

**KNOWLEDGE, ATTITUDES, AND PRACTICES ON ZOO NOTIC DISEASES AND
CONTROL AMONG ACTORS IN LIVESTOCK TRADE IN BUSIA COUNTY,
WESTERN KENYA**

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**A THESIS SUBMITTED TO THE DEPARTMENT OF ANTHROPOLOGY, GENDER,
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THE UNIVERSITY OF NAIROBI.**

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DECLARATION

This thesis is my original work and has not been presented for examination at any other university.

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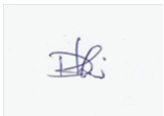
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This research thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

I dedicate this to my daughter Nelly Heri. May this be a motivation to pursue success through higher education.

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ABBREVIATIONS AND ACRONYMS

GDP	Gross domestic product
HAT	Human African Trypanosomiasis
IDI	In-depth interview
ITN	Insecticide Treated Nets
KAP	Knowledge attitudes and practices
KII	Key informant interview
WHO	World Health Organization
ZDU	Zoonotic diseases unit

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ABSTRACT

Zoonotic diseases pose a direct health threat to the communities in which they occur, and they concurrently undermine livestock keepers' livelihoods. A combination of anthropogenic, animal, and ecosystem activities drives the emergence and re-emergence of zoonotic diseases. Understanding people's knowledge, attitudes, and practices in communities related to zoonotic diseases is essential for their prevention, control, and eventual elimination. Within non-pastoral communities, it is crucial to examine practices amongst actors (trekkers and traders) involved in the livestock trade. These may heighten the risk of contracting zoonotic diseases or impact their control. This study differs from a traditional focus on pastoralists' practices in arid and semi-arid lands.

A predominantly crop-producing area with cross-border trade between Kenya and Uganda, Busia County was chosen for this study. This was an ethnography with actors involved in livestock trade on their knowledge, attitude, and practices to prevent zoonotic disease transmission. Data was collected through in-depth interviews with thirty (30) purposely sampled informants using unstructured observation of the activities of the actors and nine (9) key informant interviews.

The findings indicate some knowledge about zoonotic diseases among the interviewed livestock traders and trekkers. Brucellosis, foot and mouth disease (FMD), and anthrax were mentioned as common diseases by many of the actors in the livestock trade. The actors identify sick animals by checking if the animal has: dropping ears, a lot of mucus in the nose, diarrhea, blood-stained urine, and low activity levels. The zoonotic control measures employed by actors included isolating sick animals, vaccinating against certain diseases, treating sick animals, and separating animals to be traded from those to be kept. The actors engage in risky practices like skinning dead animals before burying and consuming dead carcasses which increase the risk of zoonotic

disease transmission. In conclusion, the study demonstrates a need for increased awareness of potential zoonotic disease prevention and control measures among actors involved in the livestock trade. Therefore, there is an urgent need for increased awareness of zoonoses within livestock keeper and trader communities, and these campaigns need to utilize multi-disciplinary teams with an understanding of human health, animal health, and social scientists so that professional knowledge, lay knowledge, and traditional practices can be adequately taken into consideration to reduce zoonotic disease transmission best and so One Health approaches are necessary to alleviate disease impacts in the community.

CHAPTER ONE: BACKGROUND TO THE STUDY

1.1 Introduction

Humans live in close relationships with animals that are domesticated or chosen as pets. These animals carry pathogens that are transmissible to humans and can be harmful to one's health (Kayumba, 2018). The diseases that are transmissible from beasts to human beings are termed zoonotic. The interaction of humans with livestock exposes them to pathogens, and the infection in humans can be direct or through vectors like mosquitoes or tsetse fly (Jones et al., 2013a). Zoonotic diseases offer challenging problems to global health. According to the World Health Organization (WHO, 2006), the endemic diseases of concern were listed as rabies, human African trypanosomiasis (HAT), brucellosis, bovine tuberculosis, cysticercosis, echinococcosis, and anthrax. These diseases have different community health burdens and marked effects on the social and economic activities of communities. The resultant burden on the family is not only because the infected individual becomes unproductive but also because close relatives must spend time taking them for treatment and looking after them. Time and money spent searching for a cure may severely drain the family resource (Bukachi, 2007). The varying public health burden and social-economic impact of zoonotic diseases across time and geographical settings make prioritization for their prevention and control important (Munyua et al., 2016). There has been a 63% increase in the number of zoonotic outbreaks in the African region in the decade from 2012-2022 compared to 2001-2011, according to World Health Organization (WHO) analysis. The analysis reports that of 1843 public health events recorded in the WHO African region office, 30 % were zoonotic outbreaks and there was a particular spike in 2019 and 2020 when zoonotic pathogens represented around 50% of public health events. Ebola Virus Disease and other viral hemorrhagic fevers constitute nearly 70% of these outbreaks; with dengue fever,

anthrax, plague, monkeypox, and a range of other diseases making up the remaining 30%. According to the Republic of Kenya zoonotic disease unit (ZDU) National strategic plan 2012-2017 Viral hemorrhagic fever (CCHF, Dengue, RVF, YF, Ebola, Marburg), Avian influenza, and other pandemic influenza viruses (e.g., 2009 A/H1N1), Brucellosis, Leishmaniasis, Leptospirosis, Anthrax, Rabies, West Nile virus, Bovine tuberculosis, Plague, Tularemia, Protozoans (Cryptosporidiosis, Toxoplasmosis), Salmonellosis, Helminths (Trichinosis, Cysticercosis, Hydatidosis, Sarcopsis, Diphyllbothrium), Fungal diseases (Dermatophilosis, Histoplasmosis, Cryptococcosis, Aspergillosis), Schistosomiasis and Trypanosomiasis have been identified as zoonotic diseases of priority that are circulating between people and their livestock.

Animal-origin diseases are cardinal to community health and therefore of foremost importance are identifying, preventing, and managing these diseases. As the threat of zoonotic diseases increases, there is a need to develop comprehensive models that appreciate the reciprocity between biological, ecological, and environmental phenomena and the cultural beliefs, perceptions, and behaviors towards these diseases. The successful prevention and control of zoonotic diseases require a One Health approach, which involves a multisectoral collaboration of the human, animal, and environmental health sectors, among other stakeholders. Kenya made a step towards implementing the One Health approach in 2011 when the Zoonotic Disease Unit (ZDU) was established. The ZDU is a collaborative platform shared between the ministries responsible for human and animal health. One Health is particularly relevant to the Horn of Africa where many people's livelihoods are highly dependent on livestock and their shared environment. The One Health Strategic Plan for the Prevention and Control of Zoonotic Diseases in Kenya (2021-2025) was launched with the goal to reduce the burden of priority zoonotic diseases which will be achieved through the strengthened implementation of the One Health

approach at the national and county levels and the promotion of applied research to fight those diseases using the One Health approach. The government, in the Ministries and various intergovernmental committees, has ultimately two major intertwined instruments to operationalize the One Health approach that is to ensure people, companies and other actors like NGOs adopt good practices to minimize public health threats. There are primary and secondary laws targeting prevention, detection, and control of emerging zoonotic diseases at various nodes of the livestock value chain. (FAO,2020)

The outbreaks of zoonotic diseases around the world have huge impacts as they affect animal and human health and affect the social and economic activities of communities and food security (Hassan et al., 2017). In the devolved governance system in Kenya, Counties have been working to intensify their livelihoods. Zoonotic diseases affect peoples' livelihood. Outbreaks of zoonotic diseases can affect families and the community by reducing the labor force and interrupting economic activities. The disease is likely to infect economically active people. The resulting burden can be heavy since the infected individual will be unproductive. The close relative will have to spend time looking after them and taking them to the hospital (Bukachi, 2007).

Since the pre-historic times, shifts in human disease burden, distribution of disease, and new infectious agents have come about primarily because of human activities (Jones et al., 2013a). During the processes of human population spreading around the world over the past 50,000–100 000 years, along with related cultural evolution and inter-populace contact and conflict, there have been several significant evolutions in the relationships of Homo sapiens with the natural world, animate and inanimate. Each of these transitions has resulted in the emergence of new or unfamiliar infectious diseases, including zoonotic diseases (McMichael, 2004). Cultural changes because of the rise in population, economic and technical developments, and augmentation of

farming activities have created more intense interaction between humans and livestock; these have been mentioned as factors that cause some of the contemporary ill-health events with impact on people's livelihood and well-being (Jones et al., 2013b). However, the increased risk of disease appearance and the possibility for pervasiveness has been linked to increased regional trade and travel, swelling human and livestock population and evolving cultures in recent times.

People's knowledge, attitudes, and practices contribute to the spread, control, and elimination of various diseases, known as cultural factors in the epidemiology of the disease (Helman, 2007:377). The transmission of these zoonotic diseases among livestock and humans happens in diverse cultural and social surroundings, and the risks of cross-transmission increase with macro-level factors such as globalization, the shift in climatic patterns, and cultural changes, all these give disease-causing agents more chances to invade new regions and develop into new forms.(Harper & Armelagos, 2010) Understanding people's knowledge, attitudes, and practices relating to a particular disease is essential for disease control and eventual elimination.

Animal trading involves moving animals from one area to another and different markets in different administrative jurisdictions. Actors in this include animal owners, trekkers, traders, brokers, administrators, and buyers. The understanding of practices and beliefs of these actors and the movement of the livestock may contribute to the spread of zoonotic diseases. There are varied practices and surrounding factors in different communities that keep livestock in the countryside and the areas surrounding urban areas that may contribute to the likelihood of disease outbreaks (Swai et al., 2010a). These traditions in animal production that impact increase or reduction on the risk of zoonotic diseases in livestock keeping, trading, and the community are dependent on understanding, perception, consciousness, perspective, and traditions to zoonoses. The level of knowledge and awareness might vary in different livestock

value chain systems from production to the market (Swai et al., 2010a). This exploratory study in design focused on the knowledge, attitudes, and practices of the actors involved in animal trading in Busia County on zoonotic diseases.

1.2. Statement of the problem

There are many diseases that humans acquire directly or indirectly from several animal species. Zoonotic diseases present a vast and growing threat to world health. They account for up to 75% of emerging infectious diseases (Goodwin et al., 2012). Zoonotic diseases are endemic in rural areas, more so in third world countries; however, increased livestock production in urban areas and their surroundings present the possibility of introducing zoonotic diseases to urban areas (Swai et al., 2010a). Zoonotic infections are on the increase worldwide (WHO, 2020) they constitute an essential part of the global health program of the world health organization.

All over the world, animals and humans often live together. People draw benefits from their animals in terms of food, clothing, fertilizer, draught power, and an important degree of financial security. The population that depends on the animals is at risk of acquiring disease from the animals and the animal products like milk and meat. A key characteristic of zoonotic diseases like anthrax, bovine tuberculosis, and brucellosis is that they are job-related diseases and people who deal with livestock are more exposed and, most of the time, get these infections from animals (Dzingirai et al., 2017). Animal keeping and trading are major economic and social activities in many communities and contribute significantly to agricultural income in Busia County. Within these settings of animal keeping and trading, zoonotic diseases pose human and animal health risks. Zoonotic infections in people and animals occur in the context of a wide range of co-endemic pathogens in a rural community in western Kenya (Fèvre et al., 2017).

These diseases commonly affect livestock, such as cattle, pigs, sheep, goats, and negatively impact livelihoods and thus affect the country's gross domestic product (Jones et al., 2013b). Livestock keeping and trading is a major economic activity in Busia county. There is evidence of cross border trading of livestock in Busia and given that the borders are highly porous to animal movement, this may contribute to zoonotic disease spread (Valerio et al., 2020). Actors in the livestock trade interact with animals in their daily operations, exposing them to the risk of infection with zoonosis and even contributing to their spread. This study was part of a larger project by the international livestock research institute (ILRI) that aimed to develop effective zoonoses surveillance program in Western Kenya. The overall research question was: How do the actors' knowledge, attitudes, and practices contribute to the spread and control of zoonotic diseases. The study set out to provide the answer to the following questions:

1. What knowledge do the actors in the livestock trade have on zoonosis?
2. What are the attitudes of actors in the livestock trade concerning zoonotic diseases?
3. What are the practices of actors in the livestock trade in relation to zoonotic diseases?

1.3 Objectives of the Study

1.3.1 Overall objective

To assess the knowledge, attitudes, and practices on zoonotic diseases of the actors in livestock trade in Busia County, of Western Kenya

1.3.2. Specific objectives

1. To establish the knowledge of actors in livestock trade on zoonotic diseases.
2. To determine the attitude of actors in livestock trade on zoonotic diseases.

3. To examine the practices of the actor in livestock trade in relation to zoonotic diseases.

1.4. Assumptions of the Study

1. The actors have knowledge about zoonotic diseases.
2. The actors' attitudes predispose them to infection with zoonotic diseases.
3. The actors' practices contribute to the spread of zoonotic diseases.

1.5. Justification of the Study

Because zoonotic diseases can spread across international borders Busia County which has a lot of cross-border trade with Uganda, was chosen, it also forms the right environment for strategic zoonotic disease control programs through public health awareness campaigns among local and foreign livestock traders. Busia County is a non-pastoralist community. This is the other reason it was chosen for this Study because most of the studies on KAP on zoonosis have been carried out among pastoralist communities. There is a gap in understanding zoonotic diseases in non – pastoral areas and among actors in livestock trade; hence, actors in the livestock trade in Busia County were selected for this Study. Busia also borders Uganda, and cross-border trade in animals is likely to happen; therefore, diseases can easily move from Uganda to Kenya and vice versa. This exploratory Study shaped part of an interdisciplinary research study looking into the economic, social, demographic, genetic, and epidemiological drivers of zoonotic diseases and how these combines to produce an overall burden of zoonotic disease and risk of zoonotic disease outbreaks in Western Kenya. The Study revealed that there is the movement of livestock from one County to another and from the neighboring country. It also revealed that some beliefs and practices could contribute to disease spread or control. There is a need to identify and

understand the knowledge, attitudes, and practices of the actors involved in the cross border and inter-county trade in livestock, as has been established by the study.

The findings of this study help in bringing to fore the actors' knowledge, attitudes, and practices towards zoonotic diseases. This will be useful in providing information that will guide the Busia County Government and the National government in designing and developing effective zoonotic disease control, prevention, eradication, and surveillance programs that will be embedded in the cultural prism and practices. Cultural factors play a crucial role in the epidemiology of diseases (Helman, 2007:377-384), and they must be considered when developing programs that target diseases in communities. This Study illuminates this by bringing out deeply rooted cultural beliefs and practices that the actors engage in, contributing to the spread of diseases. For any intervention program to be effective, these beliefs and practices must be considered.

Academically the study findings provide a rich source of data and findings for scholars who are interested in studying zoonotic diseases among actors in livestock trade in a non-pastoralist community set-up. The Study's findings contribute to the bank of knowledge on knowledge, attitudes, and practices on zoonotic diseases and expose knowledge gaps for further research. Put in context, the study results make significant contributions in the one health approach.

1.6 Scope and limitations of the Study

The Study was carried out in Busia County in Western Kenya. It employed a cross-sectional exploratory research design. The Study used the cultural materialism theory to establish how the actors' knowledge, attitudes, and practices contribute to the control and proliferation of zoonotic diseases.

The Study was purely qualitative, and therefore, In-depth interviews (IDIs), key informant interviews (KIIs) and observation were used to collect rich and detailed data. The qualitative aspect of data collection was compensated for through the triangulation of data collection methods. Some challenges were met in the field during data collection. Men constituted a majority of the informants, thus making an inference based on gender a problem. Some informants expected monetary compensation for participation in the study. However, they were explained for that their participation would benefit the larger community since the information they give will be used to author reports that will contribute to the development of policies on zoonotic diseases that would benefit the community at large. There were also cases of the study participants dropping off before the interview is completed for one reason or the other, like they were running late and needed to start their journey with the animals or wanting monetary compensation for their time, yet the Study was not offering any, for this case, the data collected from this participant was disregarded and another participant recruited. Unintentional images on one of the documents almost ruined the Study. There was a case where a lady refused to be part of the Study because she saw the KEMRI logo in some of the documents used in the study, and the image of the snake meant evil to her, and therefore she did not want anything to do with the Study. This shows the importance of cultural symbolism in how individuals interpret things around them. I tried to explain the origin of the symbol to her, but she refused, and a new

participant was recruited. The Study did not concern itself with clinical testing and following the participants to find out if they contracted zoonotic diseases or not within a given period. This gives room for a study that can cover the clinical testing of the participants.

While the Study concentrated on a geographically small area within Busia County, the findings can be mapped to other areas where livestock trading is practiced across the republic of Kenya.

1.7 Definition of terms

Actors: In this Study, this refers to any individual male or female of age 18 years and above directly involved in livestock trade

Zoonotic disease: This refers to any disease that is transmissible from animals to humans and vice versa.

Trader: This refers to an individual (trader, trekker, and market broker), male or female, who is involved in the actual business of buying and selling livestock

Trekker: This refers to a person whose duty is to walk the animals to their owners' desired destination. This could be to other markets or homes.

Market Broker: These are individuals that mediate a transaction between a buyer and a seller and then earn a commission by putting in a small percentage on the value of the animal being sold.

Attitude: A favorable or unfavorable evaluation of something. In this Study, the concept refers to how the actors evaluate zoonotic diseases and how they perceive them.

Knowledge: In this Study, Knowledge refers to knowing symptoms, causes, mode of transmission, and available treatment options for zoonotic diseases.

Practices: Practices, as used in this study, refer to conscious behaviors and actions towards sick animals. These actions could be informed by lay or acquired knowledge.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing literature on knowledge, attitudes, and practices on zoonotic diseases. The chapter also outlines and describes the cultural materialism theoretical framework, its relevance, and the conceptual framework that guided the study.

2.2 Zoonotic diseases

Any infectious disease that is potentially transmissible from animals, both wild and domestic, to humans is defined as a zoonotic disease (WHO/FAO/OIE, 2004). The diseases that infect humans from animals result from bacterial, viral, parasitic, or fungal infection and spread to humans through bites, scratches, or ingestion. Zoonotic diseases are often categorized according to their route of transmission (for example, vector-borne or foodborne), pathogen type (for example, micro parasites, macro parasites, viruses, bacteria, protozoa, worms, ticks, or fleas), or degree of person-to-person transmissibility. According to the International Livestock Research Institute Mapping of poverty and likely zoonoses hotspots 2012 report the most significant burden on human health and livelihoods, amounting to about 1 billion cases of illness and millions of deaths every year, is caused by endemic zoonoses that are persistent regional health problems around the world. Many of these infections are enzootic that is stably established in animal populations and transmit from animals to people with little or no subsequent person-to-person transmission, for example, rabies or trypanosomiasis. Other zoonotic pathogens can spread efficiently between people once introduced from an animal reservoir, leading to localized outbreaks, such as the Ebola virus or global spread, for example, pandemic influenza and Covid-19 caused by the corona virus.

Zoonoses made up most of the emerging infectious diseases identified in people in the past 70 years which, although relatively rare compared with endemic zoonoses, are a substantial threat to global health and have caused economic damage exceeding hundreds of billions of US dollars in the past 20 years (Jones et al., 2013b; Karesh et al., 2012). Apart from the appearance of a pathogen for the first time in human beings, the distinction between endemic and emerging zoonoses can be viewed as temporal or geographical. An endemic disease in one location would be regarded as an emerging disease if it crossed from its natural reservoir and entered the human or animal populations in a new geographical area, or if an endemic pathogen evolved new traits that created an epidemic, for example, drug resistance (Karesh et al., 2012)

The transmission of pathogens into human populations from other species is a natural product of our relationship with animals and the environment. The emergence of zoonoses, both recent and historical, can be considered a logical consequence of pathogen ecology and evolution, as microbes exploit new niches and adapt to new hosts. The underlying causes that create or provide access to these new niches seem to be mediated by human action in most cases and include changes in land use, extraction of natural resources, animal production systems, modern transportation, antimicrobial drug use, and global trade (Karesh et al., 2012).

Although underlying ecological principles that shape how these pathogens survive and change have remained similar, people have changed the environment in which these principles operate. Domestication of animals, clearing of land for farming and grazing, and hunting of wildlife in new habitats have resulted in zoonotic human infection with microorganisms that cause diseases such as rabies, echinococcosis, and the progenitors of measles and smallpox that had historically affected only animal populations through changes in contact and increased transmission opportunities from animals to people (Wolfe et al., 2007). As human societies have developed,

each era of livestock revolution presented new health challenges and new opportunities for the emergence of zoonotic pathogens (Coker et al., 2011).

In the past few decades, accelerating global changes linked to an expanding global population have led to the emergence of a striking number of newly described zoonoses, including hanta virus pulmonary syndrome, monkey pox, SARS, and simian immunodeficiency virus (the animal precursor to HIV). Some of these zoonoses, such as HIV, have become important new human pathogens that circulate persistently without repeat animal-to-person transmission. SARS could have been established but was contained by the rapid global response to its emergence; (Weiss & McLean, 2004). Other zoonoses, such as the Ebola virus and Nipah virus, have not become established because of local control efforts or their intrinsic inability to transmit efficiently between people.

Modern societies, governments, and farming practices have been shaped by the significant impact zoonotic diseases have had on human civilization throughout history. Rabies, anthrax, glanders, tuberculosis, plague, yellow fever, influenza, and zoonotic parasitic disease were the most common zoonotic diseases before the twentieth century. Transmission can be direct through bites or scratches by an animal that has the disease-causing agent. Transmission can also be indirectly in many ways; for example, a person can be bitten by a disease vector like a tick or mosquito or if they come into contacts with fluids produced by infected animals or consume infected animal products or consumption foodstuff contaminated with disease-causing pathogens.

There have been appearances and re-appearance of zoonosis in both the developed and developing countries in the recent past. There have been cases of zoonotic diseases in areas

where they have not been present for many years or cases appearing in species of animals where their presence had not been noted earlier. In the United Kingdom, the cattle herd suffered from an outbreak of bovine spongiform encephalopathy, also known as the mad cow, in the mid-1980s. This outbreak was linked to a deadly neurological disorder in humans who had been exposed to the infected animals and their products. Varied factors contribute to the emergence of new disease agents, and these factors do not act independently. Some of the factors that shape the emergence of new disease agents are human populations and cultural practices, economic development activities and anthropogenic activities on land, agriculture, globalization, microbial adaptations, social and environmental changes, and failure in public health measures (Burroughs 2002:27-32). The first world countries have the most excellent travel and transport system, and this provides for the rapid spread of these zoonotic diseases.

Many infectious diseases affecting humans are caused by infectious agents shared with wild and domesticated animals. They are responsible for more than 60% of human infectious diseases. These include Leptospirosis, cysticercosis, echinococcosis, toxoplasmosis, anthrax, brucellosis, Q fever, Chagas disease, type influenza, Rift valley fever, severe acute respiratory syndrome (SARS), Ebola hemorrhagic fever, and the original emergence of HIV (Rahman et al., 2020). Together, these organisms are responsible for a substantial disease burden with endemic and enzootic zoonoses causing about a billion cases of illness in people and millions of deaths every year.

Changing and increasing interaction among humans and animals and their environment over time have driven the occurrence and re-occurrence of zoonotic diseases. The increased risk of disease emergence and the possibility for pervasiveness have been linked to increased regional trade, travel, swelling human and livestock populations, and changing subsistence systems reflected in

agricultural practices that have led to agricultural intensification and significant environmental changes in recent times (Jones et al., 2013b). The potential disastrous impact of zoonotic diseases is of great concern around the World. The emergence of animal-origin diseases like bird flu has underlined the necessity to fathom zoonotic diseases considering their incidence, distribution, transmission mechanism, diagnosis, prevention, and control (Seyoum et al., 2016)

In Kenya, zoonosis has different implications on public health and varied social and economic impacts at contrasting times in different areas. This calls for the prioritization of their control and prevention at the national level. (Munyua et al., 2016) in a study on a group of 36 medical, veterinary, and wildlife experts in zoonosis and using a semi qualitative one health zoonotic disease prioritization tool, found that the top five highly ranked zoonotic diseases in Kenya were Anthrax, trypanosomiasis, rabies, brucellosis, and rift valley fever.

ZDU has listed 17 zoonotic diseases in Kenya. The list is critical because it helps allocate resources targeted for specific diseases in specific areas and design programs for disease prevention and control. In Kenya, of the 17 listed priority zoonotic diseases, there is currently limited literature on which animals are responsible for human diseases or the key behavioral patterns that cause risk of infection in humans in different settings. Despite the lack of comprehensive data, the public health significance of zoonotic infections represents a threat to human health in developing countries. Emerging zoonoses are a growing threat to global health and have caused hundreds of billions of US dollars of economic damage in the past 20 years (Karesh et al., 2012)

The movement of livestock during trade can contribute to the spread of diseases. To institute appropriate interventions for the control of the diseases, it is crucial to conduct a study on the knowledge, attitudes and practices of the different actors involved in the livestock trade.

2.3 Knowledge, Attitudes and Practices on zoonotic diseases

Knowledge, attitudes, and practices studies have been used to gather information for planning and public health interventions and disease surveillance programs. KAP studies were born in the field of family planning and population studies in the 1950s. They are appropriate for exploring and understanding health-related knowledge, attitudes, and practices.(Mangesho et al., 2021)

Non-human animals are our partners in everyday life. Aspects of livestock and wildlife animals are thoroughly embedded in practices of cultivation, consumption, and co-habitation. The health and abundance of food for the human population are dependent on the welfare of livestock. The animals that we keep, eat, or cohabit with can be reservoirs for diseases. Contact with wild and domestic animals can create opportunities for pandemic outbreaks (Karesh et al., 2012). A substantial proportion of morbidity and mortality by infectious diseases witnessed globally are attributed to zoonotic diseases. Zoonotic and other infectious diseases shared by both humans and animals are drawing worldwide attention recently. The emergence of animal-origin diseases such as bird flu has underlined the necessity to research and understand animal diseases better considering their incidence, distribution and possible control, transmission, diagnosis, prevention, and control (Omemo et al., 2012a). Studies have shown that knowledge of reservoirs of zoonoses and the way they are transmitted to humans has enabled not only early detection and reporting but also their control (Hubert *et al.*, 1975; Martin E et al., 1995 cited in (Omemo et al., 2012a).

Knowledge or awareness about diseases may vary from one individual or community to another. Sometimes, the degree of awareness or knowledge about disease depends on the degree to which people have experienced such diseases or are exposed to the campaigns available against such diseases.

Evidence shows that people's perceptions about disease risks such as transmission and health consequences influence their attitudes and health-seeking actions and behaviors towards the diseases concerned (European Centre for Disease Prevention and Control., 2013). Consequently, assessing the knowledge of the individuals or members of the public about diseases and their control methods would help the interventionists or analysts see how far the observed knowledge corresponds to biomedical concepts. The typical questions in the assessment process may include one's knowledge about the causes and symptoms of the illness under study.

According to WHO (2006), diseases like human brucellosis that prevail in areas where animal grazing is dominant may not be widely known of their existence, symptoms, modes of transmission, control. Despite their severe health and socioeconomic consequences, researchers or the authorities may also not even prioritize less known diseases.

In Africa, as in other developing countries, it is common for the people living in community settings to associate specific diseases with mystical factors or natural factors, and this underwrites the late treatment-seeking behavior, which at times end up with undesired adverse health outcomes (Awah et al., 2018). Thus, understanding the social perceptions of health and diseases within the cultural context is very important because people's beliefs and perceptions shape their behaviors and ability to adopt or cope with the existing health interventions (Glanz et al., 2005).

Today, the issue of individual and public beliefs, perceptions, and general knowledge of disease is recognized as an essential role in influencing the effectiveness of disease control strategies, including preventive health programs.

Many studies have shown that beliefs, perceptions, and knowledge of diseases vary in different communities and are dependent on traditional and religious beliefs. From Guatemala, studies found families holding modern beliefs being more likely to contact modern health providers than the families holding other beliefs (N. Goldman and P. Heuveline, 2000). Malaria is one of the common diseases, yet people had different knowledge and perceptions about its nature and different practices towards its control (King, 2001). From Nigeria and several other West African countries, studies reveal the existence of inadequate community knowledge about onchocerciasis. (Adeoye et al., 2010). In Baringo District, Kenya, almost half of the household members interviewed were found associating malaria with aetiological factors like wild vegetables, dirty water, and fresh un-boiled milk (Munguti *et al .*, 1998 cited in (Mubyazi & Bloch, 2014). Another study also in Kenya found the majority of the caretakers of children under five years knowing mosquitoes as the malaria-transmitting vectors, but about 50% of the responses associating malaria with cold weather (Hamel et al., 2001). In Tanzania, evidence reveals community knowledge and perceptions as an important factor influencing people's health-seeking behavior (Mangesho et al., 2017).

Among other factors, community knowledge has an impact on the control of zoonotic diseases. In a survey study, (Seyoum et al., 2016) looking at KAP among small-scale dairy farmers on milk-borne zoonotic diseases in Ethiopia, found that the respondents had Knowledge concerning the existence of zoonotic diseases such as Rabies, TB, Anthrax, Salmonellosis, Tapeworm, and Brucellosis. They, however, had a low level of knowledge on mechanisms of transmission from animals to humans. Some practices like assisting with cow birth, slaughtering animals, and preparing their skin expose them to infection. Low level of attitude was observed regarding the possibility of contracting a zoonotic disease from healthy animals. Education level was also

found to be of considerable influence on the attitude of respondents on drinking raw milk and the possibility of contracting zoonotic diseases from apparently healthy animals. Awareness creation and training programs for members of the dairy producers' cooperative unions on milk-borne zoonotic disease and their transmission mechanisms were recommended to help control and reduce public health risk on milk-borne zoonoses in the study area.

A KAP study on zoonotic diseases among animal health workers and livestock farmers (Swai et al., 2010b) using semi-structured open-ended questionnaires assessed perception, Knowledge, and attitude towards zoonoses and found that Knowledge about zoonotic diseases was high in small dairy holders than traditional livestock keepers. A significant difference in perception that one is likely to be infected with a zoonotic disease if they come into contact with a possibly infectious animal or its product was noted. Most of the animal health workers had a higher perception compared to livestock keepers. The findings indicated a low level of knowledge on zoonosis coupled with the eating habits and animal husbandry practices made the chances of contracting these diseases higher for the people of Arusha and Tanga. This shows the importance of Knowledge on zoonotic diseases in people who are in contact with animals in their daily lives if control and elimination are to be effective. Practice can contribute to the spread or control of these diseases. Apart from cultures and traditions, norms ,practices ,knowledge and attitudes, indicators of social inequality such as education and income play a role in determining access to healthcare as well as influencing how healthcare services are utilized and their quality. Social relationships impact adherence to medical treatment plans, seeking medical assistance, using healthcare services, and ultimately affecting health outcomes. Within healthcare organizations, social capital holds significance as it contributes to the effective provision of well-coordinated,

high-quality care. These form very important concepts of social epidemiology.(Short & Mollborn, 2015; Von Dem Knesebeck, 2015)

With the appearance and re-appearance of zoonotic diseases, control and elimination are cardinal; however, Knowledge, attitudes, and practices impact community involvement in controlling diseases. The ability to sense and avoid harmful environmental conditions is necessary for all living organisms. Humans have an additional capacity that allows them to alter their environment, practices, and behaviors towards harmful things. This capacity both creates and reduces risk. The local communities' awareness, attitude, and traditions regarding the disease in question are fundamental in designing effective control measures. (Hassan et al., 2017) investigated the KAP of inhabitants of a small village in Sudan on RVF. The Study found that they were not able to identify the symptoms of RVF. They also did not know the risk factors that can expose them or their animals to RVF. Even though most of the participants in the Study noted that the mosquito population during the RVF outbreak increased, a minimal number used ITN as a preventive measure. The participants also believed that the control of RVF occurrences was the role of the veterinary officials, and therefore, they were disinclined to notify the authorities in case of a suspected case in livestock which can be an indicator of infection in humans. Most of the participants in the Study believed that RVF could quickly proliferate to different regions. This brings into play livestock trade which involves the movement of livestock from one region to another across counties and even countries and if it contributes to the spread of RVF or any other zoonotic diseases, and if the actors involved in the trade have some knowledge on zoonotic diseases and their attitudes and practices towards these diseases and how this can predispose them to the diseases.

(Omemo et al., 2012b), using a cross-sectional study, examined the Knowledge and attitude of public health workers on emerging and re-emerging zoonosis and applying one health approach in zoonotic diseases monitoring .110 randomly selected public health workers were assessed using structured questionnaires. The Study found that the most discussed zoonosis is rabies; a sizable number of respondents reported discussing zoonoses with their animal health colleagues. It also found that there is a need to improve their attitude on the occurrence and reoccurrence of zoonotic diseases despite the excellent knowledge of rabies noted among the public health workers. The study recommended increased alliance with veterinarians, especially in disease monitoring in the community.

Rabies, Brucellosis, Anthrax, and Sleeping sickness are zoonotic diseases that are widespread in Africa. Their reservoirs have been known to be both animals found in the homestead and wild animals. Lack of knowledge or opportunity to learn more about zoonotic diseases by front-line health workers could be the reason for the slow action on both animal health and public health surveillance systems in developing countries. As a result, we have insufficient quality data on the incidence, distribution, and control of zoonotic diseases. Many factors have been mentioned as contributing to under-diagnosis and under-reporting of zoonotic diseases, especially in the sub-Saharan Africa region. These include inadequate disease surveillance coverage, inadequate diagnosis capacity, and geographical distribution of those affected (Kunda et al., 2007) According to the ZDU, the most common zoonosis are RVF, Rabies, and brucellosis; however, a public health worker on his or her daily routine work on disease surveillance will not talk about zoonotic diseases. This is because they don't consider animals as disease carriers or reservoirs of diseases that can infect humans (Omemo et al., 2012b). It is critical for the public health worker to know how a particular zoonotic disease manifests and what signs and symptoms to look out

for when investigating for its presence. With a lack of knowledge, the chances of developing a negative attitude will be high, and they would also see no need to collaborate with their counterparts in animal health. This knowledge is important to public health workers. It is also important to individuals, especially those who work and interact with animals. That is why this study set out to explore the knowledge, attitudes, and practices of livestock traders. Having a grasp of zoonotic disease reservoirs and modes of transmission has allowed for early detection, control, and prevention.

2.4 Livestock trade

Livestock trade involves the transfer of livestock ownership from one person to another, and often it is in exchange for money. Livestock trade involves the change of ownership, and the system that supports this trade is a market. Livestock trade is an integral part of regional trade in Eastern Africa, evolving from small informal activity to an active enterprise that contributes to local and regional food security and poverty reduction in vulnerable populations like the pastoralist communities. In Kenya, the livestock trade is under the ministry of livestock and fisheries. The livestock marketing council established in 2000 is an umbrella body of livestock traders and producers in Kenya.

In many households, livestock trade is triggered by financial needs rather than motives to make a profit (Pavanello, n.d.). Decisions to sell livestock are arrived at based on the weight of expenses that the household needs to take care of with proceeds of the sale. Growing financial pressure can push households to dispose of their animals without considering age, sex, or productivity.

The Livestock trade system is a complicated chain with producers, traders, and numerous other

market participants all referred to here as actors in livestock trade. Animals travel from homes through different markets and trade routes to the last consumer or terminal market. Different actors are involved at distinct stages. The actors here include the livestock keepers or households. They are the ones who rear the livestock and make the decision to sell them. We also have brokers who are mainly involved in connecting potential sellers to buyers and eventually earning a commission for the successful transactions. We have the actual traders whose business is to buy and sell livestock. We also have animal trekkers whose role is to walk the livestock from the homes to the markets or from one market to another. Chacha (2017) conducted a study to determine knowledge attitudes and practices regarding anthrax among community members, health, and veterinary workers in the Maragua sub-county, Kenya. The study findings indicated above-average knowledge on causes, symptoms, transmission mode, and prevention of anthrax among the community members. Practices and attitudes were found to be risky among community members.

2.5 Knowledge gaps

From the literature reviewed, there are knowledge gaps that exist. A few studies have looked at the KAP of actors in livestock trade on zoonotic diseases, especially among the non-pastoralists. Most KAP studies on zoonotic diseases have focused mainly on animal products like milk and meat and not on animals. This Study seeks to explore the KAP of the actors as they interact with animals. Most studies have also focused mainly on the pastoral communities (Abdi et al., 2015; Alhaji et al., 2018; Asiimwe et al., 2015; Mangesho et al., 2017; Onono et al., 2019; Owange et al., 2014) and the studies done in Kenya have been primarily concentrated in northern Kenya especially on traders along the Kenya-Ethiopia border. Therefore, this Study attempts to fill the knowledge gap on KAP of the actors in livestock trade in primarily a non-pastoralist community.

The various actors have a critical role in the spread and control of zoonotic diseases. If an intervention is to be introduced in the community, it is essential to know their KAP. Therefore, the Study seeks to provide additional knowledge on who the actors are in the livestock trade and their roles. It also seeks to explore knowledge, attitudes and practices on zoonotic diseases.

2.6 Theoretical Framework

2.6.1 Cultural Materialism

In his book, *The Rise of Anthropological Theory* (1968), Marvin Harris came up with the term cultural materialism. It originated from Culture, which is the social structure, language, law, politics, regulations, art, superstitions, science, etc., and materialism. Cultural materialism was developed by borrowing from Marxist materialism. Marx proposed that there are three levels of Culture, infrastructure, structure, and superstructure; however, cultural materialism views both productive (economic) and reproductive (demographic) forces as the primary factors that shape society. Therefore, cultural materialism explains the structural features of a society in terms of production (Harris 1996: 277). As such, demographic, environmental, and technological changes are invoked to explain cultural variation (Barfield 1997: 232). Cultural materialism retains and expands upon the Marxist three levels of culture mode; Infrastructure, Structure, and Superstructure. Infrastructure is the basis for all other levels and includes how basic needs are met and how it interacts with the local environment. Structure refers to a society's economic, social, and political organization, while the superstructure is related to ideology, religion, politics, law, traditions, values, superstitions, and symbolism (Brown, 2008)

Cultural materialism promotes the idea that infrastructure consisting of material realities such as technological, economic, and demographic factors mold and influence the aspects of Culture. It

attempts to explain the cultural organization, symbolism, and ideology within a materialistic framework: Infrastructure, structure, and superstructure. The theory believes that the development of a society is on a trial-and-error basis. Things that are non-beneficial to the society will disappear. Family values, law, religion, government, and beliefs will only exist in society if they are beneficial. Harris and Orna (2007) contend that the infrastructure is the most critical aspect as it is here where the interaction between culture and environment occurs. All three levels are interrelated so that changes in the infrastructure result in changes in the structure and superstructure, although the changes might not be immediate. While this appears to be environmental determinism, cultural materialists do not disclaim that the structure and superstructure change cannot occur without a first change in the infrastructure. However, they claim that if a change in those structures is not compatible with the existing infrastructure, the change is not likely to become set within the culture.

Cultural materialism contends that infrastructure is the most critical aspect as it is here where the interaction between culture and environment occurs. All the three are interrelated so that changes in the infrastructure result in changes in the structure and superstructure, although changes might not be immediate. This suggests that changes in a society's infrastructure are primarily the result of changes in the human population relating to its environment. In her Study, Bukachi (2007) used the cultural materialism theory to explore the socio-economic and cultural impacts of human African trypanosomiasis and coping strategies of households in the Busoga focus. She states that the socio-economic and cultural consequences of the disease are as a result of the disease itself, a people's culture, and their health-seeking behaviors (HSB). The disease directly affects an individual physically, causing pain and discomfort. This, in turn, causes social and economic consequences to the household in terms of money and time spent to cope with the

illness and the disruption of the patient's daily routine chores/engagements. All these create a burden on the affected households. At the community level, the effects manifest themselves in loss of productivity, the cost of providing care, and damage to the fiber of entire communities and societies (Bukachi 2007:41)

The structure sector of culture consists of organizational aspects such as domestic kinship systems, political and economic systems; this defines how people do things and what they do. It defines their Culture. The superstructure, which is made up of ideological, symbolic, and religious aspects, also defines how people do things, what they do, and why they do them. Cultural materialism explains the effects of infrastructure: demographic factors, economic factors, and technological factors in modeling a society. It also explains how the superstructure, ideology, symbolism, and religion affect a society's culture, beliefs, and practices.

2.6.2 Relevance of the theory to the Study

Cultural materialism contends that the physical world impacts and sets constraint on human behavior. Human behavior is part of nature, and therefore it can be understood by using the method of natural science. Cultural materialism splits culture threefold, that is infrastructure, structure, and superstructure. It explains the values, beliefs, and worldviews that predominate society. In relation to this study, the infrastructure will be the environment where the zoonotic disease pathogens and vectors can exist and cause infection. These will be the animals and animal products that the actors interact with within their daily operations. The impact and consequences of the disease are due to the disease itself, the culture of the population, and their health-seeking behavior. The structure level consisting of demographic factors, economic

factors, and economic factors is characterized by age, education level, income, and economic activity involved. This will impact their health-seeking behaviors for them and their animals and on their knowledge of zoonotic diseases and attitude and practices. Cultural beliefs, religious beliefs, and superstitions are in the superstructure. They come into play because it determines how the actors define and interpret zoonotic diseases, shaping their attitudes, beliefs, knowledge, and practices. Culture greatly influences people's health and healthcare because their culture will influence many aspects of their lives, including beliefs, behaviors, perceptions, emotions, attitudes to pain and disease (Helman,2007). The actors' attitudes, beliefs, and practices towards zoonotic diseases are influenced by their culture, contributing to either the spread or control of the disease. Culture also influences health-seeking behaviors in terms of coping strategies of individuals or community to seek relief from zoonotic diseases for themselves and their animals.

2.6.3 Conceptual Framework

The conceptual framework that was used to guide this Study is shown in fig 2.1.

The study findings show that the actors' knowledge, attitudes, and practices are influenced by their cultures, religions, and level of education, which influences the infrastructure where the zoonotic disease proliferate. This also impacts the cause of action that they take to prevent the spread of zoonotic diseases or their health-seeking behaviors and the impact of the disease in the community.

Once the zoonotic disease infects an individual or their livestock, the control of the disease will be dependent on the actors' knowledge, attitudes, and practices. These are affected or influenced by socioeconomic and political factors like culture, literacy level, religion, and government regulations.

Fig 2.1 shows the conceptual framework for cultural materialism. Structure, infrastructure, and superstructure interact and influence the changes in the population's relationships with its environment. Demographic variables such as age, religion, education level and ethnicity were relevant in conceptualizing this theory as the intervening variable. This is because these variables affect the actors' knowledge, attitudes and practices on zoonotic diseases. The actors' Knowledge, attitude, and practices are the independent variables. Knowledge, attitude, and practices are the independent variables.

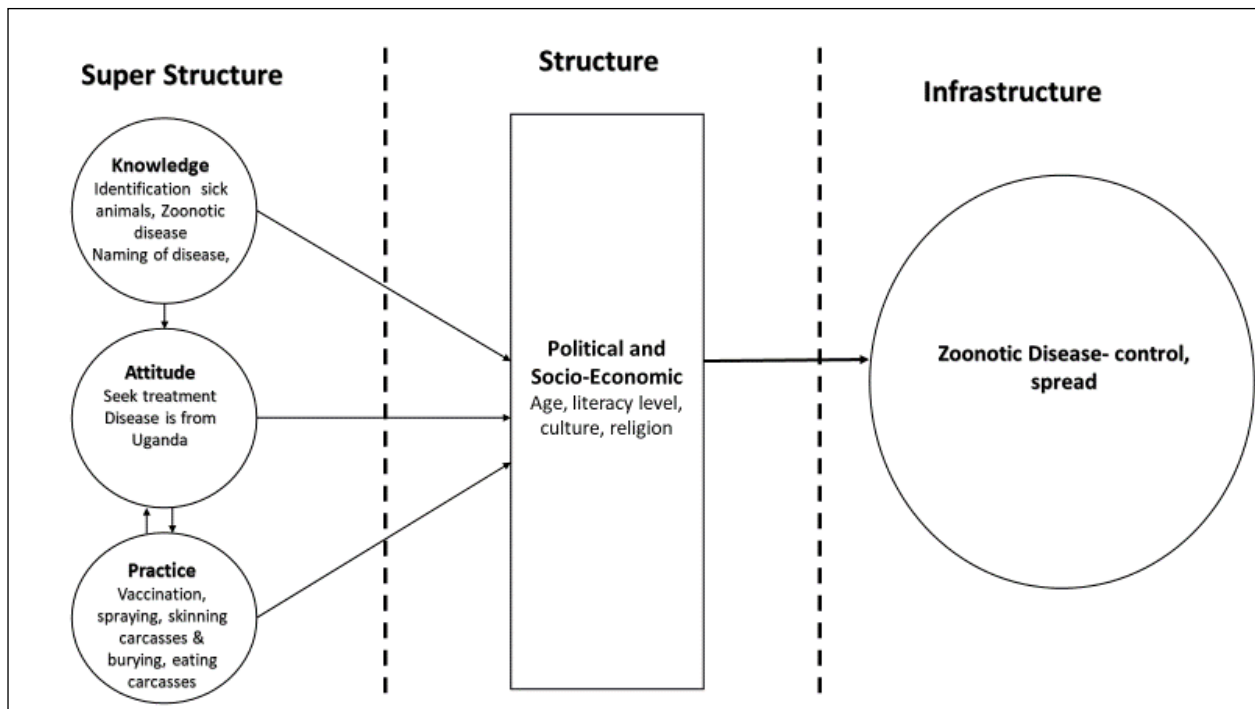


Fig 2.1: Conceptual Framework. (Source: author)

Based on this conceptual framework, it is expected that the knowledge, attitudes, and practices of the actors in livestock trade on zoonotic diseases influence zoonotic diseases spread or control, and these are affected by the actors' religion, culture and traditions, age, literacy levels and, government regulations

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the context in which the study was conducted. It describes the research site, the study design, study population, sampling procedures and sample size, data collection methods, and data analysis. The chapter concludes with a discussion on the ethical considerations that guided the study.

3.2 Study site.

The Study was conducted in Busia County, Western Kenya (Figure 3.1). The County borders Uganda with two border crossing points at Busia and Malaba trading towns. It is one of the four counties comprising the former Western province. . The County that spans 1,695 sq km borders Uganda to the North, North-East, and West, Lake Victoria to the southwest, Siaya County to the South and South-East and Kakamega County, and Bungoma County to the East. Busia County consists of seven Sub-Counties: Budalangi, Matayos, Nambale, Funyula, Teso North, Teso, and Butula. The area receives an annual rainfall of between 760 mm and 2000 mm. It has two rainy seasons: the long rainy season between March and May and the short rains between August and October. The annual mean maximum temperatures range between 26°C and 30°C while the mean minimum temperature range between 14°C and 22 °C.

The inhabitants of Busia County highly depend on agriculture as their primary source of livelihood. The main economic activity in Busia County is the production of an extensive range of food and cash crops such as sorghum, finger millet, maize, cassava, cotton, tobacco, Robusta coffee, sunflower, and sugarcane. This is made possible by the type of soil which supports the growth of these crops. Horticultural crops like pineapples, tomatoes, kales, cabbages,

watermelons, local vegetables, papaya, amaranth, onions, and mangoes are also grown in this area. A total of 58,871 Ha and 13,624 Ha are under food crops and cash crops, respectively. Fishing is also practiced in Bunyala and Samia Sub counties. Livestock keeping and trading are also practiced widely in all the parts of Busia County, with zebu cattle, sheep, goats, pigs, and free-range local chicken being the primary livestock kept and traded.

The human population is highly exposed to zoonotic diseases because of the close interaction between humans and livestock. According to the Zoonotic Diseases Unit (ZDU, 2017), the common zoonotic diseases in this area include rabies, human African trypanosomiasis, Brucellosis, Anthrax, Q-fever, and Rift valley fever. Poverty, food security, and a massive burden of animal and human diseases affect many people in this region, especially those close to the Uganda border (ILRI-Bioscience, 2012). Ninety-five percent of the population of this region are smallholder growers of crops and keepers of small herds of cattle, sheep, goats, pigs, and chickens. The animals that the people keep provide essential food and nutrition and also serve as an investment cashed-in when the need for money arises, such as payment of school fees and healthcare bills (ILRI-Bioscience, 2012).

Livestock trade is a significant economic activity, and traders move from one market to another within and outside Busia County. Some of the livestock markets in Western Kenya are Funyula, Myanga, Amukura, Nambale, Koyonzo, Webuye, Lubao, Kimilili and Ikolomani. However, the Study focused only on Busia County's markets: Funyula, Amukura, and Butula Markets.

According to the 2019 population and housing census (GOK, 2019), the population of Busia County was 893,681 people in 197,944 households, with a population density of 550 people per km². About 467,401 of the population was male, and 426,252 were female, and 28 Intersex

persons. About 16.6% of the population lives in urban areas. About 75% of the total population aged 15 years and above can read and write.

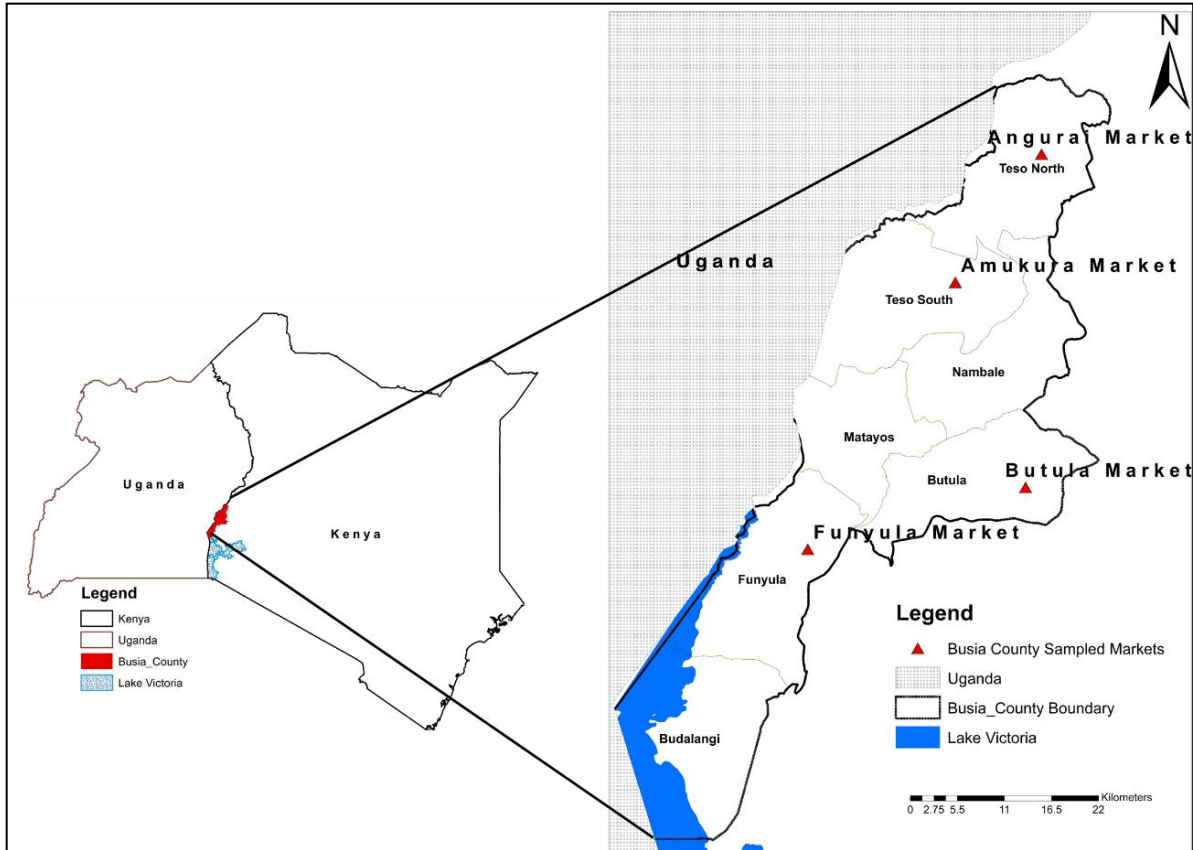


Figure 3.1: Map of Busia County in Western Kenya region Source: Author)

3.3 Research design

This was a cross-sectional exploratory study. The exploratory research design was employed because there are few studies around zoonotic diseases in non-pastoral areas among livestock actors involved in trade; hence, the Study would not fit a concise research problem associated with causal designs; the research exploratory research design is also flexible and therefore best accommodates the research question. Qualitative data was collected through in-depth interviews, key informant interviews, and unstructured observation. Data collection was done between the period of 10th November to 10th December 2019. The Study began by conducting in-depth interviews with livestock traders and trekkers on their knowledge, attitudes, and practices in relation to zoonotic diseases. Knowledge, attitudes, and practices (KAP) studies are commonly used to identify knowledge gaps and behavioral patterns among sociodemographic subgroups for the effective implementation of public health interventions. They provide useful information and are simpler to design and execute (Andrade et al., 2020; Lee et al., 2021). One drawback associated with these types of research is the tendency to overlook other forms of knowledge, given the predominant emphasis on biomedical knowledge. Additionally assessing attitudes remains a challenging task within such studies. Questions regarding practices often fail to encompass real-world behaviors or account for influential contextual elements, potentially impacting their credibility. Nevertheless, KAP studies can prove highly valuable when it comes to appraising communal understanding and gauging shifts in knowledge subsequent to interventions such as awareness-building through media initiatives and educational workshops (Bukachi et al., 2018).

The in-depth interviews were followed by key informant interviews that were conducted with the market chairman, chairman of the traders, chairman of the trekkers, veterinary officers or

animal health officers, and the county officials in the market. The key informant interviews were conducted to bring in the expert opinion on the Study's objective and clarify some of the issues raised by trekkers and traders. The analysis of the data was done between January and March of the year 2020. The qualitative data obtained was analyzed thematically in accordance with the study objectives.

3.4 Study population and units of analysis

The study population comprised all the traders involved in the actual buying and selling of livestock for a profit and the trekkers whose role is solely to move livestock from the markets to market or from market to the destination required by the owner at a fee in Busia County. There were also traders and trekkers from Uganda who come to ply their trade from across the border. They were chosen for the Study because they constantly interact with the livestock in their daily operation, buying them, selling them, and moving them from one area to another. Their close interaction with livestock puts them at a higher risk of contracting these diseases. The unit of analysis was the individual trader or trekker.

3.5 Sample and Sampling procedure

Purposive sampling (Tongco, 2007) was employed to identify the actors in livestock trade within the markets in the study area. This was to increase the likelihood of obtaining and generating appropriate and valuable data by interviewing relevant and knowledgeable subjects on the study subject. The interviews' subsequent participation was based on the actors' willingness and availability to participate in the study. The total sample size was 30; that is, five traders and five trekkers from each of the three markets were sampled. The inclusion criteria for a trader were that the individuals must be involved in buying and selling livestock for at least one year prior to

the interview. For the trekker, the individual must have been in the business of walking animals for the owners to various destinations at a fee for at least one year. An individual who walks his animals for sale was considered a trader. The traders and trekkers were identified with the help of their chairman, who introduced them to the researcher. Informants who include animal health officers, markets officials, and county government officials were sampled purposefully for key informant interviews. A total of thirty informants were interviewed, that is, five traders, five trekkers in each of the three markets. To complement the information from the informants, the market chairman, county representative in the market, and an animal health expert at each of the three markets were interviewed as key informants. These selected key informants oversee the daily operations in the markets and have better insight into the practices in the market and conduct of traders and trekkers.

3.5.2 Field entry

To effectively conduct fieldwork in markets that open very early and close before midday, where people are busy engaging in livestock trading, a well-planned strategy was necessary. I adopted the approach of arriving at the markets as early as 5 am to coincide with the traders' arrival and observe the process of bringing animals to the market, as well as other market activities. Given that I was an outsider, it was crucial to establish a connection with the market community through the chairmen who served as leaders and intermediaries between the traders. The chairmen held authority over the market and handled various matters. They oversee all market affairs including dispute resolution. Positioned as an outsider, engaging with them was vital to foster trust and explaining the purpose of my study to the prospective participants, ensuring they understood that it was academic research and not associated with any monetary incentives.

Subsequently, I proceeded to explain the nature of my study to the participants, providing them with a consent form and offering a thorough interpretation of its contents. I emphasized that their participation was entirely voluntary. Once their consent was obtained, I sought out a quieter spot within the market and proceeded with conducting the interviews.

3.6 Data collection methods

3.6.1 In-depth interviews

These interviews were conducted with thirty informants, that is fifteen traders and fifteen trekkers in the three markets in Busia County. This method was crucial in digging out data on the actors' Knowledge of zoonotic diseases, their attitudes, and practices around these diseases. The semi-structured nature of the method was significant in probing for social and cultural issues surrounding some of the practices. The method also proved vital as it yielded spontaneous responses that were significant in the inquiry. The interviews were conducted in the markets to enable the informants to continue with their operation without much interference. The curious onlookers gathering around the interview point were mitigated by telling them that responses to the interview was needed from the individual trader or trekker being interviewed at that time. The interviews were audio-recorded with permission from the informants. The interviews were conducted with the help of an interview guide (Appendix 2).

3.6.2 Key informant interviews

These interviews were carried out with nine key informants: the market chairman, county representative in the livestock market, and animal health officers or veterinary officers from each

of the three markets. The Veterinary officer was selected because of their knowledge of common livestock diseases in the area as a key informant. They also interact with the traders and trekkers in the market and have Knowledge of some of their practices related to sick animals. The veterinary officers are the ones who issue movement permits. They are therefore able to tell where most animals are being taken to and where they are from, and they are also responsible for disease surveillance. Therefore, they have information about livestock diseases in the area. The Chairman of the livestock market was selected as a critical informant because they oversee the market operations and have knowledge of the common disease challenges that the livestock traders face. They interact with traders and trekkers and therefore have knowledge of some of the practices that they engage in. The livestock market chairman is the one in charge of operations rules in the market regarding things like how sick animals are handled in the market. The County official/market master was selected as a key informant because they are the ones in charge of operations in the market and therefore have knowledge on how livestock trade is carried out, and they are also responsible for enforcing rules of operations in the market regarding things like how sick animals are handled in the market.

The aim of the key informant interviews was to provide more insight into the actors' knowledge of the diseases and the perceptions of the diseases at the community level and some of the practices that may contribute to the spread or control of the zoonotic diseases. They were also crucial in providing professional insight. The interviews were also audio-recorded with permission from the informants. A key informant interview guide in appendix 3 was used to conduct the interview.

3.6.3 Unstructured Observation

An unstructured observation method was utilized to understand better the daily lives and operations of the actors in the livestock trade. The researcher observed the activities in the market and the way the market is in terms of layout and cleanliness, how the actors were going on with their operations, and other activities going on in the market apart from livestock trade. A guide (appendix 4) was used.

3.6.5 Secondary sources

Information used to put this Study together from books: The practice of social research, Culture Health and Illness 5th, Anthropology in Theory Issues in Epistemology, One Health Science, politics and zoonotic disease in Africa. Journal publications: Journal of zoonotic diseases and public health, international journal of agriculture, American journal of health promotion, Journal of foodborne and zoonotic diseases. Theses and information from government bodies and government policy documents were also to be used throughout the Study.

3.7 Data Processing and Analysis

Once the qualitative data from the in-depth interviews and key informant interviews were received, they were coded /categorized. The audio data was transcribed. Where the interviews were not conducted in English, the audio data was translated and transcribed. The transcription was done verbatim. The data was then analyzed thematically by identifying emerging patterns from the answers given by the informants and generating themes in line with the study objectives. The themes were knowledge, attitudes, and practices. Under knowledge, the study looked for the respondents' knowledge of symptoms of zoonotic diseases, the causes, mode of

transmission, and availability of treatment options. Under attitudes, the study analyzed how the respondents perceive and evaluate zoonotic diseases. Under the theme of the practice, the study analyzed the respondents' conscious behaviors and actions that he or she is involved in towards sick animals. These actions could be informed by lay or acquired knowledge. Direct quotations and narratives have been used in the presentation of the study findings.

3.8 Ethical considerations

Necessary ethical considerations and practices were undertaken to ensure that the Study was conducted in line with sound research principles and regulations. A research permit was obtained from the National Commission for Science, Technology, and Innovation (NACOSTI) before embarking on the fieldwork, permit number NACOSTI/P/19/2547. During fieldwork, informants were duly briefed on purpose, the target groups, selection procedures, duration of the Study, and potential use of the research results. An informed consent form (Appendix 1) was signed by the informants as surety of their understanding and acceptance to be involved in the Study.

Data confidentiality was ensured by not using the participants' names anywhere in the reports. Access to the data collected was also restricted to the authorized people only, with access restricted only to use for purposes of this study and nothing else. The rights of informants to disqualify themselves at any point of the study were explained; however, due measures were taken to encourage full and informed participation of the informants throughout the study.

During the interviews, the informants' consent was sought to allow for audio recording, which would later be transcribed. The study subjects were assured of their anonymity during the publication of the research findings.

The study results will be availed to the scientific community through publications in refereed journals and unpublished literature in the form of a thesis at the University of Nairobi library.

CHAPTER FOUR: KNOWLEDGE, ATTITUDES, AND PRACTICES OF ACTORS IN LIVESTOCK TRADE ON ZOOONOTIC DISEASES

4.1 INTRODUCTION

This chapter presents the findings of the study. It starts by giving a description of the markets where the study was conducted. It also presents the socio-demographics of the actors in the livestock trade in Busia County. Discussion around the importance of the socio-demographic profiles reported has been carried out. The chapter seeks to bring out the actors' knowledge on zoonotic diseases, whether acquired or Indigenous knowledge. It also seeks to tease out the social and cultural beliefs that affect attitudes, and practices related to zoonotic diseases.

4.2 Description of the markets.

Various observations were made from the different markets under the study. The study observed that the livestock markets open incredibly early in the morning with animals arriving as early as six o'clock in the morning. The activities in the livestock markets end equally early with most of the markets closing by midday. The markets have a perimeter fence that is referred to as a livestock stock ring. The stock rings have one entry that is manned by the county officials, and it is where most of the veterinary officers are found in most of the markets. The animals are sold inside the stock ring. Before the animals leave the stock ring the owner must pay the county government. These amounts vary between Kenya shilling fifty and one hundred. This money is paid to the county government officials and receipts are issued. The receipts have details of both the buyer and the seller and a brief description of the animal in terms of the type of animal, the color and where it is being taken to. The veterinary officers at the entrance of the stock ring in most of the markets are engaged giving antibiotics and dewormers to the livestock that are leaving the markets with the new owners. Most of the veterinary officers were in private practice

and not government officials. It was observed that movement permits were being issued at Funyula market. On probing, informants indicated that the movement permits were a requirement by law and that they were being issued to livestock that is being moved from one county to another and that the permit acts as a confirmation that there is no danger of a notifiable disease in the county from which the animal is originating from. It was also observed that there is no confirmation done by anyone on the origin of the animals that come to the various markets and if they have movement permits. The actors in livestock trade are however able to tell where some animals have come from by observing the behavior of the animal and the traders who have brought them to the market for example the animals brought from Uganda act wild and are not easy to control. They also do not like having ropes around their honses, necks, or feet. The study also observed that most of the trekkers and traders do not have any protective gear or equipment that they use in their daily operations, only a few of them had gumboots. Apart from livestock trade there are various other business activities that go on around the livestock markets, it was observed that there are women selling food, there were also people selling animal antibiotics, and there were also some traders selling traditional medicine and ropes. It was noted that all animals that have been bought leave the markets with a new rope, the rope it came with is left with the original owner. This shows that there are other businesses around the livestock market that depend on the actual business of buying and selling livestock. From the observations it was also evident that people interact and mix closely with the animals in the market, and this exposes them to the risk of infection and spread of zoonotic diseases. Plate 4.2 shows how people interact freely with the animals in the livestock market.



Plate 4.2: A photo of a livestock market

4.3 Demographic characteristics of the informants

4.3.0 Profile of the respondents

Characteristic	Frequency (n=30)
Gender <ul style="list-style-type: none">• Male• Female	29 1
Age in Years <ul style="list-style-type: none">• 18-29• 30-39• 40 and above	11 9 10
Education level (Kenyan education system) <ul style="list-style-type: none">• With Primary education• With secondary education• Completed secondary education	13 12 5
Religion <ul style="list-style-type: none">• Christianity• Islam	29 1
Ethnicity <ul style="list-style-type: none">• Teso• Samia• Luo	11 13 6
Years in the livestock trade <ul style="list-style-type: none">• 1-5 Years• 6-10 Years• 11 Years and above	6 12 12

Table 1: Demographic Profile of the informants

The social demographic description of the study informants played a crucial role in understanding their knowledge, attitudes, and practices regarding zoonotic diseases. The study consisted of thirty informants who participated in the in-depth interviews. The informants held various roles, which were identified through a combination of in-depth interviews, key informant interviews, and observations. Among the informants, 29 were male, while only one female trader

was interviewed. This gender distribution implies that the livestock trade sector remains predominantly male-dominated in Busia County.

Age was identified as a critical factor in the livestock trade. The study revealed that anyone involved in the market as a trader must possess a national identity card issued by the government. In Kenya, this document is exclusively provided to individuals who are 18 years of age or older. All the interviewed traders emphasized the necessity of having a national identity card before engaging in the buying and selling of livestock. Additionally, it was observed that county government officials in the market required this document when issuing the sale agreement. They need it when recording details of the animals being sold or purchased before they leave the livestock ring.

Out of the thirty informants, eleven were between the ages of 18 and 29 years, while some informants were over 40 years old, with the oldest being 57 years old. The educational attainment among the informants was generally low, as only five respondents had completed secondary education (form four). A sizable number of respondents had not proceeded to secondary school, with several citing the lack of school fees as the reason for dropping out. Regarding religious affiliation, most of the informants identified as Christians practicing Roman Catholicism.

Ethnicity also played a crucial role in livestock trading relationships. The study observed the presence of several ethnic-based clusters in the sampled markets. Traders from the same area or ethnic community tended to congregate in specific sections of the markets. This made it easier to identify traders and animals from different regions, such as Nandi or even those from

neighboring Uganda. The ethnic composition of the informants was diverse, including individuals from the Bukusu, Teso, Samia, and Luo ethnic groups.

Religion as one of the social demographics in this study has a significant relationship to the practices that the actors engage in. Religious beliefs could potentially influence perceptions, actions, and subsequent One Health outcomes. Studies have shown the importance of religious beliefs and practices in the perception of human health(Vijayaraghavan et al., 2022). Religion and ethnicity emerged as significant factors influencing the practices of the actors involved in the study. There was an overlap between religion and ethnicity in the study as it was found that different informants from different ethnic groups were Christians. There was no religion that was specific to a particular ethnic group.

4.3.1 Traders and trekkers

The livestock trade involves a diverse range of individuals each playing a unique role in the intricate value chain. At the heart of this trade are the traders, individuals who engage in buying and selling livestock within the bustling market to generate profit. Complementing their activities are the trekkers, whose primary responsibility entails transporting the livestock from one market to another or directly to the buyer's desired destination. Notably, trekkers often arrive at the markets with the animals before the traders, who are the actual owners of the livestock. While trekkers typically undertake the task of moving animals on behalf of traders, they are also willing to transport livestock for any interested buyer, provided that both parties agree on the desired destination and payment terms. It is worth noting that most animals are observed to be

transported between markets by trekking them along the same pathways and roads commonly utilized by everyone else. The livestock movement is an important driver of infectious disease transmission and spread(Ekwem et al., 2021). In Kenya, livestock movements are largely motivated by a need for animals to access resources (pasture and watering) to ensure their survival and when they are sold or being sold as this study has revealed. Livestock often travels several kilometers each day to reach communal resource areas or the markets where extensive mixing of herds and contacts between animals occur, with considerable implications for pathogen transmission and subsequent disease spread(VanderWaal et al., 2017). If an infected animal is part of the animals being moved, then it can infect other animals or people on the way or at its destination. Plate 4.3 shows trekkers walking the animals from the market.



Plate 4.3: A photo of a trekker moving animals from the market.

The trekkers charge two hundred shillings for each animal that they move; they earn around one thousand Kenya shillings on a good day that is when they have many animals to escort. The earning by the traders is much higher compared to those by trekkers, with some making up to Kenya shillings five thousand in a day when business is good.

The study found that many traders came into the business of livestock trade through their relatives or friends. Others also started off as trekkers then became traders. Others also took up the livestock trade through the apprenticeship of their fathers or close relatives. As a channel for

achieving social inclusion, an apprenticeship offers opportunities and avenues to develop skills and proficiency in a trade, navigate and chart interpersonal power, access to emic types of knowledge, and have first-hand experience of the pedagogical milieu.(Downey et al., 2015) Apprenticeship, the process of developing from novice to proficiency under the guidance of a skilled expert, varies across cultures and among different skilled communities, in many instances it offers an ideal point of entry and this was evident from the responses from the study participants.

“Before you start this job, you must have someone who is helping you because you cannot know what size of cow is sold for what price. You must have someone to guide you on the prices” (32 Year old, Male. IDI Butula market).

“There are people who introduced me to the business, I used to walk with them, and I learned from them” (25 Year old, Male. IDI Funyula market).

“There is no formal training; however, people who have experience in the business must teach you on how to negotiate prices. The experienced traders also teach you how to select a good animal that will give you good returns” (40 Year old, Male. IDI Amukura market).

Some were also driven to the trade by circumstances, needing to earn a living.

Plate 4.2.1 is a photo of a female trader being interviewed in the market.



Plate 4.3.1: A photo of a female trader being interviewed at the market.

The study was informed that the traders and trekkers do not undergo any formal training on livestock trade or livestock diseases before they start the business. This was affirmed by information gathered from the key informants. A key informant at Butula market had this to say.

“There is no training that one undergoes; they just come and start the business” (48 Year old, Male. KII Butula market).

Another key informant at Amukura market said,

“We used to call them in the market and give them some basic education on how to identify sick animals, but we don’t do that anymore. Now we just walk and inspect animals and remove the sick ones from the market” ” (**69 Year old, Male. KII Amukura market**).

“I do not know if they undergo any training, but what I know is that anybody can just come and join the trade provided he or she has capital” (**57 Year old, Male.KII. Butula market**).

Without proper training, these individuals may face several challenges and drawbacks that can hinder their success and impact the overall efficiency of the trade. Training can play a crucial role in equipping traders with the necessary knowledge and skills to navigate the complexities of the livestock trade. Similarly, training for trekkers is essential as it can ensure the humane handling and welfare of the animals during transportation. Trekkers need to learn about animal behavior, proper handling techniques, and health management practices. They should be aware of the potential risks of zoonotic diseases and challenges associated with long-distance livestock transportation, such as fatigue, injuries, and disease transmission. Training can help them understand the market regulations and enables them to adopt measures that ensure the animals' well-being throughout the journey.

It was found that the local farmers who want to sell their animals in the market cannot do so directly without going through a trader who is known in that market. This also applies to potential buyers. This brings in another category of traders referred to as brokers in some markets. They do not have any animals in the market and they only earn commissions from the transactions that they facilitate. The traders and trekkers also carry sticks with them and this they use to not only guide the animals but also protect themselves from rogue animals in the market. Some of them also wear gumboots for safety.

4.3 Knowledge of zoonotic diseases

According to the oxford dictionary, knowledge is defined as having facts, information, and skills acquired through experience or education or the theoretical or practical understanding of a subject. It is also the awareness or familiarity gained by experience of a fact or situation. This section outlines the knowledge of actors on zoonotic diseases. The informants were asked questions to explore their knowledge of zoonotic diseases. The questions asked explored if the informants know about the existence of diseases that can be transmitted from animals to humans and from humans to animals, if they could name some of these diseases, their modes of transmission, and some of the symptoms of these diseases in human and the clinical signs in animals. These quotes below show the varied responses.

*“I know zoonotic diseases, such diseases can infect you if you eat meat and when we hear of such cases we go to the hospital” (48-Year-old, male trader. **IDI, Butula Market**)*

*“I do not know about zoonotic diseases; however, what I know of is that eating meat that is not well cooked or eating meat from an animal that had been injected with some medicine and not given enough time can make one sick” (58-Year-old, male trader . **IDI, Angurai Market**)*

*“Yes, I have heard about zoonotic diseases, and I have seen them. We have foot and mouth that affects the animals, and when it does, it becomes dangerous that even humans are not supposed to eat the animals” (49-Year-old, female trader . **IDI, Amukura Market**)*

“I know trypanosomiasis, I know that it comes from insects called tsetse flies; when the tsetse fly bites an infected animal and bites a human being, the disease is transmitted from a sick animal to the human” (18-Year-old, trekker . IDI, Butula Market)

From the study, it was evident that most of the respondents know that there are various livestock diseases; however, not all of them know that there are diseases that affect humans whose origin are animals, that is, zoonotic diseases. On further probing they used words like “I have heard” and “some people say” to try and describe what zoonotic diseases are.

“Some people say that you can get infected with anthrax if you eat meat from an animal that has anthrax, even drinking milk can cause sickness” (58-Year-old, male trader . IDI, Angurai Market)

The study found that there are varying levels of knowledge among the trekkers, revealing intriguing insights. It was found that a notable number of trekkers could identify and name specific livestock diseases. It is worth noting that these diseases were not exclusively zoonotic in nature, but rather ailments that specifically impact their animals. Among the diseases commonly named by the trekkers were foot and mouth disease (FMD), brucellosis, lumpy skin disease (LSD), and anthrax.

Furthermore, the study shed light on the traders' knowledge regarding livestock diseases, as they too exhibited some degree of familiarity. The traders displayed the ability to identify certain diseases and provide descriptions of their impact on animals. Much like the trekkers, the diseases frequently mentioned by the traders included foot and mouth disease (FMD), brucellosis, lumpy skin disease (LSD), and anthrax.

However, despite some actors demonstrating a certain level of knowledge regarding zoonotic diseases, the majority remained unaware of the potential for diseases to transfer from livestock to humans and vice versa. Remarkably, foot and mouth disease, lumpy skin disease, and anthrax were consistently cited as the most known diseases among the majority of informants. These assertions were further reinforced by the responses gathered from key informants, emphasizing the prevalence of these diseases within the community.

“The most common diseases in this area are Lumpy skin disease, foot and mouth, black water and anthrax although we have not had an outbreak recently in this market” (69-year-old male.

KII Amukura Market)

“Foot and mouth is the most common disease and lumpy skin disease. They are common in January and February. But when it is raining, we don’t have these diseases. (61-year-old

male.KII Amukura Market)

Further probing on this revealed that whenever there is an outbreak of LSD, FMD and Anthrax, the markets are closed and movement of livestock from one region to another is also prohibited. These affect the traders’ livelihood as they are not able to transact in the markets. They, however, continue with their trade by buying animals from homesteads and selling them to different buyers without going to the markets. In addition to knowing the zoonotic diseases, some of the actors exhibited knowledge of the transmission modes and signs of these diseases in humans. This is exemplified in the following excerpts:

“I know ECF, it comes as a result of not washing your animals. It is caused by ticks. I don’t know about Lumpy skin” (43-Year-old, Male trader . IDI, Angurai Market)

“We have brucellosis that can come from drinking milk and cancer from eating meat that has just been treated or meat that has not been inspected. If someone has brucellosis, they will develop boils and swelling on the body” (32-year-old male trekker, Amukura market).

“I know of diseases like Anthrax, trypanosomiasis, yellow fever, foot, and mouth disease; for the case of trypanosomiasis. I know that it is transmitted by tsetse fly” (56-year-old, male trekker. IDI, Amukura Market)

The study revealed that many of the traders and trekkers know how to identify a sick animal, and the way they use to identify sick animals was common among the informants. The study noted that the Identification of sick animals is a critical exercise because it helps the traders avoid the potential loss of buying a sick animal or the loss and problems that a trekker may encounter if they are escorting a sick animal. By identifying sick animals, the actors limit the chances of infection and spread of zoonotic diseases because as the study found out the sick animals are not allowed into the livestock ring, and any animal that is found to be sick the owner is advised to take it out of the market and seek help from a veterinary officer or doctor. Some of the signs mentioned to be signs of a sick animal were dropping ears, a lot of mucus from the nose, diarrhoea, bloody urine, and the animal not being active, unable to walk properly, and not feeding drinking. An animal showing any of these signs will be considered sick. However, the signs are general signs for sick animals, not necessarily for animals suffering from zoonotic diseases. Below are the responses received from the actors on how they identify sick animals:

“To identify a sick animal, you will see wounds on its body, it will be producing a lot of mucus from the nose and you will see that the animal is not active, it will not be eating or drinking” (56 Year old, Male trader . IDI, Butula Market)

“To identify a sick animal, you check if the fur is standing, if it is rough, you will know it has a problem. You also check if the nose is producing a lot of mucus, if the ears are dropping and generally if the animal is dull” (**32 Year old, Male trekker . IDI, Butula Market**)

“To identify sick animals, we check for dropping ears, flowing mucus and rough skin”
(**35-year-old, male trade. IDI, Funyula Market**)

The study findings indicate that there are common ways that the different actors in different livestock markets use to identify sick animals in the market. The common signs that the traders look out for are similar to the ones the trekkers mentioned. They look out for dropping ears, a lot of mucus from the nose, diarrhea, and bloody urine, the animal not eating or drinking, and rough hide.

It is crucial for livestock traders and trekkers to know how to identify sick animals for several reasons: Recognizing signs of illness in livestock allows traders to provide timely and appropriate care, ensuring the welfare of the animals. Sick animals can be carriers of contagious diseases and pathogens that can spread rapidly among human and livestock populations. By identifying and isolating sick animals, the trekkers can help prevent the transmission of diseases, minimizing the risk of outbreaks and reducing economic losses. By recognizing signs of illness, traders can take necessary precautions to prevent the spread of diseases to themselves or consumers who may come into contact with the animals or their products. By identifying sick animals early , traders can take appropriate measures, such as veterinary treatment or quarantine, to minimize financial losses and protect their investments. Overall, having the ability to identify sick animals allows the actors in livestock trader to ensure animal welfare, prevent disease

spread, protect human health, maintain market reputation, and make informed decisions to mitigate financial losses.

Drinking milk that is infected or not boiled, eating meat that is not properly cooked, or meat from a sick animal were mentioned by some of the actors as ways in which someone can get infected by a zoonotic disease. Some also indicated knowledge of ways in which the animals get infected with zoonotic diseases. Ticks and Tsetse fly were mentioned as some of the common vectors for zoonotic diseases in animals.

The actors in the trade of dealing with animals have acquired their knowledge about zoonotic diseases primarily through hands-on experience and the transmission of indigenous knowledge from previous generations. Unlike formal education, this knowledge is deeply rooted in their daily practices and has been passed down from older and more experienced traders. Before entering the trade, the actors typically do not receive any formal training specifically related to zoonotic diseases. Their understanding of ways of identifying sick animals and the appropriate actions to take when confronted with an illness comes from their interactions with fellow traders and through apprenticeships. This informal learning process involves observing and learning from others who have extensive practical knowledge in the field.

Although there may be instances where actors receive formal training on livestock diseases, particularly during outbreaks, their level of formal education generally does not contribute significantly to their understanding of zoonotic diseases. The knowledge they possess about zoonotic diseases is largely derived from their accumulated experience and the wisdom shared by seasoned traders. However, it is worth noting that formal education may still influence their

decision-making and the steps they take when faced with a suspected case of zoonotic disease infection.

The actors in the livestock trade rely on a combination of indigenous knowledge, learned through practical experience and mentorship, and occasionally supplemented by formal training during specific situations. This amalgamation of knowledge guides their actions and responses when dealing with potential zoonotic diseases.

4.3.2 Attitudes of the actors towards zoonotic diseases

Attitudes towards zoonotic diseases can be influenced by various factors such as cultural beliefs, personal experiences, and access to information. These attitudes may evolve over time as new outbreaks occur, scientific understanding advances, and public health measures are implemented. The study sought to assess the attitude of the different actors in the livestock trade towards zoonotic diseases. Actors in the livestock trade with a positive attitude towards zoonotic diseases can contribute significantly to disease prevention and control. These individuals prioritize the health and welfare of both animals and humans. They understand the potential risks associated with zoonotic diseases and take proactive measures to minimize their transmission. On the other hand, negative attitudes among actors in the livestock trade can exacerbate the spread of zoonotic diseases. Actors with a careless or complacent attitude may overlook the potential risks associated with zoonotic diseases, leading to inadequate disease control measures. This negligence could result from a lack of awareness. The informants were asked questions to assess their attitudes towards these diseases. Some of the responses received were as below.

“As traders, we came to discover that the animal had come from Uganda and it died, and the person ate it with his family, and the disease infected them” (53-year-old, male trader. IDI, Butula Market)

“I have seen diseases in cows, mostly cows from Uganda. We have cows from Uganda, but when sold here in Kenya, they die easily from diseases.” (35-year old male trader. IDI, Butula Market)

“The animals from Uganda as the ones with diseases, their meat is reddish, tasteless, and very light, The Kenyan Government should put measures in place to first screen animals from Uganda for diseases at the border before they are allowed in Kenya. This will help in the control of diseases” (56-year-old, male trader. IDI, Amukura Market)

The study revealed that the actors believe that most of the livestock diseases and zoonotic diseases originate from outside Busia County, and most are brought in by animals from Uganda.

The traders believe that the animals from Uganda are more vulnerable to diseases as compared to the ones from Kenya. The animals from Uganda are therefore sold to butchers for meat and not to farmers for breeding. This could be a considerable risk if indeed the animals have diseases because it will expose the consumers to the risk of infection.

On the issue of where they would get help from in case of a zoonotic disease infection, most informants responded that they would seek help from a hospital. The study also found out that most informants believe in conventional medicine and that there are health care facilities in many parts of the study area that are easily accessible to the residents of the study sites. Below are some of the responses received from the informants.

“In case of a suspected zoonotic disease infection, I will get help from the hospital, we have hospitals close by. We have Bumala and Murumba hospital” (48-year-old, male trader. IDI, Butula Market)

“I case of a zoonotic disease, I will get help from a hospital, we have a dispensary nearby called Bukayi dispensary” (49-year-old, male trader. IDI, Amukura Market)

“If I get infected, I will get help from a hospital. The nearest hospital is about two kilometers from my home in Malakisi” (38-year-old, male trader. IDI, Angurai Market)

The study demonstrates that most of the actors will get help from a hospital in case of an infection or suspected infection with a zoonotic disease. They will call a veterinary doctor to help their animals. This was the response from many of the actors interviewed.

4.3.3 Practices of the actors

One of the objectives of the study was to explore the practices adopted by informants and the underlying reasons motivating their engagement in these practices. Observations were carried out to supplement the understanding of these practices and their potential implications for the transmission or control of zoonotic diseases. The research findings highlight the existence of certain practices among the actors that can either mitigate or heighten the risk of zoonotic disease infections. Significantly, it was discovered that some of these practices are deeply rooted in cultural and religious beliefs held by the actors. The informants embrace these practices due to their strong adherence to cultural and religious principles, where they attribute significant influence to a higher power that remains beyond scrutiny or questioning. Primarily, these practices center around the appropriate handling and disposal of deceased animals. To gain further insight, the informants were queried about their actions when faced with the death of an animal under their care. Presented below is a selection of responses provided by actors sampled from marketplaces.

“If an animal dies and the cause of death is not known, it will be eaten. Some will dry it first, then eat it. In our tradition, most people don’t like throwing meat away because you will throw away your luck, so even if you personally don’t want to eat it, you call people who want and give it out” (32-year-old male trade. IDI, Butula Market).

“You must skin the animal before you bury it. In our Teso traditions, you cannot bury an animal with the skin because if you do that you will be cursing yourself and you will

never prosper in animal business again” (32-year-old, male trekker. IDI, Amukura Market)

“Where I come from, no one throws away their animal. it is wrong. If the animal dies, they will slaughter it, dry the meat, and cook it. That is what people do” (35 years old, male trader. IDI, Funyula Market).

The study found out that some actors will eat meat from animals that have died from an unknown cause because they believe that throwing away meat will bring bad luck to them. The study also shows that there is a common practice among the actors of having to skin their animals when they die before burying them. This practice was mentioned by most of the respondents in different markets, and the reason for doing this was given as cultural beliefs. If one does not do this, then he or she will never be successful in the business, as burying an animal with the skin is akin to burying all your wealth and luck. They also believe that drying the meat of a dead animal before cooking can kill the infectious agent that might be in it and help in preventing infections.

The study also found out that there are practices that the actors in the livestock trade have adopted that help in the prevention of the spread of livestock diseases and, to an extent, spread of zoonotic diseases. A question was asked on how the actors would prevent the spread of zoonotic diseases. The responses below were received from some of the actors in different markets under the study.

“I isolate sick animals, and then I call a veterinary doctor to come and help by treating it. I also ensure that dead animals are buried” (32-year-old male trekker. IDI, Butula Market).

“If I am moving many animals and one of them falls sick, Isolate it and tie it in a nearby homestead. I then inform the owner of the animal, who will then take action of calling a doctor. I continue with the rest of the animals to my destination” (48-year-old male trekker. IDI, Butula Market).

It was observed that most markets have a livestock ring, and sick animals are not allowed in the ring. The ones that find their way in are removed and the owners told to get help and only return them when they are well. This practice is enforced by the market chairman and his team also referred to as “youths”. The traders are also vigilant and will report any animal that appears sick in the livestock ring. The practice of isolation of sick animals was reiterated and confirmed by key informants. Below is what a key informant said.

“When we identify a sick animal in the market, we remove it from the market and advise the owner to get treatment for it and only bring it to the market when it is healed” (KII ,Angurai Market)

“When sick animals are identified in the market, they are isolated and then the veterinary doctor is called immediately to assess them and give help” (KII ,Amukura Market)

“When a sick animal is identified in the market, it is taken aside outside the market, a doctor will be called to help and if the doctor see that it is a bad disease they can even order for closure of the markets” (KII ,Amukura Market)

The practice of vaccinating animals to prevent infection and the spread of diseases is indeed an important aspect of animal health management. Findings from this study highlight that vaccination exercises primarily occur during outbreaks, and these campaigns are typically organized by the county government through the department of veterinary services. It's important

to note that the specific protocols and practices for vaccination, medication, and prophylaxis may vary depending on the region, the type of animals involved, and the specific diseases that are prevalent in the area. Local veterinary authorities and professionals play a crucial role in designing and implementing effective vaccination and disease prevention strategies tailored to the needs of the livestock population.

It was observed that animal health practitioners are positioned at the entrance of livestock rings to administer medications to newly purchased animals. These medications are given orally or via injections. On probing the study was informed that the animals receive antibiotics and dewormers as prophylaxis. The reason behind this is that the new owners may not be aware of whether the animals they have bought have been dewormed or not. Antibiotics are administered to prevent any potential diseases that the animals might be carrying but have not yet developed any clinical signs. The actors in the livestock trade believe that by administering antibiotics and dewormers, they protect the health of the animals and prevent the spread of diseases within the livestock population. These measures can help to reduce the risk of disease transmission and improve the overall well-being of the animals, but they can also increase the risk of antimicrobial resistance (AMR).

CHAPTER FIVE: DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

This discussion in this section is guided by the specific research objectives that are (i) to assess the knowledge of the actors in livestock trade on zoonotic diseases, (ii) to determine the attitudes of actors in livestock trade on zoonotic diseases, and (iii) to examine the practices of actors in livestock trade in relation to zoonotic diseases. The study identified the actors in the Livestock trade in the markets in Busia County. It assessed the knowledge of the different actors in livestock trade on zoonotic diseases. The study also analyzed the practices and attitudes of actors regarding zoonotic diseases. Interestingly, the study found that there was insignificant variation in attitudes based on the sex of the participants, this could be due to the underrepresentation of female actors. Notably, the study revealed a lack of female trekkers and only one female trader participated in the study. However, education level and religion were identified as influential factors. In terms of education, a majority of participants who could identify livestock diseases and were aware of diseases transmissible from animals to humans had attended secondary school. Some participants had even completed their secondary education. This suggests that education plays a crucial role in increasing knowledge and awareness of zoonotic diseases among actors.

Religion and cultural beliefs were also found to significantly influence the control and spread of zoonotic diseases. These factors shaped the actors' engagement in certain practices and their avoidance of others, based on their religious and cultural backgrounds. It is evident that religious and cultural beliefs contribute to the adoption or avoidance of specific practices that can impact the spread of zoonotic diseases.

Understanding the influence of education, religion, and cultural beliefs is crucial for effective control measures and awareness campaigns targeting zoonotic diseases. By tailoring

interventions to specific populations and addressing their unique concerns and practices related to zoonotic diseases, we can better address the challenges posed by these diseases.

5.1 Knowledge of the actors in livestock trade on zoonotic diseases

The study, like other similar studies on knowledge on zoonotic diseases, revealed that the actors in the livestock trade in Busia have sketchy knowledge of zoonotic diseases. The study sought to explore the actors' knowledge on zoonotic diseases and the questions asked was if they knew of diseases that can come from animals and infect humans and vice versa and from the findings it is evident that not many know about such diseases and their possible ways of transmission. Abdi *et al.* 2015 in their study on knowledge, attitudes, and practices on Rift Valley Fever (RVF) among the pastoralist community of Ijara in Northeastern Kenya, found that there is low knowledge among the community members on RVF. Swai *et al.* 2010 in their study on knowledge and attitude towards zoonotic diseases among animal health workers and livestock keepers in Tanzania, also found poor knowledge and patchy awareness on zoonotic diseases. Many of the informants interviewed in this study did not know about diseases that can come from animals and infect humans (zoonotic diseases), however there are some who know about such diseases. Some informants mentioned brucellosis, which shows that some knowledge on brucellosis as a zoonotic disease. This is consistent with a study by Seyoun *et al.* 2016 on knowledge attitude and practice among small-scale dairy farmers on milk-borne zoonotic diseases, where they found that a very high number of the study participants know about the potential health risk of drinking raw milk and linking this practice to brucellosis. Anthrax, foot and mouth disease, and lumpy skin diseases(LSD) were the diseases that most of the actors in livestock mentioned as the most common, and this was also affirmed by the key informants, although there was no recent outbreak of cases reported in the area at the time of the study the fact that most of the actors

mentioned these diseases could be attributed to the fact that whenever there is an outbreak, then livestock markets are closed, and quarantine of livestock is enforced. This means there will be no business for them, and this could be the reason why most of them mentioned these diseases as common. There are some actors who also think that cancer is a zoonotic disease, and they associate it to eating meat from an animal that has LSD.

The study found out that the actors have ways of identifying sick animals. These are not necessarily animals suffering from zoonotic infections but just ways of knowing if an animal is sick. These ways of identifying sick animals were noted as common to both trekkers and traders. This knowledge of identification of sick animals was found to be indigenous knowledge and is passed from one person to another, not through any form of formal training. The other common source of knowledge on zoonotic diseases among the actors, as revealed by the study, was mainly mentioned as researchers who came to research the area and the officials from the veterinary department who come to teach about the diseases during disease outbreaks. The mass media, specifically the vernacular radio stations, were also mentioned as sources of information on diseases, especially during disease outbreaks and when there is a call for vaccinations of animals against diseases.

Some studies have shown that there is a strong association between formal education level and knowledge, attitude, and practices on zoonotic diseases; others have also shown little or no relationship between formal education and KAP on zoonotic diseases.(Njuguna et al., 2017) investigating the knowledge on bovine brucellosis in Kahuri district, Muranga County, Kenya, found that all respondents with no formal education were unaware of the causative agent of brucellosis. Knowledge levels were higher in young, educated farmers compared to the old uneducated farmers. (Njenga et al., 2020) comparing knowledge, attitude, and practices of

animal and human brucellosis between nomadic pastoralists and non-pastoralists in Kenya, found that while a majority of pastoralists households had little or no formal education, they had heard about brucellosis and know how the disease presents in humans however a few of them know how it is transmitted between animals and humans and how the transmission can be prevented. In this study, we found that most of the respondents' level of formal education is low. However, they know how to identify sick animals. A majority of them do not know about zoonotic diseases and how they are transmitted from animals to humans. Those who know or have heard about zoonotic diseases talked about brucellosis and were able to mention the mode of transmission as consumption of raw milk.

The significance of not providing training to livestock traders and trekkers on livestock diseases and zoonotic diseases before they enter the livestock trade is considerable. Training in this aspect is crucial to mitigate potential risks and safeguard both animal health and public health. Zoonotic diseases can have severe consequences on the profitability and sustainability of the trade. The lack of training of the traders and trekkers may contribute to the lack of knowledge or scanty knowledge on zoonotic diseases, understanding of their symptoms and clinical signs in animals, and the appropriate measures for prevention and control. This can lead to the introduction and spread of diseases within the livestock population, resulting in economic losses and potential disruption of the entire value chain. Moreover, the livestock trade involves interactions between animals and humans. Without adequate training, traders and trekkers may not be aware of the potential zoonotic diseases associated with livestock, such as brucellosis or anthrax. This lack of awareness can lead to improper handling practices, inadequate personal protective measures, and a higher likelihood of disease transmission.

Training on livestock and zoonotic diseases can equip traders and trekkers with essential knowledge about disease prevention, early detection, and biosecurity measures. They learn how to identify potential signs of illness in animals, implement proper hygiene practices, and understand the importance of vaccination and quarantine protocols. By having this knowledge, they can actively contribute to reducing zoonotic disease transmission risks and protecting the health of both animals and humans. Providing training to livestock traders and trekkers on livestock diseases and zoonotic diseases is essential for minimizing disease risks, protecting animal and public health, and maintaining the sustainability of the livestock trade. Seminars and workshops conducted by the county government veterinary department or Research organizations like the International Livestock Research Institute (ILRI) working in the area have also contributed to the passing of knowledge on zoonotic diseases and has led to the actors adopting preventive measures like washing their animals and vaccinating their animals against some of the diseases. From the data collected and analyzed, it is evident that those actors in the livestock trade who have been in the trade for longer, which is for over six years, have more knowledge on livestock diseases, how to prevent them, what action to take on sick animals and how to identify sick animals. There is, however, little knowledge of zoonotic diseases and their modes of transmission apart from brucellosis and its mode of transmission, which is known by many.

5.2 Attitudes of the actors in livestock trade on zoonotic diseases

The study found that the actors take zoonotic diseases seriously even though a majority do not know about the existence of infections that can come from animals to humans. It is consistent with a study by (Abdi et al., 2015) that found positive attitude towards zoonotic diseases; a high percentage of respondents had a positive attitude towards the prevention and control of RVF, a

zoonotic disease. The positive attitude is shown by the fact that they have preventive measures that they take like washing animals to remove ticks, taking animals for vaccinations, and visiting hospitals in case of suspected zoonotic disease infection. The study also revealed that some actors believe that meat should be cooked appropriately to prevent zoonotic disease infections, and milk should not be consumed raw. The actors in the livestock trade take several measures to prevent the spread of zoonotic diseases and the occurrence of livestock diseases. The study also revealed that many actors seek help from hospitals in case of a zoonotic disease infection and from a veterinary doctor in case their animal is sick. This shows that they have a positive attitude. Many actors interviewed expressed that in the event of an infection or suspicion of a zoonotic disease, they would turn to a hospital for assistance. Recognizing the potential seriousness of diseases that can be transmitted between animals and humans, these actors understand the importance of prompt medical intervention. By turning to a hospital, they aim to receive the necessary expertise to accurately diagnose, effectively treat, and prevent the further spread of such illnesses. The actors interact closely with animals as part of their profession. By prioritizing their own health and the well-being of their animals, actors demonstrate a proactive approach to managing zoonotic diseases to safeguard both themselves and their animal companions.

The actors' reliance on hospitals and veterinary doctors reflects a broader understanding of the interconnectedness between human and animal health. Their actions underscore the importance of the One Health collaborative efforts among medical professionals and veterinarians to effectively address zoonotic diseases and mitigate their impact. However, the study also revealed some negative attitude among some actors who believe that the animals that originate from outside Busia County and especially from Uganda are the ones that have diseases and were even

calling for the restriction of such animals. This is consistent with a study by(Ozioko et al., 2018) that found negative attitude on zoonotic diseases bush meat hunters and traders in Nsukka, southeast Nigeria

5.3 Practices of the actors in livestock trade on zoonotic diseases

Africa is a hotbed for zoonotic diseases ranging from endemic zoonoses such as brucellosis and leptospirosis to neglected zoonoses such as rabies and onchocerciasis to emerging zoonoses such as anthrax, yellow fever, and Ebola(Moneer et al., 2021). Human behavioral factors have already been identified as central in perpetuating this spread as well as contributing to human infections. Risk factors for zoonotic diseases infections include consuming raw milk or handling products from sick animals, especially through milking, skinning, slaughtering, touching blood, providing care during birthing, and conducting veterinary procedures (Kamau et al., 2021; Njenga et al., 2010).This study found out that there are several practices that the actors in the livestock trade engage in. Some of the practices can contribute to the spread of zoonotic diseases, while others can help in the control of the spread of these diseases. Religion as one of the social demographics in this study has a significant relationship to the practices that the actors engage in. One of the drivers of One Health is the association between humans and animals embedded in religious beliefs. Studies have shown the importance of religious beliefs and practices in the perception of human health.(Vijayaraghavan et al., 2022). Religious beliefs could potentially influence perceptions, actions, and subsequent One Health outcomes. In this study religious beliefs and ideology forming the structure in the cultural materialism theory has a direct impact on the practices of the actors. Most of these practices are embedded in their cultural and religious beliefs. And this shows how the theory of cultural materialism comes into play. The

superstructure influencing the structure and the practices that are beneficial to the community are maintained.

Practices like skinning of dead animals before burying them or eating of dead animals are some practices that are embedded in their culture. The study also found that there are traders who do not deal in some animals or their products because of their religious affiliation. There was a trader who does not sell pigs because he is Muslim. Several studies have shown that practices such as herding, residing with livestock, slaughtering, skinning, and consumption of meat and milk from ill or dead livestock do play a vital role in the transmission of zoonotic diseases like Rift valley fever (RVF) to humans (Bird et al., 2009; Breiman et al., 2008). The study found that many of the actors believe that when an animal dies, it must be skinned before it is disposed of. This is a practice that is based on their cultural belief and is deeply rooted. This practice exposes them to the fluids from the dead animal and may contribute to infection. The study also revealed that there is a belief that meat cannot be thrown away, and therefore when an animal dies, the meat will be eaten or given to people who want to eat. Although some of the actors are aware of the risk that comes with engaging in this practice, they still engage in it, given that it is deeply rooted in their community. This is consistent with a study by (Mangesho et al., 2017) which found that pastoralists engage in risky practices embedded in their culture that exposes them to the risk of zoonotic disease infections. The consumption of raw blood by young initiates after returning from circumcision is believed to replenish the nutrients lost during exercise. Although this practice is not by many actors, it can still contribute to the spread of zoonotic infections. It is interesting to note that some actors say that they do not engage in the practice of eating meat from dead animals or skinning of deal animals before disposing of them because they are born again Christians, and that wealth comes from God, all those who practice the tradition

proclaimed to be Christians, and it can therefore be said that Christianity has little effect of cultural and traditional beliefs. The study found that the actors usually separate the animals that they are selling from the ones that they keep at home. This practice can prevent the animals from spreading the disease, be it from the ones for selling or the ones being kept by the trader or trekker. The study also found that the actors do not allow sick animals into the market; this practice helps in preventing the spread of disease. A good number of the actors mentioned that eating meat from infected animals and eating meat that is not cooked correctly, and drinking milk that is not correctly boiled can cause diseases in humans. The study sheds light on the complex interplay between cultural, religious, and practical considerations in shaping the behaviors of individuals regarding zoonotic disease prevention. It emphasizes the need for a nuanced understanding of these practices to design effective interventions that respect and incorporate the cultural and religious beliefs of the actors involved. By fostering awareness and providing alternative strategies that align with both their traditions and health considerations, it becomes possible to promote safer practices and reduce the risk of zoonotic disease transmission within these communities.

5.2 Conclusion

The most damaging outbreaks of high impact diseases in recent decades have had an animal source, including H5N1 highly pathogenic avian influenza, H1N1 pandemic influenza, Ebola, severe acute respiratory syndrome (SARS), the Middle East respiratory syndrome (MERS) and the corona viruses. These diseases have either spread rapidly in a particular region (epidemics) or spread widely in many countries across the world (pandemics), leading to massive losses of life and livelihoods and having a significant economic impact. When compounded with poverty, inadequate sanitary standards, and lack of resilience, they can quickly wipe out much of the development that a country has achieved. The One Health approach has emphasized the close connection between animals, the environment, and human health. While zoonotic diseases originate from animals, there is a wide range of potential transmission pathways for human infection. For effective control of diseases, it is crucial to know the communities' KAP on a particular disease. This shows that understanding the knowledge, attitudes, and practices on zoonotic diseases of a community is very important as it may help design appropriate control and intervention measures for a zoonotic disease outbreak. Anthropology's role conventionally has been in the translation of local concepts of illness and treatment, and the adaptation of biomedical knowledge to fit local aetiologies. It plays an important role in examining the local context of disease diagnosis, treatment, and prevention, and the structural as well as conceptual barriers to improved health status. The success of interventions and control programs is moderated by community knowledge, attitudes, and practices collectively with local priorities and therefore sustainable interventions need to acknowledge and address community-specific social, economic, and political circumstances.

The study revealed that there is some patchy awareness and poor knowledge of zoonoses by actors in the livestock trade. Even though the knowledge of zoonotic diseases is low, some of the actors' practices show that they are aware that there are diseases and are taking measures against these diseases. As has been shown in other studies, low awareness, and poor knowledge of zoonoses combined with food consumption habits in pastoral and agro-pastoral communities are likely to expose them to an increased risk of contracting zoonoses: *Journal of Animal and Veterinary Advances* (2003). The study has also shown that the practice of skinning dead animals and eating of the carcasses from dead animals is a common practice. The study also revealed that the actors (both traders and trekkers) move their livestock from one market to another and at times move from one county to another that is Busia, Bungoma, Kakamega and some of them also get animals from Uganda. This practice of movement of livestock with can contribute to the spreading of zoonotic diseases from one region to another. There is some control put in place to ensure animals don't move from regions with notifiable diseases like foot and mouth disease or anthrax; this is in the form of issuance of movement permits; however, the study noted that this was not effective as movement permits are only issued in some markets, Although Cap 364 of the laws of Kenya stipulates issuance of movement permits to animals being moved from one region to another ,the study found out that of the markets under study only Funyula market had movement permits being issued and it was only done to animals that had been sold. There was no one checking if the animals that were coming to the market were from regions that are free of diseases. Even though a number of the actors in the livestock trade interviewed do not know zoonotic diseases, they have in place practices that can help control these diseases like vaccination of animals, washing animals, separating animals for sale and those being kept at home, and also ensuring that sick animals do not enter the market. These

practices are likely to reduce the risk of animals getting infected and, in turn, infecting them with zoonotic diseases.

In conclusion the study revealed overall low zoonotic disease knowledge, low attitude towards zoonotic disease risk, and common risk behaviors among the actors in livestock trade. Participants in this study have limited knowledge of zoonotic diseases and some of the practices they engage in may increase the risk of zoonotic disease infection.

5.3 Recommendations

From the findings, the study recommends the following.

- **Enhancing knowledge and awareness:** There is a need to develop comprehensive training programs aimed at improving knowledge about zoonotic diseases among actors in the livestock trade. Conduct workshops and seminars to educate them on disease transmission routes, symptoms and clinical signs, and preventive measures. Increase awareness through targeted awareness campaigns using mediums such as radio, television, posters, brochures, social media, and community engagement.
- **Promoting positive attitudes:** Implement behavior change interventions to address the low attitude towards zoonotic disease risks. Provide guidelines and recommendations for safe practices, emphasizing proper hygiene, use of personal protective equipment (PPE), and appropriate handling and disposal of infected carcasses. Employ persuasive communication techniques to encourage adoption of these practices.
- **Promote the One Health approach:** Foster collaboration between actors in the livestock trade, veterinary professionals, and other health practitioners. This collaboration through

the One Health approach will help in zoonotic disease surveillance and it can reduce the risk of zoonotic disease transmission. Highlight the role of each of the disciplines as valuable resources for guidance and support in zoonotic disease prevention and control.

- **Strengthening Regulations:** There is a need to strengthen the enforcement of regulations and guidelines related to zoonotic disease prevention in the livestock trade. Cap 364 of the Kenyan laws on the issuance of movement permits needs to be adhered to and there is need for increased enforced to ensure proper adherence.
- **Knowledge Exchange Platforms:** Establishing platforms for knowledge exchange where actors in the livestock trade can share experiences, challenges, and best practices related to zoonotic disease prevention. Encouraging peer-to-peer learning and collaboration to foster a community of practice dedicated to improving disease control measures.
- **Supporting Research:** There is a need to support research initiatives to gather more data on zoonotic diseases within the livestock trade. Encourage studies on disease prevalence, risk factors, and the effectiveness of interventions. This research can provide valuable insights for designing targeted strategies and interventions.

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APPENDICES

Appendix 1: Consent Form

Investigator: Hamilton Otieno Majiwa

Introduction

I am **Hamilton Otieno Majiwa** from the University of Nairobi, Institute of Anthropology, Gender, and African Studies. I am conducting a study entitled, **KNOWLEDGE, ATTITUDES AND PRACTICES OF ACTORS IN LIVESTOCK TRADE IN MARKETS IN BUSIA COUNTY OF WESTERN KENYA ON ZONOTIC DISEASES.**

Purpose: The study seeks to explore and understand the knowledge; attitudes and practices of actors in livestock trade on zoonotic diseases. The study will seek the opinions of traders, trekkers, animal health officers, market officials and the county government officials at the market.

Procedure: If you agree to participate in the study, you will be asked questions about the nature of your roll in livestock trade, your knowledge on zoonotic diseases, what should be done when an animals suspected to be sick, and your opinion on how sick and dead animals should be treated and how are they treated at the moment. Your participation will add knowledge on zoonotic diseases and the information will provide more insight on beliefs and practices around zoonotic diseases and will help in mapping and developing appropriate interventions for the diseases.

Confidentiality: Your confidentiality will be maintained at all times and there will be no use of names or any possible identifiers that may connect you with the reports or publications that will connect you with the study.

Voluntarism: Participation in the study is voluntary. You can choose not to participate. You will be free to withdraw from the study at any time. You are free not to answer any question that you deem is too personal. You are however humbly requested for your full participation and cooperation in the study.

Contact person: For any question that you may have about the study, you may contact Hamilton Otieno Majiwa through telephone number 0721513381 or email address khammajiwa@gmail.com. You may also contact my supervisor Dr Salome Bukachi of the Institute of Anthropology, Gender and African studies, of the University of Nairobi. Telephone number 020-2082530.

Your Participation in the study will be highly appreciated.

I..... Hereby voluntarily consent to participate in the study. I acknowledge that I have read and understood the explanations given to me with regards to the nature of the study and the purpose of the study by

I clearly understand that my role with regards to participation in the study is completely voluntary.

Name.....

Signature.....

Date.....

Appendix 2 :In-depth Interview guide

IN-DEPTH INTERVIEW SCHEDULE FOR TRADERS/TREKKERS

Informant Background information

Date: _____

Name of informant -----

Designation-----

Market name /location -----

Name of informant's S/County-----

Name of informant's village-----

Age-----

Sex-----

Duration in the trade-----

Education level-----

Religion-----

1. Occupation (trader, trekker, broker; what exactly this job entails; why they do this job, income per day or month) - this will help to understand their MOTIVATION
2. Requirements to join the trade. Is there any training that one has to undergo before joining the trade (probe for training on safety and livestock diseases and if there are any rules of trading)
3. Requirements to operate the trade (Probe for means of communication-mobile phone, , health licenses, safety kits)
4. Where they buy the animals from and their destinations (village/market and sub location).
5. Which species of animals deal in? For draught, fattening or slaughter
6. Which markets do they visit and how often?
7. Have they heard about zoonotic diseases? Diseases that can come from animals or animal products and infect humans. Ask them to name some
8. Do they know where these diseases come from and how they can be transmitted to humans
9. Do they know some of the signs for a zoonotic infection?
10. Which is the first place they would seek for help when they suspect a zoonotic infection
11. How do they identify sick animals, and what do they do once they identify it
12. How do they dispose of animals that die under their care/ownership, Do they bury, burn or eat .Why do they do what they do.

13. What are some of the precautions they would take to ensure the disease does not spread to other animals and humans.

THANK YOU FOR YOUR TIME AND PARTICIPATION

Appendix 3: Key informant Interview guide

Informant Background information

Date: _____

Name of informant -----

Designation-----

Market name /location -----

Name of informant's S/County-----

Name of informant's village-----

Age-----

Sex-----

Duration in the trade-----

Education level-----

Religion-----

1. What is your role in the market
2. Do the traders and trekker undergo any training before starting the trade

3. What are the rules that govern operation in the market(are there and safety gear required or any health certificate)
4. What are some of the common livestock diseases
5. How are sick animals identified and handled in the market
6. What are some of the diseases in animals that can make people sick?
7. Have you encountered any zoonotic disease in the market or among traders or trekkers or anyone in the market
8. Where do people seek for help in case of a suspected zoonotic disease infection
9. What are some of the precautions they would take to ensure the disease does not spread to other animals and humans

Appendix 5: Observation guide.

	ITEM	OBSERVATIONS
	Space: The market layout. How clean is it, are there toilets, clean water, etc.	
	Actors: How are the different actors going on with their activities	
	Activities: What other activities are going on in the markets.	