Exploring Socio-Demographic Influences on Knowledge of Prevention and Cure of Tuberculosis: A Cross-Sectional Survey of Patients in a Developing Country?

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Abstract
Tuberculosis remains a major public health problem in the world and in Nigeria in particular as the country is ranked fourth globally and first in Africa, among 22 high burden TB countries. The country in recent times has intensified efforts to address the challenge posed by the disease through expansion and enhancement of TB service, and directly observed treatment short-course (DOTS) which presently falls short of WHO's recommendation. One of the identified problems and the basis of this study remains how TB could be controlled through individual preventive measures and knowledge of possible cure. The study was a cross-sectional survey in which 125 patients who were receiving treatment at the University of Nigeria directly observed treatment strategy (DOTS) centre were interviewed using self-administered questionnaire. Data analysis was achieved through the use of SPSS statistical tool. The result shows that there is a general poor knowledge of the ways of preventing TB as

92% of the patients had poor knowledge of TB prevention. The result equally showed a high level of knowledge of the ways of curing TB as 65.6% of the respondents have good knowledge of the correct ways of curing TB. Patients, having fallen short of TB preventive measures calls for urgent actions by the authorities to improve on the knowledge of TB preventive measures tailored to individual's socio-demographic needs.

Introduction

Tuberculosis remains a major public health problem in the world. It affects one third of the world's population (TB India, 2009), (Nabil et al; 2012). According to World health Organization (WHO) estimations, approximately 9.4 million new cases were reported in 2009. WHO estimates that the largest number of new TB cases in 2009 occurred in the South-East Asia Region, which accounted for 35% of incident cases globally. However, the estimated incidence rate in sub-Saharan Africa is nearly twice that of the South-East Asia Region with over 350 cases per 100 000 population. An estimated 1.7 million people died from TB in 2009, the highest number of deaths was in the Africa Region (WHO, 2009), (Nabil et al; 2012).

Nigeria is ranked fourth globally and first in Africa, among 22 high burden TB countries. According to World Health Organisation (WHO), number of TB-related deaths reported in the country in 2008 was 94,826 (WHO, 2009), (Onyeonoro et al; 2014). The country in recent times has intensified efforts to address the challenge posed by the disease through expansion and enhancement of TB service, and Directly Observed Treatment short-course (DOTS). Presently, the country has achieved 75% DOTS coverage. However, despite increased availability of TB services, case detection has only increased from 22% in 2002 to 37% in 2008 and is still grossly short of WHO target of 70% (WHO, 2008), (Onyeonoro et al; 2014).Primary control strategy for TB in the country is a passive case finding and DOTS. This implies that individuals and families must be able to recognise symptoms of TB, take appropriate measures to protect themselves, as well as seek care in appropriate places. However, poor knowledge of tuberculosis, low risk perception, stigma and lack of access to treatment facilities has been some of the factors militating against appropriate TB care seeking practices, prevention and possible cure (Onyeonoro et al; 2014).

Knowledge of prevention and possible cure for TB remain an area of investigation to manage and control the spread of TB in Nigeria. Literature citing on this has rather remained sparse as much is desired in policy to equip patients on ways to control the spread of TB in prevention and cure in Nigeria. The argument above justifies the aim and basis of this study.

Knowledge of TB prevention according to (Onyeonoro et al; 2014) in Nigeria was low, only about fourteen percent knew that it is prevented by covering of one's mouth while sneezing or coughing. Knowledge of TB disease transmission-air, symptoms-cough > 3 weeks duration and prevention was significantly better in the urban areas than in the rural area. Most households surveyed believed that tuberculosis is curable, and that it could be cured by medication/drugs. Much fewer said it could be cured by native medicine (Onyeonoro et al; 2014). The most common measure taken by majority, following suspicion of TB, among community members is visit to a healthcare facility, but a significant proportion of rural households will engage in self-medication (Onyeonoro et al; 2014). Out of the total number of interviewees (Nabil et al; 2012), less than fifty four percent knew that TB is a contagious disease, less than half of the respondents knew that TB is transmitted through air and regarding the fact that the disease is curable if treatment is taken was known by more than ninety five percent of the respondents (Nabil et al; 2012). Delays in treatment occur for several reasons, such as, lack of knowledge, lack of awareness of the significance of symptoms, negative social attitudes or different combinations of these three factors which is also linked to poor preventive measures (Koay, 2004), (Mondal et al; 2014). Patients with

low knowledge about symptoms are less likely to seek healthcare and get diagnosed. Patients with low knowledge are more likely to visit traditional healers and pharmacists rather than DOTs providers, which lead to delays in diagnosis and appropriate treatment and most of the time inability to engage preventive measures (Koay, 2004), (Mondal et al; 2014). Also, health knowledge allows individuals to assess symptoms, identify causes and transmission routes, and provide familiarity with the availability of treatment and cure (Koay, 2004), (Mondal et al; 2014). In the same study also, almost all of the respondents (98.4%) knew staying far away from TB affected people was one of the fundamental preventive measures (Koay, 2004), (Mondal et al; 2014). Result on knowledge of prevention of TB reveals that significantly more males than females stated that sharing of cups as a means of transmitting TB. Males were still more likely to hold this belief even after adjusting for age, marital status and education (Koay, 2004), (Mondal et al; 2014).

Knowledge about TB treatment and cure was relatively high. Independent determinants of poor knowledge of TB in the multivariable analysis included lack of formal education, unemployment and never testing for HIV. In the same result, although TB awareness was high, comprehension of the disease cause, symptoms, transmission and prevention were low (Obuku et al; 2012).

Knowledge of prevention and possible cure of Tuberculosis has remained a quest for most governments in the attempt to control the spread of TB. Linking this quest to how patients' socio-demographic factors (age, marital status, education, sex, religion etc. ;) could play a role in that endeavour has received little attention in the research community. Therefore, this project was directed at understanding how patients' socio-demographic factors could interface with their understanding of TB preventive measures and possible cure for the disease. This result, it is hoped will help in designing strategies that quicken the understanding of patients' to TB preventive measures and possible cure for the disease.

Methods
Study design:
This was a cross-sectional study and involved the use of questionnaire for the collection of data from the study participants (patients) on their knowledge as influenced by their socio-demographic factors of TB preventive measures and possible cure of the disease at the University of Nigeria Teaching Hospital (UNTH) in Enugu, Nigeria.

Study Population:
The study population included all the registered TB patients—one hundred and eighty five (185) at the University of Nigeria Teaching Hospital (UNTH) chest clinic--old site as at this date (19th November, 2012) which was the date this study was commenced. The site for the study was conveniently selected because of its large area of coverage including states bordering Enugu state of Nigeria. The study population was then receiving treatment at the DOTS centre. The clinic offers free services to TB patients and the drugs are provided by the global fund for Malaria, Tuberculosis and Leprosy (MTL). These patients were mostly residents of Enugu State and the adjoining states in Nigeria and were from varying backgrounds and socio-economic strata of the population. The patients were made up of urban and rural residents and many presented cases of 'human immunodeficiency virus' (HIV). The patients, regardless of gender, age, socio economic status and education were assessed and treated at the centre. Patients were treated on out-patient basis and those with acute or serious presentation of the disease are admitted into the hospital. Patients will normally submit for diagnosis if they suspect TB or are referred and results are provided on the spot.

Sampling and sample size

As at the date this study commenced--the 19th of November, 2012, the researchers were reliably provided with documents indicating that there were one hundred and eighty five (185) TB patients registered at the TB chest clinic, University of Nigeria, who were on active TB treatment. The study lasted through 20th of March, 2013. The patients were all registered for TB treatment at the site and were at the time of the study undergoing TB treatment. All the patients (total sample frame) were eligible for inclusion in the study. All the patients were given equal opportunity to be included in the study, however only 125 respondents representing 68% of the patient population at the facility responded by filling and returning the questionnaire. Data was collected in 2013.

Sample size calculation/response rate

There was no sample size calculation in this study since all the patients (sample frame) receiving treatment at the facility were all included in the study. There were 185 patients (sample frame) receiving treatment at the facility as at the time of this study and were all included in the study. One hundred and twenty five (125) of the 185 patients were able to respond to our questionnaire. So we calculated the response rate by looking at the percentage of 125 of 185 which gave 67.56% and was rounded off to 68%.

Participants' recruitment

Eligibility for patients' participation in the study was a major concern for our study. We resolved that all the patients who were then diagnosed of TB and receiving treatment (185) were to be given equal chance to be included in the study. These patients were informed by the chief nursing officer that they could choose to or not partake in the study. The potential participants were instructed on the nature of the study, how they will remain anonymous in the results and the overall benefits likely to accrue from the study. Informed consent was sought and obtained from participants before partaking in the study.

Methods of Data Analysis

Data analysis was achieved through the use of Statistical Package for Social Sciences (SPSS) statistical tool. The data was entered in Epi Info and was transferred to (SPSS 16) for analysis. The discrete data were described using frequencies and percentages, while the continuous variables were described using means and standard deviations. In addition, cross tabulations were done to establish the level of relationship or otherwise on key variables and to find out the factors that influenced variables outcomes. The level of relationship was elicited using the chi-square statistical test. The alpha was set at 0.05 and the researchers concluded a statistical significant relationship to exist when the P-value of the test statistics is less than or equal to 0.05.

Validity and Reliability

To ensure the validity and reliability of the study and also its result, the questionnaire was first pre-tested to measure patients' understanding of the contents of the questions and to measure how the understanding of the questions was agreeable and same among the respondents and the researchers. Questions that were confusing and did not make any sense to the patients were either amended or discarded.

Mode of administration/Data collection Methods

The investigators trained and supervised data collection clerks on the mode of questionnaire administration. Patient's consent was first obtained before the questionnaire administration. Patients who had difficulty understanding English language were helped by the clerks by

translating the questions into *Igbo* (local language) *or Pidgin* English (the local variance of English language) as the case may be. The students (clerks) had prior training on the translation technique.

Results

Table 1: Showing the socio-demographic composition of the respondents

Socio demographic	Frequency n =125(%)
Age	**N**
Under 30	54(43.2)
31-40	25(20)
41-50	29(23.2)
Over 50	17(13.6)
Gender	
Male	63(50.4)
Female	62(49.6)
Education level	
No school	9(7.2)
Primary	38(30.4)
High school	40(32.0)
College/ University	38(30.4)
Employment status	
Yes	59(47.2)
No	66(52.8)

Table 1 shows that a total of one hundred and twenty five respondents were interviewed. Those aged thirty years and below (≥30) constituted the majority of the respondents 54(43.2%). Respondents who are fifty years and above (≤50) were 17(13.6%). The gender of the respondents is almost split in half with males constituting a little above fifty percent 63(50.4%), while the female respondents made up just above fourty nine percent 62(49.6%). The educational status of the respondents reveals that about seven percent 9(7.2%) of the respondents had no formal education. Respondents with college/university education numbered thirty eight 38(30.4%). The employment status of the respondents shows that about fourty seven percent 59(47.2%) are employed while Sixty six 66(52.8%) had no employment.

Table 2: Knowledge of TB preventive mechanisms and possible cure

Variables	Frequency (%)
Ways of preventing TB infection	
Avoid shaking hands	-
Covering mouth and nose when coughing	106(84.8)
Avoid sharing dishes	-
Washing hands after touching items in public places	-
Good nutrition	50(40)
TB can be cured	

Yes	121(96.8)
No	4(3.2)
Ways of curing TB	
Herbal	1(0.8)
Home rest without medication	8(6.4)
By praying	61(48.8)
Specific drugs given by health centre	96(76.8)
DOTS	82(65.6)

In table 2, the respondents were asked about the possible ways of preventing TB spread and 84.8% of them said that it can be prevented by covering the mouth and nose when coughing 106(84.8%). Again 40% of the respondents said TB can be prevented by good nutrition. The table goes further to find out the views of the respondents on whether TB can be cured and an overwhelming score of 96.8% of the respondent believed that TB can be cured. The table went further to investigate into possible ways of curing TB and it was revealed that 48.8% said it could be done through praying, 76.8% said it could be done through specific drugs given by health centre and 65.6% said it could be done through Direct Observed Treatment Strategy (DOTS).

For the purpose of further analysis, the researchers decided to do a scoring of the responses concerning ways of prevention and those who had no score were regarded as having no prevention knowledge, those who scored less than 50% were selected as having poor prevention knowledge while those who scored above 50% were adjudged as having good knowledge of ways of prevention. Again, the researchers decided to use those respondents who accepted that DOTS is the way to treat TB as those with correct knowledge and those who responded in the negative were regarded as misconceptions or incorrect knowledge. Hence the result is also presented below.

Table 3: showing the knowledge of ways of TB prevention and cure

	Frequency (%) n=125
Knowledge of ways of prevention	
No prevention knowledge	10(8)
Poor prevention knowledge	115(92)
Good prevention knowledge	-
Knowledge of the correct way of curing TB	43(34.4)
No	82(65.6)
Yes	

The table 3 above shows that there is a general poor knowledge of the ways of preventing TB as 92% had poor knowledge and none of the respondents had a good knowledge of the ways of preventing TB, while 8% had no prevention knowledge. Again the table as well showed a high level of knowledge of the ways of curing TB as 65.6% of the respondents have good knowledge of the correct ways of curing TB.

Table 4: Factors that influenced the knowledge of ways of preventing TB among infected persons

Variable	No prevention knowledge (n=10) N (%)	Poor prevention knowledge (n=6) N (%)	Good prevention knowledge	Total (%)	Chi-square (P-value)
Age category					
Under 30	3(5.6)	51(94.4)	-		1.864(0.601))
				54(100)	
31-40	2(8.0)	23(92)	-		
41-50	4(13.8)	25(86.2)	-	25(100)	
Over 50	1(5.9)	16(94.1)	-		
				29(100)	
				17(100)	
Sex					
Female	4(6.5)	58(93.5)	-		0.744f
				62(100)	
Male	6(9.5)	57(90.5)	-		
				63(100)	
Educational level					
No school	0(0)	5(100)	-		11.193(0.011)
Elementary school	8(19)	34(81)	-	5(100)	
High school	2(5)	38(95)	-		
Tertiary	0(0)	38(100)	-	42(100)	
Paid employment				40(100)	
No	10(14.9)	57(85.1)	-		0.002
Yes	0(0)	58(100)	-	38(100)	
Marital status					
Single	3(5.8)	49(94.2)	-	67(100)	0.520
Married	7(9.6)	66(90.4)	-		
				58(100)	
				52(100)	
				73(100)	

The table 4 above presents the factors that influenced the knowledge of ways of TB prevention. The table shows that the age of the respondents had no influence on the knowledge of ways of preventing TB. This is because the test statistics produced a non-statistically significant result at (x^2=1.864,p=0.601). Again the table as well showed that the gender of the respondents had no influence on the knowledge of the ways of preventing TB among patient infected persons, the test statistics produced a non-significant Fishers Exact test result at (0.744). However we saw from the table that the knowledge of the respondents became better with the increase in their level of education. This is because those with the elementary school category scored 81%, the high school category scored 95% and the tertiary category scored 100%. However these knowledge levels were still very low as they were all under poor knowledge of ways of preventing TB. In addition, we saw that having a paid employment is another strong factor that influenced the knowledge of ways of preventing TB. The result showed that all (100%) who have paid employment had better knowledge when compared with those who do not have. Finally the table ended with presenting that the marital status of the respondents had no influence on the level of knowledge of preventing TB as the result presented a Fishers Exact test (0.520).

Table 5: Predictors to the knowledge of TB prevention

Variable	Odds ratio	p value	95% Confidence interval for Odds ratio	
			Lower	Upper
Age groups in years				
Under 30	17.196	0.993	0.000	-
31 – 40	2.675	0.993	0.249	845.518
41 – 50	0.408	0.197	0.079	28.766
Over 50	1			
Sex				
Female	0.440	0.658	0.091	4.534
Male	1			
Education				
No school	1.828	0.992	0.000	-
Elementary education	32.792	0.993	0.000	-
High school	30.734			
Tertiary	1			
Paid employment				
No	29.459	0.992	0.000	-
Yes	1			
Marital status				
Single	17.0377	0.993	0.000	-
Married	1			

The table 5 above shows that none of the socio-demographic variables predicted the knowledge of ways of preventing TB. This was concluded because none of the p-values was equal to or less than 0.05.

Table 6: Contributors to the knowledge on whether TB can be cured

Variable	Yes (n=121) N (%)	No (n=6) N (%)	Total (%)	Chi-square (P-value)
Age category				
Under 30	52(96.3)	2(3.7)	54(100)	2.712(0.438)
31-40	25(100)	0(0)		
41-50	27(93.1)	2(6.9)	25(100)	
Over 50	17(100)	0(0)		
			29(100)	
			17(100)	
Sex				
Female	60(96.8)	2(3.2)	62(100)	1.000f
Male	61(96.8)	2(3.2)		
			63(100)	
Educational level				
No school	5(100)	0(0)	5(100)	2.171(0.538)
Elementary school	40(95.2)	2(4.8)		
High school	38(95)	2(5.0)	42(100)	
Tertiary	38(100)	0(0)		
			40(100)	
Paid employment				
Yes	63(94)	4(6.0)	38(100)	0.123f
No	58(100)	0(0)		
Marital status			67(100)	
Single	50(96.2)	2(3.8)	58(100)	1.000f
Married	71(97.3)	2(2.7)		
			52(100)	
			73(100)	

In the table 6 above, there was generally a high knowledge of the correct way of curing TB. As a result, none of the socio demographic variables had any statistical influence on the knowledge of the correct ways of curing TB. This is because none of the factors produced a statistically significant outcome as all the p values are well above 0.05.

Table 7: Predictors to the knowledge of whether TB can be cured

Variable	Odds ratio	p value	95% Confidence interval for Odds ratio	
			Lower	Upper
Age groups in years				
Under 30	4.147	0.996	0.000	-
31 – 40	9.519	0.992	0.000	-
41 – 50	13.049	0.987	0.000	-
Over 50	1			
Sex				
Female	0.253	0.819	0.147	11.313
Male	1			
Education				
No school	9.568	0.996	0.000	-
Elementary education	11.044	0.978	0.000	-
High school	22.025	0.962	0.000	-
Tertiary	1			
Paid employment				
No	22.743	0.955	0.000	-
Yes	1			
Marital status				
Single	5.803	-	0.003	0.003
Married	1			

Again none of the predictive values in table 7 above showed a relationship with the knowledge of the correct way of curing TB.

Discussion
Overall result revealed that there is a general poor knowledge of the ways of preventing TB and at the same time a high level of knowledge on how TB could be cured. The knowledge of TB prevention was influenced by education and employment as those with higher education and employment had better knowledge of TB prevention. Our finding agrees with (Onyeonoro et al; 2014) where it was found that knowledge of TB prevention in Nigeria was low, only about fourteen percent knew that it is prevented by covering of one's mouth while sneezing or coughing. Our finding on curability of TB also agrees with (Nabil et al; 2012) regarding the fact that the disease is curable if treatment is taken at DOTS which was known by more than ninety five percent of the respondents in that study. General poor knowledge of TB prevention demands that the authorities involved in TB control improve on information dissemination that enables potential TB patients to be acquainted with all the necessary precautionary measures against contracting TB. It is also advisable to tailor such information to fit the different socio-demographic classes to maximize the impact on TB prevention. In other words, men, women, youths etc should be provided with tailored information that maximizes their group's TB prevention taking into consideration their peculiarities. On

curability of TB, the authorities should strengthen on the strategy so far by emphasizing that DOTS remains the only approved strategy on TB curability.

Conclusion and Recommendations

No doubt, TB remains a major public health problem in Nigeria as the population in our study still lacks the basic knowledge of TB prevention. The way forward will include improving on TB information dissemination tailored to the different socio-demographic classes to maximize individual patient's preventive efforts.

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