INCIDENCE OF TUBERCULOSIS AMONG SOCIOECONOMIC SUBGROUPS IN SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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Abstract

Tuberculosis (TB) is a global health challenge that affects both developed and developing countries being the world's among worst killer diseases. The relationship between the socioeconomic status and the prevalence of tuberculosis in Sokoto metropolis was investigated. The Health Related Hardness Model (HHM) was used wherein the researcher viewed tuberculosis patients as those people having a low socio-economic status. The primary data were collected using questionnaires while the secondary data was obtained from unpublished, published, and information obtainable from the internet on the issues of tuberculosis. Both systematic (the researcher used 10 as sampling interval of 956 per 96, approximately 96 sample size was used) and purposeful sampling techniques (only those patients present at the time of sampling were administered questionnaire) for this study. The results showed that high prevalence of TB was found among males (67.7%), age group of 30 – 45 years (36.5%), the married (62.5%), non-formal education (45.8%),businesspersons (38.5%), earn less than N10, 000 (62.5%) monthly, more than one persons in a room (41.7%), TB history (79.2%) and unawareness of TB patients (84.4%). Therefore, poverty is a main driving force in TB infection as attested by the correlation between socio-economic status of the population and TB incidence in Sokoto Metropolis. Thus, TB is more prevalent among the urban poor in Sokoto Metropolis. Hence, more treatment centres should be established by the Government, NGOs, or Philanthropists for easy access by the people.

Keywords: Incidence, Metropolis, Sokoto, Socioeconomic Status, Tuberculosis and Patients

Introduction

Tuberculosis (TB) is caused by the bacterium, *Mycobacterium tuberculosis* (MTB)that most often affects the lungs. The *Tuberculosis bacillus* causing the disease tuberculosis (TB) and *Mycobacterium tuberculosis* were identified and described on 24 March 1882 by Dr Robert Koch. According to the World Health Organization (WHO, 2015), tuberculosis is one among the greatest killer disease worldwide due to a single infectious agent. However, the disease is preventable and curable. It generally affects the lungs, but can also affect other parts of the body. It is spread through the air when people who have an active TB infection cough, sneeze, or otherwise transmit respiratory fluids through the air. The prevention of the disease relies on early detection and treatment of cases and screening programs and vaccination with *BacillusCalmetteGuerin* (BCG) vaccine (WHO, 2015).

Tuberculosis is spread through the air from one person to another. When people with the active form of lung TB cough, sneeze, or spit, they propel the TB germs into the air. A single sneeze can release up to 40,000 droplets. Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very small. A person needs only to inhale a few of these germs to become infected. This explains why one-third of the world's population is infected with the bacteria but is not yet ill with the disease. People ill with TB can infect up to 10-15 other people through close contact over the course of a year (WHO, 2014).Globally, about 9 million people become ill with TB each year out of which 1.5 million die of the disease. In 2015, the World Health Organization among the 22 highest TB burden countries in the world ranked Nigeria the third (Cable Media, 2014). Considering these facts, Nigeria has over 200 million people, and this provides a platform for easy transmission and spread of the disease.

A study conducted by Jibrin (2005) on the tuberculosis in Sokoto town reported that the major causes of tuberculosis in the town are malnutrition and overcrowding which are all attributes of low income and poverty. Hence, the study seeks to answer the following question: Is there any statistical significant on the incidence of tuberculosis among socioeconomic subgroups in Sokoto metropolis?

Methodology

The study area is Sokoto metropolis, which consists of three Local Government Areas: Wamakko, Sokoto South and Sokoto North. Sokoto State is located to the extreme Northwest of Nigeria between Latitudes 09˚ 57′ N and 13˚57′ N and Longitudes 03˚24′ E and 07˚24˚ E (Yelwa, 2015). It shares border with Niger Republic to the north, Kebbi State to the southwest, and Zamfara State to the northeast, covering an area of approximately 32,000 square kilometres (Iliya and Fada, 2013).

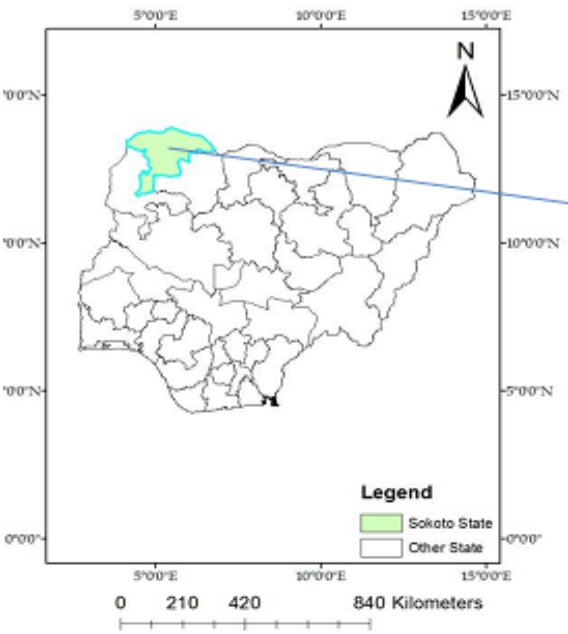

Figure. 1.1 Map of Nigeria Showing Sokoto
Source: Arc Map

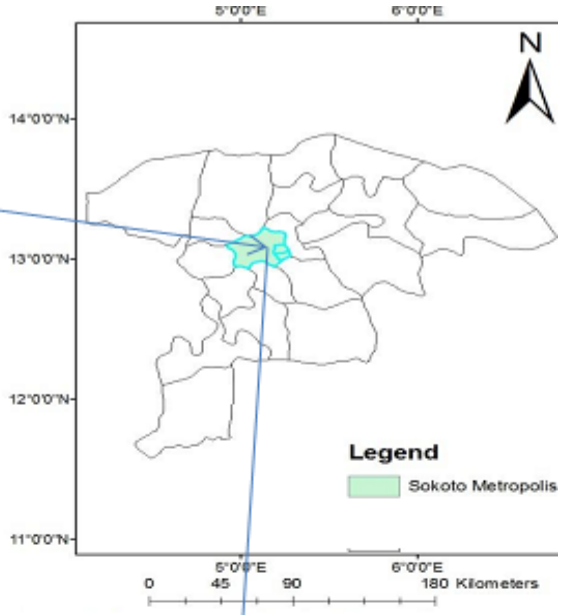

Figure 1.2 Map of Sokoto State Showing Soko
Source: Arc Map

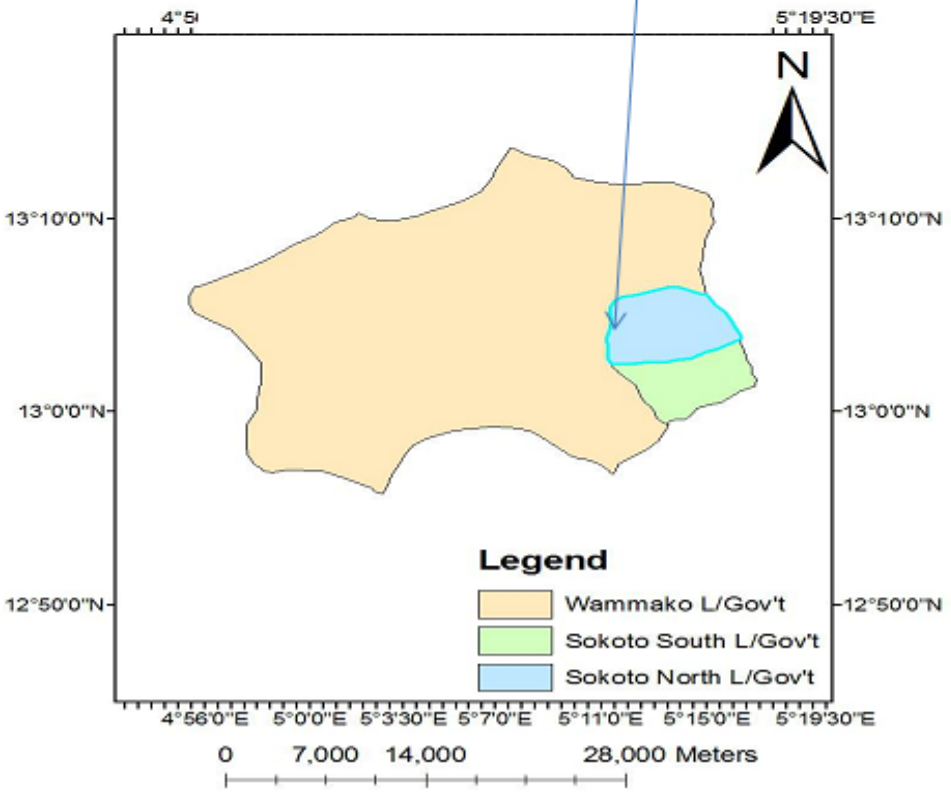

Figure 1.3 Map of Sokoto Metropolis

According to the 2006 National Population Census, Sokoto State has a population of 3,702,679 (National Population Commission [NPopC], 2009). The over 3.7 million people resident in Sokoto State are not evenly distributed. The average population density in the State is less than 150 persons per square kilometer. While in the Sokoto closed settled zone, the population density may exceed 300 persons, around Tureta and Gundumi Forest Reserves, the population is sparse, less than 100 persons per square kilometre (Iliya and Fada, 2013).

The population of Sokoto State is heterogeneous, but dominated by the Hausa and Fulani. There are also the Gobirawa, Kabawa, Adarawa, and Arawa. Furthermore, there are other Nigerians such as Kanuri, Igbo, Yoruba, Nupe, Dakarkari (Lelna), Idoma, Igbira, Igala, and Tiv among others. Other ethnic groups from outside Nigeria

include the Zabarmawa and Tuaregs from the Republic of Niger (Iliya and Fada, 2013). Islam and Christianity are the two major religions practiced by the people in the State, with the former accounting for over 90% and the later constitute less than 10% (Jibrin, 2005).

Data was collected from the Directly Observed Treatment Short-Course (DOTS) Centre in Sokoto Specialist Hospital within the metropolis. Available records from the hospital TB patients register show that, nine hundred and fifty-six (956) TB patients registered with them in the last twelve months (April 2015 to March 2016). Therefore, the researcher used 10 as sampling interval of 956 per 95.6 approximately (96) as the sample size.

Purposeful and systematic sampling techniques were used in selecting samples for this study. Using systematic sampling the total number of patients (956) was divided by the sample size (95.6). The result of this division was used as the basis for sample selection from the total population of patients in the register. That is, 956 ÷ 95.6 = 10 sampling interval. The first sample was selected from the register and then the selection was continued systematically using a sampling interval of 10 until the required sample size (96) was attained.

Structured questionnaires were used to obtain information on the health and socioeconomic characteristics of the study population (TB patients only). The data was collected within four days (every Wednesday for four weeks). Having a pre-information that 45 to 55 patients were attended to every Wednesday, each week; twenty-four (24) questionnaires were administered only to the Tuberculosis patients at the Directly Observed Treatment Short Course (DOTS) Centre of the Sokoto State Specialist Hospital. Patients who can read and write were given the questionnaire to fill in by themselves on the spot, while those who cannot were guided by the researcher to read, interpret, and fill in the questionnaire appropriately. The questionnaire was returned immediately upon completion on the spot each day for four days (every Wednesday for four weeks). However, only those patients present at the time of sampling were administered questionnaire. Based on the premise that patients come to see the doctor on appointment, the selection of patients used as samples for the study was done systematically using the files of patients who were physically present to see the doctor.

The collected data was analyzed and presented using descriptive and inferential statistics. Descriptive statistics used include mean, mode, percentages, pie charts, bar charts and frequency distribution tables. These were used to present the collected data in a simple form using statistical diagrams and tables. The inferential statistics used in the analysis and or interpretation of the data include the Pearson's product moment correlation coefficient and Chi-square statistical tests. The product moment correlation coefficient was used to ascertain whether there is relationship between socioeconomic status and tuberculosis infection and disease. The hypothesis was tested at 0.05 level of significance using Chi-square statistical test to confirm whether there is a statistically significant relationship between socioeconomic status and prevalence of TB. All data analyses were carried out using Microsoft Excel 2007 software.

Results and Discussion

Demographic and Socioeconomic Characteristics of the Respondents

Gender

Figure 3.1 shows that 67.7% of males and 32.3% of females have been infected with tuberculosis. Both sexes are affected, but there are more males than females. This reveals that TB infects more men than women. This is because men are in more close contact with people than the women within the metropolis are chiefly due to the purdah system which prevents women from coming out of the home without the permission of the husband and this makes the males more vulnerable to contract TB.

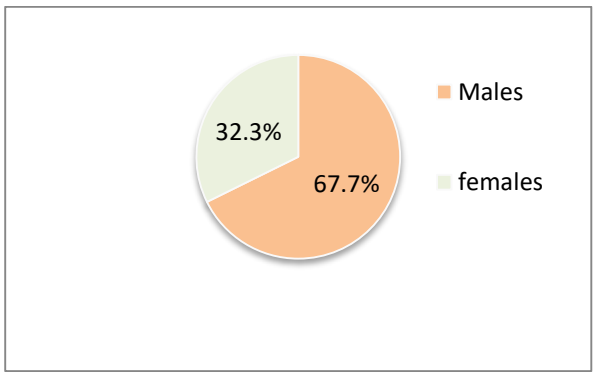

Figure 3.1: Distribution of Respondents according to Gender

Source: Field Work, 2016

In fact, it has been observed that TB infection is more prevalent in males but more female's progress to active disease than males. This is because in some countries women who suffer from tuberculosis are less likely to be detected than are men. They are also less likely to receive treatment. Men are more likely to receive treatment than women are (Barter, Agboola, Murray, and Barnighausen, 2012). The trend here supports this claim.

Age

Figure 3.2 presents the age distribution of respondents. The result showed that tuberculosis is more prevalent among the age group of 30-45 years (36.5%). This group is the most sexually and economically active group and therefore, more vulnerable to HIV/AIDS which in most cases were associated with tuberculosis. Although, all age groups could be affected generally, however people who are between 15 – 54 years are more susceptible to TB infection (CDC, 2012). The trend here falls within this range and therefore supports the claim by the CDC.

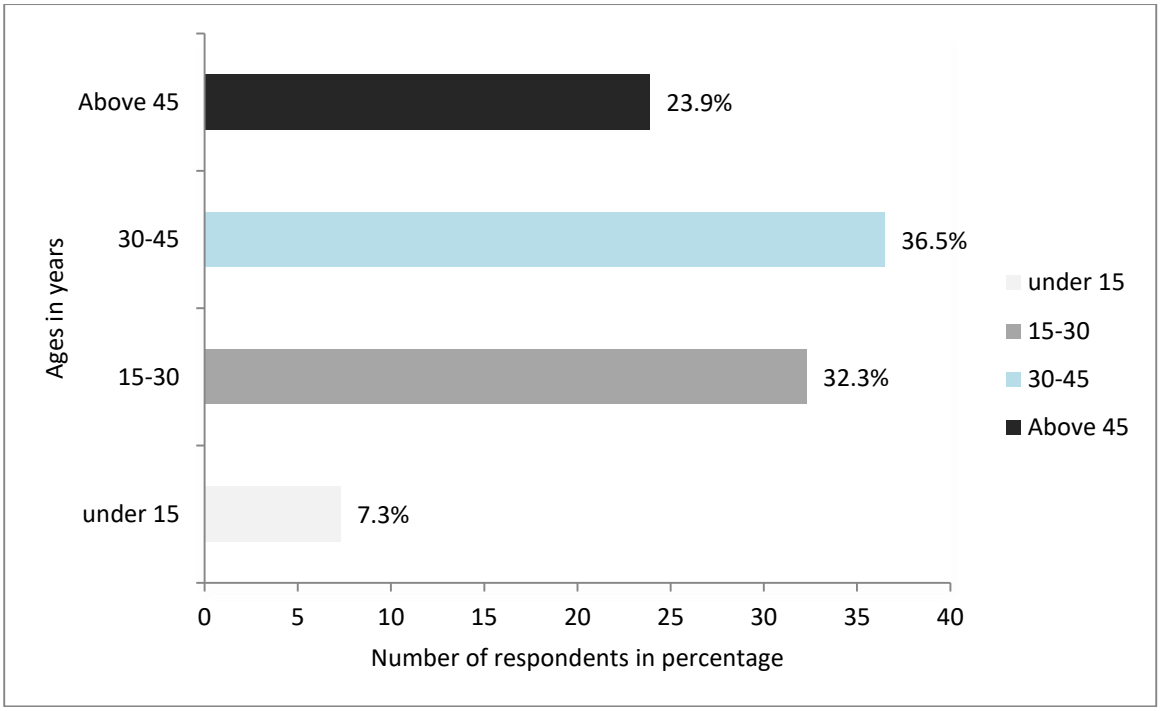

Figure 3.2: Distribution of Respondents by Age
Source: Field Work, 2016

Marital Status

Table 3.1 showed the marital status of respondents, revealed that married people are more infected with tuberculosis having 62.5% while singles have only 25% and 4.5% for the divorced. The high percentage of TB among married people supports the claim that tuberculosis is spread through close contact considering the kind of close and intimate form of interaction that exist between and among married couples. According to the CDC (2012) and WHO (2015),people with prolonged, frequent, or close contact with people that have tuberculosis are particularly at high risk of becoming infected, with an estimated 22% infection rate. That tuberculosis is transmitted from person to person through the air. When people (husband or wife) with active pulmonary TB cough, sneeze, speak, sing, or spit, they expel infectious aerosol droplets that are about 0.5 to 5.0 micrometers in diameter. A single sneeze can release up to 40,000 droplets and each one of these droplets is capable of transmitting the disease, since the infectious dose of tuberculosis is very small. A person (husband or wife) needs only to inhale a few of these droplets to be infected. It is therefore highly possible that an infected wife or husband could have performed any of the acts (cough, sneeze, speak, sing, or spit,) to infect their partner or even their children.

Table 3.1 Distribution of Respondents according to Marital Status

Marital Status	Number of Respondents	Percentage
Single	24	25
Married	60	62.5
Divorced	4	4.2
Others	8	8.3
Total	96	100

Source: Field Work, 2016

Educational Attainment

Table 3.2 displays the educational attainment of respondents. The table revealed that most TB patients (45.8 %) have no formal education while 15.6% indicated they have basic primary education and 16.7% have secondary education whereas only 21.9% indicated they have tertiary education. Thus, the high percentage of TB among people who have no formal education is an indication of the relationship between socioeconomic status and TB. This is in agreement with the findings of Stop TB Partnership (2015) in Northern Nigeria, who found that children are forced out of school courtesy of poverty which in turn is aggravated by TB because there was no money to buy school uniforms or to pay fees, or because they have to work to support the family. WHO (2012) also reported that in urban areas in Iris, TB prevalence among those with no schooling was four times higher than that of tertiary graduates. This therefore, implies that TB is more prevalent among the urban poor of Sokoto metropolis.

Table 3.2 Distribution of Respondents according to Education Attainment

Education	Number of respondents	Percentage
Non-formal education	44	45.8
Primary	15	15.6
Secondary	16	16.7
Tertiary	21	21.9
Total	96	100

Source: Field work, 2016

Occupation

Table 3.3 shows the various occupations of respondents. People who engage in different business activities are more infected with TB having 38.5%, farming has 19.8% and civil service has 16.7% with others comprising of 25%.This means that most people who engage in different business activities are more susceptible to tuberculosis infection as most of them are always in close interaction with their customers in the course of their daily business transactions. The bacteria causing TB can be expelled when one coughs, sneezes, spits, sings, laughs, or speaks in the course of business transaction. The result of this study agreed with the findings of the CDC(2012) and WHO (2015) who found that TB is spread quickly through close contact particularly when one sings, spits, coughs, sneezes, laughs, or speaks, they can release the TB-causing bacteria which could be inhaled by a business partner in Nigeria.

Table 3.3 Distribution of Respondents according to Occupation

Occupation	Number of respondents	Percentage
Farming	19	19.8
Civil service	16	16.7
Business	37	38.5
Others	24	25.0
Total	96	100

Source: Field Work, 2016

Income

Figure 3.3 presents the monthly income earned by respondents. Those who earn less than N10, 000 (62.5%), N11, 000 – N20, 000 (16.7%), N21, 000 – N30, 000 (7.3%), those who earn N31, 000 and above (13.5%). The highest percentage (62.5%) of those who earn less than N10, 000 per month supports the claim that tuberculosis is a disease of the poor. Poverty fuels tuberculosis while tuberculosis makes poverty persistent. Hence, there is high prevalence of tuberculosis among the urban poor of Sokoto metropolis. Jibrin (2005) in a related study also found that TB has a high prevalence rate among the urban poor of Sokoto town. People lost 3 to 4 months of work; they borrow or sell their assets, their children drop out of school, they cannot afford treatment, and lacks good diet – all these are attributes of low income and therefore, poverty (Stop TB Partnership, 2015; IFRC, 2015; Barter, Agboola, Murray, and Barnighausen, 2012).

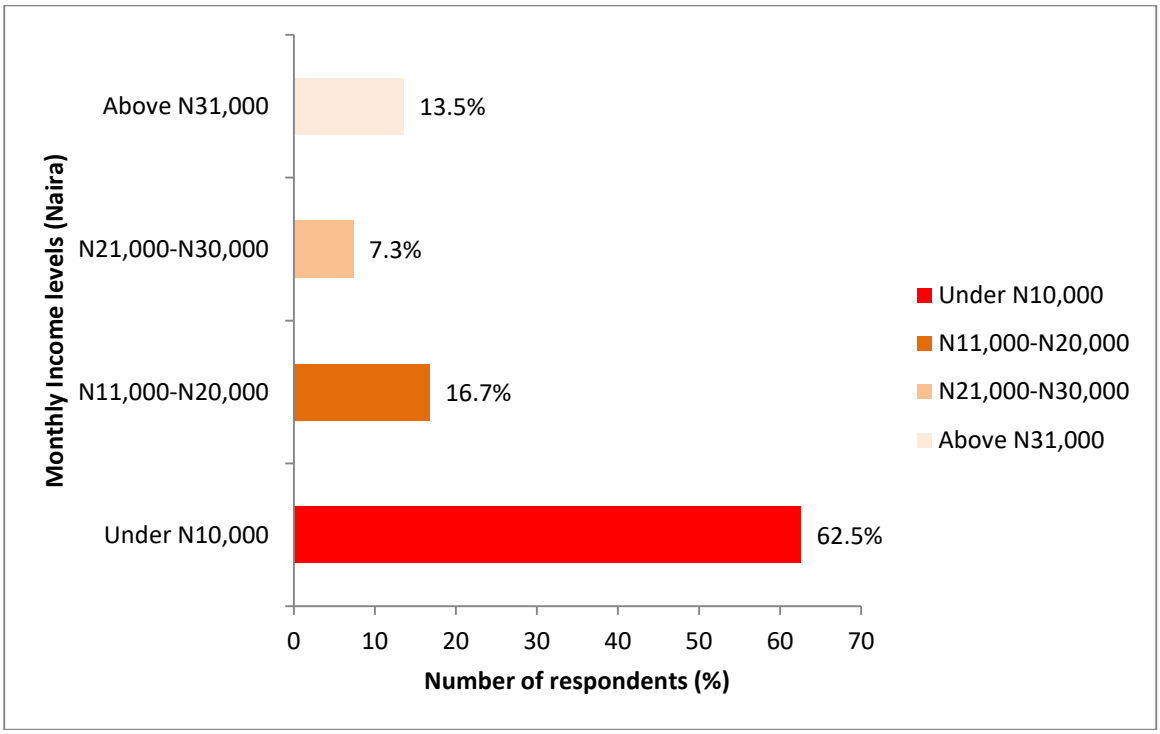

Figure 3.3: Distribution of Respondents according to Monthly Income Levels
Source: Field Work, 2016

Room Population Density

Table 3.3 showed the distribution of respondents according to room population density. People who sleep alone in one room constitutes 14.6%, two persons in one room constitutes 30.2% and 3 persons in one room has 13.5% with those who sleep more than four persons in a room constituting 41.7%. This confirms the effect of overcrowded conditions in the spread and or transmission of tuberculosis and other diseases. Overcrowding and malnutrition are attributes of poverty that increases one's susceptibility to TB infection. Malnutrition reduces the body's ability to fight off diseases whereas overcrowded, unhygienic conditions provide a platform for easy spread of tuberculosis (Stop TB Partnership, 2015). It is widely recognized that the poorer the community, the greater the likelihood of being infected with the TB germ and developing clinical disease. A lack of basic health services, poor nutrition and inadequate living conditions all contribute to the spread of tuberculosis and its impact upon the community. Overcrowded and poorly ventilated home and work environments make tuberculosis transmission more likely (Stop TB Partnership, 2015).

Table 3.4 Distribution of Respondents according to Room Population Density

Category	Number of Respondents	Percentage
One person	14	14.6
Two persons	29	30.2
Three persons	13	13.5
Four persons	40	41.7
Total	96	100

Source: Field Work, 2016

Number of People with TB History

Figure 3.4 portrays that only 20.8% of the patients administered questionnaires were infected with tuberculosis before and have been re-infected for the second time while 79.2% were infected with TB for the first time. This means that the treatment of tuberculosis is difficult and can recur in a person repeatedly failure to follow appropriate treatment procedures. The high percentage of those infected for the first time is an indication that TB spreads quickly among the urban poor (WHO, 2014; CDC, 2013) Sokoto metropolis inclusive. People who had TB before and did not follow appropriate treatment procedures or have their partners treated, are more likely to have TB recurrence. The finding of this study supports this claim.

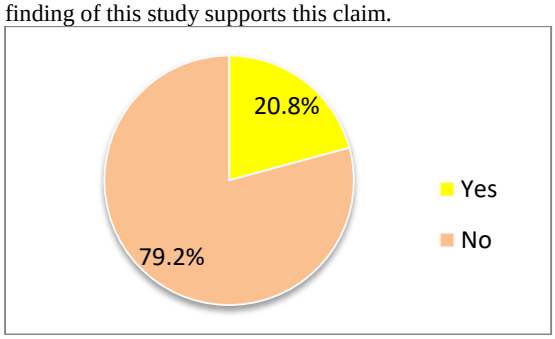

Figure 3.4 Distribution of Respondents according to Number of People with TB History

Source: Field Work, 2016

Awareness

Figure 3.5 depicts that only 15.6% of the TB patients know how tuberculosis is passed or spreads from one person to another while 84.4% do not know how tuberculosis is transmitted. This clearly reveals the degree of unawareness on the issue of tuberculosis among the people of Sokoto metropolis. Most of the people are lacking in basic formal education (44.5%) (Who are not literate in English language), and lack of education is an attribute of poverty and poverty fuels tuberculosis. The findings of this study tallied with that of the Stop TB Partnership (2015) and WHO (2012) which found that in urban areas, TB prevalence among those with no schooling was four times higher than that of tertiary graduates.

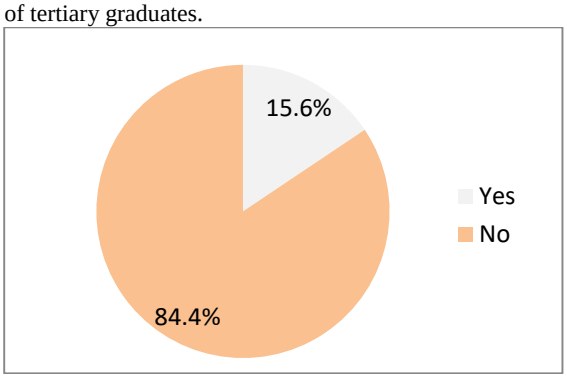

Figure 3.5 Distribution of Respondents according to Awareness

Source: Field Work, 2016

The Relationship between Socioeconomic Status and Tuberculosis Infections

Table 3.5 is the table of contingency for the Chi square statistical test. Chi square was used to test the null hypothesis at 3 degree of freedom and 0.05 level of significance. The computed or calculated Chi-squared value is 47.92 while the table/critical value at 0.05 level of significance is 7.81. Therefore, since the calculated Chi square value (47.92) is greater than the critical table value (7.81) at 0.05 level of significance, then the null hypothesis that "there is no statistical significant relationship between socioeconomic status and Tuberculosis infection" is rejected. Hence, the alternative hypothesis that "there is statistical significant relationship between socioeconomic status and TB infection" is accepted.

The findings of this study agreed with that of the United States Center for Disease Control and Prevention (CDC) (2012; 2015) which found that tuberculosis is closely related to lifestyles of poverty, overcrowded conditions, alcoholism, stress, drug addiction and malnutrition. According to CDC, tuberculosis spreads quickly among people who are undernourished.

Table 3.5 Table of Contingency for Chi-Squared Statistical Test

Category	A	B	C	D	Total
Level of income	60(37)	16(22.5)	7(10)	13(26.5)	96
Number of people that sleep in a room	14(37)	29(22.5)	13(10)	40(26.5)	96
Total	74	45	20	53	192

Source: Field Work, 2016

In addition, the Stop TB Partnership (2015) also found that tuberculosis is one of the principal diseases of poverty. They found that 95% of new TB cases and 98% of all TB deaths occur in the developing world- low-income countries. They also found that even when TB services are offered free of charge, the disease is still costly to the poor.

Furthermore, findings by the World Health Organization (WHO) (2012; 2013; 2014; 2015) also support the findings of this study. WHO found that tuberculosis contribute to poverty by reducing patients' physical strength and ability to work including huge costs incurred when utilizing health care. According to WHO 2012, the cycle of poverty and tuberculosis shows that a symbiotic relationship exists between tuberculosis and poverty. That new TB infection is not just the product of poverty, but also creates poverty because poverty fuels tuberculosis and tuberculosis also fuels poverty. Hence, tuberculosis makes poverty persistent.

Conclusion and Recommendations

In conclusion, the study revealed that poverty is a driving force in TB infection as attested by the correlation between socio-economic status of the population and TB incidence in Sokoto Metropolis. Thus, TB is more prevalent among the urban poor in Sokoto Metropolis. Hence, more treatment centres should be established by the Government, NGOs, or Philanthropists for easy access by the people. Also, directly observed treatment short-course (DOTS) centres should be expanded not only within the Metropolis but also across the State in order to effectively fight and end tuberculosis.

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