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Determination of Some Common Zoonotic Diseases Among Vulnerable Communities in an Africa Country

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Abstract

This study investigated the determinants of zoonotic diseases in vulnerable communities in Africa with clear example of Ghana, focusing on the Ashanti and Northern regions. A cross-sectional study design was employed, using quantitative surveys and qualitative interviews to assess socio-demographic factors, knowledge, cultural beliefs, hygiene practices, and healthcare access among 846 households. The findings rsevealed differences in zoonotic disease dynamics between the regions. The Ashanti region exhibited higher awareness of zoonotic diseases (39%) compared to the Northern region (29%), while the Northern region showed a higher prevalence of risky practices such as bush meat consumption and free-roaming livestock. Both regions struggled with poor sanitation and limited healthcare access, with open defecation being more prevalent in the Northern Region (42%) than in the Ashanti Region (27%). Misconceptions about disease causation and reliance on traditional healers were also more pronounced in the Northern Region. The study highlights the need for multi-sectoral interventions, including targeted education, healthcare improvements, and culturally sensitive strategies, to mitigate the burden of zoonotic diseases in these communities, with regional differences informing targeted approaches. Ultimately, the study successfully identified key

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determinants of zoonotic diseases in the Ashanti and Northern regions, thereby achieving its aims and objectives.

Keywords: Determinants, Zoonotic Diseases, Vulnerable, Communities, Ghana

Introduction

Zoonotic diseases are infections that can be transmitted from animals to humans, and they represent a significant global health challenge. These diseases are particularly prevalent in low- and middle-income countries, where close interactions between humans and animals are common, and healthcare infrastructure is often insufficient (WHO, 2020). Zoonoses can be caused by a wide range of pathogens, including viruses, bacteria, fungi, and parasites, and can lead to a range of health issues, from mild infections to severe, life-threatening conditions (Jones *et al.*, 2008).

In recent years, zoonotic diseases like avian influenza, Ebola, and COVID-19 have highlighted the rapid spread of these diseases, underscoring their potential to cause widespread public health and economic crises (Morse *et al.*, 2012). In Ghana, zoonotic diseases significantly contribute to the country's overall disease burden. The frequent contact with livestock and wildlife, poor sanitation, and consumption of bush meat are key factors that facilitate the spread of zoonotic diseases (IJPR, 2020). Major zoonotic diseases in Ghana include anthrax, rabies, zoonotic tuberculosis, viral hemorrhagic fevers (such as Ebola and Lassa fever), and trypanosomiasis (CDC, 2021). These diseases affect not only human health but also the animal populations, agricultural productivity, and the livelihoods of many people (FAO, 2011).

Vulnerable communities, characterized by poverty, limited healthcare access, poor sanitation, and a reliance on animal husbandry, are especially at risk. These communities often lack awareness of zoonotic diseases and the means to implement protective measures, leading to higher rates of infection and mortality. To improve health outcomes in these populations, it is crucial to better understand the underlying factors contributing to the spread of zoonotic diseases.

Statement of the Problem

While the role of zoonotic diseases in public health in Ghana is well acknowledged, there is

a gap in understanding the specific factors driving their prevalence, particularly among vulnerable communities. While some studies have identified individual diseases and their incidence, there is a lack of in-depth research exploring the interconnected socio-economic, environmental, cultural, and behavioral factors that influence the transmission of zoonotic diseases in these high-risk populations.

Existing research has highlighted several key drivers of disease transmission, such as poverty, cultural practices involving animals, inadequate sanitation, free-ranging animals, and low awareness of zoonotic risks (IJPR, 2020; PLOS One, 2018). However, the precise impact of these factors, and how they interact in various regions of Ghana, remains poorly understood. Without a clear understanding of these determinants, public health strategies may fail to address the root causes of zoonotic disease transmission effectively, leading to inefficient or ineffective interventions. This study aims to fill this knowledge gap by identifying the key factors contributing to the spread of zoonotic diseases in vulnerable communities.

Aim and Objectives of the Study

The primary aim of this study is to identify the key factors contributing to the transmission of common zoonotic diseases in vulnerable communities across Ghana.

To achieve this aim, the study will focus on the following specific objectives:

1. To identify the most common zoonotic diseases affecting vulnerable communities in Ghana.
2. To assess the socio-demographic characteristics of these communities and their potential connection to zoonotic disease prevalence.
3. To evaluate environmental and ecological factors that may facilitate the transmission of zoonotic diseases.
4. To examine cultural and behavioral practices that may influence the risk of zoonotic disease transmission.
5. To assess the level of awareness and understanding of zoonotic diseases within these communities.
6. To evaluate the accessibility and utilization of healthcare services for the prevention and treatment of zoonotic diseases.

7. To assess the impact of zoonotic diseases on the health and livelihoods of individuals in these vulnerable communities.

Justification/Significance of the Study

This study is of critical importance due to the significant public health threat posed by zoonotic diseases in vulnerable communities in Ghana. These diseases result in high rates of illness, mortality, and long-term health complications. By identifying the key factors that drive the transmission of zoonotic diseases, this study will contribute to the development of effective prevention and control measures that can improve health outcomes in these populations.

Furthermore, zoonotic diseases have far-reaching socio-economic implications. In addition to their impact on human health, they disrupt livelihoods, reduce agricultural productivity, and place strain on limited healthcare resources. The findings of this study will provide essential evidence to guide policy decisions, enhance health education campaigns, and improve both animal and public health services. Ultimately, the study aims to build resilience in vulnerable communities, reduce the economic impact of zoonotic diseases, and contribute to the global understanding of zoonotic disease transmission in low-resource settings.

Scope of the Study/Delimitation

The scope of this study is focused on identifying and analyzing the factors contributing to the spread of zoonotic diseases in vulnerable communities in Ghana. The study will specifically examine socio-economic conditions, environmental factors, cultural practices, and healthcare access within these communities. The research will be delimited to specific regions of Ghana where zoonotic diseases are prevalent, and the focus will be on common diseases such as anthrax, rabies, zoonotic tuberculosis, viral hemorrhagic fevers, and trypanosomiasis. The findings will be contextualized within the socio-economic realities of these communities, with the aim of informing more targeted and effective public health interventions.

Literature Review

Introduction

Zoonotic diseases—those that can be transmitted between animals and humans—continue to pose serious public health challenges, especially in low- and middle-income countries like Ghana. Communities that are already vulnerable—such as rural dwellers, urban poor, and people who live or work closely with livestock or wildlife—are often the most affected. These groups face a range of everyday risks that increase their chances of encountering zoonotic infections.

To effectively prevent and manage these diseases, it's important to understand the underlying factors that drive their spread. This chapter explores what previous research has revealed about the socio-economic, environmental, and behavioral determinants of zoonotic diseases in Ghana, particularly in vulnerable communities.

Theoretical and Conceptual Framework

To better understand the risks of zoonotic diseases in Ghana, this study adopts a framework that connects social, environmental, and behavioral factors. Rather than seeing disease transmission as a purely biological issue, this approach emphasizes the context in which people live, work, and interact with animals and the environment.

- **Socio-economic factors**, like poverty and limited access to healthcare, influence both exposure to disease and the ability to respond effectively.
- **Environmental conditions**, such as deforestation, poor sanitation, and habitat disruption, create environments where diseases can thrive and spread.
- **Cultural and behavioral practices**, including local beliefs, knowledge, and habits, affect how people interact with animals and approach health care.

This integrated perspective is rooted in the **One Health** approach, which recognizes that human health is deeply connected to animal and environmental health. It provides a broader lens through which to understand and address zoonotic diseases in Ghana.

Empirical Review

Overview of Zoonotic Diseases in Ghana

Ghana faces a wide range of zoonotic diseases such as tuberculosis, rabies, anthrax, avian influenza, and even Ebola. These illnesses are commonly linked to animals like cattle, goats, poultry, and various wildlife species. In rural areas where farming and animal rearing are part of everyday life, close interactions between humans and animals create opportunities for disease transmission—whether through bites, contaminated food, or shared environments.

Unfortunately, many of these infections go undiagnosed or untreated. Poor sanitation, environmental degradation, fragile health systems, and limited public awareness all contribute to the ongoing threat of zoonotic diseases in the country's most vulnerable communities.

Socio-Economic Determinants

Poverty and Access to Healthcare

Poverty plays a major role in shaping health risks. In many rural and peri-urban communities, people struggle to access basic healthcare, clean water, and sanitation—factors that make early detection and treatment of zoonotic diseases difficult (Akuffo *et al.*, 2022). Malnutrition is also common, weakening immune systems and leaving people more vulnerable to infections (Tetteh *et al.*, 2021). Without the right infrastructure, public health campaigns like vaccination drives and awareness programs are hard to implement.

Livelihoods and Occupational Exposure

For many Ghanaians, raising livestock or working in animal markets is not just a livelihood—it's a way of life. But these jobs come with risks. Farmers, butchers, and animal traders often handle animals or animal products without proper protection. In these unsanitary settings, diseases like anthrax, brucellosis, and avian flu can easily spread (Darko *et al.*, 2020; Agyemang *et al.*, 2021). The risk is even higher when people lack training or awareness about safe practices.

Environmental Determinants

Habitat Disruption and Human-Wildlife Contact

As cities expand and forests are cleared, humans and wild animals are increasingly pushed into shared spaces. In Ghana, activities such as bush meat hunting and farming near forest edges increase the risk of disease spillover from wildlife to people (Boamah *et al.*, 2023; Adu *et al.*, 2020). This has been linked to outbreaks of diseases like Ebola and monkeypox. Climate change is also playing a role, altering animal movement and contributing to the spread of vector-borne diseases like malaria and dengue (Boadi *et al.*, 2022).

Sanitation and Water Quality

In many communities, basic infrastructure—such as access to clean water and proper waste disposal—is lacking. Poor hygiene and unsanitary living conditions provide ideal environments for diseases like cholera, typhoid, and leptospirosis to spread (Tutu *et al.*, 2022; Sarpong *et al.*, 2021). Unsafe food handling and storage practices add to the problem, increasing the risk of foodborne illnesses.

Behavioral and Cultural Determinants

Knowledge, Attitudes, and Practices (KAP)

Awareness matters. In many parts of Ghana, people have limited knowledge about the risks associated with handling animals or consuming undercooked meat (Aboagye *et al.*, 2023). Traditional beliefs and misinformation can also get in the way of disease prevention. Some people believe animal vaccines are unnecessary or harmful, while others turn to traditional remedies before seeking medical help—often due to cost or cultural preferences (Badu *et al.*, 2022).

Traditional Practices and Beliefs

Cultural customs can also shape risk. Some communities engage in rituals that involve close contact with animals or animal products. In others, there is resistance to health inspections or vaccinations, due to beliefs that such actions bring bad luck or invite spiritual consequences (Owusu *et al.*, 2021; Tobin *et al.*, 2022). Public health efforts must take these beliefs into account and work with local leaders and traditional healers to develop respectful, culturally sensitive interventions.

Health System Determinants

Healthcare Infrastructure

Health facilities in many rural areas are not equipped to handle outbreaks of zoonotic diseases. There's often a shortage of trained personnel, diagnostic tools, and essential medications (Manafia *et al.*, 2023). Without access to proper laboratories, it's hard to identify the cause of illness quickly, which delays treatment and makes it harder to contain disease outbreaks.

Implementing the One Health Approach

Although the One Health concept is gaining recognition in Ghana, turning it into action remains a challenge. Collaboration between human health, veterinary, and environmental sectors is still limited. Budget constraints and a lack of training also make it difficult to coordinate efforts (Baffour-Awuah *et al.*, 2022). A more integrated system is needed to respond effectively to zoonotic disease threats.

Relevance of Previous Studies to the Present Study

The research reviewed in this chapter lays a strong foundation for this study by:

- Identifying key risk factors such as poverty, unsafe farming practices, weak health infrastructure, and cultural beliefs.
- Highlighting vulnerable groups like farmers, animal traders, and rural or peri-urban populations.
- Supporting the use of a **One Health** framework, which aligns with the approach taken in this study.

This research builds on existing knowledge by comparing two distinct regions—Ashanti and Northern Ghana—and combining both qualitative and quantitative methods to offer a deeper, better-rounded understanding of the issues at hand.

Gaps in the Literature

Despite a growing body of work on zoonotic diseases in Ghana, several key gaps remain:

- **Regional comparisons are rare**: Few studies have directly compared zoonotic disease risks across regions like Ashanti and the Northern Region. This study addresses that gap.

- **Cultural and behavioral factors are underexplored**: While many studies mention these influences, they rarely investigate them in depth. This study adds depth through qualitative insights.
- **Mixed-methods approaches are limited**: Most research relies heavily on quantitative data. This study enriches the picture by incorporating personal stories and lived experiences.
- **Few studies focus on solutions**: There's still a need for research that tests what actually works in reducing disease risk. While this study focuses on identifying the key determinants, its findings offer a roadmap for future interventions.

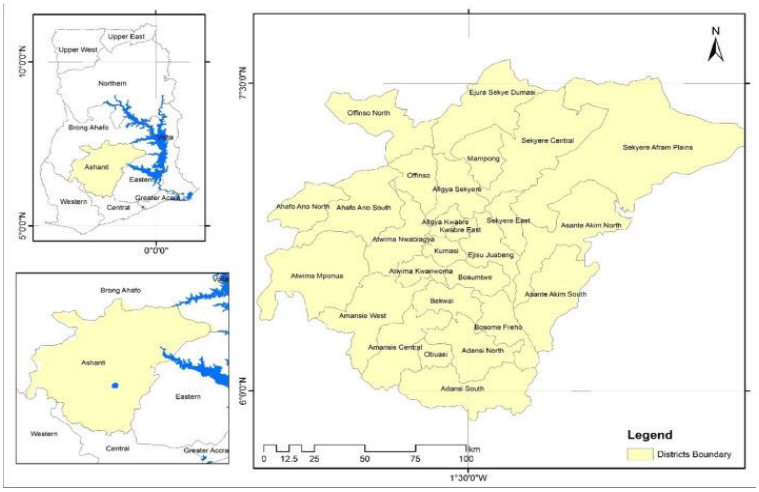
MATERIALS AND METHODS

Study Design

The study adopted a **cross-sectional descriptive design**, which was deemed suitable for examining the prevalence and factors contributing to the transmission of zoonotic diseases in vulnerable communities. The design allowed for the collection of data from the population at a single point in time, providing a snapshot of the socio-economic, environmental, and cultural determinants of zoonotic disease transmission. This approach helped identify patterns and correlations between various determinants and disease prevalence, enabling the design of targeted interventions.

Study Area

The study was conducted in two selected regions in Ghana: **Ashanti** and **Northern Regions**. These regions were chosen due to their high prevalence of zoonotic diseases, particularly **anthrax**, **rabies**, and **Lassa fever**. The study noted that these regions have a large rural population engaged in subsistence farming, livestock husbandry, and hunting, increasing human-animal contact and, consequently, the risk of zoonotic disease transmission. Furthermore, the regions were found to vary in levels of healthcare access, sanitation, and socio-economic conditions, making them ideal for examining the determinants of zoonotic diseases in vulnerable communities.



Map of Ashanti region

Source: Ashiagbor *et al.*, 2020



Map of Northern region

Source: Quaye *et al.*, 2009

Study Population

The study population comprised **households** within selected rural communities in the Ashanti and Northern regions of Ghana. The participants included:

- Heads of households, who provided detailed information on family demographics, socio-economic conditions, cultural practices, and animal husbandry practices.
- Farmers, hunters, and livestock keepers, who were more likely to engage in activities that increased their exposure to animals.

- Local healthcare providers, who offered insights into healthcare access and the impact of public health interventions.

The study specifically targeted adults aged 18 and above, as it was believed they had the experience and knowledge necessary to provide meaningful responses regarding zoonotic disease transmission and associated risk factors.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Adults aged 18 years and above residing in rural areas of the Ashanti and Northern regions.
- Individuals involved in farming, animal husbandry, bush meat hunting, or other activities increasing contact with animals.
- Heads of households or their appointed representatives who could provide accurate information about household practices, health conditions, and socio-economic status.
- Local healthcare providers involved in the diagnosis, treatment, or prevention of zoonotic diseases.

Exclusion Criteria:

- Individuals who were unwilling or unable to consent to participate in the study.
- People under the age of 18.
- Individuals not actively engaged in activities related to animal contact or who did not reside in the selected regions.

Study Tools

The study employed a combination of **quantitative and qualitative tools** to collect data:

1. **Structured Questionnaires**: These were used to gather quantitative data from households regarding socio-economic status, cultural practices, awareness of zoonotic diseases, and history of suggestive zoonotic disease symptoms.
2. **Semi-structured Interviews**: These were conducted with local healthcare

providers, farmers, hunters, and livestock keepers to gather qualitative data on their experiences with zoonotic diseases and perceptions of risk factors.

3. **Focus Group Discussions (FGDs)**: FGDs were held with groups of community members (including women and youth) to explore community-level perceptions, cultural practices, and knowledge about zoonotic diseases.
4. **Observational Checklists**: These were used during field visits to assess environmental factors, such as the cleanliness of living spaces, proximity to wildlife habitats, and livestock management practices.

Sample Size

The sample size was calculated using the **Krejcie and Morgan (1970)** sample size table for finite populations. Given a population size of approximately 10,000 households per region and a margin of error of 5%, a confidence level of 95%, and a population proportion of 0.5, the required sample size for each region was approximately **385 households**. To account for non-responses and incomplete data, the sample size was increased by 10%, resulting in a total of **423 households** per region. The final sample size across the two regions was therefore **846 households**.

Sampling Techniques

The study used **stratified random sampling** to select participants. The process was as follows:

1. **Stratification**: The study regions (Ashanti and Northern) were divided into subgroups based on geographic location (urban, peri-urban, rural).
2. **Random Selection**: Within each stratum, villages or communities were randomly selected.
3. **Household Selection**: Within each selected village, households were randomly chosen using a **random number generator**. Heads of households or their representatives were invited to participate.

Additionally, **purposive sampling** was used to select key informants, including healthcare workers, farmers, livestock keepers, and hunters, based on their direct involvement in zoonotic disease-related activities.

Data Collection

Data collection took place over a period of **six weeks**. Trained field enumerators administered the structured questionnaires, conducted semi-structured interviews, and facilitated focus group discussions.

1. **Pre-data Collection Training**: Enumerators underwent training on ethical considerations, data collection tools, and the importance of consistent data recording.
2. **Fieldwork**: Data was collected through home visits, interviews with local healthcare providers, and FGDs with community members.
3. **Supervision**: Supervisors closely monitored the data collection process to ensure adherence to the protocol and maintain quality control.

Data Analysis

Data collected was analyzed using both **quantitative and qualitative methods**:

1. **Quantitative Analysis**: Data from the structured questionnaires was entered into **SPSS** for analysis. Descriptive statistics (frequencies, percentages, and means) were used to summarize socio-economic, environmental, and cultural factors.
2. **Qualitative Analysis**: Data from the semi-structured interviews and focus group discussions were transcribed and coded using NVivo software. Thematic analysis was conducted to identify recurring themes related to perceived risks of zoonotic diseases, local knowledge, and cultural practices.

Validity/Reliability of Study Tools

To ensure **validity** and **reliability** of the study tools:

- **Pre-testing**: The study instruments were pre-tested in a non-study area to ensure clarity, consistency, and relevance.
- **Expert Review**: The tools were reviewed by experts in zoonotic disease research and public health to assess content validity.
- **Reliability Testing**: A **Cronbach's alpha test** was conducted to determine internal consistency. A score of 0.7 or higher was considered acceptable.

Ethical Considerations

Ethical approval for the study was granted by the **Ethical Review Board** of the institution. Informed consent was obtained from all study participants. Key ethical considerations included:

- **Confidentiality**: Personal data was kept confidential, and no identifying information was included in any reports or publications.
- **Voluntary Participation**: Participation was voluntary, and participants were free to withdraw at any time without any negative consequences.
- **Informed Consent**: All participants received an informed consent form explaining the study's purpose, procedures, risks, and benefits. The form was read aloud for illiterate participants.
- **Minimizing Harm**: Efforts were made to minimize potential harm, including psychological distress, during interviews or FGDs.

RESULTS

Socio-Demographic Characteristics of Respondents

The socio-demographic profiles of the Ashanti and Northern Regions reveal some similarities and striking differences. Both regions exhibit a predominantly female respondent group, with the Northern Region showing an even higher proportion (65%) compared to the Ashanti Region (52%). The age distribution is also similar, with the largest group of participants in both regions being 46 years and above (36%). This suggests that older adults are a significant demographic in both study populations. However, a major disparity is evident in educational attainment. The Northern Region has a significantly higher percentage of respondents with no formal education (47%) compared to the Ashanti Region (18%). This educational gap may have profound implications for health literacy and the effectiveness of public health interventions.

Farming is the primary occupation in both regions, indicating the reliance on agriculture in these economies. Household sizes vary, with Ashanti Region having more households with 11-15 members (33%) and Northern Region having more households with 20 and above members (29%). These differences in household size could influence living conditions and hygiene practices, potentially affecting the spread of zoonotic diseases.

Table 1: Socio-Demographic Distribution

Characteristic	Category	Ashanti Region (n=423)	Northern Region (n=423)
Gender	Male	42%	48%
	Female	58%	52%
Age	18–25	11%	11%
	26–35	23%	23%
	36–45	31%	31%
	46 and above	36%	36%
Highest Level of Education	No formal	18%	47%
	Primary	31%	19%
	JHS	21%	15%
	SHS	14%	9%
	Vocational	10%	8%
	Tertiary	6%	4%
Primary Occupation	Farmer	51%	54%
	Trader	17%	19%
	Hunter	16%	16%
	Teacher	9%	6%
	Driver	7%	5%

Animal Ownership and Interaction

Animal ownership patterns show both commonalities and regional variations. Chickens are a commonly owned animal type in both the Ashanti (24%) and Northern Regions (24%), highlighting their importance in local households. However, there are differences in the ownership of other animals. For instance, pig ownership is more prevalent in the Ashanti Region (23%) compared to the Northern Region (2%), while goat and sheep ownership is higher in the Northern Region (26% and 24% respectively) compared to the Ashanti Region (15% and 12% respectively). The ways animals are kept also vary, with a notable proportion in both regions keeping animals in separate structures (31% in Ashanti, 34% in Northern) or allowing them to roam freely (25% in Ashanti, 31% in Northern). These practices can influence the intensity of human-animal interactions.

A high frequency of direct contact with animals is observed in both regions, with a large percentage of respondents having daily contact. This close interaction presents a significant risk factor for zoonotic disease transmission. Home slaughter of animals for consumption is common in both the Ashanti (78%) and Northern Regions (76%), with chickens being the most frequently slaughtered. This practice highlights the potential for zoonotic exposure through food handling. Additionally, hunting or handling wild animals is reported in both regions, with a slightly higher prevalence in the Northern Region (62%) compared to the Ashanti Region (57%), indicating another potential source of zoonotic disease risk.

Table 2: Household & Animal Ownership

Characteristic	Category	Ashanti Region	Northern Region
Household Size	1–5	8%	6%
	6–10	19%	17%
	11–15	22%	21%
	16–20	25%	26%
	20+	26%	29%
Animal Ownership	Chickens	26%	24%
	Goats	24%	26%
	Sheep	22%	24%
	Cattle	8%	7%
	Dogs	10%	10%
	Cats, Pigs, Rabbits, Fish	≤3% each	≤3% each

Table 3: Animal Handling & Consumption

Characteristic	Category	Ashanti Region	Northern Region
Where animals are kept	Free-ranging	32%	31%
	Separate structure	36%	34%
Direct contact frequency	Several times/day	53%	54%
	Once/day	42%	41%
Slaughter at home	Yes	74%	76%
Hunt/handle wild animals	Yes	61%	62%

Environmental Conditions and Hygiene Practices

Environmental conditions and hygiene practices reveal significant challenges in both regions, with some notable differences. In terms of drinking water sources, both regions rely on a mix of sources, but the Northern Region shows a greater reliance on unprotected wells (36%) compared to the Ashanti Region (18%). This disparity indicates a higher risk of waterborne diseases in the Northern Region. Water treatment practices also differ, with a higher percentage of respondents in the Northern Region reporting no water treatment (28%) compared to the Ashanti Region (6%). This lack of water treatment further exacerbates the risk of waterborne illnesses in the Northern Region.

Sanitation practices are poor in both regions, with a significant proportion of respondents lacking proper toilet facilities. However, the Northern Region has a higher percentage of respondents practicing open defecation (42%) compared to the Ashanti Region (27%). Solid waste disposal methods also pose environmental and health risks in both regions, with practices such as burning waste and disposing of it in nearby bushes being common. Hand washing facilities are notably lacking in both regions, with the Northern Region showing a slightly higher percentage of households without these facilities (91%) compared to the Ashanti Region (86%). Moreover, the availability of soap and water for hand washing is limited, and hand washing at key times is infrequent in both regions.

Table 4: Water, Sanitation & Hygiene (WASH)

Characteristic	Category	Ashanti Region	Northern Region
Main water source	Unprotected well	35%	36%
	Protected well	24%	23%
	Borehole	19%	19%
	Public tap	13%	14%
Water treatment	No treatment	26%	28%
	Boiling	20%	19%
Toilet type	Bush/No facility	40%	42%
Waste disposal	Nearby bush/field	45%	48%
Designated hand washing place	Yes	14%	9%
Wash hands always at key times	Always	10%	9%

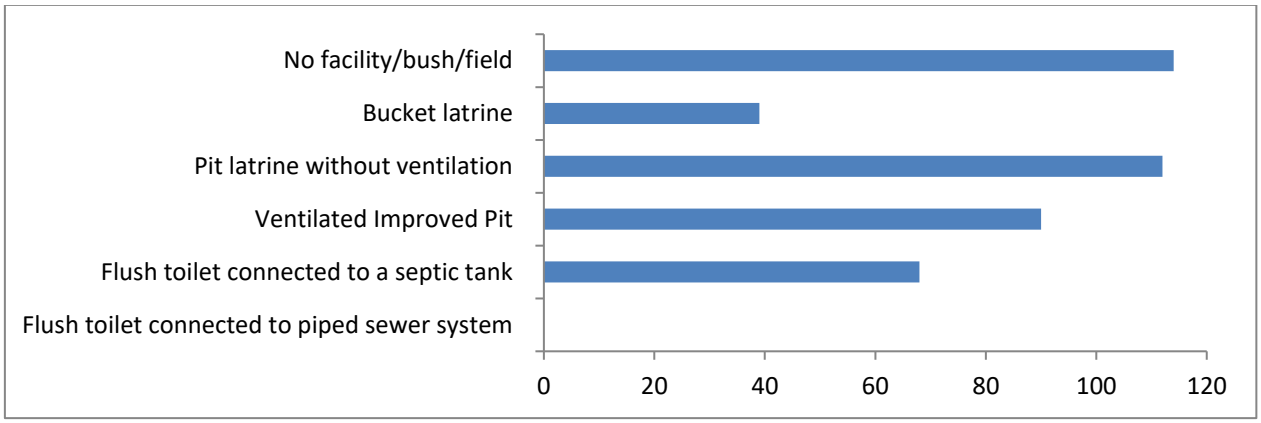


Figure 1: Toilet facility in Ashanti region

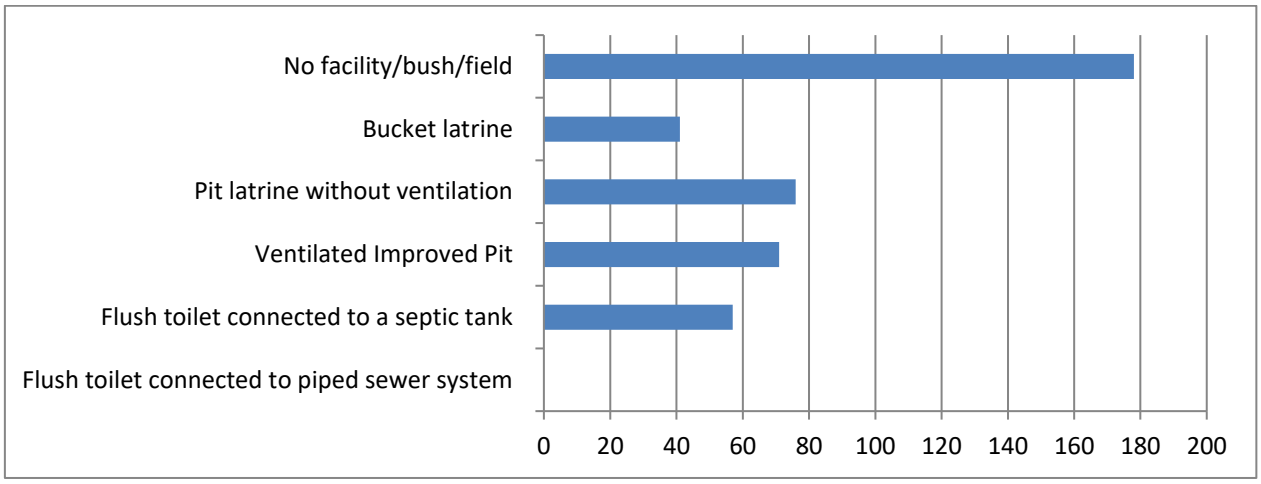


Figure 2: Toilet facility in Northern region

Knowledge and Awareness of Zoonotic Diseases

Knowledge and awareness of zoonotic diseases are generally low in both the Ashanti and Northern Regions, but there are some differences. Awareness of zoonotic diseases is higher in the Ashanti Region (39%) compared to the Northern Region (29%). Avian influenza is the most commonly recognized disease in both regions. However, knowledge of prevention measures is limited in both regions, with a lower percentage in the Northern Region (12%) compared to the Ashanti Region (46%). Commonly mentioned prevention measures include thorough cooking of meat, but the overall lack of awareness highlights the need for improved health education in both regions.

Table 5: Knowledge and Awareness of Zoonoses

Characteristic	Category	Ashanti Region	Northern Region
Aware of zoonoses	Yes	39%	29%
Most known diseases	Avian Influenza, TB	Similar	Similar
Knowledge of transmission	Contaminated food/water	Most common	Most common
Prevention knowledge	Thorough cooking	50%	63%

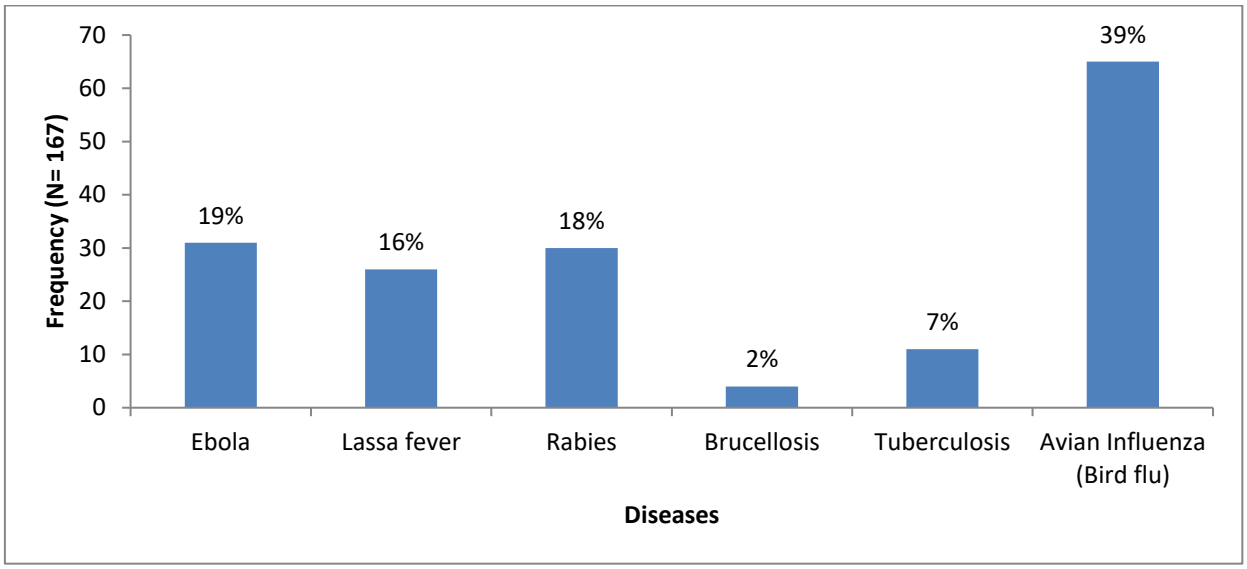


Figure 3: Awareness of zoonotic diseases in Ashanti region

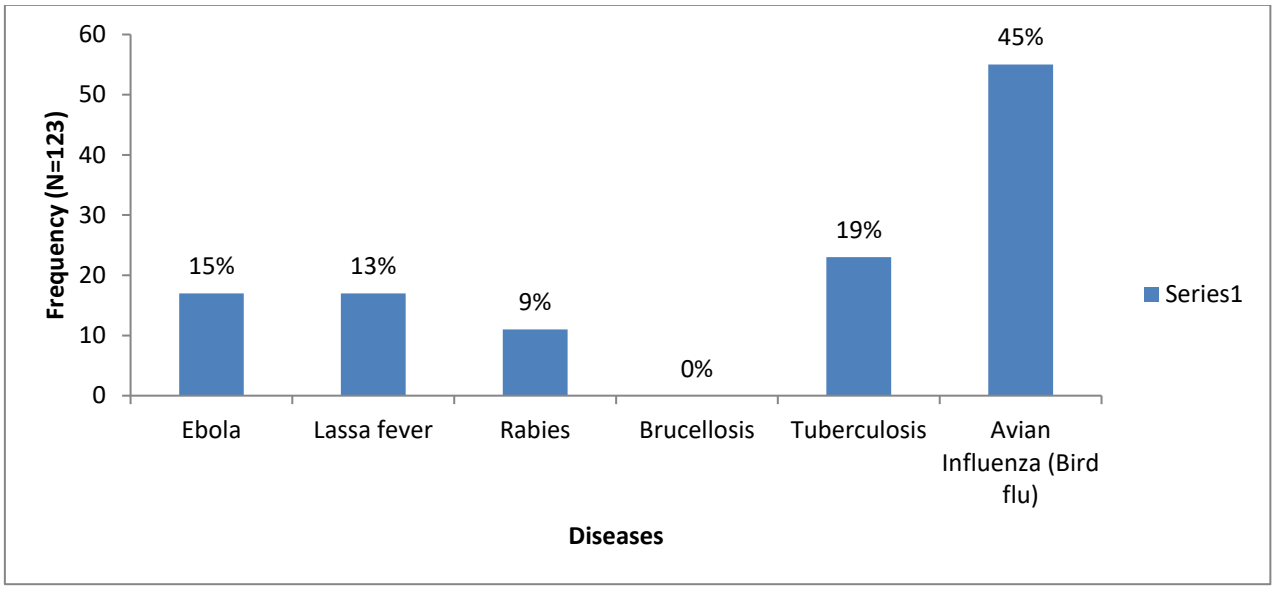


Figure 4: Awareness of zoonotic diseases in Northern region

History of Symptoms Suggestive of Zoonotic Infections (Past 12 Months)

A high percentage of respondents in both the Ashanti and Northern Regions reported experiencing symptoms suggestive of zoonotic infections. Skin rash or itching was the most commonly reported symptom, with a significantly higher prevalence in the Northern Region (94%) compared to the Ashanti Region (77%). Other common symptoms include high fever with muscle aches and headache, and diarrhea and vomiting. These findings indicate a substantial burden of potential zoonotic diseases in both regions, with some regional variations in the prevalence of specific symptoms.

Table 6: Symptom History (Last 12 Months)

Symptom	Ashanti Region	Northern Region
High fever + headache	79%	80%
Diarrhea & vomiting	73%	74%
Swollen lymph nodes	49%	48%
Unexplained bleeding	67%	68%
Skin rash or itching	93%	94%
Jaundice	52%	53%

Qualitative Findings

To complement the quantitative data, qualitative data were collected through semi-structured interviews and focus group discussions (FGDs). The analysis focused on participants' lived experiences, perceptions, and cultural practices relating to zoonotic diseases. Thematic analysis using NVivo software revealed several key themes:

Awareness and Knowledge of Zoonotic Diseases

Many participants demonstrated limited awareness of zoonotic diseases. While some community members could name diseases like bird flu, and Ebola detailed understanding of transmission pathways and prevention measures was generally poor.

"I have heard of rabies because a boy in our village died after a dog bite, but I didn't know it could be passed from animals to people in many other ways." — Male farmer, Ashanti Region

Healthcare providers expressed concern over the **low health literacy** in rural communities, noting that many people misinterpret symptoms or attribute them to spiritual causes.

Human-Animal Interaction and Cultural Practices

Animal-human contact was a common theme. Participants frequently described how animals roam freely within compounds, are kept close to living quarters, or are directly handled during feeding and slaughter.

"We raise goats and chickens right in our backyard. Children often play with them too." — Female trader, Northern Region

In both regions, slaughtering of animals at home and consumption of bush meat were highlighted as routine practices. Hunters shared that wild animal meat is not only a source of protein but also holds cultural and economic significance.

"Hunting is not just for food; it's part of who we are. We eat what we catch, and sometimes we sell it at the market." — Young hunter, Northern Region

Hygiene and Sanitation Practices

Across the interviews and FGDs, participants expressed limited access to clean water, sanitation, and hygiene infrastructure. Many admitted to not treating water before drinking and **lack of soap** for regular hand washing.

"We fetch water from the well, but we don't usually boil it. It's not easy to find fuel." — Older woman, Ashanti Region

"We only wash hands with soap when we have visitors or during festivals." — Teen girl, Northern Region

Field observations supported this, revealing poor waste disposal methods and lack of designated hand washing areas, particularly in the Northern Region.

Perceived Risk and Preventive Practices

When asked about risks and preventive strategies, many participants appeared **unaware of the link** between their practices and disease transmission. Even among those aware of zoonotic diseases, preventive behaviors were inconsistent.

"We know sick animals should not be eaten, but when you are hungry, you can't throw away meat." — Male farmer, Ashanti Region

Healthcare workers stressed the need for intensified community education, noting that behavior change remains challenging without improved infrastructure and sustained public health engagement.

Community Beliefs and Misconceptions

A recurring theme in FGDs was the influence of traditional beliefs on health-seeking behavior. Some participants believed that certain illnesses were due to curses or witchcraft, rather than animal contact.

"Sometimes when someone gets very sick, people say it's spiritual, not something from animals." — Female FGD participant, Northern Region

This belief system often delays formal treatment, as people seek help from spiritual healers before going to health centers.

Perspectives from Healthcare Providers

Healthcare workers in both regions highlighted challenges in diagnosing zoonotic diseases, citing limited resources, lack of training, and poor disease reporting systems.

"We don't have lab facilities to confirm zoonotic infections. Most times, we just treat based on symptoms." — Nurse, Ashanti Region

They emphasized the need for **integrated surveillance** and **cross-sectoral collaboration** between veterinary and public health services (One Health approach).

Summary of Key Themes from Qualitative Findings:

Theme	Key Insight
Awareness and Knowledge	Limited awareness of zoonotic diseases and their transmission
Human-Animal Interaction	High level of direct contact; free-ranging animals common
Hygiene Practices	Poor sanitation and inconsistent hygiene behaviors
Risk Perception	Low perceived risk despite risky practices
Traditional Beliefs	Misconceptions affect timely health-seeking behavior
Healthcare Perspective	Resource constraints and lack of diagnostic capacity

DISCUSSION

The socio-demographic findings from this study highlight important regional differences. Respondents in the Ashanti Region generally had higher levels of formal education compared to those in the Northern Region. This seemed to correlate with greater awareness of zoonotic diseases in Ashanti, suggesting that education plays a key role in shaping people's understanding of disease transmission and prevention. This observation aligns with Ameme *et al.* (2016), who found that in Ghana, higher education levels are closely linked to better health literacy and disease awareness.

In terms of gender, nearly half of all respondents were male, with the proportion even higher in the Northern Region. This reflects traditional gender roles, especially in animal husbandry and bushmeat hunting—activities that are closely associated with increased exposure to zoonotic diseases. These patterns are consistent with Kakkar *et al.* (2011), who reported similar trends in rural India, where men are more frequently involved in livestock handling and hunting, putting them at greater risk of zoonotic infections.

Awareness of specific zoonotic diseases also varied across the two regions. While many respondents were familiar with avian influenza, far fewer had heard of Lassa fever or anthrax, particularly in the Northern Region. This discrepancy highlights regional differences in health education and the uneven focus of public health messaging, which often prioritizes more widely known diseases.

Additionally, many respondents showed confusion about how zoonotic diseases are transmitted and what symptoms to look out for. This issue has also been noted in other parts of Africa. For example, Nyakarahuka *et al.* (2017) found that while communities in

Uganda could name diseases like Ebola and rabies, they often lacked a clear understanding of how these diseases spread or how to prevent them. Such findings emphasize the urgent need for more targeted and practical health education at the community level.

Practices such as home slaughtering and bushmeat consumption were common in both regions, particularly among households that kept livestock. These behaviors significantly increase the risk of zoonotic disease transmission, especially where hygiene standards are low. In the Northern Region, economic hardship appeared to drive many of these risky practices. Several respondents mentioned eating sick or dead animals out of necessity—a troubling but understandable reality. Similar scenarios were observed by Makita *et al.* (2010) in Uganda, where poverty led people to consume unsafe meat despite being aware of the health risks. This underscores the importance of combining health education with economic support to reduce high-risk behaviors in vulnerable communities.

Sanitation and hygiene practices were generally better in the Ashanti Region. More people reported washing their hands with soap and having access to improved toilet facilities than in the Northern Region. In contrast, the North showed higher instances of poor sanitation and improper animal waste disposal—conditions that significantly raise the risk of both zoonotic and enteric infections. These findings echo global research. For instance, Kariuki *et al.* (2021) found strong links between poor WASH (Water, Sanitation, and Hygiene) practices and the spread of zoonotic diseases in informal settlements in Kenya. Poor hygiene not only affects human health but also contributes to environmental contamination, especially in communities where humans and animals live closely together.

Traditional beliefs still play a significant role in shaping people's understanding of illness. Many respondents—especially in the Northern Region—attributed diseases to spiritual causes or curses. As a result, some individuals first sought help from traditional healers before turning to health facilities. This delay in seeking formal medical care can be dangerous, particularly in cases of fast-acting infections like rabies or anthrax. These findings mirror those of Mangesho *et al.* (2017) in Tanzania, where spiritual interpretations of disease often delayed diagnosis and treatment. This suggests that public health strategies in such settings must be culturally sensitive and involve traditional leaders and healers as partners in promoting accurate health information.

Access to healthcare remains a significant challenge, particularly in the Northern Region. Respondents reported long travel distances to health facilities, a lack of trained health

workers, and inadequate diagnostic tools for detecting zoonotic diseases. These gaps mean that many cases go undiagnosed, treatment is delayed, and outbreaks may go unreported. Grace *et al.* (2012) similarly noted that in low-resource settings, weak disease surveillance and limited diagnostic capacity hinder effective zoonotic disease control. Strengthening local health systems, improving diagnostic services, and training healthcare workers to recognize and respond to zoonoses are critical steps toward addressing these challenges.

Finally, the qualitative data added depth to the survey findings by highlighting a disconnect between knowledge and behavior. Even when people were aware of disease risks, many continued engaging in high-risk practices due to poverty, cultural traditions, or a lack of viable alternatives. This highlights the complexity of zoonotic disease prevention—it is not enough to raise awareness alone. Effective interventions must also tackle the structural and social barriers that shape people's everyday choices.

Summary of Findings

This study explored the determinants of common zoonotic diseases among vulnerable communities in Ghana's Ashanti and Northern regions. Drawing on data from 846 households, supplemented by qualitative interviews, the research uncovered critical insights into the knowledge gaps, cultural practices, and structural challenges that heighten the risk of zoonotic disease transmission.

- **Awareness and Knowledge**: While awareness of zoonotic diseases was slightly higher in the Ashanti Region (39%) than in the Northern Region (36%), understanding of transmission pathways and causative agents remained low across both regions.
- **Human–Animal Interactions**: Risk-prone behaviors—such as consuming bushmeat, home slaughtering of animals, and allowing livestock to roam freely—were more commonly reported in the Northern Region, contributing significantly to zoonotic risk exposure.
- **Hygiene and Sanitation**: WASH-related challenges—including limited access to improved toilets, poor hand hygiene practices, and improper animal waste disposal—were particularly evident in the Northern Region, underscoring systemic sanitation gaps.
- **Perceptions and Cultural Beliefs**: Misunderstandings around disease causation—

often attributed to spiritual or supernatural forces—were more pronounced in Northern communities. Dependence on traditional healers further delayed timely medical intervention.

- **Healthcare Infrastructure**: Respondents from both regions cited long distances to healthcare facilities, a shortage of skilled personnel, and inadequate diagnostic tools for zoonotic diseases as barriers to effective care.
- **Qualitative Insights**: Interviews and focus group discussions echoed the quantitative findings. They revealed low levels of zoonoses awareness, highlighted the economic drivers of risky practices, and emphasized the influence of cultural beliefs and weak healthcare systems.

Study Limitations

While the study adopted a comprehensive mixed-methods approach, several limitations must be acknowledged:

- **Cross-Sectional Design**: The study presents a snapshot in time and does not account for seasonal or temporal variations in zoonotic disease patterns and behaviors.
- **Self-Reported Data**: Some data—particularly on hygiene and health-seeking behaviors—may be subject to recall bias or social desirability bias.
- **Language and Cultural Barriers**: Despite the use of local interpreters, certain nuances may have been lost in translation, potentially affecting the depth of qualitative responses.
- **Limited Diagnostic Verification**: The study relied on self-reported awareness rather than laboratory-confirmed diagnoses, limiting the ability to draw direct correlations between knowledge and actual disease prevalence.

CONCLUSION

This study examined the social, behavioral, environmental, and systemic determinants of zoonotic diseases in two distinct regions of Ghana—Ashanti and Northern. Using a mixed-methods design, it explored how factors such as education, beliefs, hygiene practices, and healthcare accessibility influence disease exposure and outcomes.

The findings highlight widespread gaps in knowledge, particularly in the Northern Region. While some diseases, like avian influenza, were better recognized, others such as Lassa fever and anthrax were poorly understood. Cultural interpretations of illness—especially those rooted in spiritual beliefs—often delayed medical care and led to continued reliance on traditional healers.

Human–animal interactions were identified as a central factor in zoonotic disease exposure. Practices like home slaughtering, consumption of bush meat, and unsupervised livestock rearing—driven by socio-economic pressures and cultural norms—pose significant risks in the absence of proper hygiene.

Moreover, the study found that the healthcare infrastructure in both regions, especially the Northern Region, lacks the capacity for early detection, diagnosis, and treatment of zoonotic diseases. This adds another layer of vulnerability for affected populations.

Ultimately, the research underscores the need for a holistic and culturally sensitive approach to zoonotic disease control. Addressing these risks requires collaborative efforts across sectors—health, environment, agriculture, and culture—under the One Health framework, which recognizes the interdependence of human, animal, and environmental health.

Recommendations

In light of the findings, the following recommendations are proposed:

1. **Public Health Education**
    - Implement targeted awareness campaigns in local languages to improve understanding of zoonotic disease transmission and prevention.
2. **One Health Collaboration**
    - Strengthen partnerships between human health, veterinary, and environmental sectors to improve disease surveillance, reporting, and response.
3. **Cultural Engagement**
    - Collaborate with traditional leaders and healers to debunk myths and integrate culturally resonant messages into health education.

4. **Strengthening Healthcare Systems**
    - Provide rural health facilities with diagnostic tools and train staff to recognize and manage zoonotic diseases.
5. **Improving WASH Infrastructure**
    - Invest in sanitation, clean water access, and proper animal waste management to reduce environmental transmission risks.
6. **Policy and Economic Support**
    - Enforce regulations on bushmeat trade and animal slaughtering while providing alternative livelihoods to reduce economic dependency on risky practices.

Contributions to Knowledge

This study contributes to the existing body of knowledge in several important ways:

- It presents a comparative analysis of zoonotic disease determinants in two ecologically and culturally diverse regions of Ghana.
- It integrates both quantitative data and qualitative narratives, offering a more nuanced understanding of community-level risk factors.
- It brings attention to the role of traditional beliefs in shaping health behaviors—an often overlooked dimension in public health research.
- It strengthens support for the One Health approach by demonstrating the interconnected risks between human, animal, and environmental health.
- It offers evidence-based insights to inform targeted policy and intervention strategies aimed at reducing zoonotic disease burdens among vulnerable populations.

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