Most of them (89.3%) had a treatment plan of 6 months, while about 7.4% were retreatment cases and about 14.2% of the respondents were HIV positive.

**Table 3: Distribution of Health Seeking Behaviour and Access to TB Service among Respondents**

| Variables | | Frequency | Percent |
|---|---|---|---|
| Sought treatment or advice for the symptoms at any general hospital | Yes | 478 | 60.7 |
| | No | 309 | 39.3 |
| Sought treatment or advice for the symptoms at any health centre | Yes | 527 | 67.0 |
| | No | 260 | 33.0 |
| Sought k treatment or advice for the symptoms at any mission hospital | Yes | 76 | 9.7 |
| | No | 711 | 90.3 |
| Sought treatment or advice for the symptoms at any pharmacy, drug and grocery store | Yes | 536 | 68.1 |
| | No | 251 | 31.9 |
| Sought treatment or advice for the symptoms at any herbalist place | Yes | 36 | 4.6 |
| | No | 751 | 95.4 |
| Sought treatment or advice for the symptoms at any private hospital or clinic | Yes | 123 | 15.6 |
| | No | 664 | 84.4 |
| Sought treatment or advice for the symptoms at any tertiary hospital | Yes | 139 | 17.7 |
| | No | 648 | 82.3 |
| First place to seek treatment or advice for the symptoms | General Hospital | 27 | 3.4 |
| | Primary Health Centre | 229 | 29.1 |
| | Mission Hospital | 37 | 4.7 |
| | Pharmacy, Drug and Grocery Store | 431 | 54.8 |
| | Herbalist | 17 | 2.2 |
| | Private Hospital | 16 | 2.0 |
| | Tertiary Hospital | 30 | 3.8 |
| First place to receive treatment for TB | General Hospital | 344 | 43.7 |
| | Primary Health Centre | 336 | 42.7 |
| | Private Hospital | 52 | 6.6 |
| | Tertiary Hospital | 55 | 7.0 |
| Reasons for not going to the public health facilities first after the onset of TB-related symptoms | Distance to facility | 6 | 13.3 |
| | Too expensive | 3 | 6.7 |
| | Time consuming to wait | 22 | 48.9 |
| | Mistrust of government health services provision | 11 | 24.4 |
| | Belief system | 3 | 6.7 |
| Distance to the nearest government facility for diagnosis and treatment by walking (in minutes) | </= 60 mins | 213 | 27.1 |
| | 61 - 120 mins | 290 | 36.8 |
| | 121 - 180 mins | 162 | 20.6 |
| | 181 - 240 mins | 110 | 14.0 |
| | > 240 mins | 12 | 1.5 |
| Distance to the nearest government facility for diagnosis and treatment by transport (in minutes) | </= 30 mins | 262 | 33.3 |
| | 31 - 60 mins | 300 | 38.1 |
| | 61 - 90 mins | 147 | 18.7 |
| | 91 - 120 mins | 71 | 9.0 |
| | > 120 mins | 7 | 0.9 |
| Distance to the nearest government facility for treatment only by walking (in minutes) | </= 60 mins | 568 | 72.2 |
| | 61 - 120 mins | 91 | 11.6 |
| | 121 - 180 mins | 70 | 8.9 |
| | 181 - 240 mins | 50 | 6.3 |
| | > 240 mins | 8 | 1.0 |
| Distance to the nearest government facility for treatment only by transport (in minutes) | </= 30 mins | 586 | 74.5 |
| | 31 - 60 mins | 98 | 12.4 |
| | 61 - 90 mins | 62 | 7.9 |
| | 91 - 120 mins | 37 | 4.7 |
| | > 120 mins | 4 | 0.5 |

**Distribution of health-seeking behaviour and access to TB service among respondents**

Table 3 shows the distribution of health-seeking behaviour and access to TB services among respondents. Most of them primarily visited pharmacies and drug stores (54.8%) after experiencing TB-related symptoms. However, the first place where the majority began receiving TB treatment was either at a primary health centre (42.7%) or a general hospital (43.7%). Most respondents avoided public facilities because of long waiting time (48.9%) and mistrust of government health services (24.4%). Conversely, most respondents (36.8%) report that it would take them around 2 hours to walk to the nearest government facility for TB diagnostic and treatment services.

**Patient delay in seeking TB diagnostic services**

Figure 1 shows the distribution of TB diagnostic delay among respondents. The majority of the respondents had a short delay (61.7%) based on the mean value of cough duration (5.85 weeks) before medical consultation.

**Factors associated with patient delay in seeking TB diagnostic service**

Table 4 shows the association of patient delay in seeking TB diagnostic service with some relevant variables with Chi-square indicating some statistically significant association which included age, HIV status, general hospital, mission hospital, private hospital, and walking distance to the nearest government facility for diagnosis and treatment. Having short delay was higher among the children of 5 years and below (94.4%) compared to older respondents above the age of 65 years (51.4%) ($x^2 = 22.514$; $p = 0.002$). The prevalence of prolonged delay on the other hand was higher among HIV patients (52.3%) compared to HIV negative respondents (35.9%). Similarly, having prolonged delay was higher among those who at one point in the course of their illness sought care at a private hospital (52.6%) compared to those who did not (35.7%). Meanwhile, a higher proportion of those whose walking distance to the nearest government facility for diagnosis and treatment was less than or equal to 1 hour (72.1%) had a short delay compared to those with walking distance of more than 4 hours (25%).

**Predictors of patient delay in seeking TB diagnostic service**

Table 5 shows the logistic regression of factors associated with patient delay in seeking TB diagnostic service. The multivariate logistic regression model identified the predictors of patient delay in seeking TB diagnostic service as age, HIV status, private hospital, and facility distance (where $p < 0.05$, C.I. did not include 1). For instance, the respondents of 5 years of age and below had a 14.2% increased likelihood of experiencing short delay in seeking TB diagnostic services (O.R. = 14.176, p = 0.015, C.I. = 1.669 – 120.400) compared to those above 65 years of age. On the contrary, living with HIV (O.R. = 0.554, p = 0.008, C.I. = 0.358 - 0.856) and seeking care at a private hospital (O.R. = 0.554, p = 0.036, C.I. = 0.318 - 0.963) were linked to lower odds of experiencing short delay.

Finally, having a walking distance of less than or equal to 1 hour to the nearest government facility for diagnosis and treatment correlated 8.9 times (O.R. = 8.941, p = 0.002, C.I. = 2.256 - 35.444), with higher odds of experiencing short delay in seeking TB diagnostic services.

| DIAGNOSTIC DELAY | Frequency | Percent |
|---|---|---|
| </= 5.85 weeks | 468 | 61.70% |
| > 5.85 weeks | 290 | 38.30% |

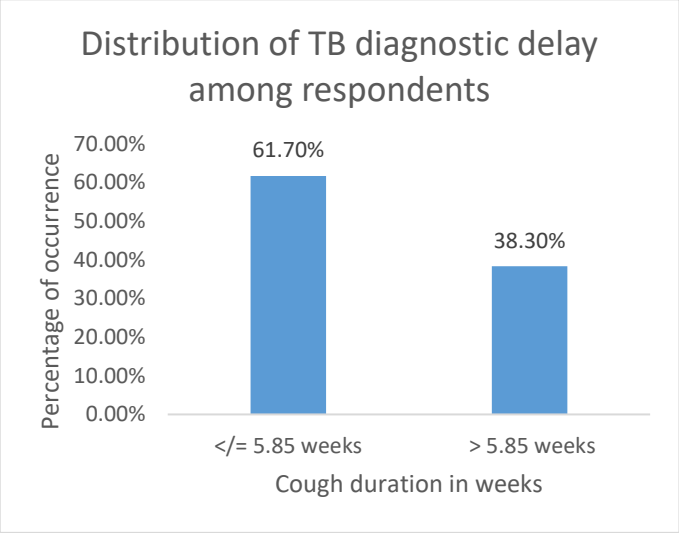


**Figure 1: Distribution of TB Diagnostic Delay among Respondents**

**DISCUSSION**

The study determined predictors of patient delay among respondents from four categories of health facilities that included primary health centres; general, tertiary and private hospitals where most of the participants were males, married, and in their late 30s. This was similar to the study population of a study conducted in Ebonyi State, Nigeria, where males were 55% with a mean age of 34 years.[11] The economic implication is that most participants were young people who should be part of the nation's workforce contributing to the economic development but probably now rendered incapacitated due to TB. Moreover, the majority of respondents were married men, suggesting they could be the main income earners in their households. This situation may result in reduced income for these households, consequently putting their members at risk of financial hardship.

Similar to comparable studies, cough and haemoptysis were the highest and the least prevalent TB symptoms respectively.[12-14] In the same vein, PTB was more common than EPTB.[15] Diagnosing EPTB is generally more complex compared to PTB, probably because invasive procedures are usually required to obtain tissues and fluid samples of the affected organ system.[16,17] EPTB may also require a longer treatment duration, and more often, surgery and

corticosteroids may be indicated.[18-20] The prevalence of HIV among study participants showed that the burden of TB in the nation is also HIV-driven.[21-23] In terms of health-seeking behaviour and access to TB services, most respondents avoided public facilities because of long waiting time and mistrust of government health services. This is comparable to the findings of two studies in Ogun State where people were not expecting to spend more than 17 - 19 minutes in health facilities before being attended to.[24,25]

**Table 4: Association between diagnostic delay and some relevant variables**

| | | Diagnostic Delay | | | |
|---|---|---|---|---|---|
| | | Short Freq (%) | Long Freq (%) | **$X^2$** | **P-value** |
| TB (DOTS) Centre | Genexpert Site | 191 (60.4) | 125 (39.6) | 2.499 | 0.298 |
| | Microscopy Site | 122 (66.7) | 61 (33.3) | | |
| | Other DOTS site | 155 (59.8) | 104 (40.2) | | |
| Age Group | </= 5 | 17 (94.4) | 1 (5.6) | 22.514 | 0.002* |
| | 6 – 15 | 31 (79.5) | 8 (20.5) | | |
| | 16 – 25 | 82 (59.0) | 57 (41.0) | | |
| | 26 – 35 | 106 (66.7) | 53 (33.3) | | |
| | 36 – 45 | 108 (54.0) | 92 (46.0) | | |
| | 46 – 55 | 67 (64.4) | 37 (35.6) | | |
| | 56 – 65 | 38 (61.3) | 24 (38.7) | | |
| | > 65 | 19 (51.4) | 18 (48.6) | | |
| Gender | Male | 243 (63.8) | 139 (36.4) | 1.141 | 0.285 |
| | Female | 225 (59.8) | 151 (40.2) | | |
| Marital Status | Single | 168 (63.6) | 96 (36.4) | 2.736 | 0.463 |
| | Married | 287 (60.3) | 189 (39.7) | | |
| | Divorced | 2 (50.0) | 2 (50.0) | | |
| | Widowed | 11 (78.6) | 3 (21.4) | | |
| Educational Status | No Education | 36 (62.1) | 22 (37.9) | 5.672 | 0.35 |
| | Primary School | 52 (65.8) | 27 (34.2) | | |
| | Secondary School | 250 (61.7) | 155 (38.3) | | |
| | Ordinary National Diploma (OND) | 56 (69.1) | 25 (30.9) | | |
| | Higher National Diploma (HND) | 8 (47.1) | 9 (52.9) | | |
| | University degree | 66 (55.9) | 52 (44.1) | | |
| HIV status | Positive | 52 (47.7) | 57 (52.3) | 10.616 | 0.001* |
| | Negative | 416 (64.1) | 233 (35.9) | | |
| Previous TB treatment | Yes | 37 (66.1) | 19 (33.9) | 0.48 | 0.488 |
| | No | 431 (61.4) | 271 (38.6) | | |
| Sought treatment or advice for the symptoms at any general hospital | Yes | 298 (64.5) | 164(35.5) | 3.817 | 0.051* |
| | No | 170 (57.4) | 126 (42.6) | | |
| Sought treatment or advice for the symptoms at any mission hospital | Yes | 32 (43.8) | 41 (56.2) | 10.964 | 0.001* |
| | No | 436 (63.6) | 249 (36.4) | | |
| Sought treatment or advice for the symptoms at any private hospital | Yes | 55 (47.4) | 61 (52.6) | 11.902 | 0.001* |
| | No | 413 (64.3) | 229 (35.7) | | |
| Distance to the nearest government facility for diagnosis and treatment by walking (in minutes) | </= 60 mins | 150 (72.1) | 58 (27.9) | 27.395 | < 0.001* |
| | 61 - 120 mins | 145 (53.5) | 126 (46.5) | | |
| | 121 - 180 mins | 94 (59.5) | 64 (40.5) | | |
| | 181 - 240 mins | 76 (69.7) | 33 (30.3) | | |
| | > 240 mins | 3 (25.0) | 9 (75.0) | | |

The prevalence of longer patient delay in seeking TB diagnosis was estimated as 38.3%. This is similar to the values of 42% and 42.1% reported in studies conducted in some TB centres within the federal capital territories of Nigeria and Ethiopia respectively.[26,27] Even though the value was found to be lower than the findings of similar studies in the western part of Nigeria and Ethiopia where the prevalence of prolonged patient delay was observed as 61.8% and 72.6% respectively,[6,28] this still needs further reduction. It showed that a significant number of the study participants did not seek TB diagnosis early and, therefore, continued to spread the infection for a long time in their respective communities, thereby increasing the burden of TB.

Multivariate logistic regression model identified the predictors of patient delay in seeking TB diagnostic service as age, HIV status, private hospital, and facility distance. Similarly, a study in Ibadan indicated that older age increased the likelihood of prolonged patient delay and suggested the likely reason for this as being preoccupied with family obligations.[6] Contrary to the current study's finding on HIV seropositivity being a predictor of longer patient delay, a study within the rural settings of Ebonyi State, Nigeria, observed that HIV-positive patients had shorter patient delay and adduced the existing collaborative TB/HIV activities in health facilities which ensures early TB screening among HIV patients and vice versa as the likely reason.[10] However, the late presentation of HIV patients for TB diagnosis might be connected with the double stigmatization associated with having TB/HIV coinfection. Those with any form of stigma experience were identified as commonly having prolonged patient delay, and this was hinged on account of a report that TB-related stigma had been heightened in sub–Saharan Africa with the spread of HIV.[6] It was documented that the stigma attached to TB often deters patients from seeking care early.[29-31]

The current study also identified seeking care at a private hospital as a predictor of longer patient delay. This might not be unconnected with a study report in Lagos, which indicated that private providers might lack the knowledge to implement proper TB case management.[32] However, 60% of Nigerians initially sought care with them when they were sick.[32] A survey identified the difficulty in accessing care for tuberculosis at private hospitals where many citizens obtain healthcare services.[33] This might, therefore, limit early access to accurate diagnosis and effective treatment, and thus leading to many complex and severe morbidities that may arise with diagnostic delay. Lastly, longer walking facility distance was one of the indicated determinants of prolonged patient delay in seeking TB diagnosis. This is in keeping with the findings of Adenager et al. in Addis Ababa, where a distance of more than 2.5 km from the TB centre indicated higher odds of patient delay.[27]

**Table 5: Logistic regression of factors associated with patient delay in seeking TB diagnostic service**

| Variables | | Odd Ratio | 95% Confidence Interval | | P-value |
|---|---|---|---|---|---|
| | | | Lower Bound | Upper Bound | |
| Age Group | </= 5 | 14.176 | 1.669 | 120.400 | 0.015* |
| | 6 – 15 | 3.373 | 1.180 | 9.647 | 0.023* |
| | 16 – 25 | 1.191 | 0.554 | 2.562 | 0.654 |
| | 26 – 35 | 1.838 | 0.858 | 3.940 | 0.117 |
| | 36 – 45 | 1.134 | 0.543 | 2.366 | 0.738 |
| | 46 – 55 | 1.690 | 0.757 | 3.769 | 0.200 |
| | 56 – 65 | 1.572 | 0.658 | 3.751 | 0.309 |
| | > 65 (ref) | 1 | | | |
| HIV status | Positive | 0.554 | 0.358 | 0.856 | 0.008* |
| | Negative (ref) | 1 | | | |
| Sought treatment or advice for the symptoms at any general hospital | Yes | 0.931 | 0.658 | 1.319 | 0.688 |
| | No (ref) | 1 | | | |
| Sought treatment or advice for the symptoms at any mission hospital | Yes | 0.637 | 0.326 | 1.244 | 0.187 |
| | No (ref) | 1 | | | |
| Sought treatment or advice for the symptoms at any private hospital | Yes | 0.554 | 0.318 | 0.963 | 0.036* |
| | No (ref) | 1 | | | |
| Distance to the nearest government facility for diagnosis and treatment by walking (in minutes) | </= 60 mins | 8.941 | 2.256 | 35.444 | 0.002* |
| | 61 - 120 mins | 3.858 | 1.000 | 14.892 | 0.050* |
| | 121 - 180 mins | 5.178 | 1.315 | 20.386 | 0.019* |
| | 181 - 240 mins | 8.368 | 2.065 | 33.916 | 0.003* |
| | > 240 mins (ref) | 1 | | | |

Overall, one key strength of this study was its implementation in multi-TB centres of different types which included Xpert, microscopy and other DOTS centres in different categories such as primary health centres, general hospitals, tertiary and private facilities to give a broader view. Another strength was that a patient chart review was done to provide further information about HIV status, type of TB, treatment plan, and TB investigation type. However, the study findings should be considered given some limitations that might include the cut-off point for the definition of patient delay and recall bias on patients' part. For instance, it was reported that "various cut-off limits had been ascribed depending on researcher's discretion" as there was no agreed standard definition of patient delays.[6,27] Finally, the concept of patient delay might benefit from further research studies using a mixed methodology approach to get a more comprehensive understanding.

In conclusion, the prevalence of prolonged delay in accessing TB diagnostic services is still generally high. Efforts must be made towards early detection as many complications arise with late presentation. Hence, every contributory factor to patient delay must be addressed holistically through horizontal or integrated health care rather than a vertical approach to increase access to TB services. The delay can be further reduced via improved engagement of private facilities in TB services, active awareness creation and patient education. It can also be suggested that active TB case-finding strategies should be promoted more effectively than passive case-finding for early TB detection.

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