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Implementation of WHO guideline on tuberculosis infection prevention and control in Kaduna State, Nigeria

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Abstract

Introduction: *tuberculosis (TB) has been documented as one of the top ten leading causes of death from a single germ, caused by mycobacterium tuberculosis (MTB) affecting the lungs (pulmonary TB) and other parts of the body (extra pulmonary TB). The study assessed the Implementation level of the WHO Guideline on tuberculosis infection preventions and control in Kaduna State, Nigeria.* ***Methods:*** *a cross-sectional cohort study was used to assess the implementation level of WHO guidelines on tuberculosis infection prevention control in healthcare settings providing tuberculosis care services through Directly Observed Treatment Short-course (DOT'S). The participants of the study include all healthcare workers providing tuberculosis care services through DOTs services in Kaduna State.* ***Results:*** *the result of the study shows that of the 252 respondents 44.0% were trained on WHO guidelines on TBIC, 81.3% have adequate artificial ventilation and 62.7% do have adequate provision of personal protective equipment such as N-95.* ***Conclusion:*** *it's concluded that the implementation of WHO guidelines on tuberculosis infection control is insufficient in the study area. It's also recommended that the provision and implementation of WHO guidelines on tuberculosis infection prevention and control measures is a general responsibility of government, partners, and healthcare workers.*

Introduction

Tuberculosis (TB) germs spread when an infected pulmonary patient sneezes or coughs around a vulnerable TB group with low immunity [1]. It was confirmed that one confirmed pulmonary TB patient can infect an average number of 10-20 people annually if not on drugs [2]. The disease has no respect for age, sex, and race but has a direct link to economic status, medical conditions, and lifestyles. Tuberculosis is endemic among low- and middle-income countries like Nigeria due to the high burden of HIV, poverty, unhealthy lifestyle, poor early TB screening, and prompt treatment with recommended valid anti-TB drugs [3]. It´s documented that there are an estimated 10 million people who developed new cases of TB, resulting in two million deaths annually [4].

Nigeria has an estimated incidence rate of at least 10,000 cases per year [5]. The prevalence rate of tuberculosis and TB/HIV co-infection in Nigeria was reported to be around 219/100,000 and 11/100,000 population [5]. Despite the incidence of TB is in a decrease in some parts of the World including Asia and the Western Pacific, Africa was reported to have a 1.5 million incidence rate in 2015 this is a clear indication that the case is still out of control in the region [1]. Nigerian alone have an estimated annual new TB case of 590,000 [2]. Nosocomial transmission also referred to as hospital-acquired infections (HAI_S) is the transmission of infectious diseases from infected patients to susceptible healthcare workers at the healthcare settings more especially in countries with poor implementations of hospital infectious control measures.

Developing countries are 20 times more vulnerable to nosocomial infection than the developed world due to poor implementation of WHO guidelines on tuberculosis infection control [6]. Transmission of active tuberculosis is the cause of mental health conditions among healthcare workers providing tuberculosis care services [7]. The World Health Organization has developed guidelines for the implementation of infectious control measures in healthcare facilities providing tuberculosis services globally, these guidelines include environmental control, personnel protective control, managerial control, and administrative control respectively [8]. The study is aimed to assess the implementation level of WHO guidelines on tuberculosis infection control (TBIC).

Methods

Study design: a cross-sectional study was conducted to assess the implementation level of WHO guidelines on tuberculosis infection prevention control in healthcare facilities providing tuberculosis care services through directly observed treatment short courses (DOTs) in Kaduna State, Nigeria.

Study area: Kaduna State is located in the north-western geopolitical zone in Nigeria, with a total coverage area of 46,053 square kilometers. The state has a projected population of 8,397,541 across the 23 Local Government Area (LGA) in 2017 with an increase to 3.0% of 6,113,503 of 2006 National projection (NBS, 2017). Agricultural activities are the major source of income in the state.

Study settings: the study was conducted across the selected healthcare facilities providing tuberculosis care service through directly observed treatment short courses (DOT´s) in Kaduna State, Nigeria.

Participants: the participants of the study include all healthcare workers providing tuberculosis care services through DOTs which includes medical doctors, nurses, community health workers, health record officers, environmental health, etc.

Study variable: administrative control measures the number of healthcare workers trained in tuberculosis infection prevention and control, conducting TB risk assessment, able to identifying presumptive TB cases, isolating infectious TB patients, and minimizing duration of contact with infectious TB patients.

Environmental control: measures the level of natural and artificial ventilation, availability, and utilization of local exhausts and particulate air. While personal protective equipment measures the provision and utilization of personal protective equipment (PPE) including N-95.

Data source: data was collected from healthcare workers providing tuberculosis care services from the selected healthcare facilities using a questionnaire.

Study size: the study was conducted among 252 healthcare workers invited for training on the implementation of WHO guidelines on tuberculosis infection prevention and control, as interventions to limit nosocomial transmission of tuberculosis among healthcare workers in Kaduna State, Nigeria.

Sampling procedure: a multistage convenient sampling procedure was used to select the study participants at the first stage, all Local Government Areas (LGAs) providing TB care services through directly observed treatment short course (DOTs) were selected the second stage stratified the local government according to the three geo-political zones. The third stage selected 2 LGAs from each of the geological zones considering urban and rural characteristics, and 36 facilities were selected across all the LGAs using a convenient sampling procedure due to insecurity.

Statistical methods: all data collected was validated through the data triangulation method and analyzed using Statistical Package for Social Sciences (SPSS version 23.0) Software. All information was presented in tables.

Ethical issues: ethical clearance was obtained from the Lead City University research ethical committee, the Kaduna State Ministry of Health Research Ethics Committee, and the Health Research Ethics Committee of the National Tuberculosis and Leprosy Training Center (HREC, NTBLTC). All data collected was managed under a high level of confidentiality and strictly used for the purpose of this study.

Results

Demographical characteristics of the respondents: a total of 252 respondents were recruited out of which (52.6%) were males,

(53.8%) were between the ages of 25-34 with mean age of 31.51±8.24. Among these health workers (67.7%) are married, (48.6%) have NCE/OND degrees, (41.1%) have a higher degree and only (9.5%) have a secondary school certificate and below. More than 50% of the respondents were either laboratory personnel (28.7%) or community healthcare workers (26.8%) only (6.5%) were doctors respectively.

Administrative control: of the total health workers 252 that attended the training, 44.0% were trained on WHO guidelines on TBIC, 70.6% conducted TB risk assessment, 74.6% could identify presumptive TB cases, 59.1% isolated infectious TB patients, and 65.1% minimized duration of contact to TB patients (Table 1).

Environmental control: the result of this analysis shows that 67.1% of the respondents do have adequate natural ventilations, 81.3% do have adequate artificial ventilations, and 0% do not have and do not use local exhaust ventilation and efficient particulate air respectively (Table 2).

Personal protective measures: the result of this analysis shows that 62.7% of the respondents do have adequate provision of personal protective equipment such as N-95, 46.0 were trained on how to use PPE, 42.5% do provide PPE to their patients and 46.4 do educate their TB patients (Table 3).

Discussion

Administrative: the finding of this study is higher than a study conducted in Ikeja Local Government Area of Lagos state and Nepal that documented 2 (10%) and 7 (11.0%) of healthcare workers trained in WHO guidelines on tuberculosis infection control (TBIC) respectively [9]. The difference could be due to the sample size and the emergence of COVID-19 increased the rate at which healthcare workers are trained on the prevention of hospital infection and control.

Environmental: this finding is similar to a study that reported 69 (67.0%) natural ventilation in Gabon [10] and 20 (100%) mixed both natural and artificial ventilation in Nigeria [9]. This could be a reason that the provision of ventilation is the most affordable guideline on tuberculosis prevention and control in healthcare settings across the globe.

Personal respiratory protection: this finding is in line with a study that reported 12 (60%) and 4 (20%) provisions and use of facemasks in Lagos [9]. This finding is lower than a study that reported 105 (59%) provision of face masks to TB patients in Ethiopia [11]. This finding is higher than a study that reported 1 (11.1%) of healthcare workers that are trained on how to use PPE in Enugu Nigeria [12]. The differences in the provision of PPE to patients could be due to the scarcity of facemasks due to coronavirus disease globally.

Limitations of the study: this study has limitations. The findings cannot be generalized to the entire healthcare setting in the country. However, the study provided in-depth information on the implementation of WHO guidelines on tuberculosis infection prevention and control in the study area.

Interpretation: the implementation of WHO guidelines on tuberculosis infection prevention and control in healthcare settings providing tuberculosis care services through Dots is insufficient in Kaduna State. This is due to the finding of this study that shows poor provision and utilizations of infectious prevention measures recommended across healthcare settings offering DOT services.

Recommendation: provision and implementation of tuberculosis infectious control is a general responsibility of government, partners, and healthcare workers. The government and partners should ensure adequate provisions of a conducive working environment and personnel protective equipment such as N-95 for healthcare workers and presumptive TB patients while the healthcare

workers should also ensure the effective utilization of the equipment.

Conclusion

The implementation of WHO Guidelines on tuberculosis infection prevention and control in healthcare settings providing tuberculosis care services through DOTs is inadequate in Kaduna State.

What is known about this topic

- *The significance of the implementation of WHO guidelines on tuberculosis infection prevention control in healthcare settings has been documented in many scientific studies;*
- *The implementation level of these guidelines has been published in many healthcare settings;*
- *The provision and implementation of tuberculosis infection and prevention control has been documented as poor in Lagos State, Nigeria.*

What this study adds

- *The provision of tuberculosis infection prevention and control such as N-95 is low across healthcare settings providing tuberculosis care services in Kaduna State, Nigeria;*
- *The implementation level of tuberculosis infection prevention and control is poor in Kaduna State, Nigeria;*
- *Provision and utilization of tuberculosis infection prevention measures is the general responsibility of the government, partners, and healthcare workers.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Conception and study design: Chiroma Laminu and Adesola Zaidat Musa. Data collection: Chiroma Laminu, Adesola Zaidat Musa and Tubosun Alex Olowolafe. Data analysis and interpretation: Chiroma Laminu, Adesola Zaidat Musa, and Tubosun Alex Olowolafe. Manuscript drafting: Chiroma Laminu. Manuscript revision: Adesola Zaidat Musa and Tubosun Alex Olowolafe. Guarantor of the study: Chiroma Laminu. All the authors have read and agreed to the final manuscript.

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Tables

Table 1: administrative control of tuberculosis in healthcare settings providing tuberculosis care services through DOTs

Table 2: environmental control of tuberculosis in healthcare settings providing tuberculosis care services through DOTs

Table 3: personal protective measures of tuberculosis in healthcare settings providing tuberculosis care services through DOTs

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Table 1: administrative control of tuberculosis in healthcare settings providing tuberculosis care services through DOTs		
	N	**%**
Trained on WHO TBIC guidelines	252	44.0
Conduct TB risk assessment	252	70.6
Identify a presumptive TB case	252	74.6
You isolate infectious TB patient	252	59.1
Minimize your duration of contact with TB patient	252	65.1
WHO; world health organization, TBIC; tuberculosis infection control, TB; tuberculosis		

Table 2: environmental control of tuberculosis in healthcare settings providing tuberculosis care services through DOTs		
	N	**%**
Adequate natural ventilation	252	67.1
Adequate artificial ventilation	252	81.3
Local exhausts ventilation	252	0.0
Use exhausts ventilation	252	0.0
Have efficient particulate air	252	0.0
Use efficient particulate air	252	0.0

Table 3: personal protective measures of tuberculosis in healthcare settings providing tuberculosis care services through DOTs		
	N	**%**
Adequate provision of personal protective equipment such as N-95	252	62.7
trained on how to use PPE	252	46.0
Provide PPE to your patients	252	42.5
Educate patients on how to use PPE	252	46.4
PPE; personal protective equipment		