

Investigative Study of Factors Leading to High Levels of Meat Being Sold on the Street at Katambalala Market of Lilanda Compound in Lusaka District, Zambia (Conference ID: CFP/234/2017)

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ABSTRACT

This study was conducted in Katambalala market and along the surrounding streets that are not more than 100 meters from the market in Lilanda compound of Lusaka district. Katambalala market is one of the biggest open air markets that are found in Lusaka and caters for not less than four compounds which are Zingalume, George, Lilanda, Dzeko and Matero.

Despite the market serving all these big compounds housing thousands of inhabitants, there is a serious compromise of food safety and hygiene standards due to the fact that there is a rapid increase in the sale of meat suspected of not to have undergone legal inspection procedure by authorized officers. Some of the traders selling meat on the market and on road-sides sell their meat under insanitary conditions such selling meat on open wheelbarrows, meat sold being highly nested on by flies and stray dust from wind freely settling on it posing a remarkable hazard to the health of the potential consumers of this meat.

These reasons led to the conviction of undertaking a study whose general objective was determining the factors contributing to the increase in the sale of such meats along the road and open-markets in Lilanda compound of Lusaka district.

The specific objectives were of the study included establishing the relationship between demand for meat and levels of uninspected meat on the market, establishing if the knowledge levels have an effect on increased levels of uninspected meat being sold on the market and, determining whether inadequacies towards enforcement of food safety policies by health inspectors contribute to increased levels of uninspected meat being sold on the market.

A descriptive cross sectional study was used. The data collection process involved both qualitative and quantitative methods. Therefore data collection tools involved administering of questionnaires in order to determine factors that contribute to increased levels of meat being sold on open-markets and on road-sides of Lilanda compound. A sample size of 53 meat traders was calculated using Epi-info statistical software from a study population consisting 370 traders at 91% confidence interval with standard error of 10%.

Data analysis involved the use of histograms, pie-charts, frequency tables and cross tabulations. , Chi-square tests were also used when testing for statistical significance of the variables that were being investigated.

The results of the study revealed that demand for meat by Shanty compound residents and their levels of knowledge about meat safety did not contribute to meat sold on roadsides. The only factor that showed to contribute to meat being sold on the street was inadequacies in enforcing the prevailing municipality laws regarding the sale of meat by the Local Municipality.

With regard to this, it is recommended that the Local Authority should consider strengthening their capacity on routine inspections of meat trading premises, sensitizing people about health risks associated with eating uninspected meat and stiffening the punishments meted to traders of meat in unhygienic conditions.

1.0. INTRODUCTION

1.1 Background Information.

The study was conducted at Katambalala market in Lilanda compound. This market is one of the biggest open- air markets found in Lusaka, Zambia's capital city. Lusaka district has a population of about 1,854,907 of which Katambalala market services 8.23% of this population (CSO, 2010).

Lilanda is one of the 35 shanty compounds found in Lusaka district. Like many other shanty compounds in Lusaka, Lilanda's population is growing at a faster rate with an annual growth rate of 3.6%. The compound is generally characterised by inadequate shelter, a lack of social services, and inadequate waste management systems according to Lusaka City Council's annual report (LCC, 2013). This makes it vulnerable to epidemics.

1.1.1. General back ground

Due to increased demand for meat and meat by-products, street selling of meat and meat by-products has been taken as a normal and legal practice by the people in the shanty compounds of Lusaka such as those in Lilanda. Due to this increased demand most of the people especially those not in formal employments have taken advantage of the situation and engaged themselves in the sale of these products at a relatively cheaper price on the street market. This is done without any meat trading license from the local authority as proof that the product is safe for human consumption.

Since the largest proportion of the population residing in this area has low levels of education, coupled with differences in cultural and religious background as well as low financial and living conditions, they resort to purchasing such products because they are usually sold at a relatively lower price compared to those sold by authorized dealers in permanent structures such as butcheries and supermarkets.

According to the research done by Chilando, (Chilando, 2012), the local authority, Lusaka City Council has been ineffective to cartel this illegal trading due to insufficient resources such as funds, insufficient human resource, inadequate transport for council health inspectors and a small number of approved abattoirs for monitoring and enforcement of pieces of legislation with regard to the selling of such products.

Political interference in the maintenance of law and order with regard to this business also plays a major role. People in higher authorities, mostly permit this act for fear of losing their positions during election times since the majority of the voters stay in these compounds where such trading take place (LCC, 2010). These are just some of the background information that has led to the presence and tolerance of the sale of unlicensed and uninspected meat and meat by-products in Lilanda and most of the compounds of Lusaka.

1.2. Statement of the Problem

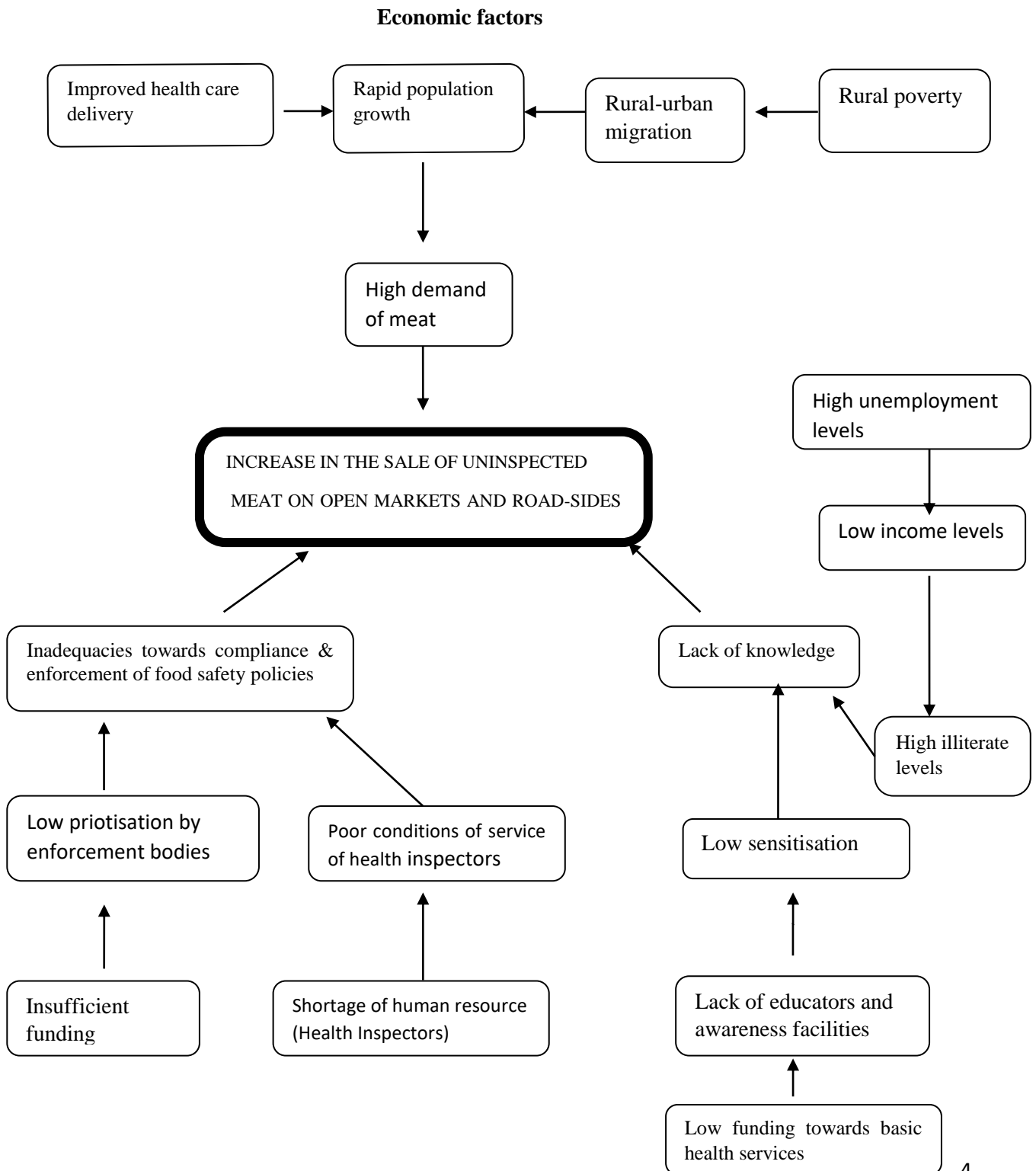
Meat is among the most highly nutritious foods. It is a good source of proteins, fats and minerals. Despite having these attributes it is also a highly perishable product since both cooked and raw meat are a good substrate (under layer) for the growth and multiplication of harmful microorganisms (Krauss, *et al*, 2003). As a result, several diseases may be transmitted to humans through the consumption of meat or meat by-products. Sometimes, even mere handling of the meat that is infected can be a source of diseases to humans and animals.

Meat sold in open markets (Katambalala market in Lilanda compound) is rarely or not inspected at all to ascertain the presence or signs and symptoms of zoonotic diseases such as bovine tuberculosis, anthrax, salmonellosis, *Taenias aginata*(beef tapeworm infection, also known as *kosso*), *Taenia solium*, (pork tapeworm infection), hydatid disease, trichinosis and toxoplasmosis. This has subjected consumers of this meat to the high risk of contracting these diseases that may have acute effects or sometimes chronic effects that may manifest later in life. This meat is actually sold along the streets under unsanitary conditions making it even highly exposed to bacteria and other contaminants.

Despite having the Public Health Act Chapter 295 and the Food and Drugs Act Chapter 303 of the Laws of Zambia as well as other Bye-Laws from the Local Authority, Lusaka City Council has failed to control the sale of meat and meat by-products at this open market thus exposing the health of the public to a high risk of contracting these diseases whose impacts are so heavy to bear. According to the market chairman, this illegal sale is growing at a rate of 2.5% per month (30% per annum) due to lapses in enforcement of the law by the Local Authority.

The public has continued eating meat and meat by-product from these open markets and as such the consumers of such products become carriers of the causative agents of the zoonotic diseases and this definitely affects their health, social life and their economic capacity is negatively affected. Little is known about the prevalence of the diseases and impacts by both the sellers and consumers of such products on street markets.

Figure 1: problem analysis tree diagram



Service related factors

Social factors

1.3. Justification of the study.

In Ethiopia, about 3500 to 4 000 people die annually due to food-borne illnesses. And most of these illnesses have been linked to consumption of meat being sold in outlets and open markets that are rarely inspected by the local authorities and more than two-thirds of these deaths occur in the shanty and squatter compounds (Abera, *et al*, 2012). This shows that this study is vital in the case of Katambalala market which is also found in a shanty compound.

Despite seeing this burden on human life losses, many countries including Zambia have remained behind in taking concrete measures to curb the increase in the sales of uninspected meat and meat by-products on open markets under unsanitary conditions. This exposes meat to increased chances of further contamination which can either be bacterial, and sometimes chemical or physical (e.g., with dust or other items that should not be in the meat) agents.

According to the study done by Chilando (2013), it showed that there is little knowledge between sellers and buyers of the meat sold on open markets and health risks associated with consumption of uninspected meat. This is because, in most cases, contaminated food results in diarrhoea and/or vomiting for about three days (Conant, *et al*, 2008). Because the illness does not last long, most people do not consult a doctor. However, contamination from very toxic bacteria can cause extreme illness requiring hospitalization

As a result of the above reasons, it is therefore, important that a study has to be done to identify and ascertain the reasons that are contributing to the increase in the sale of meat which have not undergone inspection by certified Health Inspectors on most of the open markets in the shanty compounds of Zambia (e.g. Katambalala market in Lilanda compound of Lusaka province)

Additionally, the study will also help to educate the consumers, sellers and stakeholders on the measures that are to be put in place so that this trend is put to an end with the aim of preventing food-borne illnesses associated with consumption of uninspected meat and meat by-products.

2.0 LITERATURE REVIEW

Meat is the flesh of an animal used for human consumption. In this study 'meat' will refer mainly to the flesh of bovine animals i.e. cattle and oxen, generally known as beef as well as other types such as sheep meat (mutton), goat meat, and pig meat called pork (Elias et al 2007).

2.1 Meat and Health

According to Conant, *et al.* (2008), meat is held in high esteem in most communities. It has prestige value, it is often regarded as the central food round which meals are planned, various types of meat sometime make the basis of festive and celebratory occasions, and form the popular as well as the scientific point of view, it is regarded as a food of high nutritive value.

While it is clear that meat is not essential in the diet, as witnessed by the large number of vegetarians who have a nutritionally balanced diet, the inclusion of animal products make it easier to ensure a good diet. Meat has been scientifically proved as an excellent source of protein needed to meet Human Protein Requirements (Ibid).

In summary, meat is a rich source of nutrients which human nutrition often lacks. It is a rich and important source of essential amino acids, vitamins, minerals and also long chain polyunsaturated fatty acids (Lawrie, et al, 2006). Moderate intake of lean meat enables easier composition of balanced diet. On the other hand, excessive meat intake supersedes from the diet foodstuffs which supply dietary fibres, vitamins, and also non-vitamin antioxidant active substances and minerals. Not meat itself, but imbalanced nutrition with too much fat and saturated fatty acids and deficient intake of ω -3 fatty acids, antioxidant vitamins and photochemical, minerals and dietary fibre present a risk for the development of cardiovascular disease and cancer. Because of its distinct and high nutritional value meat preserves its role in a rational human nutrition (Abera, *et al.*, 2012).

The journal on food and nutrition (FAO/WHO 1985) shows that human protein requirements have been thoroughly investigated over the years. This is currently estimated to be 55 g per day for an adult man and 45 g per day for an adult woman though there is a higher requirement in individuals with various disease states and conditions of stress.

These amounts refer to protein of what is termed "good quality" and highly digestible, otherwise the amount ingested must be increased proportionately to compensate for lower quality and lower digestibility (Abera, *et al*, 2012).

2.2. Role of meat in the diet of developed and developing countries.

There is a marked difference at the present time in attitudes towards meat between the people in developing and those in developed countries. In the former where meat is in short supply it can be taken as a measure of the nutritional quality of the diet as a whole. Where a typical diet is heavily dependent on one type of cereal or root crop, meat, even in small amounts, complements the staple food. It provides a relatively rich source of well absorbed iron and also improves the absorption of iron from other foods, its amino acid composition complements that of many plant foods, and it is a concentrated source of B vitamins, including vitamin B12 which is absent from plant foods. Consequently there is pressure to increase the availability of meat products (Fillip, 2006).

In the industrialised countries where food of all kinds is plentiful and cheap there are various concerns with regards to issues such as the potentially harmful effects of a high intake of saturated fats from animal foods, emphasis on continuous development of regulations dealing with hygiene in slaughter houses and during subsequent handling, concern about hormones administered to cattle, what is perceived as excessive addition of water to some processed products - concerns that can scarcely be afforded in developing countries when balanced against food supplies (Ibid).

The concerns about public health in industrialised countries where coronary heart disease and other diseases of affluence are common have led to recommendations to the public to modify their diet, through the use of Dietary Guidelines. These particularly recommend a reduction in fat consumption, especially saturated fatty acids and consequently, even if incorrectly, in

red meat. This has led in some sections of their populations to a relative increase in the consumption of poultry and fish at the expense of red meat (Ibid).

In addition there is concern, whether or not misplaced, about the presence in meat of pesticides, residues of hormones and growth promoters used to increase yields, and concern about human diseases thought to be transmitted by beef, together with an increase, for many reasons, in vegetarianism(Abera, *et al*, 2012).

2.3. Meat and its Dangers.

As outlined by the Hygiene and Education Training in Africa (HEAT, 2012) module, produced by the Federal Government of Ethiopia, evidence shows that, despite meat being among the most highly nutritious foods (a good source of protein, fat and minerals), it is also a highly perishable product because cooked and especially raw meat is a good substrate (under-layer) for the growth and multiplication of harmful microorganisms.

Diseases transferred to humans from animals are known as zoonotic diseases. One route of transmission of zoonotic diseases is by the consumption of infected meat. The most common zoonotic diseases found in Zambia are bovine tuberculosis, anthrax, salmonellosis, *Taenia saginata* (beef tapeworm infection, also known as *kosso*), *Taenia solium*, (pork tapeworm infection), hydatid disease, trichinosis and toxoplasmosis (Munyeme, et al, 2010)

As a result, several diseases may be transmitted to humans through the consumption of meat or meat products that have been exposed to these environmental conditions;

- Raw or undercooked meat and meat products,
- Food items contaminated with human faeces (directly or indirectly).
- meat contaminated with soil or dust,
- Meat contaminated by chemicals such as drugs for treatment of diseases e.g. antibiotics.
- food prepared using contaminated water,
- meat kept in an unsuitable condition for a long time after preparation

These conditions create a favourable environment for the growth and multiplication of microorganisms in the food in this case meat, especially if it was exposed to flies, cockroaches, etc., or kept at a warm temperature which is a common practice in almost all open markets in developing countries of which Zambia is not an exemption.

Consumption of affected or contaminated meat and meat products has the potential of causing serious cases of food poisoning and/or transmission of zoonotic diseases. One route of transmission of zoonotic diseases is by the consumption of infected meat of which most of such infections are detectable at ante-mortem and post-mortem stages of meat inspection process. As such, meat sold on roadsides and open markets are a significant hazard capable of enhancing the transmission of zoonotic diseases. In addition to the study by Munyeme(2010), the Ministry of Agriculture and Livestock (2012) included the following to the list of the most common zoonotic diseases found in Zambia are;

- Hydatidosis caused by *Hydatid cysts*.
- Diphyllorhynchiasis, fish tapeworm infection.
- trichinosis
- Toxoplasmosis.
- Anthrax
- Salmonellosis.

2.4.0 MEAT HYGIENE

In order to avoid the dangers that are associated with meat which can put the health of the public at the risk of contracting zoonotic diseases and food poisoning, serious effective and efficient meat hygiene measures need to be put in place. Inspections at all stages have to be carried out in the meat production processes from breeding of animals for meat production, abattoirs and meat transportation stage and hygiene in the butchers shop as well as during storage and preservation at a household level.

2.4.1 Abattoirs and meat transportation

Abattoirs, also known as slaughterhouses, are establishments where livestock are killed prior to sale of meat for human consumption. Slaughterhouses should be subject to inspection to ensure that the meat they produce is wholesome and safe to eat. This includes inspection of live animals called ante-mortem and also of the slaughtered animal carcasses called post-mortem. Before slaughter, the animal is observed to check for any abnormalities in its appearance or behaviour that could indicate sickness. After slaughter, animal carcasses are

inspected by a qualified meat inspector who knows the signs of specific types of disease and which organs they may be found in. If the carcass passes the inspection it will be approved by local authorities as being safe for human consumption (FAO,2012).

The carcass should be transported soon after slaughter, in a special vehicle, to a butchery or distribution centre. If such customised vehicles are not available, every precaution should be taken to avoid contamination of the meat during transportation. Even if the meat travels in a wheelbarrow it should be kept absolutely clean (FAO, 2012).

2.4.2 Hygiene in the butcher's shop

Butcher's shops are the link between the inspected and approved safe meat, and meat products and the consumer. Therefore the hygienic practices used for handling meat in these shops determine the health of the meat consumed. For this reason, butcher's shops need licenses to operate, confirming that they meet all the handling specifications that ensure the safety of the meat. For example, the licensed premises must have adequate working space.

The walls and floor should be constructed of durable material and be smooth, impermeable, easily cleanable and light-coloured. There should be adequate ventilation and natural light. The utensils should be clean and kept in an appropriate place. The butcher should wear a clean white gown, preferably with an apron and a white hair cover. Importantly, an approved means for the disposal of meat waste should be provided inside or outside the butchery.

Waste meat and meat products needs to be disposed off carefully and quickly so as to avoid and prevent waste attracting insects, rodents and other animals thereby increasing the risk of contaminating the shop and its surroundings as well as the contamination spreading to the clean meat and meat products in the shop(Wilson, 1998).

2.4.3. Hygiene of the butcher (Meat Handler)

The most important way of preventing contamination is by adopting good food handler's hygiene. This is the term for a group of practices that should be followed at all times by anyone handling food (meat and meat products) at any stage of the food supply process. Meat handlers' hygiene in retail and commercial premises where meat and meat products and any edible product of animal origin is sold to customers is of critical importance. The

same principles also apply in domestic situations. The importance of promoting good food handler's hygiene is;

- To prevent food contamination and spread of disease.
- To ensure the good health of people eating the food.
- To protect the health of the food handler.

Anyone handling food should avoid bad habits such as scratching, touching the hair, nose or mouth, having unclean hair, unclean and long fingernails, smoking, and coughing or sneezing in food handling and preparation areas(Lesley, 2010).

They should always wash their hands before starting to prepare or sale food in this case meat, and after every interruption, particularly after using the toilet. People who have skin infections, diarrhoea or sore throats should avoid handling food. As indicated by Lesley (2010),there are other general principles for preventing food contamination such as the following;

- All water used in food e.g. meat preparation should be wholesome.
- All dishes, glasses and utensils must be kept clean by regular washing inclean water, and clean utensils should be kept covered.
- All surfaces that come into contact with food e.g. meat should be meticulously clean.

2.4.4 Meat preservation methods

As noted above, meat is highly perishable, so it must be preserved properly. One way of doing this is to chill the meat in a refrigerator. Temperatures for refrigeration of meat should be lower than the usually recommended 10°C and should be below 7°C for carcasses and below 3°C for offal. For long-term storage, meat should be frozen. However, since most rural and some of the shanty compound people do not have a refrigerator or freezer, they should use traditional preserving methods such as the following below;

- Sun-drying
- Smoking
- Salting
- Boiling
- And a combination of two or all of the above methods

The mechanism behind these tradition methods of preserving meat is simply by creating an environment that is not conducive to favour and promote any or all of these;

- the survival of micro-organisms
- the growth of micro-organisms and
- the multiplication of micro-organisms

The above conditions are prevented because the amount of moisture in the meat is reduced to the lowest levels that will inhibit the above processes from taking place and hence, prolonging the shelf-life of such preserved meat and meat products (Alberta, 2006).

2.4.5 Roles of Health Inspectors in controlling zoonotic infections

Zambia is a country with a lot of different ethnicities and cultures that influences the quality of the meat to be eaten by the public. Other tribes in Zambia have a preference of eating meat which is in its initial stages of highness, and this practice is also highly despised by those of other tribes in Zambia. Two rules must be enforced, and educating the community about them is an essential part of the role of a Health Inspector;

- No one should offer any food for eating that is unsafe or unfit for human consumption.
- Meat for sale not bearing the approval of inspection by a Health Inspector of the public municipal council should be considered unsafe for human consumption.

Additionally there are measures that Health Inspectors can recommend in the community such as abstaining from eating raw or inadequately cooked meat is a good control measure. The Zambian dishes of high meat and barbecue (braai) meat by some tribes are not safe to eat. However, there are strong cultural reasons for this practice, so people may not take the advice (Bloom, et al, 2011)

The health inspectors need to educate the public on best control measures against meat-borne zoonotic diseases such as cooking the meat thoroughly before consumption. Exposing meat to a temperature above 56 degrees Celsius and strict meat inspection practices in abattoirs can ensure that meat is free from tapeworm infection as well as other meat-borne diseases (FAO, 2012).

Finally, health inspectors need to educate the masses about the importance of avoiding open defecation as a major control measure for zoonotic and other faeco-oral diseases (WHO, 2012).

2.5.0. LEGISLATION GOVERNING INSPECTION AND SALE OF MEAT

In making attempts to meet the acceptable standards regarding the sale of meat and meat by-products so that only physically fit animals without any disease or history of disease are slaughtered for human consumption and only sound, wholesome and clean meat is approved for sale on the market and consumed by consumers. The compliance to all required standard of safety transportation, handling and storage should also be maintained in meat trading premises and this is enforced by Health inspection officers from the Local Authority and the Health Ministry of Zambia.

In order to achieve this, the Zambian government has adopted both locally and internationally recognised standards, codes of practice, laws and guidelines in ascertaining that legislative and regulatory requirements on food safety are met and maintained.

2.5.1. Food and Drugs (Meat, its preparation and products) Regulations

The Food and Drugs regulation 300 up to regulation 323 under the Food and Drugs Act Cap 303 of the laws of Zambia, stipulates the standards, quality and conditions that should be satisfied for the carcass (meat) of the animal to be approved for sale on the market for public consumption. For example, Regulations 307, 308 and 309 prohibits the selling as food of dead animals, meat or meat products from dead animals. Any person found selling such shall be prosecuted by the courts of law in Zambia (GRZ, Food and Drugs Act Cap303, 2000).

2.5.2. The Local Government Act Cap 281

Under this Act, on the general functions section 3, the sale of meat that has not been examined and certified fit for human consumption by Local Authority meat inspectors is prohibited. Section 8 of the same Act stipulates, “the owner of the animal or animals to be slaughtered or the carcass or carcasses to be sold is to pay a fee to the Local Authority for examination, slaughtering and re-examination at the abattoir”. Finally, the Act also outlines

conditions that are to be met before issuance of a butchery trading license for sale of meats and meat by-products (GRZ, Local Government Act CAP 281, 1995).

2.5.3. The Public Health (Abattoir and Transport of Meat) Regulations

The Public Health (Abattoir and Transport of Meat) Regulations which are found in the Public Health Act Cap 295 of the Laws of Zambia governs the slaughter of animals and their conveyance into and/or out of one district to another. Important pieces of regulation under this Act are noted such as Regulations 5, 7 and 14. Regulation 5 states that, “the owner of the meat conveyed into the area of a different Local Authority shall submit it for examination at an approved by a certified Local Authority Health or meat inspector.” approved safe for human consumption by Local Authority Health Inspector and Regulation 14 prohibits any person from selling meat of an animal slaughtered outside the district unless such an animal was slaughtered at an approved abattoir (GRZ, The Public Health Act Cap 295, 1995).

2.5.3. The Public Health (Meat, Abattoir and Butcherries) Regulations

Additionally, the Public Health (Meat, Abattoir and Butcherries) Regulations of the Public Health Act Cap 295 stipulate the slaughter of animals and sale of meat in butcherries. Regulation 4 prohibits the sale of uninspected meat within the area of jurisdiction of the Local Authority. Regulation 7 requires people to use approved abattoirs for slaughtering and also explains on powers of the Veterinary Officer to do ante-mortem inspection of the animal and the Health Inspector to do post-mortem inspection of the slaughtered animal (GRZ, The Public Health Act Cap 295, 1995).

2.5.4. WHO/ FAO Guidelines and Policy

The world Health Organisation and The Food and Agriculture Organisation developed the Codex Alimentarius that puts emphasis on the need of both meat producers and the Local Authorities to prevent risks associated with meat by practicing risk- based meat safety programs during primary production. This demands that the general health of the animal to

be slaughtered have to be documented and the practices must be implemented and evaluated with the final goal of improving and eradicating zoonotic diseases. (WHO/ FAO, 2012).

2.6.0. RESOURCES

2.6.1. Knowledge

There is almost often lack of effective communication skills between health technocrats and the public and as a result of this the public often lacks information that will enable them make informed judgement on the negative health effects of consuming uninspected meat that may sometimes be diseased or contaminated. This happens because often times, health experts do not explain technical issues in the way that will make lay-men understand consequences that follow consumption of infected meat. For example, the outbreak of certain diseases such as porcine cysticercosis whose meat when insufficiently cooked may cause neurocysticercosis in man (Solomon, *et al*, 2004), may be viewed as an impediment to business by most of the meat traders due to lack of awareness and also due to low levels of education of the consumers of such meat. Access to quality information should be regarded as a human right (Key *et al*, 2006)

2.6.2. Monetary funding towards basic health services

A total expenditure on the health sector has experienced a decrease as from 11.5% in 2013 budget to 9.9% budget for 2014 financial year in Zambia against the total national budget. This is far below the April 2001 Abuja declaration where all health ministers pledged to contribute a total of 15% of their respective nation budgets towards health care delivery services. This has also contributed to challenges of not having enough health personnel to carry out services such as meat inspection and other food safety activities at a community level (GRZ, Ministry of Finance, 2013).

2.7.0. TEN FACTS ABOUT FOOD SAFETY

According to the World Health Organisation on food safety may, 2013 News Letter ten facts about food safety were noted down as follows;

2.7.1. Food safety is a global concern

Globalization of food production and trade increases the likelihood of international incidents involving contaminated food. Imported food products and ingredients are common in most countries. Stronger food safety systems in export countries can reinforce both local and cross-border health security.

2.7.2. Food-borne diseases are increasing worldwide

Disease-causing organisms in food are transmitted far and wide by today's interconnected global food-chains - escalating how often and where food borne illnesses occur. Rapid urbanization worldwide is adding to risks, as urban dwellers eat more food prepared outside the home that may not be handled or prepared safely - including fresh foods and fish, meat and poultry.

2.7.3. More than 200 diseases are spread through food

Millions of people fall ill every year and many die as a result of eating unsafe food. Diarrhoeal diseases alone kill an estimated 1.5 million children annually, and most of these illnesses are attributed to contaminated food or water. Proper food preparation can prevent most food-borne diseases.

2.7.4. Emerging diseases are tied to food production

About 75% of the new infectious diseases affecting humans over the past 10 years were caused by bacteria, viruses and other pathogens that started in animals and animal products. Many of these diseases in people are related to the handling of infected domestic and wild animals during food production - in food markets and at slaughter houses.

2.7.5. Minimize the risk of avian influenza

The vast majority of H5N1 avian influenza cases in people follow direct contact with infected live or dead birds. There is no evidence that the disease is spread to people by eating properly cooked poultry. To avoid risk of food-borne illnesses in poultry:

- separate raw meat from other foods
- keep clean and wash your hands
- cook thoroughly (until meat is 70 °C in all parts, with no pink areas).

2.7.6. Preventing disease starts at the farm

Preventing animal infections at the farm level can reduce food-borne illnesses. For example, reducing the amount of Salmonella in farm chickens by 50% (through better farm management) results in 50% less people getting sick from the bacteria. Salmonella-free chicken herds are becoming more common in some countries.

2.7.7. Chemical hazards can contaminate food

Acryl amide, which may cause cancer, is formed from natural ingredients during the cooking of some foods at high temperatures (generally above 120 °C), including fried potato products, baked cereal products and coffee. The food industry is working to find methods to lower exposure to such chemicals. Avoid overcooking when frying, grilling or baking food.

2.7.8. Everyone plays a role in food safety

Food contamination can occur at any stage from farm to table. Everyone on the food delivery chain must employ measures to keep food safe - farmer, processor, vendor and consumer. Safety at home is just as vital to prevent disease outbreaks. Women are primary targets for food safety education as they are responsible for household meals in many societies.

2.7.9. School is a place for food safety

Educating children on safe food handling behaviours is key to preventing foodborne diseases today and in the future. Integrating food safety lessons into school curricula gives children essential life skills that can help to keep them and their families healthy.

2.7.10 WHO and Member States are promoting the benefits of food safety, healthy diets and physical activity.

The five keys to safer food are;

Keep clean, separate raw and cooked, cook all foods thoroughly, keep food at safe temperatures, and use safe water and raw materials.

All the above factors are overlooked in meat sold on open markets and road-side meat vendors rendering the meat unsafe for consumption.

3.0 OBJECTIVES

3.1 General Objective

To determine factors contributing to an increase in the sale of uninspected meat on open markets and road-sides of Lilanda compound in Lusaka District.

3.2. Specific Objectives

3.2.1 To determine whether high demand for meat contributes to increased levels of uninspected meat on the market.

3.2.2 To establish if the knowledge levels have an effect on increased levels of uninspected meat being sold on the market.

3.2.3 To determine whether inadequacies towards enforcement of food safety policies by health inspectors contribute to increased levels of uninspected meat being sold on the market.

3.3. Research Questions

3.3.1. Does high demand for meat at a household level contribute to increased levels of uninspected meat on the market?

3.3.2. Does education and knowledge levels concerning meat consumption at a household level have an effect on increased levels of uninspected meat being sold on open and road-side markets in shanty compounds?

3.3.3. Are inadequacies towards enforcement and adherence of food safety policies by health inspectors a factor in the increased levels of uninspected meat being sold on the street markets?

3.4 Definition of Terms

The following definitions of these words/terms will apply to this study.

1. **Abattoirs** -also known as slaughterhouses, are establishments where livestock are killed prior to human consumption.
2. **Adulteration** - when the normal content of the food has been intentionally changed by adding something to it that is not essential for example, adding formaldehyde to prolong the shelf life of meat.
3. **Butcher** - a person selling and handling meat in the butchery.
4. **Butchery** - an acceptable and approved shop or stall where meats and meat products are sold.
5. **Contamination**- is the undesired presence of harmful microorganisms or substances in food.
6. **Cross-contamination of food**- the transfer of harmful microorganisms between food items and food contact surfaces.
7. **Food handler's hygiene**- this is the term for a group of practices that should be followed at all times by anyone handling food at any stage of the food supply process.

8. **Food preservation** -includes a variety of techniques that allow food to be kept for extended periods of time without losing nutritional quality and avoiding the growth of unwanted microorganisms.
9. **Health Inspector**- an officer certified to inspect meat and meat by-products working under the ministry of health or the Local Authority.
10. **Meat** - the flesh of an animal used for human consumption.
11. **Open market** – space without walls, roof or enclosure where meat is sold
12. **Road-side market** – places where meat is sold along the spaces of the streets or road on an open area.
13. **Zoonotic food-borne diseases** - those that are transmitted to humans from other animals e.g. anthrax and bovine tuberculosis.

4.0 RESEARCH METHODOLOGY

Research methodology in this study refers to the way of gathering data from the population under study in a systematic way so as to determine factors that are contributing to the high levels of uninspected meat being sold on street and open markets of Lusaka district at and around Katambalala market in Lilanda compound.

4.1. Study type

The type of study that was undertaken is a cross-sectional descriptive type. This study was concerned with the factors that are contributing to the mushrooming of the sale of uninspected meats in the streets and open markets of Lilanda compound of Lusaka district and identified the characteristics which seem to be associated with it.

4.2. Study setting and study population

The research was conducted at Katambalala market in Lilanda compound, a shanty compound found in Lusaka district. The market, and the area surrounding it has more than 370 meat traders selling meat in an open area outside the main market while others are selling meat inside the market and still others along the roads adjacent to the market.

The study population for the research will be meat traders who sale meat on any open space within and along the roads or streets that are not more than 100 metres away from Katambalala market in Lilanda compound.

4.3 Data collection techniques and tools

Both qualitative and quantitative methods were used in this study. The data collection techniques and tools that were used in this study included interviews, record review and

observation. Interviews were done using Semi- structured Questionnaires which were designed in such a way as to be consisting of closed ended questions so as to make the analysis easy and also consisting of open ended questions for in-depth investigation on the problem.

One-on-one interviews were also employed during data collection. These randomly selected study sample members were followed to their respective trading sites by the principal researcher and research assistants. Translation of the questionnaire was done by the interviewer during the interview.

4.3.4. Sampling and Sampling Techniques

The sampling units were meat traders selling meat within, outside and along the roads adjacent to the market that are not more than 100 meters away from the main market. Simple random sampling method was used in this study. This was drawn from the sampling framework of the study group of meat traders trading within the area described above. The identities of these traders were gathered by conducting a familiarisation tour since most of them carry out their businesses without any registration with the market committee or the local authority as they do not have trading documentation/ licences.

The method of sampling used in this study was simple random sampling using lottery method. This was done by listing units in the population, then put in a box. Each unit was picked after every shuffle until the calculated sample size was met.

The sample size was calculated by using EPI- Info 7 soft-ware from a population of 370.

Population size.....370.0
Expected frequency..... 65.0%
Worst acceptable.....55.0%
Confidence Interval..... 10.0

<u>Confidence level</u>	<u>Sample size</u>
80%	34
90%	53
95%	71
99%	107
99.9%	148
99.99%	178

Using 90% confidence level it will give me a **sample size of 53**.

4.4.1 Inclusion Criteria

The inclusion was any meat trader who sales meat on any open space within and along the roads or streets that are not more than 100 metres away from Katambalala market in Lilanda compound.

4.4.2. Exclusion Criteria

Any meat trader who sales meat on any open space within and along the roads or streets that are more than 100 metres away from Katambalala market in Lilanda compound were excluded from the study although they all sell meat suspected not to be inspected.

4.2.0. Variables

In the study the variables that are applied are the dependant and independent variables.

4.2.1 Dependent Variables

- Uninspected meat being sold on open markets and road-sides of shanty compounds

4.2.2 Independent Variables

- Demand for meat.
- Knowledge about the importance of inspected meat by both sellers and buyers
- Adequacies of compliance to food safety policies by buyers and sellers of the meat.
- Adequacies of enforcement of food safety policies and laws by inspectors

4.2.3 Variables and Indicators of Measurements

Table 1: Conceptual framework

Type of Variable	Variable	Indicator	Scale of Measurement
Dependent	Uninspected meat being sold on the markets	% of people selling meat without licences on open markets/ not licensed butchereries.	High-Above 50% Low –below 50%
Independent	Demand for meat.	No. of people to which each meat trader sells per day.	High-above 30 Medium -between 20 to30

			Low –below 0 to 20
	Adequacy of compliance to food safety policies by buyers and sellers of the meat.	% of meat traders who know that inspected meat is safe to eat than uninspected ones.	High–from 80-100% Medium-from50-79% Low- from 0-49%
	Knowledge on the importance of inspected meat by both sellers and buyers	% of meat traders capable of naming any of the disease that can be transmitted through consumption of uninspected (infected) meat	High -from 80-100% medium – from 50 to 79% low- below 50%
	Adequacy of enforcement of food safety policies and laws by inspectors.	% of traders who have seen Health Inspectors inspecting meat within two months prior to administration of the questionnaire.	High-from 80-100% Medium-from 50-70% Low- from 0-40%

4.3.2 Data Quality, Validity and Reliability

To ensure reliability and quality of the data collected during the administering of the questionnaire, many questions were repeated in different ways. This ensured data consistency so as to ensure data reliability and validity. Additionally, at the end of each day of administering the questionnaires, all the questionnaires were checked for completeness and any errors were quickly corrected and data was entered in the master questionnaire

4.4.2. Data Processing and Analysis

The process involved categorization of data, coding and summarizing data on master spread sheets. Data analysis was done using SPSS and Microsoft Excel computer programs.

4.4.3. Ethical Considerations

Authority to undertake the study in Lilanda compound of Lusaka district was sought from University of Zambia Research Ethics Committee. Informed consent was obtained from the

respondents. The respondents were briefed about the purpose of the study and assured them of total confidentiality of their views.

4.4.4. Pre-test

A preliminary study or testing was carried out to determine the effectiveness of the data collecting instruments and methods employed as well as the procedure. The study helped to regulate the quality of data and also to test the reliability of the results obtained. This pre-testing operation was done in Chaisa compound of Lusaka district because it shares similar characteristics with Lilanda compound in terms of source of income of the people and geographical factors as well.

To create better understanding of the questionnaire to be administered to the study population, the research assistants were trained for two days on skills regarding ethical considerations and how to administer the questionnaires and interviewing techniques.

5.0: DATA ANALYSIS AND INTERPRETATION

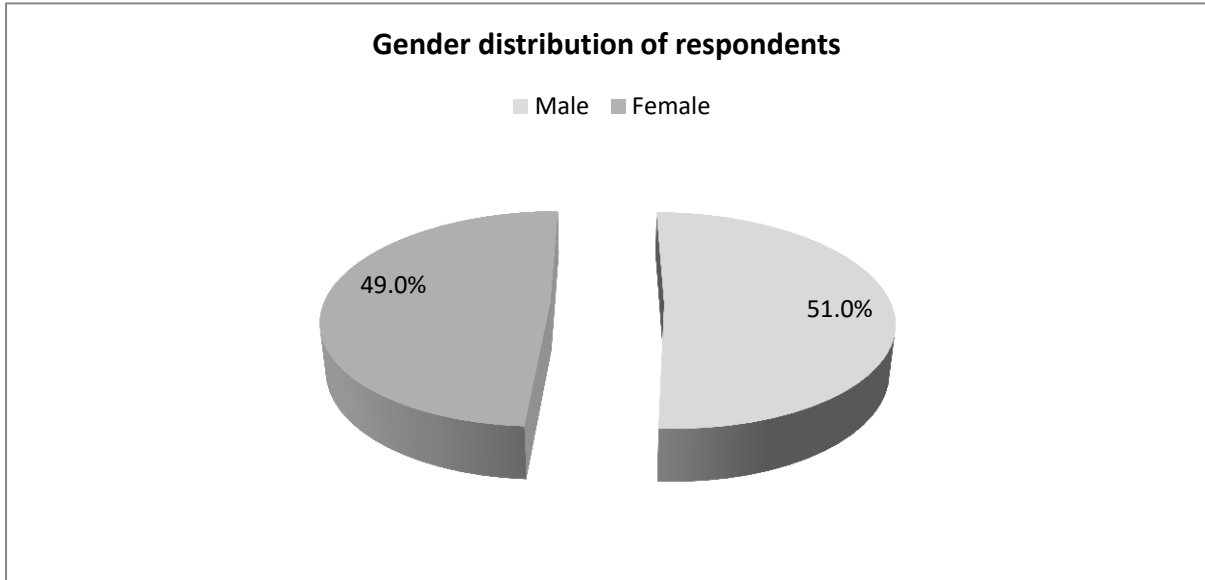
The analysis and interpretation of results presented in two parts. The first part outlines data presentation and analysis of the findings and the second part presents the interpretation of data based on its analysis.

5.1: Data analysis.

The following components have been considered under data analysis section, background information, levels of knowledge over the trading of uninspected meat, demand levels for meat in the diet of the people and adequacies towards compliance and enforcement of food safety policies by Health Inspectors.

5.1.2: Background Information about the Respondents

Figure 2: gender of the respondents



A total of 53 meat traders were sampled, 51.0% were males and 49.0% were females as shown in figure 2 above

Table 2: Ages of the respondents

	# of respondents	Minimum	Maximum	Mean
Age respondent	53	19	47	30.8

Table 1 shows that amongst all the respondents, the youngest respondent was 19 years old and the oldest was 47 years old. However, the average age of the respondents was approximately 31 years.

Table 3: Education background of respondents

Education background	Frequency	Percentage (%)
Attained formal education	43	81.1
Not attained formal education	10	18.9
Total	53	100.0

The frequency table above shows 81.1% meat traders attained formal education and 18.9% have never attained any formal education. Additionally, another table below shows the education levels of the respondents with respect to their gender.

Figure 3: Street meat traders with other (extra) job(s)

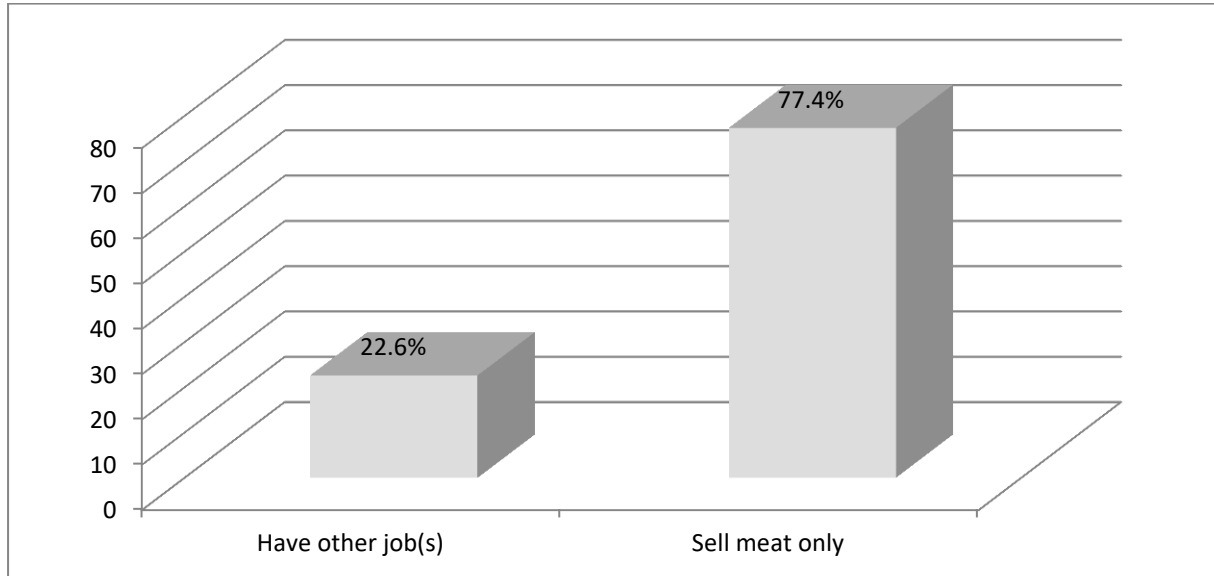


Figure 2 shows that only 22.6% of the street meat traders had (an) extra job(s) and 77.4% of them only had the business of street meat selling.

Table 4: meat traders aware of meat inspection

Response	Frequency	Percentage (%)
Aware	42	79.2
No aware	11	20.8
Total	53	100.0

Table 3 indicates that the majority (79.2%) of street meat traders have heard about meat inspection compared with 20.8% of those who have never heard about it.

Figure 3: Source of information about meat inspection

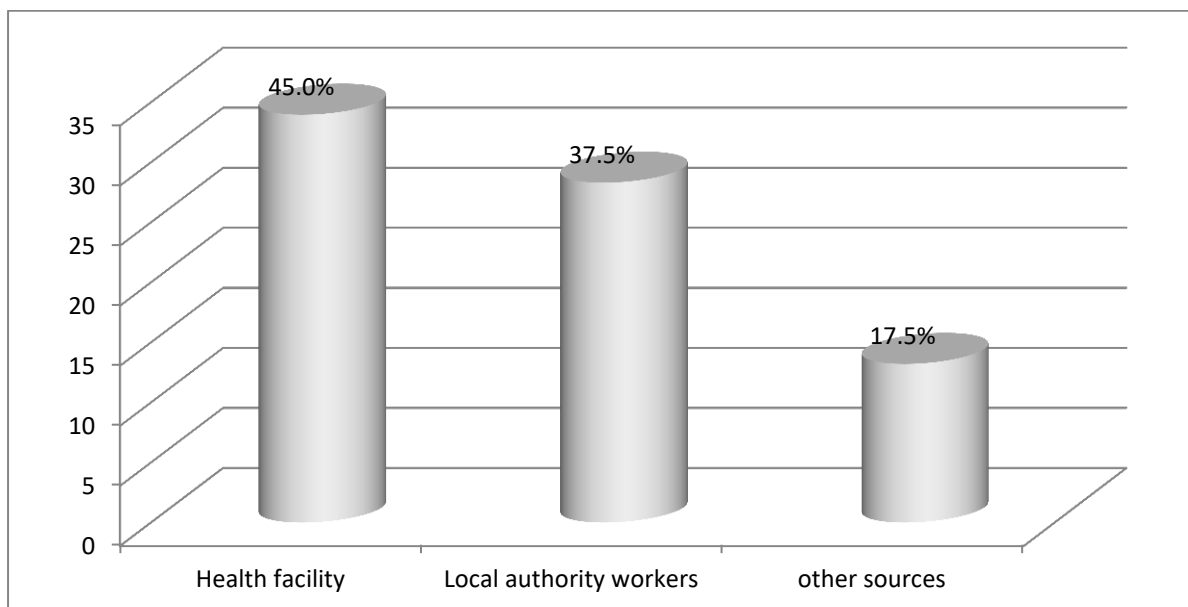


Figure 3 above shows that the majority (34.0%) of those selling meat on open-markets and road-sides heard about the importance of meat inspection from a Health facility, the other(28.3%) heard from the Local Authority Inspectors and the least(13.2%) of them heard from other specified sources.

Table 5: Responses as to whether consumption of uninspected meat can cause diseases

Responses	Frequency	Percentage (%)
Causes disease(s)	45	84.9
Does not cause disease(s)	4	7.5
No idea	4	7.5
Total	53	100.0

Table 5 above shows the respective responses given by meat traders selling meat on open-market and on road-sides to a question of whether eating uninspected meat puts the meat consumers at a risk of contracting some diseases. 60.0% knew that such meats are likely to cause diseases, 7.5% did not know and the other 7.5% had no idea with regard to the subject.

Table 6: Sources of meat for meat traders on open-markets and road-sides

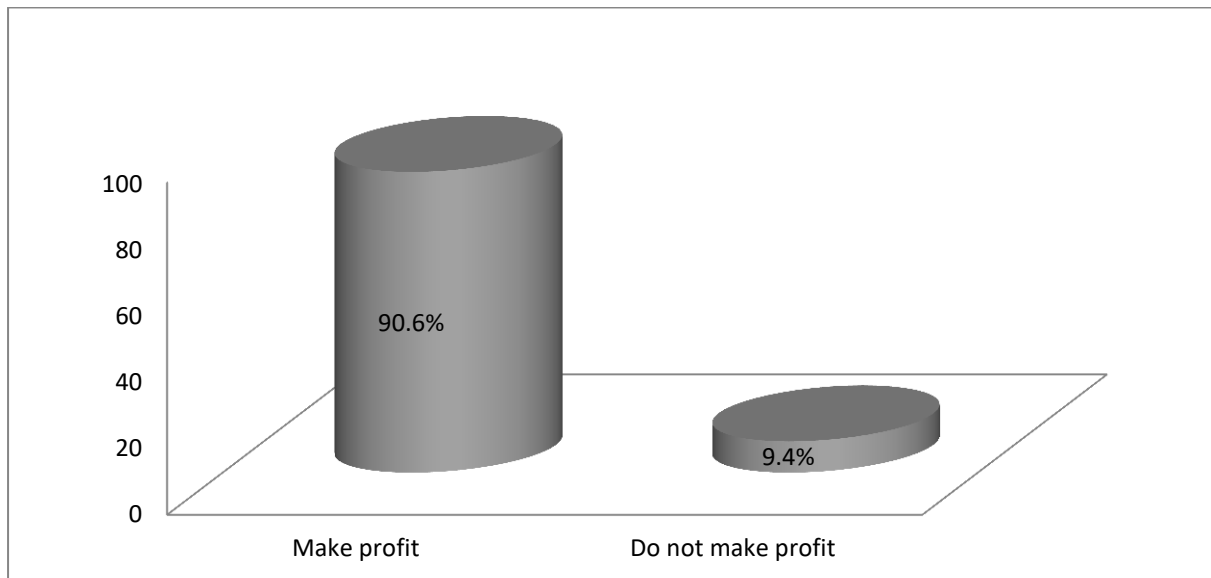
Source of meat	Frequency	Percent (%)
Licensed meat dealers/abattoir	15	28.3
Unlicensed meat dealers/abattoir	38	71.7
Total	53	100.0

Table 6 shows that the majority (71.7%) of the street meat traders ordered their meat from unlicensed meat dealers/abattoirs while the minority (28.3%) ordered their meat from licensed meat dealers/ abattoirs.

5.1.3: Demand Levels for Meat in the Diet of the People.

The tables and figures below shows data captured to assess the demand of the consumers of meat which they buy from street meat traders.

Figure 4: Profit makers from the sale of meat on-open-markets and road-sides.



According to figure 4 the study revealed that the majority (90.6%) of the street meat traders make profit from their business while few (9.4%) of them said they do not make profit from their business.

Table 7: Number of customers per day

# of customers/day	Frequency	Percent (%)
above 30	31	58.5
between 20 and 30	20	37.7
below 20	2	3.8
Total	53	100.0

According to table 7 above, 58.5% street meat traders sold to more than 30 customers per day while 37.7% of the street meat traders sold to between 20 to 30 customers per day and 3.8% street meat traders sold to less than 20 customers per day.

5.1.3: Adequacy towards compliance and enforcement of Food Safety Policies by Health Inspectors.

The tables and figures below presents the findings of the study outlining adequacy towards compliance of food safety rules by the street meat traders and the enforcement levels of food safety policies by the Health Inspectors. To verify that the meat was sourced from the licensed meat dealers, traders were asked to produce receipts of purchase.

Figure 5: Street meat traders whose selling stands were visited by Health Inspectors within a period of two months.

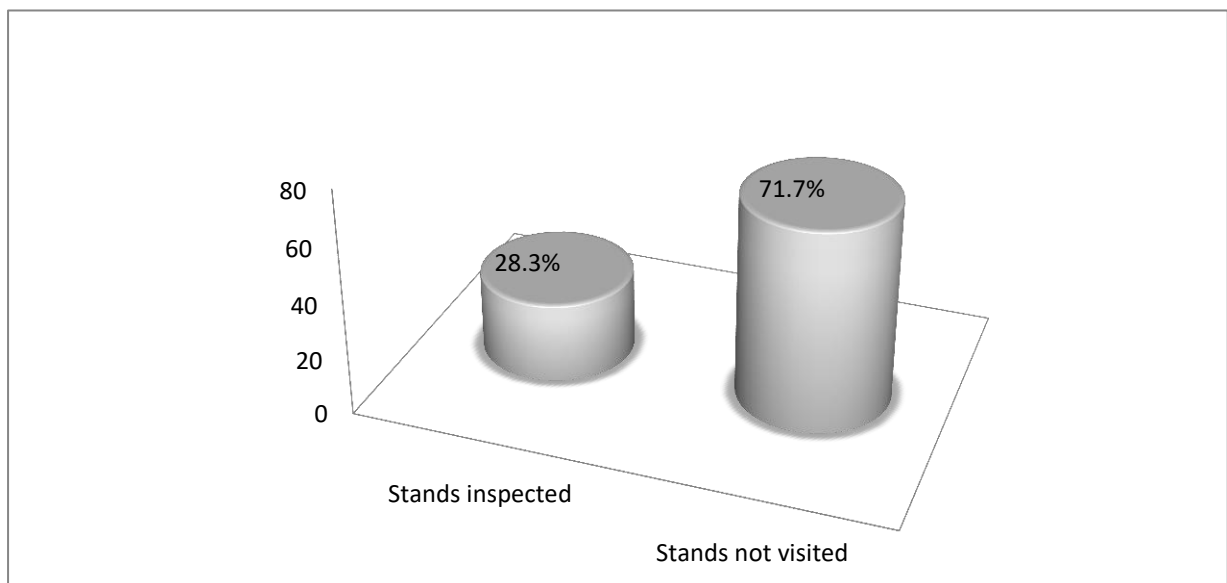


Figure 5 above shows that in the last two months prior to the research, few (28%) of the street meat traders had their selling stands visited by Health (meat) inspectors and the majority (72%) of them had never been visited by the inspectors to inspect their premises.

Table 8: Range of the number of Health Inspectors who inspected street meat traders in the last two months

Range	4
Minimum	1
Maximum	5

Table 8 shows that the highest number of Health (meat) Inspectors recorded to have inspected the stalls/ stands for street meat traders in the last two months was 5 and the lowest number was 1. This data is only for those traders whose response was ‘YES’ they have been visited by health inspectors only.

Figure 6: Street meat traders who have heard about food safety rules and policies.

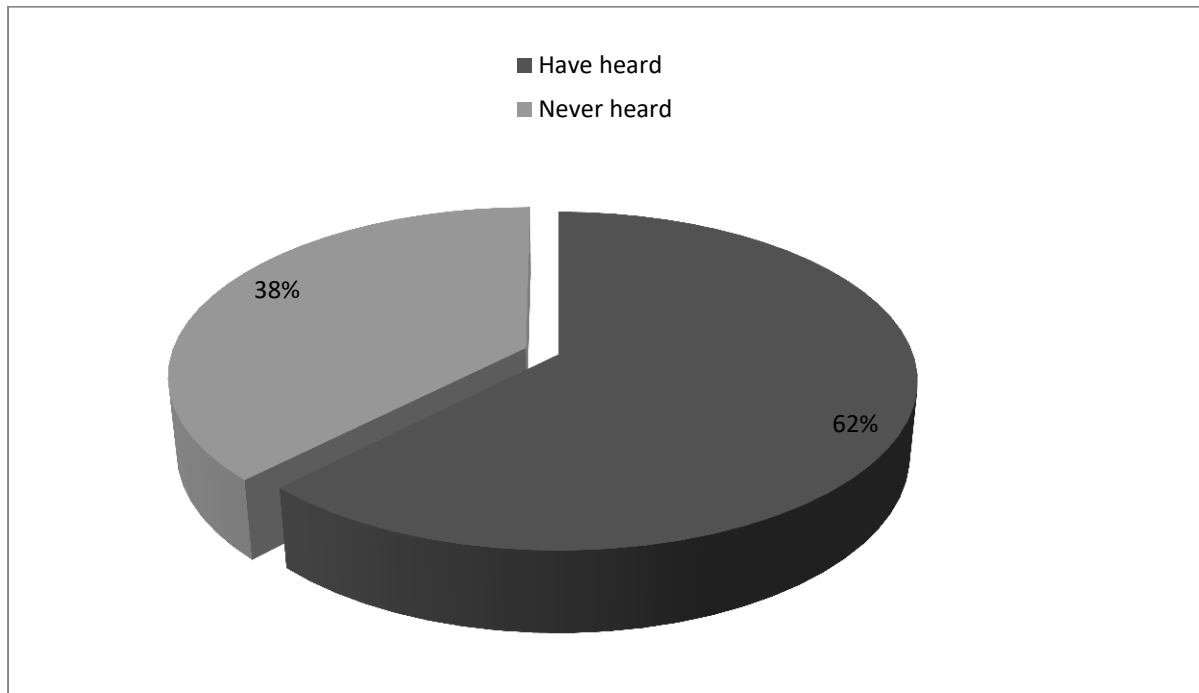


Figure 6 indicates that the majority (62.0%) of the street meat traders have heard about laws that govern the sale of meat and other food safety rules while the minority who have never heard of such rules constituted 38.0%.

5.2: Data Interpretation.

The tables below primarily explain the details of the relationship that exist between the dependent variable and the different independent variables under investigation. The dependable variable under this study is the sale of uninspected meat on road-sides and on open –markets. The independent variables will include gender of respondents, level of education, having other job(s) apart from meat trading, awareness on the importance of meat inspection, knowledge on likely diseases from uninspected meat, profit from meat selling and inadequacies towards monitoring and control of food safety rules and policies.

Table 9: Relationship between gender and the sale of uninspected meat on open-markets and road-sides

Gender	State of meat sold		Total
	Inspected	Uninspected	
Males	15.1%	35.8%	50.9%
Females	13.2%	35.8%	49.1%
Total	28.3%	71.7%	100.0%

Chi square value: 0.048 and p- value: 0.827

Table 8 indicates that there was no statistical significance between gender and the sale of uninspected meat as proved by the p- value (0.827) which is greater than 0.005.

Table 10: Relationship between level of education and the sale of uninspected meat on open-markets and road-sides

Level of education	State of meat sold		Total
	Inspected	Uninspected	
Primary	11.6%	32.6%	44.2%
Secondary	18.6%	32.6%	51.2%
Tertiary	2.3%	2.3%	4.7%
Total	32.6%	67.4%	100.0%

Chi square value: 0.759 and p- value: 0.684

As proved by the findings in table 9, the calculated chi- square value is 0.759 and the p-value is 0.689. This shows that there is no relationship between the level of education and the sale of uninspected meat along the streets and on open markets.

Table 11: Relationship between having other job(s) and the sale of uninspected meat on open-markets and on road-sides

Have other job(s)	State of meat sold		Total
	Inspected	Uninspected	
Yes	7.5%	15.1%	22.6%
No	20.8%	56.6%	77.4%
Total	28.3%	71.7%	100.0%

Chi square value: 0.194 and p- value: 0.660.

The table above (table 10) compares the relationship between having other jobs apart from street meat trading and the sale of uninspected meat along the streets and on open markets. It shows that there is no relationship between the two variables with a chi-square value of 0.194 and the p- value of 0.660.

Table 12: Relationship between awareness on the importance of meat inspection and the sale of uninspected meat on open-markets and road-sides.

Awareness on meat inspection	State of meat sold		Total
	Inspected	uninspected	
Aware	26.4%	52.8%	79.2%
Not aware	1.9%	18.9%	20.8%
Total	28.3%	71.7%	100.0%

Chi square value: 2.525 and p- value: 0.112

Table 11 (above) shows the findings on whether awareness has an influence on the sale of uninspected meat on roadsides and on open markets. As proved by the chi-square value of

2.252 and the p-value of 0.112, it shows that there is no relationship between the two variables.

Table 13: relationship between knowledge of diseases likely to be contracted from uninspected meat consumption and the sale of uninspected meat on open-markets and road-sides.

Knowledge of diseases	State of meat sold		Total
	Inspected	Uninspected	
Have knowledge	28.3%	56.6%	84.9%
Do not have knowledge	0.0%	7.5%	7.5%
Have no idea	0.0%	7.5%	7.5%
Total	28.3%	71.7%	100.0%

Chi square value: 3.719 and p- value: 0.04

The findings shown in table 12 prove that there is a relationship between having knowledge on likely diseases that can result from consumption of uninspected meat and the sale of uninspected meat on open markets and on road-sides as shown by p-value 0.04 with the chi square value of 3.719.

Table 14: Relationship between profit making and the sale of uninspected meat on open-market and road-sides

Profit	State of meat sold		Total
	Inspected	Uninspected	
Yes	24.5%	66.0%	90.6%
No	3.8%	5.7%	9.4%
Total	28.3%	71.7%	100.0%

Chi square value: 0.372 and p- value: 0.542

Table 13 above establishes the relationship between profit making and the sale of uninspected meat on markets and roadsides. It reviews that there is no statistical relationship between the two indicated variables with the Chi-square value of 0.372 and p-value of 0.542.

Table 15: Relationship between monitoring by Health Inspectors and the sale of uninspected meat on open-markets and on road-sides

Monitoring and enforcement by health inspectors	State of meat sold		Total
	Inspected	Uninspected	
Health Inspectors / enforce laws	15.1%	13.2%	28.3%
They do not monitor/enforce laws	13.2%	58.5%	71.7%
Total	28.3%	71.7%	100.0%

Chi square value: 6.460 and p- value: 0.011

The table above compares the relationship between monitoring for compliance to food safety policies by Health (Meat) Inspectors and the sale of uninspected meat on open markets and roads sides. The findings (chi-square value of 6.460 and p-value of 0.011) show that there is a strong relationship between the two compared variables.

6.0: DISCUSSION OF RESULTS

The findings of the research have been categorized into four main areas which are; background information of the sample, level of knowledge about the effects of consuming uninspected meat among road-side and open-market meat traders, demand for meat in the diet and, adequacy towards compliance and enforcement of food safety policies/laws.

6.1: background information about the sample population.

The study was conducted in Lusaka on open- markets and road-sides of Lilanda compound. 53 traders selling meat along the roads and open- markets in Lilanda were randomly sampled. Among those conducting this kind of business, the majority were females (51.0%) as compared to the males who only constituted 49.0%.

The findings established that not all those who sale meat on open- markets and on road-sides order their meat from unlicensed sources where meat does not undergo inspection. As shown in table 5, 71.7% of these traders sold meats which did not undergo inspection and 28.3% sold the meat which underwent inspection from the suppliers and those (28.3%) were asked to produce receipts of purchase which all managed to produce. These findings agree with the findings of the research done by Ngwale(2012) which stated that not all meat traders on open-markets sale uninspected meat.

It was determined that the ages of those engaged in this business ranged from as young as 19 years old to as old as 47 years old and the average age of these traders was found to be approximately 31 years. Furthermore, 81.1% of these traders attained a form of formal education while 18.9% did not. The study further reviewed that the majority (51.2%) of the traders completed a secondary education course as shown in table 2. People of this education level are supposed to further their education level by acquiring technical skills unlike this kind of business. This shows that the government haven't prioritized vocation training to empower these youths with skills for self sustainability.

The minority (22.6%) of the meat traders had extra jobs. Since the majority (77.4%) solely depend on selling meat on open-markets and road-sides, leads to the conclusion that this business is lucrative. This was the kind of conclusion that was made by Chilando, et al (2013) but the study has reviewed that there is no statistical relationship between having (an)extra job(s) and the sale of uninspected meats on open-markets and road-sides as proved by the p-value of 0.660. This means selling of uninspected meat cannot be reduced by giving those already in the business of selling meats on the streets some form of financial support to start other businesses but rather it might be sensible to empower those not in such a business so that they do not go into this business.

A statistical test was also done to investigate whether gender has influence on the sale of uninspected meat. The calculation at chi-square value of 0.048 gave the p-value of 0.827 showing that gender does not prompt people to engage in meat selling. So it should be taken

as being false if people say they do this business because of challenges which they face as a result of their gender and so disagreeing with the finding of Lucas, *et al* (2003) who stated that females should be empowered so that they can stop engaging in street vending where they cannot compete favourably with their male counterparts.

Philip, D (2006) stated that people who have not reached secondary education level are more likely to be violating food safety standards as compared to those who have reached or exceeded secondary education level. This statement, however contradicts with the findings of this study which gave a p-value of 0.684 when a statistical test was done confirm whether the level of education has influence on the sell of uninspected meat on open-markets and road-sides.

6.2: Awareness and levels of knowledge among traders selling meat on open-markets and road-sides.

This study has reviewed that most (79.2%) of the traders selling meat on open-markets and on road-sides were aware on the importance of selling meat that has undergone inspection as indicated in table 3. The findings further showed that most (45.0%) of them got the information about the importance of consuming inspected meat from the Health facilities, while 37.5% of them got this information from Local Authority workers and the least got the information from other sources such as the media, friends and others as indicated in figure 3. This shows that Officers from the health facilities carry out more awareness campaigns as compared to their counterparts from the Local Authorities.

In trying to understand their levels of knowledge, most (84.9%) of the traders expressed knowledge on the dangers associated with consumption of uninspected meat and were able to identify the signs of some of the diseases correctly, and only a small proportion (7.5%) of them either had no knowledge on the matter or completely had no idea respectively. Several diseases likely to be associated with uninspected meat were named which included cysticercosis, generalised tuberculosis, even cholera in instances where meat is not hygienically handled. This confirms the writings of Albertta *et al* (2006) in his book '*Street Meat Vending and its Effects on Health – Sub Sahara Region*' in which he stated that street meat vendors know exactly that meat is a potential vehicle for bacterial diseases and that's why they chase flies whenever they are selling their meat.

The findings further reviewed that most (71.7%) of the traders selling meat on open-markets and on road-sides orders their meat from unlicensed meat dealers/abattoirs as shown in table 5. The popular reason which came out as to why they order from such sources was that order prices are lower than those offered by licensed meat dealers/abattoirs.

The results of the statistical tests for significance indicated that there is a relationship between awareness on the importance of selling inspected meat among meat traders and the sale of uninspected meat on open-markets and road-sides. This was proved by the probability test which gave the p-value of 0.012. The findings means that the more meat traders become

aware of the dangers associated with the consumption of uninspected meat, the less the levels of selling uninspected meat will become. These findings agree with the findings of Lucas, et al (2003) who stated that health officials do not explain the significance of specific hazards associated with uninspected meat, hence traders view meat inspection as an impediment to their business.

6.3: Influences of meat demand on the increase in the sale of uninspected meat on open markets and on road-sides.

The study reviewed that the business of selling meat on open-markets and along the streets fetches a lot of monetary profit to the traders since most (90.6%) of them made profits from their sales and only (9.4%) of them do not make profit. This level of high profit making shows that there is high demand for meat by most of the residents of Lilanda compound.

Furthermore, the study showed that most (58.5%) meat traders sold to more than 30 customers per day, while (37.7%) sold to between 20 and 30 customers per day and the least (3.8%) sold to less than 20 customers per day. Additionally, the number of customers who bought to these traders as shown above shows that there is high demand of meat in Lilanda compound.

In order to examine the relationship between profit making and the sale of uninspected meat on open markets and on road-sides a cross tabulation was done to compare the two variables and it was clearly established that profit making has no influence on the increase in the sale of uninspected meat on the open-markets and road-sides of Lilanda compound, in Lusaka district..

The p-value of 0.542 that was obtained is greater than 0.05, implying that the relationship is insignificant. In other words profit making does not motivate people to engage in the sale of uninspected meat on open-markets and road-sides conflicting with the writings of Jim, et al (2007) who stated otherwise. This shows that there should be other factors that force people to enter into such business as outlined by Ngwira, H (2012). Some of the factors may include high poverty levels and low levels of awareness campaigns by health personnel on the dangers of consuming such meats.

6.3: Adequacy towards compliance and enforcement of food safety policies.

The majority (72%) of traders selling meat on open-markets and on road-sides have never seen Health Inspectors inspecting their trading stalls. Only 28% of the traders have witnessed Health Inspectors visiting their trading stalls.

The findings reviewed that the minimum number of Health Inspectors seen by the meat traders on open-markets and road-sides was one (1) and the maximum was five (5) within a period of two months as shown in table 7. Despite the fact that the majority (62.3) of meat traders having heard about various food safety rules, inadequacies in the enforcement area of these rules proved to be one of the factors that contributed massively to the increase in the sale of uninspected meat on open-markets and on road-sides.

In order to examine the relationship between adequacy towards compliance and enforcement of food safety policies, and the sale of uninspected meat on open-markets and on road-side, a chi-square test was done to compare the two variables. The chi-square test (p-value of 0.01) proved that inadequacy with regards to compliance and enforcement of food safety policies by health inspectors had on the increase of uninspected meat being sold on open-markets and road-sides. This means that the, if the number of Health Inspectors enforcing food safety rules and policies is lower, then there will be an increase in the number of people selling uninspected meat on open-market and on road-sides.

7.0. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

This study aimed at assessing the factors thought to be contributing to the sale of uninspected meat on open-markets and road-sides of Lilanda compound in Lusaka district of Zambia. The study clearly revealed that high demand for meat does not contribute to an increase in the sale of uninspected meat on open markets and on road-sides. The significance test of the results yielded a p-value of 0.542 which is greater than 0.05. Therefore, it can be concluded that demand for meat does not lead to the increase in the sale of uninspected meat on the streets.

Similarly, knowledge levels have been noted to influence the level of the sale of uninspected meat on open-markets and on road-sides positively. This means that the more knowledgeable people become about the health hazards associated with consumption of uninspected meat, the higher the possibility of recording a reduction in the increase of selling uninspected meat on open-markets and road-sides. This became so evident after the cross tabulation value of 0.042 was obtained when trying to relate the two variables.

Inadequacies towards enforcement of compliance to food safety policies by Health Inspectors was equally identified as a contributory factor to the increased levels in the sale of uninspected meat on open-markets and on road-sides. Since (72%) the respondents stated that there selling stalls/premises had never been monitored/inspected by Health Inspectors for a period of more than two months. The test for the relationship between monitoring (enforcement) of the sale of uninspected meat and the increase in the sale of uninspected meat on open-markets and road-sides yielded a p-value of 0.011 which is less than 0.05. Therefore, it can be conclude that there is a relationship between the two variables. This means that when Health Inspectors do not physically follow these meat traders in the compounds, influx in the sale of such meats will not be avoided.

To sum it all, the general objective and specific objectives of the study were achieved.

7.2 Recommendations

In light of the findings and short comings observed in this research, the following recommendations to the stakeholders outlined below will suffice and help remedy or improve the general state of affairs;

7.2.1 Ministry of Local Government and Housing

- The central government through the Ministry of Local Government and Housing should consider funding the recruitment of more human resource such as Health Inspectors so that monitoring of adherence to food safety policies can be boosted.

- The central government through the Ministry of Local Government and Housing should consider funding activities that will curb illegal slaughtering of livestock.

7.2.2. Lusaka City Council.

With the aim of tackling the issue under consideration, the Local Authority should;

- Advocate for improved conditions of service for Health Inspectors so that the workers can be motivated to perform their duties effectively.
- Should intensify routine monitoring of adherence to food safety policies especially in shanty compounds such as Lilanda compound in Lusaka.
- Should embark on regular sensitisation of meat traders on health hazards that are associated with consumption of uninspected meat through health education.
- Channel some of its financial resources towards Information, Education and Communication material production on the subject of food safety which are to be distributed in public places so that members of the public will be able to access the information on their own which they can even pass on to others.

7.3 Areas for future study

The following are some areas that can be explored for future studies:

- A similar study should be undertaken to determine the factors that are causing inadequacies towards the monitoring levels by the Health Inspectors with regards to ensuring that there is adherence and compliance to food safety policies by sellers and buyers of meat on open-markets and on road-sides.
- Similar studies should be undertaken to assess the contamination levels of meat that is sold on open-markets and road-sides through laboratory methods.

7.4 Limitations of the study

The following were the limitations of the study:

- Due to the sensitivity of the offence committed in the business, the respondents could not freely give certain pieces of information that could have been in the study.
- Due to high poverty levels, respondents were too subjective when responding to some questions rather than being objective because the business was their source of sustenance.

7.5 Plan for utilization and dissemination of research results

Copies of this research report will be distributed to the relevant institutions, these are; Environmental Health Unit, University of Zambia library and the Lusaka City council (LCC).

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APPENDICES

Annex 1: Work Plan Schedule

TASK TO BE PERFORMED	PERIOD	RESPONSIBLE PERSONEL	PERSON/DAYS
Finalizing of research proposal	Term 2 Week 5: Dec 1 to 5 th .	Principal researcher	1 x 5
Approval by the University of Zambia – Undergraduate Ethics Committee	Term2 Week 6: Dec 9 th – 20 th	Principal Investigator	1 x 11
Training of data collectors	Study break: Dec 23 rd - 24 th	Principle researcher	1 x 2
Pre testing of data collecting tools	Study Break: Dec 27 th – 29 th	Research team	4 x 3
Data collection and entry	Study Break 31 st Dec – 4 th Jan	Research team	4 x 5
Data processing and analysis	Term III Week 1: Jan 6 th -12 th	Principal investigator/researcher	1 x 4
Report rewriting	Term III Wk 2 – wk 4 Jan 13 th – 2 nd Feb	Principal investigator/researcher	1 x 21

Annex 2: Ghannty Chart of Activities for the Research

Sn	Activity																
		Wk 1	Wk2	W k3	W k4	W k1	W k2	W k3	W k4	W k1	W k2	W k3	W k4	W k1	W k2	W k3	W k4
1	Finalizing of research proposal																
2	Approval by the University of Zambia – Undergraduate Ethics Committee																
3	Training of data collectors																
4	Pre testing of data collecting tools																
5	Data collection and entry																
6	Data processing and analysis																
7	Report rewriting																
8	Results dissemination to stakeholders																

Annex3: Budget for the Research

No.	BUDGET ITEM	UNIT COST(ZK)	MULTIPLING FACTOR	TOTAL COST (ZK)
1	Transport to study area	10	4 x 3 days	120
2	Lunch during training of research assistants	50	3 x 2days	300
3	Lunch allowance for principle researcher	50	1 x 2 days	100
4	Printing of Questionnaires	2.5	130 x 1 day	325
5	Printing draft report	30	2 x 1day	60
6	Printing of final report	50	4 x 1 day	200
7	Payment of data analyst	100	1 x 3days	300
8	Miscellaneous			300
9	Payments of research assistants.	100	3 x 3days	900
	GRAND TOTAL			K 2,315

The project will be partly funded by the Bursaries Committee under the Government sponsorship by the Ministry of Education, Science, Vocational Training and Early Education and the other part will be contributed by the student, myself.

Annex 4: Respondent Consent Form

The University of Zambia,
School of Medicine,
Department of Public of Public Health,
Environmental Health Unit,
P.O. Box 50110,
Lusaka.

REF: INTERVIEW INFORMATION AND CONSENT SHEET

Am a student from the University of Zambia conducting a research on assessment of factors contributing to an increase in the in the sale of uninspected meat on open markets and road sides of Lilanda compound in Lusaka District.

The information to be collected will be useful as it will contribute to the enhancement of food safety in our society.

There is a questionnaire that you are requested to answer as an individual and it only requires very few minutes of your time. The answers that you will give will be treated with utmost confidentiality and your name will not appear anywhere because this study is of an academic purpose only.

You have been selected randomly to participate in this study but you have the right to withdraw or refuse to participate in the study before or during the course of the interview.

Thanking you for your willingness to participate in the study.

Name of interviewer.....

Signature.....

Annex 5: Consent Sheet.

The above information has been explained to me clearly and I fully understand and consent myself to participate in this research.

SIGNATURE/THUMB PRINT.....

DATE.....

Annex 7: Questionnaire.

Questionnaire serial number [_____]

The University of Zambia
School of medicine
Department of Environmental Health sciences

This questionnaire is for academic purpose only. Be rest assured that all the information you provide will be treated as private and confidential as possible. Feel free to answer all the questions honestly. Your cooperation in this regard will be highly appreciated

Date of interview.....

Name of the interviewer.....,

Section A; Background information

Q1. Gender of the respondent

1=Male

[_____]

2=Female

Q2. How old are you?

[_____]

Q3. Have you attained any formal education?

1=Yes

2=No ---> skip to Q5

[_____]

Q4. What is your highest level of education?

1=Primary

2=secondary

3=Tertiary

[_____]

Q5.1 Do you have any other job apart from meat trading?

1=Yes

2=No ---> skip to Q6

[_____]

Q5.2 Name the other job(s) that you do.

.....

Q5.3 What is the main reason(s) for doing the other job(s)?

.....

.....

SECTION B: KNOWLEDGE ON THE IMPORTANCE OF MEAT INSPECTION

Q6. Have you ever heard about meat inspection?
1=Yes
2=No ---> skip to Q9 []

Q7. Which was the main source of information to you about meat inspection?
1=Health facility
2=Local authority workers
3=Other (specify) []

From your own understanding, what is meat inspection?
Q8.

Q9. Can uninspected meat cause any disease?
1=Yes ---> if not 'Yes', skip to Q11 []
2=No
3=I don't know

Q10. Name any disease(s) associated with consuming uninspected meat?
.....

Q11. As a retailer, where do you often order your meat in bulk from?
1=Licensed meat dealers/abattoir ----> skip to Q13 []
2=Unlicensed meat dealers/abattoir

Q12. What main reason(s), makes you buy from the unlicensed meat dealers?
.....
.....

SECTION C: DEMAND FOR MEAT IN DIET

Q13 On average, does this business give you more profit?
1=Yes
2=No ----> skip to Q15 []

Q14. On average, how many customers buy from you per day
1=above 30
2= between 20 and 30 []
3= below 20

Q15. What makes people buy from you and not butcheries?
.....
.....

SECTION D :ADEQUACY TOWARDS COMPLIANCE AND ENFORCEMENT OF FOOD SAVETY POLICIES

Do you have any receipt from the supplier (where you order) your meat?

Q16 1= Yes [_____]
2= No

Q17. Is there any need to inspect your meat, before selling to the public?

1=Yes [_____]
2=No

Q18. Do health inspectors come to inspect your business?

1=Yes [_____]
2=No *----> skip to Q19*

Q19. How many inspectors have come to inspect your meat, in the last 2 months? [_____]

Q20. Have you ever heard about laws that prohibit trading un inspected meat?

1=Yes
2=No *-----> end interview* [_____]

Q21. What can be done to reduce the trade of un inspected meat?

.....

Thank you for your participation