UNIVERSITI PUTRA MALAYSIA

INFORMATION, MOTIVATION AND BEHAVIOR-BASED INTERVENTION IN IMPROVING KNOWLEDGE, ATTITUDE AND PREVENTIVE PRACTICES RELATED TO TUBERCULOSIS AMONG HIV PATIENTS IN NIGERIA

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By

CHINDO IBRAHIM BISALLAH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Doctor of Philosophy

October 2017

DEDICATION

This thesis is dedicated to my late father, Muhammad Bisallah Buhari and Mother Halima Bayi Bisallah. May Almighty Allah forgive them all their shortcomings and make Jannatul firdaus be their final abode, ameen.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the Doctor of Philosophy

INFORMATION, MOTIVATION AND BEHAVIOR-BASED INTERVENTION IN IMPROVING KNOWLEDGE, ATTITUDE AND PREVENTIVE PRACTICES RELATED TO TUBERCULOSIS AMONG HIV PATIENTS IN NIGERIA

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October 2017

Chairman : Professor Lekhraj Rampal, PhD
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The rising incidence of tuberculosis (TB) among HIV patients poses a great threat to TB control in Nigeria. The risk of development of active TB in HIV-infected individuals is up to 20-37 times higher than those that are HIV negative. Out of 87,211 TB cases (including HIV-positive TB) in Nigeria in 2015, 14,846 TB patients were HIV-positive were registered for treatment and care. Poor knowledge of TB amongst people living with HIV is associated with high transmission and delay in health-seeking behavior. The objective of this study was to develop, implement and evaluate the effectiveness of information, motivation and behavior based intervention program in improving knowledge, attitude and preventive practices related to tuberculosis among HIV patients in General Hospital, Minna, Nigeria. A randomized control trial was conducted to determine the effectiveness of a newly developed information, motivation and behavior based intervention program on TB knowledge, attitude and preventive `practices. Respondents were randomized into intervention and control groups. The intervention group received health education intervention regarding tuberculosis using the manual developed. The control group received the normal services provided for the HIV patients by Ministry of Health. Both programs were delivered by trained experienced facilitators. Baseline, immediate post-intervention, three months, six months and nine months assessment was carried out. Mixed design ANOVA was used to determine the effectiveness of the intervention. The study results showed no significant difference in knowledge, attitude and preventive practices regarding tuberculosis between the intervention and control group at baseline ($p=0.142$, 0.506 and 0.784 respectively). There was a significant change in good knowledge within the intervention group from baseline to immediate post-intervention, three, six and nine months follow up (39.8%, $p = 0.001$, 38.9%, $p = 0.001$, 40.7%, $p = 0.001$ and 39.8%, $p = 0.001$ respectively). There was no significant

change in knowledge regarding TB within the control group from baseline to immediate post-intervention, three, six and nine months follow up (-12.4%, p =0.08, 14.1%, p = 0.068, 7.9%, p = 0.298, 6.2%, p = 0.419 respectively). Similarly, there was a significant change in positive attitude and good preventive practices from baseline to immediate post-intervention, three, six and nine months follow up within the intervention group. There was significant main effect for group [F = (1,218) = 665.925, p = 0.001, partial $\dot{\eta}^2$ = 0.753]; time [F = (3.600, 218) = 52.620, p = 0.001, partial $\dot{\eta}^2$ = 0.0.194] and the interaction between group and time [F = (3.600, 218) = 34.389, p = 0.001, partial $\dot{\eta}^2$ = 0.136) for tuberculosis-related knowledge. Likewise, the main effects for group, time and the interaction of group and time for respondent's attitude and practice regarding tuberculosis were significant. The information, motivation, and behavior based intervention program developed was effective in improving knowledge, attitude and practice regarding tuberculosis among HIV patients. It is highly recommended that a structured information, motivation, and behavior based intervention program regarding tuberculosis targeted at HIV patients be included in the national tuberculosis control guidelines.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

KEBERKESANAN INTERVENSI BERASASKAN INFORMASI, MOTIVASI DAN TINGKAH LAKU DALAM MENINGKATKAN PENGETAHUAN, SIKAP DAN AMALAN TENTANG TUBERKULOSIS DALAM KALANGAN PESAKIT HIV DI NIGERIA

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Insiden batuk kering (TB) yang meningkat dalam kalangan pesakit HIV membawa ancaman besar kepada kawalan TB di Nigeria. Risiko perkembangan TB aktif pada individu yang dijangkiti HIV adalah 20-37 kali lebih tinggi daripada orang-orang yang tidak dijangkiti HIV. Daripada 87,211 kes TB (termasuk TB positif-HIV) di Nigeria pada tahun 2015, 14,846 pesakit TB telah didaftarkan untuk rawatan dan penjagaan adalah positif dijangkiti HIV. Kurang pengetahuan dan sikap berkenaan TB di kalangan mereka yang hidup dengan HIV dikaitkan dengan penyebaran yang tinggi dan tingkah laku kelewatan dalam ikhtiar mendapatkan khidmat kesihatan. Kajian inin bertujuan untuk membangun, melaksana dan menilai keberkesanan program intervensi berasaskan informasi, motivasi dan tingkah laku dalam meningkatkan pengetahuan, sikap dan amalan pencegahan mengenai batuk kering dalam kalangan pesakit HIV di Hospital Besar, Minna, Nigeria. Satu eksperimen rawak terkawal dijalankan untuk menentukan keberkesanan program intervensi berasaskan informasi, motivasi dan tingkah laku yang baru dibangunkan bagi pengetahuan, sikap dan amalan pencegahan berkenaan TB. Responden dibahagiakan secara rawak ke dalam kumpulan intervensi dan kawalan. Kumpulan intervensi menerima intervensi berkenaan batuk kering menggunakan manual yang telah dibangunkan. Kumpulan kawalan menerima rawatan normal yang disediakan untuk pesakit HIV oleh Kementerian Kesihatan. Kedua-dua program telah disampaikan oleh fasilitator terlatih dan berpengalaman. Penilaian intervensi pada masa dasar, serta-merta selepas intervensi, tiga bulan, enam bulan dan sembilan bulan telah dijalankan. Reka bentuk ANOVA bercampur digunakan untuk menentukan keberkesanan intervensi. Hasil kajian menunjukkan tiada perbezaan yang ketara dalam pengetahuan, sikap dan amalan mengenai batuk kering antara kumpulan intervensi dan kawalan pada masa dasar (masing-masing p=0.142, 0.506 dan 0.784). Terdapat perubahan yang ketara

terhadap pengetahuan yang baik bagi kumpulan intervensi dari masa dasar berbanding serta merta selepas intervensi, tiga, enam dan sembilan bulan susulan (masing-masing 39.8%, 38.9%, p=0.001, 40.7%, p=0.001, p=0.001 dan 39.8%, p=0.001). Tiada perubahan ketara terhadap pengetahuan mengenai TB dalam kumpulan kawalan dari masa dasar berbanding serta merta selepas intervensi, tiga, enam dan sembilan bulan susulan (masing-masing -12.4%, p=0.08, 14.1%, p=0.068, 7.9%, p=0.298, 6.2%, p=0.419). Namun terdapat perubahan yang ketara dalam sikap positif dan amalan yang baik dari masa dasar berbanding serta merta selepas intervensi, tiga, enam dan sembilan bulan susulan. Terdapat kesan utama yang ketara bagi kumpulan [F=(1,218)=665.925, p=0.001, $\dot{\eta}^2$ separa=0.753]; masa [F=(3.600, 218)=52.620, p=0.001, $\dot{\eta}^2$ separa=0.194] dan interaksi antara kumpulan dan masa [F=(3.600, 218)=34.389, p=0.001, $\dot{\eta}^2$ separa=0.136) bagi pengetahuan berkaitan batuk kering. Begitu juga, kesan utama bagi kumpulan, masa dan interaksi kumpulan dan masa untuk sikap dan amalan mengenai batuk kering responden adalah ketara. Program intervensi berasaskan informasi, motivasi dan tingkah laku yang dibangunkan adalah berkesan dalam meningkatkan pengetahuan, sikap dan amalan mengenai batuk kering dalam kalangan pesakit HIV. Program intervensi berasaskan informasi, motivasi dan tingkah laku mengenai batuk kering mensasarkan penghidap HIV amat disyorkan untuk dirangkumi ke dalam garis panduan kawalan batuk kering negara.

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To my departed father, Late Muhammad Bisallah Buhari and Mother Bayi Bisallah of living memory, May Allah forgive all your shortcomings and reward you with Aljannah Firdausi.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

WHO	World Health Organization
CDC	Center for Disease Control and prevention
FMOH	Federal Ministry of Health
NTBLCP	National Tuberculosis and Leprosy Control Program
PHC	Primary Health Care
NACA	National Agency for the Control of AIDS
UNAIDS	Joint United Nation Program on HIV and AIDS
PLWHA	People Living with HIV/AIDS
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency syndrome
TB	Tuberculosis
NGO	Non-Governmental Organization
ACSM	Advocacy, Communication, and Social Mobilization
IPT	Isoniazid preventive therapy
BCG	Bacillus Calmette Guerin
DOTS	Directly Observed Treatment Short-course
ART	Antiretroviral therapy
PTB	Pulmonary Tuberculosis
EPTB	Extrapulmonary Tuberculosis
MDRTB	Multi-drug Resistance Tuberculosis
XDRTB	Extensively resistant Tuberculosis
PAS	Para-amino-salicylic Acid
IMB	Information, Motivation and Behavior
SRH	Sexual and Reproductive Health
INH	Isoniazid
ICF	Intensified case Finding
HAD	Hospital Anxiety and Depression (HAD) scale
FCT	Federal Capital Territory
NPC	National Population Commission
NBS	National Bureau of Statistics
ITT	Intention to Treat Analysis
ANOVA	Analysis of Variance

CHAPTER 1

INTRODUCTION

This chapter provides background information on tuberculosis (TB) epidemic among human immunodeficiency virus (HIV) patients, problem statement, and significance of the study, its objectives, and the hypotheses to be tested.

1.1 Background

Tuberculosis is a disease of major public health concern, especially in Africa. Tuberculosis is the most common opportunistic infection among HIV-infected persons and remains the main driver of the epidemic. It is also the commonest cause of death in AIDS patients. There is a significant increase of cases of tuberculosis because of the ravaging HIV epidemic and has taken a great toll on lives in the last three decades (Olaniran *et al* 2011).

With the discovery in the 1980s of human immunodeficiency virus (HIV), the HIV epidemic has led to a major upsurge of TB cases and TB mortality in many countries, especially Africa. In 2013, 1.1 million representing 13% of the 9.0 million people who were diagnosed with TB worldwide were HIV-positive and 78% of these HIV-positive TB cases were in Africa. At the global level people living with HIV have 29 times probability of developing TB disease than those who are HIV-negative (World Health Organization [WHO], 2014a).

According to the global tuberculosis report, WHO in 2015 estimated that there were 586,000 cases of all forms of tuberculosis in Nigeria, representing an annual incidence rate of 322/100,000 population. Nigeria is among the six countries that contributed 60% of all new TB cases in 2015 and remains among the 22 high burden countries. The estimated number of HIV-positive TB patients was 100,000 representing an incidence rate of 55/100,000 population (WHO, 2016). With HIV prevalence of 3.4% (2012), having a generalized epidemic, Nigeria faces a sustained transmission of tuberculosis until the HIV epidemic is brought under control (Federal Ministry of Health [FMOH], 2013).

Nigeria is ranked the 10th in the world and fourth in Africa among the 22 countries with high burden of tuberculosis. The first-ever national TB prevalence survey conducted in 2012 revealed a TB prevalence and incidence rates of 322/100,000 and 338/100,000 respectively (National Tuberculosis & Leprosy Control program [NTBLCP], 2012). The global tuberculosis report 2014, WHO estimated the prevalence of TB in Nigeria as 326/100,000 and an incidence rate of 338/100,000 confirming the report of the survey conducted in 2012 (WHO, 2014a).

HIV alone does not kill, but various opportunistic infections that occur because of immunosuppression are responsible for the deaths of AIDS patients. The most common of these opportunistic infections is tuberculosis. The national guidelines for the prevention and control of tuberculosis in Nigeria advocates for TB screening for all HIV-positive patients (NTBLCP, 2015). Unfortunately, attention has not been given to ensure that this screening takes place. The WHO guidelines on the prevention of tuberculosis in people living with HIV provides that every person with HIV should be offered TB screening and isoniazid preventive therapy (WHO, 2014b).

1.2 Statement of the Problem

The risk of development of active TB in HIV-infected individuals is up to 20-37 times higher than those that are HIV negative (Granich *et al*., 2010, Gyar *et al*., 2014). In 2015, 90,584 of all forms of TB were registered in Nigeria. Out of this, 14,846 were HIV positive representing 17% of all forms of registered cases (WHO, 2016). Moreover, studies conducted to determine the burden of TB among HIV patients from different locations in Nigeria revealed prevalences of as high as 10.5%, 16.7% and 34.5% (Gyar *et al*, 2014, Iliyasu & Babashani, 2009, Pennap *et al*, 2009). Available information from the hospital where this study was conducted revealed TB/HIV Co-infection rate for 2014 to be as high as 35%.

Ideally HIV patients should have good knowledge regarding tuberculosis as the most common opportunistic infection and the main cause of deaths among them to prevent infection and development of active disease. A number of studies done to assess knowledge, attitude and practice regarding tuberculosis revealed that knowledge was poor and believe to be a serious challenge to tuberculosis control program((Biya *et al*, 2014, Abebe *et al.* 2012, Koana *et al*, 2004). Lack or inadequate knowledge amongst people living with HIV about tuberculosis is associated with high transmission and delay in health-seeking behavior (Abebe *et al.* 2012). Studies conducted by Gouda *et al*, 2014, Arora *et al*, 2012 and Abebe *et al*, 2012 revealed that 44.6%, 70%, 49.8% of HIV patients had poor knowledge regarding tuberculosis respectively. Similarly, studies conducted in Nigeria, among a sample of different population groups including the general public and tuberculosis patients by Biya *et al*, 2014, Uchenna *et al*, 2014 and Tobin *et al* 2013 revealed that 59%, 39.5% and 55.1% of respondents had poor knowledge regarding tuberculosis respectively.

The trend of tuberculosis in Nigeria, based on the graph at figure 1.1 shows an upward trend of all forms of TB cases notified from 2002 – 2013 (NTBLCP, 2015).

Figure 13: Trend in notification of all forms of TB cases, 2002 - 2013

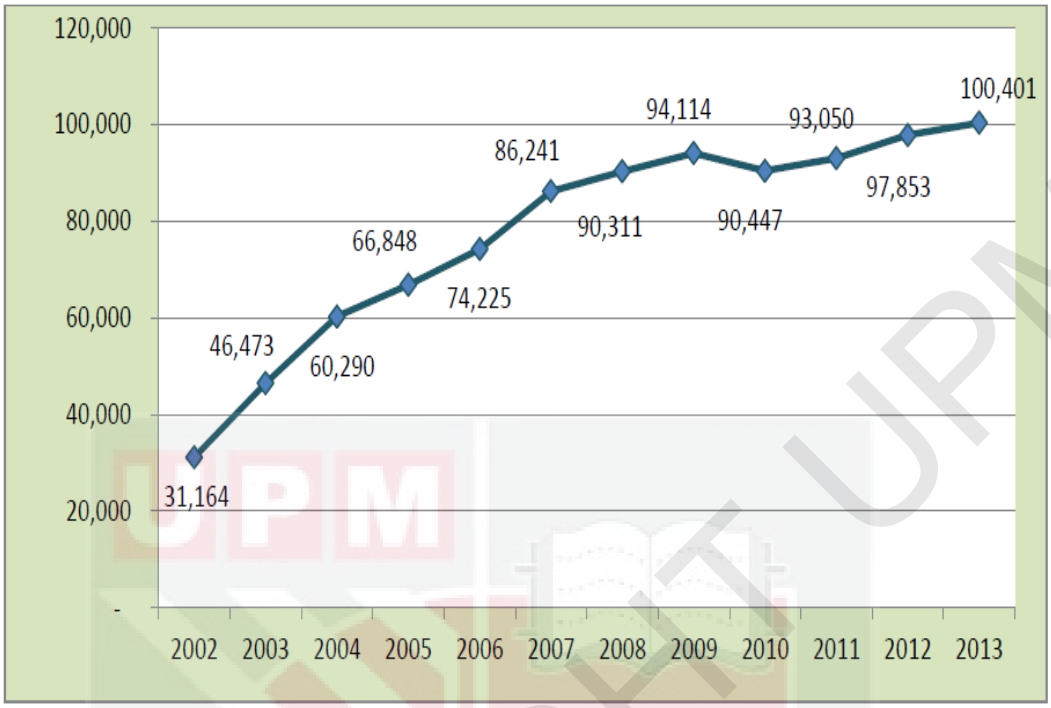

Figure 1.1 : Trend in notification of all forms of TB cases in Nigeria, 2002 – 2013
(Source: NTBLCP, 2015).

There is paucity of research to determine TB knowledge and prevention practices among HIV patients in Nigeria. Studies conducted on knowledge, attitude and practice regarding tuberculosis among HIV patients are mainly descriptive, and the effect of health education intervention has not been tested. There is no structured health education intervention program on behavior modification that is directed and specific for HIV patients regarding tuberculosis in Nigeria. Although, suspected HIV patients that present with signs and symptoms of TB are referred to TB clinics for investigation and further management (FMOH, 2008). The component of national tuberculosis control program that provides information and education to the general public about tuberculosis Advocacy, Communication, and Social Mobilization (ACSM) strategy was evaluated in the year 2012 and found to be largely ineffective (Otu, 2013) and therefore not working. This is supported by the study conducted on knowledge about tuberculosis; a national knowledge, attitude and practice survey on tuberculosis among Nigerians which revealed low knowledge, as only 26.5% of the participants had correct knowledge of the disease. Based on the report of this study, it was recommended that health education program on TB should be prioritized to different category of Nigerians, taking into consideration high-risk groups especially people living with HIV for effective prevention and control (Hassan *et al*, 2017). Moreover, if nothing is done the dual HIV/TB co-infection will continue to grow, increase death among HIV patients and we risk the development of Multi-drug resistant TB with its attendant consequences (Alena *et al*, 2013).

This study is aimed to develop, implement and evaluate the effectiveness information, motivation and behavioral skills intervention program in improving knowledge, attitude and preventive practice regarding tuberculosis among HIV patients in Minna, Niger State, Nigeria based on the principle of information, motivation and behavior theory. The IMB model was chosen for this study because of its simplicity, the diverse educational background of our respondents and the fact that the model addresses the three components that determine behavior change including information about a health condition, motivation for attitudinal change and behavioral skill necessary for behavior change. This was also based on evidence of its effectiveness from a systematic review of the model by Chang & Cataldo, 2014, which reported its applicability and effectiveness especially in promoting behavior change among people with chronic diseases. Several other studies have confirmed and reported the effectiveness of the IMB model in promoting and sustaining behavior change (Norton et al, 2010, Zarani *et al*, 2010, Diclemente *et al*, 2009, Fisher 2009 & Munro *et al*, 2007). The preference for IMB model to other models was also due to limitations observed with the application of other models. For instance, in the application of the Health belief model (HBM), a systematic review reported that the intervention successes appeared to be unrelated to the construct been addressed, as out of 18 studies only five used the different components of the model and all did not report any health effects outcomes, making utility of the model unreliable (Jones, Smith & Llewellyn, 2014). Additionally, the social cognitive theory has also suffered criticism, because of its complexity, which makes it difficult to operationalize as most studies usually utilized one or two of the components ignoring others (Munro, Lewin, Swart & Volmink, 2007). Other weaknesses identified with these other theories include: that the theory of reasoned action (TRA) only works when some aspect of behavior is not under volitional control and that perceived behavior control predicts actual behavior control, which may not be true (Ajzen & Fishbein, 1988). Additionally, these other theories do not address actual behavior skills needed to achieve the desired outcomes (Sabate, 2003) and do not conceptualize and capture attitudes (Ryan & Carr, 2010). Lastly, these theories give little attention to the origin of beliefs and how these beliefs may influence other behaviors (Weinstein, 1988).

1.3 Significance of the Study

This study, if effective will demonstrate the usefulness of IMB based health education intervention in TB prevention and control among HIV patients. This will influence policy decision by the ministry, state government and non-governmental organizations (NGOs) for the inclusion of new strategy for the prevention and control of tuberculosis among HIV patients and contributing towards TB control in Nigeria. It will provide a new module for a structured behavioral modification intervention regarding TB that is directed and specific for HIV patients in Nigeria which presently does not exist. It will contribute to the body of knowledge by generating valuable information for evaluating and further developing national training programs regarding TB. The findings of this study will benefit HIV patients by heightening the level of awareness about TB, which will influence attitudinal change and reduce the risk of infection or development of active disease.

1.4 Objectives of Study

1.4.1 General objective

To develop, implement and evaluate the effectiveness of information, motivation and behavior (IMB) based intervention program in improving knowledge, attitude and preventive practices related to tuberculosis amongst HIV patients in General Hospital Minna, Nigeria.

1.4.2 Specific Objectives

i. To determine and compare the socio-demographic (age, gender, educational level, ethnicity, occupation and socio-economic status, etc.), psychosocial (anxiety and depression) characteristics and knowledge, attitude and practice of the respondents in the intervention and control groups at baseline.
ii. To develop and implement IMB based health education intervention program in improving knowledge, attitude and preventive practices related to tuberculosis among HIV patients in the intervention group.
iii. To evaluate the effectiveness of IMB based intervention program in improving knowledge, attitude and preventive practices related to TB among HIV patients within the intervention group compared to the control group at immediate post-intervention, three, six and nine months follow-up period
iv. To evaluate the effectiveness of IMB based intervention program in improving knowledge, attitude and preventive practices related to TB among HIV patients between the intervention and control group at immediate post-intervention, three, six and nine months follow-up period

1.5 Research Hypothesis

i. There is no significant difference in the socio-demographic characteristics (age, gender, educational level, ethnicity, occupation and socio-economic status etc.), psychosocial factors (anxiety and depression), knowledge, attitude and practice of respondents in the intervention and control groups at baseline
ii. There is a significant difference in the knowledge, attitude and preventive practices related to tuberculosis among HIV patients within the intervention group as compared to the control group at immediate post-intervention, three, six and nine months follow-up period.
iii. There is a significant difference in the knowledge, attitude and preventive practices related to tuberculosis among HIV patients between the intervention and control group at immediate post-intervention, three, six and nine months follow-up period.

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Dr. Chindo Ibrahim Bisallah was born on the 3rd April 1964 at Shamuyambu in Niger state, Nigeria. He obtained his Master of Public Health (MPH) and Bachelor of Medicine and Bachelor of surgery (MBBS) degrees at Ahmadu Bello University Zaria, Nigeria in the year 2002 and 1990 respectively. Worked as a house officer at Ahmadu Bello University Teaching Hospital Zaria, Nigeria from 1990 to 1992, and upon completion of Housemanship proceeded for his one year mandatory National youth service and served as a medical officer at Specialist Hospital Obangede, Kogi state, Nigeria from 1992 to 1993. Upon completion of National youth service, was employed into the Niger atate civil service and posted to department of surgery, General hospital, Minna as a medical officer in 1993. Dr. Chindo was the medical officer and Principal meidical officer in-charge of Rural Hospital Agaie and General hospital Kagara, Niger state form 1993 – 1997 and 1998 – 2001 respectively. He also worked in the department of paediatrics of General hospital Minna in the year 1997 to 1998. He worked as State AIDs program coordinator (SAPC) and state tuberculosis coordinator between 2003 - 2009 and 2003 – 2006 respectively. He was also appointed as Secretary, State Action Committee on AIDS (SACA) and served in this capacity from 2006 to 2009. He also served as State Epidemiologist/ Deputy Director Disease control, Ministry of health, Niger state, Nigeria from 2006 to 2009. Appointed as Permanent Secretary, Ministry of health, Niger state and served in this capacity for a preiod of four years from 2009 to 2014.

LIST OF PUBLICATIONS

Accepted for publications

Bisallah CI, Rampal L, Lye MS, Sidik SM, Iliyasu Z, Onyilo MO (2018). Baseline knowledge, attitude, and preventive practices regarding Tuberculosis and its predictors among HIV patients in General Hospital, Minna, North-central, Nigeria ID MJMHS-2017-0070.R3

Bisallah CI, Rampal L, Lye MS, Sidik SM, Ibrahim N, Iliyasu Z, Onyilo MO (2018). Effectiveness of health education intervention in improving knowledge, attitude, and practices regarding Tuberculosis among HIV patients in General Hospital Minna, Nigeria – A randomized control trial. PLOS ONE, PONE-D-17-30863R1

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