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TUBERCULOSIS CASE RECOGNITION IN THE BANDA DISTRICT: THE PERCEPTION OF COMMUNITY HEALTH SURVEILLANCE VOLUNTEERS

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ABSTRACT: This study assessed the perspective of community health surveillance volunteers on tuberculosis case detection in the Banda District. Descriptive research that employs quantitative research methods and a simple random sampling method selected 159 community-based surveillance volunteers to participate in the study. The respondents were given a questionnaire that asked about their socio-demographics, health professional awareness of tuberculosis, diagnostic methods available, and integration of TB activities in-home visits by community health nurses. Data were recorded and edited appropriately to ensure accuracy and consistency, and coded data were entered into SPSS for cleaning and univariate analysis. Analyzed data was displayed in frequency tables and percentages. The mean age of the volunteers was 36.87 6.45 years. On knowledge of frontline staff, the majority of 136 (85.5%) of the participants indicated the health workers were trained on tuberculosis. Of the 159 respondents, the proportion of those who said the equipment to diagnose TB was not adequate was 98.7% (95%CI = 95.1–99.7) to answer the question of the availability of diagnostic equipment. On integrating tuberculosis activities into in-home visit activities, 124 (78.0%) of the participants indicated community health nurses conduct home surveillance in the community every week. However, 60 (37.7%) of these same participants indicated that the CHNs do not visit TB patients in their communities. Findings from the study suggest that most 136 (85.5%) of the participants stated the health workers were trained in tuberculosis. There was no adequate equipment, including a chest X-ray, to diagnose TB cases in the district regarding the availability of diagnostic tests for TB detection.

Keywords: Tuberculosis, detection, community health, surveillance volunteers

1. INTRODUCTION

TB is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It typically affects the lungs (pulmonary TB) and other sites (extrapulmonary TB). The disease is spread when people sick with pulmonary TB expel bacteria into the air, for example, by coughing. A small percentage of (5–10% of the estimated 1.7 billion persons infected with tuberculosis) may acquire TB illness over their lives (WHO, 2015) the chance of acquiring tuberculosis is substantially higher in HIV-infected persons; it is also higher in those impacted by risk factors such as malnutrition, diabetes, smoking, and alcohol usage. Overall, about 90% of cases occur among adults, with more men than women. The male and female ratio among adults is approximately 2:1 (WHO, 2015). Worldwide, TB is one of the top 10 causes of death and the leading cause of a single infectious agent (above HIV/AIDS). Millions of people continue to fall sick with TB each year. In 2017, TB caused an estimated 1.3 million deaths (range, 1.2–1.4 million) among HIV-negative people, and there were an additional 300 000 deaths from TB (range, 266 000–335 000) among HIV-positive people. Globally, the best estimate is that 10.0 million people (range, 9.0–11.1 million) developed TB disease in 2017:5.8 million men, 3.2 million women, and 1.0 million children. There were cases in all countries and

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age groups. Still, overall, 90% were adults (aged ≥15 years), 9% were people living with HIV (72% in Africa) and two-thirds were in eight countries: India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (5%), Nigeria (4%), Bangladesh (4%) and South Africa (3%). These and 22 other countries in WHO's list of 30 high TB burden countries accounted for 87% of the world's cases. Only 6% of global cases were in the WHO European Region (3%) and the WHO Region of the Americas (3%) (World Health Organization, 2018). Early detection and effective treatment are crucial for tuberculosis control, but global case detection rates remain low. The diagnosis of tuberculosis disease is problematic, and there are, as yet, no rapid screening tests to assist active case finding in the community. Progress has been made in clinic-based detection tools by introducing Xpert MTB/RIF, a nucleic acid amplification test that combines sample processing and analysis in a single instrument to provide a diagnostic result and detection of resistance rifampicin in under two hours. Enthusiasm for Xpert MTB/RIF has been high and global rollout has been facilitated by donor agencies. Accelerating progress towards ending TB requires closing gaps in TB diagnosis.

The majority of tuberculosis cases are undetected by health professionals in health facilities due to many reasons. This results in continuous transmission at the community level. Worldwide in 2017, 6.4 million new cases of TB were officially notified to national authorities and then reported to WHO. The 6.4 million cases reported represented 64% of the estimated 10.0 million new cases that occurred in 2017 (World Health Organization, 2018). In Ghana, TB has remained a petrified condition for many years, with a huge economic and health impact on individuals and the health system in general. In 2018, 13,978 incident cases of TB, representing 32% of expected cases, were detected in the country and notified to WHO (Osei et al., 2019). The National Tuberculosis Control Program has instituted interventions like tuberculosis screening, distributed tuberculosis diagnosis algorithms, trained frontline staff in case detection, x-ray, and gene Xpert diagnosis facilities to enhance case detection. Still, the national case detection rate stands at 32%, which is far below WHO target.

In Banda District, case detection of all forms of tuberculosis is low, with 34 cases recorded in 2018, representing 52% of the expected target. Gaps between the estimated number of new cases and the number reported are probably due to a mixture of underreporting of detected cases and underdiagnosis (either because people do not access health care or because they are not diagnosed when they do). Underestimation of the total number of new cases is also possible. Delay in the diagnosis and treatment of TB may result in more wide-ranging diseases and increased complications, leading to the severity of the baseline condition and its later association with the risk of mortality (Isaakidis et al., 2012). It is well-known that the longer a person delays to diagnose and treat his/her TB, the more infectious the person becomes (Alavi, Bakhtiyariniya, & Albagi, 2015). For instance, one untreated TB case can infect about 10 and 15 people in a year and over 20 people in its natural course respectively (Amo-Adjei, 2013; WHO,2007). Therefore, to reduce the health, social and economic burden of TB, it is very important to identify TB cases as early as possible to reduce the rate at which it can spread in the district. This study seeks to find the perspective of community surveillance volunteers on tuberculosis case detection.

2. MATERIALS AND METHODS

Background of the Study Area

Demography

Christians dominate in the district with 62.6% of the population. Muslims constitute 24.07%, while 8% are African Traditionalists and 5.42% do not belong to any religious groups. The district is quite heterogeneous, with Banda ethnic group forming the majority. The other ethnic groups in the district are Kologo, Bono, and Luger. The practice of the Islamic Religion makes the demand for water high in the predominated Muslim communities; hence the need to give much attention to the Mu slim communities as far as the provision of water facilities is concerned.

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Health Delivery Service

The level and distribution of health care resources are important for ensuring equity in access to quality health services. The health sector continues to be plagued with a shortage of key health professionals and inequitable distribution of the available staff. This is largely due to the departure of health professionals searching for greener pastures in other Districts. There are eleven facilities in the district, two Health Centres, and nine CHPS compounds except one. All these facilities have the basic equipment to help them deliver quality service to the people in the district. Also, to help deliver health care services is the Bui Medical centre which was purposely set up for the workers at the dam site. Farming and allied activities employ 80.2 percent of the population. The remaining 19.8 percent work in different fields like as carpentry, trade, teaching, masonry, weaving, plum ship, tailoring, handicraft, blacksmithing, and Akpeteshie brewing. With all of these problems, the agricultural sub-sector is not profitable for farmers to develop their farmlands above subsistence levels, resulting in poor yields and little or no sales to provide a meaningful income for sustenance. As a result, this is the primary reason for the district's deplorable poverty.

At the district crop sub-sector, cowpea recorded the lowest yields of 0.74% (mt/ha), while cassava chalked the highest with 22.2 mt/ha. Cassava and other drought-resistant tuber crops do better than creeping crops like cowpea, groundnuts, etc. might be because the creeping crops, protein supplements, do not grow well due to inadequate rains. Cash crops like cashew, oil palm, and Agushie have been identified with the capacity to boost economic growth and reduce poverty. There are no available statistics as to the output produced in the district. Data need to be collected to ascertain the contribution level to poverty reduction and growth. Refer to the map on major crop-producing areas in the district. The livestock sector is not without a problem in the district. Potential activities like grasscutter farming have much attention as of Rabbit farming. It is seen that inadequate staff – veterinary officers to take care of the health needs of the animals is one of the problems that retards the growth of the livestock sector. To improve their economic status, many resources need to be put in the processing sector to help in reducing poverty through employment opportunities.

Study Design and Type

A cross-sectional descriptive study was conducted in the Banda district in the Bono region of Ghana. The study described the perspective of Community Surveillance Volunteers on tuberculosis case detection in the District at a particular point in time. A quantitative approach was used to collect and analyze data on TB case detection in the district. The study was a community-based survey involving Community Health Surveillance Volunteers in all four (4) sub-districts in the Banda District.

Study Population

The study area for this research is the Banda district in the Bono Region of Ghana. The District was selected because it has recorded low tuberculosis case detection from 2016 to 2018. The district has a case detection rate between 32% to 52%. The district has 128 communities with 264 Community Health Surveillance Volunteers. The population of the district is 26295. The study population includes all Community Health Surveillance Volunteers in Banda District at the study time. These volunteers are individuals who are trained to identify cases and events of public health importance. This study population is relevant because they serve as a link between the communities and the health workers and are directly involved in the health activities at both the health facility and community level.

Sampling technique and sample Size

A simple random sampling technique was used to select volunteers to participate in this study. All volunteers in the district were listed with their sex and age on Microsoft excel 2016. Random numbers were assigned to each member using the random formula for each cell. All four columns, thus the name, age, sex and random number, were selected, and a custom sort was done by selecting random sort. automatically arranged all members randomly. The first one hundred and fifty-nine members from the randomly arranged names were selected for the study

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Study Variable

Table 1 Study Variable

Study Variable	Data source	Indicator
Variable		
Knowledge of staff on tuberculosis	questionnaire	• Training • Case management
Diagnostic systems used	questionnaire	• Screening tools • Microscopy • Chest x-ray • Gene x pert
Integration of tuberculosis case finding in-home visits by Community Health Nurses	questionnaire	• Home visits • Contacts registered • TB patients in the community

Data collection tool and techniques

A structured questionnaire was administered to Community-based Surveillance Volunteers. The questionnaire was divided into four (4) sections based on the study-specific objectives and the socio-demographic characteristics of the respondents. Section A solicited information on basic socio-demographic characteristics. Section B solicited information on the knowledge level of frontline staff on tuberculosis. Section C also solicited information on the diagnostic systems available at the district. The last section (Section D) also collected information on the integration of tuberculosis case finding in-home visits activities by Community Health Nurses. To meet the deadline ten data collection officers were trained for three days. The thoroughly trained data collection officers administered the questionnaire in approximately 40 minutes for each volunteer. All the one hundred and fifty-nine volunteers were called to assemble at their various CHPS compounds and Health Centers. The questionnaire was administered to them on an individual basis by the data collection officers.

Data Analysis

Data validation was done to determine whether the data collection was done as per the pre-set standards and without bias. It is a four-step process, which includes planning, data collection, process and discussion results. To do this, the researcher asked statistical questions that could be answered with data. Data was collected using a questionnaire. Data editing was done to make sure that there were no such errors. The researcher conducted basic data checks, checked for outliers, and edited the raw research data to identify and clear any data points that may hamper the accuracy of the results. Data were appropriately recorded and edited to ensure accuracy and consistency. Coded data were entered using SPSS for cleaning and descriptive analysis. Analyzed data was displayed in frequency tables, percentages and discussion on how the analyzed data answers the research questions.

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3. RESULTS

Socio-demographic Characteristics of the Participants

Table 2 Basic socio-demographic characteristics of participants

Variables	Frequency *(n)*	Percentage (%)
Age		
22-26	4	2.5
27-31	35	22.0
32-36	37	23.3
37-41	47	29.6
42-46	22	13.8
47 or more	14	8.8
Sex		
Male	126	79.2
Female	33	20.8
Marital status		
Married	75	47.1
Divorced	19	12.0
Separated	37	23.3
Never married	28	17.6
Educational Level		
SHS/Vocational	62	39.0
Basic Education	91	57.2
No education	6	3.8
Ethnicity		
Akan	24	15.0
Ewe	19	12.0
Nafaana	53	33.3
Dagaare	33	20.8
Mo	26	16.4
Other	4	2.5

Table 2 shows that 159 respondents were recruited and participated in the study. There was a 100% response rate, and complete information was provided by all one hundred and fifty-nine (159) respondents. As such, the analysis was based on 159 respondents. Of the 159 participants, males were 126 (79.2%), and females were 33 (20.8%). About 4 (2.5%) are between 22-26 years, 35(22.0%) between 27-31years, 37(23.0%) between 32-36 years,

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47(29.6%) between 37-41 years, 22(13.8%) between 42-46 years, 44(8.8%) are 47years and above. On the marital status of respondents, 75 (47.1%) indicated they were married. 19(12.0%) were divorced, 37(23.3%) were separated, and 28(17.6%) never married. Out of the 159 respondents, only 6(3.8%) had no education, 91(57.2%) had basic education, and 62(39.0%) had SHS/Vocational education. On ethnicity, 24(15%) of the respondents were Akans, 19(12%) Ewes, 53(33.3%) Nafaana, 33(20.8%) Dagaare, 26(16.4%), and 4(2.5%) belonged to other ethnic groups.

Knowledge of Staff on Tuberculosis

Table 3 knowledge of Staff on Tuberculosis

Variables	Frequency *(n)*	Percentage (%)
Do you think health workers are trained on tuberculosis		
Yes	136	85.5
No	23	14.5
Do you agree that health workers know the signs and symptoms of TB		
strongly agreed	75	47.2
Agreed	84	52.8
Disagreed	0	0
Strongly disagreed	0	0
In your view, do health workers at the facility use standard methods to diagnose TB cases		
Yes	135	84.9
No	24	15.1
Do you agree that health workers in the district have the knowledge to interpret test and x-ray results		
Agreed	98	61.6
Disagreed	61	38.4
Strongly agreed	0	0
Strongly disagreed	0	0
Do you agree that health workers in the district know the treatment of tuberculosis		
Strongly agreed	49	30.8
Agreed	108	67.9
Disagreed	2	1.3
Strongly disagreed	0	0
In all, how will you rate the level of knowledge of the staff on tuberculosis		
Highly Knowledgeable	12	7.6
knowledgeable	147	92.4
Not knowledgeable	0	0

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Out of the 159 respondents, 136 (85.5%) of the respondents indicated the health workers were trained on tuberculosis, whiles the remaining 23 (14.5%) said there was no training for health staff on tuberculosis. Again, 75 (47.2%) of respondents strongly agreed that health workers know signs and symptoms of TB, 84 (52.8%) of them agreed that health workers know signs and symptoms of TB, whiles none of the respondents disagreed that health staff are knowledgeable on signs and symptoms of TB. Out of the 159 respondents, 135 (84.9%) were of the view that health workers in the facilities use standard methods to diagnose TB cases as against 24 (15.1%) of the respondents who were of the view that health workers in the facilities do not use standard methods to diagnose TB cases. Also, 98 (61.6%) of them believed that health workers in the district could interpret test and x-ray results. The rest of the 61 (38.4%) respondents disagreed that health workers in the district can interpret tests and x-ray results. Only 2 (1.3%) of the respondents disagreed that health workers in the district know the treatment of tuberculosis, 108 (67.9%) of respondents agreed that health workers in the district know the treatment of tuberculosis, and the remaining 49 (30.8%) strongly agreed that health workers know the treatment of tuberculosis. In all, as shown in figure 3, 147 (92.4%) of the respondents believed that health workers are known as far as TB is concerned, while 12 (7.6%) of the respondents believe that health workers are highly valued knowledgeable on tuberculosis.

Availability of Diagnostic Tests for TB detection

Table 4 Availability of diagnostic tests for TB detection.

Variables	Frequency (n)	Percentage (%)
Do you think that the health facilities in the district have adequate equipment to diagnose TB cases		
Yes	2	1.3
No	157	98.7
Which diagnostic tests/tools are used to screen for and diagnose TB in this District		
Symptoms screening methods	156	98.1
Laboratory screening methods	3	1.9
Are chest X-rays available in the district		
Yes	2	1.3
No	157	98.7

In terms of the availability of diagnostic tests for tuberculosis detection, 157 (98.7 percent) of respondents said there was no adequate equipment, including chest X-rays, in the district to diagnose TB cases, while 2 (1.3 percent) said there was adequate equipment in the district to diagnose TB cases. As shown in table 4, 156 (98.1%) of the respondents indicated health workers used symptoms screening methods to screen for diagnosed tuberculosis in the district, and 3 (1.9%) of respondents indicated health workers used laboratory screening methods to diagnose tuberculosis. On the availability of chest x-ray in the district, only 2 (1.3%) indicated the availability of chest x-ray services in the district. The rest of the respondents, 157 (98.7%), said there were no chest x-ray services available in the district. Concerning adequacy of equipment, 157 (98.7%) said there was adequate equipment in the district, whiles 2 (1.3%) indicated equipment was not adequate.4.4

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Integration of TB activities with home visits

Table 5 Integration of TB activities with home visits

Variables	Frequency *(n)*	Percentage (%)
How often do Community Health Nurses conduct a home visit in your community		
Daily	35	22.0
Weekly	124	78.0
Do the Nurses visit, TB patients, in the community		
Yes	99	62.3
No	60	37.7
Are the Nurses able to identify contacts of TB cases during home visits		
Yes	100	62.9
No	59	37.1
Do the Nurses screen these contacts for TB during home visits		
Yes	100	62.9
No	59	37.1
How will you rate integration of TB activities with home visits by Community Health Nurses		
Moderate	100	62.9
Low	59	37.1

As seen in table 5, 124 (78.0%) of the respondents indicated Community Health Nurses conduct home visits in the community weekly, while 35 (22.0%) indicated Community Health Nurses did home visits daily. However, 60 (37.7%) of these same respondents stated that Community Health Nurses do not visit TB patients in the communities instead of 99 (62.3%) of respondents who stated that Community Health Nurses visited TB patients. Of the 159 respondents, 100 (62.9%) stated that the nurses could identify contacts of TB cases and then screen these contacts for TB during home visits, while the remaining 59 (37.1%) stated. As shown in figure 5, 100 (62.9%) of the respondents indicated that the nurses' TB activities with home visits are moderately integrated, and the rest 59 (37.1%) said the integration of TB activities with home visits by Community Health Nurses were low.

4. DISCUSSIONS

Health staff knowledge on tuberculosis

Findings from the study suggest that majority (85.5%) of the respondents indicated that the health workers were trained on tuberculosis. Therefore, it is imperative that staff can identify signs and symptoms of tuberculosis during outpatient services and home visits at the community level. This is real and consistent with the National Tuberculosis Control Programme policy of training frontline staff on tuberculosis. Capacity building of staff is an area of focus by managers to empower staff on tuberculosis case detection. Similar studies conducted by (Demissie Gizaw, Aderaw Alemu, & Kibret, 2015) to assess of knowledge and practice of health workers towards tuberculosis infection control

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and associated factors in public health facilities of Addis Ababa, Ethiopia, indicated that being trained on tuberculosis infection control is significantly associated to good knowledge (adjusted odds ratio (AOR) = 2.41; 95% CI: 1.33, 4.36).

Again, 84 (52.8%) of the respondents agreed that health workers know the signs and symptoms of TB. This is evidence as health staff in all the health facilities in the district base on signs and symptoms to screen patients at the Out-patient Department and Antiretroviral therapy clinics. Data on this is entered in the District Health Management System software for 2018. This implies staff can screen, diagnose and manage tuberculosis cases. Out of the 159 participants, the majority 135 (84.9%), believed that health workers in the facilities use standard methods to diagnose TB cases. Also, 98 (61.6%) of them believed that health workers in the district could interpret test and x-ray results. Only 2 (1.3%) of the participants disagreed that health workers in the district know the treatment of tuberculosis. In all, as shown in figure 3, the majority 147 (92.4%) of the respondents believed that health workers are known as far as TB is concerned.

Availability of Diagnostic Tests for TB detection

Findings from the study regarding the availability of diagnostic tests for TB detection indicated there was no adequate equipment, including a chest X-ray to diagnose TB cases in the district. Out of the 159 respondents, the proportion of those who said the equipment to diagnose TB was not adequate was 98.7% (95%CI = 95.1 – 99.7). This is because the District has no hospital and a medical doctor. Diagnostic equipment such as x-ray, Gene x-pert machines are usually installed in higher facilities rather than Health Centers and CHPS Compounds. The majority, 156 (98.1%) of the respondents indicated they used symptoms screening methods to screen for tuberculosis in the district. This helped staff at triage sort out presumptive cases of tuberculosis for microscopy. This is due to the directive from the National Tuberculosis Control Programme for staff to mandatorily screen all patients with upper respiratory tract infection who report to any Health facility for tuberculosis.

Similarly, a clinical microbiology review conducted by (Parsons et al., 2011) on Laboratory Diagnosis of Tuberculosis Resource-Poor Countries: Challenges and Opportunities indicated that TB smear microscopy is highly insensitive for HIV-coinfected individuals and children due to the reduced pulmonary bacillary loads in these patients. In resource-poor countries, many smear microscopy laboratories are single-room and understaffed with poorly maintained microscopes, and some of these laboratories lack consistent sources of electricity and clean water. This is the exact situation of the Banda district.

Integration of TB activities with home visits

The study's findings also suggest that 124 (78.0%) of the respondents indicated Community Health Nurses conduct home surveillance in the community every week. However, 60 (37.7%) of these same respondents indicated that the CHNs do not visit TB patients in the communities. This is associated with communities that are far from health facilities since Community Health Nurses cannot frequently travel to these communities for home visits due to a lack of resources. The majority of the respondents, 100 (62.9%), said the nurses could identify contacts of TB cases and then screen these contacts for TB during home visits. This is part of the Community Health Nurse daily home visit report indicators, so it is therefore not surprising when 62.9% of the respondents are practicing contact tracing and screening at the community level. 100 (62.9%), indicated the TB activities with home visits by the nurses are moderately integrated, 62.9% (95% CI = 55.1% - 70.1%). According to a study conducted by (Duarte, Neto, Carvalho, & Barros, 2012) on Improving tuberculosis contact tracing: the role of evaluations in the home and workplace in Vila Nova de Gaia, Portugal, home and workplace visits helped to identify more at-risk contacts (8.4 per index patient) than interview (2.5 per index patient), and improved adherence (87.3% of identified contacts were screened compared to 67.6% previously). More patients with active TB were detected (1.4 per index patient compared with 0.75 per index patient previously), and more TB cases were prevented. The integration of TB activities with home visits improves tuberculosis case detection and healthy treatment outcome in the Banda district.

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5. CONCLUSIONS

Tuberculosis case detection in Banda District is explored from the perspective of the Community Health Volunteer. This section wraps up the key findings of the study and suggests recommendations to consider. Concerning the first question of the study, "What is the knowledge of the frontline staff on tuberculosis case detection" the study concludes that health workers in the Banda district know of TB case detection, this is evident from the findings since the majority of the respondents indicated that health workers are trained in TB case detection (92.4%), can detect signs and symptoms of TB (52.8%), and can interpret test and X-ray results accurately (98.7%). The implication is that all suspected tuberculosis cases can be identified by frontline staff at both community and health facility levels. The second research question asked, "What types of tuberculosis diagnostic systems are commonly used in the district". The study concludes that most (98.1%) of the respondents indicated that health staff used symptoms screening methods to screen for tuberculosis in the district. There is no adequate diagnostic equipment (98.7%). The last research question was "What is the level of integration of tuberculosis case finding in-home visits by Community Health Nurses in the District?". the study concludes that there is moderate integration (62.9%) of tuberculosis activities with home visits by Community Health Nurse. This is evident as (62.9%) of Community Health Nurses screening contacts at the community level during home visits; (62.3%) nurses visit TB patients during home visits.

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