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Assessment of Knowledge, Attitude, and Practices on Tuberculosis Amongst Nomads in Adamawa State, Nigeria

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Abstract

Nomads are susceptible to TB because of limited access to TB services, inadequate nutrition, high prevalence of bovine TB, intake of unpasteurized milk, and migratory lifestyle, among other factors. Enhancing community knowledge and awareness plays a vital role in aiding prompt identification of TB; a fundamental aspect of the End TB Strategy. Although there have been several studies on knowledge, attitude, and practices (KAP) related to TB in Nigeria, no research has specifically focused on KAP towards TB among Nomads. Data from 160 individuals in Nomadic pastoralist communities across 2 LGAs in Adamawa State, were collected as part of a 2-arm randomized controlled trial. This study aimed to assess the KAP of Nomadic pastoralist population, using a multi-stage sampling method. Data were gathered by a validated and pretested, structured questionnaire and analysed using SPSS Version 22. Descriptive variables were summarized using frequency counts, and Chi-square test was employed to examine associations. Gaps in TB knowledge, variation in hygiene practices and beliefs about TB causes and transmission were observed. For instance, 15% of nomads have sound knowledge of TB in the intervention group as against 36.3% in the control group. 17.5% in the intervention group have a positive attitude toward TB compared to 15.0% in the control group. 22.5% of the respondents in the intervention group show adherent practice as against 20.0% in the control group. Community-specific health education programs targeting hygiene promotion campaigns, emphasizing key practices of cough etiquette, and pasteurization of milk should be developed and implemented.

Keywords: *Active Case Finding, Adamawa, Nomads, Nigeria, Tuberculosis.*

Introduction

Tuberculosis (TB) is an infectious disease caused by the bacteria *Mycobacterium tuberculosis*. TB, an airborne disease, spreads when infected patients cough, sneeze, talk, or spit, thereby releasing TB bacilli into the air. This means that transmission is common in crowded and poorly ventilated environments [1]. Nigeria is ranked sixth among the 30 highest TB burden in Africa [2]. Despite being a curable disease, TB ranks as the second most common cause of death worldwide among infectious diseases, following SARS-CoV-2 [3]. TB case detection has remained persistently low in Nigeria with only 24% of the estimated TB Cases notified in 2018 despite failing to diagnose and notify over 300,000 TB cases annually [4].

Nomads are groups of individuals who frequently relocate in search of suitable grazing land for their livestock. Nomadic pastoralists distinguished by their frequent migration and absence of fixed habitation, encounter substantial obstacles concerning healthcare. The global Nomadic population is estimated to range from 50 to 100 million individuals, with approximately 9.4 million residing in Nigeria.

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Among them, over 5 million are Nomadic Pastoralists, while the rest are Nomadic farmers and fishermen, primarily located in the Chad River basin in North-Eastern Nigeria [5, 6]. Adamawa is home to an estimated 450,000 Nomadic Fulani Pastoralists, making it the state in Nigeria with the largest population of Nomads [6]. Despite following established migration routes, the continuous movement of Nomads poses challenges for the Government, especially the State TB Control Programme, in delivering healthcare services, such as childhood vaccines and TB prevention and care, to this population. Nomadic individuals are recognized for seeking the services of traditional healers and other non-official healthcare practitioners, such as patent medicine vendors and community chemists, to address their health concerns. This practice often results in delays in accessing legitimate healthcare services, where TB can be identified and treated thereby leading to a higher rate of morbidity and mortality due to TB among Nomads. Their distinct language, limited educational background, and low level of awareness pose significant obstacles for health personnel to understand them. In Nigeria, Nomadic communities are highly vulnerable to TB infections due to several factors, such as restricted access to health information, economic impoverishment, limited healthcare services, dependence on traditional or alternative medicine, geographical isolation, social exclusion, and migration [6-8]. Studies conducted in Adamawa State and other areas have revealed a notable frequency of TB among Nomadic Pastoralists [6]. Disease management initiatives, such as TB prevention programs, can exhibit deficiencies in Nomadic communities [5] or fail to adequately accommodate the mobile lifestyle of pastoralists [9]. Supported by TB REACH from the Stop TB Partnership [10], a community-based organization, Janna Health Foundation, launched a TB intervention targeting Nomadic Communities in Adamawa State. This involved training and delivering health education to community volunteers (CVs) from Nomadic groups. However, the training curriculum utilized national CV training modules that neglected to consider the unique socio-cultural characteristics of Nomads. The CVs were supported to conduct TB awareness campaigns among Nomadic pastoralists [11]. Although there has been significant research conducted on Knowledge, Attitudes, and Practices (KAP) in Nigeria, this has not been extended to Nomadic pastoralist communities by researchers and health planners. As a result, the Nomadic population has a notable deficiency in comprehending the knowledge, attitude, behaviors, and delivery methods related to health education. Therefore, it is crucial to thoroughly assess knowledge, attitudes, and behaviors (KAPs) related to TB and implement effective interventions which is essential for the successful implementation of the End TB transformative agenda. Gaining a thorough understanding of TB is an effective strategy for inspiring people to seek medical attention and ensuring equal access to treatment. This baseline study aimed to assess the knowledge, attitudes, and actions about TB among Nomadic pastoralist groups in Adamawa State, situated in Northeast Nigeria.

Materials and Methods

Baseline knowledge, attitudes, and practices to TB were obtained from a 2 arm randomized control trial involving 160 nomads from 2 Local Government Areas (Girei and Yola South) in Adamawa state.

Study Designs

A 2-arm randomized controlled trial (RCT) was adopted to investigate the knowledge, attitude, and preventative practices regarding TB among the Nomads in Adamawa State from January to June 2022. This design enhances the statistical rigor, generalizability, and ethical considerations in research, ensuring robust and reliable findings [14, 15].

Study Area, Participants, Sample and Sampling Technique

Adamawa State is in the North-Eastern part of Nigeria with an estimated population of 4.3 million (projected from the 2006 National Census) [12], about 10% of whom are Nomadic people. The study area included 2 Local Government Areas (LGAs) containing 628 health facilities (both public and private). Of the total facilities, 109 provide TB treatment services, while 32 provide diagnostic services. There were two GeneXpert MTB/RIF testing sites in the study area in 2023. Each diagnosis and treatment unit used standard recording and reporting tools issued by the National Tuberculosis, Leprosy, and Buruli Ulcer Control Programme (NTBLCP).

The necessary sample size was determined using the formula specific to estimating a single proportion [13]. Given the absence of analogous studies in existing literature and the participants' demonstrated low knowledge of TB, a conservative estimate of 25% was utilized. With a desired 95% confidence level and a 5% margin of error, the calculated sample size was adjusted to accommodate potential respondent dropouts by increasing it by 10%.

Consequently, the finalized sample size was set at 160 subjects. For each of the two local government areas under investigation one of the LGAs was assigned intervention while the other one as a control group and from each LGA, 80 nomads were randomly selected.

Participants were recruited using a multistage sampling strategy. Stage 1: Twelve (12) LGAs with a significant Nomadic pastoralist population were selected out of the 21 LGAs in Adamawa State. Stage 2 involved the random selection of 2 LGAs; 1 of the LGAs was designated as the intervention group, where a specially designed education training module for Nomadic pastoralists was implemented while the other LGA served as the control group, where no intervention took place. The control group was used for comparative purposes. Then, from each LGA, one Nomadic community was randomly picked from the list of nomadic communities in that LGA using a simple random sample approach. Subsequently, the households were picked by systematic selection from each community, while the individuals were chosen by cluster sampling from each household, till 160 participants ($\geq$ 18 years) were chosen. The participants were questioned in the LGAs after receiving their written and verbal informed consent. The inclusion criteria for participants in the study encompassed individuals who identified as Nomadic/Pastoralists, aged between 18 and 60, demonstrated a willingness to participate throughout the study, were residents in Adamawa State at the time of the study, and were mentally sound to provide relevant responses. Conversely, exclusion criteria involved individuals below the age of 18 or above 60, those deemed not mentally sound, individuals not classified as Nomadic/pastoralists and those who were not residents of the state during the study period.

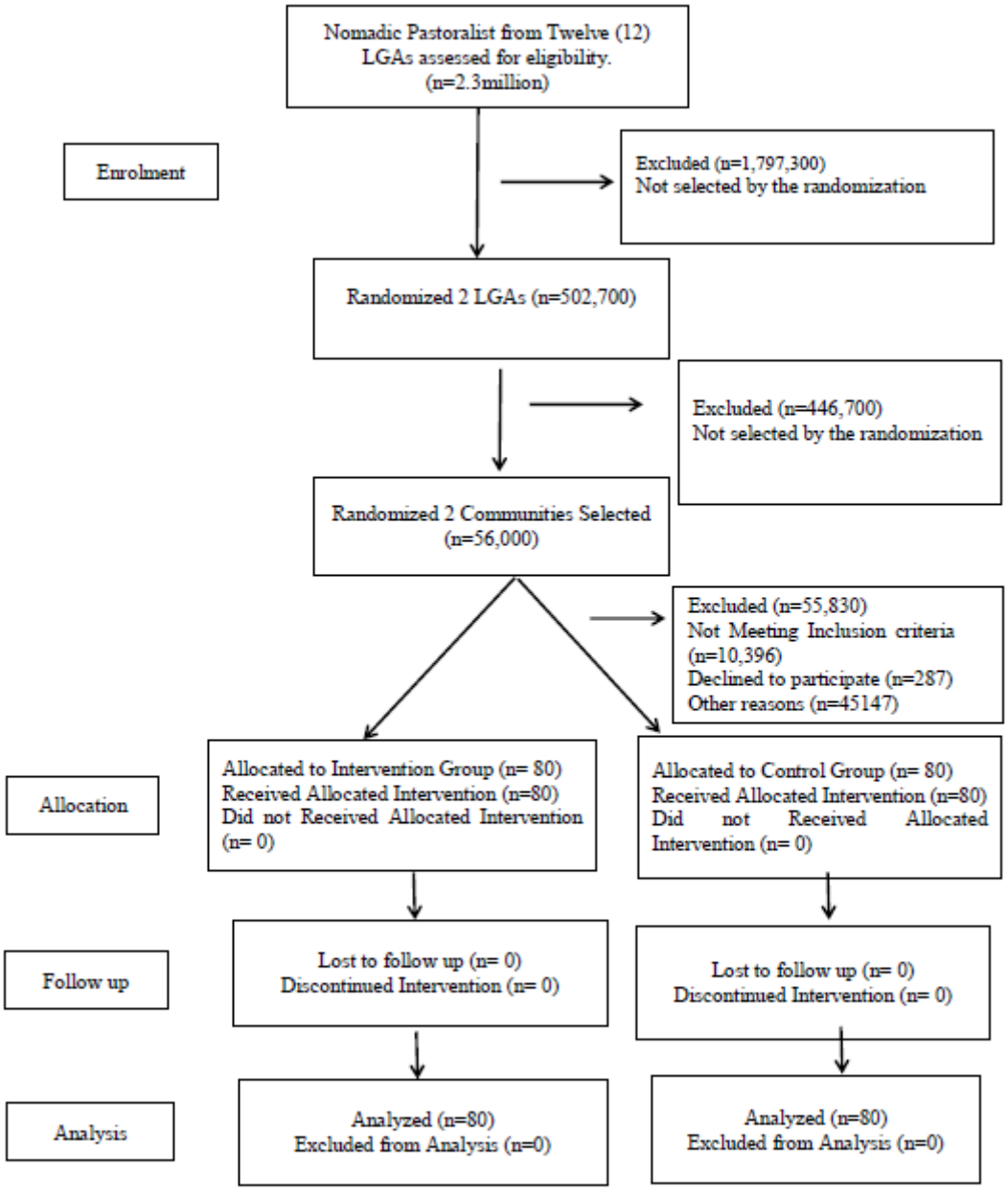

Figure 1. The Consort Diagram

Data Collection Methods

Data was collected using a validated and pretested structured interviewer-administered questionnaire. The Questionnaire was a modified version of that used by Bashorun et al [17] the questionnaires included demographic information and questions about knowledge and items about attitudes and practices. Knowledge with 22 questions on general knowledge, transmission, diagnosis, and treatment of TB. The attitude was assessed with 10 and practice with 7 items based on national guidelines for the control of TB.

Ethical Consideration

Ethical approval to conduct the study was obtained from the Adamawa State Ministry of Health's Ethics Committee for Research. In addition, permission was sought and obtained from Nomadic community leaders from all participating communities Verbal informed

consent was also obtained as many participants may not be able to read.

Data Analysis

SPSS (Statistical Package for the Social Sciences) version 22 was used for data analysis and alpha was set at the 5% level. Knowledge and practice were assessed using YES, NO, and Don't Know. Attitude was assessed on a 5-point, Likert-type scale: Strongly agree (5 points), agree (4 points), no difference (3 points), disagree (2 points), and strongly disagree (1 point).

Knowledge, attitude, and practice items were analyzed for mean scores with standard deviations. To find the correlation between scores of knowledge, attitude, and practice, the Pearson coefficient was determined.

The total scores obtained were categorized into 3 levels for each of the variables using the mean and standard deviation of the score. Using mean and standard deviation to categorize nomads' knowledge, attitude, and practice on TB offers an objective assessment of central tendencies and variability [18]. This method enabled nuanced insights into TB-related understanding and behaviors within nomadic communities, guiding tailored interventions. Quantifying average levels and assessing spread, facilitates informed decision-making to address TB awareness and stigma effectively [19]. Altogether, this approach provided a robust framework for improving TB-related outcomes in nomadic populations. A breakdown of the cut-off points is given below:

Sound: Scores below (Mean - Standard Deviation)

Intermediate: Scores between (Mean - Standard Deviation) and (Mean + Standard Deviation)

Not Sound: Scores above (Mean + Standard Deviation)

Definition of Terms

***Sound Nomadic Knowledge*:** Nomads in this category exhibit a comprehensive understanding and awareness of tuberculosis, its transmission, risk factors, symptoms, and treatment options. They demonstrate a solid grasp of information related to tuberculosis and exhibit a clear understanding of its implications on individual and community health.

Intermediate Nomadic Knowledge: Nomads in this category possess a moderate level of knowledge regarding tuberculosis. They show some understanding of the disease, its transmission modes, and preventive measures. However, their knowledge may be incomplete or not as detailed as those in the "Sound" category.

Not Sound Nomadic Knowledge: Nomads in this category lack sufficient understanding of tuberculosis, its transmission modes, and treatment options. Their knowledge may be fragmented, and they might hold misconceptions or incorrect beliefs about tuberculosis that could affect their health-seeking behaviors or attitudes toward the disease.

Sound Nomadic Attitude: Nomads in this category demonstrate a positive and supportive attitude towards tuberculosis prevention and control. They are proactive in adopting preventive measures, supportive of public health interventions, and are open to seeking medical help when necessary.

Intermediate Nomadic Attitude: Nomads in this category exhibit a neutral or indifferent stance towards tuberculosis prevention and control. They may not actively engage in preventive measures or public health interventions but are also not opposed to them. Their attitude towards tuberculosis is neither positive nor negative.

Not Sound Nomadic Attitude: Nomads in this category have a negative attitude towards tuberculosis prevention and control. They may hold misconceptions, fear, or stigma towards tuberculosis and may avoid seeking medical help or engaging in preventive measures due to these negative attitudes.

Sound Nomadic Practice: Nomads in this category adhere strictly to recommended practices for tuberculosis prevention and control. They actively engage in behaviors that reduce the risk of transmission, such as covering their mouth while coughing, seeking medical help when experiencing symptoms, and following the prescribed treatment regimen if diagnosed with tuberculosis.

Intermediate Nomadic Practice: Nomads in this category demonstrate inconsistent adherence to practices for tuberculosis prevention and control. While they may engage in some preventive behaviors, they may not consistently follow all recommended practices. This group may need targeted education and support to improve their adherence.

Not Sound Nomadic Practice: Nomads in this category do not adhere to recommended practices for tuberculosis prevention and control. They may disregard preventive behaviors, not seek medical help when symptomatic, or not comply with the prescribed treatment regimen if diagnosed with tuberculosis. These individuals are at higher risk of infection and may require intensive education and support to change their behaviors.

Results

Demographic Characteristics of the Respondents

Demographic characteristics of the Nomads in the 2 selected local government areas are given in Table 1.

In the intervention group, 75% were male, and 25% female, while the control group had 67.5% males and 32.5% females. Gender distribution did not differ significantly between the groups ($p = 0.421$). The majority in both groups were married (approximately 71-72%), with no significant differences in marital status. The age distribution, educational backgrounds, and occupation showed no significant differences between the Intervention and control groups. In both groups, the family head was predominantly the household head, with no significant differences in this relationship.

While both groups varied in the time taken to reach the nearest health facility, there was a statistically non-significant difference between them ($p = 0.334$). Household sizes differed, with the majority having 5-14 people, but no significant variations were observed between intervention and control groups. Participants in both groups exhibited diverse income levels related to cattle ownership, with no statistically significant difference, although the p-value approached significance ($p = 0.188$).

Baseline Assessment of Nomad's Knowledge of Tuberculosis

The baseline assessment of Nomads' knowledge of TB in Intervention and Control Local Government Areas is given in Table 2.

Table 1. Demographic Information of Participants

Variable	**Study Group**		**Total (N=160) n (%)**	***P value**
	Intervention (N=80) n (%)	**Control** (N=80) n (%)		
Gender				
Male	60(75.0)	54(67.5)	114(71.2)	.421
Female	20(25.0)	26(32.5)	46(28.8)	
Marital Status				
Single	6(7.5)	14(17.5)	20(12.5)	.871

Married	61(76.3)	54(67.5)	115(71.9)	
Widow	13(16.3)	12(15.0)	25(15.6)	
Widower	0(0)	0(0)	0(0)	
Age				
18-25 years	7(8.8)	12(15.0)	19(11.9)	.815
26-35 years	29(36.3)	30(37.5)	59(36.9)	
36-45 years	34(42.5)	26(32.5)	60(37.5)	
Above 45 years	10(12.5)	12(15)	22(13.75)	
Education Status				
Primary	9(11.3)	12(15.0)	21(13.1)	.845
Secondary	4(5.0)	8(10.0)	12(7.5)	
Tertiary	1(1.3)	2(2.5)	3(1.9)	
Islamic	31(38.8)	26(32.5)	57(35.6)	
None	34(42.5)	32(40.0)	66(41.3)	
Others (Nomadic)	1(1.3)	0(0)	1(0.6)	
Occupation				
Herder	13(16.3)	12(15.0)	25(9.4)	.883
Farmer	61(76.3)	62(77.0)	123(76.9)	
Herder & Farmer	2(2.5)	4(5.0)	6(2.8)	
Others (Trader)	4(5)	2(2.5)	6(3.8)	
Relationship with Family Head				
Household Head	39(48.8)	46(57.5)	85(53.1)	.980
Wife	11(13.8)	10(12.5)	21(13.1)	
Child	9(11.3)	12(15.0)	21(13.1)	
Brother	0(0)	0(0)	0(0)	
Sister	15(18.8)	8(10)	23(14.4)	
Others	6(7.5)	4(5.0)	10(6.3)	
Time is taken to reach the nearest Health facility				
1 hour	2(2.5)	2(2.5)	4(2.5)	.334
2 hours	24(30.0)	44(55.0)	68(42.5)	
3 hours	51(63.8)	30(37.5)	81(50.6)	
4 hours	3(3.8)	4(5.0)	7(4.4)	
People living in the Household				
Less than 5 people	4(5.0)	6(7.5)	10(6.3)	.848
5-14 people	52(65.0)	60(75.0)	112(70.0)	
15 & above	24(30.0)	14(17.5)	38(23.7)	
Income Level				
0-20 cattle heads	12(15.0)	10(12.5)	22(13.8)	.188

20-40 cattle heads	40(50.0)	42(52.5)	82(51.2)	

**p-value calculated using Chi-square test (X)*

Table 2. Knowledge of Tuberculosis in Adamawa State

Knowledge of Tuberculosis	**YES n (%)**	**NO n (%)**	**DON'T KNOW n (%)**
Tuberculosis is caused by germs	75(45)	36(22.5)	52(32.5)
TB infection is spread by Breathing in bacteria expelled by TB infected person	50(31.3)	36(22.5)	52(32.5)
The lungs are the most common site for TB disease	97(60.6)	20(12.5)	43(26.9)
A definitive diagnosis of TB is made at the Health Centre	19(11.9)	104(65.0)	37(23.1)
Sources of TB infection in the community include Unpasteurized Milk	11(6.9)	62(38.3)	87(54.4)
Diabetes is among the risk factors for progression from TB infection to TB disease	90(56.3)	15(9.4)	55(34.4)
Diarrhea is a symptom of active pulmonary TB disease	46(28.8)	83(51.9)	31(19.4)
TB is treatable with drugs received at the Health Centre	56(35.0)	57(35.6)	47(29.4)
TB is curable	29(18.1)	88(55)	43(26.9)
Treatment is free	44(27.5)	0(0)	116(72.5)
TB treatment duration is 6 months or more depending on the type	121(75.6)	36(22.5)	3(1.9)
Traditional Healers could treat TB	76(47.5)	36(22.5)	48(30)
TB is inherited from parents	61(38.1)	42(26.3)	57(35.6)
Women are responsible for infecting Men with TB	102(63.8)	5(3.1)	53(33.1)
All people who have TB also have HIV	54(33.8)	34(21.3)	72(45)
TB is caused by witchcraft	104(65)	45(28.1)	11(6.9)

TB is transmitted through a handshake	44(27.5)	56(35)	60(37.5)
TB is curable with drugs obtained from the Health Centre	98(61.3)	13(8.1)	49(30.6)
Traditional Medicines are effective in treating TB	61(38.1)	43(26.9)	56(35)
People living with HIV cannot be cured from TB	108(67.5)	45(28.1)	7(4.4)
People with TB remain infectious	52(32.5)	15(9.4)	93(58.1)
If one family member has TB, all family members also have TB	13(8.1)	147(91.9)	0(0)

The table provides insights into the knowledge levels regarding tuberculosis (TB) among respondents, categorized into "YES," "NO," or "DON'T KNOW" responses.

The majority of respondents correctly identified that TB is caused by germs, with 45% answering affirmatively. Similarly, a significant proportion recognized that TB infection spreads through breathing in bacteria expelled by infected persons, indicating a reasonable level of awareness regarding transmission routes.

Understanding of the most common site for TB disease was also evident, with a substantial majority recognizing the lungs as the primary affected area. However, there were areas of uncertainty and misconception. For instance, a relatively low percentage knew that a definitive diagnosis of TB is made at health centers, suggesting potential gaps in understanding diagnostic processes.

Misconceptions about TB sources were also apparent, with a notable percentage incorrectly believing that unpasteurized milk could be a source of infection. Additionally, misconceptions regarding TB transmission routes were evident, such as the belief that TB could be inherited from parents or transmitted through a handshake.

On a positive note, a considerable percentage recognized that TB is treatable with drugs obtained from health centers and that treatment is often free. Similarly, awareness regarding the duration of TB treatment was relatively high, with most respondents acknowledging the six-month or longer treatment period depending on the type. However, there were notable misconceptions about TB and its treatment. For example, a significant percentage believed that traditional healers could effectively treat TB or that traditional medicines were effective in treating the disease.

Misconceptions regarding TB-HIV co-infection were also evident, with a substantial percentage believing that all people with TB also have HIV or that people living with HIV cannot be cured of TB.

Overall, the data highlights both areas of solid understanding and persistent misconceptions regarding TB, indicating a need for targeted education and awareness campaigns to improve knowledge levels and combat misinformation.

Baseline Assessment of Nomad's Attitude Towards Tuberculosis

The baseline assessment of Nomads' attitude towards TB in the intervention and control group is given in Table 3 below:

Table 3. Attitude towards Tuberculosis in Adamawa State

Attitudes towards Tuberculosis	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
TB is a punishment from God	74(46.3)	17(10.6)	36(22.5)	32(20.0)	1(0.6)
TB is due to witchcraft	73(45.6)	8(5.0)	43(26.9)	33(206)	3(1.3)
TB is curable	5(3.1)	14(8.8)	28(17.5)	65(40.6)	48(30.0)
HIV/AIDS is due to TB	68(42.5)	19(11.9)	36(22.5)	34(21.3)	3(1.9)
TB is due to HIV/AIDS	68(42.5)	18(11.3)	31(19.4)	42(26.3)	1(0.6)
People with TB should be feared	69(42.8)	11(6.9)	28(17.6)	50(31.4)	2(1.3)
People with TB should be avoided	68(42.5)	16(10.0)	32(20.0)	41(21.6)	3(1.9)

The table provides insights into attitudes toward tuberculosis (TB) among respondents, categorized into five levels ranging from "STRONGLY DISAGREE" to "STRONGLY AGREE."

There are prevalent misconceptions and stigmatizing beliefs evident in the responses. For instance, a significant portion of respondents expressed agreement or strong agreement with the belief that TB is a punishment from God or is due to witchcraft. These attitudes perpetuate stigma and may hinder efforts to address TB effectively.

There's also a concerning level of agreement with the idea that people with TB should be feared or avoided. Such attitudes contribute to social isolation and discrimination against individuals with TB, making it more challenging for them to seek and adhere to treatment.

However, there are also positive attitudes reflected in the data. A majority of respondents agreed or strongly agreed with the statement that TB is curable, indicating awareness of the treatability of the disease. Similarly, there's widespread recognition that TB is not directly responsible for causing HIV/AIDS.

Overall, while there are some positive attitudes toward TB treatment and curability, the prevalence of stigmatizing beliefs and misconceptions suggests a need for targeted interventions to address stigma, promote accurate knowledge about TB, and encourage supportive attitudes toward individuals affected by the disease. Such efforts are essential for improving TB control and ensuring that affected individuals receive the care and support they need.

Baseline Assessment of Nomads Practices on Tuberculosis Prevention and Control practice Almost Always Comes After Attitudes

The baseline assessment of nomads' practice on TB in Intervention and Control of Local Government Areas is given in Table 4 below:

Table 4. Practices on Tuberculosis in Adamawa State

Practices on Tuberculosis	YES n (%)	NO n (%)	DON'T KNOW n (%)
Turning the face away while coughing	22(13.8)	42(26.3)	96(60.0)

Coughing/sneezing into the fold of the elbow	30(18.8)	94(58.8)	36(22.5)
Covering the mouth and nose with a clean piece of cloth while coughing	16(10.0)	66(41.3)	78(48.8)
Disposal of sputum in sand jars or spit out and burry under sand	30(18.8)	96(60.0)	34(21.3)
Coughing in a closed crowded environment with poor ventilation	44(27.5)	28(17.5)	88(55)
Boiling milk before use	102(63.8)	5(3.1)	53(33.1)
Handshake with a person who is coughing/suspected of having TB	97(60.6)	20(12.5)	43(26.9)
Sharing utensils with a person who is coughing/suspected of having TB	121(75.6)	36(22.5)	3(1.9)
Having a good diet especially when suspecting TB	76(47.5)	36(22.5)	48(30)
Visit a health facility when having TB symptoms	42(26.3)	92(57.5)	26(16.3)

The table presents insights into various practices concerning tuberculosis (TB), with responses categorized as "YES," "NO," or "DON'T KNOW."

When it comes to basic hygiene practices like turning away while coughing or sneezing into the elbow fold, the adherence seems relatively low, with only a minority responding positively. Covering the mouth and nose with a clean cloth during coughing also appears to be an uncommon practice, as indicated by the low percentage of affirmative responses.

Moreover, proper disposal of sputum seems to be lacking among a significant portion of respondents, with many opting not to follow recommended methods. The issue of coughing in poorly ventilated, crowded spaces also seems to be met with uncertainty, with a large proportion expressing a lack of knowledge.

However, there are areas where adherence seems more promising. For instance, the majority of respondents reported boiling milk before use, reflecting awareness of the importance of proper food hygiene.

Yet, concerning is the high percentage of respondents who reported shaking hands with individuals exhibiting TB symptoms, indicating a potential misunderstanding of TB transmission routes. Similarly, the prevalent practice of sharing utensils with potentially infected individuals suggests a need for education on TB prevention measures.

While there's some awareness about the importance of a balanced diet in managing TB, a significant portion of respondents still seem uncertain about this aspect. Additionally, despite a notable percentage recognizing the need to visit a health facility when experiencing TB symptoms, a substantial number reported not doing so, which could delay diagnosis and treatment.

Overall, the data underscores a mix of adherence to recommended practices and areas where further education and awareness are necessary to effectively combat TB

transmission and improve public health outcomes.

Table 5. Knowledge (Sound, Intermediate or Not Sound), (Sound, Intermediate or Not Sound.) and Practices (Sound, Intermediate or Not Sound.) Between Groups

Variable		Intervention Group (n=80)	Control Group (n=80)	Test χ^2	P value
Knowledge	Sound Knowledge	12(15.0)	29(36.3)	10.5	.005
	Intermediate Knowledge	40(50.0)	25(31.3)		
	Not Sound sound Knowledge	28(35.0)	26(32.4)		
Attitude	Sound Attitude	14(17.5)	12(15.0)	0.162	.920
	Intermediate Attitude	35(43.8)	34(43.0)		
	Not sound Attitude	31(38.7)	33(42.0)		
Practice	Sound Practice	18(22.5)	16(20.0)	5.60	.061
	Intermediate Practice	40(50.0)	53(66.3)		
	Not Sound Practice	22(27.5)	11(13.7)		

Chi-square test (χ^2)

Significant at $p < 0.05$

Chi-square Test

The results revealed a statistically significant association in knowledge level ($\chi^2 = 10.5$, $p = .005$). Specifically, participants in the intervention group demonstrated significantly different knowledge levels compared to those in the control group. However, no significant association was found on attitude ($\chi^2 = 0.162$, $p = .920$), indicating that participants' attitudes did not differ significantly between the intervention and control groups. Regarding practice, although the association was not statistically significant at the conventional threshold ($\chi^2 = 5.60$, $p = .061$), it approached significance, suggesting a potential trend worth further exploration.

Discussion

The results indicate that there are gaps in knowledge and awareness about the causes, transmission, and diagnosis of TB among respondents from the Intervention and Control Group. The results also suggest that there may be different cultural, social, or environmental factors that influence the beliefs and practices of the respondents from the two Groups.

The results show that there are significant differences in the knowledge and beliefs of respondents from Intervention and Control groups about the cause and transmission of TB. These findings were also supported by research conducted in Ethiopia conducted in India [16] [20]. This may have implications for the

prevention and control of TB in these communities. One possible explanation for the difference in the belief is the level of exposure to health education and awareness campaigns about TB. According to a report by the World Health Organization [21], Nigeria has a low TB case detection rate and a high TB burden, which indicates a need for more effective communication and social mobilization strategies to reach the population at risk. Respondents from the control group may have received more information and messages about TB than respondents from the intervention group either through formal or informal channels, and thus have a higher awareness of the bacterial origin of TB.

A possible implication of these differences is the need for tailored and targeted health education and communication interventions for the two communities, taking into account their existing knowledge and beliefs, as well as their cultural and environmental contexts. For example, for respondents from the intervention group, it may be beneficial to emphasize the scientific facts and evidence about the causes and transmission of TB, using simple and clear language, and providing examples and illustrations that are relevant and relatable to their lives. For respondents from the control group, it may be beneficial to reinforce the messages about the causes and transmission of TB, and also to expand their knowledge and awareness of the different forms and manifestations of TB, using testimonials and stories from TB survivors and health workers.

The findings also highlight variations in hygiene practices, emphasizing the importance of targeted health education interventions. The results show that participants from the control group exhibit significantly higher adherence to key hygiene practices, such as turning their face away while coughing and disposing of sputum hygienically, compared to the intervention group These practices are important for preventing the transmission of TB bacteria, which can spread through the air when a person with TB coughs, sneezes or speaks [1]. By following these practices, participants from the Control group may reduce their risk of getting infected with TB or infecting others.

The results also show that there are significant differences between the two groups in practices like coughing in closed environments and boiling milk. These practices may also affect the risk of TB transmission and infection, as closed environments with poor ventilation can increase exposure to TB bacteria [22], and unpasteurized milk can be a source of bovine TB, which can infect humans [23]. Participants from Intervention were more likely to cough in closed environments, while participants from the control group were more likely to boil milk before use, which may indicate different levels of awareness or access to information about these practices. These are in concordance with a finding of a Zimbabwean study conducted by Moyo et al. [24] and a study by Naidoo et al. [25] which covers sub-Sahara Africa. The studies also reported that there were poor and inconsistent practices regarding TB in the study areas.

The findings from the attitudes towards TB in the Intervention and control group provide valuable insights into the community's perceptions of TB-related beliefs. Notably, there were no significant differences in the belief that TB is a punishment from God or that it is attributed to witchcraft in the two groups, with a substantial proportion in both areas strongly disagreeing with these notions. This suggests a shared understanding and rejection of traditional and superstitious explanations for TB in both communities. This agrees with TB/LTBI education, misconceptions embedded in cultural beliefs about TB transmission and prevention persisted [26].

Moreover, the agreement on the curability of TB was consistent across the Intervention and control group, with 30.0% in each location expressing a strong belief in the treatability of the disease. This alignment in perspectives indicates a common understanding of the

potential for recovery from TB within the study population [27].

While there was no statistically significant distinction in the belief that HIV/AIDS is caused by TB, an intriguing variation emerged in the perception of the relationship between TB and HIV/AIDS. Participants in the Intervention and control group diverged in their views, with a statistically significant difference ($p = 0.05$) noted. This suggests a nuanced difference in attitudes towards the interplay of these two diseases, warranting further exploration to understand the factors influencing this disparity.

Interestingly, participants in both locations demonstrated a similar stance regarding the emotional and social aspects of TB. There were no significant differences in the beliefs that people with TB should be feared or avoided [27]. The shared rejection of these stigmatizing attitudes in both the Intervention and Control groups is a positive finding, indicating a potential foundation for community support and inclusion in the context of TB.

Overall, the study highlights both the commonality and subtle variations in the attitudes towards TB in the Intervention and Control Group, underscoring the importance of considering local beliefs and perceptions in public health interventions and awareness campaigns.

Conclusion

This study sheds light on knowledge variations and hygiene practices related to TB in the Intervention and Control Group. The findings underscore the necessity of targeted health education interventions to address community-specific needs and bridge knowledge gaps. The observed differences in hygiene practices highlight the importance of tailored strategies for effective TB prevention. Shared rejection of stigmatizing attitudes across the two LGAs indicates a positive foundation for community support. This research emphasizes the significance of culturally sensitive approaches in public health initiatives to enhance awareness and foster positive health behaviors.

Recommendation

Based on the findings of this study, it is recommended that community-specific health education programs should be developed and implemented in the Intervention and Control Group to address knowledge gaps regarding TB causes, transmission, and prevention. Also, launch targeted hygiene promotion campaigns, emphasizing key practices such as face-turning during coughing, proper sputum disposal, and pasteurization of milk.

Conflict of Interest

The authors wish to declare no conflict of interest in this manuscript.

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