COMPLIANCE LEVEL OF STREET FOOD VENDORS REGARDING FOOD HYGIENE AND SAFETY IN THULAMELA LOCAL MUNICIPALITY

BY

MICHAEL NNGODISENI MUKWEVHO

Student no: 11510281

A mini-dissertation submitted in Partial fulfillment of the requirement for the

Masters of Public Health at the University of Venda

Supervisor: Prof A.H Akinsola

Co-Supervisor: Dr. T.G Tshitangano

2018

DEDICATION

I would like to dedicate the study to my wife, Constance Azwinaki and three children's(Dzumbu,Dzangi and Zwoitwa) for their love, support and understanding during the course of the study

ABSTRACT

Introduction: Street food vending is a source of income for billions of people around the world. In most developing countries, including South Africa street food is popular. However, most street food has been linked to outbreaks of foodborne illness. The assessment was based on the general hygiene requirement stipulated in R962 of November 2012 framed under Foodstuff cosmetics and Disinfectant Act of 1972

Purpose: The purpose of this study was to assess compliance of street food vendors with food and safety regulations in Thulamela Municipality.

Method: The study used a quantitative, cross- sectional survey, descriptive design. A convenience sampling was used to sample 155 street food vendors. Data was collected using two instruments; namely, a self-administered questionnaire and an observation checklist. The data was analyzed using the Statistical Package for Social Science (SPSS) version 23.Validity and Reliability will be ensured and measures to ensure ethical considerations were adhered to.

Results: A total of 155 street food vendors participated in the study. Most of the street food vendors were in the age group 25- 30 years. There were more females than males. Furthermore, the majority of street food vendors had experience of 5-10 years. The majority (n=61; 39.4%) of street food vendors were operating in Thohoyandou, while some (n=25.8%)operated in Sibasa and forty others (25.8%) operated in Shayandima. Forty-five (29%) of them were illiterate, fifty (32, 3%) did primary education, thirty two (20.6%) had secondary education, four (2.6%) had a matric certification and twenty- four (15.5%) had vocational training. More than half of the

In regard to knowledge items on preventing foodborne vendors (n=100; 64.5%) did not attend food hygiene training while (n=55; 35.5%) did. Lastly about a third most (n=48; 31%) of the street food vendors were selling their food in the transport terminals.

The survey results indicate that street food vendors exhibited high levels of knowledge regarding items pertaining to hand hygiene. Therefore street food vendors were highly knowledgeable with regard to how much time should be spent when washing hands with soap, the correct way of stopping bleeding while at work, important measures to keep germs away from the food, hand washing and methods of drying hands. However, the street food vendors displayed poor knowledge with regard to reasons why they should dry their hands.

Regarding knowledge items on preventing foodborne illnesses, the street food vendors were knowledgeable about the symptoms that make a street food vendors stay away from the workplace, that the best way to destroy any harmful germs is to cook food to the right temperature, that a combination of washing hands, using gloves and keeping food at the right temperature are ways of preventing food borne illnesses. However, street food vendors displayed some knowledge gaps with regard to the correct detergents for washing vessels and why food handlers require some knowledge on food hygiene.

A total of 155 vending stalls were observed. The results from the checklist indicated that three quarters (n=116; 75%) of the stalls were protected from the sun, wind and dust. In addition, about (n=136; 87.7%) of the stalls did not have direct access to potable water. Furthermore, about (115; 74.2 %) did not have adequate hand washing facilities and 141(91%) did not have waste disposal facilities. Animals, flies and insects were indeed evident around the stalls in 124(80%) of the 155 stalls. In addition the majority of street food handlers (136; 87.7%) did not wash their hands before preparing food.

Regarding hand washing after using toilet, all of the vendors said that they washed their hands each time after visiting the toilet. This was not confirmed as the researcher did not follow the vendors into the toilets. More than three quarters (120; 77%) of the food handlers operated in clean clothes. However, only 39(25%) used an apron when handling food, while 124(80%) did not use gloves to handle food and only 24(15%) used disposable gloves. Although the street food vendors complied with wearing clean clothes, they did not consistently wear aprons and they also used bare hands to touch food.

Conclusion: Although the street food vendors were knowledgeable about food hygiene and safety practices, the majority displayed poor hygienic practice and prepared food on unhygienic sites.

KEYWORDS: Compliance, Street foods, street food vendors, Food hygiene, Food safety

ACKNOWLEDGEMENTS

I would like to express my gratitude to the Almighty God for leading me this far. To God be the glory.

I would like to thank my supervisor Prof H.A Akinsola for his tireless support and well-paced academic guidance and for the love of research

I would like to thank my co-supervisor Dr T.G Tshitangano for her contribution and encouragement in the study

I would also want to thank the university student affairs for allowing me to conduct the study.

I would like to thank the Department of Public Health for teaching, supporting and giving me the opportunity to experience the world of research.

My word of gratitude's goes to my colleagues ,Environmental Health Practitioners at Vhembe District Municipality based at Thohoyandou sub office who agreed to participate in the study and Mr Nemakhavhani TR in particular who always encouraged me to work hard.

My sincere gratitude to Mr Murwira T for the support and encouragement.

.

Table of Contents

DEDICATION i
ABSTRACT ii
ACKNOWLEDGEMENTS v
LIST OF TABLES ix
CHAPTER 1 1
INTRODUCTION AND ORIENTATION OF THE STUDY 1
1. 1 Background of the study 1
1.2. Statement of the Problem 4
1.3. Rationale of the Study 4
1.4. Purpose of the Study 5
1.4.1. Objectives of the study. 5
1.5. Significance of the study 5
1.6. Definition of terms. 6
CHAPTER 2 7
LITERATURE REVIEW 7
2.1 Introduction 7
Data- Based literature 7
2.2. Street food. 7
2.3. Food hygiene and safety practices of street food vendors 8
2.4. Legislations that govern street vended foods 12
2.4.1. Codex Guidelines on Street food Vending 12
2.4.2. General food hygiene Regulation 962 of 23 November 2012 13
 Standards and requirements for food premises in South Africa 13
2.5. Initiative to improve street food vending 15
CHAPTER 3 17
RESEARCH METHODOLOGY 17
3.1. Introduction 17
3.2. Study Design 17
3.2. Study Setting 17
3.3. Study Population. 18
3.4.2. Selection of street food vendors location 19
3.4.3. Selection of the participants 19
3.7. Data Collection 19
3.7.1. Training of the research assistants 19
3.8. Validity and Reliability of the Measuring instrument 21

3.9. Data Analysis 22
3.10. Ethical Considerations 22
3.11. Summary 22
CHAPTER 4 23
PRESENTATION OF RESULTS 23
4.1. Introduction 23
Section 1: Demography 23
1.1. Demographic information 23
Section 2: Street food vendors knowledge on food safety 24
Section 3: Observation of food safety practices 27
3.1. Observational findings on hygiene practices by street food vendors 27
CHAPTER FIVE 31
DISCUSSION 31
5.1. Introduction 31
5.2. Demographic characteristics of the respondents 31
5.3. Knowledge of street food vendors regarding food hygiene 32
5.4. Environmental and personal Hygiene profiles of street food vendors 33
5.5. Personal hygiene 35
CHAPTER SIX 39
SUMMARY CONCLUSION AND RECOMMENDATIONS 39
6.1 Introduction 39
6.2. Executive Summay 39
6.2.1. Knowledge of street food vendors regarding food hygiene 39
6.2.2. Compliance of the environment surrounding the Street vending stall with food hygiene regulations. 39
6.2.3. Compliance of street food vendors to Personal hygiene regulations. 41
6.3. CONCLUSIONs 42
6.4.RECOMMENDATIONS 42
Appendix: 1 informed consent 44
Appendix2: Information Sheet 45
Appendix 3: Letter of permission 46
Appendix 4: Food handlers questionnaire food safety & hygiene knowledge 47
Appendix 5: Food safety observation checklist 51
References 52
Research ethical clearance certificate 54
Research Plates 55

LIST OF FIGURES

Figure1: Map of Vhembe District Municipality----------23

Figure 2: Respondents distribution with regards to the following variables and their rating whether knowledgeable or not knowledgeable regarding hand hygiene----------32

Figure 3: Respondents distribution with regards to the following variables and their ratings whether knowledgeable or not knowledgeable regarding prevention of food borne illness...34

Figure 4: Respondents distribution with regards to the following variables and their rating whether knowledgeable or not knowledgeable regarding prevention of food poisoning----35

LIST OF TABLES

Table 1: Street Vended Foods In African Countries 20

Table 2: Demographic data for Street Food Vendors 39

Table 3: Street Food Vendors Hygiene Practices 47

LIST OF ABBREVIATIONS

EHP	Environmental Health Practitioner
WHO	World Health Organization
SFV	Street food vendors
CoA	Certificate of Acceptability
HACCP	Hazard Analysis Critical Control Point
CDC	Centre for Disease Control

CHAPTER 1

INTRODUCTION AND ORIENTATION OF THE STUDY

1. 1 Background of the study

In the urban areas of developing countries, street food is appreciated by low -income groups because of its affordable price and perceived delicious flavours (Ackah et al 2011). Furthermore, street food guarantees food security for poor urbanites and employment opportunities in many developing countries. WHO/FAO defines street foods as a wide range of ready-to-eat foods and beverages or food prepared at home and consumed on the streets without further preparation (Rane, 2011). They are usually sold by vendors and hawkers in public places. According to Samapundo et al., (2015) street- vended foods are popular and appreciated by many people in developing countries, including South Africa. This is due to its affordability and accessibility. Furthermore street food is a source of income for the poor urbanites and contributes to diets of many people in the least developed countries including South Africa (Steyn et al., 2013). It is a well-known fact that the street food business has become an important aspect of cultural trademark of many cities around the world (Wiego, 2013).

According to Monney, Agyei and Owusu (2013), the street food vending industry is flourishing worldwide. For example in South Africa Street food is mainly consumed by black South Africans (Steyn and Labadarios, 2011). Fruits and soft drinks are the most consumed street food (Steyn et al., 2011). In addition it is estimated that about 11.3% of the South African population consumes street foods (Steyn et al., 2011). However it should be noted that street food has been linked with outbreaks of deadly foodborne disease in many countries, including South Africa, which is grappling with listerosis virus. Steyn et al., (2011) conclude that the increased popularity of fast food and street food pose many public health concerns. A number of epidemiological studies suggest that street foods contribute to a significant incidents food poisoning. Common food borne diseases causing organism found in street food are staphylococcus aureus, Salmonella spp bacillus cereus and Clostridium perfringens. In addition, people who patronize street food have been reported to suffer from food borne diseases like diarrhea, cholera, typhoid fever and food poisoning (Samapundo et al, .2015).

According to Grace (2015),globally, each year, almost 1 in 10 people fall ill after consuming contaminated food and 420 000 die as a result. In addition the children are the most affected, especially those one under the age of five and it is estimated that about 125 000 children die as a result of food -borne diseases every year.

In the United States of America alone, it is estimated each year, 1 in 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases (Centre for Disease control, 2015).

Furthermore, food borne diseases are more common in African and South-East Asia. For example in 2016 alone Sub- Saharan Africa had the highest prevalence of foodborne diseases per population. It is estimated that more than 91 million people fell sick ill and 137 000 die each year as result of foodborne disease (WHO, 2016). In addition diarrhoeal diseases account for 70% of food borne diseases in the Sub Saharan Africa. According to Statistics released in 2016, food -borne diseases such as Salmonella, is responsible for 32000 deaths each year in Africa, which translates into half of the global deaths and 10% of the overall foodborne disease burden caused by pork tapeworm. Cyanide and aflatoxin are responsible for a quarter of the deaths in the region. Also Konzo, a particular form of paralysis caused by cyanide in cassava, is unique to the African Region, resulting in death in 1 in 5 people (WHO, 2016). All these food borne diseases have been linked to eating street food.

According to Muyanja et al., (2011) and Rane (2014), street food is unsafe foods; therefore it is implicated in many serious food- borne diseases outbreaks. Monney et al., (2013), argue that it is the street food vendors that are responsible for contaminating food, due to the fact that most of them practice poor safety and hygiene practices, such as inadequate cooking, insufficient storage and cross contamination. As such, many studies carried out in Africa suggest that indeed street food is prepared under unhygienic conditions, without proper sanitation, exposed to sun, wind dust and flies (Muyanja et al., 2011). Numerous studies have pointed that street food vendors prepare food in place such as industrial sites, markets, roadside, road intersections where there is a high volume of customers. Therefore, it is clear that these places do not meet food hygiene requirements (Campbell, 2011, Samapundo et al 2015 and Khuluso, 2016).

In South Africa Street food vendors are subject to food and safety regulations which they have to adhere to in order to safeguard human health. In this regard regulatory compliance refers to obedience by a target population with regulations. It is argued that adherence with FCD Act 54 OF 1972 (Regulation R962 of 2012) is an important health management approach because it amplifies the role of policy and law on human health. It is necessary to determine the level of compliance in Thohoyandou in order to safeguard human health as food is a major determinant of the health status of individuals within the society. It is thus crucial for food vendors dealing with food to follow stipulated policies, laws and regulations during preparation, distribution and consumption. Milbank (2010) acknowledges that law or policies is a prominent intervention tool to achieve particular public health goal.

Further Milbank (2010) highlights policies, including laws and their implementation also have important effects on population health. Given this, there is a need for food vendors to adhere to high standards of hygiene and maintain clean vending environments. This has prompted considerable research, to assess hygiene and food handling practices among food vendors across the globe, in order to contribute to efforts aimed at improving food handling practices.

In South Africa street food business is regulated by a number of legislations and policies which are meant to safeguard the consumers' health. Providing safe food to consumers is the responsibility of the food service provider. Furthermore it is the responsibility of the local authorities to ensure that any food establishment complies with the regulations in a manner which safeguards public health. In South Africa these regulations are famed under National Health Act, No. 63 of 1977 and the Foodstuffs, Cosmetics and Disinfectants Act of 1972(FCD). Under the FCD act of 1972 there are detailed regulations meant to guide food service establishments in providing safe food for human consumption. It has been well documented that frequent food hygiene inspection can improve adherence of food handlers to personal hygiene and food safety practices and public health is safeguarded (Trafialek, Drosinos, Kolanowski,2017). Therefore, in South Africa, the food handlers have to adhere to a number of health regulations and guidelines which are updated with international standards from Code Alimentarius regulations on food hygiene.

Previous studies conducted in South Africa a decade ago concluded that those street foods are safe (Hill n.d). However a critical review conducted by von Holy and Makhoane (2006), indicated that there is a necessity for appropriate hygiene practices, accessibility to sanitation infrastructure and water. As such they proposed that the activities of the street food vendors should be regularly monitored, to assess if they are complying with the regulations and why are they not. Therefore, public health regulation remains the cornerstone for preventing food borne diseases. Thohoyandou is a growing town in terms of business opportunities and population. This makes it an ideal place for street food vendors to eke out a living which unfortunately they do in unhygienic conditions. As such this calls for an understanding of the activities of street food vendors, in order to prevent the outbreak of food- borne diseases. Owing to the fact that street foods are popular food among the poor public efforts should be done to ensure that the degree of adherence with the hygiene requirements improves. Hence, this study was conducted to assess the compliance of street food vendors with food and safety regulations.

1.2. Statement of the Problem

The Vhembe District Municipality has put in place regulations in a bid to improve the way street food vendors carry out their business. The programs include training street food vendors on food hygiene, dissemination of food safety information by the government regardless of these interventions, the researcher as an Environmental Health Practitioner, has observed increasing reports of food- borne diseases outbreak linked to street food in the district. The Vhembe District Municipality, Environmental Health Services in 2017 indicated that Thulamela is challenged by food borne diseases linked to street food and this has led to several deaths (EHP Internal report, 2016).

For example, the researcher as an EHP practitioner has investigated a significant number of food borne poisoning cases within Thohoyandou and all of them were linked to the consumption of street food. After laboratory tests, most of these food poisoning cases, showed that most samples tested positive for E coli and Salmonella (EHP internal report 2016). Furthermore a study conducted by Mwale, Karambwe and Musie, (2014) to determine the prevalence and antibiotic susceptibility of salmonella isolated from street vended salads in Thohoyandou indicated that vegetable salads served along with common street vended foods were contaminated with E. coli (80.6%) and Salmonella(18.3%). This comes at a time when the country is struggling to contain the Listerosis outbreak. Although the number of cases of Listerosis are reported in the Gauteng Province there is no doubt that cases of Listerosis are also on the rise in Limpopo. Given this the researcher the study was conducted to assess street food vendors' compliance with the regulations in order to identify the source of contamination.

1.3. Rationale of the Study

South Africa as country in Sub- Saharan Africa is challenged by many pressing health challenges therefore it has competing health agendas which need to be prioritized. With the recent outbreak of deadly food- borne disease, such as Listeriosis, it is evident that food borne diseases have a negative impact on public health. Therefore, this research sought to answer a call, to understand food safety which remains a priority for health authorities (Department of Health, 2009). Furthermore, there is an urgent need to reduce the number of food- borne diseases currently being experienced in the district (EHP Internal Report 2016). In addition studies conducted in South Africa on street food- vendors focused on the impact of street food in alleviating poverty only.

In addition most of the studies focused street food vendors in big cities and metros (Campbell, 2011; Khuluso, 2016). Not much is known about street food vendors who operate in peri - urban towns such as Thohoyandou. Therefore, to the authors' knowledge, there are no studies which have assessed street food vendors compliance with food safety regulations in the District. Furthermore, most the research in South Africa has not satisfactory evaluated or disseminated compliance levels of street food vendors to food hygiene and safety standards. As such it is possible, that there is no adherence to the national and international regulation on food hygiene and safety. Therefore, there is a deficiency in regard to empirical evidence concerning street food compliance with food safety requirements

1.4. Purpose of the Study

To assess the compliance of street food vendors with South African general food hygiene Regulation 962 of 23 November 2012 under the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act no. 54 of 1972).

1.4.1. Objectives of the study.

The objectives of the study will be to:

- Determine the level of compliance of street food Vendors in Thulamela Municipality with reference to food safety regulations.

- Assess the knowledge of the street food vendors regarding food hygiene and safety requirements.

1.5. Significance of the study

The findings of the study may contribute to the knowledge needed by the municipalities and the Environmental Health Practitioners, to identify gaps in food safety/hygiene guidelines and regulations amongst street food vendors, in order to underpin the development of more specifically targeted and effective training programme. Insights form this study may assist environmental health practitioners to further formulate a research agenda in this street vending. Furthermore the findings of the study will assist in developing street vending policies which will be able to help street food vendors to safeguard public health. The study results will also assist street food vendors to comply with street food hygiene regulations.

1.6. Definition of terms.

Certificate of Acceptability(CoA): Certificate issued to owners of premises on which food is to be handled as per the regulatory requirements of the National Health Act of 1977,Act 63 of 1977.CoAs are issued to owners of premises on which food will be handled once an Environmental Health Practitioner has inspected the premises and found them to be compliant and suitable for the preparation of food in terms of the Regulations published under the National Health Act of 1977,viz Regulations Governing General Hygiene for Food Premises and the Transport of Food, Regulation 962 of 2000

Compliance: Process of yielding to changes in pressure without disruption of structure or function.

Environmental Health Practitioner (EHP): Trained professionals, competent to enforce, amongst others, Food Safety Legislation in South Africa .For law enforcement, they are authorized as Inspectors.

Food Safety: "refers to the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use" (Codex Alimentarius 1997). **Food Hygiene:** Refers to "all conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain" (Codex Alimentarius 1997.)

Knowledge : The fact or condition of knowing something with familiarity gained through experience or association

Street food: "refers to ready to eat foods prepared and/or sold by vendors and hawkers in streets and other similar public places" (WHO/FAO 2011.

Street food Vendors: Entrepreneurs selling ready to eat foods and beverages.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review is composed of two parts: the data based and theoretical based. The data- based literature covers the following: global burden of foodborne diseases, street foods, safety of street food, legislation governing street food, compliance to street foods vending regulations, and initiatives to promote food safety.

Data- Based literature

2.2. Street food.

Street foods are “ready-to-eat foods and beverages prepared and/or sold by vendors and hawkers, especially on streets and other similar public places” (FAO, 1989). Muyanja et al., (2011) describe street foods as “ready to eat food sold by vendors which are prepared beforehand”. They use push-carts or buckets or balance poles or stalls or from shops. Street food is categorized in four broad categories, such as foods prepared in small-scale food factories or traditional workshops; foods prepared in the home; foods prepared in markets; and foods prepared on the street (WHO/INFOSAN, 2010). On the other hand, a street food vendors is defined as “a street trader” someone who sells goods and services on the street, including street entertainment, goods loaders and street car guarding. It can be on a fixed or mobile basis, in markets or other public spaces” (StreetNet International, 2012). Statistics South Africa has categorized street food as an informal business which is not registered, small in nature operated from home, roadside, pavements and other convenience locales. Street food vendors sell different kind of foods. FAO compiled the following examples of street vended foods in some African countries.

Table 1: *Street vended foods in African countries*

Country	Type of food
Ghana	Fufu,kenkey,banku,waakye,akamu,jollof rice, moi-moi, agidi,koko,koose,boiled rice,gari,yam, palm nut soup, tomato stew
Zambia	Ntshima,chicken beef,boiled fried vegetables, smoked sausages,buka buka fish, offals, vegetables mixed pounded ground nuts
Zimbabwe	Sadza,chicken,beef stew, boiled fried vegetables, roasted beef, chicken ,sausage, offal boiled beans
South Africa	Maize porridge, chicken/beef, gravy salads
Kenya	Sausages ,meat, fish eggs ,French fries cereals, coffee, tea, porridge, root tubers, yams, cassavas, sweet potatoes, bananas
Malawi	Nsima, rice , sweet beer , meat ,fish, eggs and vegetables
Benin,Togo,Senegal,Burkina Faso ,Cote DIvoire	Cereal or tuber based porridges (fermented or not), buttered bread, coffee, tea, bean purees, cowpea, cereal mixtures, maize groundnut mixtures, pasta salads

Source: WHO/INFOSAN, 2010

2.3. Food hygiene and safety practices of street food vendors

It is a well-known fact that the quality of raw material used to prepare street food determines the quality of the food. For example, water is a critical raw material in the preparation of street food. Water which is contaminated creates a health hazard in that it is a vehicle for foodborne disease pathogen such as e.coli. Previous studies have pointed that the shortage of water at the street vending site has far- reaching public health consequence. As such street food vendors tend to reuse dirty water to clean utensils and dishes (Muyanja et al., 2011; Samapundo et al., 2015). Contaminated water is a source of different kind of diarrhea diseases; therefore, it is a health risk to the public (Rane, 2014).

In addition with regards to raw materials, it has been observed that street food vendors have a tendency to purchase low quality material meant for preparing food. For example, in a study conducted by Choudhury et al., (2011) observed all the mobile vendors and owners of small restaurant procured unlabeled and unpacked food grains and semi-processed ingredients from grocery shops. These cheap raw material used by street food vendors has been linked to outbreak of food- borne illnesses. For example, previous studies have indicated that most indigenous homemade cereals are infected with *Bacillus cereus,* which was reported to be responsible for outbreak of food borne illness (Alimi, 2016). Proiretti et al., (2014) observed that most street food vendors procure low cheap raw materials such as poisoned fish, milk from sick animals, vegetables with heavy chemical concentration(Alimi, 2016).

Poor storage practices leads to the contamination of food, causing an outbreak of food- borne diseases. Most street food vendors do not use fridges to store perishable; hence this leads to food poisoning. According to a study conducted by Choudhury et al., (2011) in India, none of the street food vendors had a fridge to store perishable foods such as vegetables, milk, canned foods and left over foods. With regards to keeping food at room temperature after it has been cooked has been linked to occurrence of food-borne diseases (Rane, 2014; Alimi, 2016). Street food vendors have a tendency of cooking food and hold it for several hours before selling at ambient temperature thus creating conducive conditions for the growths of pathogens such E.coli, Bacillus cereus and perfringens. For example a study conducted in Nigeria by Omemu and Aderoju, (2008) foodborne disease suggests that cooked food such as fish stored at ambient temperature for several hours under high humidity resulted in outbreak of food borne disease caused by pathogen B.cereus. Furthermore inadequate reheating of already cooked food can lead to food to be contaminated. For example street food vendors cook food partially ahead of time and reheat it when they are serving it to customers. This reheating is usually inadequate to destroy the bacteria hence it will allow the foodborne pathogens to survive and infect the food (Omemu and Aderoju, 2008)

Use of proper utensils for cooking and storage of prepared food is often critical to the safety of street vended foods. Poor quality of material, coupled with improper practices may lead to toxin formation, pathogen growth or recontamination. The design, construction and maintenance of equipments and utensils is very important for food safety, as poor maintenance may lead to inability to effectively clean and sanitize surfaces. This may then result in the buildup of residues of food, facilitating microbial growth, leading to an increased likelihood of contamination. The appropriate use of equipment is also important to prevent cross- contamination from raw materials (Tiisekwa, 2013).

According to Rahman et al., (2016) food handling personnel play an important role in ensuring food safety throughout the chain of food production, processing, storage and preparation. Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogens to come into contact with food and in some cases to survive and multiply in sufficient numbers to cause illness in the consumer. Some food handlers may introduce biological hazards by cross contamination after handling raw materials when they suffer from specific diseases and physical hazards by careless food handling practices (Samapundo et al, 2015). According to a study conducted by Trafialek, Drosinos, Kolanowski (2017) in Greece, street food vendors complied poorly to food safety regulations with regard to food preparation, serving basic hygiene infrastructure, not wearing hair nets. On the other hand, street food vendors complied satisfactorily in regard to personal hygiene, lack of visible cuts and skin diseases.

In addition it should be noted that the vendors who traded meat complied better than those who sold the fruits and vegetables (Trafialek, Drosinos, Kolanowski, 2017). Similar findings were also reported in a study conducted in Tanzania among juice street food vendors. The study reported that all vendors did not comply general Hygiene Practice and general Manufacturing Practices. To be specific, the street food vendors poorly with regards to right location and premises, sanitation level, processing and cleaning and for personal hygiene (Tiisekwa, 2013). This was also confirmed by a study conducted in India by Anane and Immanuel (2017) among street juice vendors India, where it was observed that the general hygiene of the juice vendors; that is, the sanitary practices in the extraction of juice and washing of tools and utensils were very poor. According to a study conducted in Brazil among street food vendors street food vendors did not comply with international food regulations. In the present study it was observed that street food vendors violated food storage practices, did not observe good hygiene practices such as washing after handling money, cover hair and t they did not have proper adequate running water (Cortese et al., 2016).

Several studies on hygienic practices of street food vending suggest that most street food vendors have some knowledge about hygienic practices but concluded that the majority of them do not put the knowledge into practice (Choudhry et al ,2011), and Alimi et al ,2016). In another study conducted by Choudhry et al., (2011) street vendors reported good personal hygiene practices, however, noncompliance were noted at the preparation and vending sites. These were attributed to inadequacy or near absence of basic facilities at the vending sites were mostly attributed for non-compliance with basic hygiene principles. In another study conducted by Muyanja et al., (2011) street food vendors compliance was affected by lack basic hygiene infrastructure. For example they did not have waste disposal facilities, therefore insects and flies were a common site. (Muyanja et al. 2011).

The same was reported by Muyanja et al.,(2011) who observed the accumulation of large heaps of garbage around street food vending sites in Uganda ,which harbored insects and animal pests (known vectors of diseases). Littering was also reported to be a common practice at the vending sites Haiti (Samapundo et al, 2015). These results were slightly different from that of Ababio et al., (2015) who scored 60% of the food vendor sites as hygienically.

Samapundo et al., (2015) in Haiti concluded that all the vendors who participated in the study were wearing clean and presentable clothes. Only 40% (8/20) actually wore an apron while handling, preparing and serving food. Other studies in various developing countries have also observed that a low percentage of street food vendors use aprons and gloves while handling,

preparing and serving food (Chukuezi, 2010 and Samapundo et al, 2016). Similar findings were reported in Nigeria indicating that minority of the vendors washed their hands at some point or the other, while the rest practiced hand washing between each meal serving and 20 minutes (Derry and Addo, 2016). This is contrast to a study conducted in Ghana, whereby seventy percent of the survey respondents reported that they always washed hands with soap before preparing foods, 20% most of the time and 10% some of the time (Onyeneho and Hedberg, 2013).

The environments under which street foods are prepared, vended and consumed predisposed them to recontamination and cross-contamination from environmental pollutants such as airborne chemicals in dusts, exhaust discharges from moving vehicles and industrial engines, burning fumes and offensive smell from accumulated waste and effluent from industrial discharge, insects and rodents (Proietti et al., 2014 and Muyanja et al., 2011). Street food vendors usually target high human traffic areas for the display of their products to enhance sales. Street food vending is a common site in such areas as major street corners, industrial/construction sites, bus/train terminals, public places and school compounds (Akinbode et al., 2012). The vending units are either mobile or stationary, using open or protected crude structures such as push carts, display wooden tables, aluminum trays or bowls or chop bars (Canini et al 2013).

Unsanitary handling of street foods by the some of the vendors has also been commonly found to be the source of contamination. This is because the vendors can be carriers of pathogens like Escherichia coli, Salmonella, Shigella, Campylobacter and S. aureus, which eventually transfer these food-borne hazards to the consumers. The hands of the food handlers are the most important vehicle for the transfer of organisms from faeces, nose, skin to the food. The finding that Salmonella, non-typhi salmonellae, Campylobacter and E. coli can survive on finger tips and other surfaces for varying periods of time and in some cases even after washing, supports the reports of contamination of street vended food with toxigenic S. aureus, the major lesions of human beings and the environment(Alimi, 2016).

Holding food at high ambient temperatures for long periods of time has also been reported to be a major contributor to the occurrence of food poisoning outbreaks. Foods are often held for several hours after cooking and this includes overnight holding at ambient temperatures, until sold, and thus can harbor high microbial populations. In addition, some of the foods are held in the pans in which they are cooked, until sold or reheated, which results in longer holding time, hence creating favorable conditions for the growth of foodborne pathogens. In such foods, the counts of Escherichia coli, Staphylococcus aureus, Bacillus cereus and Clostridium perfringens are reported to be high (Choudhry et al, 2011).

The method of transportation also plays a significant role in the contamination of street foods. It has been reported that the transportation and display of meats play significant role in the acceleration of their spoilage and transmission of zoonotic disease (Alimi et al 2016). The manner of moving slaughtered animal carcasses from slaughter points to retailing points in crude structures such as wooden push carts, open plastic or aluminum trays on heads or "off-road" vehicles also increased the chances of cross contamination. Muyanja et al (2011) reported that it is a common site in Uganda to see vehicles not designed for meat transportation such as taxis and buses, without cooling facilities, and even motorcycles, carrying meat products from slaughter points to retailing points. Muyanja et al., (2011) added that it is not uncommon to see butchers and retailers turning carcasses for human consumption into sitting or resting platforms in the vehicles during transportation.

2.4. Legislations that govern street vended foods

In South Africa and beyond street foods are governed by a number of international and national legislations. At the International level street food vendors are subject to codex guidelines, which specify general hygiene practices and good manufacturing practices. According to Gordon-Davis (2011) South African food staff is controlled by Department of Health and Department of Agriculture, Forestry and Fisheries. These two departments work hand in glove to ensure that the foodstuff which consumers eat is safe. In addition the Department of Trade and industry and South African Bureau of Standards (SABS) also safeguard foodstuff against being contaminated. Furthermore, the Disease Control Act guarantees that the food that has been brought into the country does not bring in diseases such as Avian Influenza (bird flu) and Foot and Mouth Diseases since these have serious health repercussions.

2.4.1. Codex Guidelines on Street food Vending

FAO has formulated guidelines for the design of control measures for street vended foods. These guidelines specify how the local authorities should provide structures, hygienic facilities and training for food vendors. The Codex guidelines also specify the general requirements for legislation, vendor health status, food preparation, including cooking, handling, serving, transportation and storage. Although these guidelines are well-coined there are two main problems which hamper their implementation in Africa. Firstly, most African countries do not have adequate resources to design and erect suitable vending infrastructure and experience has shown that most vendors shun these premises because they are far from the clientele. Having identified the international guidelines for street food vendors, there is a need to identify local legislation which are designed based on Codex (Codex Alimentarius Commission, 2003

2.4.2. General food hygiene Regulation 962 of 23 November 2012

The general food hygiene Regulation 962 of 23 November 2012 are regulations gazette under the Food, Cosmetics and Disinfectant Act of 1972. The FCD Act of 1972 sanctions the sale, manufacture and importation of food staffs, cosmetics and disinfectants and provides for incidental matters. In addition to this there is a regulation which governs general hygiene requirement for food premises, the transportation of food and related matters. Street food vendors and their sites are subject to these regulations.

Environmental health officers are in charge of implementing the R962 Regulations Governing the General Hygiene Requirements for Food Premises and the Transport of Food (Republic of South Africa 2012). Moreover, the functions of the municipal inspectors include administering applications, checking sites and supply permits. After receiving a health permit application, the environment health officer at the municipal office examines the premises, and if the premises meet the prerequisites, a health permit will be approved. The permit must be in the public domain at all times and is not transferrable from one person to another (Gordon Davies 2011).

- **Standards and requirements for food premises in South Africa**

According to the policy (Department of Health, 2012) food sites must be positioned, designed and built without causing any health risk and must afford hygienic processing of food to avoid adulteration. Walls, ceilings and floors must be washable to avoid food adulteration, and each room must be well aerated either by artificial or natural aeration.

Furthermore, there must be sufficient lighting.Food sites must:

- Have a wash- up area with both hot and cold water for washing equipment.
- Be pest- free.
- Have preventative measures to guard against flies and other insects in food preparation areas.
- Have a proper water-discarding system that has been approved by the local municipality.
- Have hand- washing facilities for employees and customers.
- Have a discrete changing area with a storeroom for staff.
- Have a disposal separate storeroom for food and equipment.
- Have water –proof containers with tight fitting lids for garbage

Above all, food sites must not have straight access to areas that have gasses, odours or vapours that might infect food. Working tops, tableware, and silverware must be clean, glossy, not damaged and free of rust. Work tops must be cleaned before and after working with food (Department of Health 2012).

- **Standard of transportation of food.**

According to regulation 13. (1) No person shall transport food including unprocessed agricultural crops on or in any part of a vehicle -

(a) Unless that part is clean and has been cleaned to such an extent that chemical (including allergens), physical or microbiological contamination of the food is prevented; **(b**) Together with

(i) Contaminated food or waste food;

(ii) Poison or any harmful substance;

(iii) A live animal; or

(iv) Any object that may contaminate or spoil the food.

- **Standards and requirements for protective clothing**

(1) No person shall be allowed to handle food without wearing suitable protective clothing as specified in Sub- regulation.

(2) The protective clothing, including head and other coverings and foot wear, of any person handling food that is not packed so that the food cannot be contaminated shall -

(a) Be clean and neat when such person begins to handle the food;

(b) At all times during the handling of the food be in such a clean condition and of such design and material that it cannot contaminate the food;

(c) Be so designed that the food cannot come into direct contact with any part of the body, excluding the hands.

(3) Visitors to food premises should, where applicable, wear suitable protective clothing

- **Standards and requirements for personal hygiene**

No person shall -

(a) spit in an area where food is handled or on any facility;

(b) Smoke or use tobacco in any other manner while he or she is handling non-prepacked food or while he or she is in an area where such food is handled;

(c) Handle non-prepacked food in a manner that brings it into contact with any exposed part of his or her body, excluding his or her hands;

(d) Lick his or her fingers when he or she is handling non-prepacked food or material for the wrapping of food;

(e) Cough or sneeze over non-prepacked food or food containers or facilities;

(f) Spit on whetstones or bring meat skewers, labels, equipment, or any other object used in the handling of food or any part of his or her hands into contact with his or her mouth, or inflate sausages.

2.5. Initiative to improve street food vending

Street food vending is an important component of socio-economic activities in developing countries. Its significance is appreciated by the volume of trade involved, provision of readymade meals and employment for the teeming populace along the chain of the business. The benefits and contribution of street food trade to the economy of developing countries elicited recommendations from researchers on ways to mitigate the hazards in its consumption and safeguard the health of consumers. Alimi et al. (2016) recommended that safety approach to hazards of street foods should start from good agricultural practices and permeate the whole chain of the business. It was recognized that policies and regulations for safe street food trade are very weak and poorly enforced in most developing countries (Liu et al 2014) and even non-existent in some countries(Samapundo et al 2015).

Therefore, strengthening of the policies and proper enforcement would undoubtedly ensure significant reduction in the hazards of street food consumption (Alim et al 2016) . These would involve active participation of all stakeholders in street food trade such as governments, street food vendors, consumers' associations, civil society groups and development partners. Raising the awareness on the treat of unwholesome practices in street food trading through dissemination of information in mass media and audience participatory programs was further recommended. Engagement of professionals in food and health related disciplines to draw-up guidelines for the management of street food practices, Implementation of Hazard Analysis Critical Control Points concept along the entire chain of the business, education of vendors and consumers on hygiene and safe food practices were canvassed by (Alimi et al. 2016).

Studies conducted in different countries around the world on food safety knowledge and the impact of training food handlers have revealed that extensive training on hygienic handling of food, and how food transfer diseases is essential. Training prior to fulltime employment and re-assessment training for all food vendors should be compulsory before food vendors are issued with a permit to trade. Furthermore, essential infrastructure such as decent food stalls with proper facilities for cooking, storage, washing and garbage removal is needed to offer healthy and safe food to customers(Seaman and Eves 2010; Choudhury et al. 2011:1233; Aluko et al. 2014).

Strict regulations of SFV's should be enforced; the implementation of the globally recognized Hazard Analysis and Critical Control Point (HACCP) system is paramount because the system detects key hazards and critical control points where contamination can either be reduced or avoided (FAO, and WHO 2007). Previous researchers (Sani and Siow 2014) suggest that food handlers should be coached and observed to confirm thorough hand washing, satisfactory cleaning and effective hygiene practices to minimize the risk of cross-contamination.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

This section discusses the research design, study setting, study population, sampling method and plan for data collection, instrument, data analysis reliability and validity, ethical considerations and summary.

3.2. Study Design

A cross-sectional descriptive, using a quantitative approach was used in this study. This design was chosen as a guide to assemble the data in order to achieve the objectives of this study. The field survey of this design was meant to assess the knowledge of street food vendors in regard to food safety and hygiene. In addition the vending stalls were observed using a validated observation checklist. The rationale for using this design is that it allows the collection of information from a large group in a short space of time.

3.2. Study Setting

The study was conducted in Thulamela Municipality of the Vhembe District in Limpopo Province, South Africa. According to VDM IDP(2012/13 – 2016/17) Limpopo Province is approximately 125 7543 km in extent (9,92% of the total area in South Africa),with an estimated population of 5 405 868 people. Limpopo Province is rural, with the distribution of the population between rural and urban being 91.20% rural and 8.80% urban. In view of the latter ,Limpopo Province may be regarded as being rural. Limpopo Province comprises of five districts municipalities. Vhembe is the northern most district of the country and shares its northern border with Beitbridge District in Matabeleland South, Zimbabwe. The Vhembe District Municipality comprises of four Local Municipalities. The Thulamela Municipality is one of them. This study will be conducted in Thulamela Municipality. Figure 1 depicts the map of Thulamela.

Figure3.1: Map of Vhembe District Municipality

Thulamela Municipal area is approximately 5 834km, with population of 1.200 462 people. The municipality comprises of 40 wards (Madi and Hadzhi,2009)The population growth is 0,62% pa and unemployment rate is 58.30%(census 2011) Thulamela is one of the fastest growing Municipality in Vhembe District and has Tshilamba, Sibasa, Shayandima and Thohoyandou as the main business areas. It has a total number of 2879 registered businesses. The Thulamela Municipality was selected for this study because no similar study has been conducted to assess the compliance of street food vendors with food and safety regulations. Therefore, this afforded the researcher a good opportunity to assess the compliance of street food vendors to the regulation in peri urban environment.

3.3. Study Population.

The target population consisted of street food vendors cooking and selling foods in Thulamela Municipality. The total population for the study were 288 street food vendors who had undergone training in food Hygiene / safety and had been issued with the Certificate of Acceptability by Environmental Health Practitioners in 2015.

3.4. Sampling

The researcher used non-probability purposive sampling to select residences and convenience sampling to select the participants. Non-probability is a procedure in which all of the persons, events or objects have an unknown and usually different probability of being included in the sample (Polit and Beck, 2012). In this study the sampling procedure is categorized in two steps, first it was the selection of towns where the street food vendors are based and then selection of participants. This is described in detail as follows.

3.4.1 Sample size

The study included the total population of street food vendors who were available. Initially the study targeted population of all the available 288 street food vendors. However, the study managed to recruit 155 only. Therefore, the sample sizes were all street food vendors who were available.

3.4.2. Selection of street food vendors location

The first stage of sampling in this study was to select the townships in which the street food vendors are located. According to Vhembe district municipality there were 288 food handlers based in Sibasa, Thohoyandou, Shayandima, and Tshilamba. The researcher purposively selected threes townships which are Shayandima, Sibasa and Thohoyandou because majority of street food vendors operate in these areas.

3.4.3. Selection of the participants

In order to select the street food vendors the researcher used convenient sampling. This means that the street food vendors who were available at the time of visiting were automatically chosen for the study. Therefore 155 street food vendors filled in the questionnaires.

3.5. Inclusion Criteria.

- All street food vendors cooking and selling food in Shayandima, Thohoyandou and Sibasa were selected for the study.
- Voluntary participation

3.6. Exclusion Criteria

- Street food vendors outside the selected areas.
- Persons who are not street food vendors.

3.7. Data Collection

Data collection, according to (Akinsola 2005), is a process of collecting information relevant to the study, which is used to address the research purpose and objectives.

3.7.1. Training of the research assistants

Prior to the collection of data three research assistants were recruited by the principal investigator. All three research assistants were junior environmental health practitioners who were currently working at Vhembe District Municipality. The principal investigator trained the

research assistants on how to administer the instruments, how to interpret questions to the respondents and also showed how data collections instruments would be used.

3.7.2. Pre-testing

The observation checklist and questionnaires were pre tested on 15 street food vendors in Musina. The rationale for this was to assess if the two data collection instruments, were able to collect the right answers meant to answer the research objectives. In regard to the questionnaire, questions were changed because they were too difficult for street food vendors. The numbers of questions were also reduced from 32 to 10 questions.

3.7.3. Data Collection instruments

The following are the data collection instruments which were utilized to collect data

- **Questionnaire**

For the purpose of the study the researcher used self-administered questionnaires. A pretested questionnaire with closed-ended multiple choice question was used to assess knowledge of street food vendors in regard to food hygiene. The questionnaire was composed of sections; section on socio demographic, section on knowledge of prevention food borne disease and knowledge on hand hygiene. The principal investigator developed the questionnaire based on literature and previous studies. The Majority of the knowledge questionnaires were adopted from questionnaire recently used among food handlers in Polokwane (Mashuba, 2016). In addition the questionnaire was constructed in English. In case whereby respondents were illiterate research assistants assisted them to fill in.

The demographic section was composed of location gender age, point of sale, educational level and food safety training. As such, the knowledge section was crafted to assess street food vendors knowledge with regard to prevention of foodborne diseases, prevention of food poisoning and hand hygiene. A total of 12 questions with four or five possible answers were formulated. For each correct response it was given one point, while incorrect response equaled to zero.

Before collecting data the researcher thoroughly outlined the entire study to the street food vendors. Those who agreed to participate signed the consent form. Therefore the researcher approached all the street food vendors who were present at the vending stalls from October to November, 2017. A total of 155 street food vendors filled in the questionnaire.

Observation checklist

For the purpose of this study an observation checklist was used to assess food hygiene and safety practices. The observation guide which was used in this study, was adopted from previous study conducted recently in a similar setting in Haiti (Samapundo et al., 2015). The demographic section was composed of location, gender, age, point of sale, educational level and food safety training. In addition it was composed of four areas which are the i) environment around the site, ii) personal hygiene, iii) utensils and iv food storage.

Before collecting data, the researcher thoroughly explained the study details to the street food vendors. Those who agreed signed the consent form. Therefore the researcher approached all the street food vendors who were present at the vending stall from October to November, 2017. A total of 155 street food vendors stall were observed. In addition supplementary photographs were taken to supplement the data.

3.8. Validity and Reliability of the Measuring instrument

Validity refers to the extent to which the instrument actually reflects the abstract constructs being examined. (Burns and Grove 2012). Polit and Beck (2011) defined validity as the extent to which an instrument measures what it is intended to measure.

Content Validity

Polit and Beck (2011) defines content validity as degree to which an instrument has suitable sample of items for the construct being measured and effectively covers the construct domain. For the purpose of this study content validity of instruments will be evaluated by using experts for face validity. In order to test for content validity, the questionnaire will be made after extensive literature review and the tools that are used in the studies with similar interests as the study being conducted. The researcher consulted a panel of experts amongst the panel there will be environmental health specialists, supervisors and lecturers from the Department of Public health. Feedback was used by the researcher to modify the instrument.

Face Validity

According to Burns and Grove (2012), face validity is defined as to whether the instrument looks as though it is measuring the appropriate construct. In order to achieve face and content validity, an extensive review of literature and instruments from similar studies will be conducted locally and internationally. In addition, the observational checklist was submitted to a panel to check that the questions reflect the concepts being studied and that the scope of the questions is adequate. The judges included course lecturers in research and Public Health Department, environmental health officers and colleagues with research experience on the topic. **Reliability**

According to Polit and Beck (2011), reliability refers to the consistency with which the measures what it is intended to measure. The reliability in this study was achieved by using a pre validated questionnaire and observation checklist and it was modified by comments gleaned during pre-test.

3.9. Data Analysis

According to Burns and Grove (2012), data analysis is a process that is conducted to reduce, organize and give meaning to the collected data. For this study the data was analyzed using descriptive techniques. SSPS version 23 was employed to analyse data.

The researcher requested the help of a statistician for data analysis.

3.10. Ethical Considerations

The permission to conduct the study was granted by University of Venda Higher degrees committee. In addition it was submitted to University of Venda Ethics Committee ethical clearance and permission to conduct the study was given by Vhembe district municipality department of community service. Furthermore in this study the respondents were recruited on a voluntary basis and that they were given chance to decide to participate in the study. All the participants in agreement filled in the consent form. No names of the participants were taken and the data which was collected was done respecting confidentiality, anonymity and privacy. The respondents were awarded the right to withdraw anytime from the study and that the study involved observation and interviews it did not pose any harmful risk.

3.11. Summary

This section discussed the research design, study setting, study population, sampling method and plan for data collection, instrument, data analysis reliability and validity, ethical considerations.

CHAPTER 4

PRESENTATION OF RESULTS

4.1. Introduction

The purpose of this chapter is to present and interpret the results. About 155 food handlers completed the questionnaires and they had their sites observed as well. The researcher solicited the street food vendors demographic information such as age, location, gender, years of experience, educational status, food hygiene training and point of sale. In addition the food safety knowledge was evaluated among street food vendors and the food safety practices were also observed.

Section 1: Demography

1.1. Demographic information

The Table 4.1 below depicts the age, location, gender, and years of experience, educational status, food hygiene training and point of sale. As indicated in Table 5 the largest group of street food vendors were in the age group 25- 30 years and most were females 86(55,5%) compared to males, 69(44.5%).The majority of street food vendors 70(45.2%) have experience level of 5-10 years. The majority 61(39.4%) were operating in Thohoyandou, while few (n=25.8%) in Sibasa and forty (25.8%) in Shayandima. Forty -five (29%) of them were illiterate, fifty (32, 3%) had a primary education; thirty two (20.6%) had a secondary education, four (2.6%) had a matric and twenty- four (15.5%) had vocational training. The majority 100 (64.5%)had attended food hygiene training while 55(35.5%) did not attend the training. Lastly most (48(31%) of the street food vendors were selling their food inside transport terminals.

Table 4.2: Demographic data for street food vendors

			N= 155
Characteristics	**Demographic data**	**Frequency**	**Percent (%)**
Age distribution(Years)	20-25 years	9	5.8
	25-30 years	59	38.1
	30-35 years	33	21.3
	35-40years	27	17.4
	40-45years	27	17.4
Gender	Male	69	44.5
	Female	86	55.5
Location	Sibasa	54	34.8
	Thohoyandou	61	39.4
	Shayandima	40	25.8
Years of experience	1-5	48	31.
	5-10	70	45.2
	10-15	34	21.9
	15-20	3	5.3
Educational status	Illiterate	45	29.
	Primary school	50	32.3
	Secondary	32	20.6
	Matric/grade 12	4	2.6
	Vocational certificate	24	15.5
Food hygiene Training	Yes	55	35.5
	No	100	64.5
Point of sale	Along road/streets	40	25.8
	Market area	40	25.8
	Transport terminal	48	31
	University	9	5.8
	Primary school	10	6.5
	Town centre/CBD	8	5.2

Section 2: Street food vendors knowledge on food safety

Questions 8- 20 were composed of multiple-choice questions, whereby only one answer is correct. Therefore questions 8- 20 were scored based on whether the respondent got the

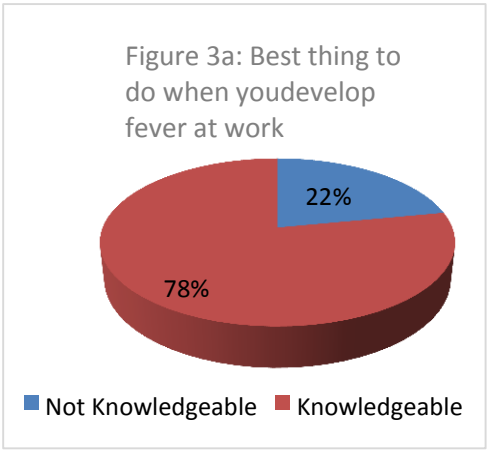
question correct on or not about food safety and hygiene out of the choices given. In addition for analysis, questions 8- 20 were grouped into 3 categories, as follows: hygiene of hand washing, prevention of food borne diseases, and prevention of food poisoning.

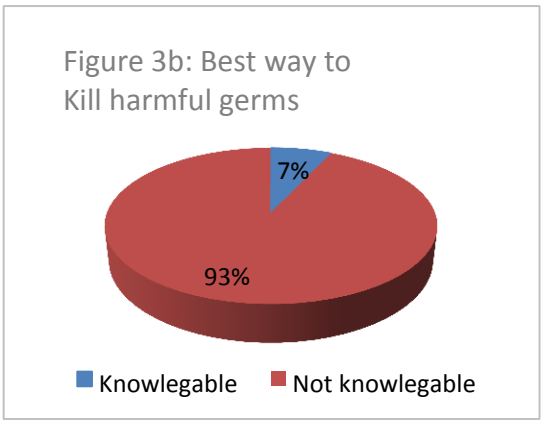
2.1. Street food vendor's knowledge on regarding hand hygiene.

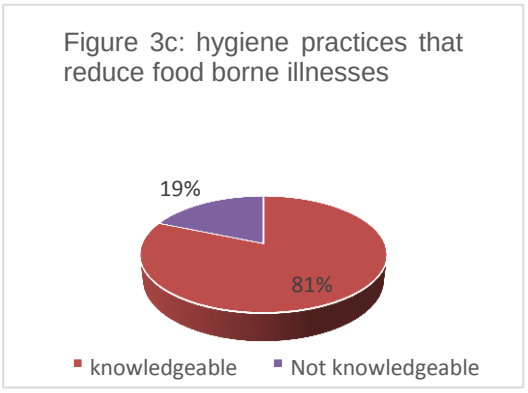
2.2. Prevention of foodborne illnesses

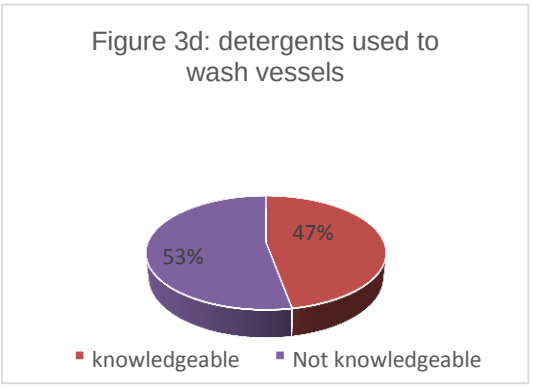
As shown in figure 3a 121(78.1%) were aware of the symptoms which necessitate that a food handler stay away from vending food thoroughly while 34 (55.5%) were not knowledgeable. In Figure 3b one hundred and forty-four (92.9%) participants were aware that the best way to destroy any harmful germ is to cook food to the right temperature, whilst only eleven (7%) were not knowledgeable.

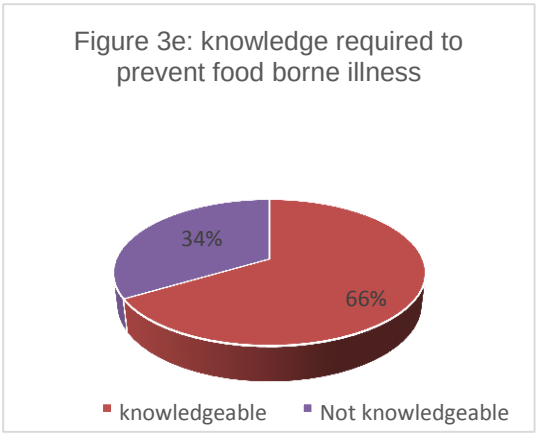
Only 126 (81.3%) of the street food vendors knew that a combination of washing hands, using gloves and keeping food at the right temperature help to prevent food-borne illnesses, whereas twenty nine (18.7%) were not knowledgeable. However, with regard to the correct detergent for washing utensils, as shown in Figure 3d less than half of the and 73(47.1%) were not knowledgeable, as compared to (n=82; 52.9%) of the participants who were not knowledgeable about what to use when washing utensils. Figure 3e shows that 103(66.5%) lacked knowledge regarding why food handlers require knowledge on food hygiene, while only 52(34%) were aware.









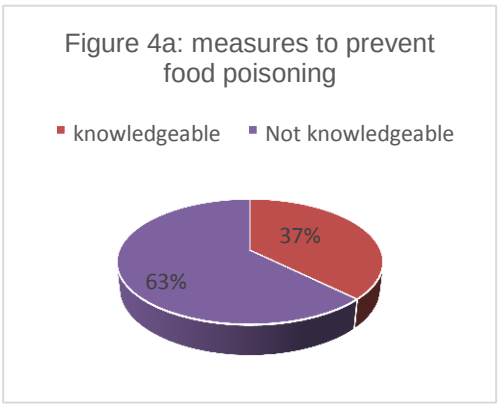


N=155

Figure 4.1: Respondents distribution with regards to the following variables and their rating whether kn owledgeable or not knowledgeable regarding prevention of food borne illness.

2.3. Prevention of food poisoning

As indicated in Figure 4a ninety seven (63%) of the respondents were not aware of the measures to prevent food poisoning, as compared to 58(37%). On the other hand, the majority (n=140; 90, 3%) of the food vendors were aware that refrigerator is the safest way to thaw foods while 15(10%) were not aware (figure 4b).



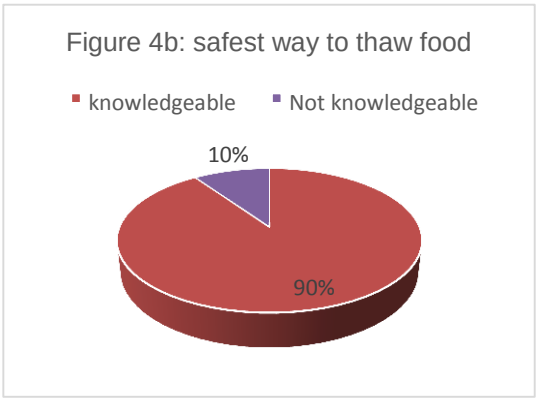


Figure 4. 2: Respondents distribution with regards to the following variables and their rating whether knowledgeable or not knowledgeable regarding prevention of food poisoning.

N=155

Section 3: Observation of food safety practices

3.1. Observational findings on hygiene practices by street food vendors

According to Table 4.3 regarding the sanitary conditions of the vending three quarters 116; (75%) of the stalls were protected from the sun, wind and dust. For example Plate A1-A10 shows that they were protected from sun and wind. This shows that three quarters of food vendors stall complied with the requirements. In addition about 136 (87.7%) of the stalls did not have direct access to potable water. For example Plate A1- A8 shows that majority of the stalls did not have direct access to potable water and they used plastic cans to store water. Therefore this shows that they are not complying with the regulations.

Furthermore about 115(74.2 %) did not have adequate hand washing facilities and 141(91%) did not have waste disposal facilities. For example Plate A1 – A10 except A9 shows that they do not have adequate hand washing facilities hence non-conforming to the regulations.

Animals, flies and insects were indeed evident around the stall in 124(80%) of the cases. For example Plate A2 shows house flies visibly roaming around food preparation area.
Furthermore, the vendors were observed to be predominately having unsatisfactory levels of personal hygiene. For example, the majority of street food handlers 136(87.7%) did not wash hands before preparing food. In regard to hand washing after toilet all of the vendors said that they washed their hands each time after visiting the toilet. This was not confirmed as the researcher did not follow the vendors into the toilets.

More than three quarters 120(77%) of the food handlers operated in clean clothes. However only 39(25%) used an apron when handling food while 124(80%) did not use gloves to handle food and only 24(15%) used disposable gloves. Plate A9 shows that vendors operating in clean uniforms, however Plate A3, A8 and A4 were observed not wearing gloves whilst Plate A6 shows a food handler using bare hands cutting cabbage. Although the street food vendors complied in wearing clean clothes, they did not consistently wear apron and they also used bare hands to touch food.

Table 3: Street food vendors' hygiene practices

Observation checklist item	OBSERVATION			
	NO			YES
	#N	%	#N	%
Environment around the stall				
1.Is vending stall protected from sun, wind and dust	38	25	116	75
2. Animals or pests flies etc. evident around the vending stall	124	80	31	20
3. The environment around the stall is clean: far from rubbish, waste water, toilet facilities, open drains and animals	128	82.6	27	17.4
4.There is access to potable water at the site or close to the site	136	87.7	19	12.3
5.There are adequate hand washing facilities available	115	74.2	40	25.8
6.There are adequate food disposal facilities available	141	91	14	9
Personal hygiene				
1.The vendors clothes are clean and presentable	35	22.6	120	77
2.The operator washes their hands in clean water each time before the handling, preparation and serving of food	136	87.7	19	12.3
3.The operator washes their hands each time after visiting the toilet	0	0	155	100
4.The operator uses an apron when handling, preparing and serving of food	116	75	39	25
5.The operator handles food with bare hands	124	80	31	20
6.If no do they use disposable gloves	131	85	24	15
7.The operator has clean and short nails	8	5	147	95
8.The hair of the operator is covered when handling preparing and serving of food	116	75	38	25
9.The operator handles money while serving food	155	100	0	0
10. If yes. Are hands washed after handling money before handling food again	155	100	0	0
11. Does the operator use the same utensil knives and boards to prepare raw and cooked food.	116	75	38	25
Utensils				
1. Utensils are cleaned with:				
Cold and soapy water			151	97.5
Clean water with no soap	4	2.5	0	0
2. Are utensils cleaned adequately every time after use?	5	4	150	96
Food storage				
1.Food is stored/displayed:				
Openly in the stalls	0	0	38	25
In sealed containers	0	0	116	75
2.Cooked Foods are stored separately from raw food at point of sale	100	65	55	35
3. Are previously cooked foods kept cool (i.e. ice box) or refrigerated?	109	70	46	29.6

Majority147(95%) of the street food vendors had clean short nails For example, Plate A9 shows that food vendors had clean nails. While (116(75%) did not cover hair whilst preparing the food. This can be seen in Plate A3, A4, A8 and A10. In addition all of them handle money while serving food and did not wash hands after handling money. For example in Plate A4 a male street food vendor can be seen visibly holding money whilst braaing/roasting chicken. In addition three quarters (75%) of the food handlers used the same knives to prepare raw and cooked food. About 151; (97.5%) of the vendors washed their utensils using cold and soapy water while 4; (2.5%) washed their utensils with clean water soap-less water and 150; (96%) cleaned utensils after being used by customers.

Thirty eight (25%) of the vendors stored their foods displayed foods openly in the stalls and 116 (75%) stored them in sealed containers. Sixty five percent of the vendors did not separate raw, partial cooked and cooked food products, whilst 109(70%) did not keep previously cooked foods in refrigerators for vending the following day. (See plates A3 and A7)

In summary, it can be generally concluded that the street food sold in Thohoyandou is prepared in unhygienic conditions, characterized by poor food safety practices and inadequate storage conditions.

CHAPTER FIVE

DISCUSSION

5.1. Introduction

The main purpose of this study was to assess the compliance of street food vendors with food and safety regulation in Thulamela Municipality.

5.2. Demographic characteristics of the respondents

It was found that street food vendors were in the age range of 20-45 years and the majorities were in the 25-30 years age group. Similar findings were reported in studies conducted in Sri Lanka (Galgamuwa, Iddawela and Dharmaratne, 2016) and Nigeria (Chukuezi, 2010). This signifies that the businesses are managed by young people in their productive age.

Both males and female were involved in street food vending in the present study, although females dominated. Similar findings were reported in studies conducted in developing countries, including Africa. For example, a study conducted in South Africa (Khuluse, 2016); Uganda (Muyanja, 2011); Nigeria (Chukuezi, 2010) and Vietnam (Samapundo et al, 2015) reported that street food vending is a job mainly done by females. However this contradicts with studies conducted in Sudan Mustafa et al., (2017); India (Hasan et al., 2016) and Thakur et al, 2013), which indicate that street trading is a job for men. The significantly higher proportion of females in this study group can be explained by the fact that in the African setting, street food vending is done by women because they are traditionally responsible for cooking and they have low levels of knowledge (Samapundo et al., 2015).

With regard to experience, the majority of the participants had more than five years of experience. Similar results were reported in South Africa by (Khuluse, 2016 and Campbell, 2011). However this is in contrast with a study conducted by Addison (2015) in Ghana, which shows that the majority of vendors had less than one year's experience. Concerning education, the majority (32.2%) of street food vendors in this study had primary education and (29%) were illiterate.

Similar findings were reported by Hassan et al, (2016) whereby majority of street food vendors had primary education and some were illiterate. This contradicts with previous studies conducted in South Africa (Khuluse, 2016); Nigeria (Aluko et al.2014), Zimbabwe

(Mayrhofer and Hendriks, 2010 where the educational backgrounds of food handlers were significantly higher. Choudhury, (2010) conducted a study in India which concluded that most Of the food vendors were educated up to primary to high school level. This finding confirms IIusanya et al.,(2012) study which indicated that street food vending is a profession for people with different backgrounds.

Okojie and Isah (2014) argue that the reason why most street food vendors are uneducated is because they hail from poverty- stricken communities with fewer economic opportunities. As such most women in Africa do not have income to further their educational studies. Therefore there is no doubt that food prepared in these vending stalls is not safe. This is a cause for concern because lack of education has been linked to poor food hygiene practices (Samapundo et al., 2015).

The majority of the street food vendors in the present study were not trained in food hygiene. Similar findings were reported by a studies conducted in Nigeria (Okojie and Isah, 2014) and Andy et al, 2015). Furthermore studies conducted in South Africa clearly show that street food vendors were not trained (Mayrhofer and Hendriks, 2010 and Oguttu et al., 2014). It can therefore be assumed that in both studies, the level of training was very low. The reason for lack of training about food hygiene and safety is because the municipality may not be organizing the trainings regularly and attitude towards the training. Most street food vendors relied on skills which they have learned through their parents or significant others and deeply rooted in cultural practices.

5.3. Knowledge of street food vendors regarding food hygiene

In the study generally the street food vendors exhibited high levels of knowledge. They demonstrated knowledge in areas of hand washing; symptoms that make a street food handler stay away from the workplace, the correct way of stopping bleeding while on duty, ways of preventing food-borne disease, measure to keep harmful germs away from food, refrigerator as a safe way to store perishable foods. On the other hand, street food vendors have knowledge gaps in the area of drying hands after washing, reasons thereof, measures to prevent food poisoning and the correct detergent to use when washing utensils.

Similar findings were reported in a study conducted among street food vendors in Johannesburg, which revealed that most vendors answered ninety-percent hygiene and food safety questions correctly (Campbell 2011). A study conducted in Nigeria by Iwu et al, (2017) also suggest that knowledge of food vendors with regard to food hygiene was good for majority of the respondents. However, studies conducted by in Haiti (Samapundo et al, 2015) and Vietnam (Samapundo et al 2016) suggests that the majority of vendors had insufficient knowledge regarding food hygiene.

5.4. Environmental and personal Hygiene profiles of street food vendors

5.4.1. Environment around the stall

Regarding the sanitary conditions of the vending, three quarters (n=116; 75%) of the stalls were protected from the sun, wind and dust. This is in agreement with a study conducted in Haiti (Samapundo et al., 2015, Vietnam (Samapundo et al., 2016). However a study conducted by Muyanja et al., (2011) in Uganda shows that open site vending was a common site. FAO (1995) indicated that foods should be prepared in a place set aside exclusively for that purpose, while the place for preparation should be kept clean at all times and should be far from any source of contamination (rubbish, waste water, dust and animals). Vending stalls should be designed and constructed to enable easy cleaning and maintenance (FAO, 1995).

5.4.2. Evidence of flies animals and insects

Evidence of flies animals and insects was observed at (n=124; 80%) of the vending sites. Similar findings were reported in Uganda (Muyanja et al, 2011) and India (Choudry, 2011) who discovered that animals, flies and insects were indeed evident around the stall in 60% of the cases.

5.4.3. Hygienic condition.

Regarding the hygiene condition about 83% of the stalls were in dirty condition and they were next to toilets, dirty water and drainage canals. The same was reported by Muyanja et al.,(2011) who observed an accumulation of large heaps of garbage around street food vending sites in Uganda, which harbored insects and animal pests (known vectors of diseases). Littering was also reported to be a common practice at the vending sites in Haiti (Samapundo et al, 2015). In another study conducted in Ghana,it was found that 68% of the vendor sites were dirty and 20% were very dirty, with only 12% characterized as clean(Amaami et al,. 2017). These results are slightly different from those of Donkor et al. (2009) who scored 60% of the food vendor sites as hygienic. Alimi et al., (2016) explain that street food vendors in developing countries prepare their food in unhygienic environments, such as next to garbage, toilets, next to moving vehicles, which enhances contamination of already prepared food. This calls for increased attention since most food contamination could be prevented by keeping the vending units and locations clean (FAO, 2012).This can be explained by the fact that most food vendors do not have permanent stalls as they are considered illegal therefore vying for the limited spaces lead to operate in unhygienic part of the town.

5.4.4. Water source

About (88%) of the stalls did not have direct access to potable water. This is in line with a study conducted by in Uganda (Muyanja et al., 2011), Nigeria (Chukuezi, 2010) who complained of water shortages. Lack of water affects practicing good hygiene and personal hygiene as well (FAO, 1995). This is in contrast with a study conducted in Greece, whereby street food vendors had a source of potable water for production and cleaning (Trafiak et al 2017). It is argued that water is a critical raw material in street food vending. Therefore, lack of it affects operations. Due to the shortage of water in many African cities street food vendors are forced to reuse contaminated water mainly for washing hands and utensils. Most street food vendors in Thohoyandou do not have access to running water. Therefore, street food vendors end up using paper towel to clean their hands, so as to save water. It is very important for the vendors to have sufficient potable water for drinking, preparation of all kinds of foods and washing operations.

5.4.5. Hand washing facilities

Most (73%) did not have adequate hand washing facilities. These findings are similar to the ones observed by Muyanja et al. (2011), Muinde and Kuria (2005), and Badrie, Joseph and Chen (2004) in studies carried out in Uganda, Kenya and Trinidad, respectively. Because of lack of adequate waste disposal facilities, street vendors have a tendency to dispose of their waste in the street. This in turn attracts flies and insects which are potential vectors of pathogens. Animals, flies and insects were indeed evident around the stall in most (80%) of the cases, which was also the case in studies conducted in Uganda (Muyanja et al. 2011). The motive for street food vendors to operate in areas without proper hygiene infrastructure is because they will be vying for customers along sidewalks. Therefore, they settle in areas without basic hygiene facilities such as toilets, hand washing facilities, potable water, good drainage and waste disposal system. These areas are fertile grounds for transmission of food borne disease to consumers (Raina et al.,R 2014).

5.4.6. Waste disposal facilities

Ninety- one percent of the street food vendors did not have waste disposal facilities. These people rely on public bins at central collection point located far away from them. These findings are similar to the ones observed by Muyanja et al. (2011), Muinde and Kuria, (2005), and Badrie, Joseph and Chen (2004) in studies carried out in Uganda, Kenya and Trinidad, respectively. This finding also conforms to that of Annan-Prah et al, (2011) in their study of street vended food in the central region of Ghana. Because of the lack of adequate waste disposal facilities, street vendors have a tendency of disposing of their waste in the street. This in turn attracts flies and insects which are potential vectors of pathogens. The motive for

street food vendors to operate in areas without proper hygiene infrastructure is because they will be vying for customers along sidewalks. Therefore, they settle in areas without basic hygiene facilities such as toilets, hand washing facilities, potable water, good drainage and waste disposal system. These areas are fertile grounds for transmission of food borne disease to consumers (Sudhakar et al., 2014). Food vendors generate all kinds of waste during food preparation and sale. If not properly managed, this waste can contaminate food being prepared for sale. As such it is recommended that food vendors should have well-kept waste bins where they can keep their waste to be collected by waste management services or to be properly disposed of (FAO, 2012).

5.5. Personal hygiene

The vendors were observed to be having unsatisfactory levels of personal hygiene. The majority (87.7%) did not wash hands before preparing food. Similar findings were reported in Nigeria, indicating that minority of the vendors washed their hands at some point or the other, while the rest practiced hand washing between each meal serving and every 20 minutes (Derry and Addo, 2016).This is in contrast with a study conducted in Ghana, whereby seventy percent of the survey respondents reported that they always washed hands with soap before preparing foods, 20% said most of the time and 10% said some of the time (Onyeneho and Hedberg, 2013). In Brazil street food vendors washed their hands on average 4 times a day while working, whereas 33% did not wash hands at all during work (Cortese et al, 2016). The noncompliance with regard to hand hygiene that was observed in the present study may be attributed to insufficient. Improper food handling is a major cause of foodborne diseases and poor hand hygiene is one of the major risk factors in the occurrence of food contamination (Codex Alimentarius Commission, 2003).

The majority of street food handlers (87.7%) did not wash hands before preparing food. Furthermore none of street food vendors washed their hands in between handling food and money. Similar findings were reported by Lawan et al., (2015) who concluded that 5% street food vendors washed their hands between handling food and money. With regard to hand - washing after toilet use all the vendors said that they washed their hands each time after visiting the toilet. However, this was not confirmed, as the researcher did not follow the vendors into the toilets. This finding is therefore highly questionable. Moreover, it has been observed in some studies that the washing of hands after visiting the toilet by street food vendors is not always a result of the lack of public toilets in many developing countries (FAO, 2009). When they do exist, most of the time they have no hand washing facilities, no running water and paper. In a study conducted in Abeokuta (Nigeria), it was found that vendors

relieved themselves on dunghills and in bushes and used sheets of paper to clean up after defecation, without washing their hands (Idowu and Rowland, 2006). According to FAO (2009) “poor hygienic practices at any stage of the food chain can lead to the introduction, growth and survival of harmful bacteria that will render food unsafe. Contamination of street food can occur through poor personal hygiene such as lack of washing hands with soap after visiting toilets, poor surroundings and improper cooking processes”

More than three quarters (77%) of the food handlers operated in clean clothes however only (25%) used an apron when handling food, while most (80%) did not use gloves to handle food and few (15%) used disposable gloves. This corresponds with a study conducted by Samapundo et al., (2015) in Haiti, which concluded that all street food vendors wore clean clothes and less than half (40%) actually wore an apron while handling, preparing and serving food. Other studies observed that few street food vendors use aprons and gloves while handling, preparing and serving food (Chukuezi, 2010 and Samapundo et al, 2016).

The majority (95%) of the street food vendors had clean short nails. It is a well-known fact that dirty hands and nail leads to contamination of food. This is in contrast with a study conducted in India whereby more than half of the street food vendors had long fingernails. According to WHO, (1989) “food handling personnel play an important role in ensuring food safety throughout the chain of food production, processing, storage and preparation. Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogens to come into contact with food and in some cases to survive and multiply in sufficient numbers to cause illness in the consumer”. The majority of street vendors did comply with the general codes of hygiene, as laid by regulation requirements. Hands should be washed before handling food and often during food preparation. Hands must be always washed after visiting the toilet in order to minimize the chance for transmitting disease (Addo et al., 2014). The World Health Organisation, (2010) also indicated that most the number of food-related illnesses and deaths could be substantially reduced by using proper food handling techniques and hand washing practices.

Seventy-five did not cover their hair whilst preparing food. This is in contrast with a study conducted by Samapundo et al, (2015) who discovered that the hair of the majority of the vendors was covered. In comparison, Chukuezi (2010) study in Nigeria indicates that more food handlers cover their hair while serving food.

However, according to a study conducted among Spanish street food vendors, all of them has missing hairnets.(Garayoa et al., 2011). However, it has to be noted that the use of hair covers by the street food vendors in these studies might not be primarily for food safety reasons. For traditional reasons women usually cover their hair irrespective of what they are doing (Samapundo et al., 2015).

All of the street food vendors handle money while serving food and did not wash hands after handling money. This finding is in agreement to the observations that have been made in Nigeria (Chukuezi, 2010; Omemu and Aderoju, 2008) and Haiti (Samapundo et al, 2015) handled food with bare hands and handled money while serving the food and only 6.3% washed their hands thereafter. These findings are a concern as hands are vectors for pathogens such as S. aureus. Codex Alimentarius Commission (2003) cautions that food handlers should avoid handling food with bare hands and handling money at the same time. The majority of the respondents (86%) served food with bare hands, instead of a pair of fork or a ladle and the same bare hands were used in receiving money from customers and giving back change to them. This finding is in conformity with previous study conducted by Janie and Marie, (2010).

Most (97.5%) of the vendors washed their utensils using cold and soapy water while (4; 2.5%) washed their utensils with clean water soap-less water and (96%) cleaned utensils after being used by customers. This is in line with a study conducted by Samapundo et al,2015) in Haiti, whereby the majority of the vendors washed their utensils using cold and soapy water while minority washed their utensils with clean water soap-less water. These results correlated with the practices observed in other studies carried out in Nigeria (Omemu, 2008) and Uganda (Muyanja et al, 2011). Most of the vendors used the same water to rinse their utensils several times during the day. The repeated use of the same water may lead to cross-contamination from the water to cooked food via the rinsed utensils (Mahon et al. 1999; FAO, 2005).

A few (25%) of the vendors stored their foods displayed foods openly in the stalls and (75%) stored them in sealed containers, whilst most (70%) did not kept previously cooked foods in refrigerators for vending in the following days. Street foods which cannot be served immediately to customers should be kept hot or cooled down rapidly and reheated completely to a minimum core temperature of 70 degrees before serving in order to prevent the growth of microbes on the food (Codex 2003). A similar situation was observed in another study, where cooked food was kept cool in a refrigerator by few vendors (Samapundo, Climat, Xhaferi, and Devlieghere, 201 Lack of adherence in this study was attributed to knowledge gaps in regard to food safety hazards. This is a cause of concern since it can lead to food poisoning and food disease outbreak.

Sixty five percent of the vendors did not separate raw, partial and cooked food products. This is contrast with a study conducted in Ghana on the practice of storing raw and cooked foods separately, whereby most of the vendors always stored raw and cooked food separately. This agrees with the findings of Donkor et al., (2009) who reported that (27%) of vendors always stored raw and cooked food separately, (23%) stored them separately most times, while (49%) did not do this often. This often lead to cross- contamination hence outbreak of food borne- diseases.

CHAPTER SIX

SUMMARY CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter provides an outline of the researcher's findings and comments that are made to assist in further research. The chapter further provides an overview of the findings and the measures of corrections in areas that are of concern to the researcher. The aim of the study was to assess the compliance of street food vendors with food and safety regulation in Thulamela Municipality.

6.2. Executive Summary

The aim of the study was to assess the compliance of street food vendors with food and safety regulations in Thulamela Municipality. Questionnaire and observation checklists were used by the researcher to collect data and the questions were formulated in line with the objectives of this study. The study concluded that street food vendors in Thohoyandou prepare food in unhygienic conditions, without basic hygiene infrastructure such as water, waste and hand washing disposal facilities. The results emanating from this study could form a database for further comparative study. The necessary recommendations have been drafted.

6.2.1. Knowledge of street food vendors regarding food hygiene

In this study generally the street food vendors exhibited high levels of knowledge. They demonstrated knowledge in areas of hand washing, symptoms that makes a street food handler to stay away from workplace, correct way of stopping the bleeding on duty, ways of preventing food borne disease, measure to keep harmful germs away from food, refrigerator as a safe way to store perishable foods. On the other hand, street food vendors lacked knowledge in the area of drying hands after washing, reason thereof, measure on how to prevent food poisoning and what the correct detergent to use when washing utensils.

6.2.2. Compliance of the environment surrounding the Street vending stall with food hygiene regulations.

The standards and requirements prescribed by regulation 9 of Regulations R962 of 2012 were not complied with in the following areas; hygienic conditions of the stall, inadequate water supply, inadequate hand washing and waste disposal infrastructure and operating in unhygienic conditions. The study concludes that three quarters of the stalls were protected from the sun, wind and dust and, therefore they complied with the regulation which stipulates

that food should be prepared in areas which are free from contaminants, such as dusts and wind. However the majority of the stalls were in dirty a condition that is they were next to toilets, dirty water and drainage canals. According to the R962 Regulations Governing the General Hygiene Requirements for Food premises and the Transport of Food (Republic of South Africa 2012) and the policy (Department of Health, 2012) food sites must be positioned, designed and built without causing any health risk and must afford hygienic processing of food to avoid adulteration. Walls, ceilings and floors must be washable to avoid food adulteration, and each room must be well aerated either by artificial or natural aeration. Furthermore, there must be sufficient lighting. This means the food preparation area should be free from pathogens which contaminate food and cause unnecessary sickness.

Furthermore the street food vendors did not have access to potable running water; as results they relied on water from 25 litre buckets. The majority of the observed vending stall did not meet this requirement because they did not have direct access to potable water. This is a cause for concern because water in these cans can be contaminated before being used. According to the Regulations Governing General Hygiene Requirements for Food Premises and the Transport of Food,(R 962 Of 23 November 2012) food premises should have adequate water supply.

According to Regulations Governing General Hygiene Requirements For Food Premises And The Transport Of Food,(R 962 Of 23 November 2012) food premises should have adequate handing washing facilities for food handlers and consumers. In addition, they should have cold and/or hot water, antibacterial hand soap, disposable hand drying material. However, most of the vending stalls did not have adequate hand washing facilities. As a results street food vendors made use of dishes which can be easily contaminated due to repeated use of the water by consumers.

Lastly, as per food hygiene regulations, all vending sites should have waste disposal facilities. However, the majority the vending sites were found to be without not waste disposal facilities. The sub-regulation prescribes that hand washing facilities should be provided with soap and with water for hand washing by workers on the food premises and by the persons to whom food is served. Hand washing is critical in the prevention of communicable diseases that can be spread by contaminated hands. Food poisoning in schools occurs mostly due to poor hygiene in latrines and poor hand washing after toilet visits. It is a requirement that food handlers and food consumers should wash their hands after visiting the toilets.

6.2.3. Compliance of street food vendors to Personal hygiene regulations.

The standards and requirements for protective clothing are prescribed in Regulation 9 of Regulations R962 of November 2012. Regulation 9 of Regulations R962 of November 2012 prescribes that food handlers should be provided with suitable protective clothing of light coloured material. To this end, the majority of the food handlers,(more than three quarters of food handlers) operated in clean clothes. The street food vendors did not comply with the regulations because only a few used an apron, gloves and disposable gloves to handle food. Therefore food prepared in these stalls is not guaranteed to be safe and can cause food borne disease. Suitable protective clothing includes amongst other things, overalls, aprons, head gears and footwear.Light coloured material is needed for the easy identification of stains and dirt. Light coloured protective clothing cannot be worn for several days for they quickly show the dirt in them. Aprons are needed to protect the protective clothing from contamination by handling or carrying of the food. Protective clothing is needed to protect the food from contamination by the food handler during food preparation and must be worn at all times during the handling of food and designed that it does not come into direct contact with any part of the body (Regulations R962, of 23 November 2012).

There was also poor compliance in regard to hand hygiene. Street food vendors did not comply with hand washing regulations because **the** majority of street food handlers did not wash hands before preparing food. According to Regulations Governing General Hygiene Requirements for food premises and the Transport of Food, (R 962 of 23 November 2012) food premises prescribe that food handler should not be allowed to touch any food item without prior hand washing. According to the standards and the requirements for hygiene food handlers are obliged to wash their hands after each and every activity before touching food. This means that measures of precautions to safeguard food from contaminations were not practiced by the food handlers. Food safety was not maintained and good personal hygiene was not practiced by the street food handlers hence probability of a food outbreak is high. Although the street food vendors did not wash hands, their nails were clean and short. However, it should be noted that in terms of clean and shorts nails they complied. According to the standards and regulations, any food handler is required to have clean and short nails. Fingernails, hands or clothes must be cleaned immediately prior to the commencement of each work shift. Majority (147;95%) of the street food vendors had clean short nails.

Furthermore all of the street vendors' food vendors handled money while serving food and did not wash hands after handling money. Majority of the respondents serve food with bare hands instead of a pair of fork or a ladle and same bare hands were used in receiving money from customers and giving back change to them. It is stipulated that no food handlers shall

touch ready to eat food, non prepacked unless doing is unavoidable for preparation purposes (Regulations R962, of 23 November 2012).

There was none conformity in regard to covering hair, majority of street food vendors did not cover their hair whilst preparing food. According to Regulations Governing General Hygiene Requirements for Food Premises and the Transport of Food, (R 962 of 23 November 2012) food premises prescribe that food handlers should cover their hair to avoid contamination of the food from hair. In addition no person shall be allowed to handle food without wearing suitable protective clothing and that protective clothing include head covering and footwear (Regulations R962, of 23 November 2012).

According to South African Regulation 962 of 23 November 2012 framed under the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act no. 54 of 1972) clearly reflects and stipulates that all food specified under the regulation and act must be kept at a low temperature or below (4ºC) during storage, transportation and while on display. Majority of the street food vendors violated safe temperature regulation because they of the vendors stored their foods displayed foods openly in the stalls , stored them in sealed containers whilst and did not kept previously cooked foods in refrigerators for vending in the following days.

6.3. CONCLUSIONs

The study concluded that generally the street food vendors exhibited level of knowledge. However despite high level of knowledge they prepared food in unhygienic conditions and also practiced poor hygiene . Therefore the study concluded that street food vendors in Thulamela prepare food in unhygienic conditions without basic hygiene infrastructure such as water, waste and hand washing disposal facilities. Street Food Vendors level of compliance is low. This means that the street food vendors do not prepare food according to the standards stipulated according to South African Regulation 962 of 23 November 2012 framed under the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act no. 54 of 1972).

6.4.RECOMMENDATIONS

Department of Health

The results of the study may assist the Department of Health to develop more policies on food hygiene and safety in relation to street food vendors , provide support and resources needed by Environmental Health Services to ensure that street food vendors comply with principles of food hygiene and food safety, as neglecting these can lead to increased morbidity and mortality. The Department of Health must also take a lead on the advocacy of food hygiene and safety as emerging and re-emerging diseases and climate change is a challenge and strengthen health systems to prevent future outbreak.

Municipality

The study recommend that the Thulamela municipality and Vhembe district municipality strengthen enforcement of the regulations e.g Municipal By laws. It has been noted that in literature that enforcement of legislation leads to correction of the majority of the violations. Therefore the municipality should come up with a stricter enforcement strategy which enables compliance. In addition the municipality should also regularly monitor the compliance of street food vendors to the regulations. Furthermore the municipality should provide basic hygiene infrastructure such as point of sale, water, toilets, hand washing and waste disposal facilities. Sporadic swab takings from hands of food handlers and utensils for laboratory tests may enhance compliance. Environmental Health Practitioners must be recruited in line with norms and standards(1:10 000) and increase funding on Environmental Health Services.

Environmental Health Practitioners

The results may help Environmental health practitioners to take appropriate measures to reduce the spread of foodborne illnesses; they may thereby also increase food handlers knowledge through continuous training on food hygiene and food safety. Maintaining food safety and food hygiene knowledge is important and improvements in food safety and hygiene practices may be achieved through on-site training, support and inspections.

They should also use the Five Keys to Safer Foods, identified as already being used to make street vendors aware of hygienic practices when applying for, Certificate of Acceptability. Training opportunities and simple education materials should be made available by the Environmental Health Practitioners to assist in this regard. Food sample runs should be taken to know the status of food prepared by street food handlers.

Appendix: 1 informed consent
Study Title: COMPLIANCE LEVEL OF STREET FOOD VENDORS REGARDING FOOD HYGIENE AND SAFETY IN THULAMELA LOCAL MUNICIPALITY

Background and Purpose

This is a request for you to participate in a research study that intends to gather information about compliance level of street food vendors regarding food hygiene and safety in Thulamela local municipality. We are looking for people who are involved in people who own sell street food; we hope you can provide us with information that will help in understanding the topic at hand.

Procedures

If you agree to be in this study, we will ask questions on your demographic characteristics, observe how you handle food and how you comply to the regulations. If you should come to any question you do not want to answer, just let us know and we will go on to the next question. Your honesty in providing the answers to the questions will be appreciated. The observation will take 20 minutes at the most.

Confidentiality

All the information that will be collected from you will be kept confidential and will not be shown to any other person. Identification will be by means of ID numbers that will be assigned to all participants. It will not be possible to identify you in the results of the study when these are published. All the questionnaires with their information will be destroyed at the end of the study.

Voluntary Participation

Participation in the study is voluntary. There are no monetary benefits to you, we hope the information you will provide may be useful in improving your work. You can withdraw your consent to participate in the study at any time during the interview without stating any particular reason. If you later on wish to withdraw your consent or have questions concerning the study, you may contact the researcher on the address provided. Michael Mukwevho

University of Venda

School of Health Sciences

Department of Public Health

P.O. Box X5050

Cell number: 0832763649 E-mail: mukwevhomn@webmail.co.za

Consent for participation in the study

I am willing to participate in the study.

(Signed by the project participant, date)

I confirm that I have given information about the study.

(Signed, role in the study, date

Appendix2: Information Sheet

Mukwevho M N (Student)

Student no : **11510281**

Contact No : 0832763649

Email address: mukwevhomn@webmail.co.za

Prof H.A Akinsola (Supervisor)

Dr T.G Tshitangano (Co-supervisor)

Title of the study: compliance level of street food vendors regarding food hygiene and safety in Thulamela local municipality.

Dear Participants

This letter serves to request for your participation in the study conducted by Mukwevho M.N a Masters student at the University of Venda, School of Health Sciences at the Department of Public Health. The purpose of the study is to assess compliance level of street food vendors regarding food hygiene and safety in Thulamela local municipality. Participation in this study is voluntary and you can withdraw, if you no longer have an interest to participate in the study. As a participant you should not expect any form of rewards during or after participating in this study. The researcher will ensure issues concerning privacy and confidentiality, data will only be shared with the supervisor and relevant person. Results obtained from the study will be published, however participants' identity will be protected by not disclosing your names.

Regards

Mukwevho M.N

Appendix 3: Letter of permission

P.O. Box 125
Vhufuli
O971

Municipal Manager
Vhembe District Municipality
P/Bag X 5006
Thohoyandou
0950

Dear Sir/Madam

REQUEST TO CONDUCT RESEARCH

This serves to seek your approval with regards to my proposal to conduct a research as part of the requirement for Masters of Public Health degree in the School of Health Sciences at the University of Venda. The aim of the study is to assess compliance level of street food vendors regarding food hygiene and safety in thulamela local municipality. It will be appreciated if you allow me permission to conduct my study within your department. Ethical clearance will be obtained from the research, ethics and publications committee of the University of Venda. All personal information will be kept confidential, anonymity will also be assured.

Your permission will be greatly appreciated

…… ……
Mukwevho M.N (Student) Prof H.A Akinsola (Supervisor)
Contact No: 0832763649
Email : mukwevhomn@webmail.co.za

……
Dr T.G Tshitangano
Co-Supervisor

Appendix 4: Food handlers questionnaire food safety & hygiene knowledge

QUESTIONNAIRE NUMBER_____

SECTION A DEMOGRAPHIC INFORMATION

A. Personal details

1. Location (Physical):……

2. Age

	code	tick
20-25years	1	
25-30 years	2	
30-35years	3	
35-40years	4	
40- 45years	5	

3. Gender

	code	tick
Female	1	
Male	2	

4. Years of experience

	code	tick
1-5	1	
5-10	2	
10-15	3	
15-20	4	
20-25	5	

5. Educational status

	code	tick
No school	1	
Primary level	2	
Secondary level	3	
University degree	4	
Vocational training	5	

6. Type of preparation

Food hygiene Training	code	tick
	Yes	
	No	

7. Point of sale/Preparation

	code	tick
Along road sides/streets	1	
Market area	2	
Transport terminal	3	
University	4	
secondary	5	
Primary school	6	
Town centre	7	

SECTION B: Knowledge on food hygiene

8. When washing your hands, you should rub your hands together with soap for at least.

	code	tick
5 seconds	1	
10 seconds	2	
20 seconds	3	
1 min	4	

9. What is the best thing that you should do in case you develop a fever and severe cough before going to work?

	code	tick
Take some medicine before going to work.	1	
Go to work but only handle food while wearing gloves.	2	
Go to work only if you feel strong	3	
Stay home until you are well as you may potentially get people sick.	4	

10. To wash the utensil we can use:

	code	tick
Bleach	1	
Detergent	2	
Pine gel	3	
None of the above	4	

11. The best way to destroy any harmful germs that may be present in food is to:

Add salt to the food	1	
Keep food at room temperature	2	
Cook food to the right temperature	3	
Keep food below 5°C at all times	4	

12. If you have a cut on your hand, you must:

Stay at home	1	
Continue working and hope that bleeding stops	2	
Stop the bleeding, cover it with bandage and wear non-latex gloves	3	
Keep your hand elevated to stop bleeding	4	

13. You can prevent food borne illnesses by:

Serving food without washing hands	1	
Washing hands, using gloves and keeping food at the right temperature	2	
Hand washing once in a day	3	
Spraying pesticides on the kitchen floor once in a month so pets would not get in the food	4	

14. Hand washing should be done:

Before handling food	1	
After handling food	2	
In between preparations	3	
All of the above	4	

15. The important measure to keep harmful germ away from food is to:

Wash hands thoroughly and frequently and use gloves when necessary	1	
Do not touch anyone other than food	2	
Remove all Jewellery prior to working with food	3	
Use of hair net/caps before handling food	4	

16. For drying hands after washing one must:

Use a cotton wool	1	
Just shake excess water away	2	
Use an air dryer	3	
Use a paper towel	4	

17. Hands must be dried after washing in order to:

Prevent dripping of water	1	
Prevent germs and bacteria which get spread with wet hands	2	
Hold the utensils properly	3	
a and b	4	

18. Food handlers require knowledge on food hygiene:

To reduce the amount of food thrown away due to spoilage	1	
To prevent the spread of illnesses through food	2	
To reduce the number of complaints from customers/patients	3	
To reduce work place accidents such as cuts and burns	4	

19. Which of the following is important to prevent food poisoning:

Thoroughly wash and dry hands	1	
Never cough or sneeze over food or where food is prepared or stored	2	
Covering and tying hair.	3	
All of the above	4	

20 The safest way to thaw (defrost) foods is:

In a container at room temperature	1	
In a sink with hot running water	2	
In the sink at room temperature overnight	3	
In the refrigerator	4	

Appendix 5: Food safety observation checklist

1. Environment around the stall	
1.Is vending stall protected from sun, wind and dust	
Yes	
No	
2. Animals or pests flies etc. evident around the vending stall	
Yes	
No	
3.The vending stall maintained in a clean condition	
Yes	
No	
4.There is access to potable water at the site or close to the site	
Yes	
No	
5.There are adequate hand washing facilities available	
Yes	
No	
6.There are adequate waste water or food disposal facilities available	
Yes	
No	
7.The environment around the stall is clean: far from rubbish, waste water, toilet facilities, open drains and animals	
Yes	
No	
2.Personal hygiene	
8.The vendors clothes are clean and presentable	
Yes	
No	
9.The operator washes their hands in clean water each time before the handling, preparation and serving of food	
Yes	
No	
10.The operator washes their hands each time after visiting the toilet	
Yes	
No	
11.The operator uses an apron when handling, preparing and serving of food	
Yes	
No	
12.The operator handles food with bare hands	
Yes	
No	
13.If no do they use disposable gloves	
Yes	
No	

14.The operator has clean and short nails	
Yes	
No	
15.The hair of the operator is covered when handling preparing and serving of food	
Yes	
No	
16.The operator handles money while serving food	
Yes	
No	
17. If yes. Are hands washed after handling money before handling food again	
Yes	
No	
18. Does the operator use the same utensil knives and boards to prepare raw and cooked food.	
Yes	
No	
19.Are utensils cleaned adequately every time after use	
20. Utensils are cleaned with:	
Cold and soapy water	
Clean water with no soap	
Clean water with no soap	
Dirty water with no soap	
21. Are utensils cleaned adequately every time after use?	
Yes	
No	
3.Food storage	
22.Food is stored/displayed:	
Openly in the stalls	
In sealed containers	
21.Cooked Foods are stored separately from raw food at point of sale	
Yes	
No	
22.Foods are stored separately without debris in a clean, organized and suitable conservation status at point of sale	
Yes	
No	
23. Are previously cooked foods kept cool (i.e. ice box) or refrigerated?	
Yes	
No	

References

Ababio, P.F. and Lovatt, P., 2015. A review on food safety and food hygiene studies in Ghana. *Food Control*, *47*, pp.92-97.

Ackah, M., Anim, A.K., Gyamfi, E.T., Acquah, J., Nyarko, E.S., Kpattah, L., Brown, S.E., Hanson, J.E., Fianko, J.R. and Zakaria, N., 2012. Assessment of the quality of sachet water consumed in urban townships of Ghana using physico-chemical indicators: A preliminary study. *Advances in Applied Science Research*, *3*(4).

Akinbode, S.O., Dipeolu, A.O. and Okuneye, P.A., 2011. Willingness to pay for street food safety in Ogun state, Nigeria. *Journal of Agricultural & Food Information*, *12*(2), pp.154-166.

Akinsola H A.2005.Research Methods in Medical & Nursing Practice

Alimentarius, C., 2003. Codex principles and guidelines on foods derived from biotechnology. Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, Food and Agriculture Organisation: Rome. *Food and Agriculture Organisation, Rome*.

Alimi, B.A. and Workneh, T.S., 2015. Consumer awareness and willingness to pay for safety of street foods in developing countries: a review. *International Journal of Consumer Studies*.

Anane, M.A. and Immanuel, G., 2017. Hygienic assessment of tools used for juice extraction by street juice vendors in close vicinity of Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh, India. *Journal of Food Processing and Technology*, *8*(3).

Annan-Prah, A., Amewowor, D.H.A.K., Osei-Kofi, J., Amoono, S.E., Akorli, S.Y., Saka, E. and Ndadi, H.A., 2011. Street foods: handling, hygiene and client expectations in a World Heritage Site Town, Cape Coast, Ghana. *African Journal of Microbiology Research*, *5*(13), pp.1629-1634.

Ansah, M.E. 2014. Cholera outbreak: GHS bans sale of food on streets. Available online:http://www.citifmonline.com/2014/09/02/cholera-outbreak-ghs-bans-sale-of-food-onstreets/ Date accessed: 16/10/2014

Burris, S., Wagenaar, A.C., Swanson, J., Ibrahim, J.K., Wood, J. and Mello, M.M., 2010. Making the case for laws that improve health: a framework for public health law research. *Milbank Quarterly*, *88*(2), pp.169-210.

Campbell, P.T., 2011. *Assessing the knowledge, attitudes and practices of street food vendors in the city of Johannesburg regarding food hygiene and safety* (Doctoral dissertation, University of the Western Cape).

Canini, N.D., Bala, J.J.O., Maraginot, E.N. and Mediana, B.C.B., 2013. Evaluation of Street Food Vending in Ozamiz City. *Journal of Multidisciplinary Studies*, *1*(1).

Choudhury, M., Mahanta, L., Goswami, J., Mazumder, M. and Pegoo, B., 2011. Socioeconomic profile and food safety knowledge and practice of street food vendors in the city of Guwahati, Assam, India. *Food Control*, *22*(2), pp.196-203.

Chukuezi, C.O., 2010. Food safety and hyienic practices of street food vendors in Owerri, Nigeria. *Studies in sociology of science*, *1*(1), p.50.

Cortese, R.D.M., Veiros, M.B., Feldman, C. and Cavalli, S.B., 2016. Food safety and hygiene practices of vendors during the chain of street food production in Florianopolis, Brazil: A cross-sectional study. *Food control*, *62*, pp.178-186.

FAO/WHO, "Basic texts on Food Hygiene" Joint FAO/WHO Food Standards Programme, Codex Alimentarius Commission, 2009, Rome, Italy

Fukuda, K., 2015. Food safety in a globalized world. *Bulletin of the World Health Organization*, *93*(4), pp.212-212.

Galgamuwa, L.S., Iddawela, D. and Dharmaratne, S.D., 2016. Knowledge and practices of food hygiene among food handlers in plantation sector, Sri Lanka. *International Journal of Scientific Reports*, *2*(12), pp.304-311.

Grace, D., 2015. Food safety in low and middle income countries. *International journal of environmental research and public health*, *12*(9), pp.10490-10507.

Grove, S.K., Burns, N. and Gray, J., 2012. *The practice of nursing research: Appraisal, synthesis, and generation of evidence*. Elsevier Health Sciences.

Henson, S. and Heasman, M., 1998. Food safety regulation and the firm: understanding the compliance process. *Food Policy*, *23*(1), pp.9-23.

Ilusanya, O.A.F., Adesanya, O.O., Adesemowo, A. and Amushan, N.A., 2012. Personal hygiene and microbial contamination of mobile phones of food vendors in Ago-Iwoye Town, Ogun State, Nigeria. *Pakistan Journal of Nutrition*.

Joint, F.A.O., WHO Expert Committee on Food Additives and World Health Organization, 2012. Safety evaluation of certain food additives and contaminants: prepared by the Seventy fourth meeting of the Joint FA.

Khairuzzaman, M., Chowdhury, F.M., Zaman, S., Al Mamun, A. and Bari, M.L., 2014. Food safety challenges towards safe, healthy, and nutritious street foods in Bangladesh. *International journal of food science*, *2014*.

Khuluse, D.S., 2016. *Food hygiene and safety practices of food vendors at a University of Technology in Durban* (Doctoral dissertation).

Liu, Z., Zhang, G. and Zhang, X., 2014. Urban street foods in Shijiazhuang city, China: Current status, safety practices and risk mitigating strategies. *Food Control*, *41*, pp.212-218.

Monney, I., Agyei, D. and Owusu, W., 2013. Hygienic practices among food vendors in educational institutions in Ghana: the case of Konongo. *Foods*, *2*(3), pp.282-294.

Mustafa K, A.A., 2017. Hygienic practices among food handlers in restaurants of AL NOHOD locality Market-west kordofan-sudan-2017.

Muyanja, C., Nayiga, L., Brenda, N. and Nasinyama, G., 2011. Practices, knowledge and risk factors of street food vendors in Uganda. *Food Control*, *22*(10), pp.1551-1558.

Oguttu, J.W., McCrindle, C.M., Makita, K. and Grace, D., 2014. Investigation of the food value chain of ready-to-eat chicken and the associated risk for staphylococcal food poisoning in Tshwane Metropole, South Africa. *Food control*, *45*, pp.87-94.

Okojie, P.W. and Isah, E.C., 2014. Sanitary conditions of food vending sites and food handling practices of street food vendors in Benin City, Nigeria: implication for food hygiene and safety. *Journal of environmental and public health*, *2014*.

Omemu, A.M. and Aderoju, S.T., 2008. Food safety knowledge and practices of street food vendors in the city of Abeokuta, Nigeria. *Food control*, *19*(4), pp.396-402.

Onyeneho, S.N. and Hedberg, C.W., 2013. An assessment of food safety needs of restaurants in Owerri, Imo State, Nigeria. *International journal of environmental research and public health*, *10*(8), pp.3296-3309.

Polit, D.F. and Beck, C.T., 2012. Resource manual for nursing research.

Proietti, I. Frazzoli,C. and Mantovani, A. 2014. Identification and management of toxicological hazards of street foods in developing countries. Food and Chemical Toxicology, 63:143 – 152

Proietti, I., Frazzoli, C. and Mantovani, A., 2014. Identification and management of toxicological hazards of street foods in developing countries. *Food and chemical toxicology*, *63*, pp.143-152.

Rahman, M.M., Arif, M.T., Bakar, K. and bt Talib, Z., 2016. Food safety knowledge, attitude and hygiene practices among the street food vendors in Northern Kuching city, Sarawak. *Borneo Science*, *31*.

Rane, S., 2011. Street vended food in developing world: hazard analyses. *Indian journal of microbiology*, *51*(1), pp.100-106.

Rane, S., 2011. Street vended food in developing world: hazard analyses. *Indian journal of microbiology*, *51*(1), pp.100-106.

Republic of South Africa. Department of Health. 2012. Regulations Governing General Hygiene Requirements for food premises and the transport of food (online).

Samapundo, S., Climat, R., Xhaferi, R. and Devlieghere, F., 2015. Food safety knowledge, attitudes and practices of street food vendors and consumers in Port-au-Prince, Haiti. *Food control*, *50*, pp.457-466.

Samapundo, S., Thanh, T.C., Xhaferi, R. and Devlieghere, F., 2016. Food safety knowledge, attitudes and practices of street food vendors and consumers in Ho Chi Minh city, Vietnam. *Food Control*, *70*, pp.79-89.

Simforian, E., Nonga, H.E. and Ndabikunze, B.K., 2015. Assessment of microbiological quality of raw fruit juice vended in Dar es Salaam City, Tanzania. *Food Control*, *57*, pp.302307.

Steyn, N.P., Labadarios, D. and Nel, J.H., 2011. Factors which influence the consumption of street foods and fast foods in South Africa-a national survey. *Nutrition Journal*, *10*(1), p.1.

Steyn, N.P., Mchiza, Z., Hill, J., Davids, Y.D., Venter, I., Hinrichsen, E., Opperman, M., Rumbelow, J. and Jacobs, P., 2014. Nutritional contribution of street foods to the diet of people in developing countries: a systematic review. *Public Health Nutrition*, *17*(6), pp.13631374.

Sudhakar, N.R., Samanta, S., Sahu, S., Raina, O.K., Gupta, S.C., Madhu, D.N. and Kumar, A., 2013. Prevalence of Toxocara species eggs in soil samples of public health importance in and around Bareilly, Uttar Pradesh, India. *Vet World*, *6*(2), pp.87-90.

Tiisekwa, A.B., 2013. *Compliance by street salad and juice vendors with national food safety and quality requirements a case of Morogoro municipality, Tanzania* (Doctoral dissertation).
Trafialek, J., Drosinos, E.H. and Kolanowski, W., 2017. Evaluation of street food vendors' hygienic practices using fast observation questionnaire. *Food Control*, *80*, pp.350-359.

Vhembe Intergrated Development Plan 2012/13-2016/17

WIEGO website. 2013. "Statistical Picture." Available at http://wiego.org/informal-economy/statistical-picture (accessed 01 December 2016)

World Health Organization, 2002. Global surveillance of foodborne disease: developing a strategy and its interaction with risk analysis: report of a WHO consultation, Geneva, Switzerland 26-29 November 2001.

World Health Organization, 2011. Report of the WHO expert consultation on foodborne trematode infections and taeniasi.

Zhang, H., Lu, L., Liang, J. and Huang, Q., 2015. Knowledge, attitude and practices of food safety amongst food handlers in the coastal resort of Guangdong, China. *Food Control*, *47*, pp.457-461.

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Mr MN Mukwevho

Student No:
11510281

PROJECT TITLE: **Compliance level of street food vendors regarding food hygiene and safety in Thulamela Local Municipality.**

PROJECT NO: **SHS/17/PH/12/0608**

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof HA Akinsola	University of Venda	Supervisor
Dr TG Tshitangano	University of Venda	Co- Supervisor
Mr MN Mukwevho	University of Venda	Investigator – Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: August 2017
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: .....
Name of the Chairperson of the Committee: Prof. G.E. Ekosse

UNIVERSITY OF VENDA
DIRECTOR
RESEARCH AND INNOVATION
2017 -08- 21
Private Bag X5050
Thohoyandou 0950

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950λ LIMPOPO PROVINCEλ SOUTH AFRICA
TELEPHONE (015) 962 8504/8313 **FAX** (015) 962 9060
"A quality driven financially sustainable, rural-based Comprehensive University"

Research Plates

Plate A1

 Unhygienic environment No designated dustbin Washing and reusing dirty water Next to sewage pipe and bushy area No stall

Plate A2:

- **Unhygienic environment**
- **Garbage lying around utensils**
- **Flies**
- **Cooking pots not covered**

Plate A3:

- **Braaing and storing meat in open air**
  - **Hair not covered**
  - **No apron**

Plate A4:

- **Exchanging money whilst preparing food**
- **Hair not covered**
- **Not wearing protective clothing**

Plate A5.

-Hair not covered **-Using dirty water** **-No access to water pipe**

Plate A6

Using dirty water to clean plates Cooking next to busy road Preparing food using bare hands Temporary stalls covered with plastics

Plate A7

- **Cooked Food openly displayed** -
Limited water supply - **Hair not covered** -
Using bare hands

Plate A8

- **Unhygienic environment behind taxi rank toilets** - **Hair not covered** - **No apron**

Plate A9

 Well-presented clothing **Clean nails** **Clean environment**

Plate A10

- **Accumulated rubbish in the stall**
- **Unhygienic environment Hair not covered Using bare hands to hold food**