Original Research Article

Online Survey onthe Acceptance of Latent Tuberculosis Testing and Isoniazid Preventive Therapy among Healthcare Workers in Nigeria

Abstract

Background: Healthcare workers in Nigeria are exposed to myriads of occupational risks including workplace acquired infections such as tuberculosis.
Methods: This study was a cross-sectional survey and used google form to administer the questionnaire via social media networks. Descriptive statistical methods were used to summarize data on socio-demographic characteristics and responses to questions, Microsoft excel and SPSS version 20.0 for statistical analysis of data summarized as categorical variables, frequency(n) and percentages (%).
Results: About six out of ten of the participants believed that they could be severely ill if they got tuberculosis. Majority of respondents 413(89.2%) reported acceptance of latent TB testing while 87.7% agreed to take Isoniazid treatment if they test positive for LTBI. The occupational risk group was found to be less likely to accept LTBI testing. Also, respondents from the Northeast (OR = 4.225; 95% CI = 1.216-14.688; p value = 0.023) and southeast (OR = 4.494; 95% CI = 1.382-14.609; p value = 0.012) were four times more likely to accept isoniazid preventive treatment respectively. Participants who held that tuberculosis is a serious disease were more likely to accept isoniazid preventive treatment (OR = 2.220; 95% CI = 1.100-4.480 p value = 0.026). The majority of the HCW (56%) in the study never get tested for LTBI.
Conclusion:the majority of the healthcare workers in this studyshowed that TB is a dangerous disease and agreed to get regular testing and isoniazid therapy to prevent tuberculosis.

Keywords: Isoniazid preventive therapy, Latent tuberculosis, Vaccination, BCG vaccine, Vaccine Acceptance

1.0 Background

The continuous rise in global tuberculosis incidence, emergence of multi-drug and extensive drug resistant tuberculosis and the increased occupational risk being posed to HCWs suggests that current global TB control and prevention strategies were inadequate. The WHO proposed the DOTS strategy for effective TB control. The key elements of the strategy are political commitment to support TB treatment, detection of TB by sputum microscopy, molecular detection of tuberculosis and rifampicin resistant tuberculosis, multi-drug resistant tuberculosis, direct observation of short course therapy, regular supply of medicines and reporting of programme performance and treatment outcomes. To eliminate tuberculosis in Nigeria the DOTs programme was launched in 1993, since then there has been a slow increase in tuberculosis case detection, contact tracing and treatment. However, the emergence of COVID-19 pandemic has led to a reverse in the gain made against tuberculosis in Nigeria and worldwide[1].

Latent TB infection (LTBI) refers to the state where one's immune system is continuously activated by the TB bacilli, but they are clinically not sick [2]. Prevention of the development of active TB in healthcare workers is important since they are constantly at risk of transmitting tuberculosis to their patients and acquiring it from then. Also, HCWs who have latent tuberculosis coinfected with HIV have a 10% yearly risk of developing active TB as compared to 10% lifetime risk in the HIV negative population [3]. Screening of HCWs for TB and the provision of preventive treatment are components of the first pillar of the World Health Organization's (WHO) End TB Strategy [4]. It is hoped that by the year 2030 the World Health Organization and its partner will end tuberculosis epidemic globally[1].

Occupational TB is expected to be high among healthcare workers in Nigeria as the countries is experiencing shortage in health workforce and facilities which is further exacerbated by the continuous increase in population growth and dwindling resources. And putting undue pressure

on available HCWs. Therefore, understanding the preventive measure adapted by healthcare workers and predisposing risk factors of active TB disease among healthcare workers in Nigeria is important in managing the disease in the establishment. Such information may lead to specific and targeted responses to disease control.

The priority groups for LTBI testing and treatment have a higher prevalence of LTBI and risk of advancement to active TB than the general population. Compared to the LTBI burden in the general population worldwide (23.0%) [5], the prevalence of LTBI among healthcare workers in low/middle-income countries was stated to be 49% with the tuberculin skin test and 39% with the interferon γ release assay in a systematic review[6]. Moreover, Individuals with immunocompromised status have higher risk of progression to active tuberculosis.

Worldwide about 10.6 million people developed TB in the year 2022, and Nigeria accounted for about 4.5% of people who developed TB in 2023 [1].The prevalence of latent tuberculosis among healthcare workers in Nigeria was high in a study conducted in Akwa-Ibom state of Nigeria, [7] reported a prevalence of LTBI was 24.8% and 45.8% as assessed by QFT-IT and TST respectively. Healthcare workers are the most important frontliners in the fight against tuberculosis. Yet, this category of the population is often neglected with regards to tuberculosis control and prevention. Hence this study aimed to evaluate the factors associated with latent tuberculosis testing and acceptance of isoniazid preventive therapy among healthcare workers in Nigeria.

2.0 MATERIALS AND METHODS

2.1: Study design

We commenced a cross-sectional, web-based anonymous survey using an online questionnaire. The researchers used the social network platforms of Facebook, Instagram, and WhatsApp to

disseminate and advertise the survey link to the healthcare workers and health support staff. The inclusion criteria were that the respondents were healthcare workers, healthcare support staff who are Nigerian residents, and were 25 years old and above.

2.2: Study population

This study was conducted at the six geopolitical zones in Nigeria. The study was reviewed and approved by the committee of the research supervisors at the National Open University of Nigeria (NOUN). Informed consent was implied following the completion and submission of the questionnaire.

Participants were twenty-five years and above, adults, health workers and residents in Nigeria. Healthcare workers (HCWs) in this study include medical doctors, veterinary doctors, nurses, pharmacist, medical laboratory scientist, radiologist, dentist, public health officers and others. While Healthcare support staff (HCSS) include genitors, drivers, electricians, engineers, security, health record and research, ward attendants, etc. Google form was used to communicate the questionnaire web link to the target participants. Social media platforms such as WhatsApp, Twitter, Facebook, and Instagram were used to reach participants. A brief explanation was included in the introduction of the questionnaire. The submitted answered questionnaire was considered consent to take part in the study. The questionnaire was pre-evaluated for consistency and error in accordance with [8].

2.3. The Measures

The survey instrument used in this study was based on the tool designed by Municipal Public Health Service Rotterdam-Rijnmond (GGD) together with the National Institute for Public Health and the Environment (RIVM) in the Netherlands [9] with minimal modification. Previous

studies consulted included [10], course material regarding tuberculosis infection control and prevention, including the global report on tuberculosis by [1] and Latent tuberculosis infection Updated and consolidated guidelines for programmatic management [1]. The questionnaire consisted of four (6) parts:

2.3.1: Part one (1): Demographic characteristics of respondents

Participants were asked to report their age, sex, state of residence, educational level, marital status, and profession. The state of residents was later grouped into geopolitical zones. Nigeria is categorized in to six geopolitical zone viz North central, Northeast, Northwest, Southeast, South-south and Southwest.

2.3.2: Part two (2): Perception of susceptibility to tuberculosis

This category included five (5) questions on the risk of acquiring tuberculosis The risk perception questions consisted of Likert questions (1, certainly not 5, most certainly). This was later converted to dichotomous questions (certainly not, most certainly); a most certainly answer was scored 1 point, while a certainly not answer was scored 0 points. The total mean perception of susceptibility score ranged from zero to five; the mean knowledge score of 0-3.5 (≤69%) was considered certainly not susceptible and a mean score of 3.6-5.0 (70% and above) represent most certain of the susceptibility to tuberculosis.

2.3.4: Part three (3) Perceived severity to tuberculosis.

The participant's perception of the severity of tuberculosis was measured by three items (e.g., " I am afraid of even thinking about getting ill with tuberculosis"; "I could be severely ill if I got tuberculosis"; How likely do you think it is that a person who falls ill with tuberculosis dies because of the disease?"). The question consisted of a 5-point Likert scale (1, Not at all serious 5,

very serious). with a higher score indicating a higher level of perceived severity. The Likert scale was converted to a dichotomous scale for the purpose of calculation mean score and for ease of analysis. (Not at all serious, not serious, and not serious-slightly serious were assigned zero; that is Not at all serious while serious and very serious were scored 1; that is very serious).

2.3.5: Part four (4) Benefit of tuberculosis immunization

The benefit of tuberculosis revaccination was measured by three items (e.g., Immunization will prevent me from contracting tuberculosis; By being immunized and not getting tuberculosis, I will protect others from tuberculosis; By being immunized, I feel less worried about the possibility of severe illness from getting tuberculosis The question consisted of a 5-point Likert scale (1, strongly disagree 5, strongly agree). The Likert scale was converted to a dichotomous scale (disagree, disagree and neutral were assigned zero; that is “disagree”, while agree and strongly agree were scored 1; that is “agree”).

2.3.6: Acceptance of screening test for latent tuberculosis and isoniazid

This item consisted of two questions (Would you accept testing for latent tuberculosis if this was advised by the government or medical practitioners? and would you accept isoniazid treatment if tested positive for latent tuberculosis?)

2.4 Statistical analyses

Descriptive statistical methods were used to summarize data on socio-demographic characteristics and responses to questions regarding respondents' perception of the seriousness, susceptibility, and the benefit of tuberculosis immunization. And the intention to accept testing for latent tuberculosis and isoniazid treatment among healthcare workers in Nigeria. Data were entered in Microsoft Excel and later imported into SPSS version.20.0 for statistical analysis.

Data were summarized as categorical variables' frequencies (n) and percentages (%). Furthermore, we presented the data in tables and graphs. Chi-square was used to determine the level of difference among the categorical variables. A binary logistic regression analysis was applied and expressed as odds ratio (OR) and 95% confidence interval (CI) to determine the predictors of the willingness to accept latent tuberculosis testing and acceptance of isoniazid preventive treatment. A p-value of less than 0.05 was considered significant in all tests.

3.0 Results

3.1 Demographic characteristics of the Study Population

The survey was disseminated to healthcare workers in Nigeria from April to August 2022, and a total of 463 healthcare workers completed and submitted the advertisement online. The survey received responses from participants of diverse demographic characters. Table 1 showed that the study participants had huge representation of 25-35 years old 328 (70.8%), male 327 (70.6%) university first degree 272 (58.7%) and healthcare workers 392 (84.7%) only a small portion reported high risk perceptions 241(5.2%) to tuberculosis infections.

Table 1: Demographic Characteristics of the study participants

Variables		Frequency	Percentage (%)
Age group	25-35	328	70.8
	36-46	109	23.5
	47-57	22	4.8
	58 and above	4	0.9
Marital Status	Single	191	41.3
	Married	272	58.7
Gender	Male	327	70.6
	Female	136	29.4

Religion	Christianity	311	67.2
	Islam	152	32.8
Geopolitical Zone	Northcentral	73	15.6
	Northeast	213	46.0
	Northwest	25	5.4
	Southeast	111	24.0
	South-south	21	4.5
	Southwest	20	4.3
Educational Level	Secondary	26	5.6
	Diploma	28	6.1
	First degree	272	58.7
	Postgraduate degree	137	29.6
Occupation	Healthcare worker	392	84.7
	Healthcare support staff	71	15.3
Risk perception	Low risk perception	439	94.8
	High risk perception	24	5.2
Total		**463**	**100.0**

3.2 Perception of Susceptibility

Figure 1and Table 2 shows the participants responses to questions regarding their perceived susceptibility to tuberculosis. Most of respondents held that they are at risk of getting tuberculosis because of their lifestyle and underlying illness were 62 (14.9%) respectively. The risk of getting tuberculosis because of family history of TB was 62 (13.4%). The occupational risk of getting tuberculosis was higher 282 (60.9%).

Table 2: Perceived susceptibility, severity, benefit of tuberculosis vaccine and Acceptanceof tuberculosis testing and treatment

Perceived susceptibility to tuberculosis		
Question	Responses (%)	
	Certainly not (%)	**Most certainly (%)**
I am at high risk of tuberculosis because of my family medical history	401 (86.6)	62 (13.4)
I am at high risk of tuberculosis because my own underlying medical conditions	394 (85.1)	69 (14.9)
I am at high risk of tuberculosis because of my occupational history	181 (39.1)	282 (60.9)

I am at high risk of tuberculosis because of my lifestyle	394 (85.1)	69 (14.9)
I think I will get tuberculosis soon	449 (97.0)	14 (3.0)
Perceived severity to tuberculosis		
	Not at all serious	**Very serious**
I am afraid of even thinking about getting ill with tuberculosis	316 (68.3)	149 (31.7)
I could be severely ill if I get tuberculosis	185 (40.0)	278 (60.0)
	Not likely	**Most likely**
How likely do you think it is that a person who falls ill with tuberculosis dies because of the disease?	327 (70.6)	136 (29.4)
Benefit of tuberculosis immunization		
	Disagree (%)	**Agree (%)**
Immunization will prevent me from contracting tuberculosis	124 (26.8)	339 (73.2)
By being immunized and not getting tuberculosis, I will protect others from tuberculosis	97 (21.0)	366 (79.0)
By being immunized, I feel less worried about the possibility of severe illness from getting tuberculosis	98 (21.2)	365 (78.8)
Acceptance of screening test for latent tuberculosis and isoniazid treatment		
	No	**Yes**
Will accept testing for latent tuberculosis if this was advised by the government or medical practitioners	50 (10.8)	413 (89.2)
Will accept isoniazid treatment if tested positive for latent tuberculosis	66 (14.3)	397 (85.7)

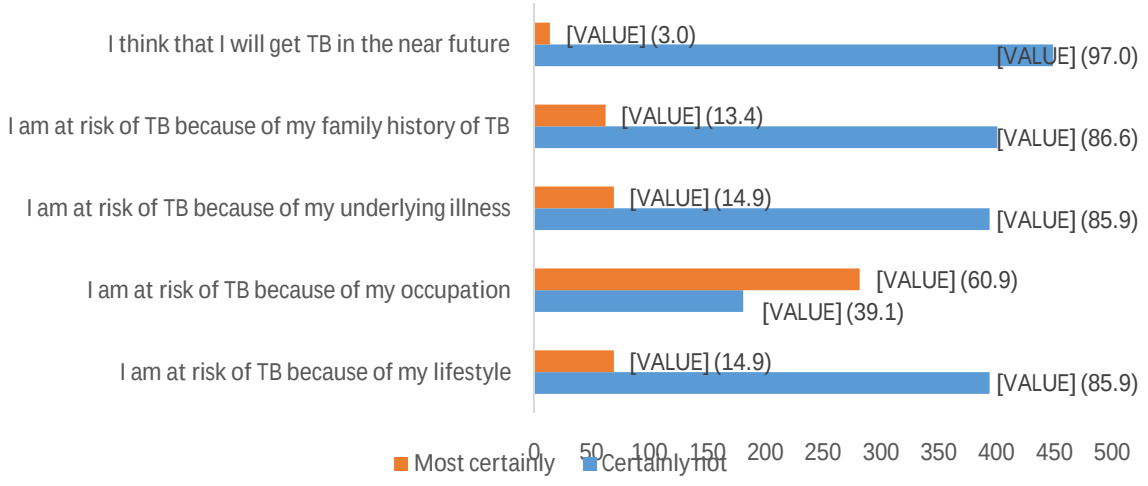

Figure 1:perception of susceptibility to tuberculosis among the respondents

3.3 Perception of Severity of Tuberculosis among Healthcare Workers in Nigeria

Concerning the fear of getting tuberculosis (68.3%) of the respondents held that they were not afraid of thinking about getting ill with tuberculosis but majority 278 (60%) of the respondents believed that they could be severely ill if they got tuberculosis. However, 136 (29.4%) believed that a person who fall ill with tuberculosis could die (table 2). Table 3 compared the perception of seriousness of tuberculosis and demographic characteristics among healthcare workers in Nigeria.

Concerning the perception of severity of tuberculosis among healthcare workers in Nigeria, 363(68.3%) held that they were not afraid of getting ill with tuberculosis. There were significant ($p<0.05$) differences among age group regarding the fear of getting TB. The age group 47 and above reported 100% not afraid of getting TB while 214(65.2%) of the age group 25–35-year-old were afraid of getting TB.

There was statistically significant difference ($p<0.05$) among age group, marital status and religion regarding respondent who reported they could be severely ill if they get TB. The age group 25-35 reported high (64.6%) severity if they get TB.

Respondents that had never married (single) reported 1.25 (65.4%) that they could be severely ill if they get TB. Also, 201(64.6%) of the respondents in the study reported that they could be severally ill if they get TB. The perception that a person infected with TB could die was significantly ($p<0.05$) different among gender, age group and geopolitical zones. Being female

gender 49(36.0%) age group fifty-nine and above (50.0%) and respondents from the south-south geopolitical zones reported higher perception that TB could lead to death. (Table 3).

Table 3: Perception of Severity of Tuberculosis among Healthcare Workers in Nigeria

Variables	I am afraid of getting TB			I could be severely ill if I get TB			Persons infected with TB could die		
	Yes (%)	No (%)	χ^2 (p value)	Yes (%)	No (%)	χ^2 (p value)	Yes (%)	No (%)	χ^2 (p value)
Gender									
Male	106 (32.6)	221 (67.6)	0.228 (0.633)	198 (60.6)	129 (39.4)	0.911 (0.730)	87 (26.6)	240 (73.4)	4.112 (0.043)
Female	41 (30.1)	95 (69.9)		80 (58.8)	56 (41.2)		49 (36.0)	87 (64.0)	
Age group									
25-35	114 (34.8)	214 (65.2)	13.573 (0.004)	212 (64.6)	116 (35.4)	10.581 (0.014)	114 (34.8)	214 (65.2)	21.458 (0.000)
36-46	33 (30.3)	76 (69.7)		55 (50.5)	54 (49.5)		13 (11.9)	96 (88.1)	
47-57	0 (0.0)	22 (100.0)		9 (40.9)	13 (59.1)		7 (31.8)	15 (68.2)	
≥58	0 (0.0)	4 (100.0)		2 (50.0)	2 (50.0)		2 (50.0)	2 (50.0)	
Marital status									
Single	59 (30.9)	132 (69.1)	0.111 (0.739)	125 (65.4)	66 (34.6)	3.954 (0.047)	59 (30.9)	132 (69.1)	0.360 (0.548)
Married	88 (32.4)	184 (67.6)		153 (56.2)	119 (43.8)		77 (28.3)	195 (71.7)	
Religion									
Christianity	98 (31.5)	213 (68.5)	0.025 (0.875)	201 (64.6)	110 (35.4)	8.308 (0.004)	96 (30.9)	215 (69.1)	1.020 (0.313)
Islam	49 (32.2)	103 (67.8)		77 (50.7)	75 (49.3)		40 (26.3)	215 (69.1)	
Geographical zone									
Northcentral	24 (32.9)	49 (67.1)	7.667 (0.176)	48 (65.8)	25 (34.2)	4.680 (0.456)	20 (27.4)	53 (72.6)	12.218 (0.032)
Northeast	64 (30.0)	149 (70.0)		126 (59.2)	87 (40.8)		65 (30.5)	148 (69.5)	
Northwest	11 (44.0)	15 (56.0)		11 (44.0)	14 (56.0)		11 (44.0)	14 (56.0)	
Southeast	33 (29.7)	78 (70.3)		70 (63.1)	41 (36.9)		23 (20.7)	88 (79.3)	
South-south	11 (52.4)	10 (47.6)		11 (52.4)	10 (47.6)		11 (52.4)	10 (47.6)	
Southwest	4 (20.0)	16 (80.0)		12 (60.0)	8 (40.0)		6 (30.0)	14 (70.0)	
Education									
Secondary certificate	6 (23.1)	20 (76.9)	4.032 (0.258)	16 (61.5)	10 (38.5)	4.501 (0.212)	4 (15.4)	22 (84.6)	3.104 (0.376)
Diploma	8 (28.6)	20 (71.4)		12 (42.9)	16 (57.1)		10 (35.7)	18 (64.3)	
First degree	96 (35.3)	176 (64.7)		162 (59.6)	110 (40.4)		80 (29.4)	192 (70.6)	

Postgraduate	37 (27.0)	100 (73.0)		88 (64.2)	49 (35.8)		42 (30.7)	95 (69.3)	
Occupation									
Healthcare worker	129 (32.9)	263 (67.1)	1.584 (0.208)	234 (59.7)	158 (40.3)	0.130 (0.818)	122 (31.1)	270 (68.9)	3.768 (0.052)

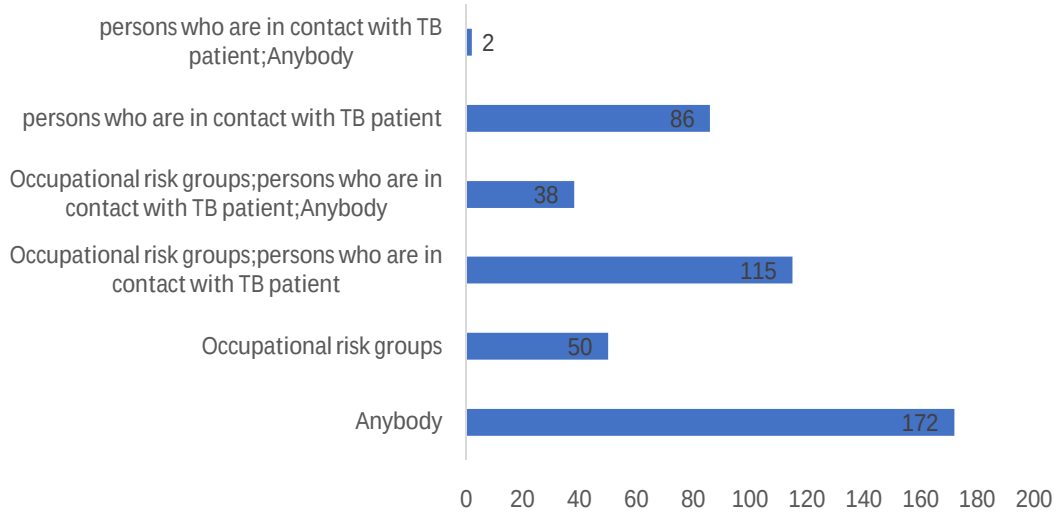

Figure 2:Who Should Receive Latent Tuberculosis Testing?

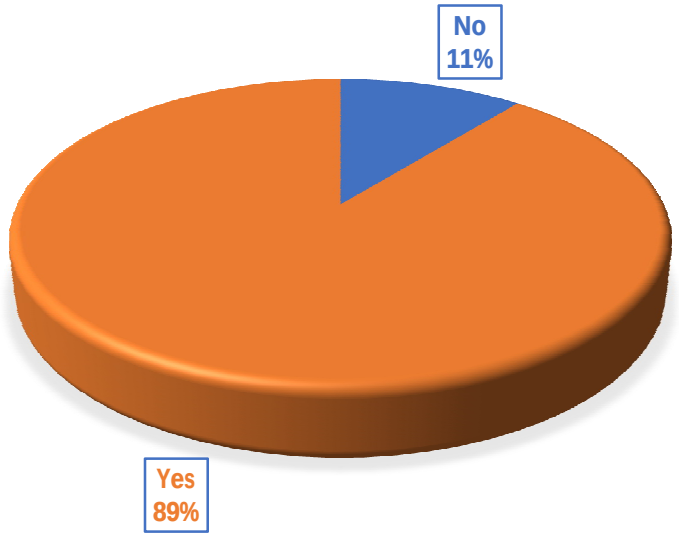

Figure 3: Proportion of respondent that would accept testing for latent tuberculosis if this was advised by the government or medical practitioners.

3.4 Factors associated with Acceptance of Latent tuberculosis testing by healthcare Workers in Nigeria

Four hundred and thirteen representing 89.2% (Figure 2 and3) of the respondents reported a definite acceptance of latent TB testing. The age group 36-46 years old (OR=14.613,95% cl 1.320-

161.833, P=0.029) were more likely to accept latent TB testing compared to 59 years old and above. Respondents who tested regularly for latent TB were reported to more likely to accept latent TB testing. (OR=4.062,56cl=1.126-14653, P=0.032). (Table 4) participants who reported that they were at high risk of getting TB because of their occupations were less likely to accept latent TB testing (OR = 0.223 95% cl =0.106-0.471, p =0.000). Perceptions of severity and benefits of tuberculosis immunization were not significant (p<0.05>) predictions of the willingness to test for latent TB (table 5). Figure 4 shows that proportion of response for the frequency of latent TB testing among healthcare workers. Overall, a total of 259 (56.0%) responded yes to never getting tested for latent TB.

Table 4: Demographic factors associated with the acceptance of latent tuberculosis testing among healthcare workers in Nigeria

Variable	OR	95% C. I	P-value
Age group			
25-35	7.438	0.702-78.785	0.096
36-46	14.613	1.320-161.833	**0.029**
47-57	14.467	0.931-224.903	0.056
58 and above			
Gender			
Male	1.049	0.520-2.116	0.893
Female			
Marital Status			
Male	1.988	0.934-4.230	0.075
Female			
Religion			
Christianity	0.772	0.356-1.674	0.512
Islam			
Geopolitical Zone			
Northcentral	1.015	0.282-3.652	0.982
Northeast	1.252	0.350-4.487	0.730
Northwest	4.272	0.568-32.151	0.158
Southeast	3.574	0.917-13.929	0.066

Southwest			
Occupation			
Healthcare workers	0.633	0.199-2.016	0.439
Healthcare support staff			

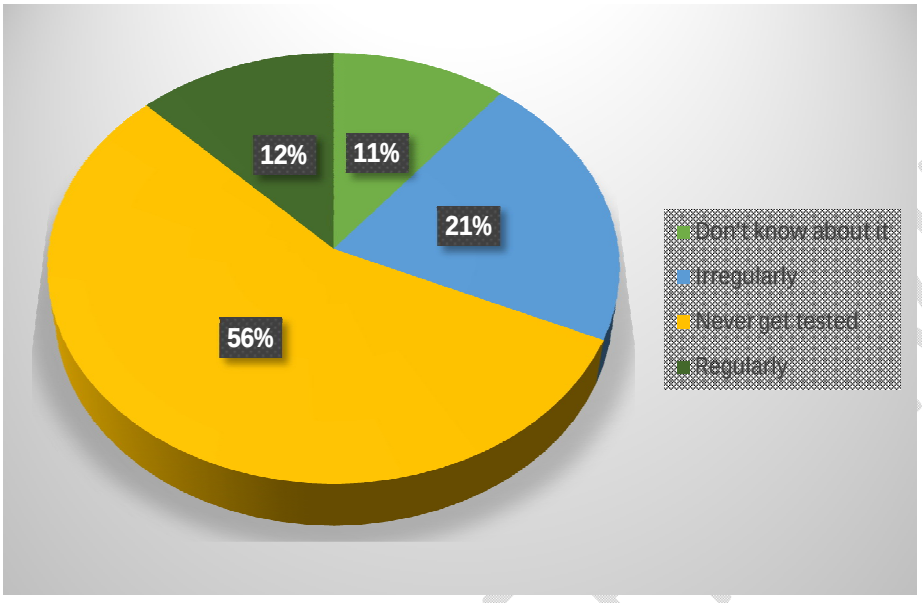

Figure 4: How often do you test for latent tuberculosis?

3.5 Demographic Factors Associated with the Acceptance of Isoniazid Treatment by Healthcare Workers in Nigeria

The proportion of respondents who agreed to take isoniazid treatment whenever they are tested and return positive for latent TB was 87.7% (Figure 5). Respondents from the Northeast (OR, 4.225; 95%CL =1.216-14.688, P=0.023) and Southeast (OR= 4.494;95%CL =1.382-14.609 P=0.012) were about four times more likely to commence treatment with isoniazid. Educational attainment was not a significant ($p<0.05$) prediction of the willingness to accept isoniazid treatment by healthcare workers.

Occupational risk for getting tuberculosis was less likely to be associated with the acceptance of isoniazid treatment (OR 0.357 95% cl =0.188-0.680, p=0.002). However, respondents who perceived Tuberculosis to be a serious disease (OR=2.220,95%cl =1.100-4.480 p=0.026) and the belief that tuberculosis vaccination prevents against infections with tuberculosis (OR=3.77;95%cl =1.230-11.605, p=0.020) were found to have the highest significant odds of the willingness to accept isoniazid preventive treatment. (Table 4).

The participants had high perceptions of the benefits of tuberculosis immunization. The majority agree that immunization prevent tuberculosis 366 (73.2%) (χ^2 =12.458; p = 0.006). There was significant difference regarding group and the prevention of tuberculosis by Immunization. The age group 25-35years old 255(77.7%) had higher proportion that agreed that immunization could prevent Tuberculosis.

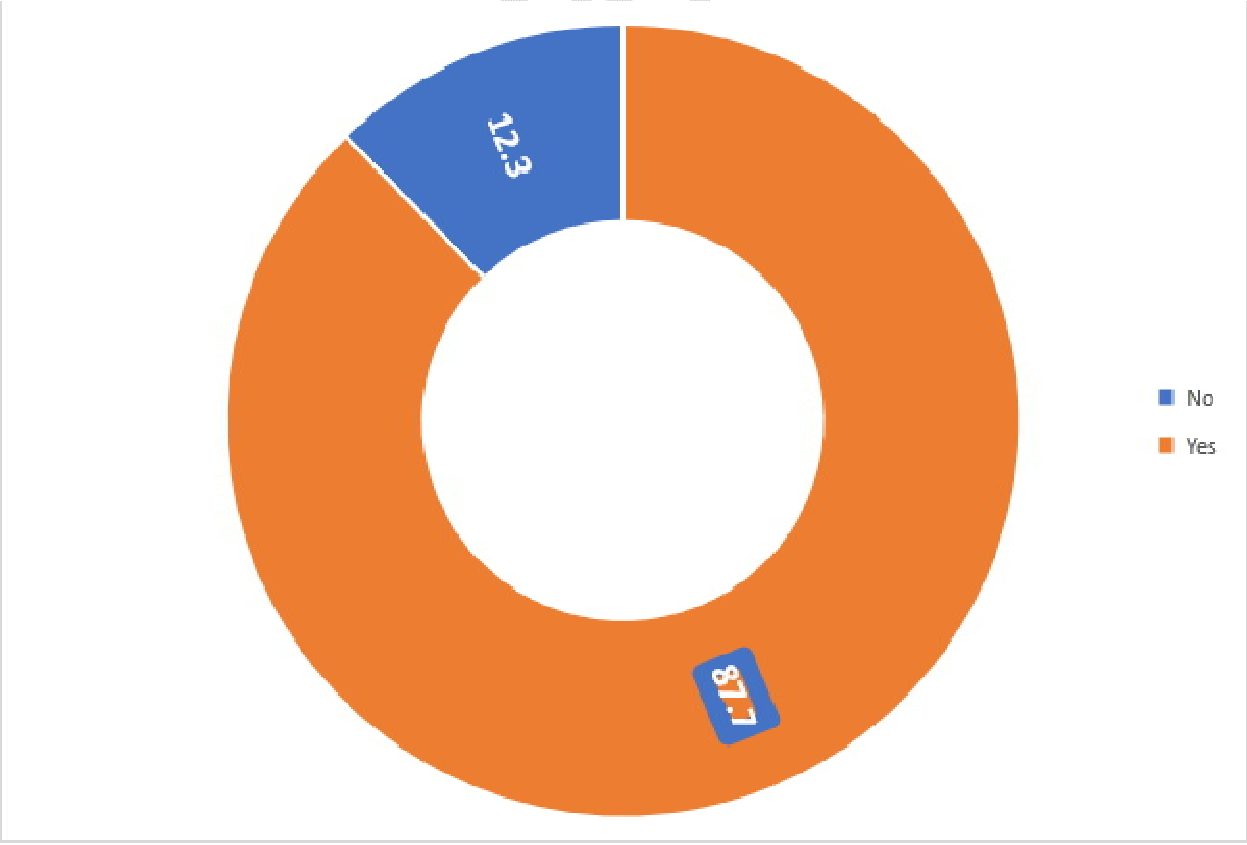

Figure 4: Will accept isoniazid treatment if tested positive for latent tuberculosis

4.0 Discussions

This survey uses the health belief model (HBM) to determine the factors associated with the willingness to test for latent tuberculosis infection and acceptance of isoniazid by healthcare workers in Nigeria. Our observation revealed that the perception of susceptibility to tuberculosis was low with respect to the probability of getting tuberculosis in the future, family history of tuberculosis, underlying illness, and lifestyle, with the exceptions occupational risk perception (60.9%). Also, the perception of severity of tuberculosis was low. Fortunately, the perceived benefit of tuberculosis vaccination was very high. The finding of this study indicates the need for increase perception of severity and susceptibility to tuberculosis by healthcare workers in Nigeria. This is because as perception to susceptibility and severity increases, the need to accept TB vaccine and other preventive measure such as preventive therapy, regular screening test among population at high risk of occupational exposure to tuberculosis increases [11]. Furthermore, it was noted that high perceived susceptibility and severity to infectious diseases translate into better preventive practice and enhance infections control and prevention [12,13,14].

Concerning the perceived severity to tuberculosis, our findings revealed that the fear of getting tuberculosis differs significantly (P<0.05>) among age categories. The group 25-46 years old had the highest proportion that expressed fear of getting tuberculosis. This is maybe because tuberculosis is associated with the middle age group [15,16]than with the elderly. And it has been shown that age is a predisposing factor to active tuberculosis. regarding the expression of the fear of getting tuberculosis, the result obtained in this study may be mask by the fear of stigmatization. Since in a similar study conducted previously, it was observed that tuberculosis and HIV/AIDS share similar symptoms; and the policy of screening for HIV in tuberculosis

patient may generate negative perception [17]and may explain the fear of tuberculosis infections observed among the middle age group in this study. Also, the fear of tuberculosis infections and stigmatization may make people with TB to hide their infection status and the intention to present for screening or diagnosis [18]. In a focus group study, [19] in the USA reported that HCWs fears coworker who tested positive for LTBI because they do not know the difference between LTBI and active tuberculosis.

Although, TB incidences and mortality was higher among males than females [1, 20], a higher proportion of the female gender 149 (36.8% vs 26.6%) believed that persons infected with TB could die. This maybe because the female gender, by her nature (based on African tradition) bears the pain of herself and family members including her husband. By carrying the weight of everybody, she expressed the perception of death due to tuberculosis for her husband and sons.

Our findings showed that most HCWs within the age group 36-46 years has the lowest proportion that agreed that persons infected with TB could die. This is surprising because tuberculosis mortality rate is higher among the age group 35-45 years old [20] compared to the very young and elderly people.

The overall acceptance of LTBI testing was high with nearly four out of every five HCWs expressing the intent to test for LTBI. Although few of the HCWs expressed a definite rejection of latent TBI testing. This proportion is significant given the fact that no one is safe until all are safe. Therefore, there is the need to intensify effort to screen all healthcare workers regularly and educating them on the dangers of tuberculosis. Moreover, the role of healthcare workers as role models in their community is essential in the control and prevention of active tuberculosis and other infectious respiratory diseases [16].

Binary logistic regression analysis found that the demographic characteristics of the respondents were associated with acceptance of LTBI testing. In particular, the findings of this study suggested that the age group 36-46 years old were 14 times more likely to accept LTBI testing. This finding was consistent with a previous study in South Korea in which age was found to be the only risk factor for latent tuberculosis screening among Healthcare Workers (Jong Lee et al., 2010)[21]. It is recommended that increase tuberculosis education regarding infection control and prevention among the middle age is needed to bring about the desired behavioral change.

Healthcare workers who indicated that they were at high risk of contracting tuberculosis because of their occupation were less likely to undergo screening for LTBI. This finding was surprising because of previous studies in Nigeria and other countries have reported that healthcare workers are at greater risk of tuberculosis infection. Therefore, it is expected that healthcare workers in this study would be more willing to undergo screening for LTBI and accept measures to prevent active tuberculosis.

Concerning who should get testing for LTBI, 115(24.8%) agreed that occupation risk groups and persons in contact with tuberculosis patients should be tested regularly. This finding is consistent with global recommendations for latent tuberculosis testing. The WHO recommended that systematic testing should be performed on people living with HIV(PLWH), adults and child contacts with active tuberculosis cases, prisoners, Healthcare workers, immigrants from high tuberculosis burdened countries, homeless persons, illicit drug users and patients with the following conditions:initialing anti-tumor neurosis factors treatment, receiving dialysis, preparing for transplants, and being affected by silicosis [1]. Thus, identifying and testing people at risk of tuberculosis is an important public health measure to prevent the spread of tuberculosis in

the community, hospital or healthcare facility by early diagnosis and initiation of preventive therapy (Ayub et al., 2004)[22].

Interestingly, our finding showed that majority of (56%) of the Healthcare workers in the study never gets tested for LTBI. This is because the policy of systematic or annual LTBI screening has not been implemented for healthcare workers by the National Tuberculosis Control Plan in Nigeria(Federal Ministry of Health, 2012)[23].

Regarding isoniazid preventive treatment, majority (87.7%) of the respondents agreed to commence chemoprophylaxis if tested positive for LTBI. Univariable logistics regression analysis revealed that HCWs from the northwest (OR 4.25, 956Cl 1.216-14.688, P=0.023) and southeast (OR 4.414, 95%Cl=1.382-14.609, P=0.012) were found to have greater odds of the willingness to accept isoniazid treatment if they are positive for LTBI. The reason for this observation is beyond the scope of this study. It is recommended that further study be carried out to elucidate the factors responsible for the variation in the intention to accept isoniazid in the different geopolitical zones of Nigeria.

Our finding revealed that HBM constructs was associated with the intention to received isoniazid prophylaxis which is in concordance with previous studies [24,25,26]. In particular, the finding of this study showed that high perception of seriousness (OR = 2.220, 95% C.I = 1.100-4400 p=0.026) and benefit of tuberculosis immunization (OR = 3.777; 95% C.I = 1.230-11.650; P = 0.020) were the most significant factors that were influencing the intention to accept isoniazid preventive therapy. This finding implies needed for promotional health messages framing a high risk of tuberculosis and the benefit of carrying out preventive measures.

5.0 Conclusions

Most health workers in this study intended to get tested for LTBI and accept isoniazid prevention therapy. The important predicators of the willingness to get tested and accept isoniazid chemotherapy against LTBI include age, geopolitical zone, perception of seriousness and the benefits of tuberculosis immunization. The study has important implication for facilitating government and stakeholders to design policies in Nigeria that will target intervention programmes to enhance tuberculosis prevention and control among healthcare workers and the public. We therefore recommend the inclusion of LBTI testing and treatment in the National TB Control Programme.

Ethics approval and consent to participate.

Permission to conduct the research was approved by the National Open University of Nigeria (NOUN) research ethic committee. To ensure confidentiality, the names of the participants were not included during data collection, analysis, and presentation. Study participants were given all the information regarding the study and consent to participate was implied by the submission of the completed online survey.

Consent for publication

Not applicable.

Availability of data and materials

All the data supporting this study are included in the article and the supplementary documents.

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