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Knowledge, attitude and uptake of tuberculosis screening services among gold miners in the Datuko sub-district in the Talensi District Ghana

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ABSTRACT

Background: In Ghana, uptake of tuberculosis (TB) screening services among miners is sub-optimal. The study assessed the knowledge, attitude and uptake of TB screening services among gold miners in the Datuko sub-district in Talensi district Ghana.

Methods: This was a cross-sectional study design using a mixed-method approach among 384 adult mine workers. A questionnaire and key informant interview guides were the instruments for data collection and both descriptive and inferential analysis was done using SPSS version 22.00.

Results: About 94.5% of the respondents have heard of TB and the overall knowledge of the cause of TB was poor, as 66.1% of the participants said TB was caused by smoking. The majority of the participants (66.4%) had poor attitudes towards TB screening and a few of them (15.4%) had screened for TB. The composite score for knowledge and attitudes of the respondents towards TB screening was 1.61 and 1.41 respectively. There was an association between having heard of TB and recognizing the importance of TB screening service with a p-value of 0.001. There was also a connection between having heard of TB and uptake of screening service (p=0.001). The only factor that determined uptake of TB screening was the educational level of the respondents. The qualitative study among health staff revealed that awareness of TB was high among miners but they perceived those attitudes and use of the TB screening services were sub-optimal.

Conclusion: Both knowledge and attitudes of TB screening services among miners were poor which resulted in a sub-optimal uptake of TB screening services. Also, the educational level of the respondents predicted uptake of TB screening service. It is therefore important for policy makers to strengthen TB control activities through health promotional programmes.

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INTRODUCTION

Tuberculosis is an airborne bacterial infection and a key cause of illness and death worldwide, especially in Asia and Africa (Mtaita, 2019). It is an ancient disease that has affected mankind for more than 4,000 years. It is a chronic disease caused by the bacillus Mycobacterium tuberculosis and spreads from person to person through the air (Zaman, 2010). Tuberculosis remains the foremost cause of death from an infectious agent in the twenty-first century despite being curable with antimicrobial drugs (Quinn *et al.*, 2021).

Globally, it is reported that ten million people had TB disease in 2017 with 90% being above 15 years and two-thirds of affected were in eight countries namely, India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (5%), Nigeria (4%), Bangladesh (4%) and South Africa (3%) (Gupta *et al.*, 2020). Of those who become infected with

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Mycobacterium tuberculosis, 10–12% will progress to tuberculosis disease after a period ranging from weeks to decades (Amenuvegbe *et al.*, 2016). The incidence of TB among gold miners in South Africa is among the highest in the world, at 3,000 -7,000 per 100,000 people (UNAIDS, 2018).

One set of people at extremely high risk of TB is mineral miners. Their migration may also facilitate the transmission of TB to the general community (Stuckler *et al.*, 2011). Miners in sub-Saharan Africa have a greater incidence of TB than any other working population in the world (reported at 3,000 – 7,000 per 100,000 miners per year in some areas) and constitute one of the largest pools of employed men in sub-Saharan Africa. The TB incidence among miners is estimated to be as much as ten times higher than in the populations from which they originate (Stuckler *et al.*, 2011). Mining takes place in almost all regions in Ghana. The population affected by mining in Ghana is not exactly known, but the population affected by precious minerals mining is estimated to be about one million including illegal miners scattered over 17 districts covering 6 geographic regions (MOH, 2014).

Ensuring high awareness in communities about health in general and of TB and TB services, in particular, can help to ensure that people recognize TB symptoms and take appropriate action early to seek care from appropriate health facilities (WHO, 2011). However, currently few studies have been conducted to understand the knowledge, attitudes, and uptake of TB screening services (Zaman *et al.*, 2010; Stuckler *et al.*, 2011; Adams *et al.*, 2017; Dorji *et al.*, 2020). Moreover, most of these studies were carried out in other countries especially the southern part of Africa and outside Africa. These studies did not reveal the determinants of the uptake of tuberculosis screening services among miners. One survey in India reported that 93% of miners had heard of TB but only 20.5% of the people demonstrated sufficient knowledge of TB (Zaman *et al.*, 2010).

Knowledge and perceptions regarding TB screening services represent a vital preliminary step in TB health education and programme planning to dispel misconceptions and improve upon both the knowledge and levels of awareness of TB screening services within the society. Relevant knowledge and positive perceptions are predisposing factors for behavioural change towards TB screening services. People with better knowledge of tuberculosis are more likely to seek healthcare and medical treatment (Mtaita, 2019). There is therefore the need to assess determinants of tuberculosis screening services among gold miners in the Datuko sub-district of the Talensi District.

MATERIALS AND METHODS

Study setting

The study was carried out in the Datuko sub-district in the Talensi District of the Upper East Region. This is due to the recent increase in mining activities in the area with low uptake of voluntary TB screening services in the area. The annual review report 2020, Datuko sub-district also revealed an increase in TB cases in the area from 2 cases as in 2018 and 2019 to 7 cases in 2020 after a free screening was organized by "Cardinal" a private mining company in the sub-district. Datuko community is close to the mining site which is approximately 0.5 Kilometers. The community fall within the Talensi District, located in the Upper East Region in the North-eastern part of northern Ghana. The Talensi District Assembly was carved out of the Bolgatanga Municipal Assembly in 2004. It lies between latitude 100 15' North and 100 60' North of the equator and longitude 00 31' West and 10 0.5' West of the Greenwich meridian. There are two main dialects spoken, Taleni and Nabit (Ontoyin and Agyemang, 2014).

Study design

The study used an analytical cross-sectional study design using a mixed-method approach. A cross-sectional study design was used because the design is suitable for finding the prevalence of a problem, phenomenon and attitude through the collection of data without any manipulation of the study environment and it generally describes the characteristics that exist in a community. The mixed-method was employed to overcome the

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weaknesses in using either of the two methods (qualitative and quantitative). This integration permits a more complete and synergistic utilization of data collection and analysis.

Participants' eligibility
Individuals were eligible to participate if they were 18 years and above, living in the mining communities of Datuko sub-district and able to provide informed consent for the study.

Sampling Method and Procedures
Three communities were randomly selected out of six communities in the sub-district using balloting. The balloting was done by writing three yes and three not on pieces of paper, the papers were folded and kept in one container. Six people, one person representing each community was made to pick without replacement. The communities of those selected yes were included in the study. The six communities are homogenous, and therefore using three communities would give the same information as the six communities.

To save time and cost, the sampling was done in the three selected communities. From the selected communities, a convenient sampling technique was employed in selecting respondents for the study. Convenient sampling was used because of the inexpensiveness of the method, time factor and easy access to respondents. Again, a purposive sampling technique was employed in sampling the healthcare staff for an interview. Purposive sampling was used because it helps the researcher to get a sample of subjects with specific characteristics. It enabled the researcher to sample health workers with a deep understanding of the topic.

Sample Size Determination
Since the total population of adults 18 years and above in the sub-district was not known, the z-score for determining a reliable sample size for an unknown population was used in determining the sample size for the study. The sample was determined using the following formula:

$$n = z^2 (p) (1-p)/c^2$$

Where n = the sample size
z = standard normal deviation set at 95% confident level; p = percentage of picking a choice or response; c = confident interval
Applying the formula gives a sample size of 384. Hence 384 respondents were interviewed in this study. Four staff were selected from the health centre and one staff from each CHPS compound for the study.

Data Analysis
The data collected was coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 22.00. Descriptive measures such as frequency distribution tables and logistic regression analysis were used to determine predictors of TB screening services among miners. The qualitative data were analyzed using content analysis by going through the contents of the in-depth explanations given and presenting the results in a narrative form.

Ethical Consideration
An introductory letter was obtained from the Department of Advanced Nursing, School of Nursing and Midwifery, University for Development Studies, administrative approval was obtained from Regional Health directorate Bolgatanga and ethical approval was obtained from KNUST-Committee on Human Research Publication-Ghana (reference CHRPE/AP/349/21). Written informed consent was obtained from all health workers, miners and their families before enrolment in the study. Names and contact information were not required as part of measures to maintain the anonymity of respondents.

RESULTS
The study engaged 384 participants in an interview using structured questionnaires to get the quantitative data, and 6 health workers were however interviewed using a key informants' interview guide to get the qualitative data.

Respondents' socio-demographic characteristics (quantitative)
The median age of the respondents interviewed was 29 years; most of the respondents 25.5% were

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between the ages of 26-30 years and the least was 36 -40 years being 8.3%. The majority 83.3% of them were directly involved in gold mining. More than half of the participants (55.4%) have been mining gold for more than three years, 28.1% have completed primary school, and about 63.8% were married (Table 1).

Knowledge of tuberculosis and tuberculosis screening services

Of the total respondents, an overwhelming majority 94.5% have heard of TB before,59.4% had their source of information from friends, with only 5.5% of them who said they never heard of TB. 73.7% indicated that TB affects both males and females (Table 2).

Few of the respondents 18.2% know the causative agent of TB, whilst more than half 66.1% of them said TB is caused by smoking cigarettes and 10.2% stated that TB is caused by coughing during sexual intercourse. 90.6% said TB can kill, 84.6% were aware that TB is preventable and 3.6% indicated that TB is not preventable (Table 2).

Also, as shown in Table 2, a total of 68.8% of the respondents knew about TB screening services, 21.4% did not have any knowledge of TB screening services. Of those who heard of TB screening services, 51.6% knew of sputum for Acid Fast Bacilli, 17.2% knew of chest x-ray whilst 29.4% did not know of any screening test for TB. 54.9% knew TB screening centres, whilst 31.5% and 13.5% did not know nor were they sure respectively about any TB screening centres.

From table 3, the composite knowledge of respondents was 1.61 on a scale of 1-3 indicating moderate knowledge of TB. Most respondents had moderate knowledge of most of the items measured in this study. Only the standard deviation for the knowledge of respondents was 0.68, implying respondents shared similar opinions on all the items measured.

Attitude towards TB screening

About 97.1% of respondents were of the view that TB screening is very important. Due to the importance respondents attached to TB screening, 94.0% would recommend their friends to go in for TB screening even if they have to pay for it. Of the 384 respondents, 41.9% have never gone for a check-up before whereas 58.1% have gone for a check-up before. Commendably, the majority of respondents would go for TB screening if they are told to do so, 93.5%. Also, 72.4% of respondents have no fear of doing TB screening. In respect of the attitude of miners regarding TB screening, the majority of respondents 66.4% were of the view that miners have a bad attitude towards TB screening while the remaining 33.6% thinks small

Table 1: Sociodemographic characteristics of respondents

Variables	Frequency	Percent
Respondent's age		
18-20	63	16.4
21-25	72	18.8
26-30	97	25.3
31-35	57	14.8
36-40	32	8.3
41 and above	63	16.4
Marital status		
Single	125	32.6
Married	245	63.8
Divorced	14	3.6
What work do you do?		
Other business	61	15.9
Gold mining	319	83.3
Food vendor	3	0.8
Level of education		
No formal education	85	22.1
Primary	108	28.1
JHS	57	14.8
SHS	95	24.7
Tertiary	39	10.2
Religious background		
Christianity	220	57.3
Islam	45	11.7
Traditionalist	119	31
Mining gold for how long		
Less than a year	51	13.3
1-2years	84	21.9
2-3years	36	9.4
Over three years	213	55.4

Data presented as frequency and percent

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Table 2: Knowledge on TB and screening

Variables	Frequency	Percent
Have you heard of tuberculosis		
Yes	363	94.5
First source of information about tuberculosis		
Friends	228	59.4
Mother	38	9.9
Books, newspaper, magazine	28	7.3
Health worker	80	20.8
Television/radio	7	1.8
None	3	0.8
Which gender does it affect		
Men	90	23.4
Women	11	2.9
Both	283	73.7
Have you seen or heard of anyone affected by tuberculosis		
Yes	215	56
The main cause of tuberculosis is?		
Mycobacterium tuberculosis	70	18.2
Many sexual partners	21	5.5
Smoking cigarette	254	66.1
Coughing during sexual intercourse	39	10.2
Do you think TB can kill		
Yes	348	90.6
No	5	1.3
Not sure	31	8.1
Are you aware TB is preventable?		
Yes	325	84.6
No	14	3.6
Not sure	45	11.7
Do you think TB is curable		
Yes	305	79.4
No	40	10.4
Not sure	39	10.2
Have you heard of TB screening?		
Yes	264	68.8
No	82	21.4
Not sure	38	9.9
Which of the TB screening tests have you heard of		
Sputum for acid fast bacilli	198	51.6
Chest x-ray	66	17.2
Others	7	1.8
None	113	29.4
Knowledge of TB screening centres		
Yes	211	54.9
No	121	31.5
not sure	52	13.5
Do you think you are well informed about TB		
Yes	188	49
No	196	51
Symptoms of TB		
Chest pain	80	20.8
Cough	299	77.9
Weight loss	5	1.3
Mode of transmission of TB		
Aerosol from infected persons	372	96.9
Touching items in public places	12	3.1
Is small scale-mining (galamsey) risk factor for getting TB		
Yes	345	89.8
No	12	3.1
Don't know	27	7

scale miners have a good attitude towards TB screening.

Uptake of TB screening

Of 384 respondents, only 59 (15.4%) have screened for TB before, the remaining 325(84.6%) have never screened for TB. Out of the 59 respondents who have screened for TB in the past, 32 (8.3%) did at the hospital, 16 (4.2) had it at a private laboratory and 11(2.9%) did at a health centre. Also, 51 out of the 59 respondents who have screened for TB does it once a year representing 8.3% of the total population. Apart from 3 (0.8%) of the respondents who tested positive, the remaining 56 respondents who screened for TB had negative results. Of the 325 respondents who have never screened for TB 132 (34.4%) indicated they did not screen because the services were not readily available, 85 (221%) did not screen due to time constraints, 72 (18.8%) did not screen due to the cost involved and 36 (8.9%) did not screen because of fear of the results.

While the majority of respondents have never screened for TB, a greater number of them think they were at risk of TB 340 (88.5%). Also, respondents think health providers were friendly and are not a contributory factor of people accessing screening services 233 (60.7%). Furthermore, the majority of respondents 290 (75.6%) do not think TB screening is a waste of money. They were of the view that the rate at which people get TB calls for attention as indicated by the majority of them 266 (69.3%).

Binary logistic regression of sociodemographic characteristics and the uptake of TB screening services

A binary logistic regression was performed to ascertain the association between the socio-demographic characteristics of respondents (independent variables) and the uptake of TB screening (dependent variable). Although 43.5% of the variables in TB screening were explained by the sociodemographic characteristics of respondents $R^2 = 0.435$. There was no association between the

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sociodemographic characteristics of respondents and the uptake of TB screening (Table 7).

Demographic characteristics (qualitative study)
The respondents were 3 males and 3 females making it 6 in all. They were between the ages of 29 to 40 years. One (1) person worked in the sub-district

Table 3: Knowledge score

Question	Mean	Std. Deviation
Have you heard of tuberculosis	1.05	.227
Your first source of information about tuberculosis	2.04	1.397
Which gender does it affect	2.53	.837
Have you seen or heard of anyone affected by tuberculosis	1.41	.494
Which of the following do you think is the main cause of tuberculosis	2.70	.906
Do you think TB can kill	1.18	.570
Are you aware of TB being preventable?	1.30	.688
Do you think TB is curable	1.34	.684
Have you heard of TB screening?	1.44	.687
Which of the TB screening tests have you heard of	2.11	1.326
Do you know any TB screening centres	1.57	.713
Do you think you are well informed about TB	1.50	.503
What are some of the symptoms of TB	1.77	.445
What is the mode of transmission of TB	1.03	.178
Is small scale mining (galamsey) risk factor for getting TB	1.18	.553
Composite score	1.61	0.68

Table 4: Respondents' attitude toward TB screening

Variables	Frequency	Percent
In your opinion, how important is TB screening		
Very important	373	97.1
Sometimes important	11	2.9
Do you think it is important for miners to have a regular TB screening		
Yes	364	94.8
No	20	5.2
Will you recommend your friend to go in for TB screening even if they have to pay for it		
Yes	361	94
No	19	4.9
How often do you go to the hospital for a check-up		
Once a year	81	21.1
Ones in two years	45	11.7
Sometimes	97	25.3
Never	161	41.9
Will you go for TB screening if you are told to do		
Yes	359	93.5
No	25	6.5
Do you have any fear doing in for TB screening		
Yes	106	27.6
No	278	72.4
Is small scale miners have a good attitude towards screening services		
Yes	129	33.6
No	255	66.4

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Table 5: Attitude score

Question	Mean	Std. Deviation
In your opinion how important is TB screening	1.03	0.178
Do you think it is important for miners to have a regular TB screening	1.05	0.227
Will you recommend your friend to go in for TB screening even if they have to pay?	1.08	0.303
How often do you go to the hospital for a check-up	2.28	1.19
Will you go for TB screening if you are told to do	1.08	0.27
Do you have any fear doing in for TB screening	1.71	0.46
In your opinion, do you think small scale miners have a good attitude towards screening services	1.66	0.49
Composite score	1.41	0.45

Table 6: Uptake of TB screening Services among gold miners

Variables	Frequency	Percent
Have you screened for TB before		
Yes	59	15.4
No	325	84.6
Where did you screen for TB		
Hospital	32	8.3
Health centre	11	2.9
Private lab	16	4.2
Not applicable	325	84.6
If yes how many times		
Once	51	13.3
Twice	5	1.3
Three times and above	3	0.8
Not applicable	325	84.6
What was /were the results		
Positive	3	0.8
Negative	56	14.6
Not applicable	325	84.6
If not, why have you not done TB screening		
It is costly	72	18.8
There is no time	85	22.1
It is not readily available	132	34.4
Afraid of the results	36	8.9
Not applicable	59	15.9
Do you think you are at risk of getting TB		
Yes	340	88.5
No	26	6.8
Not sure	18	4.7
In your opinion do healthcare providers are friendly to miners who want to do a screening test		
Yes	233	60.7
No	151	39.3
Do you think TB screening is a waste of money		
Yes	94	24.5
No	290	75.6
Do you think the rate at which people get TB here call for attention		
Yes	266	69.3
No	118	30.7

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Table 7: binary logistic regression of sociodemographic characteristics and TB screening uptake

							95% CI for EXP(B)	
Variables	**B**	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
Age	-0.296	0.281	1.112	1	0.292	0.744	0.429	1.289
Marital status	-1.312	1.132	1.343	1	0.247	0.269	0.029	2.476
Employment status	-1.015	0.954	1.131	1	0.288	0.363	0.056	2.353
Level of education	-0.645	0.316	4.172	1	0.041	0.525	0.283	0.974
Religion	1.234	0.874	1.992	1	0.158	3.436	0.619	19.074
How long have you been mining	0.559	0.336	2.76	1	0.097	1.748	0.904	3.38
Constant	6.042	2.993	4.076	1	0.043	420.76		

*Negelkerke R2 = 0.435, $p < 0.005$***

for less than a year i.e. 9 months, another also worked for 3 years, 2 persons worked for 5 years whilst 2 of them also worked for 6 years. Tow (2) of them have been directly involved in TB screening for 5 years; two have been directly involved in TB screening for 3 years whilst two are not directly involved in TB screening. All 6 respondents stayed at the staff bungalows.

Knowledge of TB

The data from the interviews conducted with some healthcare staff shows that respondents were well informed about TB in the study area as cited by most of the healthcare staff interviewed. In a question to ascertain how informed miners are regarding TB screening services, healthcare providers were asked, Are miners aware of TB screening services in this area? These were the responses from the staff,

… "Yes, they are aware of TB screening and some of the signs and symptoms of TB, we have educated them just that they are not willing" (nurse, 32 years).

… "Yes, many are aware but some may not be aware, yet some are aware but they are not just willing to come" (lab technician, 40 years).

In a follow-up, a question was asked; in your opinion, to what extent are miners in the sub-district informed about TB screening services? The responses indicated that miners were well educated on TB screening as the respondents narrated.

… "We educate them on TB screening including the signs and symptoms of TB. Also, they are informed that when they exhibit signs and symptoms they should come, so they are well informed" (nurse, 29 years).

One respondent however had a contrary view as she insisted that

… *"miners are not much informed about TB screening services, in a scale of 1 to 10 I will say 4/10 as to how they are informed about TB screening" (nurse, 32 years).*

A question was asked about what health care providers do to create awareness on TB screening services in the area. Health education was cited by all healthcare providers interview as the main activity used in creating awareness on TB screening services in the area as mentioned by some of the interviewees:

… *"When there are funds, we go to the mosques and churches to do screening" (disease control officer,30 years).*

… *"we do sensitize them through health education through durbar and outreach sessions" (midwife 37 years).*

… *"We give them health talk and education at the OPD when they come around" (nurse 29 years).*

One of them however was of the view that the healthcare providers do not do much in creating awareness on TB screening.

… "We do *nothing in creating awareness on TB screening, I have never encountered anything like that health talk on TB in my six years of work in the sub-district" (nurse 31 years).*

Attitude towards TB screening

The data from the interview shows that miners have a poor attitude towards TB screening. The majority of respondents indicated that miners only come for screening when they exhibit the signs and

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symptoms. Attitude towards screening was reported poor as captured in the following narrations.

… *"Until they are very sick, they will not come until the person is sick and coughing and in pain that they will come. In the local dialect they say "kohikrok" (old cough) they try to deny they don't cough. Thus, they will not like to mingle with people" (lab technician, 40 years).*
… *"their response is not all that good, you go there to organize a screening and they feel reluctant to come" (nurse, 30 years).*
… *"for them they don't even have time to go through those screening, time is a factor, they are too busy to talk about TB screening even if you suspect and you want to talk to them. They don't have time" (nurse, 32 years).*

When asked whether miners voluntarily come for TB screening, the response was an emphatic no. As to what prevents miners from coming for voluntary screening services, these were some of the respondents as respondents shared similar views:
… *"maybe because of sometimes the stigma, they say this person has TB and it's contagious, they don't want to come and go back and they will say this person has TB you have to isolate yourself, so it's just the stigma" (midwife 37 years).*
… *"they feel like you want to waste their time because they always want to go down and work" (disease control officer, 30 years).*
… *"They are not aware of it, they fear stigma, some are not even aware of the condition, besides that, the stigma attached to TB in the community, somebody coming to do TB screening may think he is trying to publish himself to the community and may not come" (Nurse, 32 years).*

Uptake of tb screening

Regarding the level of screening among gold miners, all the nurses interviewed referred the researcher to the disease control officer. When the disease control office was contacted, he indicated the uptake of TB screening in the sub-district was very poor as they have less than 40 miners coming for screening in a year.
…. *"Approximately we screen 3 persons in a month" (disease control officer, 30 years).*
When they were asked what they think should be done to improve the uptake of TB screening, all respondents were of the view that miners should be sensitized on the importance of TB screening as the narrations indicate.
… *"It boils on sensitization, now it's even better, they used to attribute this TB to their sacrifices someone has refused to do. They attribute it to their belief system, so more sensitization and education has to be done" (disease control officer, 30 years).*
… *"we should increase our education on TB screening services, maybe some of them lack knowledge on the disease condition if they get the knowledge it will help" (nurse, 37 years).*
… *"it's just about the education even if the human resource is adequate and the education is not down to the people and even logistics like sample containers if you see a case and there are no sample containers you cannot carry out the procedure" (nurse, 32 years).*
Regarding the availability of equipment for TB screening, all respondents gave a unanimous response. They mentioned that though they have resources for screening for TB, they were not well resourced to carry out mass screening exercises as narrated by one respondent.
… *"Yes, because we have all screening tools sputum containers and Ghana post come for the samples when we take them" (disease control officer, 30 years).*
As to what should be kept in place to enhance smooth TB screening services in the sub-district, well resourcing the various health centre in the sub-district was highly recommended by most of the respondents. The following are some of the narrations on what should be done to enhance smooth TB screening services in the sub-district.
… *"At our level, if we have gotten some of the primary tests at a facility may be the Acid-Fast Bacilli it will help (disease control officer, 32 years).*
… *"We need to look at our equipment what we need to use is it available to use" (nurse, 30 years).*
… *"Compulsory screening for all those with signs and symptoms of TB, privacy to avoid stigma, logistics like TB screening forms for proper questioning. Transportation system should be working" (nurse, 32 years).*
When respondents were asked to provide any additional information regarding TB screening among miners that are not covered in the interview, most of them shared similar views. They were of the view that health facilities at the mining areas should be well resourced with logistics and funds to

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enable them to organize free TB screening services at the various mining site. Below is a narration by one of the respondents.

… *"if we have enough support (financial) we could visit the mosque on Fridays and churches on Sundays to give education, sometimes we chip in TB programme when other programme monies come then we integrate TB in there" (disease control officer, 30 years).*
… *"We can always organize a monthly TB screening at the mining site for them to have the services" (nurse, 37 years).*

The responses by the health service providers indicated that miners know about Tb but no adequate knowledge on TB screening services, and they are ready to embrace TB screening services if the services are readily available.

DISCUSSION

This study sought to examine determinants of TB screening services among gold miners in a subdistrict in the Upper East Region. The majority of respondents 94.5% in the current study have heard of TB screening, the mean knowledge score for respondents was 1.16 indicating moderate knowledge on TB screening. Some of the health workers interviewed alluded to this as one of them narrated "*they are less informed; I will rate them very low knowledge on tuberculosis screening services"* This means that the tendency of one infected person spreading it to family and friends will be high as they have little knowledge about the real cause and how to prevent tuberculosis.

Similar findings were made in a study in South Africa, where miners/ex-miners and their family/ community members knew little about TB, how it is spread, or how it is treated (Adams *et al*., 2017). On contrary, a study by Venkatraju and Prasad (2010), found out that 10% of respondents knew the cause of tuberculosis to be breathing in cough or sneezing droplets from an infected person.

The study also found that the main source of information on TB was friends. As such, the possibility of being given wrong information is very high because the givers of this information were not professionals and may not have accurate and updated information on tuberculosis. The interview with health service providers who are supposed to educate them on TB also confirmed that not much education was given to miners as far as TB is a concern as narrated by one respondent*, "I have never seen anything like health talk on tuberculosis or a durbar organized to sensitize community members since I was posted here".*

While other studies have shown that TB is caused by bacillus Mycobacterium tuberculosis (Khadraa *et al*., 2014; MOH, 2014; Yakubu, 2015; Anna Berg *et al*., 2020), the majority of respondents 66.1% indicated smoking cigarettes as the main cause of TB. Only 18.2% of respondents knew the right causative agent of TB which is mycobacterium tuberculosis. The finding of this study disagrees with that of Menezes *et al.* (2020).where over 60% of respondents knew TB was caused by a bacillus. The poor knowledge on the cause of TB can partially be attributed to the level of education of respondents. The majority of respondents did not attain higher education and that can significantly influence their understanding of complex health issues such as bacterial and viral conditions.

Regarding the symptoms, transmission and risk factors, the majority of respondents were knowledgeable as 77.9% said coughing is a symptom of TB, 96.9% said TB is transmitted through the air when a person with TB coughs or sneezes and 89.9% said small-scale mining (galamsey) is a risk factor for getting TB. This finding is consistent with that of earlier studies where respondents mentioned cough more than two weeks as a symptom 73% followed by chest pain (44%), weight loss (44%) and blood in the sputum (37%) respectively (Menezes *et al*., 2020).

The study found that the majority of miners 97.1% sees TB screening to be very important. Although miners attached significance to regular TB screening and the majority of the respondents 58.1% have ever been to the hospital for a checkup before, the number of miners who have never been to the hospital for a checkup was not negligible.

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About 161 (41.9%) of miners in this study have never gone for any checkup before and even those who have had a checkup before, 25.3% of them did it several years ago, 21.1% does it once in a year and 11.7% does it once in every two years. This indicates that the attitude of miners towards TB screening and visiting the clinic/hospital for a checkup is moderately good and can be improved upon. This is what a healthcare provider had to say about the attitude of miners regarding TB screening*," until they are sick and cannot do anything, they will never come to the health facility, they try to deny their disease condition, they belief if they come, they will be tested for tb and when it turns positive people will point fingers at them, so they feel reluctant to show up even if they are coughing.*

The findings of this study were consistent with that of earlier studies where it was revealed that only a small proportion, 23.60 % (59/250) of the household in the mining areas screened for TB. Consequently, only five out of the 250 contacts (2.0%, p = 0.0001) were tested for TB based on a relative having TB (Amenuvegbe *et al.*, 2016). In another study to assess the knowledge attitude and practice towards TB screening and treatment, it was found that the majority of participants (29%) considered TB as not very serious (Angelo *et al.*, 2019). This indicates that miners' attitude towards TB screening generally is not too good.

The results of this study further discovered that miners were very reluctant to be educated on TB as the narration from the interviews with healthcare providers indicates. *"For them, they don't even have time to go through those screening, time is a factor, they are too busy to talk about TB screening even if you suspect and you want to talk to them. They don't have time" (nurse, 32 years).*
"*They feel like you want to waste their time when you visit the site to educate them because they always want to go down and work" (nurse, 30 years).* These were responses from healthcare providers on the attitude of miners towards TB screening.

It was however noted that respondents who have heard of TB or had some form of education on TB attached some importance to TB screening than those who have not had education on TB screening before with a p-value of (p = 0.000). This negative attitude towards TB screening also contributes to the low detection rate in Ghana reported in a previous study which revealed that people being detected with TB represent just about 21% of actual cases, highlighting the need to adopt different strategies to identify more cases (Quinn *et al.*, 2021).

Although the majority of respondents 88.5% believed they were at risk of getting TB as a result of their occupation, only 15.4% have screened for TB in the year 2020. It was found that the majority of respondents who have never screened for TB did not screen because the services were not readily available. These findings are consistent with that of other studies in the past (Yakubu, 2015). Studies found several factors influencing TB screening such as inadequate infrastructure, accessibility of health services, quality of counselling/communication or health education rendered, knowledge and skills of health care providers are factors that affect the TB control programme in Ghana (Annan *et al.*, 2013).

Other health system-related factors affecting TB include long waiting times, staff attitude towards patients, non-availability or frequent shortage of TB screening apparatus, lack of privacy, limited capacity of health workers to recognize TB and provider absenteeism (Yakubu, 2015). The current study shows that respondents lack knowledge on the importance of TB screening coupled with inaccessible screening centres and miners having no time to take up Tb screening services.

The study sort to find out the number of miners who come to the health centre for TB screening. All the nurses interviewed referred the researcher to the disease control officer. When the disease control officer was contacted, he indicated that the uptake of TB screening in the sub-district was very poor as they have less than 40 miners coming for screening in a year.
… *we screen just 3 in a month.*
The study however revealed that miners were willing to be screened if they were told to do so.

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The interview with service providers confirmed that the low level of screening uptake was a result of a lack of knowledge as some of the nurses narrated. When they were asked what they think should be done to improve upon the uptake of TB screening, all respondents were of the view that miners should be sensitized on the importance of TB screening as the narrations indicate.

… "*it boils on sensitization, now it's even better, they used to attribute this TB to their sacrifices someone has refused to do. They attribute it to their belief system, so more sensitization and education has to be done" (DCO, 30 years).*
… *"we should increase our education on TB screening services, maybe some of them lack knowledge on the disease condition, if they get the knowledge it will help" (nurse, 37 years).*

Similar findings were made in an earlier study in Ghana where all survey respondents admitted that they had consulted traditional healers at one time or the other for their prolonged coughing (Ahorlu and Bonsu, 2013). Even though the National TB Health Sector Strategic Plan for Ghana (2015–2020) identified TB case detection among mining populations as one of these key populations for intervention (Quinn *et al.*, 2021), the findings of this study indicate that many resources have not been allocated to effectively carry out this activity. While healthcare providers think the best way to improve on the uptake of TB screening is to increase health education and organizing of free TB screening at the mining sites, they lamented lack of resources as a major hindrance to rolling out this project.

When respondents were asked to provide any additional information regarding TB screening among miners, most of them shared similar views. They were of the view that health facilities at the mining areas should be well resourced with logistics and funds to enable them to organize free TB screening services at the various mining site. Below is a narration by some of the respondents.

"If we have enough support (financial) we could visit the mosque on Fridays and churches on Sundays to give education, sometimes we chip in TB programme when other programme monies come then we integrate TB in there" (DCO, 30 years).
"We can always organize a monthly TB screening at the mining site for them to have the services if the resources are available" (nurse, 37 years).

There was no association between the sociodemographic characteristics of respondents and the uptake of TB screening. Whereas Mutala (2018) found age to be associated with the uptake of TB screening in his study in the Sawla district of the Savanna region, this is contrary to the current study. Zaman *et al.* (2010) also found that respondents who have attained higher education were more likely to uptake TB screening compare to those without formal education. The current study however did not find any association between the educational background of respondents and the uptake of TB screening. The differences in these studies could be a result of the difference in geographic characteristics and level of exposure of respondents. Zaman *et al.* (2010) conducted his study in Bangladesh, which geographical characteristics and healthcare policies may be different from that of the Talensi district.

Study limitations
Of the sample size, all the gold miners were not covered for their diverse views which were due to the busy nature of their work and the cost constraints of the researcher. Also, the study was conducted in Datuko sub-district out of the many mining districts in the Upper East Region and did not allow space for respondents from other settings to express their feelings and perceptions about their situations. The findings may therefore not be generalizable to the wider population of gold miners in the Upper East Region. The study has however indicated the level of knowledge, attitude, and uptake of tuberculosis screening services among gold miners in the subdistrict, with the findings conforming to available related literature. Despite these important findings, future studies are still needed to ascertain factors influencing uptake of tuberculosis screening among gold miners in the entire Upper East Region

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as well as the country to confirm or otherwise the findings of this current study.

CONCLUSION

Based on the findings of this study it was concluded that the majority of small-scale miners have heard of TB before and their source of information is from friends who may not have adequate and appropriate knowledge on TB, hence can mislead them. The study also revealed poor knowledge of TB which has led to a negative attitude towards TB screening. The poor knowledge of TB among miners is attributable to the inability of the health personnel in the area to provide them with the relevant education on the importance of TB screening, which is a result of no logistics and financial resources.

It is therefore recommended that health education should be given to miners and their families through community durbar and radio programs to sensitize them on the relevance of TB screening. Also, health workers should make TB control activities part of their routine duties and integrate all activities concerning TB control into existing health services such as outreach programs.

COMPETING INTEREST

Authors declare that they have no competing interests.

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REFERENCE

Adams L.V., Basu D., Grande S.W., Craig S.R., Patridge M.T., Panth N., Trump Redd V., Phalaste M., Singo A., Osewe P. and Mulley A.G. (2017) Barriers to tuberculosis care delivery among miners and their families in South Africa: an ethnographic study. *The International Journal of Tuberculosis and Lung Disease* 21(5), 571-578.

Ahorlu C.K. and Bonsu F. (2013) Factors affecting TB case detection and treatment in the Sissala East District, Ghana. *Journal of Tuberculosis Research* 01(03), 29-36.

Amenuvegbe G.K., Francis A. and Fred B. (2016) Low tuberculosis case detection: a community and health facility based study of contributory factors in the Nkwanta South district of Ghana. *BMC research notes* 9(1), 1-7.

Anna Berg J., Synne Osaland H., Dipesh T. and Ingunn H. (2020) A questionnaire of knowledge, attitude and practices on tuberculosis among medical interns in Nepal. *elsevier*.

Annan A., Singh A., Dogbe J., Asante D. and Owusu-Dabo E. (2013) Health-seeking behaviour of tuberculosis patients and related factors in the central region of Ghana. *Journal of Science and Technology (Ghana)* 33(3), 27-38.

Dorji T., Tshering T. and Wangdi K. (2020) Assessment of knowledge, attitude and practice on tuberculosis among teacher trainees of Samtse College of Education, Bhutan. *PloS one* 15(11), e0241923.

Gupta N., Bhatnagar T., Rade K., Murhekar M., Gangakhedkar R.R., Nagar A. and Team I.C. (2020) Strategic planning to augment the testing capacity for COVID-19 in India. *The Indian Journal of Medical Research* 151(2-3), 210.

Khadraa M.M., Nawal A.F. and B. S.A. (2014) Assessment of Knowledge and Self-Reported Practices of Iron Mines' Workers about Pneumoconiosis in Baharia Oasis, Giza Governorate, Med. J. Cairo Univ., Vol. 82, No. 2, June: 23-29, 2014 www.medicaljournalofcairouniversity.net.

Menezes R.G., Dorji T., Tshering T. and Wangdi K. (2020) Assessment of knowledge, attitude and practice on tuberculosis among teacher trainees of Samtse College of Education, Bhutan. *Plos One* 15(11), e0241923.

https://doi.org/10.51374/annalsmls.2022.2.2.0063

MOH (2014) The national Tuberculosis Health Sector Strategic Plan for Ghana 2015–2020.

Mtaita G.R. (2019) Knowledge, awareness and practices regarding tuberculosis among gold miners in Tanzania, University of South Africa.

Mutala M. (2018) Factors Influencing Tuberculosis Treatment Outcome in Sawla Tuna Kalba District, University of Ghana.

Ontoyin J. and Agyemang I. (2014) Environmental and rural livelihoods implications of small-scale gold mining in Talensi-Nabdam Districts in Northern Ghana. *Journal of Geography and Regional Planning* Vol.7(8), pp. 150-159.

Quinn F., Ohene S.-A., Bonsu F., Adusi-Poku Y., Dzata F. and Bakker M. (2021) Case finding of tuberculosis among mining communities in Ghana. *Plos One* 16(3), e0248718.

Stuckler D., Sanjay B., Martin M. and Lurie M. (2011) Mining and Risk of Tuberculosis in Sub-Saharan Africa, American Journal of Public Health, Vol 101, No. 3.

UNAIDS D. (2018) UNAIDS. 2017.

Venkatraju B. and Prasad S. (2010) Beliefs of patients about the causes of Tuberculosis in rural Andhra Pradesh. *International Journal of Nursing and Midwifery* 2(2), 21-27.

WHO (2011) Early detection of Tuberculosis: An Overview of Approaches, Guidelines and Tools.

Yakubu E. (2015) Factors affecting Tuberculosis treatment in the Bole District of the Northern region of Ghana.

Zaman K. (2010) Tuberculosis: A Global Health Problem, International centre for diarrhoeal disease research, bangladesh.

Zaman K., Anh D.D., Victor J.C., Shin S., Yunus M., Dallas M.J., Podder G., Thiem V.D., Luby S.P. and Coia M.L. (2010) Efficacy of pentavalent rotavirus vaccine against severe rotavirus gastroenteritis in infants in developing countries in Asia: a randomised, double-blind, placebo-controlled trial. *The Lancet* 376(9741), 615-623.