Dutse Journal of Pure and Applied Sciences (DUJOPAS) Vol. 4 No. 1 June 2018

DEVELOPMENT AND VALIDATION OF TRAINING MANUAL FOR HEALTH MASTERS/MISTRESSES AS PREVENTIVE STRATEGY ON SPREAD OF TUBERCULOSIS IN BOARDING SECONDARY SCHOOLS IN KANO METROPOLIS, KANO STATE

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Abstract

Tuberculosis (TB) is an infectious disease caused by Mycobacterium species (mainly Mycobacterium tuberculosis and rarely by Mycobacterium bovis), It is transmitted from person to person via respiratory droplets, often in a long term contact in a crowded setting.Tubeculosis is one of the 10 leading cause of death worldwide (WHO, 2016). Seven countries account for about two-third of the global burden of tuberculosis, and Nigeria is one of these countries.Annually there are estimated 8.8 million new cases, and 1.45 million deaths, mostly in developing countries (WHO, 2011). Kano State is among the three states with high prevalence of tuberculosis with about 30,000 cases annually, which is expected to be higher in crowded boarding houses. The study developed a manual as a strategy for prevention ofTuberculosis through enlightenment and training as well as screening for tuberculosis in boarding secondary schools in Kano metropolis to ensure effective case detection, prevention, control and treatment.Twenty four (24) participants aged 24-44 years (mean 32±6.7 year) were selected for training in this study. They were health masters/

mistresses of public and private secondary schools within Kano metropolis. At the end of the training, both male and female participants were found to have similar mean post-test score of 35.7±8.1, and 33.8±11.0 respectively, p >0.05).There was also significant improvement in the knowledge of the participants to detect and refer cases of tuberculosis between baseline and post-training (p < 0.05). This indicated that the training manual can be included in the curriculum for effective training of other health masters and mistresses in Kano State boarding schools for early detection and treatment of tuberculosis.

Key Words: Tuberculosis, training manual, boarding secondary school, Kano.

Introduction

Tuberculosis is known to nearly all societies for several centuries, and is believed to have crossed to human with the first domestication of cattle (Madigan and Martinko, 2006). Evidence of tuberculosis was found on mummies from over six thousand years ago (Balcells*et al*., 2006).Tuberculosis is a contagious disease caused predominantly by the *Mycobacterium tuberculosis* and occasionally by *Mycobacterium bovis*. Tuberculosis usually infects the lungs, but can affect almost any part of the body. It is the second highest cause of death from an infectious disease worldwide, after the human immunodeficiency virus and is associated with conditions like over-crowding especially in poorly ventilated settings (WHO, 2011). This condition can easily occur in boarding houses. Most infections do not have symptoms and occur as latent tuberculosis, which foster the risk of transmission in crowded settings since patients can go on without noticeable symptoms in a boarding house or other similar setting. About one out of 10 cases of latent infections progresses to full-blown disease whichleft untreated kills about half of those infected. The classic, but not invariable, symptoms of active tuberculosis are a chronic cough with blood-containingsputum, fever, night sweats, and weight loss (WHO, 2009). Infection of other organs can cause a wide range of symptoms(WHO, 2009).

Approximately33% of the world's population has been infected with *M. tuberculosis*, and new infections occur at approximately one new case per second globally(CDC, 2011). Institutional settings such as prisons, military barracks and schools are key places where risk of tuberculosis transmission is higher, thus necessitating need for active measures to detect and refer cases in a timely manner(WHO, 2011). This is more so important because Tuberculosis is the second most common cause of death from infectious disease (after HIV) and is associated with HIV infection (WHO, 2011).Low Tuberculosis case finding remains the biggest problem of TB control efforts in Nigeria and most developing countries. More than 36 million patients have been successfully treated globally via the World Health Organization's strategy for tuberculosis (TB) control since 1995. Despite predictions of a decline in global incidence, the number of new cases continues to grow, approaching 10 million in 2010. Although there are ways to reduce susceptibility to

infection and disease, and a high-efficacy vaccine would boost TB prevention, early diagnosis and drug treatment to interrupt transmission remain the top priorities for control, which this study focuses on in a high risk setting of boarding schools (WHO, 2010).

Between January and April 2013 there was an outbreak of tuberculosisin a secondary school in London leading to the need to screen students for tuberculosis (Williams*et al* 2016). Tests were conducted to identify contacts with tuberculosis and specimens were sent for testing.Two hundred and seventy-one contacts were identified, of whom 202 (75%) consented for screening. Two further cases of confirmed TB were diagnosed and six cases of latent TB were diagnosed(Williams*et al* 2016). This shows that tuberculosis can be a big a problem in secondary schools settings even in developed countries. TB is mainly a poverty-related disease, affecting disadvantaged populations in the poor countries (Giorgia, *et al* 2014).

Boarding houses offer opportunity for spread of TB as when people with a pulmonary TB coughsneeze or cough they can release up to 40,000 infectious droplets (Cole and Cook 1998).This puts people at close contact with TB at an estimated 22% infection rate (Ahmed and Hasnain, 2011). The probability of transmission from one person to another depends upon several factors, and notable risk factors in a boarding school include poor ventilation and the duration of exposure (CDC 2011).

Tuberculosis prevention and control efforts rely primarily on the vaccination of infants and the detection and appropriate treatment of active cases (Lawn and Zumla, 2011). The emergence of MTB resistance to anti- TB drugs has been a major public health obstacle to achieve the goal of effective global TB control(CDC 2006 and Maryn2012). Therefore boarding schools present appropriate setting in which intervention to detect and refer TB cases for early treatment is paramount.

Statement of the Problem

Tuberculosis is among the leading cause of morbidity and mortality throughout the world (WHO, 2011). In 2014 alone, 1.5 million people died of tuberculosis with an estimated 9.6 million new cases (WHO 2011). In Africa alone, 3.2 million were affected with TB with 45,000 deaths in 2014 alone.Tuberculosis is a disease of public health importance in Nigeria. In 2014, a total of 91,354 cases of TB were registered,of these numbers, 84,049 (92%) where new cases.While about 399,062 presumptive TB cases were identified and evaluated for TB in 2014. This call for a need to develop a manual which could be used particularly by Health Masters in our boarding secondary schools as a preventive precautionary measure for screening of tuberculosis.

Aim and Objectives of the Study

The aim of the study is to design and validate a curriculum for screening of tuberculosis in boarding secondary school within Kano Metropolis. This could be achieved through the following objectives:-

i. To design and develop a manual to train health masters and mistresses in boarding secondary schools within Kano metropolis for the detection of tuberculosis in their schools.
ii. To train health masters and mistresses on measures to be followed in the schools.
iii. To establish measures the schools' health masters / mistresses to follow in referral to detected cases of tuberculosis to the facilities that provide treatment services.

Materials and Methods

A descriptive cross-sectional study involving health masters and mistresses in boarding secondary schools in Kano metropolis was carried out for the purpose of designing and validation of tuberculosis screening training curriculum for boarding secondary schools in Kano. The study was conducted among health masters and mistresses and other health care providers in boarding secondary schools within Kano Metropolis. A multistage sampling technique was used. First, the list of boarding secondary schools within Kano metropolis was obtained from Kano State Secondary Schools Management Board out of which12 schools (7 public and 5 private) were selected. The schools were boys only (6 in number), girls only (5 in number) and mixed gender (1 in number).Two (2) participants (health mistresses/masters) were invited from each of the twelve (12) selected boarding secondary schools for the training. Data collection instruments(training manual and questionnaire) were designed and developed. The training manual has three distinct segments on epidemiology of tuberculosis including the relatively higher risk in boarding houses, its possible manifestations that can be detected by the trainees and what to do when they detect possibility of tuberculosis in the students. The manual had segment of presentations by trainers, group discussions with sample case notes. The instruments validity was ascertained using criterion-related validity using correlation; reliability was ascertained using test and re-test method and the participating health masters and health mistresses were trained on the use of the developed curriculum and their knowledge ascertained based on their pre-and post-training test outcomes. The data obtained in the study were analyzed descriptively and inferentially using two-sample t-tests via using the SPSS statistical software and presented using tables and charts.

Results

The training was conducted on 29th and 30th September, 2016. Twenty four selected health masters/ mistresses aged 24-44 years (mean 32±6.7) participated in the study and findings are summarized as follows:

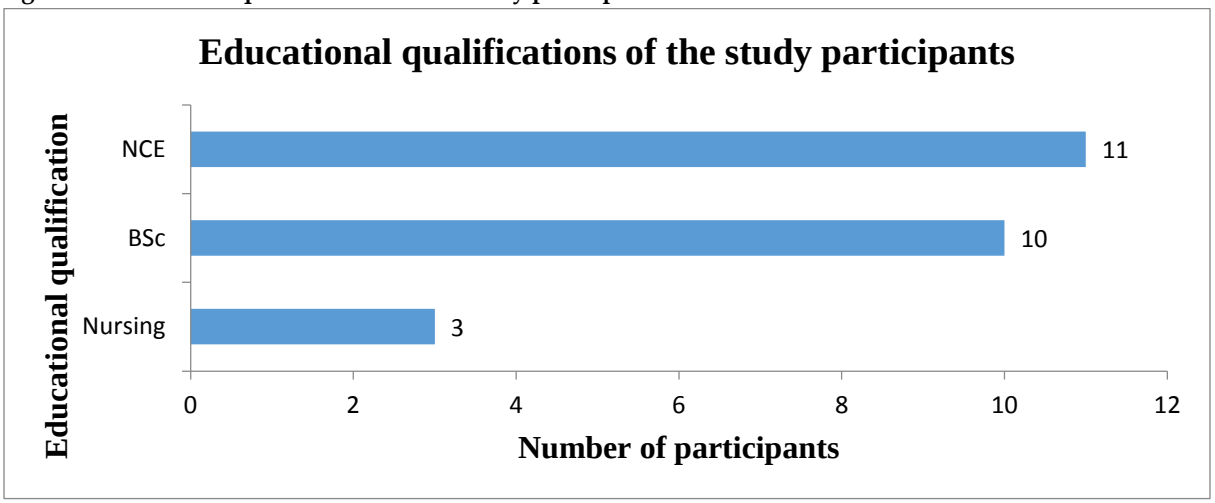
Table 1: Gender Distribution of the Study Participants

Gender	Number	Percent
Male	15	62.5
Female	9	37.5
Total	24	100.0

Source: Fieldwork, 2016

More than half of the study participants, 15 (62.5%) were male, while 9 (37.5%) were female.

Figure 1: Educational qualifications of the study participants



Source: Fieldwork, 2016

The educational qualification of the participants ranged from NCE (11 participants, 45.83%), B. Sc. (10 participants, 41.67%) while 3 of them (12.50%) had nursing and health related certificates (Figure, 1).

Improvement of the participants after the training

Table 2: Summary of post-test scores of study participants according to their gender

Gender	Mean	Std. Deviation
Male	35.7	8.1
Female	33.8	11.0

Source: Fieldwork, 2016

At the end of the training, both male and female participants had nearly similar mean post-test score of 35.7±8.1 and 33.8±11.0 respectively.

Table 3: Relationship between post-test scores and gender

Mean Difference	Std. Error	95% Confidence Interval of the Difference		T	df	P
		Lower	Upper			
1.95556	3.9168	-6.1674	10.0785	0.49927	22	0.62254

Source: Fieldwork, 2016

Comparison between post-test scores of participants from public and private schools

T-test showed there was no difference in post-test scores between participants from public and private schools (F=0.710; df= 18; p= 0.732) (table 3).

Table 4: T-test comparison of post-test scores of participants from public schools and private schools

Sum of Squares	df	Mean Square	F	P
3.833	18	0.213	0.710	0.732

Source: Fieldwork, 2016

Discussion

Despite concerted efforts by various governmental and non-governmental organizations to reduce the spread of tuberculosis among citizens of Kano metropolis, there still exists gap due to lack of coverage of institutional areas like schools. Studies have shown that areas with large populations, for example schools are susceptible to the spread of tuberculosis infection (Ahmed and Hasnain, 2011). We found that majority of the health masters and mistresses in this study were not health personnel and/ or had little knowledge on prevention of spread of tuberculosis in their schools. In fact some of them did not have the basic knowledge of detection of cases of tuberculosis. This is worrisome due to the risk of transmission of the disease among the students who lived in these boarding schools, due to prolonged contact in classes and dormitories in which there may be over-crowding and poor ventilation. It has been shown that prolonged contact with a person with tuberculosis is a risk factor for transmission of the infection (Ahmed and Hasnain, 2011). It has also been found that boarding houses present ripe settings for spread of TB among students (Williams 2016).

Our study showed that training of health masters and mistresses can improve their capacity to detect and hence prevent transmission of tuberculosis among students of their schools. This is

evident in the significant rise in mean scores of participants from pre-test (4.3±1.3) to post-test (7.8±1.3) after the training, as well as increase in pass rate from 40% pre-test to 100% after the training. Thus, the participants have acquired the skills for early detection of cases of tuberculosis in their schools, this will ultimately reduce the spread of the infection among the students. Early detection is key to preventing transmission of tuberculosis, and poor case finding has been shown to be the cause for continuous spread of the infection (WHO, 2011). Furthermore, since the students of these boarding schools return to their homes during holidays, early detection and referral of cases of tuberculosis will help in reducing transmission of the infection in the community at large. The simplicity of the training model will enable even non-health professionals to adequately detect cases of tuberculosis in their schools.

Post-test scores did not differ between male and female participants nor between participants from private and public schools. This showed that the training model used in this study can be reliably applied by health masters and mistresses in both public and private schools to detect cases of tuberculosis and refer them to health centers for management, and hence prevent its spread in their schools. Treated cases of tuberculosis infection have been shown to be non-communicable especially when the organisms are non-resistant variants (Ahmed and Hasnain 2011).

The mean age of the participants in this study was 32±6.7 years. Hence, it's hoped that these participants would stay longer in their schools thereby contributing in early detection and prevention of tuberculosis in their schools. The participants might also pass on the basic skills of detection of tuberculosis to next generations of health masters and mistresses in their schools. A study (Williams 2016) has shown that screening for tuberculosis infection in schools has potential to detect new cases and stem the spread of epidemic. This will provide another justification for continuous detection and prevention of spread of tuberculosis among students of boarding schools in Kano metropolis and Kano State at large.

Conclusion

There were no skills for early detection of tuberculosis cases by the health masters and mistresses of selected 14 boarding schools in Kano metropolis prior to this training. At the end of the training, there was significant improvement in the understanding of how to detect and refer cases of tuberculosis. This indicates that the training manual can be included in the curriculum for effective training of other health masters and mistresses in Kano State boarding schools for early detection and treatment of tuberculosis. This would ultimately reduce new cases of tuberculosis infection in the boarding schools and the Kano State at large.

Recommendations

The following recommendations are considered useful:

i. Further evaluation of this training module should be carried out among health masters and mistresses particularly from rural areas of Kano State to streamline its implementation in both rural and urban boarding schools settings.

ii. Technical support should be provided by Kano State government and development partners for effective implementation of this training module, and to provide sustainability for the project.

iii. Experts in the field should be employed to develop effective means of monitoring and evaluation of this training implementation to ensure that it achieves its desired objectives.

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