

Analysis of factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases: a case of Kilosa district council, Tanzania

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**ANALYSIS OF FACTORS INFLUENCING MULTI-SECTORAL
COLLABORATION IN RESPONDING TO EMERGING ZOO NOTIC DISEASES:
A CASE OF KILOSA DISTRICT COUNCIL, TANZANIA**

By

Subira O. Mumba

**A Dissertation Submitted in (partial) Fulfillment of the Requirements for the
Degree of Master of Arts (Health Policy and Management) of**

**Muhimbili University of Health and Allied Sciences
October, 2017**

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: *“Analysis of Factors Influencing Multisectoral Collaboration in Responding to Emerging Zoonotic Diseases among Veterinary, Wildlife Conservation and Health Professionals in Kilosa District Council, Tanzania”* in (partial) fulfillment of the requirements for the degree of Master of Arts (Health Policy and Management) of Muhimbili University of Health and Allied Sciences.

Dr. Gasto Frumence

(Supervisor)

Date

DECLARATION AND COPYRIGHT

I, **Subira O. Mumba**, declares that this **dissertation** is my original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature:.....

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DEDICATION

I dedicate this thesis to my lovely husband, daughter (Khairat Kilua), and son (Abdulrahman Kilua) for their patience in my absence during my study period.

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ABSTRACT

The integration of the veterinary, medical and wildlife conservation necessary to predict, prevent or respond to emerging zoonotic diseases requires effective collaboration and exchange of knowledge across these disciplines. Current status reveals the non-existence joint structures that are prepared for collaboration in response to zoonotic disease emergencies.

Aim: The study analysed factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases among livestock, wildlife and health departments in Kilosa District, Tanzania.

Methodology: A qualitative case study design in which key informants interviews were used to seek in-depth information on the Factors Influencing Multi-sectoral Collaboration in responding to emerging zoonotic diseases. The sample size of 15 key informants were drawn purposefully from Health, Wildlife and Livestock Department from Kilosa whereby respondents selected based on their occupational and professional experience and involvement in zoonotic disease with regards to multisectoral collaboration and they were interviewed at their natural setting.

Data analysis: The qualitative data analysis employed a thematic approach which involved reading through the transcribed texts of each interview to identify responses relevant to the specific research questions of the study. Themes were categorized in different phases from familiarization with data up to producing the final report whereby researcher started by listening carefully to the audio tape recorder for several times, and all transcript were transcribed verbatim.

Results: The study did not find any functioning organizational structure in the departments of livestock and wildlife in controlling and managing the emergence and spread of zoonotic diseases, which contributed to low collaboration between the three departments. Lack of financial resources to support the running of the three departments was a key setback to the efforts at countering the challenge of zoonotic diseases which later on resulted to poor or no supportive supervision conducted. Also, not considering zoonotic diseases as a priority within the district's planning framework hinder the efforts to address

the challenges posed by zoonotic disease in Kilosa District. However findings reveals on the availability of clear roles and responsibilities on managing zoonotic diseases though implementation of the roles were hindered by financial constrictions.

Conclusion

The multi-sectoral collaboration should be considered as one of the main issues to all sectors that are responsible for controlling and managing zoonotic diseases. Moreover, control of zoonotic diseases should be included in the district and departmental plans and should be placed among the priority areas of the district.

Ministry of Health, Veterinary and wildlife should increase its commitment through Memorandum of Understanding (MOU). in controlling and managing zoonotic diseases to prevent the eruption of such diseases instead of waiting until a particular disease erupts so as to reduce the negative impacts of the diseases.

The central government should ensure that the existing guidelines and policies emphasize on 'One Health' concept and multisectoral collaboration in managing and controlling zoonotic diseases.

Officials from all departments in Kilosa District should be trained on the concept of 'One Health' so as to facilitate the implementation of joint activities that, if not addressed by all the departments, could result in heightened risk including the eruption of zoonotic diseases in the community.

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LIST OF ABBREVIATIONS

APSED	Asia Pacific Strategy for Emerging Diseases
AUSVETPLAN	Australian Veterinary Emergency Plan
DMD	Disaster Management Department
EAD	Emergency Animal Disease Responses
EIDs	Emerging Infectious Diseases
GDP	Gross Domestic Product
HPAI	Highly Pathogenic Avian Influenza
IDSR	National Integrated Disease Surveillance and Response
KII	Key Informant Interview
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children.
MoLFD	Ministry of Livestock and Fisheries Development
MNRT	Ministry of Natural Resources and Tourism
NRVF EPRP	National RVF Emergency Preparedness and Response Plan
PMO-RALG	Prime Minister's Office- Regional Administration and Local Government
REDMAC	Regional Disaster Management Committees
RISDP	Regional Indicative Strategic Development Plan
RVF	Rift Valley Fever
RVF-EPRP	Rift Valley Fever Emergency Preparedness and Respond Plan
SADC	Southern Africa Development Community
TEPRP	Tanzania Emergency Preparedness and Response Plan
TDCS	Tanzania Disaster Communication Strategy
VIDMAC	Village Disaster Management Committees
WHO	World Health Organization

DEFINITIONS OF TERMS

Multi-sectoral

Involvement of multiple sectors in preparedness, response, prevention, control and mitigation of Zoonotic outbreak [1].

Outbreak Preparedness:

The capacities and knowledge developed by governments, professional response organisations, communities and individuals to anticipate and respond effectively to the impact of likely, imminent or current outbreak events or conditions [1].

Outbreak Management:

Comprehensive approach and activities to reduce the adverse impacts of any zoonotic outbreaks.

Outbreak Response:

A sum of decisions and actions taken during and after an outbreak, including immediate relief, rehabilitation and reconstruction [1].

Priority Diseases:

Are diseases/conditions that have been identified to be of important/major public health concern, such as the rift valley fever (2)].

Zoonoses

Zoonoses are defined as those diseases and infections naturally transmitted between people and vertebrate animals [3].

Collaboration:

Process where two or more organizations or sectors work together to realize shared goals. It portrays a deep and collective determination to reach an identical objective in preparedness, response, prevention, control and mitigation of zoonotic outbreak [4].

CHAPTER ONE

1.0 INTRODUCTION

1.1. Background

Zoonotic diseases are infections that can be transmitted directly or indirectly between animals and human beings. Zoonotic diseases can be caused by viruses, bacteria, parasites, and fungi. Zoonotic diseases pose a significant burden on animal and human health. Despite recognition of this fact, endemic zoonoses often remain undiagnosed in people. They are often mistaken with febrile illnesses such as Malaria [5].

Approximately 60% of all human infectious diseases and 70% of those reported in the last 30 years are likely to have originated from animals. New pathogens from animals, particularly viruses, remain unpredictable, continue to emerge and spread across countries, and have profoundly affected member states of the WHO South-East Asia Region. Outbreaks of emerging diseases such as severe acute respiratory syndrome (SARS), avian influenza A(H5N1) and Nipah virus infection have caused widespread economic loss as well as being a serious threat to public health [6].

However, with the Tanzania's rapid population growth which stands at 44,000,000 as per NBS report 2012, increased human encroachment into wildlife ecosystem and interactions between humans, livestock and wildlife is increasingly becoming common. Also, there is an increased association between people and domestic animals. It is also apparent that increased animal-human interactions, coupled with poor human and animal health service delivery systems including disease surveillance, have led to the escalation of transmission and perpetuation of zoonotic diseases.

The 'One Health' concept is a worldwide strategy for expanding inter-disciplinary collaborations and communications in all aspects of healthcare for humans, animals and the environment. It is documented that 60% of emerging and re emerging pathogens are zoonotic, and 72% of them originate from wildlife. Contact of human to wildlife has increased tremendously due to factors such as the increase in human population, human encroachment into wildlife corridors, climate change and other related factors [7].

Experiences in prevention and control of influenza A (H5N1) have shown that cooperation between health and agricultural sectors is essential and has brought significant positive effects on thoroughly controlling influenza outbreaks in poultry and limiting the spread of the disease to humans. Lack of effective surveillance systems combined with low awareness or compliance with prevention and control measures for zoonotic diseases in Vietnam contributed to the underestimating of the importance zoonotic disease control efforts, lack of strategic prioritization, and poorly coordinated action, which ass resulted in wide range and number of pathogens and the great variation in each pathogen's epidemiology and severity [8].

In Tanzania, The Prime Minister's Office (PMO) coordinates all activities on emergency preparedness. The PMO is mandated to ensure that multi-sectoral collaboration is promoted and recognised from control, prevention, preparedness and response. This is particularly the case in defining the roles and responsibilities of different ministries in combined efforts towards a particular emergency. For example, the Ministry of Health, Community Development, Gender, Elderly and Children, the Ministry of Livestock and Fisheries Development, and the Ministry of Natural Resources and Tourism, have to work together in the event of a zoonotic disease outbreak. In spite of these challenges and drawbacks, zoonotic disease prevention and control has been prioritised by the World Health Organization (WHO) Asia Pacific Strategy for Emerging Diseases[9].

Strengthening the links between the human and animal health sectors, and increasing the coordination, collaboration and networking on zoonoses prevention and control activities among stakeholders have specifically been the case in Vietnam whereby rapid assessment was conducted in advance of the workshops to identify the types of activity being conducted by those invited to the workshop, and, to determine the participants' views on priority zoonotic diseases in the country.

In addition, suggestions on how to improve multi-sectoral collaboration for zoonotic disease activities in Vietnam were gathered. They included: the establishment of a collaboration and coordination mechanism; enhanced information sharing and exchange; development of a legal framework for collaboration; joint capacity building, and financial support [8].

During the 2007 rift valley fever (RVF) incidents which occurred in Tanzania and Kenya, the situation developed a high level of severity which underlined the need for collaboration among different actors, institutions and countries in controlling the spread of the outbreak. Evidence shows that control measures that were taken in Tanzania and Kenya mirrored the multidimensional nature of RVF which included closing livestock markets and butcheries, imposing movement controls and quarantines, and providing advice warning against drinking raw milk, slaughtering animals, or eating uninspected meat. Collaboration is not only confined to outbreak control but also in the strengthening of outbreak preparedness [2].

According to Tanzania's Disaster Management Policy of 2004 and the National Operational Guidelines, the lead ministries are those responsible for animal health, human health and wildlife. In complementing this plan, other relevant ministries and institutions are responsible for implementing their respective roles as stipulated in the document. Networking in disease surveillance will ensure that a dialogue with local traders and international trading partners is maintained in order to make sure that they are aware of the risk status and the need to support National Zoonotic Disease Emergency Preparedness and Response Plan. The realization of this objective depends on individuals and institutions whose activities relate to medical, veterinary and wildlife services [2].

In Tanzania, several instruments acknowledge the need for collaboration in addressing various health challenges affecting the society. The National Health Policy, 2007, Sustainable Development Goal NO.6 (SDG) on combating HIV/AIDS, malaria, and other diseases, Livestock Policy, and Disaster Management Strategy all recognize the importance of collaboration in disaster control and management, but still there is a gap on collaboration of zoonotic disease outbreaks which are largely considered as neglected diseases.

1.2. Statement of the Problem

Zoonosis remains a major and increasing problem globally due to increasing global human population with intensifying livestock production, and ongoing encroachment of people and domestic animals into formerly sheltered natural ecosystems which causes greater contact with wildlife [4].

Zoonotic diseases increase in proportion to the number of animals and the intensity of their contact with human beings. The close continuous contact between humans and animals, which is common in Morogoro Region provides ample opportunity for cross-species infection by microorganisms, as well as genetic modification and adaptation to the new host. Collaborative efforts are needed to improve human and animal health [10].

Despite the existing policies and strategies; nearly 40% of the burden of human mortality and morbidity in low-income countries, including Tanzania, 7% is attributable to zoonoses and 13% to recently emerging diseases from animals [11]. Management of risks attributable to zoonotic diseases is further compounded by weaknesses in multisectoral collaboration.

However, little is known on the existing strategies at the district level regarding the collaboration between health, wildlife conservations and livestock sectors which are among the key actors in preventing and responding to zoonotic disease emergencies.

Therefore, there is a need to analyse the factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases as a way to improve strategies on responses to zoonotic diseases between health, wildlife and livestock sectors.

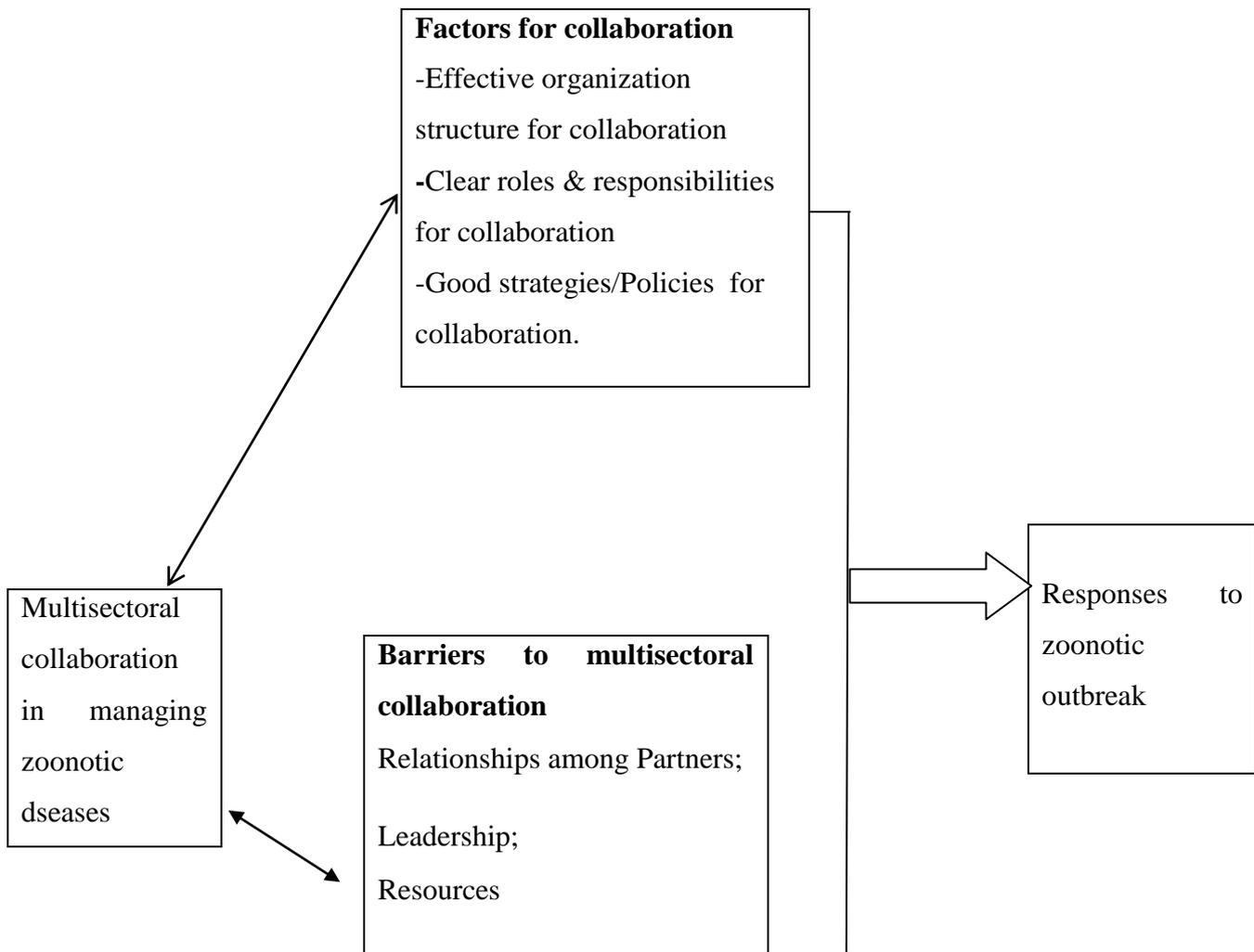
1.3. Rationale

The study will generate findings that will help to improve strategies on responses to zoonotic diseases between health, wildlife conservation and livestock sectors.

The analysis of the existing strategies will identify what works and what does not work in terms of joint strategies and to make necessary recommendations for collaboration towards zoonotic outbreak responses between the livestock, wildlife conservation and health sectors.

The study findings will also help in enhancing the health and livestock sectors' involvement and contributing to the adoption of the 'One Health' agenda in arresting infectious disease outbreak and response

Figure 1.4 : Conceptual Framework Showing Factors Influencing multi-sectoral Collaboration in Responding to Zoonotic Outbreak



The conceptual framework concept was adopted from various research ideas and modified in order to analyze the factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases.

Effective collaboration and good response to zoonotic disease control and prevention requires participation of more than one sector. Therefore, the conceptual framework shows a cumulative approach of the analysis of factors that have a direct influence in the overall outcome of multi-sectoral collaboration in relation to multi-sectoral response to any zoonotic disease outbreak in an area.

The conceptual framework shows that the existence of good strategies and policies for collaboration, coupled with effective organization structures, good leadership skills and clear roles and responsibilities will result in effective and timely response in managing zoonotic disease outbreak.

1.5. Research Questions

1.5.1 Main Research Question

What are the factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases?

1.5.2 Sub Questions

1. What are the existing organizational structures at the district level in livestock, wildlife, and health sectors for controlling and managing zoonotic diseases?
2. What are the roles and responsibilities of existing organizational structures at the district level in livestock, wildlife and health sectors for controlling and managing zoonotic diseases?.
3. What are the existing strategies for collaboration at the district level both in livestock, wildlife and health sectors for controlling and managing zoonotic diseases?
4. What are the barriers for collaboration in the livestock, wildlife and health sectors for controlling and managing zoonotic diseases?

1.6. Objectives

1.6.1 Broad Objective

To analyze factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases among Veterinary, Wildlife and Health professionals.

1.6.2 Specific Objectives

1. To identify the existing organizational structures at the district level in livestock, wildlife and health sectors for controlling and managing Zoonotic diseases.
2. To examine the roles and responsibilities of existing organizational structures at the district level in livestock, wildlife and health sectors for controlling and managing Zoonotic diseases.
3. To analyse the existing strategies for collaboration at the district level between livestock, wildlife and health sectors for controlling and managing zoonotic diseases.
4. To assess the barriers for collaboration in livestock, wildlife and health sectors for controlling and managing Zoonotic diseases.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 General Overview of Zoonotic Outbreak

Zoonotic diseases constitute a public health problem throughout the world, particularly in the tropics where their control is restricted by inadequate infrastructure and financial resources. Additionally, there is a lack of information on their significance and distribution. It includes diseases like anthrax, botulism, plague, and virah haemorrhagic fever [4].

Many of the zoonotic epidemics have affected pastoral and agro-pastoral livestock and people themselves. Pastoralists and agro-pastoralists are the people who live below the poverty line. Therefore, when outbreaks occur they are normally unable to report the outbreak to the veterinary office or medical facilities due to remoteness and lack of communication facilities.

The major risk factors associated with human cases in nomadic, pastoral and agro-pastoral communities are contact with sick animals and animal products including blood, meat and milk. High precipitation associated with flooding in an area of high density of livestock create conducive a environment for rift valley fever (RVF) outbreak. The life style of nomadic pastoralists and agro-pastoralists is also one of the risk factors for contracting the infection [2].

The episodic nature of the disease creates special challenges for its mitigation and control, and many of the epidemics happen when the governments and communities at risk are not prepared and have limited resource to contain the disease at source. Inadequate maintenance of standard biosecurity practices in livestock production and lack of proper Personal Protective Equipment (PPE) predisposes animal workers and medical personnel to contracting the infection during routine professional practices. In general, the surveillance systems for early detection and response for zoonotic diseases in both humans and animals are inadequately operational due to limited funds [3].

About 75% of the new diseases that have affected humans over the past 10 years have been caused by pathogens originating from an animal or from products of animal origin. Many of these diseases have the potential to spread through various means over long distances and to become global.

To effectively address zoonoses and emerging infectious diseases at the human, animal and ecosystem interfaces, a 'One Health' approach is being increasingly adopted emphasizing multi- sectoral and multi- disciplinary approach at various levels (international, regional, national and community levels). The WHO Regional Offices for South East Asia and the Western Pacific came up with common bioregional strategy called 'Asia Pacific Strategy for Emerging Diseases (APSED)', which is designed to support member countries to develop core capacities required for implementation of the International Health Regulations.

Zoonoses control is one of the priority areas of APSED and the establishment of a functional coordination mechanism for prevention and control of zoonoses is a pillar of this strategy. WHO in collaboration with FAO and OIE have developed a guideline for establishing a coordination mechanisms for prevention and control of zoonoses at the country level [12].

In addition, a number of well known and preventable animal diseases that can be transmitted to humans (i.e. zoonoses) such as rabies, brucellosis, leishmaniasis and echinococcosis continue to occur in many countries, especially in the developing world, where they mostly affect the poorest segments of the human population. They cause a serious amount of deaths and millions of affected people every year[13].

2.2. Factors Influencing Multi-sectoral Collaboration in Responding to Zoonotic Disease Outbreak.

2.2.1. Clear Organization Roles and Responsibilities

FAO, OIE and WHO recognize that addressing health risks at the human-animal-ecosystems interfaces requires strong partnerships among players who may have hold perspectives on some issues and have different levels and amounts of resources [13].

These partnerships – which could include ones among international organizations, governments, civil society and donors – must be coordinated to minimize the burden on member countries of multiple monitoring, reporting and delivery systems, and to avoid duplicated efforts and fragmented outcomes. A framework for collaboration is necessary at national and international levels, with clearly defined roles and responsibilities.

There is also a need to strengthen animal and human health institutions and structures, as well as partnerships, and to manage the existing and novel diseases that will be of public health, agricultural, social and economic importance in the future. Appropriate, protocols and standards for managing emerging zoonotic diseases should be jointly developed. In the cases of high-impact Zoonotic diseases, improvements in governance, infrastructure and capacity building will also prove valuable to secure the livelihoods of vulnerable populations [14].

A joint framework to address gaps and strengthen collaboration in human and animal health laboratory activities should be developed. The framework should cover the upgrading of facilities, training and collaboration between regional and international reference laboratories for diagnosis and quality assurance. The framework should also promote cooperation between human and animal surveillance systems in analysing the available evidence and evaluating responses to allow for timely sharing of comparable epidemiological and pathogen data across the relevant [13].

In recognising the importance of zoonotic disease control and prevention, WHO identifies collaboration with WHO collaborating centres, other universities, research centres and institutions as the way to identifying their roles and responsibilities. Specifically, it encourages several actions like:

- (i) Identifying and evaluating of microbiological hazards of animal origin to human health: new, emerging and re-emerging zoonotic diseases, and foodborne diseases, including those caused by antimicrobial resistant bacteria.
- (ii) Developing of policies, guidelines, operational research and strategies for the control of zoonotic and foodborne diseases.

- (iii) Promoting research on zoonotic and foodborne diseases and their management in humans.
- (iv) Strengthening of global surveillance of zoonotic diseases and antimicrobial resistance in foodborne pathogens by enhancing the epidemiological capabilities of national laboratories.
- (v) Disseminating of relevant information to experts in public health, veterinary science and other scientific disciplines, as well as to consumer groups and the public.
- (vi) Contributing to field and laboratory investigations of zoonotic and foodborne diseases.
- (vii) Facilitating of active contributions to public health by the veterinary services of member states, an essential requirement for the cost-effective surveillance and control of zoonotic and foodborne diseases in their animal hosts.
- (viii) Providing technical and scientific assistance to member states for their surveillance and control programmes, when requested, and Supervising the work of the Mediterranean Zoonoses Control Programme (MZCP)

2.2.2. Strategies/Policy for Multi-sectoral Collaboration in Responding to Zoonotic Diseases

Zoonosis often falls in the gap between the animal and human health sectors, and this can lead to an underinvestment in their surveillance at all levels. At the international level, there are no dedicated systems to govern official reporting of zoonosis; instead, they are partially covered by separate sets of regulations and requirements for the animal and human sectors. In the human health sector, the IHR provide a legislative framework that formalizes the human disease reporting responsibilities of national governments, including minimum requirements for developing and maintaining core capacities for detecting and responding to emerging threats and a decision support tool designed to help in the identification of public health emergencies of international concern (PHEIC) [15] .

In the animal sector, the closest equivalent to the IHR is the Terrestrial Animal Health Code of the OIE which requires veterinary services in participating states to carry out monitoring and surveillance, and to report animal disease outbreaks to the OIE, particularly of listed notifiable diseases. The OIE Performance of Veterinary Services (PVS) tool is designed to enable the evaluation of the capacity of veterinary services to meet service requirements and further encourage reporting of disease outbreaks to the international community.

However, they do little to address the significant barriers that act as strong disincentives for a country to report a disease outbreak. Principal among these are the economic and social consequences of reporting outbreaks, which can be extremely severe in terms of imposition of trade embargoes, loss of income from tourism and overall impact upon international reputation.

2.2.3. Effective Organization Structure for Collaboration

Structures refer to the institutions, legislation, policies, and mechanisms that determine how work is carried out. It also includes the organizations or institutions that fund and legitimize the work of sectors to address population health. It may also refer to the architecture of a structure that houses multiple sectors. For example, well designed structures can facilitate integration of services and strengthen communication among partners.

One promising collaborative direction are hub models for delivering care based on the assumption that individuals have multiple needs that could be addressed by any number of providers or programs and that grouping them together is both efficient and better service. Hub structures were seen as working in the best interests of clients because the task of navigating care and linking with a particular provider resided with staff rather than the client[4]. Oftentimes, people were unsure about where to go for help. For this reason, a hub structure fits well. Schools are a common hub setting that meet the needs of children and their families and provide opportunity for multiple partnerships. One benefit of the effective organization structure is to be prepared in case of zoonotic outbreak.

Therefore, more often delivery of services tends to be organized around programs, but people's needs do not necessarily fit within program categories. A principal challenge is that the system of funding structures lacked flexibility and could not always accommodate a request to pool resources.

2.2.4. Barriers to Multi-sectoral Collaboration.

2.2.4.1 Relationships among Partners:

Successful multi-sectoral collaboration relies on individual partners knowing and trusting each other. Trust at a personal level was seen as the most important component of successful collaboration. It relies on the capacity to listen to what the other is saying [16].

Establishing positive working relationships is a necessary investment. The development of relationships cannot be rushed, as partners need to be able to get to know each other as people. Without it, navigating the inevitable bumps and challenges along the way becomes more difficult. For example, trust makes it possible to focus on the greater good and share accountability even though some agencies were clearly more powerful and better resourced than others. Trust, accompanied by a fair and transparent process, helps different sectors acknowledge duplication of service and take action to avoid it. It also helps sectors work within the system to accomplish tasks.

Communities, in which partners knew each other or has a positive history of working together, gelled as a group, and were able to focus on the task at hand right away. In some larger inter-sectoral collaborations (more than 20 people), a core group forms to exercise leadership and make decisions. Even if members were added or left for a period of time, the strong working relationships of the core group can carry the work forward.

Successful collaborations require the right people at the table. Partners often know what agencies or groups should be at the table. What was just as important, however, having the right person from a sector or agency - an individual with credibility and the authority to make decisions.

Individuals, who place their own interests above those of the group, even though they may say they are committed to the shared vision, can jeopardize not only the partnership, but also the outcome. If a resident from a community did not represent the interests of his or

her group or a staff person consistently put agency goals first, it was difficult for the collaboration to work effectively. Conflicting mandates of various sectors or agencies has the potential to interfere with the work of the collaboration. Strong working relationships made it possible to work through the differences to address the “big picture” [17].

A challenge in forging strong relationships are the variation in understanding of an issue among the partners. Those with a long history of working as part of the inter-sectoral collaboration or those most affected by an issue has a depth of understanding that not everyone may have embraced to the same extent. A clear vision was essential in transcending this.

2.2.4.2. Shared Vision

It is not enough to simply bring people together, or even to have partners work well together. Collaborations with a clear vision – a common and clear understanding of the issue and how to solve it – were more likely to be successful in meeting their goals. The vision is the anchor for the work of the collaboration, one that focuses activities but allows room for creative possibilities, especially if external conditions change. New rules may be enacted regarding funding, unemployment rises, a crisis develops and so on, but the vision keeps the group on track by minimizing distractions and acting as a reminder of why the group came together [16].

The impact of a coherent and inspiring vision can be very concrete and practical. Some collaborations used the vision statement as a tool to decide future directions, reviewing it periodically to make sure it was still relevant. Reviewing the vision can help the collaboration take into account any external changes or emerging issues and take action if necessary. Partners “owned” the vision through a shared language that was understood by all in the collaboration. Several collaborations went further by developing a set of principles from the vision that set parameters for the work of the group. These were referred to when making a decision regarding a course of action[17].

2.2.4.3. Leadership

Leadership develops out of trust among partners, and in turn, fosters trust and good working relationships. Partners in a collaboration need to know it can count on the person

representing their best interests and put the common good before personal gain. Effective leadership requires excellent communication. Key informants described leadership as essential and closely tied to strong working relationships and a transparent process for working together.

Leadership can be exercised through formal authority by virtue of position, such as a mayor, cabinet minister or community leader of a citizen's group. Several key informants referred to the importance of a champion in government (be it at the municipal, provincial, or federal level) in ensuring an issue remained a priority. At the same time, leadership can be informal and include those who exercise influence because they act in the best interests and the greater good of the community. Leaders inspire the group and keep the momentum going.

Leadership exists at different levels. Governments can exercise leadership through the coordination of policy and establishing structures that build upon local successes to sustain broader change. At a local level where collaboration is more horizontal, leadership occurs when a lead agency takes a role in coordinating partnership activities (administrative role) or it is shared with a citizen representative. It can also emerge from within the group, particularly when a citizen becomes a champion. When collaborations are heavily weighted with staff it can be difficult for community members to take a lead, but those who do speak on behalf of other residents are powerful role models and can inspire others to act[17].

Beyond the collaboration, it is also crucial that partners exercise leadership within their home sectors. In other words, inter-sectoral collaboration needs champions or leaders who communicate the issue in a language understood by their respective sectors and which is congruent with organizational mandates. By bringing along their own organizations and sectors, partners can build a broader base of support for the necessary policy or program changes[18].

2.2.4.4. Structure:

Structures refer to the institutions, legislation, policies, and mechanisms that determine how work is carried out. It also includes the organizations or institutions that fund and

legitimize the work of sectors to address population health issues. It may refer to the architecture of a structure that houses multiple sectors. For example, well designed structures can facilitate integration of services and strengthen communication among partners.

One benefit of the hub structure is that there are dedicated staff (intake) that understood the language of the client and could ask specific questions to connect the client to the needed program, or co-ordinate multiple services to provide better access to care. It was the role of the staff to navigate and link on clients' behalf. Community members are not alone in not knowing what services are available. Many agencies also have difficulty knowing where to refer clients, underscoring the need for an integration function.

2.2.4.5. Process

Process can be described as central to the success of inter-sectoral collaboration and is closely tied to strong working relationships. It is threaded through all aspects of inter-sectoral work and reflects the way a collaboration carries out both task and maintenance functions to solve a problem [18]. It allows relationships and trust to grow and enables leaders to emerge. Process is one of the means to achieve successful outcomes, rather than an end in itself. However, it was seen as critical to creating energy and momentum in the work of the collaboration.

Attending to process means that people's concerns are taken seriously and there are structures in place for people's voices to be heard. This does not mean that consensus needs to be achieved on all issues. In fact, key informants observed that there could be agreement to disagree as long as the principles guiding the collaboration are followed.

Two strategies characterize an effective process: integration and community engagement. Integration involves making the connections between people and organizations to coordinate program delivery and facilitate change without duplicating services. It is central to the work of regional bodies and provincial ministries (vertical collaboration), and between service sectors at the same level (horizontal).

Integration is a complex process whose importance is often understated. Its benefits lie in leveraging opportunities and identifying gaps. It requires an in-depth understanding of what various sectors do and the context for the work being carried out. Key informants referred to this as “connecting the dots.” Integration can also be described as a more complex and higher order method of collaboration, relative to information sharing or cooperation. Community engagement at the local level has also proved to be an essential strategy. Collaborations were more likely to be successful if they engaged citizens as full participants and ensured their concerns were being heard, especially if those affected most by an issue were included early on.

Attending to process can be time consuming and a challenge when external conditions such as funding deadlines and reporting requirements limit the time available to communicate and organize effectively. As important as process is, however, it needs to go beyond coordination and communication functions to demonstrate visible outcomes in order to retain interest and commitment to the work of the collaboration [12].

2.2.4.6. Existence of effective Communication

In the 21st century, zoonotic diseases compared to non zoonotic pathogens are twice as likely to be associated with newly discovered, emerging human illnesses. Indeed, of all the infection agents that infect humans, approximately 60% are zoonotic. The 1999 outbreak of West Nile virus in New York City was a perfect illustration of the challenges societies face in addressing zoonotic diseases. In this examples, there were two simultaneous outbreaks: one in animals, and another one in humans. Establishing the viral link between these two outbreaks was largely due to the persistent efforts of a veterinary medical pathologist, Tracey McNamara, head pathologist at the Bronx Zoo [4].

Lessons learned to date suggest that easy channels of communication between departments of human and animal health and the public and private sectors are mostly nonexistent. Some efforts to improve communication across medical and veterinary health sectors were launched when HPAI H5N1 began spreading, but those were weak at best. Given the disappointing experiences previously noted—followed by similar communication difficulties encountered with SARS and Nipah virus outbreaks in Hong Kong and Malaysia several countries have organized special multisectoral coordinating committees and task

forces to oversee HPAI H5N1 disease surveillance and response and to formulate appropriate disease control policies (Tanzania, Kenya, Asian countries). These initiatives will need to be assessed for their success and to determine how best to overcome communication barriers between human, animal, and environmental health officials that seem to exist independently of the resources available to a country [16].

Early detection and reporting of disease cases is critical for initiating preventive measures before localized outbreaks develop into large-scale epidemics. In these cases, the observation of animal cases can be used to trigger targeted surveillance for high-risk human populations to improve the chances of early detection and prevention [6].

Using a database of all disease outbreaks reported to WHO from 1996 to 2009, that has attempted to quantify global surveillance capacities for detecting and communicating disease outbreaks. Their findings showed that in many regions, outbreak detection and reporting occurs very rapidly and that the intervals between the start of an outbreak, its detection and public communication had generally decreased over time.

Considering all regions globally in 2009, the median delays to detection and communication ranged between just 13.5 and 19 days, respectively, but with considerable geographical variation. Of all the outbreaks considered, 53 % were reported from Africa, where both detection and public communication delays were longest and several delays of over 150 days were observed. Spatial reporting biases have also been identified for emerging infectious zoonotic diseases specifically, with reduced reporting of disease events from developing regions. Because of the potential for rapid international spread of infectious zoonotic diseases, this reduced capacity for early detection of disease outbreaks in most developing regions has implications for the global community as a whole [8].

Ministry of Public Health and Ministry of Agriculture and Forestry, in cooperation with World Health Organization in Laos, held a workshop on National Zoonotic Disease Coordination Mechanism for the Health and Animal Sectors in Vientiane. Participants from both ministries collaboratively developed the Zoonosis Coordination and Communication Mechanism and agree that a key to working together is through the functional coordination

mechanism [6]. Therefore, effective communication channels between health and agriculture sectors is highly needed in controlling and managing any zoonotic outbreak.

In Tanzania, the fact that only selected top officials are involved in top meetings and accessing new developments, noting that these top officials are also busy multi task individuals, hampers the top down flow of information in the respective departments. This has contributed to the miscommunication and inadequate cooperation between departments [19].

Flow of information upon onset of disease outbreak depends on sectors involved and community based strategies in place. This flow of information from the sectors to the communities depends on the form of communication and the quality of information to be delivered [20].

The 2006/07 RVF outbreak received significant media attention. Unfortunately, the media triggered unnecessary public scare because of misinformation. Consequently, lack of public awareness has fueled lack of community participation and recognition in support of reducing the impact of RVF outbreak. During the onset of the 2006/07 RVF outbreak, the community did not get access to relevant, adequate and correct information on the processes of identification of sick animals, reporting to relevant authorities and community practice on protection against infection from the household level. It is important for Ministry of Health and Social Welfare and Ministry of Livestock and Fisheries Development to collaborate and formulate communication strategies and develop public consumer messages. To develop posters and brochures that will deliver correct information to the public on early detection, prevention, control, preparedness and response in case of any zoonotic outbreaks and responses [13].

Effective integration of surveillance in both human and animal populations is widely recognized as the key to the successful surveillance and emergency plan of emerging diseases [20]. But a review of articles published between 1992 and 2006 indicated that only 19% of studies relevant to surveillance systems for emerging diseases included evaluation of both human and animal data [23].

Addressing the challenges of zoonotic diseases requires greater communication and collaboration between veterinarians and physicians in areas beyond public health, including clinical practice and biomedical research [22]. However, Zoonotic diseases are often underreported, and it is important to understand and tackle the reasons for this underreporting. Many factors contribute to underreporting, arising from both an inability caused by lack of awareness to among clinicians, patients, veterinarians and the community itself, lack of diagnostic capacity, communication, logistic difficulties and the people's unwillingness to report which might be due lack of feedback and responses. The relative importance of these factors varies in different situations, but they often act in combination to stifle the collection and distribution of accurate and comprehensive data, particularly in resource-poor settings [12].

A collaborative effort between human and animal health resources at all levels is needed. As the world becomes more connected, and thus smaller, the spread of zoonotic disease will only increase [24]. Emergency preparedness and response to zoonotic outbreak and responses in Tanzania has been a collective and incorporated work in line with the three major national policies: like the Livestock Policy of 2004, the Health Policy of 2007 and the Disaster Management Policy of 2004. All policies recognise the importance of multi-sectoral and multi-disciplinary approaches in preparedness, response and control of zoonotic outbreaks in Tanzania although the issue of collaboration is still minimally observed [4].

Despite all the roles and responsibilities outlined above, there are unknown factors that influence and contribute to poor sectoral collaboration in managing response to zoonotic outbreak, and hence, these need to be examined and investigated accordingly [8].

2.2.4.7. Resource Mobilization

Power imbalances between stakeholders are a commonly noted problem in collaborative governance. If some stakeholders do not have the capacity, organization, status, or resources to participate, or to participate on an equal footing with other stakeholders, the collaborative governance process will be prone to manipulation by stronger actors.

However, lack of adequate mobile laboratory equipment and enough PPE for all trained personnel affects the ability to mobilise several teams to make a quick diagnosis and take necessary mitigation measures to contain the disease at source [2].

The Prime Minister's Office (PRO) is responsible for resource mobilization and allocation. The PMO is mandated to collect resources from the government, national and international stakeholders. In times of outbreaks or epidemics, depending on the magnitude of the outbreak and the capacity of the region or district to contain the outbreak is when the PMO gives hand to support [20]. In Tanzania, most of the regions and districts do not have budgets set aside to cater for emergencies in time of outbreaks and even those who have it, the budget is never sufficient to cover for all the required activities as part of the responses. As a result, nearly all districts rely on the PMO to provide assistance in such instances [17].

These practices have resulted in to delay in responding to zoonotic outbreaks and poor coordination among stakeholders in control and management of zoonotic outbreak from the village to the regional levels. The Ministry of Health, Community Development, Gender, Elderly and Children and Ministry of Livestock and Fisheries Development always work apart. Upon the occurrence of an RVF or another zoonotic emergency outbreak is when forces are brought together. This often creates sectoral division and inadequate corporation as prior strategies did not exist.

Despite technological advancement and knowledge on the epidemiology of zoonotic diseases outbreak and presence of enough trained manpower, 50 years after independence, Tanzania like many other at-risk African countries, is not well prepared to contain zoonotic disease at source in the event of an outbreak. However, due to poor economy it is difficult to set aside financial resource waiting for years for a possible outbreak to occur as in the case of RFV and EBOLA while there are other pressing issues in the communities. On the other hand, there has been laxity in taking expert advice from professionals by policy makers, especially on the proper control of livestock movement which is the primary source of the disease epidemic to at-risk human population [21].

Therefore, the episodic nature of zoonotic disease creates special challenges for their mitigation and control, and many of the epidemics happen when the governments and communities at risk are not prepared and have limited resources to contain the diseases at source. Inadequate maintenance of standard biosecurity practices in livestock production and lack of proper Personal Protective Equipment (PPE) predisposes animal workers and medical personnel to contracting the infection during routine professional practices. In

general, the surveillance systems for early detection and response for zoonotic diseases in both humans and animals are inadequately operational due to limited funds [2].

2.2.4.8. Joint and Emergency Preparedness Plan

Experience in Australia shows that disease strategy for the management of a rabies outbreak is an integral part of the Australian Veterinary Emergency Plan (AUSVETPLAN). Therefore, rabies is included as a Category 1 emergency animal disease in the Government and Livestock Industry Cost Sharing Deed In Respect of Emergency Animal Disease Responses (EAD Response Agreement) followed by Category 2 which is (RFV). Also, it is included on the World Organization for Animal Health (OIE) list of notifiable diseases as a multiple species disease. This obliges OIE member countries that had been free from the disease to notify the OIE within 24 hours of confirming the presence of rabies. OIE-listed diseases are diseases with the potential for international spread, significant mortality or morbidity within the susceptible species, and/or potential for zoonotic spread to humans.

Vaccination coverage plays a greater role in eradicating rabies whereby all persons involved in the operational management of rabies (e.g. veterinarians, field officers and their staff who may handle animals) should be vaccinated in accordance with the *Australian Immunisation Handbook*, 9th edition [16]. Also, rabies-specific occupational health and safety issues must be considered in field operations. However, over the decade (years 2001–2010), an average of more than 700 natural and technological emergencies occurred globally every year, affecting approximately 270 million people and causing over 130 000 deaths annually [17]. Twenty-five per cent of these emergencies, and 44% of these deaths, occurred in less developed countries with limited capacities to prepare for and respond effectively to emergencies.

Over the same time period, risks to public health have increased due to globalization, and international travel and trade. Such risks might be transmitted by people (e.g. SARS, influenza, polio, ebola), goods, food, animals (e.g. zoonotic disease), vectors (e.g. dengue, plague, yellow fever), or the environment (e.g. radio-nuclear releases, chemical spills or other contamination) [17].

In all types of emergencies, the poorest and most vulnerable people suffer disproportionately. The appropriate and timely management of these risks requires effective national and international capacities, intersectoral collaboration, the promotion of equity, the protection of human rights, and the advancement of gender equality.

The rapid evolution of the outbreak creates a challenge in zoonotic outbreak responses towards mitigation and control, especially in developing countries which are already burdened with infectious diseases like HIV/AIDS, malaria, and tuberculosis [8].

These long periods are characterised by a sharp decrease in community awareness, decline in collective memory and resource reallocation to more impending and prioritized issues. Therefore, the occurrence of the next outbreak always finds countries unprepared and uncoordinated for timely response [13].

The global emergence of the pandemic H1N1 virus, otherwise known as the Swine Flu, has opened the eyes of the general public, as well as the public health world to the threat of zoonotic pathogens. Zoonoses, diseases that can cause infection in both humans and animals, have become household names, and in many locations, have become public health problems. In the past decade, some of the most known of these threats included the West Nile Virus, Creutzfeldt-Jakob disease (more commonly known as “Mad Cow Disease”) and Avian Influenza [18]. Moreover, high risks of infections in both animal and human low capacity to sustain early detection and reporting, low level of preparedness and response, lack of public awareness as the public is not properly informed or given wrong information that led to unnecessary public scare, lack of emergency plans and inadequate pre-allocated funds target for the zoonotic disease responses hinder multi-sectoral collaboration towards control and preventing zoonotic diseases [19].

Meanwhile, Tanzania has put in place the Tanzania Emergency Preparedness and Response Plan (TEPRP) and Tanzania Disaster Communication Strategy (TDCS) in both Tanzania Mainland and Zanzibar (2014) which aim to improve procedures to be followed by all disaster stakeholders in emergencies management. Also, the revised National Avian and Pandemic Influenza Emergency Preparedness and Response Plan and the developed Rift Valley Fever Emergency Preparedness and Response Plan (RVF-EPRP) have been distributed to respective stakeholders considering the issues of multi-sectoral approach and

recovery programs. These are important plans that will help the respective ministries, the Prime Minister's Office – Disaster Management Department (PMO-DMD) and other stakeholders to adapt public awareness, prevention and control of zoonotic diseases and hence build resilience to increased threat of infectious diseases. This plan recognises and is in line with the livestock policy and MKUKUTA II [2].

2.2.4.9. Ways to achieve Strategies For Collaboration

i. Understanding Community

One way to ensure that the collaborative group is representative is to create a list of community stakeholders that will be affected by the activities of the collaboration. Traditional, family advocates and service providers are critical partners. This approach strengthens the foundations for effective collaboration [14].

ii. Create a Charter for Collaboration

It is highly recommended to create a charter for collaboration that lays out a common goals and working relationship in case of diseases outbreak.

iii. Explain an Evaluation Plan for Collaboration

Collaborations can be strengthened by defining specific outcomes to be achieved that are supported by input from the community and relevant 'hard data' showing the rationale for its outcomes, and then establishing an evaluation plan to periodically measure and reflect on outcome achievement [22].

iv. Establish Internal Communication Protocol

Collaborative efforts are dependent upon open and clear communication. Methods that can help create effective communication within the collaborative group are outlined below.

One way to promote effective communications is to develop a 'language' which is acceptable to all members, using common terms that are well defined and understood by all members so that shared meaning can occur. Establish a format for conduct of meetings and decision-making early in the development of the collaboration. Utilize agenda for each meeting, listing the purpose and goals for the meeting along with the specific topics to be discussed. Send this out ahead of time; and Keep the meetings moving toward the agreed goals. Each meeting should create progress toward the overall target(s) and participants

should recognize this progress when they leave. Remember, participants' time is valuable! A formal process for communication between meetings must be established[23].

v. Plan for Sustainability of the Collaboration.

The collaboration should have a plan for sustaining membership and resources. This involves membership guidelines relating to terms of office, time commitment, responsibilities, and replacement of members. Similarly, resource development efforts must be ongoing to assure that the appropriate level of revenue, time and people are available to conduct the group's programming efforts. The collaboration must be able to identify emerging trends and issues and develop strategies for the needed expansion [24].

2.2.4.10. Theories of Collaboration

Since zoonoses are diseases of animals that can infect humans, veterinarians, physicians, and public health officials need to work closely together to control, prevent, and understand them. In the individual health setting, collaborative input from both veterinarians and physicians would help assess a patient's potential zoonotic disease risks from animal exposure. For high-risk immunocompromised patients, these collaborative efforts could be tremendously important, not only for their personal well-being but also for their livelihoods.

Regarding population health, reporting of animal disease varies considerably from state to state is of paramount importance. Some states have a single agency responsible for all animal disease reporting while others split the reports between various agencies. However, in many states, animal disease surveillance appears to be largely a state level function. In few states, local public health agencies are expected to receive zoonotic disease reports directly from veterinarians. If controlling zoonotic diseases is to be improved, greater communication and collaboration between veterinarians, physicians, and public health officials at the local level are needed [25].

i. Individual Health Collaborations

At the individual health level, Zoonotic diseases are a concern for all who live or work with animals. This risk is especially problematic for persons, such as companion animal owners, who are immunocompromised. Physicians are generally not comfortable discussing the role of animals in the transmission of zoonoses and would prefer that

veterinarians play a role. However, most patients do not view veterinarians as a source of information for human health[26].

ii. Population Health Collaborations

Recognizing whether human and animal disease outbreaks were simultaneous would provide important information for identifying the causative pathogens and developing control strategies.

iii. Comparative Medicine Research Collaborations

The need for physicians and veterinarians to work together to control zoonoses extends beyond the individual and population health settings and should include collaborations in comparative medicine research. Comparative medicine is the study of the anatomic, physiologic, and pathophysiologic processes across species, including humans. Considerable attention is paid to infectious diseases, specifically the study of host-agent interactions.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

This was a qualitative case study design in which key informant interviews were used to allow in-depth interviews about the factors influencing multisectoral collaboration in responding to emerging zoonotic diseases. According to Baxter and Jac; a case study in qualitative studies provides tools for researchers to study complex phenomena within their contexts[32].

The case study facilitates exploration of a phenomenon within its context using different sources of data collection [32]. Furthermore, Baxter and Jac state that using the case study approach, researchers ensure that the issue is not explored through one lens, but rather a variety of lenses which allow for multiple aspects of the phenomenon to be revealed and understood.

3.2 Study Area

Kilosa was selected as the study area based on presence of high interactions of agricultural activities which could play a role in the continued outbreak of the diseases. The district has crop farming, pastoral and agro-pastoral activities, and is an intermediate place for transporting animals to and from different parts of Tanzania. The district is also an area where livestock, including dogs and cats, are kept and are rarely attended by vets and has children looking after the animals instead of going to schools [5]. The original inhabitants of Kilosa are the Kaguru and Zigua ethnic groups.

Kilosa District is one of the six districts of the Morogoro Region in Tanzania. Its administrative structure is based in the town of Kilosa. Kilosa District covers 14,918 square kilometres (5,760 sq mi). It is bordered to the north by the Manyara Region, to the northeast by the Tanga Region, to the east by Mvomero District, to the southeast by Morogoro Rural District, to the south by Kilombero District, to the southwest by Iringa Region and to the west by Dodoma Region. The population of the Kilosa District Council is 438,175 as per National Bureau of statistics [DHIS data]; The district is surrounded by Mikumi National Park.

3.3 Study Population

The study involved public officials from the departments of livestock, wildlife conservation and health, as well as professionals from Kilosa District Council in Morogoro Region. These included 5 members from the Wildlife Department, 4 from Livestock Department, 5 from Health Department and 1 from the office of the District Executive Director. These public officials had been selected purposively as they hold responsibility for planning, coordinating and implementing zoonotic outbreak and responses.

3.4 Sample Size

A qualitative case study design in which key informants interviews were used to seek in-depth information on the Factors Influencing Multi-sectoral Collaboration in responding to emerging zoonotic diseases was used. The sample size of 15 key informants was used. Purposefully sampling was used whereby respondents were selected based on their occupational and professional experience and involvement in zoonotic disease with regards to multisectoral collaboration; these were the members from the Health Department, Wildlife Conservation Department, Livestock Department and the Office of the District Executive Director were involved in the study. However respondents were interviewed at their natural setting.

3.5 Sampling Technique

Convenient sampling technique was employed to recruit key informants for in-depth interviews, which were based on their occupational and professional experience, views and involvement in zoonotic disease responses.

In-depth interviews were conducted with health professionals specifically belonging to the Council Health Management Team (CHMT) as well as with Wildlife Conservation Officers, while in the Livestock Department, the head of department and veterinarians of the Kilosa District Council were involved in the study.

3.6 Pre Testing

Pre testing of the data collection tools was done whereby convenient sample of 2 Livestock officers and 2 Health workers from Mvomero District were taken before conducting the actual study. Piloted responses were excluded from the study results. Pilot study helped to modify the questions that were not clear so as to improve the interview guide .

3.7 Research Assistant Recruitment Criteria

Recruitment criteria for research assistant was based on holders of at least a bachelor's degree preferably in health sciences, wildlife or livestock related fields and who have experience in qualitative research and possessing good communication skills.

3.8 Data Collection

Data were collected between May and June 2017. Prior to interview date, researcher introduced themselves and the purpose of the study. Participants were asked to fill in consent form before conducting the interview. In depth interview was conducted by the principal investigator (PI), who interviewed the selected participants and one research assistant took notes and all non-verbal responses that emerged during the interview. Appointments were made with the key informants prior to the interview date. The duration of the interview ranged from 45 to 60 minutes.

A semi structured interview guide was used for conducting in-depth interviews in each department involved under the study i.e. health, livestock and wildlife sector. The interview guide was neither strictly structured with standardized questions, nor entirely non-directive. Subsequent interviews were used to introduce new questions (Kvale, 1996). Meanwhile after finishing the interview, Principle investigator thanked all respondents for their willingness to participate the study.

3.9 Data Management

Data generated from the interviews were checked daily by the principal investigator by listening to the recorded information and were compared with note taker's information.

The data were also exported to a laptop computer while a backup of all audio files was created in a hard drive and online. Data from tape recorder were processed through listening and transcribing the text word for word. Later researcher review the tape and notes every day after an interview has been conducted, occasionally writing down direct quotes that are deemed especially relevant to the study.

‘Each study participant was given code number that could identify him/her and facilitate data analysis. Transcribed data was typed in the Microsoft 2010 and kept into a computer local disk D for security purposes and stored it in an external disk as a back up storage.. In addition, management of data was done at a high level of confidentiality as nobody who was not directly involved in the study had an access to the collected data.

3.10 Data Analysis

The qualitative data analysis employed a thematic approach which involved reading through the transcribed texts of each interview to identify responses relevant to the specific research questions of the study. Themes were categorized in different phases from familiarization with data up to producing the final report whereby researcher started by listening carefully to the audio tape recorder for several times, and all transcript were transcribed verbatim. Principal investigator transcribed the audio tape recorder and then translated from Swahili to English language. Transcripts were read line by line to generate initial codes through data reduction. Identified themes or pattern and data whose text matches with the theme were grouped together and labelled. Recurent themes were organized into subcategories then coherent categories to make meaning in the text. Researcher continued to build categories until no new themes were identified. All non verbal signals were taken into consideration during transcription. Finally data was interpreted and presented in a narative descriptions including quotations to illustrate respondent points.

3.10 Ethical Issues

Research clearance was sought from Muhimbili University of Health and Allied Sciences Directorate of Research and Publications Committee and National Research Ethical Committee. The permission to conduct research was requested from Morogoro Regional

Administrative Secretary whereby a research permit was granted and directed to the District Administrative Secretary at Kilosa District Authority where interviews were conducted.

However, all participants were informed about the purpose of the study and informed consent to participate was obtained from all participants before being interviewed. All measures to maintain the rights of human subjects in social research including right to privacy, confidentiality and prevention from any harm were considered.

Confidentiality

Confidentiality was highly observed by using anonymous participant identifiers during interviews. The interviewes were only shared among members of the study team.

3.11 Study Limitation

The main limitation of this study was on how to ensure trustworthiness of the study and data quality.

In addressing this limitation, Guba's four criteria for ensuring trustworthiness has been used and these are credibility, transferability, dependability and confirmability.

Credibility

This refers to the confidence to the study findings therefore participants were engaged for indepth interview for some hours in a day time. This was done in a friendly manner in order to make useful, accurate and rich information that has to be obtained from the field. Triangulation method was used whereby multiple source of data from three department was taken to gain its consistency[34].

Transferability

To allow transferability, sufficient details on the context was provided to ensure that the findings of one study can be applied to other situations whereby clear and thick description of the process were provided. This was enhanced through purposeful sampling of the respondents of the study in order to get different views on the research topic under the study.

Dependability

Dependability was addressed by ensuring that similar work if repeatedly would obtain the same results. Auditing of the study findings was done from the interview records, note takers information and readily available document from the field.

Confirmability

Lastly, confirmability was obtained by ensuring that the work's findings represented the results of the experiences and ideas of the participants, rather than the characteristics and preferences of the researcher. This was also ensured through cross checking of the responses before leaving the interview site, whereby respondent was given chance to proofread on what has been discussed and written by a note taker.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This part presents findings from qualitative data extracted from in-depth interviews.

It starts by presentation of results on existing organizational structures and their roles and responsibilities. It also explains the existing strategies for collaboration and how they are used in controlling and managing Zoonotic diseases. Lastly, it presents information on the barriers for effective collaboration in controlling and managing Zoonotic diseases.

4.2 Existing Organizational Structures for Controlling and Managing Zoonotic Diseases at the District Level

In assessing the existing organizational structures that are responsible for controlling zoonotic diseases at the district and departmental levels, participants were asked to confirm if there is any structure established for controlling zoonotic diseases. Furthermore, participants were asked to explain if there is any collaboration in managing and controlling zoonotic diseases in the district. The findings revealed that there is a District Emergency Preparedness Committee, an ad hoc structure and facility governing committee responsible for managing and controlling zoonotic diseases in the district.

4.2.1 The Emergency Preparedness Committee

Findings reveal that:

There is the District Emergency Preparedness Committee which comprises a total of 12 members with which 6 members come from the Health Department, 1 from Livestock Department, 1 from Water Department, 1 from Accounting and Finance Department, 1 from Agricultural Department, 1 from Mikumi National Park, and 1 member from the administration section.

With regard to the functioning of the committee, one respondent said the following:

“At the district level, there is an Emergency Preparedness Committee which is responsible for dealing with managing and controlling of any kind of outbreak including zoonotic diseases.” (Key Informant no. 15, Administration)

4.2.1.1 Roles and Responsibilities of the Emergency Preparedness Committee

In assessing the existing structures that are responsible for controlling zoonotic diseases at the district and department levels, participants were also asked to identify various roles and responsibilities of the existing structures that are responsible for controlling and managing zoonotic diseases. The study respondents revealed that the major roles and responsibilities of the Emergency Preparedness Committee are planning, budgeting, and coordination.

(i) Planning and Budgeting

Respondents said that the major role of the Emergency Preparedness Committee is planning for the prevention and mitigation of morbidity, mortality caused by zoonotic diseases, and planning for public health system and community as a whole.

“There is a departmental plan in which zoonotic budget is included. This includes things such as the purchase of medicine and medical supplies for rabies patients.” (Key Informant no. 11, Health Department)

(ii) Coordination

In every department there is an officer assigned to co-ordinate and report all zoonotic cases. In this committee each head of department has a mandate to co-ordinate and ensure proper management and response to zoonotic diseases. As part of their implementation plan, the committee has decided to allocate special areas for animal husbandry.

“Co-ordination is normally done at the departmental level. There is no collaboration between the three departments. Maybe such departmental collaboration exists for rabies. That is where we co-ordinate the activities together with the Livestock Officer in efforts to provide animal vaccination.” (Key Informant no. 14, Health Department)

4.2.2 Existence of Ad hoc Structures for Controlling and Managing Zoonotic Diseases in Health, Livestock and Wildlife Departments

The findings also revealed the existence of temporary structures within each department headed by heads of the respective departments. These structures are formed upon an outbreak of a certain zoonotic disease. They are established in response to a specific situation without considering wider or longer-term issues.

At the department level, key informants reported that there are ad hoc structures within departments that are responsible for controlling and managing zoonotic diseases.

A respondent from health department explained that:

“There is no formal structure for controlling and managing the outbreak of zoonotic diseases unless there is already an outbreak. That is when structures are formed to manage the problem.” (Key Informant no. 12, Health Department)

Another respondent from the health department expressed that:

“We have the District Immunization and Vaccination Unit headed by the officer responsible for all matters as far as vaccination for zoonotic diseases is concerned. But we also have veterinarians who are also responsible for managing zoonotic diseases.” (Key Informant no. 10, Health Department)

A Livestock Officer stated that:

“We have an Ecological Unit at Mikumi National Park in which ecologists are involved in case there is an outbreak.” (Key Informant no. 8, Livestock Department)

4.2.3 Facility Governing Committee

The study team was further informed of the existence of Facility Governing Committee in health and livestock departments. The committee is responsible for managing and controlling of zoonotic diseases. The structure is headed by Facility In Charge (i.e. can be Clinical Officer/Assistant, Environmental Health Officer for Health Department and Animal Health Specialist in Livestock department).

4.2.3.1 Roles and Responsibilities

(i) Outbreak Reporting and Responses

Majority of the professionals working at ward level from both health and livestock sectors prepare reports on a quarterly basis and send them to the district and regional levels for further action. Once an outbreak occurs, reports of patients with zoonotic diseases are communicated via local radio and monitored through patients’ record forms. An interviewee said that:

“Every month our Animal health specialist prepares a report and sends to the Department of Livestock. Then, the head of department presents it to the Council Management Team

(CMT) and is finally submitted to the regional office.” (Key Informant no. 6, Livestock Department).

(ii) Risk Prevention

Risk prevention was reported to be done during the provision of health education whereby the society is discouraged from drinking raw milk, from drinking animal blood, and people are insisted not to eat raw meat. People are also educated not to live with livestock in the house.

“The roles of the facility governing structures (committee) is to organize for emergency preparedness and address any risks signaling the eruption of diseases.” (Key Informant no. 7, Livestock Department)

(iii) Meat Inspection

Respondents reported that meat inspection is conducted regularly at the community level whereby the officers responsible are animal health specialists located at the ward level.

“Animal Health Specialists conduct regular meat inspection before and after slaughtering to ensure its safety for the people.” (Key Informant no. 14, Health Department)

The informant further stated that:

“The Assistant Environment Health Officer conducts meat inspection in the absence of Animal Health Specialist.” (Key Informant no. 14, Health Department)

4.2.4 Availability of NGOs Responsible for Controlling and Managing Zoonotic Diseases

Key informants for the study reported that there is an NGO which cooperates with the Livestock Department in controlling and managing the spread of zoonotic diseases in the district. Major roles and responsibilities include training of Veterinary Officers and providing health education to pastoralists. Also, the NGO recruits Animal Health Specialists to enable regular meat inspection. During the interviews, the following was said regarding the work done by the NGO:

“We only collaborate during an outbreak. There is an NGO known as BLACK which collaborates with the Livestock Department in providing training aimed at educating pastoralists to regard their livestock as a capital. This education is offered to some hamlets

in the community. The NGO also employs Animal Health Specialists. (Key Informant no 8, Livestock Department).

Despite the existence of the mechanism to address the emergence and spread of zoonic diseases, a few participants from the wildlife and health departments said that there existed no structure responsible for controlling and managing outbreak of zoonotic diseases in Kilosa:

“I am not aware of such organizational structure which is responsible for controlling zoonotic diseases especially in our department. Maybe they exist in other departments but I am not sure of that.” (Key Informant no 5, Wildlife Department)

4.3 Existing Strategies for Collaboration between Livestock, Wildlife and Health Sectors

The study sought to understand the existing strategies for collaboration at the district level between livestock, wildlife and health sectors and how they control and manage zoonotic diseases. The findings revealed a number of strategies, namely: health education and promotion campaigns, surveillance, vaccination campaigns, and the allocation of a designated area for animal husbandry.

4.3.1 Health Education and Promotion Campaigns

Respondents said that health education to the community is scheduled on a quarterly basis and communities are informed about a planned health education event through their village leaders. The following was said during an interview with one respondent:

“We, as Health Department, provide education concerning danger signs covering issues such as dog bite, for instance, and the required vaccination and treatment to the community members.” (Key Informant no. 12, Health Department)

Another respondent had this to say:

“Animal Health Specialists used to provide advice to the community and pastoralists especially on preventing eating raw meat which can cause anthrax, but also we have been educating Maasai tribe to avoid drinking un-boiled milk for the purpose of preventing T. B” (Key informant no 6, Livestock department)

4.3.2. Surveillance

It was reported that successful disease surveillance detects increases in disease occurrence over expected levels early so that effective and timely disease control interventions can be introduced and appropriately targeted to reduce morbidity, mortality, and economic loss.

Respondents said surveillance is normally conducted at the department level based on the availability of resources. They also said that as part of diseases control and proper notification, there is a Intergrated Diseases Surveillance and Reporting System Coordinanor (IDSR Co) who has been assigned the responsibilities of making regular follow up and proper reporting of all infection outbreaks including zoonotic diseases. One respondent said the following:

“Nowadays, we have an IDSR Coordinator within the prevention unit who is a health officer by profession, He is responsible for disease surveillance and reporting.” (Key Informant no. 10, Health Department)

4.3.3. Allocation of Animal Husbandry Area

As part of controlling and managing zoonotic diseases, respondents said that the only strategy that put them together is the decision of allocating a designated area for livestock and animal husbandry activities.

“We sometimes collaborate with the livestock sector when the Livestock Department seeks advice on the appropriate areas for animal keeping as well as offer advice on the type of grass which is safe to feed the animals in order to ensure the safety of the animals and the people.” (Key Informant no 2, Wildlife Department)

4.3.4. Vaccination Campaigns

Respondents reported that the health and livestock departments usually work together during vaccination campaigns, which is one of the measures of controlling and eliminating the epidemics of animal diseases.

“We only collaborate during vaccination campaigns and in case of rabies patients, whereby the District Vaccination and Immunization Officer wants to trace if a dog has been vaccinated or not.” (Key Informant no. 13, Health Department)

Moreover, one respondent commented that:

“These strategies are very important. However, they require the involvement of more than one sector so that every one could do his or her best to ensure timely collection, analysis, interpretation, and dissemination of information about the occurrence, distribution, and determinants of the diseases transmitted for proper management and response to any emergent situation. (Key Informant no. 14, Health Department)

4.3.4 Strengths of Existing Strategies for Collaboration between Livestock, Wildlife and Health sectors

Respondents were asked about the strengths of the existing policies and strategies implementing departmental and joint activities between livestock, health and wildlife conservation departments.

The only strength of the existing strategy reported was the availability of departmental annual plans in which zoonotic intervention, including health education, are partly included in the plan.

“The only strength is the availability of some zoonotic intervention in the departmental plans, but strengths for collaborative strategies cannot be easily earmarked as we only collaborate on a single disease (i.e. rabies).” (Key Informant no. 7Livestock Department).

4.4 Barriers to Collaboration in Controlling and Managing Zoonotic Diseases

Study participants were asked about barriers to departmental and other stakeholder collaboration in controlling and managing Zoonotic diseases in the district where a number of barriers were mentioned. These include: lack of effective strategies, lack of adequate resources, low prioritization of zoonotic diseases, absence of joint emergency preparedness plan, absence of policy statement to enforce collaboration among health experts, lack of awareness on the need for collaboration among the departments, absence of a laboratory for conducting investigation, and poor monitoring of zoonotic diseases.

4.4.1 Lack of Effective Strategies

Study findings reveal that respondents show some doubts on the effectiveness of the existing policies and strategies in implementing department and joint activities by the departments of livestock, health and wildlife conservation.

Majority of the respondents from the Health Department i.e. 4 out of 5 reported that the lack of effective strategies leads to weak collaboration, poor implementation of control mechanisms for managing and responding to zoonotic diseases, and addressing diseases persistence within the district.

One respondent from the Health Department had this to say:

“The lack of effective strategies leads to failure in implementing any interventions according to planned budget.” (Key Informant no. 11, Health Department)

Another respondent from Livestock Department reported that:

“I think these strategies prove failure as since last year we do not have laboratory, no vaccine, pastoralists are told to buy vaccines but most of them cannot afford it. As a result, they hide some of their dogs.” (Key Informant no. 6, Livestock Department)

4.4.2 Lack of Adequate Resources

Study respondents mentioned that the resources needed for planning and implementation are not adequate, a situation that hinders the collaboration in controlling and managing zoonotic diseases in the district.

They further noted that zoonotic health education, surveillance, and vaccination are not implemented due to lack of funds, inadequate skilled personnel, especially Animal Health Specialists, and that even the existing Livestock Officers have reached the age of retirement.

“Lack of adequate resources make it hard health education sessions to be conducted properly. No report from the animal health professionals as they fail to cover costs for bus fare.” (Key Informant no. 8, Livestock Department)

They also revealed that lack of adequate resources, both financial and human resources, obstruct the efforts of collaboration in managing and controlling zoonotic diseases. A good number of participants declared that lack of adequate resources is the key factor that hinders the efforts for controlling and managing such diseases:

“Collaboration is very important in managing and controlling these diseases, but the problem is funds. Without funds it becomes difficult for us to work together in fighting zoonotic diseases.” (Key Informant no. 13, Health Department)

Respondents also mentioned that the district does not have enough number of staff to be able to handle labor-intensive activities such as holding health education session which as a result are not regularly conducted. Moreover, there are no reports from the animal health professionals as they fail to afford bus fare. Respondents further mentioned lack of motivation among workers in the various departments as another factor slowing down the efforts at controlling and managing the emergence and spread of zoonotic diseases in the district. They further stated that even the laboratory for investigation is not currently in use due to lack of laboratory equipment.

There is neither close follow up nor screening conducted on animals before and after slaughter. Screening is only conducted for the community reported cases. This is due to inadequate funds.” (Key Informant no. 7, Livestock Department)

4.4.3 Low Prioritization of Zoonotic Diseases

Meanwhile, the study also revealed that zoonotic diseases are not given priority in the health and wildlife departments. However, in the Livestock Department, zoonotic diseases are number one priority diseases in their plan.

Zoonotic diseases is the number one priority in livestock department, the only problem is insufficient funds for the allocated activities (Key informant no 7, livestock department)

Given the prevailing situation, it has been difficult to forge strong collaboration between the three sectors. The following were the responses from the key informant interviews:

“Zoonotic diseases are not integrated in the district plan. This is not one among district priority areas. The only priority now is conflict resolution between herders and farmers.” (Key Informant no. 3, Wildlife Department)

Another respondent had this to say:

“The department usually collects money as a levy known as Livestock Capital Development Fund. 10% of the funds collected would be transferred to the departmental account to help with the efforts at controlling zoonotic diseases. Nowadays, no funds are

transferred on a timely manner. Even the amount is not constant as it used to be because zoonotic diseases is not a priority area within the district. (Key Informant no. 7, Livestock Department)

From the above senarior, findings reveal that, Council authority did not allocate locally generated funds for zoonotic disease interventions. Therefore Department did not receive funds to support some zoonotic intervention using own source funds as it was supposed to be.

4.4.4 Lack of Joint Emergency Preparedness Plan

It was reported that majority of the departments do not have zoonotic emergency plan; they rather have departmental plans in which zoonotic diseases a incorporated. However, the district has allocated an area for animal husbandry. The following were responses from key informants:

“We only have wildlife plan although am not involved in preparing it. The plan does not prioritize neither human nor animal health. We rather base on total loss of the community’s properties.” (Key Informant no. 3, Wildlife Department)

However, another respondent from the Health Department had this response regarding the existence of zoonotic preparedness and response plan.

“There is departmental plan which allocates funds to purchase medicine and supplies for zoonotic patients like rabies. There are no strategies for zoonotic disease collaboration between departments.” (Key Informant no. 11, Health Department)

Furthermore, participants were asked to state whether all key stakeholders from the three departments and other departments in the district are involved in preparing the plan. The responses were as follows:

“Veterinary Officers are involved in preparing the plan. No any other partners from the Department of Health or Wildlife are involved.” (Key Informant no. 8, Livestock Department)

Another respondent from the Health Department explained the following:

“The District Immunization and Vaccination Officer (DIVO) is involved in preparing the plan. Wildlife and livestock sectors are not involved.” (Key Informant no. 13, Health Department)

Another respondent declared that:

“We only have wildlife plan although I am not involved in preparing it. The plan does not prioritize either human or animal health. We rather base on total loss of the community properties.” (Key Informant no. 3, Wildlife Department)

4.4.5. No Policy Statement to Enforce Collaboration among Health Experts

Respondents were able to mention policies used to control and manage zoonotic diseases. The mentioned tools such as the Animal Control Act, 2010; Health Policy, 2007; Livestock Policy, 2006; and the Disaster Management Act, 2014.

However, majority of respondents 2 from livestock, 3 healths and 2 wildlife acknowledged a number of weaknesses within the available policies and strategies whereby they reported that these laws and policies do not put the required emphasis on multi-sectoral collaboration among the three departments.

“We have the Livestock Policy and the Animal Diseases Act, 2010, but collaboration on zoonotic disease outbreak and responses among these departments has not been put into consideration.” (Key Informant no. 9, Livestock Department)

However, key informants reported that there is a difficulty in accessing the available policy documents. They further complained about poor feedback system on matters arising within the district.

“We also have heard of different guidelines regarding zoonotic disease management. We are aware that there are three guidelines so far produced, but I have never accessed them.” (Key Informant no. 14, Health Department)

4.4.6. Lack of Awareness on the need for Collaboration among the Departments

Some respondents from the Wildlife Department reported that they are not aware of the need for collaboration with the the Health Department.

One respondent from the Wildlife Department reported that:

“I didn’t know if we are required to have collaboration between departments, but it is a very good thing. Your presence has opened my eyes on the importance of having collaboration between departments. (Key Informant no. 1, Wildlife Department)”

4.4.7. Lack of Equipped Laboratory for Conducting Investigation

Respondents from the Livestock Department said that they do not have an equipped laboratory for conducting investigation of suspected cases. They usually collect specimen and send them to a nearby laboratory facility at Sokoine University. According to the study respondents, this is a big barrier which slows down the implementation process on zoonotic disease control, strategic planning and surveillance. It is also causing failure in disease detection and control.

“Some years back when we were under the central government, laboratory investigation was not a problem. But since we had shifted to local government, no budget to equip laboratory is allocated.” (Key Informant no. 6, Livestock Department)”

4.5.8. Poor Supervision of Zoonotic Diseases

The study respondents expressed concerns over lack of supervision in zoonotic disease control in the district. They explained that supervision is conducted only if there is a support of transport from non-governmental organizations (NGOs) known as BLACK who came to the district to follow-up on the implementation of their projects. They further explained that poor transport system is caused by inadequate resources especially vehicle and fuels for conducting supportive supervision. Normally department supposed to conduct supervision quarterly, but they fail to implement due to lack of fund as a results they decide to be aligned with donors schedules.

“We fail to conduct supervision because of lack of funds.” (Key Informant no. 11, Health Department)”

4.4.9. Poor Leadership Management

Another respondent reported that, nowadays supervision is not conducted regularly due to poor emphasis from the district authorities. They do not take it seriously; you may come up with a schedule for supervision but someone in authority would not recognize or endorse the tasks you are going handle.

“A few years ago supervision was conducted at least quarterly, but with the current district leadership, it is not conducted regularly. This might be due to change of leadership (reshuffle) that has occurred in Kilosa several times.” (Key Informant no. 12, Health Department)

CHAPTER FIVE

5.0 DISCUSSION

5.1. General Overview on Zoonotic Disease Outbreak

This study aimed at analysing factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases among livestock, wildlife and health departments in Kilosa District.

This study aimed at analysing factors influencing multi-sectoral collaboration in responding to emerging zoonotic diseases among livestock, wildlife and health departments in Kilosa District. However discussion on existing organizational structures and their roles and responsibilities; the existing strategies for collaboration in controlling and managing Zoonotic diseases. Lastly, it discussion on the barriers for effective collaboration in controlling and managing Zoonotic diseases.

5.2. Existing Organizational Structures for Controlling and Managing Zoonotic Diseases at the District Level

The findings indicated diversity in terms of the awareness of existing organizational structures at the district and departmental levels which are responsible for controlling and managing the outbreak of zoonotic diseases.

Findings showed that there is existence of Disfunctional Emergency Preparedness Committee, a Facility Governing Committee, ad hoc structures and non-governmental organizations (NGOs) that are the part of the existing organizational structure responsible for controlling and managing zoonotic diseases in the district.

5.2.1 Emergency Preparedness Committee

Globally various frameworks/structures established to support zoonotic diseases preparedness and response, including the World Health Organization's International Health Regulations (IHR), the World Organisation for Animal Health's (OIE) Animal Terrestrial Code and Pathway to Veterinary Services (PVS), and the Global Health Security Agenda. All these structures recognise on the importance of emergency preparedness committee to

be one among the available structures responsible for zoonotic preparedness and responses[35].

In the study 'Recurring epidemics in the WHO African Region' found that, The H5N1 avian influenza threat revealed a lack of multisectoral coordination organizational structures, National and District epidemic management committees do not usually incorporate technical experts from health, wildlife, veterinary sectors; in addition, there are no functional joint preparedness and response activities for animal and human health[36].

The findings in Tanzania revealed how the preparedness against disasters is not given priority regardless of the fact that Kilosa is a risk area for the outbreak of zoonotic diseases based on its bordering the Mikumi National Park, as well as other cultural, social and economic factors. The district's Wildlife Department seems not to be aware of the organizational structures that are available in the district for controlling and managing zoonotic diseases. This could indicate that this department is not adequately involved in managing and controlling zoonotic diseases in the district. The health and livestock departments also retained a confusing knowledge regarding the existing organizational structure, especially in assigning duties to the departmental officials.

For instance, officials from the Health Department mentioned the District Immunization and Vaccine Officer (DIVO) as the existing organizational structure responsible for managing and controlling zoonotic diseases in the district. The variations in zoonotic disease awareness and control among key informants indicate the existence of a gap in sharing information and co-operation within the district as related to multi-sectoral collaboration in responding to emerging zoonotic diseases.

In addition to the varied levels of awareness of existing structures among stakeholders in Kilosa's various departments, the findings revealed low collaboration among the three departments. Respondents acknowledged that collaboration may only occur after an outbreak and in the event that one department needs help from another department. However, the disaster-contingent departmental collaboration lacks the strategies for ensuring sustainability. Efforts by development partners to make the departments work collaboratively are ongoing.

The findings above agree with the findings of a study conducted in Mwanza Region Tanzania by Hambati and Kiduanga which indicated the availability of dysfunctional emergence preparedness committee at all levels. It further revealed that despite the existence of a plan, preparedness against zoonotic disasters is not a priority. The argument indicates that most districts in Tanzania have emergency preparedness and response committee. However, the functionality of the committee team is not satisfactory given the various limitations hindering its functionality including inadequate resources to support their activities[37].

5.3. The Roles and Responsibilities of Existing Organizational Structures

From the study findings, it was observed that members in two departments of health and livestock have clear roles and responsibilities towards zoonotic diseases management and response. The experience was different in the Wildlife Department where members did not have any assigned roles or responsibilities in zoonotic disease management. The major roles and responsibilities of the existing organizational structure are planning and budgeting, co-ordination, risk prevention, meat inspection, and disease reporting and response.

5.3.1 Disease Reporting and Response

In the study done by Institute of Medicine, in Sustaining Global Surveillance and Response to Emerging Zoonotic Diseases in Sub Sahara Africa; Routine disease diagnosis has a central role in disease surveillance. Although it is not a direct driver of disease emergence, differences in laboratory diagnostic approaches and diagnostic goals between the human and animal health fields, variable levels of communication, and limited comparison of microbial populations in humans and animals can hinder early recognition of an emerging zoonotic disease event. These factors can delay intervention and response with consequent amplification of the impact in both human and animal populations[38].

The laboratory infrastructure and approach is quite different in resource-constrained countries. Although some point-of-care assays for targeted diseases such as avian influenza are available for animals, few are actually deployed in laboratories at the district or community level. Assays for zoonotic diseases such as brucellosis—which are simple, commonly used in developed countries, and easily deployed—are not uniformly available in developing countries. Routine infectious disease diagnosis in animals is virtually

nonexistent in sub-Saharan Africa and in much of the Near and Far East, where expertise that is on par with most state diagnostic laboratories is simply not available. Diagnosis of animal diseases is often established in the field through familiarity of field personnel, such as veterinarians or community animal health paraprofessionals, with clinical presentations for transboundary infectious diseases of importance to the country for trade and disease-free status. Confirmatory diagnosis is made in national laboratories when possible, and OIE reference laboratories when not. Some of these diseases will be zoonotic (e.g., RVF), while many are not. As a result, diagnosis of zoonotic diseases in developing countries is most often first made in humans. However, diagnosis of zoonotic disease agents is also quite limited in resource-constrained countries except at the national level.

5.3.2 Risk prevention

Institute of Medicine on the study drivers to zoonotic diseases reveals that Early recognition and intervention in an emerging infectious zoonotic disease event is essential to limit spread, whether it involves a novel agent such as the SARS virus or an adaptation of a routinely recognized pathogen such as influenza virus. Limitations in conventional approaches to diagnosis of infectious diseases in humans and animals, while not directly driving emerging disease events, can contribute to spread within the population. Differential diagnoses for unusual disease events need to be expanded to include the unknown or not-yet-discovered pathogen. Recognition of these limitations will help inform a strategic approach toward effective zoonotic disease prevention [36].

The findings of this study concur with the observations by the World Health Organization which recommended a step-by-step approach to developing appropriate collaborations with clear roles and responsibilities in four key areas of surveillance and information sharing, coordinated response, risk reduction, and collaborative research. WHO insisted that these components are a necessity in zoonotic disease response and management efforts.

In Microbiology Society's online magazine; Zoonoses in Africa reported that effectively tackling zoonoses requires a focus on transmission control, prevention and burden reduction in humans through health promotion, but also control and transmission prevention in animals. This, in turn, requires a One Health approach, involving joint planning and budgeting, joint control and joint policy management by veterinary, medical and other sectors. With respect to African countries, the weaker institutions that exist

relative to many developing countries actually present a real opportunity in this regard, with greater possibility to strengthen those institutions with, in mind from the outset, a unified approach to disease management across sectors[39].

5.3.3 Coordination

Research article titled Mapping of networks to detect priority zoonoses in Jordan had commented that Communication and coordination among national disease surveillance and response networks are vital in ensuring the timely response to a public health event. They further reported on strong desire and commitment for multi-sectoral coordination as one among the roles and responsibility in detection and response to zoonoses across public health and veterinary sectors[37]

5.4. Existing Strategies for Collaboration between Livestock, Wildlife and Health sectors for Controlling and Managing Zoonotic Diseases

Collaboration for zoonotic disease control depends largely on the strategies for collaboration between livestock, wildlife and health sectors. The findings showed that the existing strategies for collaboration in Kilosa District are surveillance, health education, and vaccination campaigns. However, it was reported that these strategies are not effective due to inadequate resources, particularly funds.

5.4.1 Disease surveillance

In a study that sought to understand the connections between human and animal medicine in controlling zoonotic diseases in Southern China, researcher Kahn and colleagues made similar findings commending the joint surveillance of animal and human zoonotic disease outbreaks as already reaping benefits worldwide. For example, recognition of the first human case of H5N1 avian influenza in Hong Kong in 1997 was facilitated by the surveillance of ducks, geese, and chickens in Southern China; therefore on their recommendation the study suggests disease surveillance is very important at all levels [14].

Also in the study on Prioritizing zoonotic diseases using a one health approach cemented that Multi-sectoral collaborations strengthen disease surveillance system development in humans and animals and suggest that surveillance and diagnoses of zoonotic diseases requires a One Health approach involving human, animal and environmental sector

participation. The One Health Zoonotic Disease Prioritization tool can foster discussion and collaboration between sectors[38].

The integrated disease surveillance and response system in northern Ghana; challenges to the core and support functions reported the existence of irregular weekly and monthly Integrated Disease Surveillance and Reporting (IDSR) reports submitted in the human sector. This problem was mentioned to be attributed by transport problems in rural areas which lead to delays in report submission to the District Medical Officer or District Veterinary Officer[38]

The findings also concur with those of another study by Sayalel (2013) on enhancing surveillance mechanism in Ngorongoro, Tanzania, which observed that the surveillance systems were inefficient and could therefore be considered as a setback to the effort to respond and manage zoonotic diseases in Ngorongoro District. Moreover, Kipanyula (2015) explains that the lack of compliance to vaccination schedules, amongst other factors, creates a unique environment for the enzootic status of the disease. He further reveals strengthening the reporting system, early detection of rabid animals, mapping of endemic areas, and prompt response to treatment are considered part and parcel of the control strategies required to break the transmission cycle between humans and domestic dogs. However they further reported that Lack of clear strategies to address the plight of zoonotic diseases cause delay in multisectoral collaboration.

5.5. Barriers to Collaboration in Controlling and Managing Zoonotic Diseases

Study findings reveal that the following barriers hinder collaboration in controlling and managing zoonotic diseases. They are: lack of effective strategies, lack of adequate resources, low prioritization of zoonotic diseases, lack of joint emergency preparedness plan, absence of a policy statement to enforce collaboration among healthcare experts, lack of awareness on the need for collaboration among the departments, lack of equipped laboratory for conducting investigation, and poor supervision of zoonotic disease control activities. All of these factors hinder collaboration in controlling and managing zoonotic diseases.

However, it was observed that the wildlife sector is the one experiencing the worst of these barriers as majority of the respondents showed lack of requisite knowledge on zoonotic collaboration. This has led to poor planning and budgeting on disease response and management.

Meanwhile, findings show that rabies is the commonest zoonotic disease that occurs in Kilosa. However, the Department of health and livestock does not allocate enough budget for rabies vaccines to meet the quality services as stipulated in the the country's Health Policy, 2007, which carries the emphasis of "Health for All". At the same time, the Wildlife Department did not participate in resource mobilization as it considers itself exclusively responsible for dealing with total community loss rather than protecting the health of humans and animals.

5.5.1 Lack of adequate resources

This particular observation on lack of resources agrees with the findings on the study Practice of One Health approaches: Bridges and barriers in Tanzania; who sought to understand the factors that hindered stakeholder collaboration in addressing zoonotic disease challenges in Tanzania. The reasons mentioned by most of the key respondents were lack of relevant knowledge or skills needed for collaboration, lack of collaborative budgeting for human and animal health, and insufficient budget [39].

Also, Kayunze study mentioned other barriers to collaboration which were not found in this study. They include lack of teamwork among healthcare experts, poor communication among healthcare experts and lack of common research on zoonotic diseases.

5.5.2 Lack of equipped laboratory for conducting investigation

In the study Prioritizing zoonotic diseases in Ethiopia using a one health approach reported that Multi-sectoral collaborations is necessary to enhance laboratory capacity, and support implementation of prevention and control strategies; and these have to be done through the adoption of one health agenda for zoonotic collaboration[38].

A study on BMC infectious diseases in Tanzania also reveals poor diagnostic capacity of many diseases, including zoonoses, as a factor fuelling the occurrence and spread of zoonotic diseases. Laboratories, particularly in the rural areas where majority of people reside, are poorly equipped and can not diagnose most of the emerging and re-emerging

diseases. Besides this fact, the researchers suggested that increased awareness of diseases among healthcare workers and the community is still the most important area in disease control[40]

5.5.3 Low prioritization of zoonotic diseases

5.5.4 Lack of joint emergency preparedness plan

Also in the study ‘The challenges and lessons from Ebola crisis for zoonotic disease preparedness and Control’ in West African Countries including Guinea, Sierra Leone and Liberia’ reveals the importance of joint emergence preparedness plan. The findings from this study, further reveals that; Ebola crisis in three West African countries including Guinea, Sierra Leone and Liberia, was one of the greatest health tragedies in modern times that has caused more than 11,300 deaths (CDC, 2016). This tragedy is partly attributed to the acuteness of the virus, but the lack of preparedness and inappropriate responses plan exacerbated the situation. These include the belated response of global health governance, deterioration of national health systems and inappropriate interventions to control the disease[41].

Meanwhile in Tanzania particularly Kilosa District where the study taken; participants from health and some from livestock departments agreed on the availability of departmental plan while maintaining zoonotic interventions –like vaccination against notifiable diseases – are integrated within the plan. It was noted that there are difficulties in the implementation of the plan due to insufficient resources such as material, financial and human resources.

Infectious Disease control in their study ‘Recurring epidemics in the WHO African Region’ had most of the interviewed respondents expressing availability of District Council’s emergency preparedness plan and committee though it is not working since its formulation. The study pointed to a lack of disaster mitigation in the study areas whereby respondents mentioned that, oftentimes, an action would be taken after a disaster occurs despite having the history of frequent disaster occurrences in the district[36].

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study was conducted to analyze Factors Influencing Multi-sectoral Collaboration in responding to emerging zoonotic diseases among livestock, wildlife and health sectors in Kilosa, Tanzania. This study concurs with other studies conducted elsewhere in Tanzania mainland and with the other study outside Tanzania whereby the most emphasis was on zoonotic preparedness and responses in multisectoral aspects.

Study findings reveal that health and livestock departments have included zoonotic intervention in their plans though it is not district priority. Moreover, the two departments have a number of staff who are responsible for dealing with control and management of zoonotic diseases, including provision of health education, health promotion, vaccination and treatment, as far as the question of zoonotic diseases in Kilosa District is concerned.

The study also found that there is the absence of a joint emergency preparedness plan for controlling and managing zoonotic diseases among the three departments of health, livestock and wildlife. This has led to low collaboration between the three departments. The Wildlife department, which has been mostly affected by lack of financial resources, would be considered a major setback for its decision not to consider zoonotic diseases as a priority area within the department.

Also, the study has found that there exists an emergency preparedness team and ad hoc structures despite both of them not being operational. Moreover, there was found to be a poor co-ordination among the three sectors in bringing and working together on controlling and managing zoonotic diseases.

Meanwhile, the study has found that there exist various strategies for controlling and managing zoonotic diseases in Kilosa District, although such strategies were found to be ineffective due to lack of resources.

Lastly, the study reveals the various barriers that may hinder collaboration in the implementation of zoonotic disease management and response plans. The barriers include lack of effective strategies, lack of adequate resources, low prioritization of zoonotic diseases, and absence of a joint emergency preparedness plan.

However this study concurs with other studies done by different researchers inside and outside Tanzania in different perspectives.

6.1.2 Existence of Policy environment

Tanzania has showing great commitment in controlling and managing zoonotic disease responses through the establishment of the country strategy for One Health Approach on which animal and human health activities/network emphasized to be handled in multidisciplinary approach though the concept of one health is still not well known. Meanwhile none of the existing Policies address much on zoonotic coloboration.

6.2 Recommendations

6.2.1 Recommendations for the central Government authorities

1. Government i.e. Ministry of Health, Veterinary and wildlife should increase its commitment to zoonotic diseases by allocating sufficient funds for preparedness measures and prioritize response to zoonotic diseases countrywide. This will help to prevent the eruption of such diseases and reduce their consequences in case of any emergencies.
2. Ministry of Health, Veterinary and Wildlife should ensure that the existing guidelines and policies emphasize on 'One Health' concept and multisectoral collaboration in managing and controlling zoonotic diseases.
3. The government should ensure equal distribution of human resources in all cadres in the department of Health, Livestock and Wildlife to facilitate effective implementation of 'One Health' approach at all levels.

6.2.2. Recommendations to the District authorities

1. Officials from all departments should be trained or educated on the concept of 'One Health' This will facilitate the implementation of joint activities which, if not embraced by all the departments, could lead to more effects including eruption and spread of zoonotic diseases in the community.

2. Control of zoonotic diseases should be included in the district and departments' annual plans with adequate funding and close monitoring so as to consider it as one among the priority areas of the district.
3. Departments of health, wildlife and livestock should conduct regular supportive supervision and surveillance in zoonotic diseases to ensure effective implementation of interventions aimed at managing and controlling zoonotic diseases.
4. District authorities should carry out campaigns to educate community members about the health effects of living closer to national parks in order to reduce the eruption of zoonotic diseases.
5. District authorities should set aside enough budgets to equip its laboratory for conducting investigation to enable effective decision making regarding measures to be taken in efforts to control the emergence and spread of zoonotic diseases.
6. District officials should emphasize the preparation of joint emergency preparedness plan for zoonotic disease management and response, as well as ensure the functioning of the emergency team.

6.2.3 Recommendation to NGO's and Development partners

Development partners should continue working together with the department of Health, Livestock and Wildlife to ensure effective participation and involvement towards zoonotic collaboration and responses.

6.2.4 Community-level Recommendations

1. Village leadership should supervise and monitor the implementation of national and local authorities' guidelines, including those prohibiting community dwellers to stay away from animals' reserved areas.
2. Community members should respect directives from the district and national level authorities, including the prohibition of invading reserved areas for national parks or living closer to national parks, as this will help to reduce the eruption of zoonotic diseases.

3. Community members should be trained on the health effects on a culture of drinking raw milk/blood, and not to sleep in same house with their livestock.

6.2.4 Recommendation for further research

1. Furthermore, research should be conducted to explore innovative techniques that would be applied by stakeholders on how to improve collaboration among different sectors in the country in efforts to scale-up control and management of zoonotic diseases.
2. Efforts should be made to mobilise resources in order to support postgraduate student funding for further zoonotic collaboration research.

REFERENCES

1. UN; Disaster Preparedness for Effective Response. United Nations secretariat of the International Strategy for Disaster Reduction (UN/ISDR) and the United Nations Office for Coordination of Humanitarian Affairs (UN/OCHA). 2015. 60 p.
2. Fyumagwa RD et al; Response to Rift Valley Fever in Tanzania : Challenges and Opportunities. *Tanzan J Health Res.* 2011;13:1–9.
3. WHO; The Control of Neglected Zoonotic Diseases A route to poverty alleviation: Report of a Joint WHO/DFID-AHP Meeting with the participation of FAO and OIE. 2006.
4. Kahn LH et al; Confronting zoonoses through closer collaboration between medicine and veterinary medicine (as “one medicine”). *Vet Ital.* 2007;43(1):5–19.
5. WHO; A Systematic Review of Public Health Emergency Operations Centres (EOC). 2013.
6. WHO. Regional Meeting on Zoonotic Diseases. Report of the meeting Chiang Mai, Thailand. 2014.
7. Mbugi et al; “One Health” infectious diseases surveillance in Tanzania: Are we all on board the same flight? *J Vet Res.* 2012;79(2):1–7.
8. Trang DT et al: Prioritization of zoonotic diseases of public health significance in Vietnam. *J Infect Dev Ctries.* 2015;9(12):1315–22.
9. WHO; Report on Emergency response framework: Geneva 27, Switzerland; 2013.
10. Lee K, Brumme Z. Operationalizing the One Health approach: The global governance challenges. *Health Policy Plan.* 2012;28(7).
11. Prof. Robinson M et al; The Current Knowledge and Needs of the Country in Zoonotic Disease Research in Tanzania. 2012.

12. Nicholas D et al; Risk factors associated with human Rift Valley fever infection: systematic review and meta-analysis. *Trop Med Int Heal*. 2014;19(12):1420–9.
13. FAO-OIE-WHO; Sharing responsibilities and coordinating global activities to address health risks at the animal-health-ecosystems interfaces: A tripartite Concept Note. *Heal (San Fr)*. 2010;6.
14. Kahn LH et al; Confronting zoonoses, linking human and veterinary medicine: Princeton University, USA. *Vet Ital*. Version 3. 2012;3:40.
15. Halliday J et al; Bringing together emerging and endemic zoonoses surveillance shared challenges and a common solution: UK Department for International Development. *Phil Trans R Soc B* . 2012;367.
16. Danaher A. *Reducing Health Inequities: Enablers and Barriers to Inter-sectoral Collaboration*. Wellesley Institute. 2011. 20 p.
17. WHO; *Zoonotic Diseases: A guide to establishing collaboration between animal and human health sectors collaboration at the country level*: Geneva; 2008. 10-11 p.
18. Scott-orr et al; *A final report to the UK Government Department for International Development (DFID) on Collating examples of Institutions , Policies and Stakeholders involved in the Management of Zoonoses*: 2012.
19. Rama ER. *Report on Factors affecting multisectoral collaboration response to rift valley fever outbreak in kongwa district*: MUHAS; 2013.
20. Sherman DM. A global veterinary medical perspective on the concept of one health:Focus on Livestock. *ILAR J*. 2010;51(3):281–7.
21. Osoro NE. *Working paper on Domestic Resource Mobilization in Sub-Saharan Africa: The Case of Tanzania*:The North South Institute; 2010.
22. Keusch GT et al; *Sustaining Global Surveillance and Response To Emerging Zoonotic Diseases*:Washington, DC. National Academy of Sciences. 2009. 340 p.

23. WHO; Report on Combating Emerging Infectious Diseases in the South-East Asia Region:New Delhi; 2005.
24. Cohen O et al; Promoting public health legal preparedness for emergencies: Review of current trends and their relevance in light of the Ebola crisis. *Glob Health Action*. 2015;8(1):1–9.
25. Kalugendo F et al; National progress report on the implementation of the Hyogo Framework for Action. Tanzania; 2015.
26. FAO-OIE-WHO; Sharing responsibilities and coordinating global activities to address health risks at the animal-health-ecosystems interfaces: A tripartite Concept Note. *Heal (San Fr)*. 2010;6.
27. Trang DT, Siembieda J, Huong NT, Hung P, Ky VD, Bandyopahyay S, et al. Prioritization of zoonotic diseases of public health significance in Vietnam. *J Infect Dev Ctries*. 2015;9(12):1315–22.
28. Balster EB. Report on Zoonotic Disease in Ohio : Surveillance , Preparation , and Response. 2010.
29. Kathmandu et al: Meeting Report on Asia-Pacific Workshop on Multisectoral Collaboration for the Prevention and Control of Zoonoses. 2013.
30. Trang DT et al; Prioritization of zoonotic diseases of public health significance in vietnam. *J Infect Dev Ctries*. 2011;9(12):15–22.
31. Kahn LH. Confronting zoonoses, linking human and veterinary medicine: Princeton University, USA. *Emerg Infect Dis*. 2006;12(4):556–61.
32. Baxter P, Jack S. The qualitative report qualitative case study methodology: Study design and implementation for novice researchers: *Qual Rep*. 2008;13(4):2.
33. Kipanyula MJ. Why has canine rabies remained endemic in the Kilosa district of Tanzania? Lessons learnt and the way forward. *Infect Dis Poverty*. 2015;4(1):52.

34. Yin RK. *Complementary Methods for Research in Education*: American Educational Research Association; Washington, DC. 2004.
35. WHO; *International health regulations*; Geneva 27, Switzerland; 2005. 40-66 p.
36. Impouma B, Kasolo F, Yada A, Yoti Z, Yaya S, Woodfill C, et al. *Recurring epidemics in the WHO African Region*. *Infect Dis Control*. 2007;15:1–6.
37. Sorrell EM, El AM, Maswdeh N, Kornblet S, Standley CJ, Katz RL, et al. *Mapping of Networks to Detect Priority Zoonoses in Jordan*; *Front Public Heal*. 2015;3(2296–2565 (Electronic)):219.
38. Pieracci EG, Hall AJ, Gharpure R, Haile A, Walelign E, Deressa A et al.; et al. *Prioritizing zoonotic diseases in Ethiopia using a one health approach*; *One Heal*. 2016;2:131–5.
39. Kayunze KA, Kiwara A, Lyamuya E, Kambarage DM, Rushton J, Coker R, et al. *Practice of One Health approaches: Bridges and barriers in Tanzania*. In: *Onderstepoort Journal of Veterinary Research* 81(2) Art. 2014. p. 1–8.
40. John K et al; *Knowledge of causes , clinical features and diagnosis of common zoonoses among medical practitioners in Tanzania*: *BMC Infect Dis* 8162. 2008;8:1–8.
41. Kim Y. *The challenges and lessons from Ebola crisis for zoonotic disease preparedness and Control*” in *West African Countries*; 2016.

APPENDICES

Appendix 1 A: Consent Form English Version

**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES(MUHAS)
DIRECTORATE OF RESEARCH AND PUBLICATIONS**



No Date

Introduction

Greetings! I am Subira Mumba a student of Master of Arts in Health Policy and Management at Muhimbili University of Health and allied sciences. I am conducting a research on Factors Influencing Collaboration between Health and Agricultural sectors in responding towards emerging zoonotic diseases. A case of Veterinarians, Wildlife and Health professionals in Kilosa District Council.

About the study

It is estimated that a total of 15 adults professionals will be interviewed in this study; but the number may change upon reaching saturation points of information. Hence, I will ask you few questions on multisectoral collaboration towards zoonotic diseases.

This will take approximately 30 minutes of your valuable time.

What Participation Involve

If you agree to join this study, you will be required to sign this consent form and answer the question that you will be asked by the interviewer.

Benefits

You will not get direct benefits from the study; but, the information provided by you will help us to understand the Factors influencing collaboration between Health and Agricultural sectors in responding towards emerging zoonotic diseases.

Risk

We do not expect any harm will happen to you because of participating in this study.

Confidentiality

I wish to assure you that, this information will be treated in confidentiality between you and the researcher. All the information collected in this interview guide will be entered in the computer with only the study identification number and no names.

Voluntary participation

Taking part in this study is totally voluntary, that is, you can decide to participate or not. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Who to contact If you have any question about this study

You should contact the Principle Investigator, Subira Mumba - Muhimbili University of Health and Allied Sciences, P. O. Box 65001, Dar es Salaam, Mobile phone 0715 13 55 22
If you ever have a questions about your right as a participant, you may call Prof. S. Abood Chairman of the senate Research and Publications Committee, P.O.BOX 65001 Dar es Salaam. Tel: 2150302-6 and my supervisor Dr Gasto Frumence. Phone 0713 212 212

Do you agree? Yes..... No.....

Participant agrees Participants does not Agree.

I, Have read the contents of this consent form and my questions have been adequately answered. I therefore agree to participate in this study.

Signature of the participant Date

Signature of the interviewer Date

Appendix 1 B: Consent Form Kiswahili Version

Ridhaa ya kushiriki kwenye utafiti (Swahili)

Namba ya utambulisho: _____

Salaam! Naitwa....., kwa niaba ya Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili (MUHAS), ninakusanya takwimu kwa ajili ya utafiti kuhusu mambo yanayopelekea ushiriki wa sekta mbalimbali kuchukua hatua katika kudhibiti mlipuko wa magonjwa yaenezwayo na wanyama katika halmashauri ya wilaya ya Kilosa.

Nini kinahitajika ili kushiriki

Kama utachagua kushiriki katika utafiti huu, utahitajika kujaza fomu ya maridhiano na utahitajika kujibu maswali ambayo utaulizwa na mhojaji.

Faida

Kama utakubali kushiriki katika utafiti huu, tunategemea kwamba taarifa tutakazozipata kutoka kwako zitakuwa na maana kwetu na kwa wadau wengine katika sekta mbali mbali zinazohuzika na kudumisha ushiriki wao dhidi ya magonjwa ya mlipuko.

Madhara

Hatutegemei ya kwamba utapata madhara yoyote kwa kushiriki kwako katika utafiti huu

Usiri

Taarifa zitakazokusanywa kupitia dodoso hili zitakuwa ni za siri ni Mtafiti mkuu na ndio watakuwa na ufahamu huu na hairuhusiwi mtu mwingine asiyehusika kuwa na taarifa hizi. Taarifa hizi zitatumika kwa madhumuni wa utafiti huu na sio kwa sababu zingine. Fomu hii haitahitaji jina lako ila namba ya utambulisho wa fomu ndio zitatumika.

Haki ya kushiriki au kujitoa au vinginevyo

Ushiriki katika utafiti huu ni wa hiari, unaweza kuruka swali ambalo hutaki kulijibu au kuacha kushiriki katika utafiti huu hakutakuwa na adhabu yeyote na hutapoteza stahili zako, endapo utaona ni vema kufanya hivyo. Fahamu kuwa ushiriki wako katika tafiti hii ni jambo la muhimu.

Nani wa kuwasiliana naye

Endapo utakuwa na maswali kuhusiana na utafiti huu , unaweza kuwasiliana na Mtafiti wa utafiti huu Subira Mumba wa Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, SLP 65001, Dar es salaam, simu ya kiganjani 0715 13 55 22

Msimamizi Mkuu Prof. S. Abood kitengo cha Kamati ya kupitia na kuidhinisha tafiti mbalimbali (Chuo kikuu cha Afya na Tiba Muhimbili) Namba ya kiganjani: **2150302-6** au Dr. Gasto Frumence (msimamizi wangu) namba 0713 212 212

Sahihi: Je umekubali?

Mshiriki amekubali Mshiriki hajakubali

Mimi _____nimesoma maelezo ya fomu hii. Maswali yangu yamejibiwa. Nakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki.....

Sahihi ya mtafiti

Tarehe ya kutia sahihi ya Kushiriki.....

Appendix 2 A: Interview guide (English Version)

Key informant interview guide Number:.....

Sex of the informant :.....

Title.....

Duration in office/ Department

General overview on zoonotic diseases outbreak

1. What do you know about zoonotic diseases? (**Probe:** causative agent, transmission)
2. What are the risk factors associated with zoonotic in your area? (**Probe:** for specific social, cultural, economic, geographic factors that might explain the spread in the district)
3. Do these diseases ever occurred in your district/area?

Effective organization roles and responsibilities

4. What are the existing organizational structure that are responsible for controlling and managing zoonotic diseases in your district?
 - Probe: ask about specific organizational structures for the department of agriculture/health in the district
5. What are the roles and responsibilities of the existing organizational structures in the department of agriculture/health in controlling and managing zoonotic diseases?
 - Probe roles and responsibilities for individuals and existing committees for controlling and managing zoonotic diseases
 - What are the existing joint organizational structures between agriculture and health sectors responsible for controlling and managing zoonotic diseases at the district level?
 - Probe roles and responsibilities for individuals and existing committees for controlling and managing zoonotic diseases

Emergence preparedness, prevention, control and response to zoonotic diseases

6. What are the existing zoonotic preparedness and response plan? If there are preparedness and response plan, probe who are involved in preparing it
 - Probe if all key stakeholders from the two departments and other departments in the district are involved in preparing the plan (participatory approach in planning)
 - Probe the key issues addressed in preparedness and response plan
 - Probe: if the district does not have zoonotic preparedness and response plan, what strategies/policies are used by the two departments in controlling the outbreak of zoonotic disease.
 - Probe: to understand the details of each existing strategy in terms of identified activities/interventions to control and manage zoonotic diseases in the district.
- a) For the joint plan, probe how the strategies identify specific activities for each involved department and the joint activities.
 - Probe: how the district mobilizes resources to manage zoonotic diseases
- b) Specifically probe how they mobilize financial resources, human resources and others including equipment)
7. What are the strengths of the existing strategies/policies in terms of implementing individual and joint activities between agriculture and health department in controlling and managing zoonotic diseases in the district?
 - Probe about strengths for each department
 - Probe about strengths for the collaborative strategies between the two departments
8. What are the weaknesses of the existing strategies/policies in terms of implementing individual and joint activities between agriculture and health department in controlling and managing zoonotic diseases in the district?
 - Probe about weaknesses for each department
 - Probe about weaknesses for the collaborative strategies between the two departments

9. For each of the identified weakness, probe how they act as a barrier in controlling and managing zoonotic diseases in the district
10. To what extent is zoonotic integrated in the district plan? Are there resources allocated to zoonotic response? Is zoonotic diseases one of the priority diseases?(If NOT, why)

Multisectoral collaboration in response to zoonotic outbreak

11. How is multisectoral collaboration being practiced in addressing zoonotic outbreak in Tanzania?
12. To what extent are NGO's/private stakeholders involved in the overall response to zoonotic outbreak? Do they involve themselves in managing outbreak?
13. How does information concerning zoonotic communicated in the intersectoral aspect?
 - Probe: How effective are the identified communication strategies?
14. Recommendations and wayforward.

Appendix 2B: Dodosa: Swahili Version

<p>Utambulisho</p> <p>Sehemu A</p> <p>Sehemu B</p>	<p>Jina la muhojaji:.....</p> <p>Tarehe ya Mahojiano:.....</p> <p>Namba ya utambulisho ya muhojiwa:.....</p> <p>Wilaya:.....Idara:.....</p> <p>Jinsia ya muhojiwa:....</p> <p>Cheo:</p> <p>Muda wa kukaa kazini....</p> <p>Mtazamo wa ujumla kuhusu magonjwa ya mlipuko yatokanayo na wanyama</p> <ol style="list-style-type: none"> 1. Unafahamu nini kujusu magonjwa ya mlipuko yanayosababiushwa na wanyama? (Dodosa: aina ya magonjwa, visababishi, namna unavyoambukizwa) 2. Ni aina gani ya vihatarishi vinavyoambatana na magonjwa ya mlipuko yanayotokana na wanyama katika eneo lako? (Dodosa:mambo ya kijamii, kiutamaduni,kiuchumi,hali ya kijiografia ambazo zinaweza kuelezea kuenea kwa ugonjwa katika wilaya yako) 3. Je magonjwa yatokanayo na wanyama yameshawahi kutokea katika katika eneo lako? Kama ndio taja aina ya ugonjwa: <p>Ufanisi wa utelezaji wa kazi na majukumu ya Taasisi katika kujikinga dhidi ya magonjwa ya wanyama</p> <ol style="list-style-type: none"> 4. Je, kuna muundo au mfumo wa kiutendaji unaohusika na kudhibiti magonjwa yanayotokana na wanyama katika wilaya yako? <ul style="list-style-type: none"> • Dodosa: Uliza kuhusu wa kiidara ya afya, mifugo na maliasili katika wilaya.
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	<p>5. Ni zipi kazi na majukumu ya mifumo iliyopo katika kudhibiti magonjwa yatokanayo na wanyama?</p> <ul style="list-style-type: none"> • Dodosa kuhusu kazi na majukumu ya mtu mmoja mmoja na kamati zilizopo kwa ajili ya kudhibiti magonjwa ya wanyama? <p>6. Je kuna muingiliano wowote wa idara ya mifugo, afya na maliasili katika kudhibiti magonjwa yatokanayo na wanyama katia ngazi ya wilaya?</p> <p>Timu ya dharura ya maandalizi kuzuia, kudhibiti na kukabiliana na magonjwa yanayosababishwa na wanyama</p> <p>7. Je kuna mpango kazi wa kuzuia, kudhibiti na kukabiliana na magonjwa yanayotokana na wanyama? Kama upo, nani anahusika kuuandaa?</p> <ul style="list-style-type: none"> • Dodosa: kama kuna wadau wakuu kutoka idara zote tatu wanashirikishwa kwenye kuandaa mpango kazi • Dodosa: mambo muhimu yaliyoshughulikiwa katika mpango kazi • Dodosa: Kama wilaya haina mpango kazi, ni mikakati ipi/sera zipi zinatumiwa na idara kudhibiti magonjwa ya wanyama? • Dodosa kwa undani katika kila mkakati kuangalia kazi zilizoainishwa/afua kudhibiti magonjwa yatokanayo na wanyama. • Dodosa namna wilaya inavyokusanya rasilimali za kupambana na kudhibiti magonjwa yanayotokana na wanyama. (rasilimali fedha, watu na vifaa) <p>8. Ni nini uimara wa mikakati/sera zilizopo katika kutekeleza kazi binafsi na za pamoja kati ya idara ya afya, mifugo na maliasili katika kudhibiti magonjwa yatokanayo na wanyama?</p> <ul style="list-style-type: none"> • Dodosa kuhusu uimara/ufanisi wa kila idar • Dodosa kuhusu uimara/ufanisi katika mikakati ya kutekeleza shughuli za pamoja kama ipo?
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9. Ni nini mapungufu/changamoto ya mikakati/sera zilizopo katika kutekeleza kazi binafsi na za pamoja kati ya idara ya afya, mifugo na maliasili katika kudhibiti magonjwa yatokanayo na wanyama?

- **Dodosa** kuhusu mapungufu kwa kila idara:
- **Dodosa** kuhusu mapungufu katika mikakati ya kutekeleza shughuli za pamoja kama ipo?
- **Dodosa:** Kwa kila mapungufu ni jinsi gani yanaweza kuwa kikwazo katika kudhibiti magonjwa yatokanayo na wanyama?

10. Kwa kiwango gani udhibiti wa magonjwa yatokanayo na wanyama yanahusishwa katika mpango kazi wa wilaya? Kuna rasilimali zilizotengwa kwa ajili ya shughuli hizo? Je magonjwa haya ni moja ya vipaumbele vya wilaya? Kama sio kipaumbele, kwanini?

Ushiriki wa Sekta mbalimbali katika kukabiliana na kuzuka kwa magonjwa yatokanayo na wanyama?

11. Kwa namna gani sekta mbalimbali zinashiriki pamoja katika kupambana na magonjwa yatokanayo na wanyama Tanzania?

12. Kwa kiwango gani mashirika yasiyo ya kiserikali/wadau binafsu wanashirikishwa katika kukabiliana na magonjwa yatokanayo na wanyama?

Je wanahusishwa katika kukabiliana na mlipuko wa magonjwa hayo?

13. Kwa namna gani taarifa zinazohusiana na magonjwa yatokanayo na wanyama zinawasilishwa katika nyanja mbalimbali?

Dodosa: Mkakati wa mawasiliano hayo yana ufanisi kwa kiwango gani?

14. Je unamapendekezo gani kuhusu kukabiliana na magonjwa yanayotokana na wanyama?