KNOWLEDGE SHARING AMONG PUBLIC HEALTH PRACTITIONERS ON ZOONOTIC DISEASES IN PLATEAU STATE, NIGERIA

BY

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DECLARATION

I hereby declare that the work in this thesis titled "Knowledge Sharing among Public Health Practitioners on Zoonotic Diseases in Plateau State, Nigeria" has been conducted by me in the Department of Library and Information Science. The information derived from the literature has been duly acknowledged in the text by list of references. No part of this thesis was previously presented for another degree or diploma at this or any other Institutions.

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Name	Signature	Date

CERTIFICATION

This thesis titled "KNOWLEDGE SHARING AMONG PUBLIC HEALTH PRACTITIONERS ON ZOONOTIC DISEASES IN PLATEAU STATE, NIGERIA by LYDIA ENDABEN LAKAN meets the regulations governing the award of the degree of Doctor of Philosophy in Library and Information Science, Ahmadu Bello University and is approved for its' contribution to knowledge and literary presentation.

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DEDICATION

To

My Beloved Husband and Children

PAUL DINDAM MIRI
TIMZING FAITHMAN
NANLA OTHNIEL
JINAN JACHIN

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After an intensive period of six years, today is the day I am writing this last piece of my thesis. This journey has been a mountain climbing experience. It was filled with tears, challenges, and sacrifices, along also came joy, successes, and victories. Really, it is a happy ending. I am so grateful to everyone who supported and encouraged me in the pursuit of this dream.

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TABLE OF CONTENTS

Title Page		i
DECLARATION		ii
CERTIFICATION		iv
DEDICATION		v
ACKNOWLEDGEMENT		vi
TABLE OF CONTENTS		x
LIST OF APPENDICES		xiv
ABSTRACT		xv
CHAPTER ONE: INTRODUCTION		1
1.1	Background to the Study	1
1.1.1	Absorptive capacity and knowledge management	2
1.1.2	Absorptive capacity and knowledge sharing	4
1.1.3	Absorptive Capacity and managing zoonotic diseases	6
1.1.4	Types of Knowledge Sharing Techniques	8
1.2	Statement of the Problem	9
1.3	Research Questions	11
1.4	Objectives of the Study	11
1.5	Significance of the Study	12
1.6	Scope of the study	12
1.7	Operational Definitions of Terms	13
CHAPTER TWO: REVIEW OF RELATED LITERATURE		19
2.1	Introduction	19

2.2 Research paradigm 19

2.3 Theoretical Framework 21

2.4 Previous studies that adopted Social Exchange Theory as theoretical foundation 26

CHAPTER THREE : RESEARCH METHODOLOGY 40

3.1 Introduction 40

3.2 Research method adopted for the study 40

3.3 Population of the study 41

3.4 Sample Size and Sampling Techniques 42

3.5 Instruments for Data Collection 43

3.6 Procedure for Data Collection 44

3.7 Ethical Considerations 45

3.8 Procedure for Data Analysis 45

3.9 Trustworthiness/Rigor in qualitative research 47

CHAPTER FOUR : DATA PRESENTATION AND ANALYSIS 52

4.1 Introduction 52

4.2 Data analysis 52

4.3 The perception of public health professionals about knowledge sharing in managing zoonotic deseases in Plateau State, Nigeria 55

4.4 The absorptive capacity of public health professionals in managing zoonotic diseases in Plateau State, Nigeria 61

4.5 Factors that motivate public health professionals to share knowledge in managing zoonotic disease in Plateau State, Nigeria 70

4.6 Factors limiting knowledge sharing among public health professionals in managing zoonotic diseases in Plateau State, Nigeria 78

CHAPTER FIVE : DISCUSSION OF FINDING 87

5.1 Introduction 87

5.2 The perception of public health professionals about knowledge sharing in managing zoonotic diseases 87

5.3 The absorptive capacity of public health professionals in managing zoonotic disease 93

5.4 Factors that motivate public health professionals to share knowledge in managing zoonotic diseases 100

5.5 Factors that limit knowledge sharing among Public health professionals in managing zoonotic diseases 106

5.6 Constructs of “reciprocity” and “trust” of social exchange theory explaining the perception of public health professionals about knowledge sharing in managing zoonotic disease 111

CHAPTER SIX : SUMMARY, CONCLUSION AND RECOMMENDATIONS 121

6.1 Introduction 121

6.2 Summary of the Study 121

6.3 Summary of the Major Finding 122

6.4 Contributions to Knowledge 123

6.5 Limitations of the Study 124

6.6 Conclusions 124

6.7 Recommendations 125

6.8 Suggestions for further studies 127

References 128

Appendices 143

LIST OF ABBREVIATIONS

ACAP:	Absorptive Capacity
AVMA:	American Veterinary Medical Association
CDC:	Centre for Disease Control and Prevention
CoP:	Community of Practice
FAO:	Food and Agricultural Association
FGD:	Focus Group Discussion
JUTH:	Jos University Teaching Hospital
NCDC:	Nigeria Center for Disease Control
NFELTP:	Nigeria Field Epidemiology and Laboratory Training Program
NVRI:	National Veterinary Research Institute
OIE:	Office International des Epizooties
PACAP:	Potential Absorptive Capacity
RACAP:	Realised Absorptive Capacity
SET:	Social Exchange Theory
WHO:	World Health Organisation

LIST OF APPENDICES

APPENDIX I: Interview Protocol 142

APPENDIX II: CONSENT FORM 145

APPENDIX III : Illustrative quotes for each of the classification sub categories 146

APPENDIX IV: Coding Template 157

APPENDIX VA: Introductory Letter 157

APPENDIX VB: Ethical Clearance Letter for Data Collection 159

APPENDIX VC: Ethical Clearance Letter for Data Collection 160

APPENDIX VD: Ethical Clearance Letter for Data Collection 161

APPENDIX VE: Ethical Clearance Letter for Data Collection 162

ABSTRACT

This study explores knowledge sharing among public health professionals in managing zoonotic diseases in Plateau State. To achieve the objective of this study five research questions were raised to include: What is the perception of public health professionals about knowledge sharing in managing zoonotic diseases? What is the absorptive capacity of health professionals in managing zoonotic diseases? What factors motivate public health professionals to share knowledge in managing zoonotic diseases? What factors limit knowledge sharing of public health professionals in managing zoonotic diseases? How do the constructs of social exchange theory explain the perception of public health professionals about knowledge sharing in managing zoonotic disease? Social Exchange Theory provided the theoretical framework for the study. A qualitative method using a case study research design was used for the study. Data were collected through a semi- structured interview and focus group discussion. Purposive sampling technique was used to select participants for the study. Thirty-nine recorded voices were used for analysis. The analysis was done using qualitative content analysis. Findings revealed positive perception of public health professionals about knowledge sharing in managing zoonotic diseases as follows; Effective management of zoonotic diseases, Knowledge gap exist, Conform to the notion of "One Health Initiative", Save humans lives. Also, the study found that; Public health professionals acquire external knowledge in managing zoonotic disease through multidisciplinary networks and Professional associations; Attending Seminars, Workshops, Symposia and Conferences; Consulting books, journals, and internet databases and During work routines and processes. Findings of the study also indicated that the two construct of social exchange theory reciprocity and trust explain the perception of health professionals about knowledge sharing in managing zoonotic disease. It is therefore, recommended that Stakeholders should take advantage of the positive perception of public health professionals and strengthens the capacities in the human and animal health sectors and create the mechanism necessary to effectively share knowledge among public health professionals in order to detect and respond to emerging health threats of zoonotic diseases.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Zoonotic diseases are a major cause of morbidity and mortality (World Health Organisation [WHO], 2003; Tekki, Nwosu, and Okewole, 2013). Zoonotic diseases have caused the death of over 14 million people annually of global population (WHO, 2000). Zoonotic diseases are transmitted from wild and domestic animals and from their products to humans. Examples of zoonotic diseases are ebola, rabies, lassa fever, swine flu, avian influenza, tuberculosis and brucellosis. Ebola virus killed 9,541 people in Guinea, Liberia and Sierra Leone and 8 people in Nigeria (Centres for Disease Control and Prevention [CDC], 2014); rabies results in the death of between 40,000 and 70,000 people annually world-wide (Pastoret , Gucht and Brochier, 2014; Singh, Singh, Cherian, Saminathan, Kapoor, Manjunatha...Dhama, 2017); 5,000 people die annually in West Africa of lassa fever (Ogbu, Ajuluchukwu and Uneke, 2007) and 12,000 people died of Swine flu in the United States in 2009 (Shrestha, Swerdlow, Borse, Prabhu, Finelli, Atkins...Meltzer 2011). Beside morbidity and mortality, zoonotic diseases have other negative consequences such as restrictions in international trade and travels. Similarly, in countries with limited resources where zoonotic diseases are high, the health systems are usually overstretched (Jaffry, Ali, Rasool, Raza, and Gill, 2009; Katare and Kumar, 2010).

To reduce the adverse effects of zoonotic diseases, studies have been conducted; for instance, Kujul, Banyigyi, Abechi and Moses (2010); Ehizibolo, Ehizibolo, Ehizibolo, Sugun, and Idachaba (2011); Aiyedun and Olugasa (2012); Tekki *et al.* (2013) conducted studies on control strategies that consist of vaccine production, education and training of high risk population, mass vaccination of animals, restriction in the movement of animals, meat and milk hygiene, safe

disposal of animal waste and improved by-product management. In spite of these studies aimed at reducing the problem, the incidence of zoonotic diseases still persists. To advance in the prevention and control of zoonotic diseases, scholars have stressed the need for collaborative efforts across veterinary, medical and environmental health professionals (Joshi, 2008; Ehizibolo *et al.,* 2011; Karshima, 2012). One-way collaborative effort is made possible is through multidisciplinary knowledge sharing among various health professionals, specifically veterinary, medical and environmental health professionals. Multidisciplinary knowledge sharing among veterinary, medical and environmental health professionals is significant because it allows for the integration of expertise from different fields of knowledge which will lead to the development of cost-effective control strategies that include; organizing shared surveillance systems, common training of health professionals and training of high risk population (Busani, Caprioli, Macrì, Mantovani, Scavia, and Seimenis, 2006; Kahn, Kaplan and Steele, 2007; Joshi, 2008; Karshima, 2012; Zhang, Yu, Fan, and Duan, 2013). It is important to highlight that low collaboration between the human and animal health sectors is a major setback in the prevention and control of zoonotic diseases which has led to increase in human and economic losses (Wielinga and Schlundt, 2012). Therefore, to control zoonotic diseases, there is the need to look at the problem from the perception of public health professionals about multidisciplinary knowledge sharing in managing zoonotic diseases specifically from absorptive capacity perspective.

1.1.1 Absorptive capacity and knowledge management

Absorptive capacity is rooted in knowledge management (Fig 1. Pg4). Knowledge management is a process for identifying, acquiring, organizing, sharing, applying and renewing knowledge that is essential to the organization (Gerami, 2010). A critical component of knowledge management is absorptive capacity (Beimborn, Moos, Wagner, and Weitzel, 2010). If knowledge

management is all about harnessing the organizational knowledge resources, the resources need to be first identified, assimilated and exploited. These three components are explained thus:

Identification of knowledge is a factor of knowledge management and absorptive capacity (Gonzalez and Martins, 2017). No matter how good a knowledge is, if it is not identified it is useless. If an organisation knows the knowledge it needs, the organisation is likely to be more proactive in identifying who holds the knowledge or where the knowledge resides. Knowledge identification therefore, refers to the process of proactively identifying internal and external organisational knowledge that is useful to an organization (Tow, Venable, and Dell, 2015).

Similar to the critical understanding of how to identify knowledge is knowledge acquisition. Knowledge acquisition is the process of extracting knowledge from internal or external sources, usually from books, documents, computer files or human experts (Turban, Aronson, and Liang 2005). Knowledge acquisition process facilitates the assimilation of knowledge and experiences of different area of expertise.

When knowledge is identified and acquired, but not assimilated, it may not be used. Assimilation therefore, refers to the processes that allow the newly acquired knowledge to be processed, interpreted and incorporated into the organizational knowledge base (Hoarau, 2014). Furthermore, if valuable knowledge is identified, acquired, assimilated but not productively exploited, the time and conscious effort will be useless. Exploitation of knowledge refers to the ability to use knowledge (Vidal, 2005). Knowledge management therefore, provides a platform for knowledge sharing and absorption of knowledge.

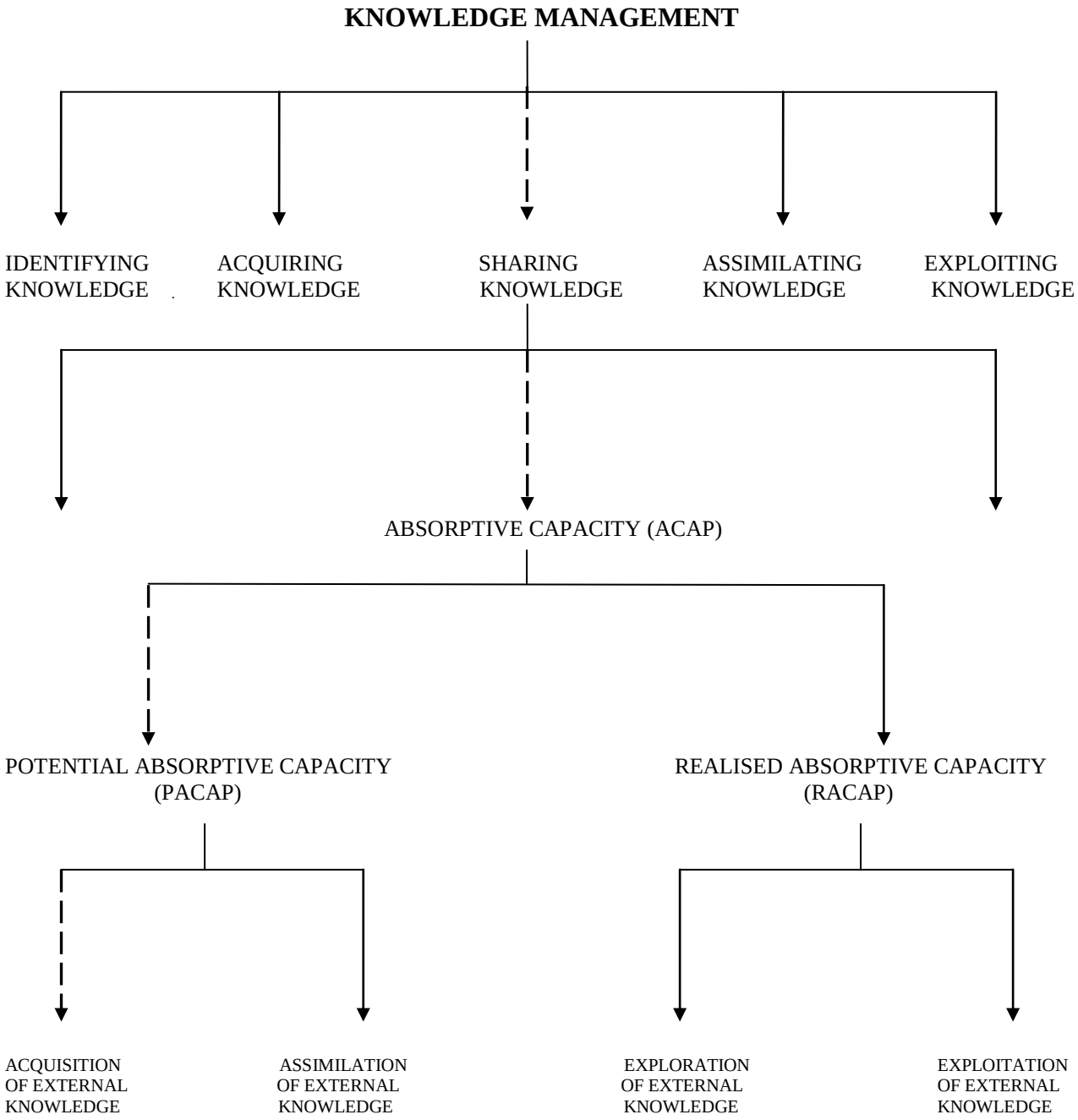


FIG 1: KNOWLEDGE MANAGEMNET AND ABSORPTIVE CAPACITY MODEL. (Lakan, 2019)

1.1.2 Absorptive capacity and knowledge sharing

Absorptive capacity and knowledge sharing are required to achieve a higher level of innovation. No matter what knowledge is acquired and assimilated, there is a critical component

that needs to occur after acquisition and assimilation of knowledge which is knowledge sharing. Knowledge sharing is the act of exchanging knowledge (in form of information, skills, or expertise) between individuals, multidisciplinary teams, communities of practices or within an organization (Hendricks, 2018). Through the process of sharing knowledge with others, professionals acquire new knowledge that increases their learning abilities and performance. Consequently, absorptive capacity is shaped by human resource management policies including multidisciplinary teams which are a key driver of knowledge sharing among professionals that affect the acquisition and assimilation of external knowledge.

Absorptive capacity (ACAP) as a concept was developed by Cohen and Levinthal (1989) defining it as: 'the firm's ability to identify, assimilate and exploit knowledge from the environment'. Subsequently they adopted a slightly wider view as: '… an ability to recognize the value of new information, assimilate it, and apply it to commercial ends' (Cohen and Levinthal, 1990). Putting the two together provides a 'classical' view of absorptive capacity as: the identification and recognition of new information, both internal and external, and its assimilation, application and exploitation for commercial ends. However, Zahra and George (2002) developed a model referred to as Potential Absorptive Capacity (PACAP) and Realised Absorptive Capacity (RACAP).

Potential Absorptive Capacity (PACAP) consists of two sub-elements. First, there is knowledge acquisition which refers to a firm's capability to acquire externally generated knowledge that is critical to its operations. Second, there is assimilation capability which refers to the firm's routines and processes that allow it to analyze, process, interpret and understand the information obtained from external sources. Potential Absorptive Capacity makes the firm receptive to acquiring and assimilating external knowledge.

Similarly, Realized Absorptive Capacity (RACAP) consists of two sub-elements, transformation capability on one hand that can be defined as a firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge. On the other hand, Realized Absorptive Capacity is also made of the exploitation capability of a firm which is basically the capacity of a firm to apply the newly acquired knowledge in products or services that it can get financial benefit from. Zahra and George (2002) as a result, extended the definition of Cohen and Levinthal by labelling Absorptive Capacity a set of organizational routines and strategic processes by which firms acquire, assimilate, transform, and exploit knowledge for purpose of knowledge creation. The acquisition of external knowledge discussed in this study is derived from the ACAP model of Zahra and George (2002).

1.1.3 Absorptive Capacity and Managing Zoonotic Diseases

Acquisition of external knowledge is essential in managing zoonotic diseases. The expertise required to manage zoonotic diseases are derived from epidemiology as a knowledge domain. Epidemiology is the branch of knowledge in medicine which deals with the incidence, distribution, and control of diseases and has been recognized as an important area of knowledge for public health professionals (Zhang, Mnzava, Mitchell, Melubo, Kibona, Cleaveland 2016; Oxford English Dictionary, 2017). Studies in epidemiology cut across three public health professional's knowledge bases e.g. Veterinary epidemiology, Medical epidemiology and Environmental epidemiology and it is the knowledge needed to effectively manage zoonotic diseases. Therefore, public health professionals are expected to be concerned with making the most of these knowledge bases in managing zoonotic diseases. Public health professionals should be willing to acquire and increasingly invest in teamwork, routines, mechanisms, and activities

that will facilitate external knowledge absorption from these knowledge bases, in order to improve their responsiveness to zoonotic diseases emergence.

However, no matter how an organization wants to develop absorptive capacity of their members, the organization must understand the various factors that are critical for knowledge sharing and these are knowledge sharing enablers. Knowledge sharing enablers are critical components for absorptive capacity and knowledge sharing. These are discussed thus:

Institutional support- For absorptive capacity and knowledge sharing to be applied to the optimum, there must be institutional support. Institutional support refers to the commitment from institutions to provide an enabling environment that encourages participation in knowledge sharing (Premkumar and Ramamurthy, 1995; Grover, 1993). Wilson and Pirrie (2000) stated that institutions promote knowledge sharing among professionals by providing employees opportunity to develop their capacity and potential through the interactions with different expertise in related field of knowledge. Closely related to institutional support is professional and cultural cohesion.

Professional and cultural cohesion plays an important role in the absorptive capacity and knowledge sharing among diverse professionals. Multidisciplinary professional teams are founded on the basis that different professional groups add a specific expertise of their profession to the solution required on a particular problem. Therefore, multidisciplinary teams with shared goals and values are an important component in knowledge sharing in managing zoonotic diseases (Hall, 2005; Mental Health Commission, 2006). Related to Professional and cultural cohesion is mutual trust and respect.

Mutual trust and respect for other team members is an enabler for effective knowledge sharing. The mutual trust between individuals encourages them to engage in varieties of transactions - exchange advice, information/knowledge exchange. The level of trust that exists between an individual and the recipient of the exchange resources will determine whether or not

the resources are shared and how it is received. With high level of trust, a sense of companionship and team involvement is generated and a working together over time (Mickan and Rogers, 2005). Furthermore, a critical factor for knowledge sharing is funding.

Funding is a key enabler of knowledge sharing. Financial support to multidisciplinary teams is necessary for knowledge sharing to be effective. The financial support covers the cost for attending workshops, seminars and conferences, joint training programmes and research. In a situation where there is no financial support for knowledge sharing particularly across multidisciplinary boundaries, the desired result will not be achieved. Closely linked to funding is policy guideline.

A good policy guideline facilitates knowledge sharing. Policies and legislations adopted by public health professional bodies for multidisciplinary team work will enable successful knowledge sharing as it provides the framework in which health professionals operate. Policy promotes knowledge sharing particularly for a multidisciplinary knowledge sharing for achieving better outcomes (Tschannen-Moran, 2001; Dahlan, Rahman, Dahan, and Saman, 2014). Beside a policy guideline for knowledge sharing is the use of technology as enabler for knowledge sharing.

Technology facilitates communication and access to external knowledge. It is an effective and a fast medium to acquire, store, share and transfer knowledge (Milligan, 2006). Technologies that support knowledge sharing are the internet, intranet and virtual communities (Lin, 2007). Knowledge sharing enablers provide different types of techniques for knowledge sharing. These techniques provide a platform to increase the absorptive capacity of professionals. These techniques are discussed thus:

1.1.4 Types of Knowledge Sharing Techniques

Training is a major factor in knowledge sharing and absorptive capacity. Training provides a platform for acquiring, assimilating and application of knowledge in order to improve individual,

team, and organizational effectiveness (Aguinis and Kraiger, 2009). Its achievement is based on plans and strategies developed by the organisation to ensure that employees' knowledge is continuously updated. Training usually takes place in a formal or informal format (Ruikar, Anumba, and Egbu, 2007). Closely linked to training is community of practice (CoP).

Community of Practice (CoP) is an effective channel for the absorption of knowledge. A Community of Practice (CoP) is a framework that facilitates knowledge sharing among groups of individuals who engage in the process of collective learning around a specific topic (Langley, Patel and Houghton, 2017). Community of practice that involves a number of professionals will be an integrative mechanism in the identification, assimilation and exploitation of knowledge particularly in managing zoonotic diseases.

Similarly, face-to-face interaction is a technique that increases the absorptive capacity of professionals. Face-to-face interaction focuses on one person transferring knowledge to an individual or a group of other people. Face-to-face interactions help in increasing an individual or an organisation's memory and encouraging effective learning. It provides strong social ties that give rise to collective sense-making (Lang, 2001).

1.2 Statement of the Problem

Multidisciplinary knowledge sharing among Veterinary, Medical and Environmental health professionals is essential in conducting investigations into emerging and re-emerging zoonotic diseases. Multidisciplinary knowledge sharing has the advantage of driving positive changes in zoonotic disease prevention and control, through the exchange of ideas and sharing of best practices, expertise and experience of professionals. Its importance has become imperative with the global rise in disease prevalence (AVMA, 2008). Many emerging health issues are linked to increasing contact between humans and animals and their products. The emergence and re-emergence of zoonotic diseases pose a significant challenge to public health. In spite of significant

progress achieved in the field of research, zoonotic disease remains a considerable public health problem in many regions of the world (Dawit, Aklilu, Gebregergs, Hasen, and Ykealo 2013). Surveys of populations at risk have shown that zoonotic diseases are more prevalent than previously anticipated in many endemic regions and control is difficult. Effective prevention and control however, requires sustained efforts over many decades (FAO/OIE/WHO, 2010).

Multidisciplinary knowledge sharing has achieved significant results in different fields of research. For instance, multidisciplinary knowledge sharing was carried out in the identification of new arenaviruses in North America (Fulhorst, Bowen, Ksiazek, Rollin, Nichol, Kosoy, and Peters, 1996). Secondly, multidisciplinary knowledge sharing was carried out in the treatment of persons with co-morbid physical and mental conditions (Mental Health Foundation, 2013). Even though the prevalence of zoonotic diseases is on the increase with devastating effect, close collaboration in the area of knowledge sharing among public health professionals in managing zoonotic disease is minimal (WHO, 2003). A guide developed by WHO (2008) on establishing collaboration between animal and human health sectors on zoonotic diseases in developing countries identified numerous difficulties relating to the effective delivery of prevention and control programmes. These include among others; minimal surveillance and information sharing. Furthermore, several studies have been conducted to show that the increase in prevalence of the diseases is due to lack of knowledge sharing by health professionals (Chomel, 2003; Kahn, 2006; Pappaioanou, 2010; WHO, 2010; Karshima, 2012; Yassif, Santhakumar, and Lightfoot, 2013). Therefore, to reduce the prevalence of zoonotic diseases, multidisciplinary knowledge sharing is essential among veterinary, medical and environmental health professionals.

1.3 Research Questions

The following questions were answered:

1. What is the perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau State, Nigeria?
2. What is the absorptive capacity of public health professionals in managing zoonotic diseases in Plateau State, Nigeria?
3. What are the factors that motivate public health professionals to share knowledge in managing zoonotic diseases in Plateau State, Nigeria?
4. What are the factors that limit knowledge sharing among public health professionals in managing zoonotic diseases in Plateau State, Nigeria?
5. How do the two constructs “reciprocity” and “trust” of Social Exchange Theory explain the perception of public health professionals about knowledge sharing in managing zoonotic disease in Plateau State, Nigeria?

1.4 Objectives of the Study

The objectives of this study were to determine:

1. The perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau State, Nigeria
2. The absorptive capacity of public health professionals in managing zoonotic diseases in Plateau State, Nigeria
3. The factors that motivate public health professionals to share knowledge in managing zoonotic diseases in Plateau State, Nigeria
4. The factors that limit knowledge sharing among public health professionals in managing zoonotic diseases in Plateau State, Nigeria

5. How the two constructs, “reciprocity” and “trust” of Social Exchange Theory explain the perception of public health professionals about knowledge sharing in managing zoonotic disease in Plateau State, Nigeria

1.5 Significance of the Study

This study has conceptual significance. Conceptually, little is known about the perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau state, Nigeria. This study has therefore, uncovered the perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau state, Nigeria. It has also uncovered the absorptive capacity of public health professionals in managing zoonotic diseases in Plateau state, Nigeria.

The conceptual constructs of the perception of public health professionals about knowledge sharing and the absorptive capacity of public health professionals are potentially useful for creating the mechanisms necessary for Public health professionals to share knowledge and become proactive in managing zoonotic diseases.

The conceptual framework will also be used to inform new approaches to multidisciplinary knowledge sharing in managing zoonotic diseases in Plateau state by policy makers, health professional bodies and others involved in managing zoonotic diseases in Plateau State.

1.6 Scope of the Study

The study explored the perception of Veterinary, Medical and Environmental health professionals in managing zoonotic diseases in Plateau State. The participants consist of veterinary, medical and environmental health professionals. The scope of this study is limited to four Institutions in Plateau state namely; National Veterinary Research Institute (NVRI) Vom, Jos University Teaching Hospital (JUTH), Plateau State Specialist Hospital and Plateau State Ministry

of Health. The choice of these institutions in Plateau state for the study was based on the fact that they have a high concentration of veterinary, medical and environmental health professionals that are eligible target population. Secondly, there is a high concentration of health care services involving humans, animals and the environment going on in these institutions. Jos, Plateau state is therefore, an ideal location to meet the targeted population and obtain the anticipated responses.

1.7 Operational Definitions of Terms

The following key terms are operationally defined thus:

Absorptive Capacity: a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends.

Acquisition of Knowledge: firm's capability to acquire externally generated knowledge that is critical to its operations.

Knowledge sharing: the act of exchanging knowledge (in form of information, skills, or expertise) between individuals, multidisciplinary teams, communities of practices or within an organization.

Management of zoonotic diseases: Control and prevention strategies aimed at reducing the adverse effects of zoonotic diseases.

Multidisciplinary: involving several academic disciplines or professional specializations in an approach to solve problem.

Perception: the understanding of public health professionals on knowledge sharing on zoonotic diseases.

Public Health Professionals: Veterinary, Medical and Environmental Public Health professionals who focus on preventing diseases, protecting and promoting human health through organized efforts and informed choices.

Zoonotic diseases: diseases transmitted from wild and domestic animals and from their products to humans.

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter is presented under the following subheadings:

2.2 Research paradigm

2.3 Theoretical framework

2.4 Previous studies that adopted Social Exchange Theory

2.5 Summary of the Reviews

2.2 Research Paradigm

This study adopted the interpretative research paradigm. Paradigm refers to framework shared by a community of scientists which provided them with a convenient model for examining problems and finding solutions (Kuhn, 1962). Research paradigm is an all-encompassing system of interrelated practice and thinking that defines the nature of enquiry along three dimensions namely: ontology, epistemology and methodology. These are explained thus:

Ontology refers to one's view of reality or existence. There are two broad contrasting ontological positions: objectivism that holds that there is an independent reality and constructionism that assumes that reality is the product of social processes (Neuman, 2003). Social constructivism is an interpretive framework whereby individuals seek to understand their world and develop their own particular meanings that correspond to their experience (Creswell, 2013). Social constructionism places great emphasis on daily interactions between people in social construction of reality (Brusila 2015). Social constrictionism was considered appropriate for this study because it helps in uncovering the perception of public health professionals in the construction of their perceived social reality of knowledge sharing in managing zoonotic diseases.

Epistemology on the other hand provides explanation on how people think and the way people know things (Wrenn, 2018). It is required in order to be able to determine the true from the false, by determining a proper method of evaluation. There are two major epistemological positions: positivism and interpretativist. A researcher with a positivist orientation regards reality as being out there in the world and needing to be discovered using conventional scientific methodologies. However, the interpretive paradigm yields insight and understandings of behavior, explain actions from the peoples' perspective. Researchers who agree with this paradigm employ data gathering methods that enable rich and detailed description of social phenomena. An interpretative paradigm is therefore, appropriate for this study because it helped to uncover the perception of public health professionals in construction of their social reality in knowledge sharing in managing zoonotic diseases. Researchers that adopted the interpretative paradigm widely used interview, focus group discussion and naturalistic observation as data gathering methods.

Similarly, methodology is the strategy or plan of action in conducting a research, so as to gain knowledge about a research problem. Two methodologies that have featured prominently in research are quantitative and qualitative research. Quantitative method of research is an objective and systematic process in which numerical data constitutes the findings of a research. It describes, tests, and examines cause and effect of relationships, using a deductive process, through developing hypothesized relationships and proposed outcome for a study; while qualitative research is a form of social enquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live. Researchers use qualitative research to explore the behaviour, perspective, feelings and experiences of people and what lies at the core of their lives (Atkinson, Coffey, and Delamont 2001). This study adopted qualitative methodology because

the researcher wants to understand knowledge sharing in managing zoonotic diseases from the participant's perspective using social exchange as a theoretical lens.

2.3 Theoretical Framework

Knowledge sharing is a social interactive process involving the exchange of knowledge, experiences and skills among professionals, organisations, friends, families, and communities (Wei, Choy, Chew and Yen, 2012). Over the years, scholars have proposed theories for studying the exchange of resources including knowledge and information. One of such theories that study knowledge as a resource for sharing in a social interactive context is Social Exchange Theory (SET). SET was introduced in 1958 by sociologist George C. Homans with the publication of his work "Social Behavior as Exchange" (Homans, 1958). Homans defined social exchange as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons (Homans, 1961). Several other exchange theorists emerged after Homans founded the theory, such as Peter M. Blau (1964), Richard M. Emerson (1976) and Karen S. Cook (1987). The theoretical framework for this research is based on social exchange theory (SET) of Peter M. Blau (1964).

Social Exchange Theory of Blau (1964) is based on the works of George C. Homans' Social Behavior as Exchange" (Homans, 1958) and Alvin W. Gouldners' "Norm of reciprocity" (Gouldner, 1960). Gouldner (1960) was concerned with the functionalist argument that reciprocity promotes the stability of a social system however; Social exchange theory of Peter M. Blau shifted its attention to the effects of reciprocity and trust on economic and social exchange relationships. While economic exchange is based on a formal contract that specifies the exact quantities to be exchanged, social exchange relationship is founded on implicit agreement of unspecified obligations. Thus, in contrast to economic exchange, where trust isn't essential and obligations are

specified, social exchange tends to engender feelings of personal obligation, gratitude and trust (Blau, 1964). This study adopted Social exchange theory of Peter Blau (1964)

"Social exchange" as the term is used by Blau (1964) refers to "the voluntary actions of individuals that are motivated by returns they are expected to bring and typically do in fact bring from others". Actions compelled by physical coercion are not voluntary, although compliance with other forms of power can be considered a voluntary service rendered in exchange for the benefits such compliance produces. The objective of exchange theory therefore, is to explain social life in terms of exchange principles (Blau, 1964). One of such is the principle of reciprocity.

The Principle of Reciprocity

Blau (1964) refers to the principle of reciprocity as set of socially accepted rules regarding a transaction which a party extending a resource to another party obligates the latter to return the favour. Reciprocity is considered a "prototype" of social exchange in relationship. According to Blau, "people often do favours to their associates and by doing so they oblige them to return favours. The anticipation that an association will be a rewarding experience is what initially attracts individuals to it, and the exchange of various rewarding services cement the social bonds between associates" (Blau, 1964). This agrees with Gouldner (1960) who asserted that, the need to reciprocate for benefits received in order to continue receiving them serves as a "starting mechanism" of social interaction, thus fostering the development of a network of social relations and a group structure. However, in contrast to Gouldner (1960), the norm of reciprocity merely reinforces and stabilizes tendencies inherent in the character of social exchange itself and that the fundamental starting mechanism of the guide to social interaction is found in the conditions of exchange e.g. when an association is intrinsically rewarding as in love, the exchange of extrinsic benefits is merely a means to attain and sustain the ultimate reward for reciprocated attraction. Reciprocity is an important part of exchange that individuals, in the interest of continuing to

receive needed services, discharge their obligations for having received them in the past. The concept of reciprocity captures three major components namely; obligations in exchange, expectations from exchange and benefits of exchange. They are further explained below.

Obligations in exchange according to Blau (1964) refer to the act of giving a favor to others legally or morally. An individual who supplies rewarding services to another obligates him. To discharge this, the second must furnish benefits (return the favor) to the first in turn. If both individuals value what they receive from the other, both are prone to supply more of their own services to provide incentives for the other to increase his supply and to avoid becoming indebted to him. Secondly, expectations in exchange connote future returns for contributions between the exchange partners although the exact nature of the returns is not known or negotiated in social exchanges but the tendency to help others is frequently motivated by the expectation that doing so will bring social rewards. In essence, people need something from other people, in exchange for what they give; that then leads to an increase in social exchange; while benefits in exchange are the rewards and resources gained by partners in social relationship. These benefits could be extrinsic or intrinsic. Closely linked to reciprocity is the principle of trust.

The Principle of Trust

Blau (1964) described trust as "essential for stable social relationships; the more committed individuals are to an exchange relationship, the more stable it is". Trust is referred to as that willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor (Mayer et al., 1995). The establishment of exchange relations involves making investment that constitutes commitment to the other party and the gradual expansion of the exchange permits the partners to prove their trustworthiness to each other. Process of social exchange consequently, generate trust in social relations. The mutual trust between committed exchange partners encourage them to engage in

varieties of transactions i.e. exchange advice, help and social support. An exchange partner's trust in the other actor therefore, is important for the emergence and maintenance of social exchanges between them. However, Lewiki and Tomlinson (2003) stated that trust will only be extended to the other to the extent that this cost-benefit calculation indicates that the continued trust will yield a net positive benefit. In the event trust is violated, it may seriously damage or irreparably destroy the relationship. Studies have proved that trust can increase cooperation and quality of relationship (Palmatier, 2008; Merrilees, 2003); promotes mutual understanding and global cooperation (Zolin, 2002), reduces conflicts (Curseu and Schruijer, 2007; Sanders and Schyns, 2006); facilitates learning and innovation (Thomas, 2002), improves performance (Handfielda and Bechtelb, 2002; Masuku, and Kirsten, 2003) and improves alliance flexibility (Išoraitė, 2009).

2.3.1 Social Exchange Theory and Knowledge Sharing

The key elements outlined in social exchange theory of Peter Blau (1964) are; building relationship through the exchange of tangible and intangible resources; reinforcement of relationship through reciprocation and trust as an essential ingredient for a stable relationship. These are further discussed below:

Building Relationship Through the Exchange of Tangible and Intangible Resources

Homans (1961) defined social exchange as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons (Homans, 1961). In relation to social exchange, knowledge sharing is viewed as the behavior by which an individual voluntarily provides other members of an organization with access to his or her knowledge and experiences. This knowledge may be tangible/explicit or intangible/implicit. Knowledge sharing is also seen as an exchange of valuable resource between two parties which is expected to incur costs borne by the knowledge owner and bestow benefits to the recipient. An individual's motivation to share his/her knowledge would depend on his/her consideration of these costs and benefits (Cyr and

Choo, 2010); and are willing to share the knowledge when the benefits of this action outweigh the costs (Krok, 2013). Furthermore, Blau (1964) found that benefits within social exchange do not have a specific quantifiable time frame, meaning that endured social patterns are created by social exchanges.

Reinforcement of Relationship Through Reciprocation

Blau (1964) stated that the norm of reciprocity reinforces and stabilizes tendencies inherent in the character of social exchange. In essence, within a network of communities, there is a tendency towards greater collaboration and sharing; reciprocity therefore, reinforces the tendency (Choi and Berger, 2007). Reciprocity is a strong driver of knowledge sharing, where, in this context, a knowledge shared today with an individual may be followed by a request for knowledge from that individual tomorrow. Therefore, reciprocating knowledge received is most likely to reinforce and stabilizes relationship. Thus, reciprocity is enhanced due to shared goals and mission (Mergel, Lazer, and Binz-Scharf, 2008)

Trust as an Essential Ingredient for a Stable Relationship

While sharing of explicit knowledge can be easily codified and transferred indirectly through various means such as in books, reports, pictures and non-book media such as videos and tapes among others and can be transported and shared without difficulty (Awad and Ghaziri, 2007), sharing of complex tacit knowledge through the informal networks required direct interactions between two or more individuals. A direct tie with the knowledge source(s) must be built (Liebowitz 2008). In order for people to be willing to share their tacit knowledge, they must have trust. Trust is therefore, essential in the process of strengthening collaboration and knowledge sharing among the veterinary, medical and environmental health professionals in managing zoonotic diseases.

2.4 Previous Studies that Adopted Social Exchange Theory as Theoretical Foundation

Several authors have adopted two constructs “reciprocity” and “trust” of Social Exchange Theory (SET) in scholarly discussion and research. This section discussed some of the previous studies that used the constructs from SET to explain exchange in relationships.

Mahon (1998) investigated parents and teacher’s perceptions of influence and level of satisfaction on issues related to sharing of information and decision making within schools. The author assessed the efficacy of social exchange theory, in particular the norm of reciprocity, with respect to the relationship between parents and teachers within early year’s classrooms (kindergarten through grade four). The following hypotheses were tested in that study: The discrepancy score related to influence over school matters for parents will be greater than the discrepancy score for teachers; The discrepancy score as related to the other's influence over school matter for teachers will be greater than the discrepancy score for parents. Teachers will be more satisfied with the degree of influence that they have over school matters than parents.

The study adopted a quantitative survey method for the research. To achieve the objective, a survey questionnaire was used to collect data. A non-probability sample of 41 parents and 17 teachers within the Catholic school system in Winnipeg, Manitoba were used.

The findings of Mohan (1998) indicated that there is a significant level of reciprocity between the parents and teachers in Catholic school system in Winnipeg. The social exchange model was an effective tool with which to examine the relationship between parents and teachers. The study recommended that early year’s educators and parents should continue to strive towards building positive reciprocal relationships that can then be maintained as the year’s progress.

Using a qualitative research, Chen (2005) examined whether workers reward fair wages with higher job effort, better labour relations, and greater workplace labour productivity and profitability and punish unfair wages with lower effort, worse relations, and lesser productivity

and profitability. The research questions raised were: Do employees who feel that they are paid fairly put greater effort on the job? Do workplaces, which have a greater proportion of workers who receive a fair wage, have better labour relations, higher labour productivity, and greater profitability? The norm of reciprocity of social exchange was used as a theoretical lens for the study.

The findings of Chen (2005) indicate that no statistically significant evidence of positive reciprocity is found in labour relations and workplace labour productivity. The implication is that employees who are paid fairly are not more likely to put greater effort in their job relative to those who feel that their pay is neither fair nor unfair. Managers of workplaces with a greater proportion of fair wage workers do not report better labour relations, labour productivity, or profitability. In contrast, some evidence in favour of negative reciprocity is found.

Adopting a quantitative research method Feiler (2006) examined the extent to which various forms of social capital impact participation in nonprofit organisations. Two hypotheses were tested: - 1 Civic engagement, political trust and community trust are predictors of involvement in nonprofit organisations. 2. People with more social capital assets are more likely to participate in nonprofit organisations.

Constructs from social exchange theory (trust and reciprocity) were used to understand the relationship between social capital and participation in nonprofit organisations. Feiler, (2006) stated that social exchange theory and social capital are similar in that both place primary importance on the development and use of reciprocity and trust in relationships.

The results of the bivariate and multivariate logistic regressions used in the study indicated that civic engagement and community trust are predictors of participation in nonprofit organisations and that people who maintain higher levels of these two assets are more likely to volunteer and engage in philanthropy.

Juntiwasarakij (2010) investigated knowledge transfer issues with respect to facilitators and barriers among outsourcing sub units, the vender's and the clients. Concept of reciprocity, balance, cohesion, power, trust, and cultural sensitivity prove to be promising for theoretical applications in a very large array of knowledge management settings, especially in knowledge sharing and knowledge transfer. The study adopted qualitative method, specifically by using a content-analysis technique and an interpretive lens.

Juntiwasarakij (2010) found that reciprocity in strategic alliance vocabulary, help in sustaining knowledge transfer among firms in a network. To a certain extent, being in an alliance positively influences the belief on the part of individuals that their partners will not exploit them. When relationships conform to the norms of reciprocity and when the pattern of exchange is perceived as being fair, individuals are more likely to come to believe that they will be treated fairly. Also, reciprocity allows individuals to be less calculative and to see longer-term outcomes, as they are likely to expect fairness and justice in the long-term. This expectation leads to commitment that builds stability into relationships by increasing the partners' dependence on their relationships in part because the emergence of commitment is thought to be accompanied by reduced interest in alternative relationships. Therefore, the sense of competition is lessened, while the willingness to cooperate increases.

Using a qualitative research method, Smit-Bakker (2010) investigated knowledge sharing in new product development (NPD) consortia in the field of space science (refer to as instrument consortia). The study investigated the challenges faced in organizing new product in development in consortia. Reciprocity as a central construct from social exchange theory and transactive memory theory was used as a theoretical lens. Six hypotheses were tested; among these are: - 1 What is the effect of expertise overlap, co-location, involvement in multiple projects and task dependency on the reciprocity, frequency, and multiplexity of knowledge sharing within teams? 2

What is the effect of expertise overlap, co-location, and task dependency on the reciprocity, frequency, and multiplexity of knowledge sharing between teams? 3 Compared on explanatory strength, which theory best explains the effects of enablers on knowledge sharing characteristics within teams?

The findings at the inter-team level suggest that task dependency has a large enabling effect for the reciprocity and frequency of knowledge sharing between teams. Expertise overlap and co-location also enable knowledge sharing between teams and both appear to increase the probability of mutual and more frequent knowledge sharing

Using quantitative research method Nunkoo, and Ramkissoon (2011) examined a model of community support using trust from social exchange theory as its theoretical basis. Eight hypotheses were tested among these are: - 1. There is a direct positive relationship between the perceived benefits of tourism and residents' trust in government actors. 2. There is a direct negative relationship between the perceived costs of tourism and residents' trust in government actors. 3. There is a direct positive relationship between residents' trust in government actors and their support for tourism. 4. There is a direct positive relationship between residents' power to influence tourism and their trust in government actors.

The finding of Nunkoo, and Ramkissoon (2011) indicated that support is determined by residents' trust in government actors and perceived benefits. Trust is in turn predicted by residents' perceived benefits and costs and their level of power. The theoretical contributions of the study emanate from the inclusion of the trust and power variables in the model.

In another study, Volmer et al. (2011) used a full cross-lagged panel analysis to test reciprocal relationships between Leader-Member Exchange (LMX) and job satisfaction. Three Hypotheses were tested: - (1): Job satisfaction and the quality of Leader–Member Exchange (LMX) are positively related at Time 1 and Time 2, respectively. (2): Leader–Member Exchange

(LMX) at Time 1 will positively predict job satisfaction at Time 2. (3): Job satisfaction at Time 1 will positively predict the quality of Leader–Member Exchange (LMX) at Time 2. LMX theory explicitly builds on social exchange theory of Gouldner (1960) and Blau (1964).

Using a quantitative research method, the study found that good LMX increases job satisfaction, but that job satisfaction can also enhance high-quality supervisor–employee relationships. The results also demonstrate the need to consider reciprocal relationships between job satisfaction and LMX when explaining employees' workplace outcomes.

Wikhamn and Hall (2012) investigated social exchange theory and its underlying mechanism of obligation feeling in light of Swedish work environment. To expand the knowledge in the area, the norm of reciprocity was applied. Wikhamn and Hall (2012) tested whether felt obligation mediated the relationships between perceived organizational support and both affective organizational commitment and personal initiative. Four hypotheses were raised among thus: 1 Felt obligation will mediate the relationship between POS and affective organizational commitment. 2 Felt obligation mediates the relationship between POS and personal initiative. The study used the norm of reciprocity from social exchange theory (Blau, 1964) to describe motivations behind employee behaviors and attitudes.

The result indicated that Perceived Organisational Support (POS) relates positively to employees‟ emotional attachment with the organisation and their perceptions of initiative-taking behaviour. The study provides support for the proposition that social exchange theory is applicable within a Scandinavian context and that obligation feeling, as a mechanism of reciprocation, is still a key factor in certain social exchanges. The results confirmed the applicability of SET in a Swedish context.

Xerri (2013) examined factors and workplace relationships that are used to develop commitment and an environment that fosters innovative behaviour of nursing employees working

within Australian health care. The following research questions were raised: What is the impact of some factors (procedural and interactional justice, culture, tie strength, Leader-Member Exchange (LMX) and Perceived Organisational Support (POS) upon work-related outcomes (affective commitment and innovative behaviour) of nursing employees working within Australian healthcare? What are the similarities and differences in behaviour with regards to some factors (procedural and interactional justice, organisational culture, tie strength and LMX) and work-related outcomes (POS, affective commitment and innovative behaviour) for public and private sector nursing employees working within Australian healthcare? The study used the norm of reciprocity derived from social exchange theory. The study adopted quantitative method to gather data in addressing the research questions. A multiple analysis of variance (MANOVA) was used for statistical analysis to show whether there are statistically significant differences between public and private sector nursing employees.

Xerri's (2013) findings confirm that several factors tested directly affect the affective commitment and innovative behaviour of nursing employees positively. The implication of the findings is that the study provides new knowledge about how workplace social exchange can foster perceptions of organisational support, affective organisational commitment and the innovative behaviour of nursing employees. The main contribution to social exchange theory is that workplace social relationships can be used to foster the innovative behaviour of employees

Ali (2013) investigated the antecedents of trust and performance relationship in International Joint Ventures (IJVs). The conceptual framework of the study was drawn from social exchange theory (SET) and Transaction Cost Theory (TCT) using the construct trust. 16 hypotheses were tested; a few are as follows: 1: There is a positive relationship between the prior alliance experiences with a partner and trust one partner places on the other IJV partner. 2 There is a positive relationship between the partner reputations and trust one partner places on the other IJV

partner. 3: There is a positive relationship between the communication between the IJV partners and trust one partner places on the other IJV partner. 4: There is a positive relationship between the partner cultural sensitivity and trust one partner places on the other IJV partner. 5. There is a positive relationship between the perceived longevity of the IJV and trust one partner places on the other IJV partner

Using a quantitative research method, Ali (2013) found that trust has a positive effect on the performance of the IJVs. The findings also indicated that partner's cultural sensitivity and reputation, quality of inter-partner communication, and expected longevity of IJVs enhances trust, while partner's opportunistic behaviour reduces trust. Equivalent ownership share and symmetric interdependence are found to be unrelated to trust. These findings have important implications for managers planning to form and manage IJVs in foreign markets.

Using a quantitative approach and survey research method to data collection, Liao (2013) investigated supervisor monitoring influencing on subordinate innovation. Guided by two construct of social exchange theory (reciprocity and trust), the study argues that two types of supervisor monitoring would affect subordinates' job attitudes (trust and distrust in supervisor), social relationship quality (leader-member exchange), and work behaviours (feedback seeking behaviours), which in turn affect their innovative behaviours. The following hypotheses were raised: 1. Supervisor-granted resources, including dyadic interaction quantity and quality and leadership behaviours are positively related to leader member exchange. 2. Employer-granted resources are positively related to leader member exchange. 3. Leader member exchange is positively related to subordinates' task performance. 4. Leader member exchange is positively related to subordinates' career success outcomes.

Liao (2013) found that control monitoring was negatively related to subordinates' trust in supervisor (and positively related to their distrust in supervisor), while developmental monitoring

was positively related to subordinates' trust in supervisor (and negatively related to their distrust in supervisor). Trust and distrust in supervisor, in turn, were related to quality of leader-member exchange, feedback seeking behaviours, and, ultimately, supervisor-rated innovative behaviours. These findings suggest that supervisors' monitoring behaviours have both positive and negative effects on subordinates' innovations, depending on the kind of monitoring behaviour they display.

Using qualitative case study, Lampinen *et al*. (2013) investigated user experiences on exchange and reciprocity in local online exchange based on the fact that many existing and emerging online systems allow people to share content and coordinate the exchange of goods and favors in local geographic settings.

Using an in-depth interviews (containing forty-nine separate exchange experiences) Lampinen *et al*. (2013) found an aversion to indebtedness and several user behaviours that lessen these negative feelings such as: (1) offering small tokens of appreciation to exchange partners, (2) understanding and accepting indirect nature of generalized exchange, (3) managing expectations by framing offers and requests carefully, (4) minimizing efforts needed in exchange processes, and (5) bartering and exchanging for a third party. The study contributes to the understanding of emergent behaviours and norms in local online exchange systems. Lampinen *et al*. (2013) discuss design implications from these empirical insights that can help alleviate the discomfort of indebtedness and better encourage and sustain participation in systems of indirect reciprocity.

Alsharo (2013) investigated the relationship between knowledge sharing, trust, and collaboration among team members in virtual team settings; and also examined how these constructs ultimately affect virtual team effectiveness. That research introduced a conceptual model which describes the hypothesized relationship between knowledge sharing, trust, collaboration, and team effectiveness in virtual team settings. The theoretical foundation for the model is found in the knowledge-based theory of the firm, social capital theory, and the social

exchange theory. The following hypotheses were tested: 1. In virtual team settings, knowledge sharing has a positive influence on trust among team members. 2. In virtual team settings, knowledge sharing has a positive influence on collaboration. 3. In virtual teams, collaboration among team members has a positive influence on team effectiveness. 4. (a) In high trust context, there will be a positive association between collaboration and team effectiveness. (b) In low trust contexts, this association between collaboration and team effectiveness will be significantly less strong.

The study employed quantitative, positivist research. The survey method was adopted for data collection. The unit of analysis is at the individual level and behavior level as virtual team members' perceptions of trust, collaboration, and team effectiveness in an open knowledge sharing environment. The results of the research support three hypotheses which explain the relationship between knowledge sharing, trust, and collaboration.

A study by Koskenkari (2014) examined factors influencing and enhancing individual level knowledge sharing in offshore projects which often involve uncertainty of the knowledge provider's own future and also why individuals are willing to share their knowledge under these kinds of circumstances. Two constructs from Social exchange theory (reciprocity and trust) provided the theoretical lens.

The main research question is: What makes individuals willing to share knowledge within an organisation under uncertain conditions? The following sub-questions were also raised; what are the factors enhancing individual level knowledge sharing? What are the obstacles to individual level knowledge sharing? A qualitative multiple case study in a global IT company was used. Data was gathered using semi-structured personal theme interviews within two different offshore projects. In order to gain a wider perspective on the matter, some management representatives were interviewed as well. The data was analysed using inductive content analysis method.

Results of the study indicate that individuals are willing to share their knowledge despite uncertainty if they are motivated, provided with opportunities and have the competence and experience to share their knowledge. A strong knowledge sharing culture in the organisation or team also works as a strong incentive for individual level knowledge sharing. The findings also suggest that under uncertain conditions it is possible to encourage people to share their knowledge. The support and commitment of management in addition to favourable environmental circumstances play an essential role in building a bridge between the knowledge provider and acquirer in order to create a virtual environment and space for knowledge sharing.

Using a mixed method research, Ghaznavi (2014) used the norms of reciprocity from social exchange theory as model to explain how informal knowledge cooperation develops in an Ego Center Network (EKN) professionals. The role of informal networks or ego center network of professionals is very important in knowledge-intensive sector, where the access to relevant information and the ability to coordinate and combine expertise from diverse sources can make substantial difference of the performance of individuals and organisations. The following research questions were raised: - What enables and sustains informal knowledge collaboration among professional connected through EGKNs?; Where does trust-like structures exist in the EKGN of a professional, how they affect the job performance of an individual?; The following hypotheses were also raised. 1 Norms of reciprocity increases the level of TMS held by individuals in their EGKNs. 2. Norms of reciprocity increases the level of trust between socially connected individuals. 3- Interpersonal trust increases the level of TMS held by individuals in their EGKNs.

The findings of the study revealed that CEOs and senior managers frequently share work-specific knowledge through personal contacts both within and across organisation and boundaries. These findings suggested that managers realised the potential of informal networks and knowledge

sharing through personal contacts. However, the study was unable to find what these managers actually think about the knowledge sharing activities of their employee i.e. subordinates.

2.5 Summary of the Review

This chapter provided an overview of the research paradigm along three dimensions namely: ontology, epistemology and methodology. Interpretive epistemology which involves the use of inductive approaches to text analysis was adopted for the study. Furthermore, the chapter discussed the theoretical framework for the study and the reason behind the adoption of the social exchange theory for this study and why it was deemed appropriate for this study. Previous studies that adopted Social Exchange Theory were also reviewed.

Even though several scholars have carried out investigations in different fields and have applied constructs from social exchange theory to explain different phenomenon; little studies have been conducted to explore knowledge sharing in managing zoonotic diseases, particularly among veterinary, medical and environmental health professionals. Furthermore, it is clear from the review that all the studies were conducted outside Nigeria; suggesting that none of these studies that adopted social exchange theory were conducted in Plateau state, Nigeria. The purpose of this qualitative case study is to explore how these three professional groups describe their experiences in knowledge sharing in an effort to curtail the prevalence of zoonotic diseases in Plateau state, Nigeria using social exchange as a theoretical lens.

Uniqueness of this Study

This study is unique as it addressed the conceptual gaps relevant in multidisciplinary knowledge sharing in managing zoonotic diseases among public health professionals in Plateau State, Nigeria.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter is discussed under the following sub-headings:

3.2 Research Method Adopted for the Study

3.3 Population of the study

3.4 Sample size and Sampling Techniques

3.5 Instruments for Data Collection

3.6 Procedure for Data Collection

3.7 Ethical Considerations

3.8 Procedure for Data Analysis

3.9 Trustworthiness/Rigor in qualitative research

3.2 Research Method Adopted for the Study

Methodology is the overall strategy chosen for the research process from its theoretical foundation to the design, collection and analysis of data required to effectively address the research problem (Labaree, 2016). The study adopted a qualitative research method. A qualitative research is appropriate when the research seeks to explore and gain understanding and knowledge within an area where little is known (Strauss and Corbin, 1998). Moreover, choosing a qualitative approach is appropriate when emphasis is on describing, understanding, and explaining complex phenomena (Yin, 1994). This methodology is deemed appropriate for this study because the study was conducted in a natural setting as it attempts to gain an in-depth understanding of the perception of public health professionals about knowledge sharing in managing zoonotic diseases.

3.2.1 Research Design

A qualitative case study design was adopted for the study. A qualitative case study design is a holistic strategy that provides rich and in-depth information about an event, an individual, an organization or groups in a naturalistic setting. A case study design which allows the researcher explore in-depth knowledge sharing in managing zoonotic diseases among the targeted population was adopted. Crowe, Cresswel, Robertson, Huby, Avery, and Sheik (2011) define case study as a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context. It is an established research design that is used extensively in a wide variety of disciplines, particularly in the social sciences. Case study research is not limited to a single source of data, as in the use of questionnaire to carry out a survey study, good case studies benefit from multiple sources of evidence (Yin, 2004), such as interviews, document review, focus group discussions and observation. Evidence collected from these multiple sources is used for analysis in order to gain a better understanding of the phenomenon in question. The choice of qualitative case study design is based on their appropriateness because they employ different strategies of inquiry and tools for researchers to study complex phenomena within their contexts (Baxter and Jack, 2008).

3.3 Population of the Study

Population is all the individuals who possess characteristic that are of interest to the researcher from which samples are taken for measurement (Mugo, 2002). The primary population of the study consists of veterinary, medical and environmental health professionals in Plateau state. These consist of 214 Veterinary Doctors (Nigerian Veterinary Medical Association, Plateau State Chapter Record, 2018), 1,114 Medical Doctors (Nigerian Medical Association, Plateau State Chapter, 2018) and 1200 Environmental health professionals (Environmental Health Professional Association, Plateau State Chapter Record, 2018) However, in qualitative research the

determination of sample size is relative; saturation point was used as a guide in determining the sample size for this study. Saturation point indicate that, on the basis of the data that have been collected or analysed hitherto, further data collection and/or analysis are unnecessary.

3.3.1 Inclusion, Exclusion /Eligibility Criteria

Inclusion/Eligibility criteria are the reason or criteria for including a participant in the study (Polit and Hungler 2004). In accordance with the aim of the study, two criteria were considered for the recruitment of study participants. The first criterion concerned participants' area of specialization. Only public health professionals in the veterinary, medical and environmental health sector were selected for this study. Secondly, participants had a minimum of five years clinical and field experience in the area of zoonotic disease management in animals, humans and the environment.

3.4 Sample Size and Sampling Techniques

Sampling is the process of selecting a subset of a population to participate in a study; it is a fraction of the whole (Gay, 1987). In qualitative case study researches, small purposive samples are drawn. This is because in qualitative researches, sample sizes are determined by the quality and depth of the information-rich data collected in addressing the research problem (Landry, 2014). Purposive sampling technique was adopted in this study. This involves selecting participants that met the predetermined criteria that are important to the research (Gentles et al, 2015; Patton, 2015). The primary consideration in purposive sampling is the judgment as to who can provide the best information to achieve the objectives of the study.

Sample Size

There are no rules for sample size in qualitative research**,** that is, how many participants are sufficient to guarantee the validity and reliability of findings from semi- structured interview (WHO, 2004; and Bui, 2009). The size will depend on the research methods employed, and some

other important factors such as scope of study, nature of the topic, quality and amount of data obtained per participant.

Different sample sizes might be suggested for qualitative data collection methods. Mason (2010) recommended 30-50 interviews for both ethnography and ethnoscience, Creswell (1998) as cited in Mason (2010) recommended 5 to 25 for grounded theory/phenomenology. Guest, Bunce, and Johnson (2006) found in their examination of actual sample size to achieve data saturation that saturation occurs within the first twelve interviews. In addition, Marshall (1996) stated that sample size is perceived to be appropriate and adequate for a qualitative study as long as it adequately answers the research questions. In other words, sampling must be continued until complete explanation of the phenomenon or saturation of the concepts is achieved. Therefore, a sample size of 30 participants for this study was considered adequate when the saturation point was reached during data collection where no new information was coming in during the interview process and 9 participants for the focus group discussion.

3.5 Instruments for Data Collection

Data collection is an essential component to conducting research. It is derived from a number of methods, which include interviews, focus groups, surveys, field notes, or questionnaires (Heaton, 2004). No one method of data collection is inherently better than another. Therefore, the data collection method to use would depend upon the research goals and the advantages and disadvantages of each method. This study adopted Semi- structured interview and Focus Group Discussion (FGD) for data collection for the study.

A semi-structured interview is a qualitative method of inquiry generally organised around a set of predetermined open-ended questions, with other questions emerging from the dialogue between interviewer and interviewee (DiCicco-Bloom and Crabtree, 2006). The semi- structured interview is a technique designed to elicit a vivid picture of the participant's perspective on the

research topic. It is also an effective qualitative method for getting people to talk about their personal feelings, opinions, and experiences. The rationale for adopting semi- structured interview is because the current study is an exploratory study using interpretive paradigm. Such an exploratory study is well conducted using semi- structured interview, which provide the researcher opportunities to ask participants for a detailed account and explanation of their opinions and experiences (Pathak and Intratat, 2012). In addition, research on knowledge sharing in managing zoonotic diseases, which is a complex concept, requires an in-depth understanding of the phenomenon to generate a variety of perspectives and experiences. Such an understanding can be realized through conducting semi- structured interview rather than administering open-ended questionnaires.

Similarly, FGD was also used to gather public health professional's opinions about knowledge sharing in managing zoonotic diseases. In order to get participants for the FGD, the research used convenient sampling in picking samples. Public health professionals willing to participate were given consent form to read and fill a section so as to attest their willingness to participate. FGD gave the researcher the opportunity to interact with the group of public health professionals over the research problem.

3.6 Procedure for Data Collection

Data were collected using semi-structured interview questions as a guide during the interview session with each participant. The participants responded in their own words. Interviews were scheduled at venues that were convenient for the participants; in the offices, library conference room, and the e-library and at various times convenient for the participants. The semi-structured interview session lasted between 40 minutes to an hour; while the FGD lasted one and half hours. A consent form (see Appendix II) was used to educate the participants about the study

purpose and the procedure for data collection; it also assured participants of the confidentiality of the interview as it relates to their identity and the use of such information for research purposes only.

The words of the participants from the semi-structured interview and FGDs were recorded on an audio tape recorder. The interview process for the semi- structured interview and the FGDs cover all the questions on the interview guide and contained open ended questions to facilitate an in-depth response from the participants. The processes were completed within 3 months with the help of three research assistants.

3.7 Ethical Considerations

In this study, moral issues were taken into account and adhered to. Firstly, the researcher obtained the approval of the National Veterinary Research Institute, Vom; Jos University Teaching Hospital (JUTH), Plateau State Specialist Hospital, Jos and Plateau State Ministry of Health, Jos to contact the public health professionals. Thereafter, interviewees were informed of the objective of the research and of their right to participate or not (Myers, 2009; King and Horrocks, 2010). They were also informed that the interview would be recorded securing accuracy of their words and this process was accomplished with their permission. The entire 30 participants for the individual interview and 9 for the focus group discussion consented to voice recording. Final copy of the thesis was agreed upon to be sent to the participant's Institution (See Appendix VB-E).

3.8 Procedure for Data Analysis

Qualitative data analysis is defined as working with the data, organising them, breaking them into manageable units, coding them, search for patterns and blend ideas. The aim of analysis in qualitative data is to discover patterns, concepts, themes and meanings through direct interpretation of what is observed, as well as what is experienced and reported by the subjects (Bogdan and Biklen, 2003; Yin, 2003); and also report the findings in an easily understandable

format (Gorman, Clayton, Shep, and Clayton, 2005). One strategy adopted in qualitative analysis is thematic analysis.

Thematic Analysis

It is a method that primarily seeks to identify, categorise, and report patterns of experience and important concepts and meanings within a data set. Alhojailan (2012) stated that thematic content analysis could be appropriate when the study aims to understand current practices of any individual; in particular, the influence of any variable, which is utilised by participants in a practical way in order to investigate and identify how current situations are influenced by their points of view. The aim of this present study is to explore and identify emerging concepts in regard to the research questions. Thematic analysis was chosen in accordance with the interpretive perspective to analyse the data. In other words, the semi- structured interview and focus group discussion data were analysed inductively to demonstrate the potential of knowledge sharing in facilitating and contributing to the management of zoonotic diseases. The process of inductive analysis as described by Thomas (2003) and adopted in this study is as follows.

1. **Preparation of Raw Data Files ("Data Cleaning")**

   The raw data collected from voice interview and focus group discussion tapes were transcribed. A word document template was used to store all interview transcripts. Backup copies were made in multiple storage devices for each of raw data file.

2. **Close reading of text**

   When all raw data have been prepared, the transcribed data (raw text) was read in (soft and hard copy) multiple times to gain an understanding of the content and themes covered within the text. Narrations that give a clue to the answers to the research questions were identified and highlighted using bold letters.

3. **Creation of sub-Categories**

Sub-categories were identified and defined. Relevant narratives were read several times over to identify relationships and difference. From each narrative, open code(s) were drawn using exact wording of the participant. Furthermore, the open codes were scrutinized and related open codes were identified and grouped together to form sub-categories.

4. **Continuing revision and refinement of category system**

The final stage of the inductive process involved merging common sub-categories to form categories, searching for contradictory points of view and new insights, and selecting appropriate quotations that convey the core theme of each category.

3.9 Trustworthiness/Rigor in Qualitative Research

Reliability and validity remain appropriate concepts for ensuring rigor in qualitative research. It emphasised procedural precision and the use of 'verification strategies integral and self-correcting during the conduct of inquiry itself (Morse, Barret, Mayan, Olson, and Spiers 2002; Bashir, Afzal and Azeem, 2008). Long and Johnson (2000) asserted that failure to assess the worth of a study, the soundness of its method, the accuracy of its findings, and the integrity of assumptions made or conclusions reached could have dire consequences. Unclear or worthless findings may result in wasted time and effort, while findings which are simply wrong could result in the adoption of dangerous or harmful practices. Evaluation of studies, then, is an essential pre-requisite of the application of findings. Rigor in qualitative research has to do with the capacity to determine if the conclusions drawn by the researcher are truthful.

Guba and Lincoln (1985) proposed four criteria for judging the soundness of qualitative research and explicitly offered these as an alternative to more traditional quantitatively-oriented criteria. These are credibility, transferability, dependability, authenticity. To ensure trustworthiness

of this study, the researcher used credibility and dependability to judge the soundness of this research.

Credibility criteria involve establishing whether or not the research findings represent believable information drawn from the participants' original data and are a correct interpretation of the participants' original views (Graneheim and Lundman, 2004). According to Lincoln and Guba (1985), credibility can be achieved through prolonged engagement, persistent observation, and triangulation of data. Thus, the researcher used the following to achieve credibility:

i. **Prolonged *engagement***: The Researcher took 1year and six months during data collection phase and analysis interacting with the participants of this study. At some appoint of data analysis, the researcher went back to the field to verify some information and also to get additional data from the participants of this study.

ii. ***Triangulation***: The Researcher used two forms of triangulation; data triangulation and analysis technique triangulation. Data triangulation was achieved with the use of two data sources; semi- structured interview and focus group discussion. Analysis technique triangulation was achieved with the use of frequency counts and inductive content analysis. The use of frequency count is counting the number of times an observation occurs (frequency) for a data item (variable). Similarly, inductive content analysis involves allowing themes and categories emerge from the data through the researcher's careful examination and constant comparison.

Dependability refers to the consistency of the inquiry processes used over time and could be repeated. Dependability was established using inquiry audit technique.

i. **Inquiry Audit Technique*:*** The researcher adopted an inquiry audit technique. This involves a researcher that is not involved in the research process to examine the process and product of the research study. The purpose is to evaluate the accuracy and evaluate

whether or not the findings, interpretations and conclusions are supported by the data. Aside the supervisors of this study, the researcher was able to ensure dependability by allowing qualitative researchers both within and outside the study area to examine the process and outcome of this research study and they were able to ensure that the findings, interpretations and conclusions were supported by the data provided for the study.

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CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter is presented under different sub-headings.

4.2 Data analysis

Qualitative data in the forms of phrases and sentences were collected through semi-structured interview of the participants of this study. The interviews were recorded using a tape recorder. The audio recordings were then transcribed. All transcripts of the interviews were vigorously read, examined and re-examined for phrases and sentences that form patterns that are consistent with the objectives of the study. These patterns were further categorized into Categories using the analytic inductive process described by Creswell (2013).

Forty-three open codes were generated for research question one. Fourteen subcategories emerged from these open codes and four Categories were used to name the related sub-categories. Thirty-five open codes were generated for research question two. Twenty subcategories emerged from the open codes and three Categories were used to name the related subcategories. Fifty-two open codes were generated for research question three. Sixteen subcategories emerged from the open codes and five Categories were used to name the related subcategories. Fifty-one open codes were generated for research question four. Fifteen subcategories emerged from these open codes. Six Categories were used to name the related sub categories. This was achieved using the inductive analysis process which is an iterative process of sorting, ordering and coding of qualitative data into units of meanings, categories, patterns and themes (Cohen, Manion and Morrison, 2011; Kekeya, 2016).

Table 4.2.1: The sub-categories and emergent categories from the narratives related to the four research questions that were raised for this study:

Table 4 .2.1: Data Analysis by Categories and Subcategories

Research Questions	Categories	Subcategories
1: What is the perception of public health professionals about knowledge sharing in managing zoonotic diseases?	1. Effective management of zoonotic diseases	1. Prevent zoonotic diseases 2. Identify zoonotic diseases 3. Effective control 4. Combating these zoonotic diseases 5. Break the chain of transmission 6. For easy diagnosis
	2. Conform to the Notion of "One Health" Initiative	1. Bringing the health professionals under one medicine 2. The one health concept
	3. Knowledge gap exist	1. There is a limit to which the veterinary profession will be able to reach in tackling the disease condition 2. Knowledge gap exist 3. Each profession is insufficient in its own capacity 4. No profession is an island 5. Human doctor has a limited level of knowledge of animal diseases
	4. Save human lives	1. Lives are saved

2: How do health professionals acquire external knowledge in managing zoonotic diseases?	1. By belonging to multidisciplinary networks and professional associations and attending seminars, workshops, symposia and conferences	1. Member of One Health Network 2. Global Health Network 3. Wildlife Disease Association (Africa, Middle East and Asia region) 4. Global Adhoc Committee for Lyme and Borreliosis 5. Nigeria Conservation Foundation 6. Public Health Association (Nigeria) 7. International Society for Infectious Diseases 8. International Society for Influenza and other Respiratory Diseases 9. Expert scientists on OFFLU (FAO-OIE) committee 10. Tropical Council of Companion Animal Parasites 11. Intern Fellowship at the International Atomic Energy Agency in Vienna 12. The African Field Epidemiology Network (AFENET) 13. Attending annual national conferences of professional groups 14. Attending seminars, workshops and symposia with other professionals 15. Biosafety team (National Biosafety Management Agency)
	2. By consulting books, journals, and internet databases	1. Read a lot of journals and books on infectious diseases 2. Browse a lot of information from internet databases
	3. During work routines and processes	1. I worked with animal scientist, worked with laboratory scientist and technician 2. I've been trained by veterinarians and non - veterinarians 3. I work with a lot of health professionals in ministry of health
3: What are the factors that motivate public health professionals to share knowledge in managing zoonotic diseases?	1. Forum to share Knowledge	1. Joint conference 2. The laboratory setting 3. Public health and veterinary public health training 4. One health programme 5. Research that brings them together 6. Monthly meeting 7. Common data base
	2. Funding	1. Funding for research
	3. Professional ethics	1. The support of the allied health workers 2. Professional ethics.
	4. Good policy guideline	1 Government policies

	5.	Organisational support	1. Administrative interest 2. Remuneration 3. Work condition 4. Availability of information 5. Job security
4: What are the factors that limit knowledge sharing among public health professionals in managing zoonotic diseases?	1.	Negative traits	1. Superiority and inferiority 2. I know it all 3. Ego 4. Arrogance, 5. Parochialism/Narrow minded
	2.	Professional dichotomy	1. Protecting your professional group 2. Professional bias 3. Professional rivalry 4. It's just our area 5. Professional dichotomy
	3.	Mono-disciplinary training	1. Narrow based training 2. Agencies are specialized
	4.	Lack of policy	1. Lack of policies
	5.	Lack of funds	1. Not willing to provide funds
	6.	Leadership issues	1) Leadership issues

4.3 The perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau State, Nigeria

This objective of the study sought to determine the perception of public health professionals about knowledge sharing on zoonotic diseases management. Four categories emerged from the narratives of the participants of this study namely; (1) Effective management of zoonotic diseases, (2) Knowledge gap exists (3) Conform to the notion of "One Health Initiative", (4) Save the lives of humans. These categories and sub categories are explained thus:

Table 4.3: The perception of public health professionals about knowledge sharing in managing zoonotic diseases

Research Question	Categories	Sub-Categories	Freq	Percentage
What is the perception of public health professionals about knowledge sharing in managing zoonotic diseases	**1) Effective Management**	1.1 Prevent Zoonotic diseases	1	2.08
		1.2 Identify zoonotic diseases	4	8.33
		1.3 Effective control	12	25
		1.4 Combating these zoonotic diseases	1	2.08
		1.5 Break the chain of transmission	2	4.16
		1.6 For easy diagnosis	1	2.08
		Group Total	**21**	**43.75%**
	2) Conform to the notion of "One Health" Initiative	2.1 Bringing the health professionals under one medicine	1	2.08
		2.2 The One Health concept	1	2.08
		Group Total	**2**	**4.16%**
	3) Knowledge Gap exist	3.1 There is a limit to which the veterinary profession will be able to reach in tackling the disease condition	1	2.08
		3.2 Knowledge gap exist	1	2.08
		3.3 Each professional is insufficient in his own capacity	1	2.08
		3.4 No profession is an island	1	2.08
		3.5 Human doctor has a limited level of knowledge of animal diseases	1	2.08
		Group Total	**5**	**10.40%**
	4) Save humans lives	4.1 Lives are saved	3	6.25
		Group Total	**3**	**6.25%**
		Grand Total	**31**	**64.58%**

4.3.1: Effective Management of Zoonotic Diseases

Effective management of zoonotic diseases category **(**21/48: 43.75%). describes the narratives related to the perception of public health professionals in managing zoonotic diseases in Plateau state. It consists of seven sub categories: Prevent zoonotic diseases (1/48: 2.08%) Identify zoonotic disease (4/48:8.33%) effective control (12/48:25%) combating these zoonotic diseases (1/48:2.08%) break the chain of transmission (2/48:4.16%). For easy diagnosis (1/48: 2.08%)

Preventing zoonotic diseases: Preventing zoonotic diseases sub category gives explanation on the perception of health professionals in knowledge sharing on zoonotic diseases management. Participant 2 narrated *"Sharing knowledge among health professionals is aimed at preventing zoonotic diseases".*

Identify zoonotic disease – This sub-category emerged as one of the perceptions of public health professionals in managing zoonotic diseases. Emerging infectious diseases often originate from animals, making it important to identify infectious agents in the animal populations for effective management. In line with this, Participant 1 puts it this way *"Identifying and understanding the root and how people get infected with zoonotic diseases is important…this can be done when we share knowledge".* This is important because this information provides several insights; first, it gives information on the host range and specificity of the infectious agent. Second, it provides information on the geographic distribution of the infectious agent in animals.

Effective control: Effective control sub category gives explanation on the perception of public health professionals in managing zoonotic diseases. Participant 2 narrated that "… *if there is going to be an effective control of zoonotic diseases, it means health professionals must have to collaborate…",* in the same manner Participant 6 commented that "*…knowledge sharing between those that know these diseases in animals and those who are managing these diseases in humans will help in effectively controlling the infection. That's how important knowledge sharing is in*

mitigating zoonotic diseases". In a similar way, Participant 9 stated that "*When you share knowledge, especially in disease management, it helps in the effective control of such diseases… when you share common knowledge; it creates room for effective control of such diseases in a locality".*

Combating these zoonotic diseases - This sub category explains the perception of health professionals about knowledge sharing in managing zoonotic diseases. Participant 21 has this to say "*Every professional is supposed to share knowledge in combating these zoonotic diseases because it will really go a long way".*

Break the chain of transmission - Break the chain of transmission is another sub category that explains the perception of health professionals about knowledge sharing in managing zoonotic diseases. Participant 14 said "*The sole aim of knowledge sharing is to be able to break the cycle of transmission"* In addition, Participant 28 explained by saying *"knowledge sharing among various health personnel is to ensure that we break the chain of transmission of zoonotic diseases"*

For easy diagnosis - This sub-category emerged as one of the perceptions of public health professionals in managing zoonotic diseases. Thus Participant 4 narrated that *"information sharing is key because without it, you cannot diagnose. You diagnose disease based on the history of the cases, and the clinical signs of the case, so information must flow once you don't have information; there is nothing you can do"*

4.3.2: Conform to the Notion of "One Health" Initiative

Conform to the notion of "One Health Initiative category (2/48:4.16%) includes narratives related to the perception of public health professionals about knowledge sharing which conform to the notion of one health initiative. It consists of two sub categories: Bringing the health professionals under one medicine (1/48:2.08%); the one health concept (1/48:2.08%).

Bringing the health professionals under one medicine -This sub category is observed from the following narrative by Participant 4 "…*Well, knowledge sharing is the key… there is the concept of "one world, one health". We're trying to bring the health professionals under one medicine, and that involves human health, animal health practitioners, and environmental scientist"*

The one health concept - This sub category is explained by Participant 5 *"there is this concept of "one health", which means taking health in a holistic form; in its entirety, whether it affects animals, or whether it affects humans, or the environment… all these require that knowledge should be shared among these professional groups"* In line with this, Participant 17 said "*The concept of one health, one medicine comes into play when we talk about knowledge sharing on zoonotic diseases and that is the central thing to do"*

4.3.3: Knowledge gap exist

Knowledge gap exists category (5/48: 10.40%) includes narratives related to the perception of public health professionals about knowledge sharing in managing zoonotic diseases. This category consists of three sub-categories: there is a limit to which the veterinary profession will be able to reach in tackling the disease condition (1/48:2.08%); Knowledge gap exist (3/48:6.25%); human doctor has a limited level of knowledge in managing zoonotic diseases (1/48:2.08%) Each profession is insufficient in its own capacity (1/48:2.08%) No profession is an island (1/48:2.08%)

There is a limit to which the veterinary profession will be able to reach in tackling the disease condition - This sub category explains the perception of public health professionals about the limitation the veterinarian has in managing zoonotic diseases. Participant 7 commented that: *… as I have earlier explained since this disease condition occurs both in human and animals; there is a limit to which the veterinarian can be able to reach in tackling the disease condition. While he is*

an expert in animal disease condition, the human medical doctor is an expert in handling diseases within the human beings.

Human doctor has a limited level of knowledge of animal diseases - This subcategory depicts narrative on the perception of public health professionals about the limited level of Knowledge of human doctors in managing zoonotic diseases. Participant 18 puts it this way;

> *…the human doctor has a limited level of knowledge of animal diseases; if they want to know more about these diseases …they will have to contact the people who are really in it; like veterinarians know more about these diseases because this is their area*

Knowledge gap exist - Knowledge gap exist sub category depicting narratives on the assertion that each professional has limited capacity in handling zoonotic disease cases. Participant 8 said … "knowledge g*aps exist, and these gaps can only be closed when there is communication…The way zoonotic diseases occur, no single professional group will claim exclusive reservoir of knowledge of how to handle it".* Also Participant 20 has this to say "*… nobody knows it all… if I am aware and you are not aware, and I try to enlighten you, that is part of sharing…I can see there is knowledge gap… outbreak of diseases that emanate among us the two professions have a say in it. The medical doctor and the veterinary doctor, if they come together, they will achieve a lot".*

Each profession is insufficient in its own capacity- This sub category expressed the fact that each of these professions has insufficient knowledge in managing zoonotic diseases. Participant 16 expressed this opinion *"Each profession in zoonotic disease management is insufficient in its own knowledge capacity".*

No profession is an island - This sub category expressed the fact that each of these professions has insufficient knowledge in managing zoonotic diseases. Participant 11 has this to say "*The essence and relevance of knowledge sharing hinge on the fact that no man is an island, so the professionals*

involved; the veterinarians and human medical practitioners even the environmental scientists are needed in this type of work.

4.3.4: Save humans lives

Save humans lives (1/48:2.08%) captures narratives on the perception of health professionals about knowledge sharing in response to the high rate of mortality in humans and animals. It encompasses 1 sub category: Save the lives of humans (1/48:2.08%).

Save the lives of humans - this shows the narratives on the perception of health professionals for the need to share knowledge in order to reduce the rate of mortality in humans. Participant 3 responded that "*it is very relevant to share knowledge, because the goal is to preserve human lives."* while Participant 17 said this "*it is very relevant to share knowledge, because give or take the goal is to save humans on the earth, and to make sure human lives are still preserved because by the time you don't share knowledge and these diseases go on, human lives are lost, animal lives are lost; and most of the time zoonotic diseases are epidemic, and it's good we share knowledge"*

+-4.4: The absorptive capacity of public health professionals in managing zoonotic diseases in Plateau State, Nigeria

This objective of the study sought to determine the absorptive capacity of health professionals on zoonotic disease knowledge. To respond to this objective, the following sub question was asked: How do health professionals acquire external knowledge in managing zoonotic disease? Three categories emerged in response to the participants namely; (1) By belonging to multidisciplinary networks and professional associations (2) By consulting in external knowledge sources (3) During work routines and processes. The categories and sub categories are explained thus:

Table 4.4: The absorptive capacity of public health professionals in managing zoonotic diseases in Plateau State, Nigeria

Research Question	Categories	Sub-Categories	Freq	Percentage
How do health professionals acquire external knowledge in managing zoonotic diseases?	**1) By belonging to multidisciplinary networks, professional associations and attending seminars, workshops, symposia and conferences**	1.1 Member of One Health Network	10	20.4
		1.2 Global Health Network	2	4.08
		1.3 Wild Disease Association (Africa, Middle East, Asian Regions)	1	2.04
		1.4 Global Adhoc Committee for Lyme disease and Borreliosis	1	2.04
		1.5 Nigeria Conservation Foundation	1	2.04
		1.6 Public Health Association (Nigeria)	4	8.16
		1.7 International Society for Infectious Diseases	1	2.04
		1.8 International Society for Influenza and other Respiratory diseases	1	2.04
		1.9 Expert Scientist on OFFLU (FAO-OIE) Committee)	1	2.04
		1.10 Biosafety training	1	2.04
		1.11 Tropical Council of Companion Animal Practices	1	2.04
		1.12 Intern Fellowship at the International Atomic Energy Agency in Vienna	1	2.04
		1.13 The African Field Epidemiology Network (AFENET)	1	2.04
		1.14 Attending conferences of professional groups	1	2.04
		1.15 Attending seminars, workshops and symposia with other professionals	1	2.04
		Group Total	**28**	**57.14%**
	2) By consulting Books, Journals and Internet databases	2.1 Read a lot of journals and books on infectious diseases	3	6.12
		2.2 Browsing the Internet especially specialized Internet databases	2	4.16
	3) During work routines and processes	**Group Total**	**5**	**10.20%**
		3.1 I worked with Animal Scientist, laboratory scientists and technicians	1	2.04
		3.2 I have been trained by veterinarians and non-veterinarians	1	2.04
		3.3 I work with a lot of health professionals in Ministry of Health	1	2.04
		Group Total	**3**	**6.12%**
		Grand Total	**36**	**73.46%**

4.4.1: By belonging to multidisciplinary networks, professional associations and attending seminars, workshops, symposia and conferences

By belonging to multidisciplinary networks and professional associations and attending seminars, workshops, symposia and conferences category (28/49: 58.14%) captures narratives related to the acquisition capacity of health professionals of external knowledge on zoonotic diseases outside their professional domain knowledge. It encompasses 17 sub categories namely; Member of One Health Network (10/49:20.4%), Global Health Network (2/49: 4.08%), Wildlife Disease Association (Africa, Middle East and Asia region) (1/49: 2.04%), Global Adhoc Committee for Lyme disease and Borreliosis (1/49: 2.04%)Nigeria Conservation Foundation (1/49: 2.04%),Public Health Association (Nigeria) (4/49: 8.16%), International Society for Infectious Diseases (1/49: 2.04%), International Society for Influenza and other Respiratory Diseases (1/49:2.04%) Expert scientist on OFFLU (FAO-OIE) committee (1/49: 2.04%), Biosafety training (1/49: 2.04%), Tropical Council of Companion Animal Parasites(1/49: 2.04%), Intern Fellowship at the International Atomic Energy Agency in Vienna (1/49: 2.04%), The African Field Epidemiology Network (AFENET) (1/49: 2.04%), Attending annual national conferences of professional groups (1/49: 2.04%), Attending seminars, workshop and symposia with other professionals(1/49: 2.04%)

Member of One Health Network -This subcategory explains narratives concerning the acquisition of external knowledge by health professionals outside their profession. Participant 2 said '*I attend the One Health Network meetings with different health professionals where I gain a lot of knowledge'* Participant 3 said *'I am a member of the One Health Network'*, Similarly Participant 4 said this *'I am a member of the One Health group, which have some professionals in attendance particularly from abroad'*; Participant 6 has this to say *'I gain a lot of knowledge on zoonotic disease issues from the One Health Network meetings*'; In addition Participant 7 said '*I*

am a member of the One Health group, which entails my regular interaction and communication with other professionals for exchange of ideas and update of skills and research techniques. Participant 8 *said 'I am a member of the One Health Network, where I gain a lot of knowledge. We have an e-mail group dedicated to "One health" where veterinary doctors, bio-medical scientists, human doctors can register to be a member, that email group has discussion forum on one health issues'*; Participant 10 said '*I am part of One Health group which has different health professionals in attendance'* Similarly Participant 11 has this to say *'I attend the One Health Network meeting with other professionals'*; Also Participant 12 said *'I am a member of the multidisciplinary team called one health';* and Participant 14 said *'I gain a lot of knowledge from the 'One health meetings with other health professionals.*

Global Health Network- This subcategory explains narrative concerning the acquisition of external knowledge by health professionals outside their profession. Participant 6 said 'I *belong to the Global Health Network where discussions on infectious diseases take place; it's a platform to enable research by sharing knowledge and methods. You can find many areas of interest within a specific research community of practice, there are also a vast array of resources to guide, train and support researchers. I acquire a lot of knowledge from this network*

Wildlife Disease Association (Africa, Middle East and Asia region) - This subcategory explains narrative concerning the acquisition of external knowledge by health professionals outside their profession. Participant 6 said… *this is an association dedicated to the study and understanding of the health of wild animals. 'I gain a lot of knowledge from the association. The knowledge has broadened my understanding on infectious diseases generally'*

Global Adhoc Committee for Lyme and Borreliosis- This subcategory explains narrative concerning gaining external knowledge by health professionals outside their profession.

Participant 6 said this *"I am part of the Global Adhoc Committee for Lyme disease and Borreliosis which seeks to improve the diagnosis and treatment of Lyme disease in human"*

Nigeria Conservation Foundation- This sub-category emerged from the narratives related acquisition of external knowledge by health professionals. Participant 6 has this to say "*I have acquired knowledge as a result of my membership of Nigeria Conservation Foundation (Nigeria). The foundation works to preserve the natural resources and biodiversity of Nigeria"*

Public Health Association (Nigeria)- This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals. Participant 6…. *I belong to the public health association of Nigeria. It is a field that involves multidisciplinary approach to disease control".* Similarly, Participant, 7 said *... I am a member of public health association of Nigeria. It requires regular interaction with other professionals for exchange of ideas and update of skills and research techniques.* In line with this, participant 8 has this to say. "*I relate with other professionals as a member of public health association, the interaction is good"*. Participant 12 *said "the public health association is a fora where knowledge from different health discipline is disseminated. It's an excellent forum for knowledge sharing".* Similarly, Participant 17 further said… *I am a member of public health association. It's more like human health related association but there are other professionals as members. There is close collaboration among these professionals".*

International Society for Infectious Diseases- This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant 6 noted that... *I am a member of International Society for Infectious Diseases. It is a scientific assembly for the exchange of research and clinical information of infectious diseases and works to control infectious disease outbreaks. Membership cuts across health care disciplines.*

International Society for Influenza and other Respiratory Diseases- This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant 6 said this "*This is a field of public health promoting the prevention, detection, treatment, and control of influenza and other respiratory virus diseases. It works in collaboration with many health professionals, I have acquired a lot of knowledge as a member.*

Expert scientist on OFFLU (FAO-OIE) committee- This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant 6 has this to say "*This is a global network of expertise on animal influenza working to reduce the negative impacts of animal influenza viruses by promoting effective collaboration between animal health experts and the human health sector. As a veterinarian, I have gained a lot of knowledge from this platform"*

Tropical Council of Companion Animal Parasites- This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals. Participant 7 noted that. "*I am a member of Tropical Council of Companion Animal Parasite. Its mission is to report, direct and make best-practice recommendations to veterinarians and allied health professionals for the diagnosis, treatment and control of companion animal parasites in the tropics and sub-tropics with the aim of protecting animal and human health".*

Biosafety team-This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant12 noted that…*Through my engagement in Biosafety team and Biosafety trainings/ workshop…it is a scientific discipline that serves the growing needs of biosafety professionals across the globe and provides fora for continued and timely exchange of biosafety information among health professional associations.*

Intern Fellowship at the International Atomic Energy Agency in Vienna - This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant8 noted that…

…IAEA internship programme provides opportunity for people studying to gain practical work experience in line with their studies or interests, and also expose them to the work of the Agency. It also works to obtain the assistance of qualified students specialized in various professional fields. I worked in the Siebersdorf laboratories with professionals of different backgrounds in terms of undergraduate training. I acquired a lot of knowledge from the training.

The African Field Epidemiology Network (AFENET). - This sub-category emerged from the narratives related to acquisition of external knowledge by health professionals. Participant 8 said... *I am a member of the African Field Epidemiology Network (AFENET). It's a networking alliance of African Field Epidemiology (and Laboratory) Training Programs (FELTPs), and other applied epidemiology training programs. The Headquarters is in Kampala, Uganda with Seven AFENET-regional centre including Nigeria*

Attending conferences of professional groups this sub-category emerged from the narratives related to acquisition of external knowledge by health professionals from Participant 17 thus ...*I have attended conferences organized by Christian veterinarian of Nigeria as a medical doctor. I learnt quite a lot from them*

Attending seminars, workshop and symposia with other professionals- this sub-category emerged from the narratives related to acquisition of external knowledge by health professionals Participant 7 has this to say ... *I have attended seminars, workshops and symposia that are multidisciplinary in nature e.g. Techniques in molecular biology and diagnosis of vector-borne disease at the Hebrew University Jerusalem, Israel; Current trends and emerging challenges of Vectors, Pathogens and Diseases in South Africa; also, on Remote sensing technologies in animal*

disease diagnosis and surveillance in Nigeria. It has always been a rewarding experience interacting with other professionals.

4.4.2: By consulting books, journals, and internet databases

By consulting books, journals, and internet databases category (5/49: 10.20%). This Category captures narratives related to the acquisition and assimilating ability of health professionals of external knowledge on zoonotic diseases outside their profession. It encompasses 2 sub categories namely; read a lot of journals and books on infectious diseases (3/49: 16.12%), browse a lot of information from internet databases (2/49: 2.08%)

Read a lot of journals and books on infectious diseases. This subcategory depicts narratives on the absorptive capacity of health professionals. Participant 8 narrated this…*I read wide. I read journals and books on infectious diseases. I try to get enough knowledge as I can, especially on zoonoses because it affects me directly.* In like manner, Participant 15 said this

> *...personally, I read journals on emerging zoonosis, whether in the medical journal or veterinary journal to update information on what is happening ... look out for some of these new pathogens that have evolved and are causing new dimension of zoonotic problems, get updated on their management and the mechanism of transmission, the risk of exposure so that we can put in measures in our little way, to let people know what they need to do to avoid such risk.*

Also, Participant 18 has this to say "*I am open to receiving knowledge from other sources like books, journals etc… that will improve my understanding of zoonotic disease in order to be effective in its management*

I browse a lot of information from internet databases - This sub category includes narratives on the absorptive capacity of health professional on knowledge outside their profession. Participant 5 stated ... *the internet, has made life quite easy for us now; if you want to see how things are done*

in more developed areas, all you have to do is go into the internet…all in order to improve your knowledge in solving zoonotic diseases. In the same way Participant 6 stated that… *I receive an average of one hundred emails per day, because I subscribe to a lot of sites including journals, I subscribe to a lot of journals on infectious diseases which I read.*

4.4.3: During work routines and processes

During work routines and processes (3/49: 6.12%). This Category captures narratives related to the acquisition and assimilating ability of health professionals of external knowledge on zoonotic diseases outside their profession. It encompasses 3 sub categories namely; I worked with animal scientist, worked with laboratory scientist and technician (1/49: 2.04%); I've been trained by veterinarians and non-veterinarians (1/49: 2.04%); I work with a lot of health professionals in ministry of health (1/49: 2.04%).

I worked with animal scientist, worked with laboratory scientist and technician. This sub category includes narrative on the absorptive capacity of health professional on knowledge outside their profession. Participant 7 narrated…

> *I have realized that there is an information overlap obvious between myself as a veterinarian and other professional colleagues that I work with and I have tried to learn from other professionals. I have worked with animal scientist, worked with laboratory scientist and technician, and each time I try to learn from them. There are some disciplines and some areas that obviously I have not been exposed to and I feel working and learning from them will add to my understanding and enhanced my performance in my work as a veterinarian. I have also been privileged to travel out of the country and collaborate with bio-informatics, where data generated from my research output can be easily interpreted and I think I have gained from them. I have also worked with molecular biologist and I have learned techniques from them on how to run the programme. So, to some extent, I have tried to be*

open as much as possible to gain from other related professionals so as to be able to enhance my performance as a veterinary doctor in the control of zoonotic disease problems.

I've been trained by veterinarians and non-veterinarians - This sub category includes narrative on the absorptive capacity of health professional on knowledge outside their profession. Participant 14 narrated this …

I do know this fact and I know that there are many people that are not in my profession that do know a lot about what I'm looking for. So, I just don't hesitate in going to them. I've been trained by veterinarians and non-veterinarians. I've been trained by biologists, by molecular biologists too. They know something that I don't know and I need it in my work so I go to them. I have also worked with medical doctors because I need an aspect from them to say about zoonotic diseases.

I work with a lot of health professionals in ministry of health- This sub category includes narrative on the absorptive capacity of health professional on knowledge outside their profession. Participant 23 narrated that … *I work with a lot of health professionals in ministry of health. The whole ministry of health with all the directorates is here, we have the public health comprising of all the environmental health, we have the community health, and we have the nurses and also doctors. I have learnt a lot from them*

4.5: Factors that motivate public health professionals to share knowledge in managing zoonotic disease in Plateau State, Nigeria

This objective of the study sought to determine the factors that motivate public health professionals to share knowledge on zoonotic diseases management. Five categories emerged from the narratives from the participants namely; Forum to share knowledge, Funding, Professional Culture, Policy, Organizational Support and Improving Human and Animal Health. The categories and sub categories are explained thus:

Table 4.5: Factors that motivate health professionals to share knowledge in managing zoonotic diseases

Research Question	Categories	Sub-Categories	Freq	Percentage
What are the factors that motivate health professionals to share knowledge in managing zoonotic diseases?	1. Forum to share knowledge	**1)** Joint conference	1	1.92
		2) The laboratory setting	1	1.92
		3) Public health and veterinary public health training	1	1.92
		4) One Health Programme	4	7.69
		5) Research that brings them together	1	1.92
		6) Monthly meeting	1	1.92
		7) Common data base	1	1.92
		Group Total	**10**	**19.23%**
	2. Funding	2.1 Funding for Research	3	5.76
		Group Total	**3**	**5.76%**
	3. Professional Ethics	3.1 Professional Ethics	1	1.92
		3.2 The support of the allied health workers	1	1.92
		Group Total	**2**	**3.85%**
	4. Policy	4.1 Government Policies	4	7.69
		Group Total	**4**	**7.69%**
	5. Organizational Support	5.1 Administrative Interest	1	1.92
		5.2 Remuneration	1	1.92
		5.3 Work Condition	1	1.92
		5.4 Availability of Information	1	1.92
		5.5 Job Security	1	1.92
		Group Total	**5**	**9.62%**
		Grand Total	**24**	**46.16%**

4.5. 1: Forum to Share Knowledge

Forum to Share Knowledge (10/52: 19.23%). Category one captures narratives on justification for sharing knowledge by health professionals in managing zoonotic diseases. It covers 6 sub categories: Joint conferences (1/52:1.92%); the laboratory setting (1/52:1.92%); Public health and veterinary public health training (1/52:1.92%); the One Health programme (4/52: 7.69%); Research that brings them together (1/52: 1.92%); Monthly meeting (1/52:1.92%); Common data base (1/52:1.92%)

Joint conferences - This sub category contains narrative on conditions that can help health professionals share knowledge in managing zoonotic diseases. Participant 3 narrated this;

> *I believe that if there can be a forum whereby you can have joint conferences between the different health professionals, microbiologists, veterinarians, physicians, laboratory technicians sitting under the same roof and sharing knowledge as a people belonging to the same family, then with time you will find out that it will bring people closer and closer and the need to interact will become more visible and the conflict between one group and the other will be reduced.*

The laboratory setting- This sub category contains narrative on conditions that can help health professionals share knowledge on zoonotic disease management. Participant 10 said:

> *The second level is in the laboratory, that is where the veterinarian or the physician and other health professionals can also come together to interact. If you are able to isolate for example a deadly zoonotic organism from an animal and you are able to link it to what is happening by isolating the same organism in a human; you see, that setting brings you together. So that interface in the laboratory is suitable for professionals to interact.*

Public health and veterinary public health forum - This sub category contains narrative on circumstance that helps health professional share knowledge on zoonotic disease management. Participant 10 said *"On the professional level, the public health on the human side and the veterinary public health forum; so, I think there is already an established position where there will be rubbing of minds where professionally, people can come together"*

The One Health Programme - This sub category contains narrative on avenues that bring health professionals together to share knowledge on zoonotic disease management. Participant 2 said

> *…gradually the understanding is coming up… this concept of one health, you find out that people are gradually coming to work together. You find veterinarians working together with human doctors and human doctors collaborating with veterinarians and you have medical laboratory technicians too, the laboratory scientists also working in the area of disease diagnosis, human disease epidemiology and so on and so forth. So gradually, people are beginning to see the need to work together*

Similarly, Participant 4 has this to said

> *there is an attempt by the Centre for Disease Control in Nigeria to come up with something that will involve both human and veterinary doctors, so if they go out for practical purposes, they go out together. What we are trying to do is to try and see what role the veterinarian has to play in the Ebola incidence, what role the veterinarian has to play in Lassa fever.*

In the same way Participant 8 added that "*at the policy level, the government has begun a programme called Nigeria Field Epidemiology Training Programme which brings together these entire professional group and train them in the same classroom for a postgraduate master degree"*

In a related development Participant15 expressed this;

…the principle of one health is the principle of interdisciplinary mobilization and cooperation for the purpose of controlling some of these emerging zoonoses. One health means, I am a veterinarian I'm not just restricted to my field, there will be need to cooperate and collaborate with other people in the different professions that have to do with zoonotic management and so, looking at sharing of information, by the time you are confronted with an emergency, basically the knowledge gained from information sharing will help you to be able to appropriately and efficiently manage zoonotic emergencies.

Research that brings them together - This subcategory gives explanation on the factors that can motivate health professionals share knowledge. Participant 18 said *"…and then if there is a research that brings them together of course…,*

Monthly meeting - This subcategory explains the factor that can motivate health professionals share knowledge. Participant 21 said thus; if *we can have a meeting, a monthly meeting or quarterly meeting with the veterinary doctors…*

Common data base - This subcategory explains the factor that can motivate health professionals share knowledge. Participant 15 sums it this way

…in the area of technology there should be a common data base where professionals can have access to information. You see, the epidemiology unit of the ministry of health, every week send me reports of disease situation in Nigeria. So, you see, that is a way of sharing information. It's a network that brought us together and so through the platform we were able to exchange addresses, whatever is the disease situation, weekly disease situation in Nigeria is being sent to veterinarians, the laboratory scientist and other colleagues in the hospital. So, I think it's a good idea. Once you have a platform like that, it helps others to upload information that will benefit other people.

4.5. 2: Adequate Funding

Funding (3/52: 5.76%) category contains narratives related to funding as a motivation to share knowledge by health professionals in managing zoonotic diseases. It contains one subcategory namely funding for research (3/52: 5.76%).

Funding for research - This subcategory gives explanation on funding as a factor that can motivate health professionals share knowledge on zoonotic disease management. Participant 14 explains:

> *Definitely, these days you don't get funding for research except you collaborate with more of different professionals especially internationally. Like I said, internationally they appreciate this fact. So, if you want to get international funding from America, from Europe, you need to let them know, Look, I'm a human doctor but in my team, I have a veterinary doctor who is going to handle zoonotic aspect for me. You can see, so they are ready to…*

Still narrating on funding as a motivator Participant 15 said *... once there is proper funding, the professionals will be motivated to share information.* In a similar way Participant 26 added by saying "*you see in Nigeria today we talk about funding. Well, when it comes to funding, that is the real motivation, you need to be motivated to do research through funding, and so funding is another factor."*

4.5.3: Professional Ethics

Professional ethics (2/52: 3.85%) category includes narratives on professional ethics as a motivation for knowledge sharing among health professionals on zoonotic disease management. It covers two subcategories i.e. Professional ethics (1/52: 1.92%); The support of the allied health workers (1/52: 1.92%)

Professional ethics as a motivation for knowledge sharing among health professionals is observed from this statement by Participant 9 ". *It is part of the call of what health professionals' do-sharing knowledge and information".* Similarly, Participant 11 said this "*one other factor that motivates us to share knowledge is the professional ethics. If you understand the ethics of your profession, you can hinge on that, anything you do to be a better professional cannot be wished away. If we understand that it will help us".*

The support of the allied health workers as a stimulus for knowledge sharing among health professionals is observed for this statement by Participant 17 *"... you need the support of the allied health workers and that can motivate you to share knowledge".*

4.5.4: Good policy guideline

Good Policy guideline (3/52: 5.76%). This category includes narratives on Good policy guideline as a motivation for knowledge sharing among health professionals on zoonotic disease management. It covers one subcategory i.e. Good policy guideline (3/52: 5.76%)

Good policy guideline as a motivation for knowledge sharing on zoonotic diseases is captured from the following narratives by three Participants; Participant 3 has this to say "*... if government policies are properly drafted so that there will be cooperation and collaboration between professionals, it can motivate. So, good policies that are encompassing will also motivate cooperation and collaboration"* Participant 17 added that *"... beyond here, talking about policy, one person doesn't take decisions… the policy maker has got a role because it is the policy that, at the end of the day, will guide us towards this thing".* In the same way Participant 26 said *"There should be a good policy that will encourage interdisciplinary work"*

4.5.5 Organizational Support

Organizational support (5/52: 9.62%) category consists of narratives on organizational support as a driver for knowledge sharing among health professionals in managing zoonotic

diseases. It covers five subcategories: Administrative interest (1/52: 1.92%) Remuneration (1/52: 1.92%); Work condition (1/52: 1.92%); Availability of information (1/52: 1.92%); Job security (1/52: 1.92%)

Administrative interest as a motivation for knowledge sharing in zoonotic disease management among health professionals is seen from the narrative by Participant 17 thus;

...when the management or whosoever is in charge is interested in an area, then effort is being channeled, and it makes you see the reason why things should be done in that area; and when you know that your boss is interested, there is this loyalty to the cause, you are motivated…

Remuneration as an incentive for knowledge sharing in managing zoonotic diseases among health professionals is seen from the narrative by Participant 4 thus *...remuneration is key to it. If you don't have good remuneration, it's a problem. Without these, I don't think people will be motivated enough to handle some of these things… remuneration must be seen to be equal…*

Work condition as an encouragement for knowledge sharing in managing zoonotic diseases among health professional is seen from the narrative of Participant 7 "*I think paramount is the work condition of the health worker, the professional saddle with management of zoonoses control. If the work environment is satisfactory the welfare is properly taken care of, they have that sense of satisfaction, it helps them to collaborate"*

Availability of information as an encouragement for knowledge sharing in managing zoonotic diseases among health professionals is narrated by Participant 7 "*and also the availability of information to health professionals, current information, when you are vested with knowledge, there is that tendency that you will want to share, especially if it is current knowledge"*

Job security as a motivation for knowledge sharing in zoonotic disease management among health professional is seen from the narrative by Participant 7 "*Then job security too, when people are assured yes your job is secured and you can go and get knowledge and share with others, it encourages them to share"*

4.6: Factors limiting knowledge sharing among public health professionals in managing zoonotic diseases in Plateau State, Nigeria

This objective of the study sought to determine the factors that limit knowledge sharing among public health professionals in the management of zoonotic diseases. Six categories emerged from the narratives from the participants of this study namely; Negative Traits, Professional Dichotomy, Mono-disciplinary training, Lack of Policy, Lack of Funds and Leadership Issues

Table 4.6: Factors that limit knowledge sharing among Public health professionals in managing zoonotic diseases

Research Question	Categories	Sub-Categories	Freq	Percentage
What are the factors that limit knowledge sharing in managing zoonotic diseases?	1. Negative traits	1.1 Superiority and inferiority	5	9.80
		1.2 I know it all	1	1.96
		1.3 Ego	1	1.96
		1.4 Arrogance	1	1.96
		1.5 Parochialism/Narrow mindedness	1	1.96
		Group Total	**9**	**17.64%**
	2. Professional Dichotomy	2.1 Protecting your professional group	4	7.84
		2.2 Professional Bias	1	1.96
		2.3 Professional Rivalry	4	7.84
		2.4 Its just our area	1	1.96
		2.5 Professional Dichotomy	2	3.96
		Group Total	**12**	**23.53%**
	3. Mono Disciplinary Training	3.1 Narrow-based training	1	1.96
		3.2 Agencies are specialized	2	3.92
		Group Total	**3**	**5.88%**
	4. Lack of adequate Policies	4.1 Lack of Policies	3	5.88
		Group Total	**3**	**5.88%**
	5. Lack of funds	5.1 Not willing to provide funds	2	3.92
		Group Total	**2**	**3.92%**
	6. Leadership Issues	6.1 Leadership Issues	1	1.96
		Group Total	**1**	**1.96%**
		Grand Total	**30**	**58.82%**

4.6.1: Negative Traits

Negative traits (9/51: 17.64%). This category consists of narratives on negative traits that hinder knowledge sharing among health professionals on zoonotic disease management. It covers

three subcategories namely; Superiority and inferiority (5/51: 9.80); I know it all (1/51: 1.96%); Ego (1/51:1.96%). Arrogance (1/51: 1.96%); parochial or narrow minded (1/51: 1.96%).

Superiority and inferiority as a hindrance for knowledge sharing in managing zoonotic diseases among health professional is seen from the narrative by Participant 4 "*The major factor that limits this issue of sharing are this issue of superiority and inferiority complex. Somebody will tell you, "What do I have to do with veterinary medicine?" So, if you do not drive away this issue of selfishness, superiority and inferiority complex, you will never have it".*

In a related manner Participant 8 said this "*There are social status interpretation issues …there is a foundational problem with inferiority or superiority complex".*

Participant 19 also expressed this

Like I said, it's largely from the fact that we are not putting heads together for whatever reasons. Either for superiority or inferiority as the case might be. Probably the physician might feel too big to refer to a fellow professional in the veterinary profession. Not even to talk of the lab scientists or lab technician to try to seek for information… possibly the other one feels more superior than the other in knowledge or the other person feels inferior … so these are some of the factors that can actually give rise to situations like that.

In line with this statement, Participants 22 and 1 said this respectively "*In some aspects when there is a team, there is a little superiority complex that comes up. Doctors say they have put so many years in the school to become what they are; how can they come and give somebody the leadership? (Participant 22)"* "*you know, that human tendency of feeling more important than the other person is a major problem and that is wrong indoctrination that this profession is better (Participant 1)"*

I know it all as a limitation for knowledge sharing in managing zoonotic diseases among health professionals is seen from the narrative of Participant 20 "*the feelings of 'I know it all'… People*

feel that their own is better than your own. That is another big factor that can hinder us from coming together to know as professionals.

Ego as a hindrance for knowledge sharing in managing zoonotic diseases among health professionals is seen from the narrative by Participant 8

> *So, some of the problems have to do with individual ego irrespective of profession… You can't take that away. Ego is a big problem. You have veterinary professionals and human medical professionals that are open-minded, but we have also people with ego and such people, whether you train them as veterinary or human doctors, the ego will exist, which will not allow them to effectively close the gap that is required in delivering health-care services to either our animals or human patients.*

Arrogance as a barrier to knowledge sharing in managing zoonotic diseases among health professional is seen from the narrative by Participant 3 *"One is arrogance. Arrogance, if we are arrogant, will make us feel that this is just my field so I see this factor as major hindrance to sharing knowledge".*

Parochial or narrow minded as an obstruction to knowledge sharing in managing zoonotic diseases among health professional is seen from the narrative by Participant 3 *"Parochial and narrow minded thinking that, this is my area but when it has to do with zoonotic diseases it is just beyond one person's area, so if we are narrow minded, we will not share information"*

4.6.2: Professional Dichotomy

Professional dichotomy (12/51: 23.53%) category consists of narratives on the separation that exist among health professionals on zoonotic disease management. It covers six subcategories namely; Protecting your professional group (4/51: 7.84%) Professional bias (1/51:1.96%) Professional rivalry (4/51:7.84%) It's just our area (1/51: 1.96%) Professional dichotomy (2/51: 3.92%)

Protecting your professional group captures narrative on domain protection that exists among health professionals on zoonotic disease management. Participant 2 captures it this way "*you still find out that people want to protect their territories, they see their profession as their territory and they don't want anybody to encroach"* In addition Participant 5 captures it this way "…*their response shows that they are aware, but there is some form of "Protectionist" and "isolationist". They want to protect their respective areas so that members of different professional groups would not veer into their own areas. This does not augur well for knowledge sharing"* Similarly Participant 12 said *"we have this attitude that, this is my corner, everybody wants to be at his corner and secure and protect his corner…"* In line with this, Participant 17 said this *"even among the human medical profession we are having inter-disciplinary problems, not to talk of outside that…talking about crossing over to the veterinary medicine. So, humanity is such that everybody more or less wants to protect his domain. It has not been helping actually".*

Professional bias captures narrative on prejudice that exists among health professionals on zoonotic disease management. Participant 21 said

> *Sometimes professional bias, people will think this is for us we don't need any other person to come into it. The veterinary doctor will think this is my profession, any other profession should not come into it, and it's my work, so that they will not take up our job. It's not supposed to be like that. It's supposed to be an effort together to manage the zoonotic diseases.*

Professional rivalry captures narrative on jealousy that exists among health professionals in managing zoonotic diseases. Participant 6 said this "*There is professional rivalry. This put some kind of restrictions on our ability to interact"* In addition Participant 8 said this "*there are professional rivalry issues; we believe that people should not take over our job so there are people who are overly protective of what they believe is their job description*…" In the same way,

Participant 16 says "…*one of the factors mostly that I have seen is professional rivalry. It makes people not to share knowledge because he feels as if he does, other professionals will go and begin to practice it"* Participant 17 added with this statement *"health professionals can't shy away from that, there is inter-professional rivalry"*

It's just our area as a limitation for knowledge sharing in zoonotic disease management among health professional is seen from the narrative by Participant 18 thus "*I have said initially that people tend to want to maintain their own professional area"* In the same manner Participant 31 narrated this "*Yes, I think that we need to have a team approach because so far everybody seems to be doing his own work separately but if we come as a team and we have all these sub specialists working together…"*

Professional dichotomy as a factor that limit knowledge sharing in managing zoonotic diseases among health professional is captured from this narrative by Participant 7

> *Well, historically, there was nothing like veterinary or human medicine. The history of medicine started with people doing what is called comparative medicine. Scientists looked at animals; study the animals and they try to extend their findings to humans. It is as time progressed that there was this dichotomy; human and veterinary medicine. Even in the early 19 centuries, scientists have realized that this dichotomy and this so-called specialization are working against them. So currently at the global level there is the move to bring back again all health professionals to one.*

In a related way Participant 22 said this *"In my opinion, they have some level of unity among them, yet if you go deep inside you find professional dichotomy in the hidden aspect".*

4.6.3: Mono-disciplinary training

Mono-disciplinary training (3/51: 5.88%) consists of narratives on the nature of training that health professionals receive that limits knowledge sharing in managing zoonotic diseases. It

covers two subcategories namely; Narrow based training (1/51:1.96%) agencies are specialized (2/51: 3.92%)

Narrow based training as a factor that slows down knowledge sharing in managing zoonotic diseases among health professional is captured from this narrative by Participant 10

> *Well first and foremost, for me personally, I think it's the kind of training that we receive in Nigeria. Historically, our training has always been boxed up. Everybody is in his own box but the world has moved on, because you know, like I said, it's becoming smaller and smaller. Our universities need to start looking at training in a way that professionals will overlap. Before students graduate, they are able to see the interface with other professions. So these are the areas where I think in knowledge sharing, the difficulties begin from the kind of training that we get.*

Agencies are specialized as a factor that hinders knowledge sharing in managing zoonotic diseases among health professional is captured from this narrative by Participant 10

> *…on the third level when we come to recruitment, I'm talking about government agencies, sometimes because agencies are specialized, ministries are specialized we tend to forget, overlook the fact that other professionals can come in and make a contribution on what is happening there whether it is health agency, a veterinary agency. When you are doing research and it is multi-disciplinary, it becomes more robust and you are able to see from a wider perspective what is going on because nature does not occur in a vacuum.*

In a related development Participant 4 said this

> *Like, for example, in the whole of this National Veterinary Research Institute (NVRI), Vom, the only human doctor we have is the one we brought from the Federal College, for treating human cases. But does it mean that we cannot see things from this. In any veterinary medicine conference, you hardly see human doctors there, and in any human medicine*

conference, you hardly see veterinary doctors there. But there is supposed to be a linkage.

4.6.4: Lack of Policy

Lack of policy (3/51:5.88%) consists of narratives on the absence of policy for bringing health professional together for knowledge sharing on zoonotic disease management. It covers one subcategory namely; Lack of policy (3/51: 5.88%)

Lack of policy as a factor that restricts knowledge sharing in zoonotic disease management among health professional is captured from this narrative by Participant 3 "*... if policies are also not properly put right then there will be no encouragement for people to want to share with the other professionals. So, policies being properly put will help knowledge sharing among professionals"* In the same way Participant 7 said "*Sometimes its government policy; government policy sometimes can negate the sharing of information. When government tends to promote one aspect over another or when the government in their own right feels this group should do it without seeking consent of the professionals themselves...* In addition, Participant 21 narrated that "*No policy from the government, lack of good policies from the government…"*

4.6.5: Lack of Funds

Lack of funds (2/51: 3.92%) consists of narratives on the absence of funds to facilitate knowledge sharing among health professional in managing zoonotic diseases. It covers one subcategory namely: not willing to provide funds (2/51:3.92%)

Not willing to provide funds captures narrative on the unwillingness of government to provide funds to enable health professionals share knowledge on zoonotic disease management. Participant 17 captures it this way "*...and funding is also an issue, there is no motivation and materials are not there".* Supporting this assertion Participant 29 said

Governments are not willing, even some research institutions or academic institutions; are not willing to provide funds to train people. Once you cannot train people, you have no

knowledge to share. It is when you train people that you acquire knowledge to some depth and then you are ready to share but where there is no training and you are just clinging to your basic knowledge you become a local champion.

4.6.6: Leadership Issues

Leadership Issues (2/51:3.92%) consist of narratives on leadership contention among health professional on zoonotic disease management. It covers one subcategory namely leadership issues (2/51: 3.92%)

Leadership issues captures narrative on leadership infighting that exist among health professionals on the management of zoonotic diseases; Participant 8 said this

...we have leadership issues, for example we have what is called the Nigeria Center for Disease Control (NCDC), and you can't have two leaders at the same time. So, if they want to appoint a director for NCDC, veterinary doctors want a veterinary doctor to be appointed, human doctors want a human doctor to be appointed, pharmacist believes a pharmacist should be appointed, medical laboratory scientist will say our boss is good, he can do this job.

In addition, Participant 9 said *"...and then the availability of limited positions in relation to the fact that inter-disciplinary knowledge can create the fight for the limited available space"*

CHAPTER FIVE

DISCUSSION OF FINDING

5.1: Introduction

This chapter is presented under the following headings:

5.2: The perception of public health professionals about knowledge sharing in managing zoonotic diseases

In Plateau state, Nigeria, the perception of public health professionals about knowledge sharing in managing zoonotic diseases are; (1) Effective management of zoonotic diseases, (2) Knowledge gap exist (3) Conform to the notion of "One Health Initiative", (4) Save the lives of humans.

Public health professional's perception about knowledge sharing is for the effective management of zoonotic diseases. This finding indicated that health professional's perception about knowledge sharing is for the effective management of zoonotic diseases**.** This perception about knowledge sharing for the effective management of zoonotic diseases is rooted in the desire of public health professionals to reduce the negative impact of these diseases in humans in terms of morbidity and mortality. Suffice to say that the effective management of diseases that are of public health importance will require well organized surveillance programmes, well defined epidemiological knowledge of local public health problems; availability of public health educational materials and programmes for extension; ease in electronic access to science-based current public health information sources; availability of suitably trained individuals at all levels; and availability of public health infrastructures (WHO, 2003; Karshima, 2012; Zhang, Yu, Fan, and Duan, 2013). However, no matter how well organized the training programmes, surveillance programmes, or health infrastructures are; achieving effective management of zoonotic diseases will also depend on the attention paid on knowledge sharing by public health professionals. The

management of zoonotic diseases in Nigeria is said not to be effective because public health professionals do not pay attention to multidisciplinary knowledge sharing.

It is gratifying to note that all the three public health professionals have positive perception to multidisciplinary knowledge sharing as a tool for effective management of zoonotic diseases. Veterinary, Medical and Environmental health professionals are communities of practice that are interdependent and possess an overlapping knowledge on health-related issues. Health professionals' positive perception of knowledge sharing will facilitate the absorptive on external knowledge. Acquiring knowledge from external knowledge base of health professionals will increase the efficiency in management of zoonotic diseases.

In line with this, Kahn (2006) affirmed that the importance of physicians and veterinarians' cooperation in the effective management of zoonotic diseases cannot be sufficiently stressed. Rapid communication and cooperation between public health professionals and public health departments is the most critical component in the effective management of zoonotic diseases. Cripps (2000) also stated that facilitating communication and collaboration between veterinary, public health and agricultural personnel will help in the approach and control of zoonotic diseases in an efficient and effective way as possible.

Similarly, Public Health England [PHE] (2009) affirmed that robust investigation and management of potential zoonotic investigations is paramount and requires close collaboration between various governmental and non-governmental agencies and other professionals. Inter-sectoral collaboration demonstrated itself as a need and a very important tool for the prevention and control of emerging zoonotic diseases. In line with this, Scheftel, Elchos, Cherry, DeBess, Hopkins, Levine… Silvia (2010) stated that Veterinarians are accessible, expert sources of information regarding zoonotic diseases and participate fully in biomedical research as principal investigators, collaborators with unique insights into comparative medicine, experts in the

assessment of clinical outcomes in animals. Veterinarians therefore, possess qualities which can be directed to the investigation and management of zoonotic disease in human. The Physicians on the other hand, control zoonotic diseases through proper clinical diagnosis and treatment of infectious diseases of humans. While the environmental health professionals focused on sanitation, hygiene, consequences of blocking water ways with refuge. These actions effectively controlled many significant communicable pathogens (Eisenberg *et al*., 2007 as cited in Karshima, 2012). The interdependence of animal life, human and non-human alike creates many common interests in health-related issues between veterinary, human and environmental health. Based on this, Day (2016) said that health professionals have many opportunities to partner on this shared problem and promote the well-being of humans and animals. It is therefore, expected that health professionals work together increasingly to solve these disease problems that affect both animals and humans. Knowledge gained from one species often benefits another, since both humans and animals suffer from many of these diseases. When health professionals from the various expertise work together toward a common goal of controlling zoonotic diseases, they achieve excellence and with more impact than something done in isolation.

Public health professionals' perception about knowledge sharing is that knowledge gaps exist among health professionals in managing zoonotic diseases. This finding shows that knowledge gaps exist among health professionals in managing zoonotic diseases. Knowledge gap is about the disparity in levels of knowledge in professionals which limits the ability to reach an effective conclusion about a broad range of issues (Tran, 2013). The knowledge gaps that exist in managing zoonotic diseases occurs between what health professionals know about zoonotic diseases within the context of their professional training and what they need to know about zoonotic diseases from other health professionals. Therefore, acquiring knowledge from other health professionals to fill such a gap is about incorporating knowledge which a professional or an

organisation currently lacks but is identified to be critically important for its survival and growth (Haider and Mariotti, 2010). The importance of identifying and filling knowledge gaps has been recognized to be an important factor in the survival and growth of alliances.

The inability of public health professionals to engage in active knowledge sharing in order to fill these gaps is perceived as one of the leading factors to the continuing slow pace in overcoming the challenges in managing zoonotic disease. Nonetheless, the management of diseases that are of public health importance by public health professionals will require that the knowledge gaps be closed. The exploitation of the knowledge of other health professionals will complement and fill the knowledge gaps in managing zoonotic diseases.

It is worthy to note that public health professionals in this study were positive that sharing knowledge will close the knowledge gaps that exist. Health professionals were of the opinion that knowledge required in the management of zoonotic diseases be shared, so that professionals are able to understand zoonotic diseases from a wider perspective.

The importance of identifying and filling knowledge gaps which is critically important in managing zoonotic diseases and also for the survival and growth of an organization have been discussed for decades by scholars. Murphy (1998) noted that many elements contribute to the emergence of new zoonotic disease. As a result, medical scientists studying any of the elements may be unaware of key research done by veterinary scientists studying a similar element. Similarly, National Research Council (2005) stated that the interactions of the intrinsic and extrinsic factors that lead to emergence of new disease are poorly understood among public health professionals. Individual researchers address various diseases relatively independently and which are usually closely related in other specialties. It is therefore, viewed that the scientific understanding of any one of these disciplines is incomplete for a holistic understanding

particularly with regard to knowledge relevant to the management of zoonotic diseases in animals and human, therefore, the need for public health professionals to interact with each other.

In the context of knowledge management literature, knowledge exchange within professionals and inter-professionals generally involve networks of members. Knowledge may be acquired from the experiences of others, or organizational repository (Baird and Henderson, 2001). Seeking and obtaining knowledge from others encompasses common practices such as benchmarking, forming joint ventures, and networking, making strategic alliances, and working with other important stakeholders. This strategy is effective in narrowing "knowledge gaps" within professionals. With a decrease in knowledge gaps among health professionals, Häsler, Cornelsen, Bennani, Rushton (2014) affirmed that it will result in improved diagnosis of diseases, more information and insights, comparative medicine i.e. the cross-fertilisation of veterinary and human medical disciplines, new skills and experience and capacity building.

Public health professional's perception is that knowledge sharing conforms to the notion of "One Health" Initiative. Findings in this study indicate that knowledge sharing among health professionals conforms to the notion of "One Health Initiative". The "One Health initiative" is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment. It is a platform for improving health in the broadest sense in a cost-effective fashion. This requires cross disciplinary partnerships and cooperation among a diverse arena of professionals such as veterinarians, physicians, ecologists, sociologists, economists and public health professionals (The One Health Initiative 2008; Zonootic and Emergency Disease ZED Group, 2017).

In addition, the One health initiative is achieved through: Joint educational efforts among human medical, veterinary medical schools, and schools of public health; Joint communication efforts in journals, at conferences, and via allied health networks; Joint efforts in clinical care

through the assessment, treatment and prevention of cross species disease transmission; Joint cross- species disease surveillance and control efforts in public health; Joint efforts in better understanding of cross- species disease transmission through comparative medicine research; Joint efforts in the development and evaluation of new diagnostic methods, medicines and vaccines for the prevention and control of diseases across species and; Joint efforts to inform and educate political leaders and the public sector through accurate media publications (One Health Initiative, 2008). The three health professionals consider the initiative as a significant step in the prevention and control of zoonotic diseases, which gives an appealing motivation for knowledge sharing.

On the other hand, Kaplan and Echols (2009) noted that the One Health initiative is a global strategy that is expanding within public health and academic circles. Even though, it is not widely known among practicing physicians, veterinarians, news media, or the general public. Once fully implemented, the synergism achieved will advance health care for the 21st century and beyond by accelerating biomedical research discoveries, enhancing public health efficacy, expeditiously expanding the scientific knowledge base, and improving medical education and clinical care. Seeking essential practicable "out of the box" scientific knowledge will most likely require a merging of various perspectives from within human and veterinary medical disciplines as well as others.

Public health professional's perception about knowledge sharing is an approach to save the lives of humans. This finding indicated that public health professionals consider knowledge sharing as an approach to save the lives of humans. This finding indicates that health professionals recognised the negative consequence of zoonotic diseases on humans in terms of morbidity and mortality and are willing to share knowledge to curtail the diseases. Six out of every ten known infectious diseases in people are spread from animals, and three out of every four new

or emerging infectious diseases in people are spread from animals (CDC, 2017). These have resulted in the death of over 14 million people annually of global population (WHO, 2000).

It is heartwarming to know that public health professionals have positive perception that sharing knowledge among health professionals will reduce the high rate in deaths from zoonotic diseases. Health professional collaboration from all points of view will promote the health of humans, animals and the environment. Fortunately, most zoonotic diseases can be avoided with proper prevention measures and maintenance of optimum health in humans and animals. From the perspective of each of these professionals, there are measures to be taken to minimize the spread of the diseases. These measures could be targeted at human, animals and the environment. The effectiveness of these depends largely on communication among health professionals, stakeholders and with the larger society.

5.3: The absorptive capacity of public health professionals in managing zoonotic disease

Absorptive capacity is about how external knowledge is acquired. External knowledge refers to knowledge that resides outside professional domain or knowledge base. Therefore, in order to determine the absorptive capacity of public health professionals in managing zoonotic diseases; the following sub question was asked: How do Public health professionals acquire external knowledge in managing zoonotic disease?

In Plateau state, Nigeria, Public health professionals acquire external knowledge in managing zoonotic disease: (1) By belonging to multidisciplinary networks and Professional associations and attending Seminars, Workshops, Symposia and Conferences; (2) By consulting books, journals, and internet databases and (3) During work routines and processes.

Public health professionals belong to multidisciplinary networks and Professional associations and attend Seminars, Workshops, Symposia and Conferences for acquiring external knowledge in the management of zoonotic diseases. Findings in this study indicate that the veterinary professionals, medical professionals and environmental health professionals acquire knowledge beyond their professional discipline i.e. outside their professional domains and knowledge base in managing zoonotic diseases. Sources of acquiring external knowledge include multidisciplinary networks and professional associations where public health professionals acquire external knowledge. Multidisciplinary networks refer to the coming together of several disciplines to talk about issues on a topic or problem from each of their perspectives. Examples of such networks include: The One Health Network (American Veterinary Medical Association [AVMA], 2008); Wildlife Disease Association (WDA, 2018); Global Adhoc Committee for Lyme disease and Borreliosis, (CDC (2013); Nigeria Conservation Foundation (NCF, 2018); Public Health Association of Nigeria (SPHPN, 2012.), International Society for Infectious Diseases (ISID, 2017), Biosafety team (National Biosafety Management Agency, 2015).

The fact that public health professionals belong to multidisciplinary networks and professional associations to acquire external knowledge is not new in the literature, it is in line with the concept of Community of Practice (CoP). CoP refers to a group of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Brown; Chartrand; Lambert; Nicholas; Wolfe, 2003). It is an avenue where members provide an opportunity for mutual engagement by means of a discussion forum with professionals actively sharing knowledge and in so-doing developing their competencies together.

Closely related to CoP is Professional Networks which are networking as a deliberate activity to build, reinforce and maintain relationships of trust with other professionals in order to

advance professional goals. Professional networks form an important channel of knowledge acquisition and in this case external knowledge **(**Hermanrud, 2009**)**.

Other than Multidisciplinary Networks and professional associations, Seminars, Symposia and Conferences and Workshops are other avenues where public health professionals acquire external knowledge. Seminars, Symposia and Conferences are important forms of knowledge acquisition, because these are meetings in which professionals receive knowledge and training in a particular subject. One good thing about Seminar, Symposia and Conferences is that people acquire knowledge in regards to one single issue that is either conceptual in nature or theoretical. A properly organized Seminar, Symposia or Conferences offer attendees a wealth of knowledge in one place in a condensed period of time. People who attend Seminars, Symposia and Conferences learn new ideas and skills to help them improve their productivity.

Beside Seminars, Symposia and Conferences, health professionals also attend workshops for hands-on experience and practical application of techniques and skills and development of creative solutions with other professional groups especially during outbreak of zoonotic diseases.

Seminars, Symposia, Conferences and Workshops provide dynamic and stimulating group learning process (Goldman, Cohen, and Sheahan, 2008). The trend in learning activities is now for people to interact with their peers and share knowledge. Thus, deriving benefit from each other's views and experiences (Brown; Chartrand; Lambert; Nicholas; Wolfe, 2003). Seminars, Symposia, Conferences and Workshops also establish relationships among scholars and actors which will in turn promote future collaborations that support research and education in the subject area (Krishi Gobeshona Foundation, 2017)

Knowledge sharing is both social and individual. Engaging in multidisciplinary networks and professional associations, seminars, symposia, conferences, and workshops, promotes learning and innovation. It is a fora where professionals share knowledge with others who are passionate

about the same topic. In return, they learn from others knowledge and experience. The result could be developing a unique, action-oriented perspective.

Public health professionals consult books, journals and internet databases as sources for acquiring external knowledge from allied discipline in managing zoonotic diseases. Findings in this study indicate that the veterinary professionals, medical professionals and environmental health professionals acquire knowledge from external knowledge source in managing zoonotic diseases. These knowledge sources include books, journals, and internet databases.

Books are tremendously important as sources of information for professional knowledge in health and medical field. They provide structure and substance for scientific communities; both communities within scientific practice and communities of scientific interest that extend beyond the professional scientific world. Books drive public discussion because of the multiple roles they play in providing knowledge, engaging lay expertise, and contributing to public discussion thus contributing to the intellectual development of science itself (Lewenstein, 2007).

Similar to books, Journals are found to be an invaluable source of external knowledge for health professionals; usually by reporting new research. Articles in scientific journals are mostly written by active scientists thereby providing in-depth perspectives on intriguing contemporary issues in this case zoonotic disease. Journal publication offers comprehensive analysis on a single topic, examining it from inter-disciplinary perspective. Even though journals are quite expensive, it is worthy to note that professionals in this study went out of their way to source for journals from libraries, through subscription and consulting with friends. Articles in these journals have had a remarkable improvement on the research activities among health professionals. While journals are good for enabling research and improving productivity among health professionals, it

also brings some challenges to health professionals in the process. For example: Libraries are facing the challenge of hard print journal subscription for institutions of learning.

Beside books and journal, Internet database are other channels where public health professionals acquire external knowledge. Internet databases are specially designed website that brings information from diverse sources. They are usually referred to as research gateway. Most of them are multidisciplinary in nature capturing both books and journal publications. Examples are Access to Global Online Research in Agriculture **(**AGORA, 2003**);** Hinari Access to Research for Health Programme (WHO, 2002), OARE - Access to Research in the Environment 2006); ARDI - Access to Research for Development and Innovation ARDI, 2009). Internet databases are mostly provided to health professionals through institutional subscription or individual subscription. It is quite expensive for an average institution or individual professionals to subscribe to an online database; however, Institutions and individual professionals in this study went out of their way to subscribe for online database from the internet. It is worth noting that online databases are extremely important; these databases broaden the perspective of public health professional's knowledge on epidemiology thereby having a huge influence on their research findings.

The use of knowledge resources is not new in library and Information Science literature **(**Tenopir, 2003**;** Ugah, 2008**;** Chimah, and Nwokocha, 2013; Onye, 2016). Health professionals draw knowledge from knowledge sources outside their professionals' knowledge domain in managing zoonotic diseases.

Public health professionals acquire external knowledge for managing zoonotic diseases during work routines and processes with other public health professionals. Findings in this study indicated that professionals managing zoonotic diseases sometimes found themselves working with other health professionals either solo or collaboratively. In the process of performing

their job, they intermingle with each other and that provides a perfect platform for the acquisition of external knowledge.

Routines and processes as a backbone for daily knowledge acquisition is not new in the literature (Lazaric 2000; Nathalie 2011**;** Ivna, Fabiane and Andréa 2017). Routine and processes indicated a high significance of knowledge integration and knowledge creation processes **(**Okhuysen and Eisenhardt 2002). Immeasurable routines transform organizational inputs into outputs and are an important component of organizational learning processes **(**Levitt and March, 1988). Routine and processes that are fit to organisational demands focus on exploration of knowledge; nonetheless routines and processes may lead to poor performance if the organisation suffers from the inability to coordinate its routines and processes effectively or experiences excessive bureaucratization.

Acquisition of external knowledge that is critical in managing zoonotic disease is in line with Zahra and George (2002) who extended the concept of Absorptive capacity to include Potential and Realized Absorptive Capacity, each consisting of two sub-elements. Potential ACAP consist of knowledge acquisition which refers to a firm's capability to acquire externally generated knowledge that is critical to its operations. Secondly, there is assimilation capability which refers to the firm's routines and processes that allow it to analyze process, interpret and understand the information obtained from external sources (Zahra and George, 2002). The concept of Potential Absorptive capacity (PACAP) has been discussed for decades by scholars (Tribó and Fosfuri, 2008**;** Kamal, and Flanagan, 2014**;** Albort-Morant, Henseler, Cepeda-Carrión, and Leal-Rodríguez, 2018). These literatures described Potential Absorptive capacity (PACAP) as the firm receptive to acquiring and assimilating external knowledge for innovative purpose.

In conclusion three critical issues appeared relevant to this discussion

A prerequisite for knowledge acquisition in building absorptive capacity has to take cognisance of knowledge sharing. This implies that health professionals be open towards knowledge sharing. Thus, the process of building absorptive capacity can be described as: Openness towards knowledge sharing: a precondition for knowledge acquisition. This broadens the absorptive capacity as well as creates new knowledge. These steps have a positive impact on the innovative performance of the health professionals. Arrow (1999) (as cited by Cummings Jeffrey, 2003) stated that "countries and firms must be open to new ideas, have multiple sources of new ideas, and see that ideas are diffused" if they are to achieve economic development and growth. Acceptance of and competition among new ideas is what allows organizations and their nations to remain on the creating rather than on the destructing end.

Secondly health professionals need to realize that external knowledge is critical to increasing the existing knowledge base of the individual professional and the organization/Institution. Therefore, they should constantly strive to expose themselves to relevant external knowledge.

Thirdly, health professionals need to realize that workplaces, intra- and inter organizational networks/associations are invaluable platforms where valuable knowledge is created and shared. This is particularly relevant in the Nigerian context where working and learning are seen as separate phenomena. Heads of organizations and institutions need to increase the support base to enable health professionals interact with other health professionals within and outside their organization/institution.

5.4: Factors that motivate public health professionals to share knowledge in managing zoonotic diseases

In Plateau state, Nigeria, factors that motivate public health professionals to share knowledge in managing zoonotic diseases are; (1) Forum to share knowledge (2) Adequate Funding (3) Professional Ethics (4) Good Policy guidelines (5) Organizational support

Public health professionals consider forum to share knowledge as a motivation for knowledge sharing. Health professionals consider forum for knowledge sharing as a great motivator for knowledge sharing in managing zoonotic diseases. Forum that motivate public health professionals to share knowledge include; interdisciplinary conferences, the laboratory setting, public health and veterinary public health training programme, research that brings professionals together and monthly meetings.

Interdisciplinary conferences as a motivator for knowledge sharing is a place where professionals from both specialized and different disciplines; microbiologists, nurses, veterinarians, physicians, laboratory technicians, environmental scientist make presentations; interact and share knowledge freely without any profession feeling superior or inferior to the other. This kind of forum with time will bring professionals closer and closer and the need to interact will become more visible and the conflict between one group and the other will be reduced. Interdisciplinary conferences are similar to multidisciplinary networks and professional associations discussed earlier on research question 2.

Beside interdisciplinary conferences, health professionals stated that the laboratory setting is a good motivator for knowledge sharing. A medical laboratory or clinical laboratory is a setting where clinical investigation/tests are usually done on specimens in order to obtain information about the health of a human patient and animal patient as pertaining to the diagnosis, treatment, and prevention of diseases. The laboratory setting creates interplay between the veterinarian, the

laboratory scientist, the microbiologist, the physician and other health professionals as the case may be. It is therefore, a good setting for knowledge sharing. That interface in the laboratory is suitable for professionals to interact.

Closely related to this is the public health and veterinary public health training programmes as another motivator for knowledge sharing. On the professional level, the public health on the human side and the veterinary public health is an established forum for knowledge sharing; where there will be merging of ideas on zoonotic disease issues. Public health and veterinary public health training programme is an organized training facilitated by Center for Disease Control (CDC) Nigeria under the umbrella of Nigeria Field Epidemiology and Laboratory Training Program (NFELTP) unit where different health professionals come together to study. This collaborative forum was introduced to address the increasing threat of zoonotic and epizootic diseases in Nigeria. NFELTP is a two-year competency –based training programme modeled on CDC's epidemic intelligence service model. It trains medical epidemiology residents, public health laboratory residents, and veterinary epidemiology residents from all over the country to address the ever-growing threats of zoonotic and epizootic diseases to improve public health. The aim is to develop a public health work force capable of performing outbreak investigation, epidemiology research and surveillance and also to increase collaboration and strengthen linkages among epidemiologist and laboratory from human and animal health sector in the context of one health (Mukanga, Namusisi, Gitta, Pariyo, Tshimanga, Weaver, Trostle, 2010).

Beside Public health and veterinary public health training programmes as a robust motivator for knowledge sharing, professionals also cited a common database on infectious disease information as a motivator for knowledge sharing. In this era of technology, a common data base on infectious diseases where professionals can have access to information is critical for knowledge sharing. The epidemiology unit of the ministry of health is building up such database with weekly

reports of disease situation in Nigeria which it sends to participating professionals. Through this platform, professionals exchange email addresses; weekly disease situation in Nigeria are sent to veterinarians, laboratory scientists and other health professionals in the hospitals and research institutes. A database of this nature helps professionals to upload information that will benefit other health professionals.

Similarly, health professionals cited joint research projects as a motivator for knowledge sharing. Joint research projects refer to a partnership between 2 or more professionals with common research themes working together cooperatively over a project while exchanging opinions from their professional standpoint of mutual equality. This type of forum has mutual merits, and facilitates effective knowledge sharing. It is therefore, possible to expect higher efficiency and synergistic effects in comparison with independent research.

This response shows that health professionals recognised the importance of fora for external knowledge acquisition that will generate valuable insight through meaningful collaboration on issues in zoonotic disease management. Noorderhaven and Harzing (2008) stated that social interaction between managers from different units of a multinational corporation was shown to be an important factor stimulating intra- multinational knowledge sharing. Face-to-face social interactions form a communication channel particularly conducive to the transfer of tacit, non-codified knowledge. Intensive social interaction also provides opportunities for social construction of knowledge in a learning dialogue.

Scholars have discussed the concept of knowledge sharing fora in knowledge management literature **(**Chalkiti and Sigala, 2008a; Chalkiti, Kalotina and Sigala Marianna, 2008b; Gluch; Johansson; Räisänen 2013**;** Mairs; McNeil; McLeod; Prorok; and Stolee 2013**;** Wang, Wang, Li, and Fan, (2014)**).** These literatures described Knowledge sharing fora as a common meeting point for a community and a medium for exchanging and sharing knowledge and learning. A major function of

discussion fora is to support problem solving where professionals educate themselves or seek solutions to problems.

Public health professionals consider adequate funding for research and training as a motivation for knowledge sharing. Health professionals in this study perceived that adequate funding for research and training is a motivating factor for multidisciplinary knowledge sharing in managing zoonotic diseases. Adequate funding is a sign of commitment to multidisciplinary knowledge collaboration on zoonotic disease by the health sector and the government.

Thus, adequate funds need to be dedicated to multidisciplinary teams and need to be sustainable. This is because complex interdisciplinary research projects increasingly need to be tackled through multi-institutional proposals which bring together the necessary expertise to address challenging research problems. Multi-institutional research proposals have the potential to demonstrate the excellence of their proposed approach through research projects, training programmes, field trips, and peer review publications which will require adequate funding. Other areas that may require funding include; adequate funding for resources in terms of well-equipped libraries, longer-term funding to build infrastructure and facilities for effective operations.

Public health professionals consider Professional ethics as a motivation for knowledge sharing. Findings revealed that health professionals in this study consider professional ethics as a motivation for knowledge sharing in managing zoonotic diseases. Professional ethics refers to the personal and corporate rules that govern behavior within the context of a particular profession (Your Dictionary online, 2018). Professional ethics in the health sector provide for collaborative work which includes knowledge sharing with other health professionals in order to protect and promote the health and wellbeing of patient and the wider community through disease prevention, control and education (Council for Allied Health Professions, 2016). Consequently, public health professionals consider the support of allied health workers in knowledge sharing as a motivator to

share knowledge. This response indicates that health professionals understand the ethics of the profession and cling to that to share knowledge with other health professionals in managing zoonotic diseases.

Public health professionals consider a good working policy as a motivation for knowledge sharing. Findings in this study revealed that a good policy guideline by the public health professional bodies for multidisciplinary team work is a motivator for knowledge sharing among health professionals managing zoonotic disease. A policy is a set of basic principles and associated guidelines, formulated and enforced by a governing body of an organization, to direct and limit its actions in pursuit of long-term goals. Health professionals' approach to knowledge sharing will be positive when a comprehensive policy to support knowledge sharing is in place.

In line with this, Policy Framework and Standards (2017) affirmed that policy guideline promotes information sharing to achieve better outcomes for clients between government agencies; suggests processes for overcoming barriers to sharing information; and provides information handling standards to safeguard clients and officers. In like manner, OECD (2013) stated that policy bridges the gaps between different disciplines in a team, as well as manages and conveys corresponding uncertainties. These policies and procedures form part of the overall operational guide of each multidisciplinary team. Not only is this policy a written record of agreed protocols, it is essential for the training and induction of new team members.

In addition, policy guidelines affect so many facets of multidisciplinary collaboration such as definition of roles, rights and responsibility of health professionals, understanding of how to carry out these responsibilities; allocation of resources across the different health sectors, leadership appointment, composition of training and emergency response team. This finding supports the assertion by NASCIO (2007) that to begin and sustain successful cross-boundary collaboration, there must be sound policy in place. The challenge lies in bringing together all stakeholders and

determining a clear working relationship for collaboration. This is because the policy and standards in place may affect the level of interoperability between the two or more entities involved. Similarly, Nolte (2005) highlighted several aspects of inter disciplinary collaboration in health care and found that common element of collaboration is found in its policy document which include; team's approach to service delivery, increased emphasis to health promotions and prevention, funding formula for service and programs. However, there are many instances in which collaboration begins without this careful consideration.

Public health professionals consider organisational support as a motivation for knowledge sharing. The findings of this study show that organizational support in multidisciplinary teamwork has a positive impact on knowledge sharing in managing zoonotic diseases. Organisational support refers to the value an organization places on the contributions of her members, provides care about their well-being and fulfils their socio-emotional needs. Organisational support also include those implicit, unstated aims of organisations which reflect the common interests of its members in terms of career development, status and power. When an organisation, supports multidisciplinary knowledge work, resources will be channelled towards that. In this way, professionals will see the need to get involved, and there will be loyalty to the cause. However, if a professional has an interest in multidisciplinary work and it is not the priority of the organisation or the employer, the effort will be fruitless. A key factor in the retention and engagement of employees appear to be the alignment of employee interests with organisational interests so that employees are aware that their interests will be served much better by contributing toward the organisation's interests.

Scholars over the decade have shown that organizational support is critical for the success of knowledge management and knowledge sharing initiatives (Fowler, 2009; Ryan, Windsor, Ibragimova, and Prybutok 2010; Muneer, Iqbal, Khan and Long, 2014). Organization support in the

area of remuneration, work condition, availability of information and job security are critical success issues that play important roles in defining the relationships among health professionals and in turn, providing possibilities to knowledge sharing. Organizations therefore, need to harness employee knowledge not only to stay competitive, but also to become innovative through a supportive organizational climate that can bring its entire organizational learning and knowledge to bear on any problem, anywhere in the world, at any time (Gupta, Iyer, Aronson, 2000)

5.5: Factors that limit knowledge sharing among Public health professionals in managing zoonotic diseases

In Plateau state, Nigeria, factors that limit knowledge sharing among Public health professionals in managing zoonotic diseases are; (1) Professional dichotomy (2) Negative traits (3) mono-disciplinary training (4) Lack of policy (5) Lack of funds (6) Leadership Issues

Public health professionals consider professional dichotomy a limiting factor for knowledge sharing. Findings in this study revealed that professional dichotomy among health professional limits knowledge sharing in managing zoonotic disease. Professional dichotomy refers to the division among health professionals that have presented the health profession as though entirely separate entity. This has resulted to professional bias and unhealthy rivalry among health professionals. They are a major cause for the weakness in multidisciplinary teamwork. The key drivers of this unhealthy relationship among health professionals in Nigeria include among others the struggle for superiority over others; parochial and narrow mindedness and the disparity in remuneration of health workers.

The professional dichotomy among health professionals has generated a lot of discussion by several authors. Comrade Faniran Felix Olukayode, President, Nigeria Union of Allied Health Professionals (NUAHP), stated that team spirit among health professional has been destroyed by this rivalry; patients in hospitals cannot get the best health care services. Secondly, collaborative

research among public health professionals has remained minimal or impossible (Ogundipe and Obinna 2014a). In line with this, a former Minister of Health, Prince Julius Adelusi-Adeluyi, noted that synergy among health professionals would ensure that the health sector attains its potential. However, he stated that the animosity among health professionals was not unfounded as developments over the years have pitted the different groups against one another (Alekhuogie, 2017)

Similarly, a former Nigerian Minister of Health, Prof. Eyitayo Lambo, described rivalry and bickering among the health professionals as a beauty contest that has led to lost of lives and waste of resources in the health sector (Adebayo, 2017). An effective team work among health professionals is recognized as an essential tool for patient-centered health service delivery, and the process of providing health care is interdisciplinary requiring health professionals to work in teams.

However, lack of team work has led to poor coordination of patient care, poor ultilisation of health care services, patient dissatisfaction, medical errors which often result to patient mortality. Ogundipe and Obinna (2014b) stated that the healthcare is increasingly a team concept and multidisciplinary where each stakeholder contributes to a pooled effort to achieve desired outcomes. The reoccurring rivalries in the health sector are avoidable or can be minimized because the wealth of a nation is measured by how healthy the citizens are. The rivalries in the health sector have major consequences on the economy of the nation particularly the increase in mortality and morbidity.

Public health professionals consider mono-disciplinary training as a limiting factor for knowledge sharing. Findings in this study revealed monodisciplinary training as a limiting factor for knowledge sharing among health professionals managing zoonotic diseases. This indicates that the health professional training is narrow based involving a single academic

discipline that is targeted at humans or animals where every professional body is confined to that small area of discipline. However, research studies across the globe are increasingly drawing on knowledge and expertise outside of one main discipline (Ilter, 2017).

It is worth mentioning that human and veterinary medicine have a strong cultural background with many subject matters in common, unfortunately the undergraduate and postgraduate education programme (with few important exceptions) do not offer training in inter professional collaborative skills as a determining factor that will integrate all health professionals (Mantovani, 2008). This means that public health professionals trained to be medical doctor; learn to treat, manage, cure and prevent disease in human patients; while a veterinary doctor learns to diagnose disease in animals, treat, vaccinate, cure where possible; and an environmental specialist do advocacy visit, do surveillances without drawing knowledge and expertise from other public health professionals.

To support this, a former Nigerian Minister of Health, Prof. Eyitayo Lambo, in a symposia entitled Health of the Nation: The imperative of inter professional collaboration" called for inclusion of inter professional collaborative skills in curriculum. The minister stated that the demand for healthcare is increasing; the resources are limited so there is the need to find a new way of meeting this demand and one of the ways that is being proposed is inter professional collaboration. With inter-professional collaboration the weak health system that results in poor health status will be addressed and at the same time improve the health outcome (Akinloye, 2017) There is therefore, the need to include inter-professional collaboration in the educational training programmes for the various professions.

In conclusion, zoonotic diseases are distinct and are cross species diseases, their prevention and control will require unique strategies, based more on collaborative research and training than

on a mono-disciplinary approach. Such strategies require that a cadre of career-committed professionals with a holistic appreciation of several medical and biological sciences be trained.

Public health professionals consider lack of policy a limiting factor for knowledge sharing. Findings in this study revealed that lack of policy guideline by public health professionals for multidisciplinary team work is a limiting factor for knowledge sharing among health professionals managing zoonotic diseases. The absence of knowledge sharing policy appears to act as a significant barrier to knowledge sharing among public health professionals on zoonotic diseases management; making it difficult for health professionals from the different health sectors to come together on a round table on zoonotic disease cases with the benefit of the full spectrum of relevant perspective and expertise, which permits full consideration of potential outcomes of decisions taken. The effectiveness of multidisciplinary teams is limited unless there is a clear guiding principle of inter-professional working.

Public health professionals consider lack of funds a limiting factor for knowledge sharing. Findings in this study revealed that lack of funds for multidisciplinary knowledge sharing is a limiting factor for knowledge sharing among health professionals managing zoonotic diseases. The extent to which multidisciplinary collaborative programme are achieved depends largely on the financial provisions supporting it. Good as the concept of multidisciplinary knowledge sharing is to the management of zoonotic diseases; inadequate funds will result in less comprehensive knowledge collaboration from a full team of public health professionals. Adequate funding is therefore, necessary for knowledge collaboration to be achievable.

However, to mitigate the effect of inadequate funding for multidisciplinary knowledge sharing, government must build the political will to fund and strengthen multidisciplinary collaboration among health professionals. Secondly, health professionals need to develop joint funding streams from human, animal and environmental health sectors to support integrated

veterinary and public health disease detection, prevention, and response programs. Health professional bodies and policy makers need to provide economic incentives, social support, and communication strategies that encourage early disease reporting and control efforts in animal populations. For example, there is need to provide appropriate compensation and important social support when animal populations must be gathered, and offer vaccines and other veterinary services to reward early reporting.

Public health professionals consider leadership issues a limiting factor for knowledge sharing. Findings in this study revealed that Leadership Issues is a limiting factor for knowledge sharing among health professionals in managing zoonotic diseases. Contention and struggle over leadership position is affecting multidisciplinary knowledge collaboration in zoonotic disease management. The availability of the limited positions in relation to inter-disciplinary teams, for example, the Nigeria Center for Disease Control (NCDC), has only one position for a leader at a time and there can't be two leaders at the same time. So, if the government wants to appoint a director for NCDC, veterinary doctors want a veterinary doctor to be appointed, human doctors want a human doctor to be appointed, pharmacists believe a pharmacist should be appointed; medical laboratory scientists will want a medical laboratory scientist to be appointed. This has always been a matter for contention among public health professionals.

Several studies contended that leadership appears to be a determinant of team success (Misiolek and Heckman, 2005). Contention over leadership position among multidisciplinary teams can easily give rise to conflicts between them; hence, a clear mechanism for leadership conflict resolution with a well-thought-out strategy are required and preferably through multi-professional consensus. Having such clear mechanisms will result in less conflict. Such mechanism may include leadership succession plan from among multidisciplinary teams (Byrne 2005).

However, one major factor identified in the literature that is the cause of leadership conflict in a multidisciplinary team is lack of a clear strategic plan for leadership succession (Deloitte Development LLC, 2013)**.** For a succession plan to be successful there must be a strategic plan for succession which supports the organization's vision. Therefore, to avoid leadership conflict, agencies responsible for the conduct of interdisciplinary health professionals must ensure they have the appropriate succession plans in place to avert potentially negative impact of leadership changes.

In another development, Ogundipe and Obinna (2014c) stated that leadership of a team must be earned through demonstration of skills, competence, and humility that is the hallmark of international best practice. According to Morrison, (2016) leadership competencies are leadership skills and behaviors that contribute to superior performance benchmark. By using a competency-based approach to select leaders, both organizations and the employee benefit. However, in an event of conflict, Burns, (2004) (as cited in Barbra and Mutswanga (2015) suggested the recognition of some authority structures to resolve disagreements may be necessary.

5.6: Constructs of "reciprocity" and "trust" of social exchange theory explaining the perception of public health professionals about knowledge sharing in managing zoonotic disease

Blau's (1964) theory of social exchange suggests that "reciprocity" and "trust" influences an individual's knowledge sharing behavior. Findings of this study indicate that Blau's (1964) theory can explain perception of public health professionals about knowledge sharing in managing zoonotic diseases. For instance, Blau's concept of reciprocity refers to a set of socially accepted rules regarding a transaction which a party extending a resource to another party obligates the latter to return the favour. This definition captures three major components of reciprocity namely,

obligations in exchange, expectations from exchange and benefits of exchange. These three major components are explained below in relation to the findings of this study.

Obligations in exchange. According to Blau (1964) Obligations in exchange refers to the act of giving a favor to others legally or morally. There is a moral obligation to exchange resources. Consequently, in Plateau State, Public health professionals consider knowledge sharing a moral choice on issues pertaining to management of zoonotic diseases. Moral obligation to share knowledge feature prominently as a theme in the course of interaction with participants of this study. Public health professionals felt obliged to share knowledge because they consider it a responsibility. A veterinary health professional asserted that he has the responsibility to share knowledge with other health professionals outside his field of knowledge so that they can prevent zoonotic diseases. This response indicates that moral obligation to share knowledge is rooted in the desire to prevent zoonotic diseases through collaborative endeavour with other public health professionals (Refer to Table 4.3. pg. 56).

Expectations from exchange. According to Blau (1964) Expectations from exchange connote future returns for contributions between exchange partners. Accordingly, in Plateau State, Public health professionals expect future contributions to knowledge from other health professionals outside their field of knowledge when they share knowledge. Expectations from other health professionals when knowledge is shared were expressed in the course of interaction with participants of this study. A medical health professional stated that he expects knowledge in return for the knowledge shared because it will help raise his intellectual capacity and develop competence in managing zoonotic diseases (Refer to Table 4.3. pg. 56). This response shows that health professionals recognised the fact that knowledge gap exists and this gap can only be closed when they receive knowledge in return from other health professionals.

Benefits of exchange. Benefits of exchange according to Blau (1964) are rewards and resources gained from exchange. Thus, in Plateau State, public health professionals anticipate some benefits when knowledge is shared with other health professionals. Benefits of knowledge sharing emerged under various themes during the course of interaction with participants of this study. A medical health professional and an environmental health professional stated that if health professionals share knowledge with other health professionals outside their field of knowledge, human lives will be saved (Refer to Table 4.3. pg. 56).

Apart from reciprocity, trust can also explain the perception of public health professionals about knowledge sharing in managing zoonotic diseases. Blau (1964) stated that trust is a necessary feature of all social relations. Trust is referred to as that willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor (Mayer *et al*., 1995). Trust as a theme feature prominently in the course of interaction with Participants of this study. A Veterinary health professional said that "trust is important in relationship because if there is no trust, there won't be any relationship...if health professionals trust one another; they will be able to freely share knowledge about zoonotic diseases and how to manage it (Refer to Table 4.3. pg. 56). This response shows that trust increases the confidence of health professionals in the desire to share knowledge in managing zoonotic diseases.

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CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of the study, summary of the major findings, the conclusion and the recommendations. The chapter is presented under the following headings:

6.2 Summary of the Study

6.3 Summary of the major finding

6.4 Contributions to Knowledge

6.5 Limitations of the Study

6.6 Conclusion

6.7 Recommendations of this study

6.8 Suggestion for further studies

6.2: Summary of the Study

The main objective of this study was to explore the determinants of multidisciplinary knowledge sharing in managing zoonotic diseases in Plateau state, Nigeria. Chapter one presented the research problem and research questions to achieve the five specific objectives of the study. The chapter also discussed the significance of the study and the scope of the study.

Chapter two presented the literature review which discussed the theoretical framework in detail. Constructs from Social Exchange Theory was used to explain the perception of public health professionals about knowledge sharing in managing zoonotic diseases. The chapter also discussed the research paradigm and previous studies that adopted Social Exchange Theory as a framework.

The study adopted the qualitative research methodology and a qualitative case study research design in chapter three. Thirty (30) participants were interviewed during the oral interview and 9 for the focus group discussion. The data collected were subjected to qualitative content analysis as contained in Chapter three of this study.

Qualitative content analysis was achieved as contained in Chapter four of this study. Discussion of findings of this study was carried out in detail in this chapter.

Chapter five of this study contained the summary of the study and the major findings. The conclusion of the study and recommendations of this study were based on the major findings. The chapter also contained the contributions to knowledge, the limitations of the study and suggestion for further studies.

6.3: Summary of the Major Finding

1. The perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau state are: Effective management of zoonotic diseases; Knowledge gap exist; Conform to the notion of One Health Initiative; and Save the lives of humans.
2. Public health professionals acquire external knowledge in managing zoonotic disease through; belonging to multidisciplinary networks and Professional associations and attending Seminars, Workshops, Symposia and Conferences; Consulting books, journals, and internet database; and During work routines and processes with other health professionals.
3. Factors that motivate public health professionals to share knowledge in managing zoonotic diseases in Plateau state are: Forum to share knowledge; Adequate Funding; Professional Ethics; Good Policy guidelines; and Organizational support

4. Factors that limit knowledge sharing among Public health professionals in managing zoonotic diseases in Plateau state are: Professional dichotomy; Negative traits; mono-disciplinary training; Lack of policy; Lack of funds; and Leadership Issues
5. The two Constructs “reciprocity” and “trust” of Social Exchange Theory explained the perception of public health professionals about knowledge sharing in managing zoonotic diseases.

6.4: Contributions to Knowledge

1. This study uncovered the perception of public health professionals about knowledge sharing in managing zoonotic diseases, which include; effective management of zoonotic diseases, Knowledge gap exist among Health professionals, conform to the notion of “One Health Initiative”, and save the lives of humans. This is a positive attitude towards the effective management of zoonotic diseases.
2. The study revealed three major sources for acquisition of knowledge by Public health professionals in managing zoonotic disease. These are; by belonging to multidisciplinary networks and Professional associations and attending Seminars, Workshops, Symposia and Conferences, by consulting books, journals, and internet databases and during work routines and processes with other health professionals.
3. This study uncovered the factors that motivate public health professionals to share knowledge in managing zoonotic diseases which include; Forum to share knowledge, Adequate funding, Professional ethics, Good policy guidelines, Organizational support
4. This study uncovered the factors limiting knowledge sharing among Public health professionals in managing zoonotic diseases. These are; Professional dichotomy, Negative traits, Mono-disciplinary training, Lack of policy, Lack of funds and Leadership Issues.

5. A conceptual framework for Knowledge Sharing and Absorptive Capacity in Managing Zoonotic Diseases (See fig 2, p.155) was developed from the findings of this study.

6.5: Limitations of the Study

This study encountered some limitations. First, the researcher focused on the special challenges of employing a qualitative approach in writing this thesis. Qualitative research requires a different set of skills and offered some special challenges because of its nature and scope. It was a rigorous experience learning the skills and putting it down as it is required. Secondly, conducting interview for the individual participants and focus group discussion was time consuming and financially burdensome as well. Thirdly, the analysis was done manually. Manual coding is tasking and time consuming particularly when a researcher has to deal with large amount of qualitative data, however, the whole exercise is highly rewarding.

6.6: Conclusion

The following conclusions are drawn from this study that explored the determinants of multidisciplinary knowledge sharing among public health professionals in managing zoonotic diseases; first, this study has established that participants have positive perception about knowledge sharing in managing zoonotic diseases in Plateau state. This positive perception is rooted in the desire of public health professionals to reduce the negative impact of zoonotic diseases and to fill the knowledge gaps that exist among public health professionals in managing zoonotic diseases.

Secondly, the study revealed three major sources for acquisition of knowledge by public health professionals; by belonging to multidisciplinary networks and professional associations and attending seminars, workshops, symposia and conferences; by consulting books, journals, and internet databases and during work routines and processes with other health professionals. The

integration of knowledge is critical in managing zoonotic diseases as it will broaden the perspective of public health professionals on infectious diseases affecting man, animals and the environment.

Thirdly, Participants consider factors such as; Forum to share knowledge, Adequate funding, Professional ethics, Policy, and Organizational support as motivating for multidisciplinary knowledge sharing. The approach to multidisciplinary knowledge sharing will be positive when these factors are adequately in place. In addition, that will also result to a robust investigation of potential zoonotic diseases in Plateau state.

Fourth, the study uncovered factors that limit knowledge sharing among public health professionals in plateau state. These factors constitute major setback in managing zoonotic diseases in Plateau state.

The study finally established that two constructs of Social Exchange Theory explained the perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau State.

6.7: Recommendations

Based on the findings, the following recommendations were made:

1. The Veterinary Council of Nigeria (VCN), Medical and Dental Council of Nigeria (MDCN) and Plateau State Ministry of Health should take advantage of the positive perception of public health professionals about knowledge sharing on zoonotic diseases, by strengthening the capacities in the human and animal health sectors and also create the mechanism necessary to effectively share knowledge in order to detect and respond to emerging health threats of zoonotic diseases.
2. The concept of “One Health” is on the front burner between the veterinary and medical health professions, therefore, making policy that will enhance its operation in Nigeria

should be pursued with rigour by the Veterinary Council of Nigeria (VCN) and Medical and Dental Council of Nigeria (MDCN).

3. Adequate funding for multidisciplinary teams is a good motivator for knowledge sharing. The Nigerian health policy makers, Veterinary Council of Nigeria (VCN), Medical and Dental Council of Nigeria (MDCN) and Plateau State Ministry of Health should consider this as an important impetus for achieving an effective management of zoonotic diseases**.**
4. Nigerian universities need to expand the curriculum for the undergraduate and postgraduate programmes in a way that veterinary, medical and environment health professionals' training will overlap. In addition, all categories of public health professionals should be encouraged to participate in the Nigeria Field Epidemiology and Laboratory Training Program (NFELTP). The training will model a public health system that is prepared to address the ever-growing threats of emerging and re-emerging zoonotic diseases.
5. Government agencies like National Veterinary Research Institute, Vom, Jos University Teaching Hospital and Plateau State Hospital should expand their knowledge base by integrating other categories of public health professionals for a wider perspective on zoonotic diseases (e.g., rabies, lassa fever and toxoplasmosis). These public health professionals will make meaningful contribution to the mission and mandate of health agencies.
6. The Veterinary Council of Nigeria (VCN), Medical and Dental Council of Nigeria (MDCN) and Plateau State Ministry of Health should provide a clear policy guideline on establishing stronger connection among the different public health professionals in terms of training and capacity development. In addition, a clear mechanism for leadership succession among multidisciplinary teams is necessary to minimize leadership crisis in the health sector.

7. The Nigerian Veterinary Medical Association and the Nigerian Medical Association should jointly float a journal that will feature zoonotic diseases and other related issues. This platform will nurture reciprocity and trust among public health professionals, since the editorial board will consist of professionals in both fields. `.

6.8: Suggestions for further studies

1. Research question 2 focuses on absorptive capacity in line with Zahra and George (2002) specifically on acquisition sub-element of Potential absorptive capacity (PACAP), there is therefore, the need for an in-depth study on acquisition and assimilation capabilities on external knowledge by Public health professionals. Since workshops, seminars and conferences are forum for knowledge acquisition, there is no research on assimilation capabilities of Veterinary health professionals attending workshops, seminars and conferences organised by the Medical health professionals, there is the need for further research on assimilation capabilities of health professions during workshops, seminars and conferences organised by allied health professionals in Plateau State, Nigeria.
2. More so, further study could also investigate the impact of transformation and exploitation of external knowledge on zoonotic diseases by Public health professionals in Plateau State, Nigeria.
3. There is also the need for comparative study on the absorptive capacity of Veterinary Doctors and Medical Doctors on zoonotic diseases in Plateau, State, Nigeria.

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APPENDICES

APPENDIX I

Interview Protocol

Introduction

My name is Lydia Endaben Lakan, I am a postgraduate student in Library and Information Science Department, Ahmadu Bello University Zaria; and would like to interview you as part of my dissertation **"Exploring knowledge sharing in managing zoonotic disease among public health professionals in Plateau State, Nigeria".**

The estimated duration is 1hour. Confidentiality is ensured as all the data and information gathered will be kept in confidence and will be used for scholarly purpose only. All responses will be recorded on a tape.

.

Interview Guide

Introduction

i. Which profession do you belong to?
ii. How long have you served in your profession?

Sub Question 1:

a. Please share with me the perception of public health professionals about knowledge sharing in managing zoonotic diseases?

b. Please, kindly share with me the view of public health professionals on the importance of multidisciplinary knowledge sharing in managing zoonotic diseases?

c. In your opinion, what is the relevance of knowledge sharing in collaboration in managing zonootic diseases management?

Sub Question 2:

a) Can you please share with me your absorptive capacity i.e. the ability to acquire knowledge from external sources/other public health professions outside your expertise in managing zoonotic diseases?

b) Please share with me how public health professionals acquire external knowledge in managing zoonotic disease?
c) What multidisciplinary teams and or training programmes have you been involved in that enables you acquire knowledge from other professionals (in Nigeria or abroad) outside your expertise?
d) What routine activities do you do that enables you acquire knowledge from other public health professionals outside your expertise?
e) What other avenue do public health professionals acquire external knowledge in managing zoonotic diseases?

Sub Question 3:

1. In your opinion, what are the factors that motivate (encourage) public health professionals to share knowledge in managing zoonotic diseases with other public health professionals?

Sub Question 4:

1. In your view, what are the factors limiting (restricting) knowledge sharing in managing zoonotic diseases by public health professionals?

Sub Question 5:

1. Can you please explain your feeling of obligation to share knowledge when you receive knowledge on zoonotic disease from other public health professions in managing zoonotic diseases?
2. Please share with me your expectations when you share knowledge on zoonotic disease with other public health professions in managing zoonotic diseases?
3. Let us talk about the benefits in knowledge sharing among public health professions in managing zoonotic diseases?
4. What is your understanding that trust relationship will contribute to achieving effective management of zonootic diseases among public health professions?

APPENDIX II

CONSENT FORM

As a participant in the study "Exploring Knowledge Sharing in Managing Zoonotic Diseases among Public Health Professionals in Plateau State, Nigeria", I understand the general nature, purpose and procedure for data collection as explained to me by the researcher. I equally understood that the information generated as a result of my participation in the study will not reveal my identity and will be strictly used for research purpose only.

The estimated duration is 1hour. Confidentiality is assured as all the data and information gathered will be kept in confidence and will be used for scholarly purpose only. All responses will be recorded on a tape.

I hereby give my consent for a tape recording of individual/focus group interview with the researcher.

Participant's signature/Date ----------

Date schedule for interview ----------

Lydia Endaben Lakan

Researcher's signature /Date

National Veterinary Research Institute, Vom
Phone: 08033957914; 08021391927

APPENDIX III

Table 1: Illustrative quotes for each of the classification sub categories

S/NO	SUB CATEGORY	*ILLUSTRATIVE QUOTES*
	Research Question 1	
1.	Preventing zoonotic diseases	*"Sharing knowledge among health professionals is aimed at preventing zoonotic diseases"*
2.	Identify zoonotic disease	*""Identifying and understanding the root and how people get infected with zoonotic diseases is important…this can be done when we share knowledge".*
3.	Effective control	*"… if there is going to be an effective control of zoonotic diseases, it means health professionals must have to collaborate…"* *"…knowledge sharing between those that know these diseases in animals and those who are managing these diseases in humans will help in effectively controlling the infection. That's how important knowledge sharing is in mitigating zoonotic diseases".* *"When you share knowledge, especially in disease management, it helps in the effective control of such diseases… when you share common knowledge; it creates room for effective control of such diseases in a locality".*
4.	Combating these zoonotic diseases	*"Every professional is supposed to share knowledge in combating these zoonotic diseases because it will really go a long way"*
5.	Break the chain of transmission	*"The sole aim of knowledge sharing is to be able to break the cycle of transmission"* *"knowledge sharing among various health personnel is to ensure that we break the chain of transmission of zoonotic diseases"*
6.	For easy diagnosis	*"Information sharing is key because without it, you cannot diagnose. You diagnose disease based on the history of the cases, and the clinical signs of the case, so information must flow once you don't have information; there is nothing you can do"*
7.	Bringing the health professionals under one medicine	*"…Well, knowledge sharing is the key… there is the concept of "one world, one health". We're trying to bring the health professionals under one medicine, and that involves human health, animal health practitioners, and environmental scientists"*
8.	The one health concept	*"there is this concept of "one health", which means taking health in a holistic form; in its entirety, whether it affects animals, or whether it affects humans, or the environment … all these require that knowledge should be shared among these professional groups"* *"The concept of one health, one medicine comes into play when we talk*

		about knowledge sharing on zoonotic diseases and that is the central thing to do"
9.	There is limit to which the veterinary profession will be able to reach in tackling the disease condition	*… as I have earlier explained since this disease condition occurs both in human and animals; there is a limit to which the veterinarian can be able to reach in tackling the disease condition. While he is an expert in animal disease condition, the human medical doctor is an expert in handling diseases within the human beings.*
10.	Human doctor has a limited level of knowledge of animal diseases	*…the human doctor has a limited level of knowledge of animal diseases; if they want to know more about these diseases …they will have to contact the people who are really in it; like veterinarians know more about these diseases because this is their area*
11.	Knowledge gap exist.	*… Knowledge gaps exist, and these gaps can only be closed when there is communication…The way zoonotic diseases occur, no single professional group will claim exclusive reservoir of knowledge of how to handle it".* *"… nobody knows it all… if I am aware and you are not aware, and I try to enlighten you, that is part of sharing…I can see there is knowledge gap… outbreak of diseases that emanate among us the two professions have a say in it. The medical doctor and the veterinary doctor, if they come together, they will achieve a lot".*
12.	Each profession is insufficient in its own capacity	*"Each profession in zoonotic disease management is insufficient in its own knowledge capacity".*
13.	No profession is an island	*"The essence and relevance of knowledge sharing hinge on the fact that no man is an island, so the professionals involved; the veterinarians and human medical practitioners even the environmental scientists are needed in this type of work.*
14.	Save humans lives	*"it is very relevant to share knowledge, because the goal is to preserve human lives."* *"it is very relevant to share knowledge, because give or take the goal is to save humans on the earth, and to make sure human lives are still preserved because by the time you don't share knowledge and these diseases go on, human lives are lost, animal lives are lost; and most of the time zoonotic diseases are epidemic, and it's good we share knowledge"*
	Research question 2	
15.	Member of One Health Network	*'I attend the One Health Network meetings with different health professionals where I gain a lot of knowledge'* *'I am a member of the One Health Network',* *'I am a member of the One Health group, which have some professionals in attendance particularly from abroad';* *'I gain a lot of knowledge on zoonotic disease issues from the One Health Network meetings';* *I am a member of the One Health group, which entails my regular interaction and communication with other professionals for exchange of ideas and update of skills and research techniques.* *'I am a member of the One Health Network, where I gain a lot of knowledge. We have an e-mail group dedicated to "One health" where veterinary*

		doctor, bio-medical scientists, human doctor can register to be a member, that email group has discussion forum on one health issues'; *'I am part of One Health group which has different health professionals in attendance'* *'I attend the One Health Network meeting with other professionals';* *'I am a member of the multidisciplinary team called one health';* *I gain a lot of knowledge from the 'One health meetings with other health professionals.*
16.	Global Health Network	*'I belong to the Global Health Network where discussions on infectious diseases take place; It's a platform to enable research by sharing knowledge and methods. You can find many areas of interest within a specific research community of practice, there are also a vast array of resources to guide, train and support researchers. I acquire a lot of knowledge from this network*
17.	Wildlife Disease Association (Africa, Middle East and Asia region) –	*... this is an association dedicated to the study and understanding of the health of wild animals. 'I gain a lot of knowledge from the association. The knowledge has broadened my understanding on infectious diseases generally'*
18.	Global Adhoc Committee for Lyme and Borreliosis	*I am part of the Global Adhoc Committee for Lyme diseases and Borreliosis which seeks to improve the diagnosis and treatment of Lyme disease in human*
19.	Nigeria Conservation Foundation	*"I have acquired knowledge as a result of my membership of Nigeria Conservation Foundation (Nigeria). The foundation works to preserve the natural resources and biodiversity of Nigeria*
20.	Public Health Association (Nigeria)	*I belong to the public health association of Nigeria. It is a field that involves multidisciplinary approach.* *... I am a member of public health association of Nigeria. It requires regular interaction with other professionals for exchange of ideas and update of skills and research techniques.* *"I relate with other professionals as a member of public health association, the interaction is good.* *the public health association is a fora where knowledge from different health discipline is disseminated. It's an excellent forum for knowledge sharing.* *... I am a member of public health association. It's more like human health related association but there are other professionals as members. There is close collaboration among these professionals.*
21.	International Society for Infectious Diseases.	*... I am a member of International Society for Infectious Diseases. It is a scientific assembly for the exchange of research and clinical information of infectious diseases and works to control infectious disease outbreaks. Membership cuts across health care disciplines*
22.	International Society for Influenza and other Respiratory Diseases	*This is a field of public health promoting the prevention, detection, treatment, and control of influenza and other respiratory virus diseases. It works in collaboration with many health professionals, I have acquired a lot of knowledge as a member*
23.	Expert scientist on OFFLU (FAO-OIE) committee	*This is a global network of expertise on animal influenza working to reduce the negative impacts of animal influenza viruses by promoting effective collaboration between animal health experts and with the human health sector. As a veterinarian, I have gained a lot of knowledge from this platform*

24.	Tropical Council of Companion Animal Parasites-	*I am a member of Tropical Council of Companion Animal Parasite. Its mission is to report, direct and make best-practice recommendations to veterinarians and allied health professionals for the diagnosis, treatment and control of companion animal parasites in the tropics and sub-tropics with the aim of protecting animal and human health.*
25.	Biosafety team	*… Through my engagement in Biosafety team and Biosafety trainings/ workshop…it is a scientific discipline that serves the growing needs of biosafety professionals across the globe and provides fora for continued and timely exchange of biosafety information among health professional associations.*
26.	Intern Fellowship at the International Atomic Energy Agency in Vienna	*...IAEA internship programme provides opportunity for people studying to gain practical work experience in line with their studies or interests, and also expose them to the work of the Agency. It also works to obtain the assistance of qualified students specialized in various professional fields. I worked in the Siebersdorf laboratories with professionals of different backgrounds in terms of undergraduate training. I acquired a lot of knowledge from the training.*
27.	The African Field Epidemiology Network (AFENET).	*I am a member of the African Field Epidemiology Network (AFENET). It's a networking alliance of African Field Epidemiology (and Laboratory) Training Programs (FELTPs), and other applied epidemiology training programs. The Headquarters is in Kampala, Uganda with Seven AFENET-regional centre including Nigeria*
28.	Attending conferences of professional groups	*I have attended conferences organized by Christian veterinarian of Nigeria as a medical Doctor. I learnt quite a lot from them*
29.	Attending seminars, workshop and symposia with other professionals	*I have attended seminars, workshops and symposia that are multidisciplinary in nature e.g. Techniques in molecular biology and diagnosis of vector-borne disease at the Hebrew University Jerusalem, Israel; Current trends and emerging challenges of Vectors, Pathogens and Diseases in South Africa; also on* Remote sensing technologies in animal disease diagnosis and surveillance in Nigeria. *It has always been a rewarding experience interacting with other professionals.*
30.	Read a lot of journals and books on infectious diseases.	*I read wide. I read journals and books on infectious diseases. I try to get enough knowledge as I can, especially on zoonoses because it affects me directly* *…personally, I read journals on emerging zoonosis, whether in the medical journal or veterinary journal to update information on what is happening … look out for some of these new pathogens that have evolved and are causing new dimension of zoonotic problems, get updated on their management and the mechanism of transmission, the risk of exposure so that we can put in measures in our little way, to let people know what they need to do to avoid such risk.* *"…I am open to receiving knowledge from other sources like books, journals etc… that will improve my understanding of zoonotic disease in order to be effective in its management*

31.	I browse a lot of information from internet databases	*... the internet, has made life quite easy for us now; if you want to see how things are done in more developed areas, all you have to do is go into the internet ...all in order to improve your knowledge in solving zoonotic diseases.* *... I receive an average of one hundred emails per day, because I subscribe to a lot of sites including journals, I subscribe to a lot of journals on infectious diseases which I read.*
32.	I worked with animal scientist, worked with laboratory scientist and technician.	*"I have realized that there is an information overlap obvious between myself as a veterinarian and other professional colleagues that I work with and I have tried to learn from other professionals. I have worked with animal scientist, worked with laboratory scientist and technician, and each time I try to learn from them. There are some disciplines and some area that obviously I have not been exposed to and I feel working and learning from them will add to my understanding and enhanced my performance in my work as a veterinarian. I have also been privileged to travel out of the country and collaborate with bio-informatics, where data generated from my research output can be easily interpreted and I think I have gained from them. I have also worked with molecular biologist and I have learned techniques from them on how to run the programme. So, to some extent, I have tried to be open as much as possible to gain from other related professionals so as to be able to enhance my performance as a veterinary doctor in the control of zoonotic disease problems"*
33.	*I've been trained by veterinarians and non-veterinarians.*	*I do know this fact and I know that there are many people that are not in my profession that do know a lot about what I'm looking for. So, I just don't hesitate in going to them. I've been trained by veterinarians and non-veterinarians. I've been trained by biologists, by molecular biologists too. They know something that I don't know and I need it in my work so I go to them. I have also worked with medical doctors because I need an aspect from them to say about zoonotic diseases*
34.	I work with a lot of health professionals in ministry of health	*... I work with a lot of health professionals in ministry of health. The whole ministry of health with all the directorates is here, we have the public health comprising of all the environmental health, we have the community health, and we have the nurses and also doctors. I have learnt a lot from them*
	Research Question 3	
35.	Joint conferences	*I believe that if there can be a forum whereby you can have joint conferences between the different health professionals, microbiologists, veterinarians, physicians, laboratory technicians sitting under the same roof and sharing knowledge as a people belonging to the same family, then with time you will find out that it will bring people closer and closer and the need to interact will become more visible and the conflict between one group and the other will be reduced.*
36	The laboratory setting.	*The second level is in the laboratory, that is where the veterinarian or the physician and other health professionals can also come together to interact. If you are able to isolate for example a deadly zoonotic organism from an animal and you are able to link it to what is happening by isolating the same organism in a human; you see, that setting brings you together. So that interface in the laboratory is suitable for professionals to interact.*
37	Public health and veterinary public health.	*"On the professional level, the public health on the human side and the veterinary public health; so, I think there is already an established*

		position where there will be rubbing of minds where professionally, people can come together"
38	The One Health Programme	*...gradually the understanding is coming up... this concept of one health, you find out that people are gradually coming to work together. You find veterinarians working together with human doctors and human doctors collaborating with veterinarians and you have medical laboratory technicians too, the laboratory scientists also working in the area of disease diagnosis, human disease epidemiology and so on and so forth. So gradually, people are beginning to see the need to work together* *...there is an attempt by the Centre for Disease Control in Nigeria to come up with something that will involve both human and veterinary doctors, so if they go out for practical purposes, they go out together. What we are trying to do is to try and see what role the veterinarian has to play in the Ebola incidence, what role the veterinarian has to play in Lassa fever.* *"at the policy level, the government has begun a programme called Nigeria Field Epidemiology Training Programme which brings together these entire professional group and train them in the same classroom for a postgraduate master degree"* *...the principle of one health is the principle of interdisciplinary mobilization and cooperation for the purpose of controlling some of these emerging zoonoses. One health means, I am a veterinarian I'm not just restricted to my field, there will be need to cooperate and collaborate with other people in the different profession that have to do with zoonotic management and so, looking at sharing of information, by the time you are confronted with an emergency, basically the knowledge gained from information sharing will help you to be able to appropriately and efficiently manage zoonotic emergencies.*
39	Research that brings them together	*"...and then if there is a research that brings them together of course...,*
40	Monthly meeting	*if we can have a meeting, a monthly meeting or quarterly meeting with the veterinary doctors...*
41	Common data base	*...in the area of technology there should be a common data base where professionals can have access to information. You see, the epidemiology unit of the ministry of health, every week send me reports of disease situation in Nigeria. So, you see, that is a way of sharing information. It's a network that brought us together and so through the platform we were able to exchange addresses, whatever is the disease situation, weekly disease situation in Nigeria is being sent to the veterinarians, the laboratory scientist, and other colleagues in the hospital. So, I think it's a good idea. Once you have a platform like that, it helps others to upload information that will benefit other people.*
42	Funding for research	*Definitely, these days you don't get funding for research except you collaborate with more of different professionals especially internationally. Like I said, internationally they appreciate this fact. So, if you want to get international funding from America, from Europe, you need to let them know, Look, I'm a human doctor but in my team, I have a veterinary doctor who is going to handle zoonotic aspect for me. You can see, so they are*

		ready to…
		… Once there is proper funding, the professionals will be motivated to share information
		"you see in Nigeria today we talk about funding. Well, when it comes to funding, that is the real motivation, you need to be motivated to do research through funding, and so funding is another factor"
43	Professional ethics	*". It is part of the call of what health professionals' do- sharing knowledge and information"*
		"one other factor that motivates us to share knowledge is the professional ethics. If you understand the ethics of your profession, you can hinge on that, anything you do to be a better professional cannot be wished away. If we understand that it will help us".
44	The support of the allied health workers	*"... you need the support of the allied health workers and that can motivate you to share knowledge"*
45	Government policy	*"… if government policies are properly drafted so that there will be cooperation and collaboration between professionals, it can motivate. So, good policies that are encompassing will also motivate cooperation and collaboration"*
		"… beyond here, talking about policy, one person doesn't take decisions… the policy maker has got a role because it is the policy that, at the end of the day, will guide us towards this thing".
		"There should be a good policy that will encourage interdisciplinary work"
46	Administrative interest	*…when the management or whosoever is in charge is interested in an area, then effort is being channeled, and it makes you see the reason why things should be done in that area; and when you know that your boss is interested, there is this loyalty to the cause, you are motivated…*
47	Remuneration	*…remuneration is key to it. If you don't have good remuneration, it's a problem. Without these, I don't think people will be motivated enough to handle some of these things… remuneration must be seen to be equal…*
48	Work condition	*"I think paramount is the work condition of the health worker, the professional saddle with management of zoonoses control. If the work environment is satisfactory the welfare is properly taken care of, they have that sense of satisfaction, it helps them to collaborate"*
49	Availability of information	*"…and also, the availability of information to health professionals, current information, when you are vested with knowledge, there is that tendency that you will want to share, especially if it is current knowledge"*
50	Job security	*"Then job security too, when people are assured yes your job is secured and you can go and get knowledge and share with others, it encourages them to share"*

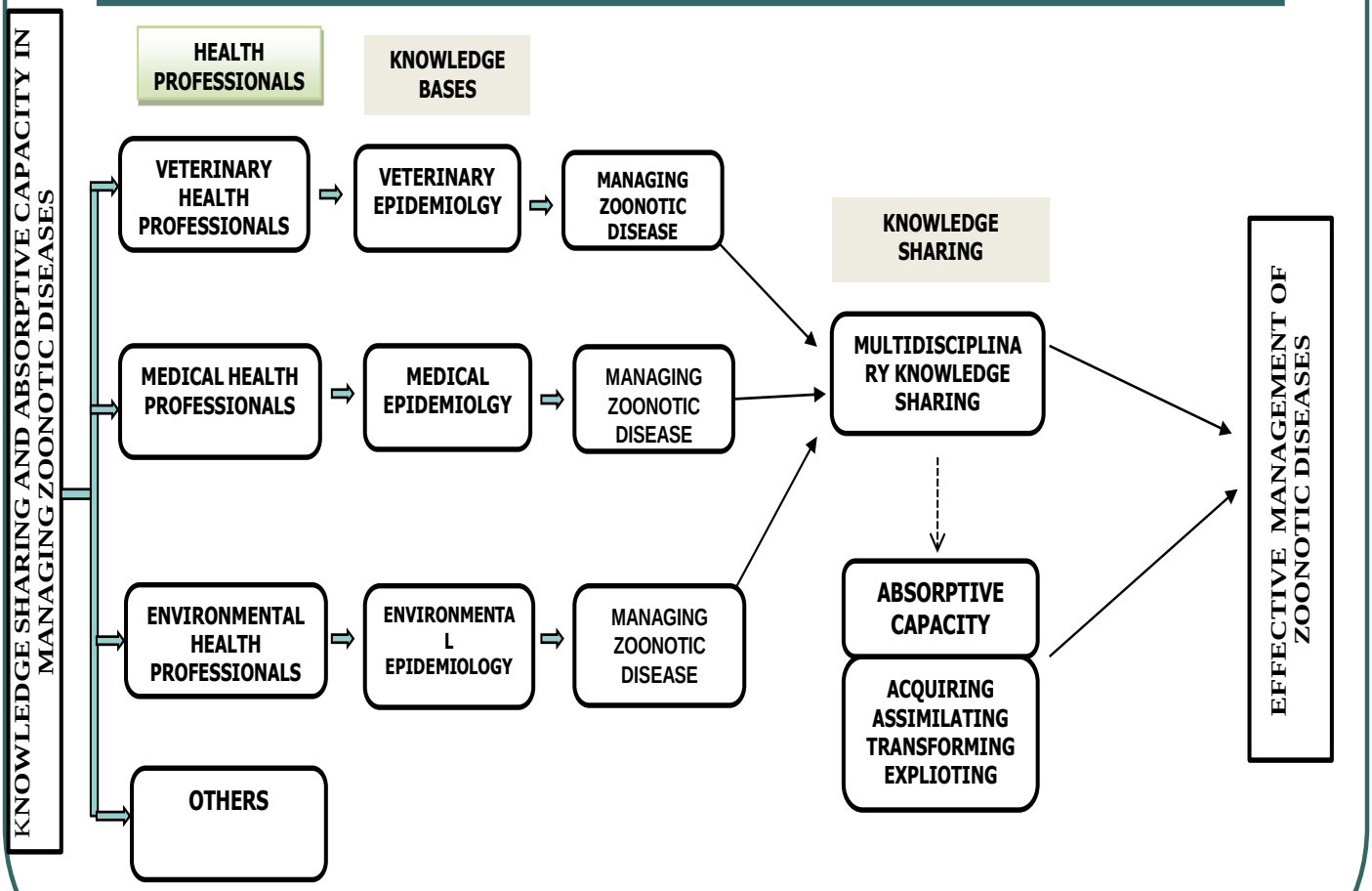
Research Question 4

51	Superiority and inferiority	*"The major factor that limits this issue of sharing are this issue of superiority and inferiority complex. Somebody will tell you, "What do I have to do with veterinary medicine?" So, if you do not drive away this issue of selfishness, superiority and inferiority complex, you will never have it".* *"There are social status interpretation issues …there is a foundational problem with inferiority or superiority complex".* *Like I said, it's largely from the fact that we are not putting heads together for whatever reasons. Either for superiority or inferiority as the case might be. Probably the physician might feel too big to refer to a fellow professional in the veterinary profession. Not even to talk of the lab scientists or lab technician to try to seek for information… possibly the other one feels more superior than the other in knowledge or the other person feels inferior … so these are some of the factors that can actually give rise to situations like that.* *"In some aspects when there is a team, there is a little superiority complex that comes up. Doctors say they have put so many years in the school to become what they are; how can they come and give somebody the leadership?"* *"you know, that human tendency of feeling more important than the other person is a major problem and that is wrong indoctrination that this profession is better"*
52	I know it all	*"…the feelings of 'I know it all'… People feel that their own is better than your own. That is another big factor that can hinder us from coming together to know as professionals.*
53	Ego	*So some of the problems have to do with individual ego irrespective of profession… You can't take that away. Ego is a big problem. You have veterinary professionals and human medical professionals that are open-minded, but we have also people with ego and such people, whether you train them as veterinary or human doctors, the ego will exist, which will not allow them to effectively close the gap that is required in delivering health-care services to either our animals or human patients.*
54	Arrogance	*"One is arrogance. Arrogance, if we are arrogant, will make us feel that this is just my field so I see this factor as major hindrance to sharing knowledge"*
55	Parochial or narrow minded.	*"Parochial and narrow-minded thinking that, this is my area but when it has to do with zoonotic diseases it is just beyond one person's area, so if we are narrow minded, we will not share information"*
56	Protecting your professional group	*"you still find out that people want to protect their territories, they see their profession as their territory and they don't want anybody to encroach"* *"…their response shows that they are aware but there is some form of "Protectionist" and "isolationist". They want to protect their respective areas so that members of different professional groups would not veer into their own areas. This does not augur well for knowledge sharing"*

		"we have this attitude that, this is my corner, everybody wants to be at his corner and secure and protect his corner *"even among the human medical profession we are having inter-disciplinary problems, not to talk of outside that… talking about crossing over to the veterinary medicine. So, humanity is such that everybody more or less wants to protect his domain. It has not been helping actually".*
57	Professional bias	*Sometimes professional bias, people will think this is for us we don't need any other person to come into it. The veterinary doctor will think this is my profession, any other profession should not come into it, and it's my work, so that they will not take up our job. It's not supposed to be like that. It's supposed to be an effort together to manage the zoonotic diseases.*
58	Professional rivalry	*"There is professional rivalry. This put some kind of restrictions on our ability to interact"* *"there are professional rivalry issues; we believe that people should not take over our job so there are people who are overly protective of what they believe is their job description…"* *"…one of the factors mostly that I have seen is professional rivalry. It makes people not to share knowledge because he feels as if he does, other professionals will go and begin to practice it"* *"health professionals can't shy away from that, there is inter-professional rivalry"*
59	It's just our area	*"I have said initially that people tend to want to maintain their own professional area"* *"Yes, I think that we need to have a team approach because so far everybody seems to be doing his own work separately but if we come as a team and we have these entire sub specialists working together…"*
60	Professional dichotomy	*…historically, there was nothing like veterinary or human medicine. The history of medicine started with people doing what is called comparative medicine. Scientists looked at animals; study the animals and they try to extend their findings to humans. It is as time progressed that there was this dichotomy; human and veterinary medicine. Even in the early 19 centuries, scientists have realized that this dichotomy and this so-called specialization are working against them. So currently at the global level there is the move to bring back again all health professionals to one.* *"In my opinion, they have some level of unity among them, yet if you go deep inside you find professional dichotomy in the hidden aspect".*
61	Narrow based training	*Well first and foremost, for me personally, I think it's the kind of training that we receive in Nigeria. Historically, our training has always been boxed up. Everybody is in his own box but the world has moved on, because you know, like I said, it's becoming smaller and smaller. Our universities need to start looking at training in a way that professionals will overlap. Before students graduate, they are able to see the interface with other professions. So these are the areas where I think in knowledge sharing, the*

		difficulties begin from the kind of training that we get.
62	Agencies are specialized	*Then on the third level when we come to recruitment, I'm talking about government agencies, sometimes because agencies are specialized, ministries are specialized we tend to forget, overlook the fact that other professionals can come in and make a contribution on what is happening there whether it is health agency, a veterinary agency. When you are doing research and it is multi-disciplinary, it becomes more robust and you are able to see from a wider perspective what is going on because nature does not occur in a vacuum.* *Like, for example, in the whole of this National Veterinary Research Institute (NVRI) Vom, the only human doctor we have is the one we brought from the Federal College, for treating human cases. But does it mean that we cannot see things from this. In any veterinary medicine conference, you hardly see human doctors there, and in any human medicine conference, you hardly see veterinary doctors there. But there is supposed to be a linkage.*
63	Lack of policy	*"… if policies are also not properly put right then there will be no encouragement for people to want to share with the other professionals. So policies being properly put will help knowledge sharing among professionals"* *"Sometimes its government policy; government policy sometimes can negate the sharing of information. When governments tend to promote one aspect over another or when the government in their own right feels this group should do it without seeking consent of the professionals themselves...* *"No policy from the government, lack of good policies from the government…"*
64	Not willing to provide funds	*"…and funding is also an issue, there is no motivation and materials are not there".* *Governments are not willing, even some research institutions or academic institutions; are not willing to provide funds to train people. Once you cannot train people, you have no knowledge to share. It is when you train people that you acquire knowledge to some depth and then you are ready to share but where there is no training and you are just clinging to your basic knowledge you become a local champion.*
65	Leadership issues	*…we have leadership issues, for example we have what is called the Nigeria Center for Disease Control (NCDC), and you can't have two leaders at the same time. So if they want to appoint a director for NCDC, veterinary doctors want a veterinary doctor to be appointed, human doctors want a human doctor to be appointed, pharmacist believes a pharmacist should be appointed, medical laboratory scientist will say our boss is good, he can do this job.* *"…and then the availability of limited positions in relation to the fact that inter-disciplinary knowledge can create the fight for the limited available space"*

Fig 2: CONCEPTUAL FRAMEWORK FOR KNOWLEDGE SHARING AND ABSORPTIVE CAPACITY IN MANAGING ZOONOTIC DISEASES



Appendix IV: Coding Template

	RP	Narratives	Open codes	Related open codes	subcategories	related subcategories	categories
RQ							
What is the perception of public health professionals about knowledge sharing in managing zoonotic diseases in Plateau State, Nigeria?	**2**	**Knowledge sharing is very important. Sharing knowledge among health professionals is aimed at preventing zoonotic diseases. The vet with medical lab, with human doctors because of the role the play in zoonotic disease prevention.**	**1) Sharing knowledge among health professionals is aimed at preventing zoonotic diseases.**	**preventing zoonotic diseases(R2) (R13)**	• **prevent zoonotic diseases** • **identify these diseases** • **to effectively control the diseases**	– **prevent zoonotic diseases** – **identify these diseases** – **to effectively control the diseases**	**Effective management**
	3	**it is very relevant to share knowledge, because the goal is to preserve human lives. Most of the time zoonotic diseases are very epidemic, and it's good we share knowledge among health professionals.**	**2) because the goal is to preserve human lives**	**preserve human lives (R3) (R19) (R29)** **to save humans on the earth (17)**	• **preserve human lives** • **to save humans on the earth,**	– **preserve human lives** – **to save humans on the earth**	**Save the lives of human**
	4	**Well, knowledge sharing is the key; there is the concept of "one world, one health". We're trying to bring the health professionals under one medicine, and that involve human health, animal health practitioners, and environmental scientists**	**3) there is the concept of "one world, one health". We're trying to bring the health professionals under one medicine, and that involve human health, animal health practitioners, and environmental scientists**	**bringing health professionals under one medicine (R4) (R17)** **means taking health in a holistic form (R29)**	• **bringing health professionals under one medicine** • **means taking health in a holistic form**	– **bringing health professionals under one medicine** – **means taking health in a holistic form**	**Conform to the one health initiative**
	8	**Knowledge gaps exist, and these gaps can only be closed when there is communication. As a veterinarian I work in a vet clinic a man walks into my clinic with a sick cat showing possible signs of toxoplasmosis, as I try to examine this cat basically to improve the human health, I am supposed to ask my client: Do you have a wife? If the answer is yes, is she pregnant? If the answer is yes, then, be careful when she interacts with this cat, because there is something in this cat that can affect her. Can I have the contact of your doctor? My human doctor colleague is also supposed to discuss this with his patients that attend antenatal. Do you have cats at home? Then be careful, and if you don't mind, can I have the contact of your veterinarian? The way zoonotic diseases occur, no single professional group will claim exclusive reservoir of knowledge of how to handle it.**	**4) Knowledge gaps exist, and these gaps can only be closed when there is communication** **5) The way zoonotic diseases occur, no single professional group will claim exclusive reservoir of knowledge of how to handle it.**	**Knowledge gaps exist (R7) (R8) (R11)**	**Knowledge gaps exist**	**Knowledge gaps exist**	**Knowledge gaps exist**

APPENDIX VA:

Introductory Letter

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA

Vice Chancellor: Professor Ibrahim Garba, B.Sc. (Hons) Geology, M.Sc. (Mineral Exploration) ABU, Ph.D Geology (London), O.I.C., FNMGS
Ag. Head of Department: Dr. Mohammed Habibu, NCE, BLIS, MLIS, PhD (ABU),
e-Mail: lis@abu.edu.ng
Tel: 08174568401/09033706347

PhD/EDUC/43833/2012/2013

3rd June, 2016

TO WHOM IT MAY CONCERN

INTRODUCTORY LETTER: LYDIA E. LAKAN

This is to certify that **LYDIA E. LAKAN** with Registration Number **PhD/EDUC/43933/2012/2013** is a Postgraduate Student in this Department. She is currently engaged in a research titled **"Exploring Knowledge Sharing on Zoonotic Disease Prevention and Control Health Professionals in Plateau State, Nigeria".**

We would be grateful if you could kindly give her the assistance she requires for conducting the research work successfully.

Thanks for your cooperation.

Yours sincerely,

Dr. Habibu Mohammed
Head of Department

APPENDIX VB:

Ethical Clearance Letter for Data Collection

NATIONAL VETERINARY RESEARCH INSTITUTE
Federal Ministry of Agriculture and Rural Development
P.M.B. 01, VOM, PLATEAU STATE

Efax: +44208117080
Email: edvr@nvri.gov.ng
nvri1924@yahoo.com

Website: www.nvri.gov.ng
Telephone: 0705 557 8676

ANIMAL ETHICS COMMITTEE

PROJECT TITLE:	EXPLORING KNOWLEDGE SHARING ON ZOONOTIC DISEASE PREVENTION AND CONTROL AMONG HEALTH PROFESSIONALS IN PLATEAU STATE, NIGERIA
PROJECT NUMBER *(Where applicable)*	*NIL*
NVRI AEC *REF.* No:	AEC/02/47/18
RESEARCHER/PRINCIPAL INVESTIGATOR	LYDIA ENDABEN LAKAN *E-mail: endabenlakan@yahoo.com*

STUDENT/STAFF NUMBER *(Where applicable)*	*NIL*
PURPOSE OF RESEARCH	*Academic/PhD Research*

ANIMAL SPECIES	*Nil*	*Nil*
NUMBER OF SENTINELS	*Nil*	
Approval period to use animal	*2016 – 2018*	
Pain/Discomfort/Stress Classification	None *(Zoonotic disease knowledge sharing questionnaire study)*	

KINDLY NOTE:
Should there be a change in the species or number of animal/s required, or the experimental procedure/s - please submit an amendment to the Animal Ethics Committee for approval before commencing with the experiment. *The Committee reserves the right to carry out on-site assessment without prior notice. Status reports should be provided annually to AEC.*

APPROVED	*Date: 14th August, 2018*
CHAIRMAN, NVRI AEC	*for Signature:*

AEC SECRETARIAT: dgbwala@yahoo.com; Daydo.bwala@nvri.gov.ng Phone: +234 813 775 5661

APPENDIX VC:

Ethical Clearance Letter for Data Collection

JOS UNIVERSITY TEACHING HOSPITAL
JOS, NIGERIA

Phone: 073-450226-9
E-mail: juth@infoweb.abs.net

Cables & Telegram: JUTH
P.M.B. 2076
JOS

Ref: JUTH/DCS/ADM/127/XIX/6577

Date: 25th July, 2016.

Lydia Endaben Lakan,
Library and Documentation,
National Veterinary Research Institute,
Vom.

RE: ETHICAL CLEARANCE/APPROVAL

I am directed to refer to your application dated 21st June, 2016 on the research proposal titled:

"Exploring Knowledge Sharing on Zoonotic Disease Prevention and Control among Health Professionals in Plateau State, Nigeria"

Following recommendation from the Institutional Health Research Ethics Committee, I am to inform you that Management has given approval for you to proceed on your research topic as indicated.

You are however required to obtain a separate approval for use of patients and facilities from the department(s) you intend to use for your research.

The Principal Investigator is required to send a progress report to the Ethical Committee at the expiration of three (3) months after ethical clearance to enable the Committee carry out its oversight function.

Submission of final research work should be made to the Institutional Health Research Ethical Committee through the **Secretary, Administration Department,** please.

On behalf of the Management of this Hospital, I wish you a successful research outing.

Azi M. Magaji
For: Chairman, MAC

APPENDIX VD:

Ethical Clearance Letter for Data Collection

PLATEAU STATE SPECIALIST HOSPITAL JOS

Ref.NO.PSSH/ADM/ETH.CO/2016/006
Old Bukuru Road,
P.M.B. 2113,
Jos, Nigeria
Tel: 073-462180
Fax: 073-464031
Email: psshjos@yahoo.com
Date: JULY 28, 2016

Reg. No: NHREC/09/23/2010b

NOTICE OF EXPEDITED REVIEW AND APPROVAL

Rep; Exploring Knowledge Sharing on Zoonotic Disease Prevention and Control Among Health Professionals in Plateau State

Name of Principal Investigator: Lydia Endaben Lakan
Address of Principal Investigator: Amadu Bello University Zaria, Library and Information Science Department.
Date of receipt of valid application: July 21, 2016.,
Date of meeting when final determination of research was made: July 28, 2015.

This is to inform you that the research described in the submitted protocol, has been reviewed and *given expedited approval by the Health Research Ethics Committee.*

This approval dates from **28/07/2016**to **28/07/2017**. Note that no participant accrual or activity related to this research may be conducted outside of these dates. You may liaise with the Hospital records department for necessary co operation / assistance All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of research. *The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.*

Dr. Bitrus Matawal, MBBS, FWACS
Chairman, HREC PSSH

APPENDIX VE:

Ethical Clearance Letter for Data Collection

GOVERNMENT OF PLATEAU STATE

MINISTRY OF HEALTH HEADQUARTERS

P.M.B. 2014, JOS, PLATEAU STATE

MOH/MIS/202/VOL.T/X

18th July, 2016

Mrs. Lydia D Lakan .
Library and Documentation
National Vetnary Research Institute
Vom.

RE: APPLICATION FOR ETHICAL CLEARANCE.

Reference to your communication on the above subject.

Unfortunately, the Ministry of Health Ethical Committee has not been properly constituted. However I have been directed to inform you that the Ministry has granted you permission to conduct the study on the proposed topic "***Exploring Knowledge Sharing Zoonotic Disease Prevention and Control among Health Professionals in Plateau State***".

Please note that the participation of any individual or group in this study is optional.

You are requested to send a copy of your research findings to the Ministry, please.

Thank you.

MINISTRY OF HEALTH * DIRECTOR * STATISTICS

Paul D. Dwagas
For: Hon. Commissioner