

Assessment of awareness of local community on the role of environmental risk factors in susceptibility to and development of tuberculosis: a case study of Kicukiro District-Kigali city, Rwanda

James Kant KAMUHANDA¹ and Emmanuel Kigadye²

¹ Environmental Studies, The Open University of Tanzania
Kigali, Rwanda

² Professor, Department of Life Sciences, the Open University of Tanzania
Dar es Salaam, Tanzania

Abstract

Tuberculosis is the second death causing disease in Rwanda with 3.9% for new multidrug resistance tuberculosis which gives the concern for the assessment of awareness of local community on the role of environmental factors in susceptibility to and development of Tuberculosis. This research took 11 months; it was started in October 2013 and ending in September 2014. The primary data were collected by means of structured/semi-structured questionnaire and collected data were analyzed and presented in figures and tables using the Microsoft excel and SPSS 16.0 Windows© program (statistical packages for social sciences).

The results show that the community of KICUKIRO District is unaware about the environmental risk factors responsible for tuberculosis infection (61.30%).

Keywords: TB Tuberculosis, Environmental factors, susceptibility and development of Tuberculosis

1. Introduction

Tuberculosis is one the most leading killer disease in the world and it is as old as humanity (<http://www.tballiance.org> retrieved on 6th February, 2014). And it was known to be the disease of poor and most people who suffer from tuberculosis are from poor countries or developing countries (2-3 millions). Tuberculosis has been linked with environmental risk factors that go hand-in-hand with some conditions such as poverty, air pollution, tobacco smoke, and malnutrition, living conditions that are overcrowded and excessive

alcohol drink, infection of human immunodeficiency virus (HIV), homelessness, and immigration of people that are coming from countries with high prevalence of tuberculosis. Experts now, argue that control programs must consider risk factors to stop the spread of the disease.

Most known information of tuberculosis and the effect of environmental risk factors comes from mainly studies conducted in developed countries over the last 60years (WHO 2011)

Globally and especially in African, tuberculosis is an overwhelming health problem (WHO 2005). According to World Health Organisation report of 2005, showed that 8.8 million cases have been estimated in which 1.7 million have died, 27% of these cases, and 37% of deaths were observed from Africa that houses 11% of the world's population (WHO 2005). And this was as result of Poverty and other socioeconomic factors

Rwanda as one of African countries, the study of *Mycobacterium tuberculosis* as the leading agent of tuberculosis indicated that the status of tuberculosis in Rwanda comes from the events of 1994 genocide (Umubyeyi et al, 2007) and socioeconomic and culture related factors. This has been the key for our research on awareness at local level especially in Kigali city, specifically Kicukiro District.

From the government of Rwanda and its health partners especially the Global Fund have invested substantially in the control of the disease, as a result TB has experienced a relative decrease from 2003 (WHO 2006) but again still a threat to humans in Rwanda.

Generally in 2013, statistics shows that over 6000 people have been prognosticated with TB symptoms in Rwanda, 3554 were found positive and Kicukiro district has detected 124 per 1000 cases according to the reports from Gahanga health center which is in charge of TB testing in Kicukiro district (<http://english.umuseke.rw/rwanda-eager-to-eradicate-tuberculosis>). Recent findings on crowding and tuberculosis risk infection were published by Baker and Oranga (2008). The study revealed that in young age below 40 years age, a 1% increase in the proportion of overcrowded households in a given census block led to an 8% increase in TB incidence in that block, holding other variables constant.

In Rwanda environmental risk factors are not considered as the key cause of tuberculosis and even the community is not aware of relationship between environmental factors and spread of tuberculosis. The present study aims to assess the awareness of the community on the role played by environmental factors in the development and spread of tuberculosis infection in the study area populations. In addition this study will contribute valuable information on Tuberculosis control at a community level of Rwanda.

1.1 . Problem statement

Studies have been conducted concerning tuberculosis for different purposes in Rwanda, but its pathological mechanisms are still observed in the country. A recent national survey showing that the prevalence of multidrug resistance among new TB patients is 3.9% gives cause for concern and there is no study that has been conducted on the assessment of awareness of local community on the role of environmental factors in susceptibility to and development of Tuberculosis in Rwanda and particularly in Kicukiro district. However, in this present study we need to deal with the awareness of the local community on the role of environmental factors in susceptibility to and development of Tuberculosis. The result emanating from this study will be very important in contributing to provide well documented evidences that will help in eradicating the disease locally and globally.

1.2 General objectives

The general objective of this study is to assess community awareness on environmental risk factors leading to the susceptibility and development of tuberculosis in **Kicukiro District**.

1.2.1 Specific objectives of the study

The specific objectives of this study are:

1. To assess community awareness on the environmental risk factors responsible for Tuberculosis infection.
2. To establish the community awareness on tuberculosis transmission in the study area
3. To determine the level of community's awareness on measures used in tuberculosis prevention.

1.2.2 Hypothesis of study

1. The community is aware about the environmental risk factors responsible for tuberculosis infection in the study area.
2. The community is aware on how TB is transmitted in the study area.
3. The community is aware on the measures used in tuberculosis prevention.

1.3 Significance of the Study

Joined efforts and collaboration between researchers from different scientific disciplines are both required for the better understanding of Mycobacterium tuberculosis nature and its impact on the Rwandan community. In addition the local community needs to understand how the disease is related to environmental risk factors. Tuberculosis remains one of the major public health problems today and no other disease has so much socio-economic and health significance as tuberculosis. Without current adequate information on tuberculosis status and its relationship with environmental risk factors, its eradication will be unsuccessful. Accurate information and precise evidences on tuberculosis severity and its relationship with environmental risk factors in Rwanda are both required in the battle against this overwhelming health problem to the community

3. Materials and Methods

The study was conducted in Kicukiro District. The District of Kicukiro is situated at the South-East of the City of Kigali, the capital of Rwanda. The district is divided into 10 sectors (*Imirenge*) namely: Gahanga, Gatenga, Gikondo, Kagarama, Kanombe, Kicukiro, Kigarama, Masaka, Niboye and Nyarugunga and the respondents were drawn from the above sectors. According to the National institute of Statistics, the District of Kicukiro counts currently has 249,284 inhabitants composed of natives and other people who come from other regions of the country dispatched in the ten sectors. Which more than half the families in the District find it to be too remote (EICV, 2006). During our study, we used of cross sectional survey and closed questions were used in the study area for carrying out the necessary information which related to our research topic. The study was done by using

random sampling (simple random and stratified sampling) followed by random sampling technique which was employed in selecting the study sites and respondents. This method allows collecting and examining the different documentary sources (written documents, visual documents etc.). By this method, some books, articles, reviews, memoirs, and internet web sites; were consulted in order to improve knowledge and to enrich the research work. Different reports, documents held by KICUKIRO District, were consulted. After determining the focus area of our study and the elements that must govern our study, an English questionnaire was designed and translated in Kinyarwanda for easy communication with respondents.

The designed questionnaire used to collect data from 58 respondents who were chosen from the whole district with 10 sectors.

3.1 Data collection method

(i) Primary data from local community were collected by means of pre-designed questionnaires. (ii) Primary data from 58 people from the local community were collected by means of personal interview; (verbal conversation) questionnaire. (iii) Secondary data were collected through intensive literature review and data collected were summarized in form of tables.

Data analysis

The study comprises both quantitative and qualitative data and the researcher have to find suitable in the analysis accordingly to the information regarding to the results of the study which has to be presented in tabular, graphical as well as numerical format using SPSS Windows© program 16.0 version and Excel; where SPSS (*Statistical Package for Social Sciences*) Finally, Friedman test was used since for several related samples procedure it compares the distributions of two or more variables. With reference to this study, the collected data was analyzed basing on the number of respondents. This was calculated in percentages on which the researcher was based on in order to design the conclusion and recommendations of the study.

4. Results and Discussion

Figure 1: Awareness of environmental factors

Figure 1 shows that the people surveyed are not aware of environmental risk factors that can cause tuberculosis (61.70%) and those who are aware (38.30%) of surveyed people (a) and about awareness of the cause of tuberculosis, 55.17% of

respondents are not aware and 44.83% of respondents are aware of the cause of tuberculosis.

Table 1: Presentation of environmental risk factors that can cause tuberculosis

Table 1 presents the mean rank and STD deviation of environmental risk factors that can cause tuberculosis in study area. This table presents also the most appreciated environmental risk factor that can cause tuberculosis.

This table shows that the respondents who are aware of environmental risk factors is 44.8% and those who are not aware of environmental risk factors is 55.2%.

Regarding results from Chi-Square Tests, it is shown that there is no significant different between understanding level and awareness of environmental risk factors, since Pearson Chi-Square (Chi-Square observed) = 0.375 at the $p=0.829$ is less than Chi-Square of the table= 5.991 at $df= 2$. This allows us to reject predetermined hypothesis which told us that the surveyed people are aware of environmental risk factors of the study area.

Table 2: Ranking of environmental risk factors that can cause tuberculosis

This analysis with Friedman Test was aided through the use of a 6 point Liker scale ranging from 1 very important through 5-least important and according to this scale the lower the mean the higher the importance attached by respondents to a given factors.

A non parametric test (Friedman's Test) is used to rank the different environmental factors appreciated by respondents about the most environmental factor that can cause the tuberculosis. The most appreciated environmental factor is crowding factor (Chi-squared value 28.059, $p=0.000$) where it is ranked by 3.01 Mean rank, 0.502 of STD Deviation and the probability of ($p= 0.000$) shows that high significance difference, since $p < 0.001$.

Awareness level of environmental risk factors for TB

Table 3 presents the awareness level of environmental risk factors of tuberculosis. For details, the following tables explain more.

Table 3: Cross-tabulation of awareness level and environmental risk factor

This table shows that the respondents who are aware of environmental risk factors are 44.8% and

those who are not aware of environmental risk factors are 55.2%.

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20.478, $p=0.00$) where it is ranked by 2.13, Mean rank and the probability of ($p= 0.00$) shows very high significance, since $p < 0.001$.

4. Discussion

In this chapter, the analyzed data from 58 respondents who were selected from 10 sectors of kicukiro district are discussed.

The findings showed that the majority of respondents are employed (86.7%) and over the 50% of respondents among those employed are self-employed (58.3%). One man said that *“Depending on where I work, every time when I cough for two weeks I get scared that I have got tuberculosis.”*

4.1 Awareness on the environmental risk factors

Awareness on the environmental factor, environmental risk factor that can cause tuberculosis and Information about tuberculosis was one of the factors that one must consider in this study.

The majority of surveyed people (61.30%) are not aware on the environmental factors that can cause tuberculosis. One women tenant said: *“When I started coughing, I think it is a problem of climate and the seasonal change. Sometimes the cough depends on the work done.”*

The surveyed people in study area are also not aware of the cause of tuberculosis (55.17%). The analysis showed that the few number which are aware of environmental factors denoted that the crowding among different other environmental risk factors is ranked with mean rank of 3.01, Chi-square of 28.059 at the std deviation of 0.502 with the probability of $p=0.000$. This probability of ($p= 0.000$) shows that high significance difference, since $p < 0.001$. The findings about the awareness level of environmental risk factor (44.8%). This is contrary to the hypothesis

predetermined that the surveyed people are aware of environmental risk factors of the study area. Environmental factors may have an impact on the incidence of tuberculosis in a given population as a result of their effect on both the risk of infection and the risk of disease once a person is infected (infection) (Rose, 1985).

One tenant said: *“the tuberculosis is a disease for HIV infected person and where the economics is not good, the tuberculosis may appear”.*

In the ten sectors of Kicukiro, the surveyed people, do not have any information known about tuberculosis (Chi-squared value 20.478, $p=0.00$), since $p < 0.001$.

Generally in 2013, statistics shows that over 6000 people were found with TB symptoms, 3554 were found positive and Kicukiro district has detected 124 per 1000 cases according to the reports from Gahanga health center which is in charge of TB testing in Kicukiro district (<http://english.umuseke.rw/rwanda-eager-to-eradicate-tuberculosis>). And some of the measures used to mobilize the community includes awareness campaign but at health centers levels only which is not effective to the community (Baker and Oranga, 2008).

The results about the different environmental risk factors, the most appreciated by respondents about the environmental risk factor that can cause the tuberculosis is crowding factor (Chi-squared value 28.059, $p=0.000$), since $p < 0.001$.

Resulting to the recent findings on crowding and TB infection risk were published by Baker and Oranga (2008). The study revealed that in people aged below 40 years age, a 1% increase in the proportion of overcrowded households in a given census block led to an 8% increase in TB incidence in that block, holding other variables constant. Crowding has been cited as important infection threat in both industrialized and non-industrialized countries (Styblo, 1991). But this factor's as a unique contribution to TB risk is hard to measure. In Rwanda environmental factors are not considered as the key cause of tuberculosis and even the community is not aware of relationship between environmental factors and spread of tuberculosis as it was mentioned by Umubyeyi et al. (2007)

5. Tables and Figures

Table 1: Presentation of environmental risk factors that can cause tuberculosis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.375 ^a	2	.829
Likelihood Ratio	.384	2	.825
Linear-by-Linear Association	.121	1	.728
N of Valid Cases	58		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.69.

Table 2: Ranking of environmental risk factors that can cause tuberculosis

Environmental factors	Mean Rank	STD Deviation
Race	4.09	0.395
HIV infection	3.22	0.504
Urbanization	3.78	0.459
Nutrition	3.06	0.503
Alcoholism	3.84	0.451
Crowding	3.01	0.502

Test Statistics^a

N	58
Chi-Square	28.059
Df	5
Asymp. Sig.	0.000

a. Friedman Test

Table 3: Cross-tabulation of awareness level and environmental risk factor

Environmental risk factors	Awareness level		Total
	Yes	No	
Socio-economic status	15	18	33
Genetic susceptibility	9	10	19
Immunosuppressive treatment	2	4	6
Total	26	32	58
%	44.8	55.2	100

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.375 ^a	2	.829
Likelihood Ratio	.384	2	.825
Linear-by-Linear Association	.121	1	.728
N of Valid Cases	58		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.69.

Figure 2: Awareness of environmental risk factors that can cause the Tuberculosis
 Figure presents the awareness about environmental risk factors that can cause the tuberculosis (a) and awareness of the cause of tuberculosis (b).

(a) Environmental risk factors

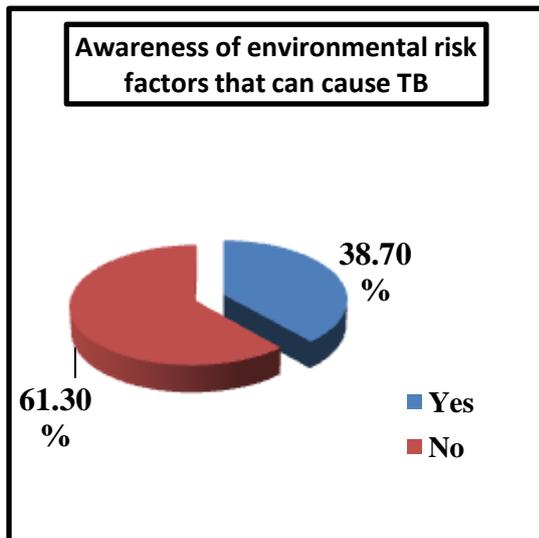


Figure 1: Awareness of environmental factors

(b) Awareness of the cause of TB

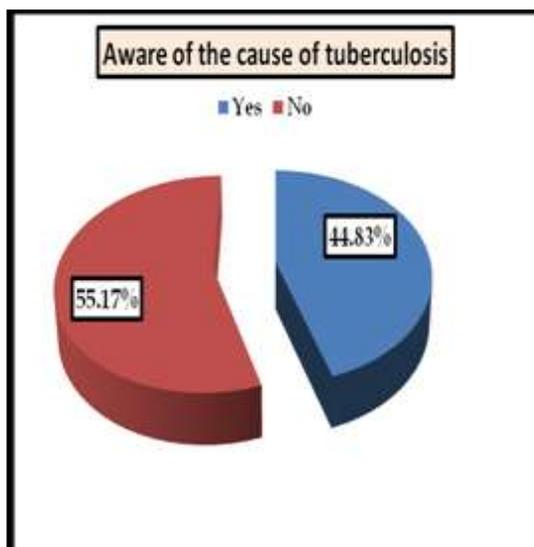


Figure 2: Awareness of environmental risk factors that can cause the Tuberculosis

6. Conclusions

This manuscript is original work of my effort it has not been published in any other journal or its part. It concerns about assessment of the awareness of local community on the role of environmental risk factors in susceptibility to and development of tuberculosis: a case study of Kicukiro District-Kigali city, Rwanda. The results from this study showed that the local community is not aware of the role of environmental factors in susceptibility to and development of tuberculosis.

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