Examining the Influence of Socio-Demographics Including Geographical Factors on the Knowledge and Possible Use of Tuberculosis Treatment Centre: A Cross-Sectional Study of Patients in a Developing Country

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Abstract

Background

Tuberculosis (TB) has remained a major killer disease, despite efforts to reduce its burden globally. More significantly affected are developing countries, including Nigeria. But how socio-demographic factors including distance from the TB treatment facility influence the knowledge and the possible use of Tuberculosis treatment centre is not well known among the patients and that constituted the basis for this study. 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 gender of the respondents showed an influence on the knowledge and possible use of the TB treatment centre (Fishers value of 0.044) in favour of the female patients. The table also indicated that respondents who went to the hospital from more than 30 kilometres distance had the least knowledge of the TB treatment centre (x^2 = 6.726, p=0.081). It reveals that the respondents who are less than 30 years are 16.745 times more likely to know and make use of TB treatment centre when compared to the next age group [31-40 years] (95%CI: 1244287.056-281439587.6), p<0.001. Socio-demographics including geographical factors remain viable options of consideration in an attempt at understanding which patients are to likely to be aware of the DOTS treatment centre and its possible use when in need of TB services.

Key words: *Tuberculosis knowledge, Patients, socio-demographic factors, geographical distance, Nigeria.*

Introduction

Tuberculosis (TB) has remained a major killer disease, despite efforts to reduce its burden globally. More significantly affected are developing countries, including Nigeria (Wang et al., 2008), (Onyeonoro et al; 2014). The country 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 challenges posed by the disease through expansion and enhancement of TB services, and directly observed treatment short-course (DOTS) (Onyeonoro et al; 2014). 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 (Onyeonoro et al; 2014). But how socio-demographic factors including distance from the TB treatment facility influence the knowledge and the possible use of Tuberculosis treatment centre is not well known. This becomes the aim of this investigation.

Findings on Knowledge of and access to TB treatment services indicate that about seventy percent of the respondents were aware of TB treatment facility, but fewer, about thirty seven percent knew of any DOTS facility. Among those aware of DOTS facility, less than half of them (46.7%) live within 10 km radius of an existing DOTS facility. Knowledge of DOTS facility and relative distance of DOTS facility from place of residence was significantly better in the urban than the rural areas (Onyeonoro et al; 2014). Same results equally indicate that gender was not significantly associated with knowledge, perception and treatment seeking behaviour. Individuals who are literate and those with higher educational status had better knowledge of the disease and TB treatment/DOT facility (Onyeonoro et al; 2014). Besides improved coverage, several other factors influence timely access of TB patients to appropriate health services and knowledge (Storla, Yimer, Bjune, 2008), (Ukwaja et al; 2013). Longer patient delays in the knowledge and use of TB centre were found among patients with HIV-infection, sputum smear-negative, and those living in rural/remote settings. A systematic review in Sub-Saharan Africa showed that travel time and consultation with a traditional healer was associated with patient knowledge and delay in seeking care at the appropriate DOTS facility (Finnie et al; 2011), (Ukwaja et al; 2013). Patients who did not first visit a Tuberculosis control programme (NTP) provider, stated their reasons as follows;

because it was too expensive (22%), it takes time (26%), long distance to the facility (23%), belief that they would get better services elsewhere (18%), and mistrust of the public facility (10%) (Ukwaja et al; 2013). The median patient knowledge and delay in using appropriate DOTS facility was 8 weeks. In bivariate association, patient delay was significantly associated with older age, urban residence, illiteracy, longer walking distance to the nearest public facility, HIV seropositivity, and doing a chest X-ray. The median reported health system delay was 3 weeks (Ukwaja et al; 2013). In multiple linear regression analysis, independent determinants of longer patient knowledge and delay were older age, urban residence, longer walking distance to the nearest public facility, and doing a chest x-ray; while HIV seropositivity and having a formal education were determinants of shorter delays. Also, male gender, and first visiting a non-NTP provider were found to be independent determinants of longer health system delay. Furthermore, independent determinants of increased total delay in knowledge and possible use of the TB treatment centre were older age, male gender, urban residence and longer walking distance to the nearest public facility (Ukwaja et al; 2013). Analysing factors associated with patient delays or otherwise factors responsible for TB patients not knowing and seeking timely care at designated tuberculosis treatment centre (Osei, Akweongo and Binka, 2015), concluded that being in employment, not medically insured, poor knowledge on TB, and stigma regarding TB was associated with an extended patient delay on univariable analysis. Females were more likely to have prolonged healthcare services delay than males. Contributing to low usage of tuberculosis DOTS centre for diagnosis and treatment by patients (Dunbar, 2013), found that only thirty percent of the respondents knew of a treatment facility in their area for TB. Disaggregation of awareness was even lower among rural respondents with twenty four percent as compared to thirty four percent among urban respondents. A study by (Laohasiriwong et al; 2016) found that the median patient delay or factors associated with knowledge and not seeking care at designated DOTS centre by TB patients was 32 days. There was unacceptable patient delay in majority of the respondents. In the bivariate analysis it was found that the factors independently associated with unacceptable delay and knowledge included the following: being Buddhist and residing in the rural areas of Nepal. Chest pain was the only first symptom that showed an association with the unacceptable patient delay. In addition, living more than 5 km far from the DOTS centre, being diagnosed and treated by medical officer, and consulting chest specialist were also significantly associated with unacceptable patient delay and knowledge of the TB treatment centre. Also analysing reasons why patients delayed going to designated DOTS centre for TB services (Lusignani et al; 2013), uncovered that patient delay associated with low knowledge had a median value of 30 days and a mean value of 71.37 days. Factors associated with delay included primary education, volume of DOTS centres $\geq$ 600 patients per year, no food in the DOTS centre and health centre of the first contact if this was different from the DOTS centre. Overall about fourty two percent of the patients sought medical advice within 1 month of the onset of their illness (Demissie, Lindtjorn, and Berhane, 2002). The median patient delay associated with knowledge was 60 days; mean. The smear negative patients who lived above an hour walking distance from the health unit were at risk of delaying more than 30 days after the onset of symptoms due to associated low knowledge of the TB treatment centre. There was a significant association between patient delay and the symptom haemoptysis in both the smear positive and negative patients respectively. No significant difference was observed in the mean delay and knowledge of TB treatment centre between the smear positives and smear negatives.

As at the time this study was conceived and conducted, no work has been done specifically to the best of the researchers' knowledge in this part of Nigeria to ascertain the relationship between patients' knowledge of TB treatment centre and the socio-demographic variables including distance to the TB treatment centre that may actually influence the usage of such

facility. That is if patients' socio-demographics (age, marital status, education, sex, religion etc ;) do determine to an extent patients' variances in knowledge and the use of the diagnosis centre for diagnosis and treatment.
The results, it is hoped will improve knowledge of the variances at which patients gain knowledge of TB treatment centre and the use of it for treatment.

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 and possible use of TB treatment centre as influenced by socio-demographic factors and distance from the TB treatment centre 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. The sampling method included all the patients registered at the TB treatment facility in the hospital. A total of 185 patients were registered with the TB treatment facility as at the time of this study. All the patients were given equal opportunity to be included in the study sample, 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 size) receiving treatment at the facility were all included in the study. There were 185 patients (sample size) 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 were 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 students by translating the questions into *Igbo* (local language) *or Pidgin* English (the local variance of English language) as the case may be. The students had prior training on the translation technique.

Results

Table 1: showing TB patients' socio-demographics, distance and awareness of TB treatment centre.

Patients' socio-demographics and awareness of TB treatment centre	**Frequency (%)**
Age	
Under 30	54(43.2)
31-40	25(20)
41-50	29(23.2)
Over 50	17(13.6)
Gender	
Female	62(49.6)
Male	63(50.4)
Educational level	

No school	5(4)
Elementary school	42(33.6)
High school	40(32)
Tertiary	38(30.4)
Marital status	
Single	52(41.6)
married	73(58.4)
Employment status	
No paid employment	67(53.6)
Paid employment	58(46.4)
Distance to UNTH	
0-10 kilometers	27(21.6)
11-20 kilometers	41(32.8)
21-30 kilometers	26(20.8)
More than 30 kilometers	31(24.8)
Not sure where to get TB treatment	
Yes	15(12.0)
No	111(88.8)

The table 1 shows the socio-demographic distribution of the respondents. It revealed that a good number of the respondents are less than 30 years of age. The rest are spread within the other age groups with the least being those that are above 50 years of age (13.6%). Again we had more males (50.4%) than females in the data returned. Also there was a high literacy level as more than half (62.4) of the respondents have at least attempted a secondary school. Majority (58.4%) of the respondents are married while rest (41.6%) is still single. The table as well showed that 53.6 % of the respondents do not have a paid employment while the remaining (46.4%) percent have paid employment. The distances from the homes of the respondents to UNTH were evenly spread among the respondents with majority (32.8%) of the respondents residing within 11– 20 kilometres from the point of care. Finally about 12% of the respondents did not know where to get TB treatment.

Table 2: showing knowledge about the TB treatment centre

Socio demographic	**Knowledge about where to get TB treatment**		X^2 (P-value)
	No	**Yes**	
Age group			
Under 30	47(87.0)	7(13)	2.505(0.474)
31-40	21(84)	4(16)	
41-50	28(96.6)	1(3.4)	
Over 50	15(88.2)	2(11.8)	
Gender			
Female	59(95.2)	3(4.8)	0.044f
Male	52(82.5)	11(17.5)	

Educational level			
No school	5(100)	0(02)	1.347(0.718)
Elementary school	38(90.5)	4(9.5)	
High school	34(85)	6(15)	
Tertiary	34(89.5)	4(10.5)	
Paid employment			
No	62(92.5)	5(7.5)	0.169f
Yes	49(84.5)	9(15.5)	
Marital status			
Single	45(86.5)	7(13.5)	0.458(0.499)
Married	66(90.4)	7(9.6)	
Distance to UNTH			
0-10 kilometers	27(100)	0(0)	6.726(0.081)
11-20 kilometers	34(82.9)	7(17.1)	
21-30 kilometers	24(92.3)	2(7.7)	
More than 30 kilometers	25(80.6)	6(19.4)	

The table 2 shows that the age of the respondents did not have any influence on the knowledge of the TB treatment centre. This was concluded as the test statistics gave thus (x^2 =2.505, p=0.474). However the gender of the respondents showed an influence on the knowledge of the TB treatment centre. This is because the test statistics produced a significant Fishers value of 0.044. This indicates that more females (95.2%) have knowledge of the TB treatment centre when compared to their male counterparts (82.5%). Moreover there was no relationship between the educational level of the respondents and the knowledge of the TB treatment centre. The test statistics here showed a (x^2 =1.347, p=0.718). Again the employment status did not influence the knowledge of TB treatment centre as the table showed a Fishers value of 0.169f. We as well saw from the table that the marital status did not have any influence on the knowledge of the TB treatment centre. The test result showed (x^2 =0.458, p=0.499). Finally the table ended by showing that respondents who went to the hospital from more than 30 kilometres distance had the least knowledge of the TB treatment centre. Even though the test result (x^2 = 6.726, p=0.081) was not significant, the result indicates that to an extent the closer the home of the respondents to the place of care, the higher their knowledge or the lower their ignorance of the TB treatment centre.

Table 3: showing the predictive values to the factors that contributed to the ignorance/knowledge of the treatment centre.

Variable	**Odds ratio**	**p value**	**95% Confidence interval for Odds ratio**	
			Lower	**Upper**
Age group				
Under 30	16.745	0.000	1244287.056	281439587.6
31-40	2.060	0.164	0.007	2.391
41-50	1.415	0.396	0.157	107.752
Over 50	1			

Gender				
Female	1.767	0.131	0.017	1.696
Male	1			
Educational level				
No school	16.498	0.996	0.000	-
Primary	1.831	0.154	0.013	1.982
Secondary	0.193	0.844	0.177	8.322
Tertiary	1			
Employment status				
No paid employment	1.804	0.066	0.024	1.130
Paid employment	1			
Distance to UNTH				
0-10 kilometers	16.892	0.990	0.000	-
11-20 kilometers	0.565	0.499	0.342	9.043
21-30 kilometers	0.131	0.902	0.143	9.054
More than 30 kilometers	1			
Marital status				
Single	17.079		3.8250000	3.8250000
Married	1			

The table 3 shows the predictive values of the factors that contributed to the knowledge and possible use of the treatment centre. It reveals that the respondents who are less than 30 years are 16.745 times more likely to know of TB treatment centre when compared to the next age group [31-40 years]. This was ascertained at (95%CI: 1244287.056-281439587.6), $p<0.001$. Also from the result even though not significant but close (P=0.066), those not employed are 1.804 times more likely to have knowledge of TB treatment centre than those with paid employment.

Discussions

The result revealed that a good number of the respondents are less than 30 years of age. Again we had more males than females as being infected with TB. Also there was a high literacy level as more than half of the respondents have at least attempted a secondary school. Majority of the respondents are married while the rest is still single. Equally, majority of the respondents do not have a paid employment. Again majority of the respondents who were residing within 11–20 kilometres from the point of care were aware of existing TB facility. This finding is in line with (Onyeonoro et al; 2014) where it was noted that those aware of DOTS facility live within 10 km radius of an existing DOTS facility. This finding has been discussed generally in the literature with the understanding that proximity to TB treatment centre is significantly related to both knowledge of the facility and the actual use of such facility as the need arises for TB services (Onyeonoro et al; 2014), (Ukwaja et al; 2013).. It makes common sense that relative proximity to TB treatment centre would be significantly related to knowledge and use of the facility everything being equal in the time of service need. The policy direction has always been as in this case to recommend more TB facilities to

be provided within primary health centres to enable easy access to TB services at the peripheral (primary) health centres.

The result equally shows that the age of the respondents did not have any influence on the knowledge of the TB treatment centre and possible use of services. However the gender of the respondents showed an influence on the knowledge of the TB treatment centre as more females were shown to have more knowledge of the TB treatment centre when compared to their male counterparts. Our result here is in negation of the findings of (Onyeonoro et al; 2014) where it was recorded that gender was not significantly associated with knowledge, perception and treatment seeking behaviour. An offered explanation to our result could be that men are likely to be less concerned about initial manifestation of disease symptoms as women do and are less likely to seek medical help at this juncture. Contributing to this also could be the busy schedule men are known for that makes it a little difficult to seek medical attention. Women on the other hand are likely to be frightened at initial manifestation of symptoms and also are likely to seek help without much waste of time. Policy direction in this regard could be a tailored awareness of TB symptoms and improved possible utililisation for men. Finally the result of our wok showed that respondents who went to the hospital from more than 30 kilometres distance had the least knowledge of the TB treatment centre which indicates that the closer the home of the respondents to the DOTS centre, the higher their knowledge of the TB treatment centre and improved likely usage of the clinic should the need arise. This result was confirmed by the predictive values to the factors that contributed to the knowledge and use of the treatment centre. This finding agrees with a systematic review in Sub-Saharan Africa that showed that travel time (distance) was associated with patient knowledge and delay in seeking care at the appropriate DOTS facility (Finnie et al; 2011), (Ukwaja et al; 2013). Patients, who did not first visit a Tuberculosis control programme (NTP) provider, stated as one their reasons the long distance to the facility (Finnie et al; 2011), (Ukwaja et al; 2013).

Conclusions

Tuberculosis (TB) remains a major public disease especially in low income countries including Nigeria. Socio-demographics including geographical factors remain viable options of consideration in an attempt at understanding which patients are to likely to be aware of the DOTS treatment centre and its possible use when in need of TB services. Improving the availability of TB services especially at the peripheral (primary) level of health care could be a starting point for bridging geographical (distance) factors that hinder patients' access to TB services. Tailored programmes to improve knowledge of TB symptoms for the men that also increase their usage of TB treatment centres would also be a step in the right direction.

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