Article

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Abstract: Tuberculosis (TB) remains a significant public health challenge in Nigeria, with high rates of transmission and low case detection rates. This paper presents the challenges of TB screening and the existing gaps in Contact Investigation (CI). This descriptive qualitative study was conducted in 8 local government areas with high TB burdens in Oyo and Osun States, Nigeria. Twenty-four focus group discussions and 27 key informant interviews were conducted among TB patients, household TB contacts, and government TB staff, among others. Respondents' ages ranged from 17-85 years with a mean of 42.08±14.9 years, and (4.0%) had a postgraduate degree. The unwillingness of the majority of TB contacts who tested negative for TB to be placed on TB preventive therapy because of the belief that only a sick person should take drugs and hostility from the TB contacts to the contact tracers during the house-to-house screening of presumptive TB cases due to community stigma associated with TB were some of the existing gaps reported in TB contact investigations. The findings emphasize the importance of tailored approaches in TB prevention and control, addressing challenges in testing and contact investigations; this necessitates investments in community engagement strategies to enhance the cooperation of TB contacts.

Keywords: : tuberculosis; contact investigation; challenges; existing gaps

1. Introduction

Tuberculosis (TB) remains a significant public health problem in Nigeria, with a high burden of both active and latent TB cases. Approximately 10.0 million people developed active TB disease, and an estimated 1.5 million died of TB in 2020. According to the World Health Organization (WHO), Nigeria is one of the 30 countries with the highest TB burden, accounting for 3% of global TB cases and deaths [1]. Nigeria accounts for 4% of the global gap between new TB cases and notified cases (diagnosed, treated, and reported). Nigeria has a TB incidence rate of 219 per 100,000 people, with an estimated 467,000 people with active TB disease. In 2021, according to the National TB, Leprosy, and Buruli Ulcer Control Programme (NTBLCP), 207,785 were notified, which gave rise to a gap of 56% [2]. Untreated TB cases can infect 10 to 15 persons yearly; hence, undiagnosed cases raise the risk of TB transmission [3]. Therefore, identifying and notifying the missed cases is essential for efficient TB control. Contacts are defined as individuals who have spent prolonged periods (usually more than 8 hours) in close proximity to the index case, such as family members, colleagues, or classmates [4].

Contact tracing is an essential component of TB control in Nigeria, as it helps to identify individuals who may have been exposed to TB and are at risk of developing the disease. Identifying

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index TB cases is crucial in initiating contact tracing [5]. Contact investigation is a key element of TB control in high-burden countries like Nigeria. However, there are several challenges to effective contact investigation in Nigeria, including limited resources, poor coordination among healthcare providers, and inadequate community engagement [6]. There are significant gaps in several areas of TB programming, such as TB contact investigations, despite continued attempts to control and eradicate TB. It is critical to develop an in-depth understanding of the challenges and opportunities encountered in the field to address these gaps and enhance TB control activities. According to Oshi et al. [7], community engagement and participation are crucial for effective TB contact investigation; however, community participation is often limited in Nigeria [8]. Limited healthcare access, particularly in remote and hard-to-reach areas, also poses a challenge to TB contact investigation in Nigeria [7].

Nigeria's weak health system also has inadequate infrastructure, poor funding, and limited coordination among different health system levels [1]. Many healthcare facilities have been reported to lack the necessary equipment, supplies, and personnel to conduct effective contact investigations [9]. By identifying the specific gaps and challenges in TB contact investigations, appropriate interventions and strategies can be developed to strengthen TB programming in the Oyo and Osun States. The findings of this research initiative will provide valuable information to inform policy and programmatic decisions aimed at strengthening TB control efforts in the two states. This paper, therefore, presents the challenges of TB screening and the existing gaps in contact investigations in Oyo and Osun States, Nigeria.

2. Materials and Methods

2.1. Study Design

This descriptive qualitative study was used to ascertain challenges with TB screening and existing gaps in contact investigations in Oyo and Osun States, Nigeria.

2.2. Study Area

This research was carried out in 8 (Osun=4; Oyo=4) Local Government Areas (LGAs) with a TB high burden in Oyo and Osun States, Nigeria, which are USAID-supported IHVN TB LON 3 project. In Oyo State, the study LGAs were Ibadan North, Oyo East, Ogbomoso South, and Iseyin, while in Osun State, Iwo, Oshogbo, Ife Central, and Ede South were used for the study.

2.3. Target Population

Bacteriologically diagnosed TB patients, household contacts of TB patients, community volunteers, community gatekeepers, and government-employed TB personnel made up the study's target group.

2.4. Sample Size

The saturation method was used for this study; however, 12 Focus Group Discussions (FGDs) were conducted in each State. Each FGD group is made up of 6–10 participants. The participants were from diverse socio-demographics and included several categories of TB-related stakeholders, such as TB patients (TBP), household TB contacts (TBC), and community volunteers (CVs). In addition, 14 (Oyo State) and 13 (Osun State) Key Informant Interviews (KIIs) were conducted with government representatives (DOTS officers, TBLS officer), ward development committee (WDC) chair, State TB and Leprosy Manager and IHVN staff (Table A1).

2.5. Sampling Techniques

The participants for this research were chosen using a 4-stage sampling method.

Stage 1: Using the IHVN (Institute of Human Virology Nigeria) program sites, a purposeful sampling method was used to select two States (Oyo and Osun) in the South-West of Nigeria.

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State 2: Four LGAs each were randomly selected from Oyo and Osun States.

Stage 3: One facility was chosen from each LGA using random numbers generated from www.randomizer.org from the IHVN-supported DOTS facilities list.

Stage 4: In the catchment areas of the chosen DOTS facilities, a purposeful sampling method was used to select all the stakeholders required for the study.

2.6. Data Collection

A qualitative method of data collection was adopted for this study. Validated tools—KII and FGD guides—were developed based on literature review and consultation with public health and TB experts. The validation was done through an extensive literature search, a review from field experts, and the tool's pre-test among the homogenous population in Ibadan. Translation to Yoruba and back translation was also done to ensure the instruments were suitable for the local context. The tools were used to collect information on the participants' sociodemographic characteristics, challenges with TB screening, and existing gaps in contact investigations.

2.7. Data Management and Analysis

Several procedures were employed in the data management and analysis. Data processing started with the verbatim transcription of tape recordings by note-takers. This was done on the same day the data was collected to avoid losing or omitting important details. Field notes were used to beef up audio-taped recordings developed into transcribed notes. Data collectors transcribed their audio-taped recordings using the same local language(s) as the interviews. All the transcribed notes of interviews in local languages were given to linguistic experts alongside their respective audio-taped recordings for quality forward translation. The translated notes were also given to another set of two linguistic experts who performed the back translation of the English translation into the original languages to ensure the quality of the data. The transcribed notes were further subjected to validation, and data collectors, along with the consultant, supervisors, and data clerks, were allowed to participate in the audit and validation of the translated notes. Validated transcribed notes were entered into the computer using NVIVO version 12 Pro. An inductive-dominant coding approach was used to drive the coding process (Armat et al., 2018). Thematic content analysis procedures guided the data analysis.

3. Results

3.1. Respondents/Participants Sociodemographic Characteristics

The respondents' ages ranged from 17-85 years with a mean age of 42.08±14.9 years; among these, 46.7% were between the ages of 35-54 years. More than half of the respondents (57.3%) were male, while 42.7% were female, a few (4.0%) had a postgraduate degree, were married (65.3%), and 31.3% were TB patients (Table A2).

3.2. Challenges with TB Screening

When asked about the challenges faced so far concerning TB screening, more than half of the government officials said insufficient diagnostic tools to cater for the number of samples generated via various demand-creation activities, low turn-over time of test results from within 24 hours previously to an average of 4 days – 6 weeks currently. This, in turn, leads to the delay in the initiation of TB treatment and further enhances the circulation of TB disease and other comorbidities in the community. One of the STBLM Officials specifically stated that;

"One of our key challenges is a grossly inadequate number of screening tools. I mean the gene expert that is meant for the test. Presently, we have 13 gene experts, and we have other testing facilities, but it is not enough; it is grossly inadequate. As it is what we are having in this is that we don't get results within 24 hours. The result often takes three, four, or six weeks, and you can imagine that when people get to

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laboratories and are not getting their results, you can imagine what will happen. So they will go back to the community. So, when people are not treated, the infection continues to circulate in the community."

In addition, an inadequate number of trained TBLS in some local government areas was also mentioned as one of the challenges faced by some government officials. They further said that the country's security volatility had created fear among the supervisors about traveling to Zaria for the training. It was, however, suggested that if the training could be held in Lagos or a sub-central state in the country, it would encourage more personnel to become trained TBLS in the State. Furthermore, inadequate supply of reporting and recording tools, minimal human resources in the deployment of the different components of TB program activities, an insufficient supply of TB treatment drugs and HIV testing kits, non-availability of project vehicles for mobility to enable routine supportive supervision across the State were also listed as part of the challenges currently faced in the execution of the TB program activities. One of the STBLM Official stated that;

"We are also not having adequate reporting and recording tools…these things are grossly inadequate…we don't have adequate HIV testing kits, and it is affecting us; we need to test every identified tuberculosis, whether they have a TB as well as HIV is very important…the other thing is HR, we have a very minimal number of human resources, we don't have enough DOT staffs in our facilities…we also need a project vehicle to be able to have supervision…so, we need a vehicle to move around from time to time every quarter to see that our patients are given all the standard drugs. So, these are the few but very important challenges we have; if we have a solution, it goes a long way to improve the States."

One of the TBLS Officers from Oyo State also;

"In terms of tracing patients, we have challenges. Before, they used to give us a motorcycle that we use to trace the patients in the community; they gave us everything we needed to maintain it, but now, we don't have such a thing, and they don't supply us with a motorcycle again..."

Majority of the community volunteers listed the nonadherence of some TB cases to the drug dosage, refusal of some contacts of TB cases to getting screened for TB, and lack of funds for the TB cases to eat and visit the health facility for their drug refill as some of the challenges faced. A participant from Oyo State said;

"Those that have TB are usually stubborn and completely disagree that they don't have TB; some will agree to start drugs that same day, and you know that drug works like magic when they start using drugs for two weeks, and they have been relieved, they tell us they are no longer using drugs, some will run away, we look for them, we will call them, some of them will start abusing us on the phone. They once told us they would beat us if we passed their area. It happened before when I started working, and that's one of our challenges."

According to the TBLON3 project staff, the low turn-around time of the test results due to the limited number of Gene Xpert machines in the State and the unwillingness of the males in the community to get screened for TB were listed as the major challenges faced with TB programming. The need to provide more TB diagnostic machines and targeted TB sensitization to the male gender was highlighted as a strategy that can help mitigate this challenge. One of the TBLON3 project Staff said;

"When you get out there to the field, you will only see only females showing up for TB screening. Now, let's put it that it is in the natural nature of men to hustle…they're out there, and they don't have time for this. Now, they can be the major carrier, or they can also be the ones to catch it some other time out there in the field; females tend to turn out more than males, so what can happen there is that whichever way the awareness should be done or sensitization about male coming out whenever there is an outreach, I would encourage that."

Furthermore, the fact that the diagnostic capacity of the State has been currently overwhelmed by the increased number of samples generated via facility- and community-based screening and the outright refusal of some patients to be screened for TB were also listed as the challenges faced.

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3.3. Existing Gaps in the Current TB Contact Investigations

Existing gaps: Most of the government officials mentioned that the TB contacts are supportive of getting screened and tested for TB; however, the majority who tested negative for TB are unwilling to be placed on TB preventive therapy because of the belief that drugs should only be taken by a sick person. The unavailability of some TB contacts during the team's visit to their various houses and hostility from the TB contacts to the contact tracers during the house-to-house screening of presumptive TB cases due to community stigma associated with TB were reported as other existing gaps in the current TB contact investigations. A few of the respondents also mentioned difficulty in reaching the TB contacts living in hard-to-reach areas due to the deplorable State of the roads, low availability of TPT for TB contacts, and inadequate recording and reporting tools needed for contact tracing by some government officials. One of the STBLM officials specifically said;

"The issue of the availability of drugs, we don't have enough 3HR, i.e., three months drugs that supposed to be were distributed. So, we're now prioritizing what you have in store as being distributed with our normal drug out or commodity in the market based on the high burden. Whereas every facility that handles patients is supposed to have enough drugs so that any contact is identified. We also don't have enough recording and reporting tools for this contact investigation, so certain forms need to be used for contact tracing."

About half of the community volunteers mentioned that some TB cases don't have a good relationship with their contacts, e.g., neighbors, which makes TB contact investigations a challenge. Also, some of the participants highlighted the fact that some treatment centers are far from the houses of TB patients, and this poses a challenge in the current TB contact investigations. They further said that some TB contacts display a hostile attitude when they are asked certain TB screening questions.

When asked about the gaps that exist in the process of TB contact investigations in the TBLON3 project staff, one of the staff mentioned the perceived stigmatization attached to TB in the community as an inhibitor to the smooth conduct of TB contact investigation because the TB patients don't want others around them to be aware of their TB status. Another TBLON3 project staff mentioned low patient education about contact tracing, specifically its importance in TB management, and the fact that most TB patients have little or no information about TB preventive therapy as the notable gap in TB contact investigation. In addition, challenges with regards to the transport mechanisms in getting the TB preventive therapy clients to get their medications at the facility, as well as high-cost demands of TB contact investigation, were also stated; this is evident in situations when there is a need for return visits to patient's household to conduct TB screening for contacts that were not initially available.

Strategies currently employed in filling the gaps: Rigorous counseling sessions and advocacy visits to the community and religious leaders were listed by most government officials. In addition, few government officials believed that providing the X-ray machine from TBLON3 funds has helped increase the testing yield of TB cases in communities and schools and can also help fill the gaps. One of the STBLM Officials specifically said;

"Another thing is the X-ray through one of our developing partners, the TBLON3; I think they provided two digital machines which we use to screen each time we have outreaches based on where we have, suspect to have a high number of this patient, we carry out outreach from time to time so it is also an opportunity for us, with the use of digital X-ray we will be able to screen especially the pupils in that area where we have eh what do you call it influx so that's an opportunity, another opportunity we are thinking is, this another opportunity will showcase when we incorporate this digital x-ray very well it may also assist us in knowing those areas we need to concentrate."

In response, the TB patients mentioned that the government should provide TB treatment centers in each community to make the treatment services closer to the people. A few participants also mentioned that the government can employ them to witness the TB eradication program in the communities since they are currently receiving treatment via the program.

Also, some community volunteers mentioned the provision of encouragement and support to the TB cases so that they can inform their contacts about the need to be screened for TB, and

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sometimes having direct communication between the contacts and the service provider are strategies adopted in filling the gaps. A community volunteer from Oyo State specifically said;

"Some can talk with the patient having TB. So, after talking with the patients, you can encourage the patient if they have any close relatives. Even if you can collect the number from the patient and call the relative and talk with the relative, the relative can come around. So, you speak with the relative and explain better to the relative."

For TB LON 3 project staff, adopting a community approach via the engagement of trained health care providers to dispense the TB preventive therapy drugs was reported to have helped in combating the challenge of not getting non-presumptive cases to complete their line of care. Another TB LON 3 project staff member also reported that creating routine awareness about TB disease in the community was the strategy deployed to fill the gaps in TB contact investigation.

Areas of possible partnership in filling the gaps: More than half of the government officials mentioned the provision of training to health workers in the area of health-focused counseling and its varied components – awareness counseling, pre and post-test counseling, patient counseling, etc., to build the capacity of the health workers to offer effective counseling to the TB contacts which will, in turn, promote positive behavioral change towards TB screening and enrollment in TB preventive therapy. One of the STBLM officials specifically said;

"You know counseling is an ongoing process, a continual process. So, maybe TB-LON 3 can assist in training some of our health workers on counseling, on how to counsel a patient, awareness counseling on pre and post-test counseling, and that area of counseling so that we inculcate it in them so that they would be a good counselor That one will help us."

Other areas of possible partnership highlighted were the need for development partners like TB LON 3 to provide the GeneXpert machine to the State, donate a source of mobility like motorcycles or vehicles for ease of movement of the TB contacts to the facility for TB screening, recruit more community volunteers and trained them to handle contact tracing and awareness creation with the community, and provision of sufficient incentives and funds to the community volunteers/contact tracers.

The TBLON3 project staff identified the provision of TB drugs to cater for long-term dispensation of the drugs to TB patients, engagement of experienced healthcare providers to distribute the drugs (TB treatment and TB prevention), and the need for continuous sensitization to make the TB program a robust community intervention as the areas of possible partnership to close the gaps in TB contact investigation further.

4. Discussion

This study showed insufficient diagnostic tools to cater to the number of samples generated via various demand-creation activities and turn-over time of test results from within 24 hours previously to an average of 4 days – 6 weeks currently as part of the challenges of TB. A similar study also reported insufficient training of healthcare professionals, staff shortages, stigmatized community, lack of knowledge about TB, illiteracy, inability to persuade patients to submit to sputum tests, and delays in receiving Cartridge Based Nucleic Acid Amplification Test (CBNAAT) results are the difficulties encountered during the conduct of active case finding [10].

The unwillingness of the males in the community to get screened for TB was listed as the major challenge faced with TB programming in this study. However, research reports from other developing countries have testified to an increased notification rate of pulmonary TB in men [11]. There was a relatively high male-to-female ratio of patients on DOTS (Directly Observed Treatment, Short-Course) compared to the gender TB prevalence ratio, possibly reflecting the challenges in engaging men in TB screening and treatment programs [12–17].

Our study identified key areas where partnerships with development organizations like TBLON3 could significantly benefit TB programs. One such area is the provision of essential resources such as the GeneXpert machine and transportation options like motorcycles or vehicles, which could be used for the follow-up of patients and their drug distribution. Studies from Nepal,

 doi:10.20944/preprints202405.0082.v1

Uzbekistan, Malaysia, Swaziland, and Zambia have also shown that the cost and availability of transport play critical roles in patients' compliance with TB treatment. For example, in Malaysia, non-compliant patients faced higher costs and longer travel times to treatment centers, which impacted their ability to adhere to treatment regimens [18–20].

The studies by Gebremariam et al. [21] and Maswanganyi et al. [22] reported that many TB patients believed that insufficient food intake or lack of food contributed to more severe side effects and difficulties in tolerating TB medications. Similarly, Aiyegoro [11] highlighted the issue of non-availability of food due to patients being too weak to work and afford meals, which can lead to nonadherence to TB treatment, often linked to poverty. Our findings align with these previous studies as we also identified the lack of funds for TB patients to eat and visit health facilities for medication refills as a significant challenges. Our study mentioned that recruiting more community volunteers and training them to handle contact tracing and awareness creation with the community will reduce nonadherence of TB cases to drug dosage; this aligns with Iweama et al., [23] which mentioned that health education experts, CHOs, and nurses at the community and health facility levels should implement a more intensive health education program to improve people's knowledge of TB and its treatment.

On the existing gaps in the contact investigation, it was reported in the study that the TB contacts are supportive of getting screened and tested for TB; however, the majority who tested negative for TB are unwilling to be placed on TB preventive therapy. The WHO End TB Strategy prioritized TPT among high-risk persons as a key component under Pillar 1. The programmatic management of TPT (PMTPT) fits within a larger framework of preventive actions envisaged under Pillars 1 and 2 of the End TB Strategy. It includes screening for TB disease, infection control, prevention and care of HIV and other comorbidities, access to universal health care, social protection, and poverty alleviation [1]. Also, the low availability of TPT drugs in DOT facilities was reported in this study. This is similar to a study in South Africa where it was reported that isoniazid supply shortages only trended towards significance in association with low prescription rates; nearly a quarter of the study participants reported not having TPT medications available when needed [24]. Limited isoniazid supplies have been well-documented as a barrier to TPT implementation [25–27]. A 2020 multi-site study in Nigeria identified stockouts of isoniazid as a reason for low TPT uptake and suggested the need to strengthen drug supply logistics to optimize TPT uptake [26]. Isoniazid stockouts serve as a two-fold barrier. First, the obvious absence of medications prevents HCWs from supplying their patients with TPT. Second, a lack of certainty in having an uninterrupted supply of isoniazid generates HCW fear of creating isoniazid resistance [25].

The findings also suggest that contact investigations are generally carried out according to WHO guidelines [28], which recommend screening all close contacts of TB patients for TB disease and latent TB infection (LTBI). Contact investigations should be initiated after a TB patient is diagnosed as soon as possible, and all contacts should be screened for TB [29]. The contact investigation team then visits the household of the index patient to identify all household members and any other individuals who may have been in close contact with the index patient. Contacts who test positive for TB are initiated on treatment. In contrast, those who test negative but are at increased risk of developing TB are initiated on preventive therapy, also known as latent TB infection (LTBI) treatment. Healthcare providers follow up with contacts to ensure they complete their treatment and are monitored for adverse effects [30]. Contact investigation has been proposed as a worthwhile strategy to enhance the early detection of TB cases and reduce transmission in high-incidence localities [31,32].

Stigmatization attached to TB in the community was identified as an inhibitor to the smooth conduct of TB contact investigation because TB patients don't want others around them to be aware of their TB status. Although the treatment of TB is affected by various biological, cultural, and economic factors, stigma continues to be a major social factor affecting compliance with treatment among patients and influencing their health-seeking behaviours [33,34]. TB is viewed as a stigmatizing disease because of its associations with marginalized groups such as the poor [35,36], ethnic minorities [37], low social class [38,39], prisoners and refugees [35,40], and HIV/AIDS patients [37,41,42].

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On the possible areas for improvement, it was identified that the provision of training to health workers in the area of health-focused counseling and its varied components – awareness counseling, pre and post-test counseling, patient counseling, etc. to build their capacity to offer effective counseling to the TB contacts which will, in turn, will promote positive behavioral change towards TB screening and enrollment in TB preventive therapy. Training health workers is an important strategy for improving health workers' productivity. Poor performance may result from health staff not being sufficient in numbers, not providing care according to standards, and/or not being responsive to the needs of the community and patients. Apart from training, other influences on the productivity of health workers in tuberculosis control include personal and lifestyle-related factors, living circumstances, adequacy of preparation for work during pre-service education, health-system-related factors such as human resources policy and planning; job satisfaction-related factors such as financial remuneration, working conditions, management capacity and styles, professional advancement and safety at work. These factors constitute a 'productivity mix,' of which tuberculosis training is important [2].

5. Conclusions

Conclusively, our findings emphasize the importance of tailored approaches in TB prevention and control, addressing challenges in testing and contact investigations; this necessitates investments in diagnostic tools, training programs for healthcare personnel, improved access to TB preventive therapy, and community engagement strategies to enhance cooperation of TB contacts.

Author Contributions: Agbaje, Dakum, Mensah, and Daniel conceived the study and developed the protocol with Adelekan, Okpokoro, Akingbesote, and Adekunle. Anyaike, Alege, Gbadamosi, Chijoke-Akaniro, and Babalola implemented the protocol and supervised data collection for this study. Agbaje, Daniel, Dakum, Okpokoro, and Adelekan validated the transcripts and performed the analysis. Anyomi, Mensah, Adekunle, Alege, and Akingbesote developed the draft manuscript, while Eneogu, Ihesie, Alege, Nongo, and Anyaike reviewed and finalised it. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: The Ethical Review Committee of the State Ministry of Health in the States of Oyo (AD 13/479/44628B) and Osun (OSHREC/PRS/569T/287) approved the research.

Informed Consent Statement: Before being accepted into the research, participants were required to give written informed consent. The primary regional language spoken at the study locations was available alongside English on the informed consent forms. The nature of the research, the participants' roles, their vulnerability, and the risks and advantages of participating in the study were all covered in the informed consent form that was given to the participants. They were informed that they could leave the study at any moment. Confidentiality was also guaranteed to safeguard the participants' identification information and other sensitive data. Data from different sources were labeled with codes. Participants received incentives (sanitizers and face masks) to compensate for the time spent participating in the research.

Data Availability Statement: Data Availability Statements are available in section "MDPI Research Data Policies" at https://www.mdpi.com/ethics.

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Conflicts of Interest: The authors declare no conflicts of interest.

Appendix B

Table A1. Sample Size.

		Osun State		
S/N	**LGA**	**FACILITY**	**FGD (TBP; TBC, CVs)**	**KII (DOTS officers, TBLS, STBLM, WDC)**
1	Iwo	Feesu PHC	3	3

 doi:10.20944/preprints202405.0082.v1

2	Ede South	State Hospital Ede	3	3
3	Ife Central	Enuwa PHC	3	2
4	Osogbo	State Hospital, Asubiaro	3	3
		IHVN Staff		1
		Total	**12**	**12+ 1 (STBLPM)**
		Oyo State		
1.	Ibadan North	\PHC Sabo	3	3
2.	Oyo East	State Hospital, Oyo	3	3
3.	Ogbomoso South	PHC Igboyi	3	3
4	Iseyin	General Hospital Iseyin	3	3
		IHVN Staff		2
		Total	**12**	**13 + 1 (STBLPM)**

Table A2. Sociodemographic characteristics (N=150).

Sociodemographic variables	**No**	**%**
Age*		
15-34	49	32.7
35-54	70	46.7
55-74	27	18.0
75 and above	4	2.7
Sex		
Male	86	57.3
Female	64	42.7
Marital status		
Single	43	28.7
Married	98	65.3
Separated	3	2.0
Divorced	2	1.3
Widow/widower	4	2.7
Religion		
Islam	85	56.7
Christianity	62	41.3
Traditional	3	2.0
Ethnicity		
Yoruba	145	96.7
Igbo	3	2.0
Others	2	1.3
Level of education		
None	12	8.0
Primary	34	22.7
Secondary	59	39.3
OND/NCE	13	8.7
HND/First Degree	26	17.3
Postgraduate degree	6	4.0
Occupation		
Civil or public servant	29	19.3
Trader	37	24.7
Farmer or fisherman	8	5.3
Artisan	26	17.3
Unemployed	12	8.0

 doi:10.20944/preprints202405.0082.v1

Others	38	25.3
Respondent classification		
TB patients	47	31.3
Government Staff	18	12.0
TB contacts	39	26.0
Community volunteers	34	22.7
IHVN Staff	3	2.0

*Mean age=42.08±14.9 years.

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