UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS ZOONOSES AND BRUCELLOSIS AMONG MEDICAL AND VETERINARY STUDENTS IN PUBLIC UNIVERSITIES IN MALAYSIA AND NIGERIA

HAMZA ADAMU TANKO

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By

HAMZA ADAMU TANKO

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

September 2016

DEDICATION

This thesis is dedicated to my dearest parents for molding me into the person that I am today. May Allahu [SWT] bless them and grant them peace, may He (The Most Merciful) make Jannatul Firdaus their final abode.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the Degree of Master of Science

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Chairman : Prof. Dato' Lye Munn Sann MBBS, MPH, DrPH
Faculty : Medicine and Health Sciences

Introduction: Worldwide, emerging infectious diseases has continued to threaten the global health substantially. About 150 to 300 emerging infectious diseases that are transmissible between animals and humans have been identified. Interaction between man and animals increase the chance of zoonotic disease occurrence among people, their livestock, companion animals and wildlife. Brucellosis is the most common zoonotic disease and is still present throughout the five continents. In many parts of the world today brucellosis remain a disease of great economic impart and yet it is often unrecognized and frequently goes unreported.

Objectives: To determine the level of knowledge, attitude and practices towards zoonoses and knowledge towards brucellosis among medical and veterinary students in Universiti Putra Malaysia and Usmanu Danfodiyo University Sokoto, Nigeria.

Methodology: A cross-sectional study was conducted using a proportionate stratified sampling method among 709 eligible students from both institutions. Data was collected on knowledge, attitude and practices regarding zoonoses and knowledge towards brucellosis among students from November 2014 to April 2015, using self-administered questionnaire, which was validated through content and face validity. Reliability was measured by checking the internal consistency using Cronbach's alpha and values above 0.7 were considered. Descriptive analysis, Chi-square, univariate and multiple logistic regression and Mann Whitney to compare the median scores across students were conducted using SPSS version 22. Level of significance was set at $P< 0.05$.

Result: There were a total of 709 students 369 and 340 from UPM and UDUSOK respectively. Response rate was 95.3% in UPM and 87% in UDUSOK. About 90.2% and 92.4% of the students had good knowledge in UPM and UDUSOK respectively.

Majority (99.2%) in UPM and (90.6%) in UDUSOK exhibited positive attitude. However, About 71.0% and 96.2% of the students had good knowledge regarding good preventive in UPM and UDUSOK respectively. Knowledge regarding brucellosis was found to be high 97.8% in UPM and 67.1% in UDUSOK. Predictors of knowledge, attitude and practices showed that faculty predicted knowledge in UPM (ORadj = 13.241, *P* = 0.001*, CI = 3.928- 44.635) while year of study in UDUSOK (ORadj = 0.214, *P* = 0.019*, CI = 0.059-0.774). Age predicted attitude in UPM (OR_{adj} = 63.302, *P* = 0.037*, CI = 1.272-3150.18), while gender and year of study in UDUSOK (ORadj = 3.451, *P* = 0.029*, CI = 1.136-10.48; ORadj = 4.342, *P* = 0.029*, CI = 1.161-16.24 respectively). Knowledge on brucellosis was predicted by faculty in UPM and UDUSOK (ORadj = 24.399, *P* = 0.001*, CI = 11.083-53.71; ORadj = 4.729, *P* =0.001*, CI = 2.149-10.40 respectively). However, year of study predicted knowledge regarding brucellosis in UDUSOK (ORadj = 0.242, *P* =0.001*, CI = 0.106-0.533 respectively).

Conclusion: Overall, the present study showed/demonstrated there was a high knowledge levels towards zoonoses and brucellosis. However, poor responses were established in some knowledge domains such as meaning and what zoonoses really are. Majority of the participants exhibited positive attitude towards zoonoses with better knowledge on good preventive measures.

Keywords: Knowledge, attitude, practices, zoonoses, brucellosis.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Sarjana Sains

PENGETAHUAN, SIKAP DAN AMALAN TERHADAP ZOONOSIS DAN PENGETAHUAN TERHADAP BRUCELOSIS DALAM KALANGAN PELAJAR PERUBATAN DAN VETERINAR DI UNIVERSITI PUTRA MALAYSIA DAN USMANU DANFODIYO UNIVERSITY, NIGERIA

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Pengenalan: Di seluruh dunia, penyakit berjangkit bangkit masih terus mengancam kesihatan global dengan ketara. Sekitar 150-300 penyakit berjangkit bangkit yang boleh berpindah antara haiwan dan manusia telah dikenal pasti. Interaksi antara manusia dan haiwan meningkatkan peluang kejadian penyakit zoonotik dalam kalangan masyarakat, ternakan mereka, haiwan peliharaan dan hidupan liar. Brucelosis adalah penyakit zoonotik yang paling biasa dan masih ada di seluruh lima benua. Sebahagian daripada dunia brucelosis kekal sebagai penyakit yang memberi kesan ekonomi yang besar akan tetapi masih sering tidak diiktiraf dan kerap tidak dilaporkan.

Objektif: Untuk menentukan tahap pengetahuan, sikap dan amalan mengenai zoonosis dan pengetahuan terhadap brucelosis dalam kalangan pelajar-pelajar perubatan dan veterinar di Universiti Putra Malaysia dan Usmanu Danfodiyo University Sokoto, Nigeria.

Metodologi: Satu kajian keratan rentas telah dijalankan dengan menggunakan kaedah persampelan berstrata bersekadar dalam kalangan 709 responden berkelayakan dari kedua-dua institusi. Data telah dikumpulkan mengenai pengetahuan, sikap dan amalan mengenai zoonosis dan pengetahuan terhadap brucelosis dalam kalangan peserta dari bulan November 2014 hingga April 2015, menggunakan soal selidik ditadbir sendiri yang telah disahkan melalui kesahan kandungan dan muka. Kebolehpercayaan diukur dengan memeriksa ketekalan dalaman menggunakan alfa Cronbach dan nilai melebihi 0.7 akan dipertimbangkan. Analisis deskriptif, khi-kuasa dua, univariat dan regresi logistik berganda dan Mann Whitney untuk membandingkan skor median bagi seluruh pelajar telah dijalankan menggunakan SPSS versi 22. Tahap signifikan telah ditetapkan pada $P < 0.05$.

Keputusan: Terdapat sejumlah 709 pelajar 369 dan 340 dari UPM dan UDUSOK masing-masing. kadar sambutan adalah 95.3% dan 87% di UPM dan UDUSOK. Kira-kira 90.2% dan 92.4% pelajar mempunyai pengetahuan yang baik di UPM dan UDUSOK masing-masing. Majoriti (99.2%) di UPM dan (90.6%) di UDUSOK mempamerkan sikap positif. Walau bagaimanapun, kira-kira 71.0% dan 96.2% pelajar mempunyai pengetahuan yang baik mengenai pencegahan baik di UPM dan UDUSOK masing-masing. Pengetahuan mengenai brucelosis didapati tinggi 97.8% di UPM dan 67.1% di UDUSOK. Peramal pengetahuan, sikap dan amalan telah fakulti meramalkan pengetahuan di UPM (OR_{adj} = 13.241, *P* = 0.001*, CI = 3.928- 44.635) manakala tahun pengajian di UDUSOK (OR_{adj} = 0.214, *P* = 0.019*, CI = 0.059-0.774). Umur meramalkan sikap di UPM (OR_{adj} = 63.302, *P* = 0.037*, CI = 1.272-3150.18), manakala jantina dan tahun pengajian meramalkan sikap di UDUSOK (OR_{adj} = 3.451, *P* = 0.029*, CI = 1.136-10.48; OR_{adj} = 4.342, *P* = 0.029*, CI = 1.161-16.24 masing-masing). Pengetahuan terhadap brucelosis telah diramal oleh fakulti di UPM dan UDUSOK (OR_{adj} = 24.399, *P* = 0.001*, CI = 11.083-53.71; OR_{adj} = 4.729, *P* =0.001*, CI = 2.149-10.40 respectively). Walau bagaimanapun, tahun pengajian meramal pengetahuan mengenai brucelosis di UDUSOK (OR_{adj} = 0.242, *P* =0.001*, CI = 0.106-0.533 masing-masing).

Kesimpulan: Secara keseluruhan, tahap pengetahuan terhadap zoonosis dan brucelosis. Walau bagaimanapun, respon lemah didapati di beberapa domain pengetahuan seperti makna dan apa zoonisis sebenarnya. Majoriti peserta mempamerkan sikap positif terhadap zoonosis dengan pengetahuan yang lebih baik mengenai langkah-langkah pencegahan baik.

Kata kunci: Pengetahuan, sikap, amalan, zoonoses, brucelosis.

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sincerely apologize to those that I have wronged directly or indirectly during the course of my work and to those I could not mention their names personally one by one, God bless you all.

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

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

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LIST OF ABBREVIATIONS

>	Greater than
%	Percentage
&	And
SGS	School of Graduate studies
<	Less than
≤	Less than or equal to
≥	Greater than or equal to
B.	Brucella
CI	Confidence interval
DF	Degree of freedom
F	Frequency
FAO	World Organization for Animal Health
IQR	Inter-quartile range
KAP	Knowledge, attitude and Practice
M	Mean
N	Total number
OR	Odds ratio
OR_{adj}	Adjusted odds ratio
OR_{crude}	Crude odd ratio
SD	Standard Deviation
Spp	Specie
SPSS	Statistical package for social sciences
UDUSOK	Usmanu Danfodiyo University Sokoto
UDUTH	Usmanu Danfodiyo University Teaching Hospital

UPM	Universiti Putra Malaysia
WHO	World Health Organisation
x^2	Chi-square
YOS	Year of study
Z	*Z*- Statistics

CHAPTER 1

INTRODUCTION

1.1 Background

A zoonotic disease refers to any contagious disease that can be spread between animals and humans (Swai E et al., 2010 & WHO/FAO/OIE, 2004). Worldwide, emerging infectious diseases have continued to distort the global health substantially (Hahn et al., 2000).

About 150 to 300 emerging infectious diseases that are transmissible between animals and humans (Taylor et al., 2001), and about 75% of recently emerging infectious diseases affecting humans are diseases of animal origin. More so, it has been estimated that 60% of all human pathogens are zoonotic in nature (Jones et al., 2008; Murphy, 1998). Those diseases have been identified involving all types of microbial agent's bacteria, parasites, viruses, prions and fungi. Zoonotic diseases can be spread through diverse means such as working closely with livestock, household pets, exhibited animals or related wildlife, by simply coming in contact with soil or water contaminated by animals or by consuming improperly processed foods and dairy products (Kakkar et al., 2011).

In developing countries today, zoonotic diseases such as anthrax, tuberculosis, brucellosis, rabies, trypanosomiasis are the most common neglected zoonoses (WHO/FAO/OIE, 2006), causing a devastating hindrance to livestock growth. Those diseases have continued to infect a large proportion of the human population in many developed countries including United States each year and many other parts of the globe today are considered to be endemic zones of zoonotic diseases (Kakkar et al., 2011b).

Emerging zoonotic diseases are diseases of infectious origin that have been highly prevalent in the past and threatens to increase in the near future (Institute of Medicine, 1992). Zoonotic diseases remain a threat because of their potential to move from animal-to-human and further advances to a human-to-human transmission route with deadly outcome. Indeed, some of the most common infectious human diseases of animal origin are now no longer zoonotic (Wolfe et al, 2007). Other zoonotic diseases are challenging because they are sustained in livestock or wild animal reservoirs (Grace et al., 2011). Risk to humans increases when there is a change in behavior that allows levels of pathogens to circle in their animal hosts; for example when intensive farming leading to higher levels of food-borne pathogens enhances more contacts with humans and infected animals (Grace et al., 2011).

Brucellosis otherwise known as Mediterranean fever, Malter fever is the most common zoonotic infection disease caused by primarily several *Brucella* species namely *B. melitensis, B. abortus, B. ovis, B canis and B. suis*, which is a small Gram-negative aerobic or micro-aerophilic (Pappas G. *et al.*, 2006). The agents are non-motile, non-spore-forming, encapsulated in cells. The organisms are equally facultative intracellular pathogens, which give them a special feature of being difficult to treat with antibiotics, with a preference to reproductive organs and mononuclear phagocytes, in which they survive and multiply. In addition to its parasitic features, the agents can withstand environmental changes, can survive for a long period of time on the space, can spend close to a year in animal excrement and during winter the agent can stay for a very long time (nearly fifty days) on the walls, and about half a day during summer. Brucellosis has continued to persist as a world health problem ranking near the top of the list of infections transmitted from animals to human (Deanet al., 2012).

The disease have serious economic and public health ramifications on livestock that is to a greater extent distributed among human populations, livestock industries and related wildlife at large (Anka et al., 2013). WHO reported 0.5 million annual new cases of human brucellosis across the globe (Pappas et al., 2006). The impact of the disease has continued to persist in many part of the world today especially in the European countries, north and east Africa, the Middle East, South and Central Asia, Central and South America and yet it is often unrecognized and frequently goes unreported (Jama'ayah, 2011).

Impact of zoonotic diseases has continued to significantly affect human health (Marcotty et al., 2013). This is often due to the close contact with animals, the lack of recognition when zoonotic disease occurs in humans and the lack of resources to control them. In fact, domestic and wild animals harbor a huge pool of micro-organisms that are potentially pathogenic to humans (Grace et al., 2011). The natural history and epidemiology of zoonotic infectious diseases has implications for their management. Moreover, the emergence of zoonotic diseases is driven by disturbance of the host (be it human, animal, or insect), pathogen, and environment equilibrium, with the implication that sociology, farming systems, and ecology can all contribute to better understanding of the genesis and, ultimately, detection and prevention of zoonotic emerging infectious diseases (Grace et al., 2011).

Southeast Asia including Malaysia have been regarded as endemic zone for emergence zoonotic diseases as it was selected one of the global ‘‘hotspots’’ by the United States Agency for International Development funded project on Emerging Pandemic Threats commencing in 2009 (Grace et al., 2011). Constant increase in the economy of the region and rapid population growth provides and creates serious situations and drivers for disease occurrence (Bidaisee & Macpherson, 2014).

Incidence of Brucellosis has continued grow in many parts of the world and sub-Saharan Africa remains the worldwide epicenter, while rates of infection have increased in recent times in many developing countries and in southeast Asia, India

and China, where large population of humans are potentially at risk (Pappas et al., 2006).

1.2 Problem statement

Interaction between human and animals increase the chance of zoonoses occurrence among people, their livestock, companion animals and wildlife (WHO, 2010). Those diseases often surface at an increasing rate; public health practice requires greater cooperation between medical, public health and veterinary profession. Recent classification of infectious diseases has shown that nearly 75% of evolving pathogens are of animal origin (Graham et al., 2008).

Hence the need for inter-disciplinary capacity building to address the complexity of zoonotic disease (Ankri & Mirelman, 1999). In 2004, the Joint World Health Organization and Food and Agricultural Organization meeting on emerging zoonotic diseases identified inadequate support for building public health and veterinary core capacities in zoonosis including the lack of basic training and education in various medical and veterinary institutions in a larger part of the world (WHO, 2010).

In 2008, World bank came up with a series of programs suggesting differential investments in basic and/or focused veterinary and medical education to build trained human resources in many parts of the world (Kakkar et al., 2011b).

However, the United States Institute of Medicine expert committee in 2009 recommended joint educational representations to advance and improve inter-sectorial communication and the understanding of the inter-disciplinary nature of diseases of zoonotic origin. In many developing societies including Southeast Asia and Africa are considered as seriously endemic regions with reference to Malaysia and Nigeria where the impact of zoonotic diseases including brucellosis present a devastating threat to livestock industries and wildlife at large as revealed by many previous studies and hence the need to assess the level of understanding of zoonoses among medical and veterinary students in those regions as health providers for proper control of zoonoses.

Few previous studies were community-based and reported patchy knowledge among the community. Level of knowledge, attitude and practices such brucellosis had not been widely studied among medical and veterinary students in many developing countries to ascertain their level of understanding of zoonoses with respect to good management preventive to reduce the impact of those diseases among human population and livestock industries (Kakkar et al., 2011b). Hence, medical and veterinary student were selected for the study.

1.3 Significance of the study

The impact of zoonoses on public health, socio-economic and livestock have continued to increase in many countries (Taylor et al., 2001). In these countries, the implementation of suitable methods for livestock and zoonotic disease protection zoonotic is extremely difficult (WHO, 2006).

It is therefore important to apply effective intervention methods to properly minimize the threats, part of which is the need to understand the gaps in covering zoonoses in the present curriculum of medical and veterinary institutions. A way of addressing these gaps is by assessing knowledge, perception and knowledge oriented practice regarding zoonosis among students in the medical and veterinary fields.

Such a basic assessment has not been carried out in many countries today. It is in this context that the current study provides baseline information on the level of knowledge, perception and knowledge-oriented practice among medical and veterinary students and also established those areas in their curricula where knowledge is lacking. This study will also provide critical recommendations on what is needed to be incorporated in their teaching contents so that gaps identified can be bridged effectively.

1.4 Research questions

i. What is the level of knowledge, attitude and practices towards zoonoses among medical and veterinary students in UPM and UDUSOK?
ii. What is the level of knowledge towards brucellosis among medical and veterinary students in UPM and UDUSOK?
iii. What are the factors associated with Knowledge, attitude and practices towards zoonoses among medical and veterinary students in UPM and UDUSOK?
iv. What are the factors associated with Knowledge towards brucellosis among medical and veterinary students in UPM and UDUSOK?
v. What are the predictors of knowledge, attitude and practices towards zoonoses among medical and veterinary students in UPM and UDUSOK?
vi. What are the predictors of knowledge towards brucellosis among medical and veterinary students in UPM and UDUSOK?

1.5 Objectives of the study

General objective

The main aim of the research is to determine the level of knowledge, attitude and practices towards zoonoses and knowledge towards brucellosis with their predictors among medical and veterinary students in Universiti Putra Malaysia and Usmanu Danfodiyo University, Nigeria.

Specific objectives

i. To determine the level of knowledge, attitude and practice regarding zoonoses and knowledge on brucellosis among medical and veterinary students in Universiti Putra Malaysia and Usmanu Danfodiyo University, Nigeria.
ii. To determine the socio-demographic characteristics among medical and veterinary students in UPM and UDUSOK.
iii. To determine the association between:
    a. Socio-demographic factors and knowledge, attitude and practice for zoonoses and knowledge of brucellosis among medical and veterinary students in UPM and UDUSOK.
    b. Knowledge and attitude on zoonoses in UPM and UDUSOK.
    c. Knowledge and practice on zoonoses in UPM and UDUSOK.
    d. Attitude and practice on zoonoses in UPM and UDUSOK.
    e. Knowledge, attitude and practice for zoonoses and knowledge of brucellosis in UPM and UDUSOK.
iv. To compare the level of knowledge, attitude and practice regarding zoonoses and knowledge of brucellosis between medical and veterinary students in UPM and UDUSOK.
v. To determine the predictors of knowledge, attitude and practice and knowledge about brucellosis among medical and veterinary students in UPM and UDUSOK.

Research Hypotheses

i. There is a significant association between socio-demographic factors and knowledge, attitude and practice regarding zoonoses and knowledge on brucellosis among medical and veterinary students in UPM and UDUSOK.
ii. There is a significant relationship between:
    a. Knowledge and attitude on zoonoses in UPM and UDUSOK.
    b. Knowledge and practice on zoonoses in UPM and UDUSOK.
    c. Attitude and practice on zoonoses in UPM and UDUSOK.
    d. Knowledge, attitude and practice on zoonosis and knowledge on brucellosis in UPM and UDUSOK.
iii. There is a significant difference in the level of knowledge, attitude and practice for zoonoses and knowledge of brucellosis among medical and veterinary students in UPM and UDUSOK.
iv. Socio-demographic characteristics are associated with knowledge, attitude and practice regarding zoonosis and knowledge on brucellosis among medical and veterinary students in UPM and UDUSOK.

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