

ASSESSING THE KNOWLEDGE, ATTITUDES AND PRACTICES OF STREET FOOD
VENDORS WITH REGARD TO FOOD HYGIENE AND SAFETY IN TOBIAS
HAINYEKO CONSTITUENCY WINDHOEK, KHOMAS REGION, NAMIBIA

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ABSTRACT

Globally, the projected number of foods found to be contaminated from street vendors particularly in developing countries is on the increase. It is however unclear; the contribution unhygienic practices make to food contamination. This study sought to determine the practices of food vendors regarding food hygiene, safety and assessed the level of knowledge of street food vendors with regard to food hygiene and safety, as well as to determine the attitudes of street food vendors towards food hygiene and their food safety practices in Tobias Hainyeko constituency in the Khomas region of Namibia.

A cross sectional, descriptive and quantitative study was used. The study recruited 96 food vendors using a stratified sampling method. A structured questionnaire was used to gather data about knowledge, attitude and practices of street foods vendors towards food hygiene and safetyof food vendors. Data was collected on 96 respondents and were analyzed and presented using visual aids which include pie charts. The study used several techniques in analyzing the findings relative to the research objectives. In addition, the study used means and standard deviations derived from the various responses to interpret the results. This was facilitated by the Statistical Package for the Social Sciences (SPSS.). Basically, primary data generated by the study was edited and tested for consistency and reliability.

The result indicate that there was statistically significant connection between the adherence to good hygiene practice and food vendors undergone a training on food preparation and vending of food hygiene and safety amongst street food vendors with a p-value of 0.001.Results also show that 47% of the vendors do not have knowledge about food preparation and vending and 58% have never participated in a training on food handling and preparation. Most of the street food vendors which is 58% started food vending without going through any trainings. Results also indicate that there is a habit of poor hand washing practice among vendors, with 47% of the vendors who do not believe in washing hands which could lead to food contamination.

The study recommends that intervention should target organizing periodic training on food safety, food preparation and hygiene practices for the street food vendors. Additionally, the study also recommends that the municipal assembly must increase awareness about the benefits of observing proper food hygiene practices by food vendors.

Key words: Food Hygiene, Food Safety, Street Food Vendors, Knowledge, Attitudes and Practices

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LIST OF ABBREVIATIONS

COA -	Certificate of Acceptance
CDC -	Centre for Disease Control
EHP -	Environmental Health Practitioner
KAP -	Knowledge Attitudes and Practice
SFVs -	Street Foods Vendors
WHO -	World Health Organization
MoHSS -	Ministry of Health and Social Services
UNAM -	University of Namibia

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DEDICATION

This study is dedicated to my supervisors Dr. H.IITA and Mr. D.HAUIKU for providing me with the support and encouragement to complete the research work. I wish to gratefully thank the Lord God for all his blessings, generosity and mercy upon me.

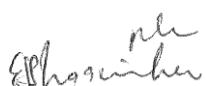
DECLARATION

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January 2020

Name of Student

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Date

CHAPTER 1: ORIENTATION TO THE STUDY

1.1 Introduction

The World Health Organization defines street foods as ready-to-eat foods and beverages prepared and or sold by vendors on the street and in public places for immediate consumption or consumption at a later time without further processing or preparation(1). These foods include meat, fish, fruits, vegetables, grains, cereals, frozen produce and beverages. The streets food industry provides a significant amount of employment, mainly to those with little education and training and often responsible for the feeding of millions of people with a wide variety of foods daily that are relatively cheap and easily accessible (2).

In many instances the street food business is started with minimum capital and little expertise. This allows for the participation of a lot of women who generally tend to be unskilled in the developing countries. With very little overheads and the use of cheap and probably low-quality raw materials, street food vendors can provide basic foods at a lower cost than restaurants. Important as these foods are in the food supply industry, however, street vended foods are also recognized as a possible hazard to health (3).

In the last few decades, the street food industry has expanded rapidly especially in urban areas of low- and middle-income countries, in terms of providing access to a diversity of inexpensive foods for low- income households in particular. However, this expanding sector is not without its own problems as food safety is now a major public health concern where serious outbreaks of food borne diseases have been documented in the past decade, illustrating both the public health and social significance of these diseases especially amongst children were the impact is most felt (3).

Some studies in Africa have shown that the tremendous unregulated growth of street food vendors has placed a severe strain on city resources, such as water, sewage systems and sometimes even interfere with city planning through congestion and littering which tend to adversely affect daily life (4).

Lots of efforts have been made by health ministries of developing countries in the field of food safety and hygiene education amongst street food vendors. Although these efforts have led to an increase in awareness and knowledge levels of food safety and hygiene practices, this knowledge is however not always translated in to actual practice (1).

1.2 Background of the study

In Namibia as well as in most African countries, street foods which are ready-to-eat foods and beverages prepared and/or sold by vendors especially on streets and other similar public places tend to have an enormous impact on the urban food supply, economically, socially and nutritionally (5).

According to WHO report of 2010, people of all ages and from different social and educational backgrounds depend, one way or the other on street foods because they are comparatively cheap, varied, usually traditional, convenient, available when required and often tasty. Furthermore, the WHO report also indicated that in Africa the incidence of both food and water borne diseases is estimated at 3.3 to 4.1 episodes per child per year accounting for between 450,000 to 700,000 deaths in children annually, with many more sporadic cases remaining unaccounted (6).

The Namibian Ministry of Health and Social Services (MoHSS) recently reported 134 cases of food borne diseases in 2015. This might be due to the mushrooming of wayside food

vendors who lack an adequate understanding of the basic food safety issues. The majority of cases have been reported from the informal settlement such as Havana, Goreangab, Okuryangava and Ombili (6). These are the locations where there are no proper sanitary facilities and street food vendors do not follow sound hygiene practices. This is a cause for concern and hence there is need to create awareness, social mobilization and behavior change communication should be intensified in affected communities.

According to the cross-sectional survey conducted in Namibia in 2014 on street food vendors, it revealed that majority of the Street Food Vendors (94%) were uneducated and unskilled women of low-income levels who tended to have no formal training on Namibian's economic development and the health of the people (7).

The various agencies concerned with street foods in Namibia work independently of each other. The laws governing the preparation and sale of street foods in Namibia are barely enforced and coupled with these shortcomings is the fact that data on health, social and economic significance of street foods are very limited.

Although street foods are sources of providing employment and generating supplementary income for the family, the poor handling and storage techniques as well as improper hygiene and sanitation practices could cause food adulteration and contamination resulting in possible health hazards to the consumer. These vendors have also not constituted themselves into well-organized associations which could enable them develop codes for their business, access credit from the banks or constitute a forum for interaction with the food control agencies (1).

1.3 Problem statement

Because of the many advantages of street food vendors, the emergence of informal food enterprises synonymous with inadequate food preparation and handling causes food-related

health issues. Street foods are sometimes stored at unsuitable temperatures and sold to customers from a variety of sales sites including kiosks, industrial building sites, street shopping and small cash business areas. Bryan et al. (6) revealed that food sold exposed and it is apparent that spoilage or pathogenic microorganisms can become dangerous in unhygienic conditions along the road side.

In addition, according to WHO (7), such foods are sometimes kept at an appropriate temperature, tremendously treated by food vendors and sold in an unhygienic setting. According to Ministry of Health and Social Services report of 2015, each month 1 in 5 Namibians get sick by consuming contaminated foods. Meanwhile the Centre for Disease Control and Prevention (CDC) estimated that each year 128 000 people worldwide get sick and are hospitalized due to food borne illness while 3000 people die annually (7).

Ministry of Health and Social Services report of 2012, asserted that Khomas region reported a high number of foodborne diseases with a total of 600 cases from January to December 2017 e.g. diarrheal diseases that means the public is consuming contaminated food and thus why there is a need to conduct this study so that we can determine the knowledge, attitude and practice of street food vendors about food hygiene in Khomas region (7).

Many measures have been taken to ensure that street food sellers abide on hygienic standards during food handling and preparation, e.g. by surveillance, health education, allocation of specific food sale areas to food vendors, and enforcement of laws and regulations.

It is therefore found that a review of the street food industry on knowledge, attitude and practice towards food safety is essential. This evidence gathered from this study would help the authorities to develop specific and effective programs to address the issue.

1.4 Purpose of the Study

This study is important in terms of food hygiene and health, to explain the awareness, attitudes and practices of street food vendors in an urban setting. Through such study, it is possible to identify gaps in knowledge of food safety / hygiene among street food vendors and support the development of a more specifically targeted and efficient training program for such groups. It is thus possible to achieve consumer confidence and regulatory control in street food sales and to reduce the detrimental effects of food poisoning accidents on both customers and the city. With the belief that street food vendors present a health risk to all consumers, the ability of street food vendors to produce healthier foods could still be doubtful. Given the significant contribution street food vendors make too many Namibians ' economy and food security / nutrition, Knowledge produced from this study that assist regulatory authorities with regard to street food vendors ' policies and approaches. It supports the government's policy to make sure products sold on the streets or any other public place are safe and of good quality. The next chapter explains the research-related literature.

1.5 Research objectives

1.5.1 Main Objective

The main objective of this study was to assess the knowledge, attitudes and practices of street food vendors with regard to food hygiene and safety in Tobias Hainyeko constituency Windhoek, Khomas region, Namibia

1.5.2 Specific Objectives

This study is guided by the following research specific objectives:

- i. To assess the level of knowledge of street food vendors with regard to food hygiene and safety.

- ii. To determine the attitudes of street food vendors towards food hygiene and their food safety practices.
- iii. To determine the practices of food vendors regarding food hygiene and safety.
- iv. Observation of the handling practices of street food vendors in order to assess if the methods of food preparation, storage and presentation meet the required food safety standards.

1.6. Significance of the study

The results of this study might contribute to the increase body of knowledge when it comes to food safety and hygiene. It might also inform the government in developing policies and regulatory frame work, establishing and implementing effective foods safety system to ensure that foods street vendors are operating responsible and supplying safe food to the consumers or public. The result might also help the street vendors when it comes to practice of WHO FIVE KEYS to safer food at home and also when they are selling at local market, furthermore, the result will also lead to the development of standards and policy that will help in ensuring the safety of street foods.

1.7 Limitation of the study

The study was cross-sectional in nature and therefore could be limiting, longitudinal study needs to be conducted to establish the changes in attitude, practices and knowledge of street food vendors over time. Selection of one geographic region and one specific location could be limiting in terms of generalization of the study findings.

1.8 Delimitation of the study

The study focused on assessing the knowledge, attitudes and practices of street food vendors with regard to food hygiene and safety in Tobias Hainyeko, Windhoek, Khomas region. It is

important that further research be conducted in other geographical regions and locations within Namibia to confirm the findings of this study. In addition, it was not possible to conduct the research in all the regions in Namibia due to financial and time constraints.

1.9 Definition of concepts

Definitions that are going to be defined in this study are delivered from the topic:

Knowledge –an information that and skilled acquired through experience or education or the sum of what's known (8).

In this study the concept refers to the fact that it is important to assess how knowledgeable the street food vendors are with regard to food hygiene practices as this would determine their ability to handle and store food, so in this study this concept will refer to the knowledge the food vendors in Tobias Hainyeko constituency display in relation to food hygiene.

Food safety- is a scientific discipline describing handling, preparation and storage of food in ways that prevent foodborne illness (1).

Food safety is an important concept in this study as it will form the basis to determine whether food safety practices are being adhered to by street food vendors, in this study this concept refer to safety practice that street food vendors display with regard to food hygiene and the assurance that the food can not cause any harm to the consumers when it is prepared or eaten to its intended use.

Hygiene- refers to conditions and practices that help to maintain health and prevent the spread of disease (9).

Hygiene is an important concept in food handling and therefore will be used to determine the hygiene conditions in places where the food is being sold, so in this study this concept applies

to all conditions and measures that street food vendors must maintain to ensure the safety and sustainability of food at all stages of the food chain.

Assessment - act of judging or deciding the amount, value, quality or importance of something, or the judgment or decision that is made (10). This concept is apply in this study as an assessment of the practice will be done before reaching a conclusion on the hygiene practices and behavior of street food vendors.

Street food- is ready-to-eat food or drink sold by a hawker, or vendor, in a street or other public place, such as at a market or fair. It is often sold from a portable food booth, food cart, or food truck and meant for immediate consumption (10).

Foodborne disease: A disease caused by consuming contaminated food or drink (1),it is applied in this study as this concept will refer to foodborne illness that associated with food contamination and street food vendors need to know about them.

1.10 Summary

The first chapter of this thesis opens with the background of the study and further describes the knowledge, attitudes and practices of street food vendors with regard to food hygiene and safety in Tobias Hainyeko constituency Windhoek, Khomas region. This chapter indicates that street food vendors have adequate information regarding food safety principles and their attitudes to food safety can be regarded as attuned to the need to ensure safe practices in food preparation. It also indicated that street food vendors can provide food safely although attention needs to be given to some practices and regulatory compliance. Training can be regarded as essential to ensure food safety. This is followed by the research objectives, research questions and significance of the study. The chapter concludes with the definition of terms of the thesis.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

Literature review is an organized written presentation of what you find when you review the literature. It summarizes what has been published on a topic by scholars and presents relevant research findings (11).

This part of the study focuses on describing related literatures from different authors and how it is related to the research topic, theoretical and empirical literature will be used. The topics covered include health risks associated with street food vending, knowledge of street food vendors about food hygiene and safety, attitudes and practices of street food vendors towards food hygiene and their food safety practices.

2.2. Reviewing of related studies or literatures

2.2.1. Health risks associated with street food vending

Street foods are perceived to be a major public health risk. In 2002, the World Health Organization (WHO) undertook a survey in over 100 countries to assess the situation with regard to street-vended food. The survey noted that the majority of countries reported contamination of food (from raw food, infected handlers and inadequately cleaned equipment), time and temperature abuse to be the major factors contributing to food-borne disease. This was partly due to the fact that infrastructure development was relatively limited, with restricted access to potable water, toilets, refrigeration and washing and waste disposal facilities. Moreover, registration, training and medical examinations were not among the selected management strategies (5).

A comparative study on the risks involved in the use of hands and cutleries to serve street foods in Ghana by Mensah et al, also showed that the use of bare hands to serve increased the level of contamination. The study recognized serving stage as a critical point in the street food industry. Enteropathogens, such as *Salmonella typhi* that can survive on human hands for more than three hours have been isolated in vendors' hands in Ghana. Enterogenic *E. coli* of the type isolated in diarrhea cases were isolated in some women's hands in Thailand. Serving of some street foods with bare hands is a common practice in most developing countries (2).

Water is a critical raw material in many street-vended operations. Contaminated water can create a public health risk when it is used for drinking, washing of foods, incorporated in the food as an ingredient and used in the processing of food or used for washing equipment, utensils and hands (12).

Studies done in India by Bapat (2) to find out the bacteriological quality of the water used by some street vendors have revealed frequent contamination with coliforms and fecal coliforms(8). When the street foods in Trinidad and Tobago were analyzed, it was reported that 35% of foods were contaminated by *E. coli* while 57.5% of water used by vendors were contaminated by coliforms. These reports were similar to the findings that the stored water used by consumers and vendors, at the vending site, showed heavy bacteriological contamination of fecal origin. Such heavily contaminated water is a primary source of diarrheal diseases to the street food consumers. When water samples from storage tanks used by some vendors were checked at different localities in Pune, India, it was revealed that 29.6% of the water samples were not conforming to the WHO standards of portability and had coliform counts of more than 16/100 ml, while fecal coliform counts were more than 16/100 ml in 15.5% of water samples, 4.5% of samples were positive for *E. coli* and 2.7% for

enter pathogenic. Similarly, pathogens like Salmonella and Shigella have been detected in the water used by vendors for dish washing (13).

2.2.2 Knowledge of street food vendors about food hygiene and safety

According to FAO, food handlers should have the necessary knowledge and skills to enable them to handle food hygienically. Systems should be put in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food. FAO recommends that every vendor/helper of food should undergo a basic training in food hygiene before licensing.(3).

Kalua (2) conducted a study in Kuching city and the study revealed that knowledge positively influences attitude formation, and the recipient's comprehension of health facts (12). Positive attitude formation leads to positive behaviour. On the contrary, superficial knowledge leads to misconception and development of negative attitudes. As a result, it increases harmful practice. In fact, many vendors have sufficient knowledge to ensure hygienic handling of food, such as the knowledge of the dangers of contamination, storage, preparation of food. According to Hines *et al* (1) both declarative (knowledge of issues) and procedural knowledge (knowledge of action strategies) are essential for behaviour change. However, knowledge was not turned into safe practices, not even by those vendors who had obtained formal training in food safety (9).

The study conducted in Malaysia on hygiene and safety of foods on street food vendors found a significant association between level of knowledge and race indicating the Malays had good knowledge of food safety (2). However, this might be due to the fact that the food vendors in the northern part of Kuching city are predominantly Malays. The analysis revealed that it was 4.039 times higher with good practice and 2.834 times higher with average practice of food safety among respondents with history of food safety training.

Street food vendors in most developing countries including Zimbabwe are currently not sufficiently organized and responsive to undertake the responsibility of their own training. Food vendors should be adequately educated on the role of food in disease transmission as well as on rules of personal hygiene and approved practices in handling street food. The legal implications of selling unsafe foods should be made clear to street food vendors. Basic infrastructures, like standard food cart, with facilities of storage, cooking, washing and system for waste disposal, selection for proper sites away from dump, drains, dustbins, etc. is also required to provide hygienic foods to the consumers(2).

2.2.3. Attitudes and practices of street food vendors towards food hygiene and their food safety practices

The study done in India by WHO (2000) revealed that the successful food hygiene training and the consent of safe food handling practices learnt during training are critical elements in the control of food-borne illnesses throughout the world. It is true for food handlers and vendors belonging to all sectors. But, it is all the more urgent for street vendors because they are more exposed to environmental hazards and are predominantly from much weaker socioeconomic backgrounds and yet cater to the general mass(5).

Using a cross-sectional study design a sample of 80 street food vendors were selected and provided with training to evaluate the existing Attitude and Practice regarding food safety and hygiene and the change of the same after training interventions. Responses regarding KAP on food safety and hygiene before and after training revealed that there was a significant change in their perception to food safety knowledge and also practices. The knowledge level of the food vendors increased from an average 24.35% to 66.2% after training interventions. The overall performance rating of full adoption of good hygiene practices by the vendors ranged from 37.5% to 50.8% in post-training period (1).

2.2.4. Perceptions of street food vendors about consumer behaviors and attitudes towards street food health risks and sanitary conditions

Attitude of consumers to the hazards of street food Consumers are the major risk bearers of the consequences of street food safety. The attitude of consumers to safety of street food varied and is dependent on some socio-economic factors. While some are cautious of where and how they purchase the street foods because of their knowledge of the hazards attached are beclouded with the urgency to satisfy their culinary drive and enjoy the gustatory attributes attached to the street foods(3).

Consumer's attitude and perception of hazards in street foods is often driven by their level of education, income, knowledge of food safety, age and gender. Literature reported varied effect of these factors on the attitude of consumers to safety of street food and their perception of hazards inherent in its consumption. For instance, while Alimi et al. and Bekerroum separately reported that education and income positively affected perception of consumers on the hazards of street foods in Nigeria and North Africa respectively(8).

The reports of Liu et al. and Sama-pundo et al. were to the contrary for street food consumers in China and Haiti. Alimi et al. had reported in their study that consumers with higher education were more conscious of possible health risks inherent in street food because of the information at their disposal while those with higher income would rather patronize regulated fast food outlets and supermarkets though expensive. Liu et al., Samapundo et al. and Asiegbu et al. reported a surprising trend where barely literate consumers had higher food hazards consciousness than highly educated consumers in China, Haiti and South Africa respectively (14).

2.2.5 Summary

Street foods are perceived to be a major public health risk. The majority of countries reported contamination of food (from raw food, infected handlers and inadequately cleaned

equipment), time and temperature abuse to be the major factors contributing to food-borne disease. This was partly due to the fact that infrastructure development was relatively limited, with restricted access to potable water, toilets, refrigeration and washing and waste disposal facilities. Moreover, registration, training and medical examinations were not among the selected management strategies (5).Knowledge positively influences attitude formation, and the recipient's comprehension of health facts (12).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers information on the research design, population, sampling, research instrument and procedure for data collection, data analysis, validity and reliability, research ethics were considered in this study.

3.2 Research design

A quantitative approach, descriptive, cross sectional design was used. Firstly, it was quantitative in the sense that it measured all relevant variables objectively at a specific time and did not include an experimental or a control group. Secondly, it was cross-sectional, because the study was conducted in the present time to examine what currently exists and it was characterized by the fact that all data was collected at one time (9).

3.3 Population

Population is all elements (individuals, objects or substances) that meet certain criteria for inclusion in a study (11). In this study, the total population of the study was registered street food vendors in Windhoek Tobias Hainyeko constituency; estimated study population was 456 street foods vendors (15).

3.4 Sampling method

Stratified sampling method was used to select the sample, the master list of participant was taken from constituency counselor's office. Sample is a subset of the population that is selected for a particular study; the members of a sample are the subjects (11). Sample size was calculated at 5% by use of statically in *Epi info* computer software (15).The sample size was 96 street food vendors in Tobias Hainyeko constituency specifically.

$$n = N$$

$$\frac{1}{1+N \times \alpha^2}$$

n = is the sample size, N= is the total population

And α = is the confidence limit 5% or 0.05

Thus N=456 and. n=96

3.5 Research Instrument

The research instrument, namely the structured questionnaires was developed. Questionnaire format and sections used from previous studies in other countries on food safety knowledge level and hygiene practice of street foods vendors were adapted and modified for the use of this study. The questionnaire contained four sections: *Section A* captured the demographic characteristics of the participant; *Section B* captured health risks associated with street food vending. *Section C* captured the knowledge of street food vendors with regard to food hygiene and safety and *Section D* captured attitudes and practices of street foods vendors towards food hygiene and safety.

3.6 Procedure for data collection

Data collection approach for this study was self-administered questionnaire to all the registered street food vendors in Tobias Hainyeko constituency. Two method of data collection were used, first it was self-administered questionnaire to street food vendors to collect data on knowledge and attitude and secondly it was observation in form of checklist in the questionnaire to collect data on practices related to food hygiene and safety.

3.7 Data cleaning

Data cleaning was done together with data entry and there were 3 questionnaires that were incomplete.

3.8 Data analysis

Data was analysed based on knowledge, attitude and practices variables of street foods vendors towards food hygiene and safety, according to their responses. Data was then presented in figure and table form for easy presentation. The chosen method made the data easy to interpret at the first glance, observational data was coded to facilitate statistical analysis. All numerical data was analysed using descriptive statistics. Categorical data was analysed using frequencies. The questionnaires were coded before data entry. Collected data was then prepared for data entry into the computer. After the data entry has been completed, the researcher checked all the records with the original data. The few items that had been skipped or had a wrong entry were corrected. This process also included checking and editing the collected data and eventually, cleaning, coding (systematically reorganising raw data into a computer readable format) and analysing them, using (15).

As each questionnaire was coded, that particular number was transferred to the computerised data base to keep track of the data source once it was transferred. Frequency distribution tables, graphs, descriptive statistics like measure of central tendency and measures of variability were used. Descriptive statistics was also used. Descriptive statistics are computed to reveal characteristics of the sample data set. In this study, the data was analyzed by using statistical package for social science (SPSS) and it was used to generate tabulated reports to present the findings (11).

3.9 Research Ethics

Firstly, the researcher got approval from School of public health. Secondly, the research proposal and summary got approval from University of Namibia postgraduate study committee and lastly clearance and approval from the Ministry of Health and Social Services Research Ethical Committee. Use of other people's work was acknowledged. The researcher obtained informed consent from individuals and UNAM gave the permission. Respect will be

based on the right to self-determination, to privacy, to anonymity and confidentiality and scientific integrity. Participation was at all times voluntary and no one was forced to participate in this study. In this case, individuals had the right to decide whether or not to participate in a study, without the risk of penalty or prejudicial treatment. To ensure privacy, the researcher made sure that the collected information was stored in the locked cabinet. To ensure justice, the researcher selected the participant for the reason specifically related to research problem but not simple because they are readily available and the researcher avoided favoritisms and false promise to the participants. To ensure beneficence, the researcher secured the well-being of the participant, who had the right for protection from harm and discomfort, be it psychological, physical emotional and social or legal. If there is any intention of harming in the research it has to be abandoned or investigated to allow ethical manners. The researcher tried to avoid harming the participant in any way by careful structured questions in the questionnaires and monitoring the participant for any sign of discomfort, if any sign of distress occurred the researcher should facilitate the debriefing by giving the participant the opportunity to ask questions.

3.10 Validity and Reliability

The validity of an instrument determines the extent to which it actually reflects or is able to measure the construct being examined (11). In this study, content validity was used, whereby instrument represents all the components of the variable to be measured. To insure the valid of the instrument, the instrument was assessed and reviewed by experts such as the main supervisor of this study, research committee and the senior staff within Ministry of Health and Social Services.

The reliability of an instrument denotes the consistency of the measures obtained of an attribute, item, or situation in a study or clinical practice (11). In this study, self-structured questionnaire was used as an instrument. For it to be reliable, both instruments were

containing the same questions and consistently informant regarding safety food knowledge level and hygiene practice of street foods vendors on foodborne disease and it provided the values to ensure that participants do understand the questions. The instrument was administered to the participants whom are street foods vendors and they have an understanding regarding street foods. Face and content validity were ensured through the peer review of the questionnaire; ensuring that questions were consistent with the training material and the questionnaire was piloted to test the definitions and to ensure that ambiguity is addressed.

3.11 Summary

The cross-sectional, descriptive, quantitative research was conducted. Considering 95% confidence level, the total of 96 street vendors were systematically selected from the total of 456. A self-administered questionnaire was used to collect the information. Validity and reliability were ensured. The statistical tool SPSS Statistics was used for descriptive statistical analysis, with results presented in tables. Research ethics were adhered to.

CHAPTER 4: RESULTS

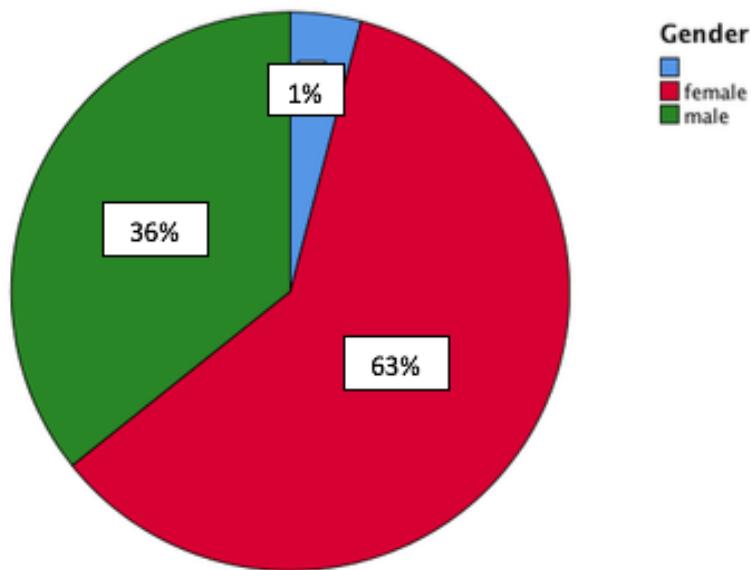
4.1 Introduction

In this chapter, the researcher presents the results of the data collected through the self-administered questionnaire from a sample of street food vendors at Tobias Hainyeko Constituency Windhoek, Khomas region, Namibia. The results of this study are illustrated using tables and pie chart.

4.1.1 Demographic characteristics of the respondents

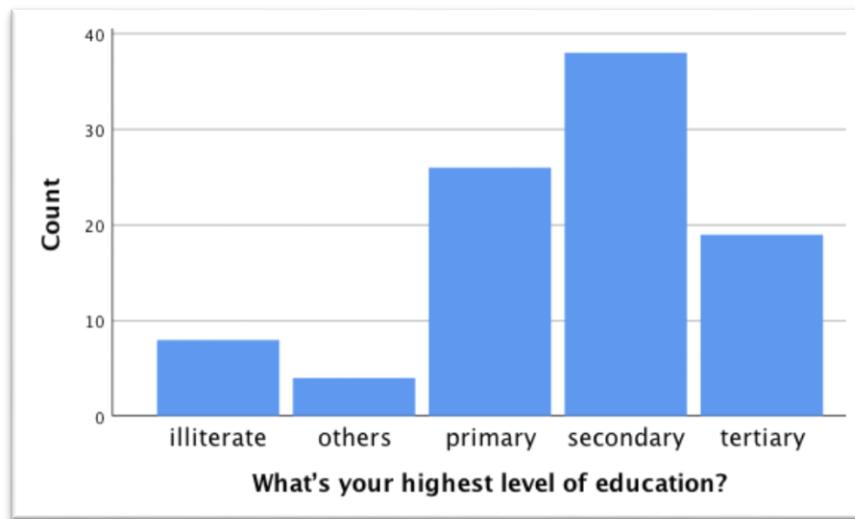
The researcher targeted a sample of 96 street foods vendors in Windhoek Tobias Hainyeko constituency. A total of 96 self-administered questionnaires were distributed to all the registered street food vendors in Tobias Hainyeko Constituency. A total of 96 questionnaires were completed. The study revealed that 63% (n=60) of the participants were female, 36% (n=35) were male and 1% (n=1) of the participants did not specify their gender as shown in figure 1 below.

Figure 1: Gender percentage representation of participants



The participants were between the ages of 13 and 51 who spoke different languages, including English, Oshiwambo, Afrikaans, Herero, Tswana and Rukwangari. It is shown in figure 2 below that 40% (n=38) of the vendors went to school until secondary level, 20% (n=19) have tertiary qualifications, 27% (n=26) ended at primary school level and 9% (n=9) of the participants are illiterate.

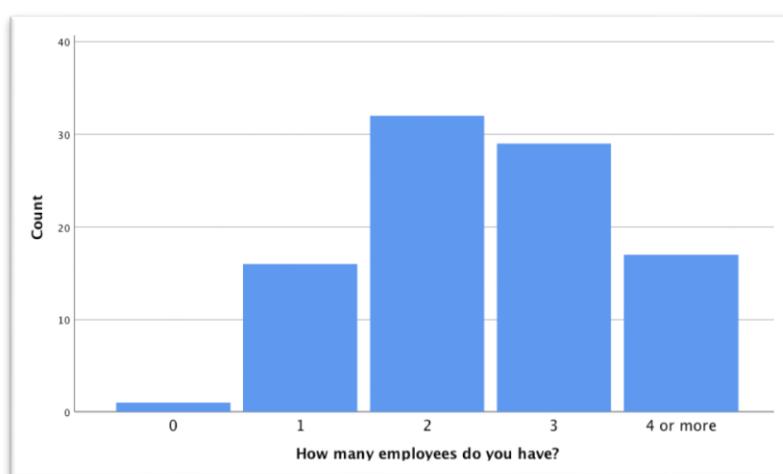
Figure 2: Distribution on the basis of highest level of education



Source: Researcher Field Work, 2019

Statistics shows that 68% (n=65) street vendors are the owners of the businesses or they are the ones who manage the businesses, thirty percent (30%) (n=29) have employed 3 people, 32% (n=31) have employed 2 other people, 19% (n=18) of the vendors have employed 4 or more other vendors, 18% (n=17) have 1 employee and only 1% (n=1) did not employ anyone as shown in figure 3 below.

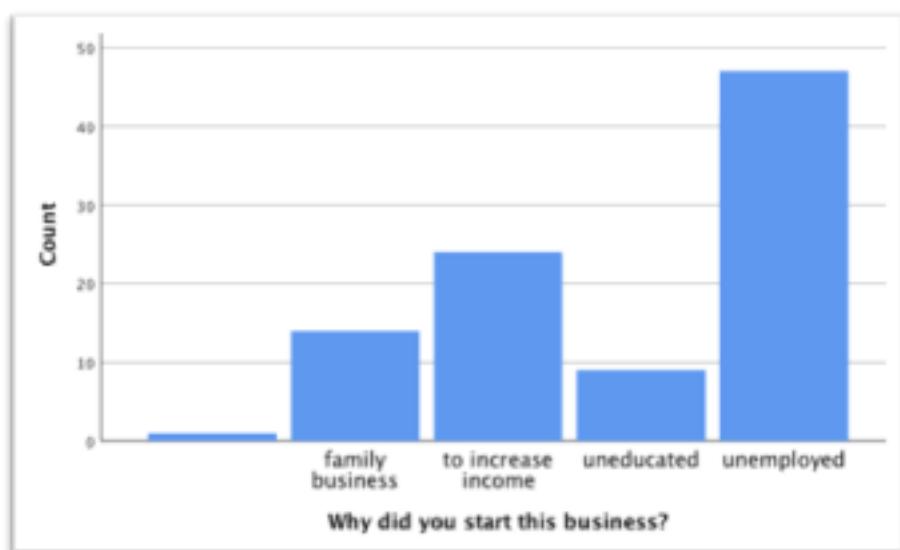
Figure 3: Distribution on the basis of Number of employees



Source: Researcher Field Work, 2019

When the vendors were asked how long they have been selling food, 36% (n=35) of the participants indicated that they have been in the business for at least 2 years, 11% (n=11) for 1 year, 27% (n=26) for 3 years and only 22% (n=21) of the vendors have been in the business for 4 or more years. Results also show that 50% (n=48) of the vendors started selling food as they are unemployed; 25% (n=24) vendors sell with the aim of increasing their income, 15% (n=14) are selling because it is their family business and 9% (n=9) are vendors as they are uneducated as shown in figure 4 below.

Figure 4: Distribution on the basis of reasons for starting the business

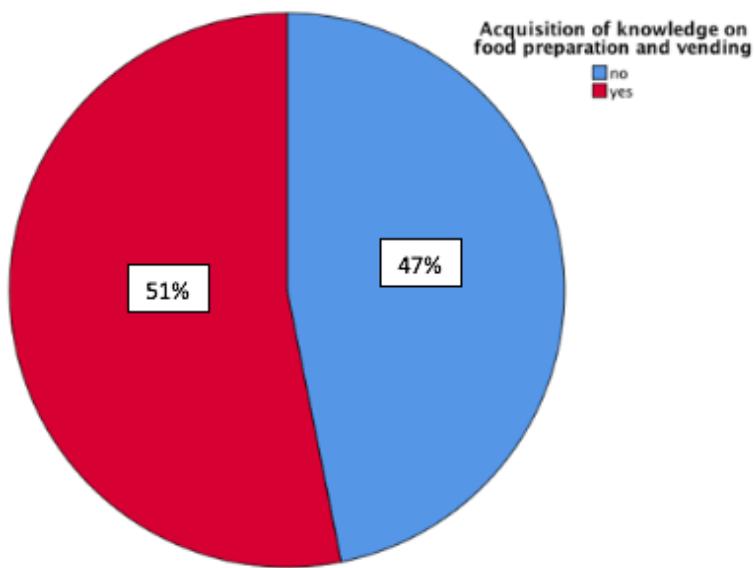


Source: Researcher Field Work, 2019

4.1.3 Level of knowledge of street food vendors with regard to food hygiene and safety

The knowledge of street food vendors with regard to food hygiene and safety was captured. The vendors were asked about their knowledge and practices regarding food hygiene and safety. The results show that 53% (n=51) of the vendors have knowledge about food preparation and vending while 47% (n=45) of the vendors do not have that knowledge as shown in figure 5 below.

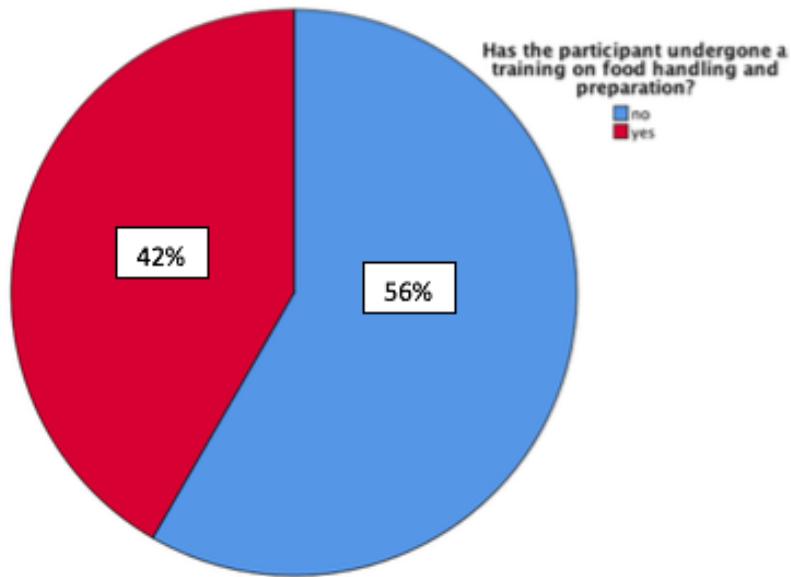
Figure 2: Acquisition of knowledge on food preparation and vending



Source: Researcher Field Work, 2019

It is also indicated that only 42% ($n=40$) of the food vendors have participated in a training on food handling and preparation while 58% ($n=56$) of the vendors did not attend any training as shown in figure 6 below. From the 40 vendors who have participated in a training on food handling and preparation, 30 of them cook food adequately when preparing food. Only 19 (40%) vendors of those that did not participate in a training on food handling and preparation do not cook food adequately. Additionally, 22 vendors of the 40 vendors who have participated in a training on food handling and preparation also have knowledge, beliefs concerning risk of food-borne illness and they have storage available with food covered and kept at a safe temperature.

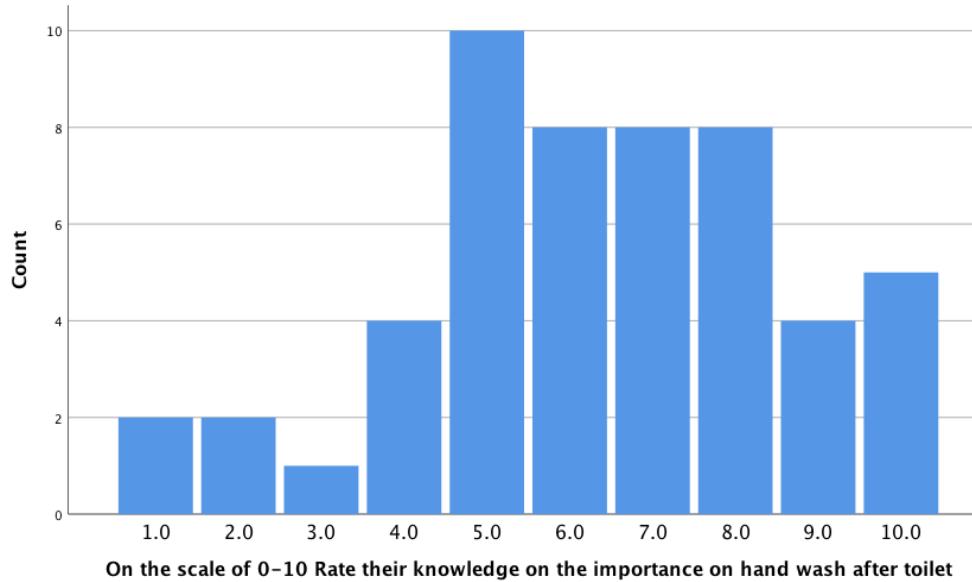
Figure 6: Distribution on the basis of Participation in training on food handling and preparations



Source: Researcher Field Work, 2019

In addition to training, the participants were asked if they are aware of laws about food security and only 51% (n=49) are aware of the laws. Additionally, 61% (n=59) of the vendors have knowledge and beliefs concerning risk of food-borne illness and 39% (n=37) vendors do not have the knowledge. On the scale of 0-10, 5% (n=5) of the vendors rated their knowledge on the importance on hand wash after toilet at a scale of 10, 25% (n=24) of the vendors rated their knowledge at a scale of 6, 7, and 8. 1% (n=1) of the vendors rated their knowledge at a scale of 3 and 4% (n=4) at 1 and 2 each as shown in figure 7 below.

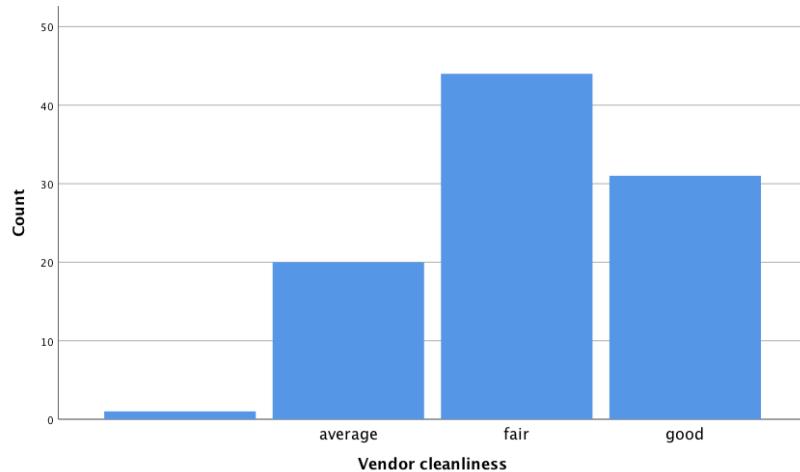
Figure 3: Knowledge on the importance on hand wash after toilet



Source: Researcher Field Work, 2019

In regards to food hygiene and safety, the vendors were asked if their surrounding vicinity is free of sources of contamination and 67% ($n=64$) of the vendors indicated that they are free. The vendors whose surrounding vicinity is free of sources of contamination, 41 of them are educated until secondary or tertiary level, thirty-seven (37) of the vendors whose surrounding vicinity is free of sources of contamination also avoid cross contamination, sixty five percent (65%) ($n=63$) of the vendors indicated that they have proper waste management. When asked how the vendors consider their cleanliness, 32% ($n=31$) of the vendors considered their cleanliness to be good, 45% ($n=44$) considered it to be fair, 20% ($n=20$) vendors showed that their cleanliness is average and 1% ($n=1$) of the participants did not specify as shown in figure 8 below.

Figure 4: Distribution on the basis of Cleanliness

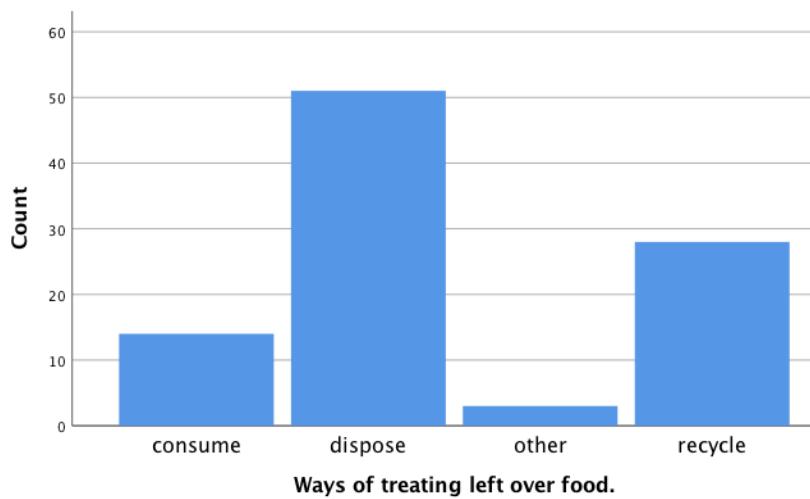


Source: Researcher Field Work, 2019

The participants were asked about the ways they treat leftover food and the results show that 53% (n=51) of the food vendors dispose the left-over food, 15% (n=14) consume the leftover food, 29% (n=28) recycle and the other 3% (n=3) of the vendors chose the other option as shown in figure 9 below.

The results also show that 15% (n=14) of the vendors keep their food for 10 hours before they dispose, 59% (n=57) keep the food for 24 hours and 21% (n=20) of the participants keep the food for 48 hours before disposal as shown in figure 9 below.

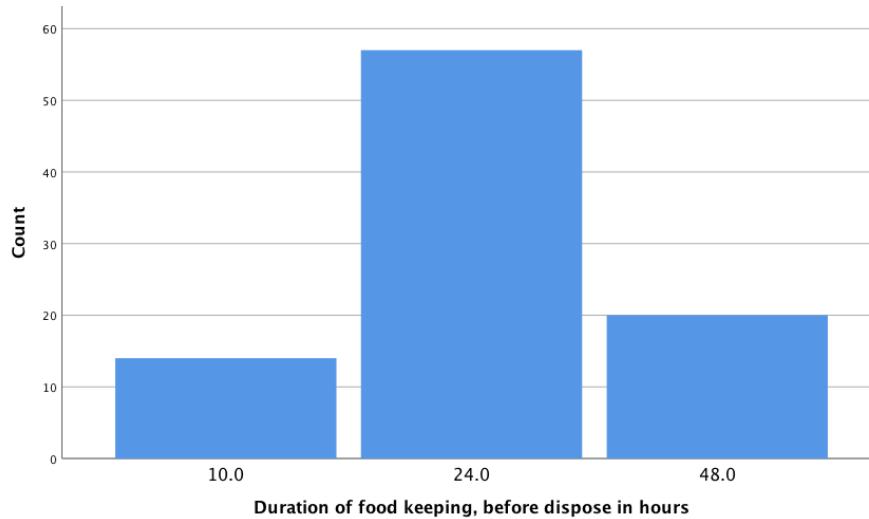
Figure 5 : Ways of treating left over food



Source: Researcher Field Work, 2019

The results also show that 15% (n=14) of the vendors keep their food for 10 hours before they dispose, 59% (n=57) keep the food for 24 hours and 21% (n=20) of the participants keep the food for 48 hours before disposal as shown in figure 10 below.

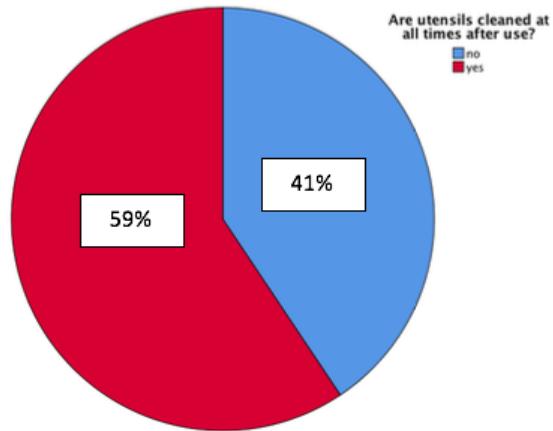
Figure 6: Duration of keeping food before dispose



Source: Researcher Field Work, 2019

The results show that 59% (n=57) of the vendors have their utensils cleaned at all times after use while 41% (n=39) do not have their utensils cleaned as shown in figure 11 below.

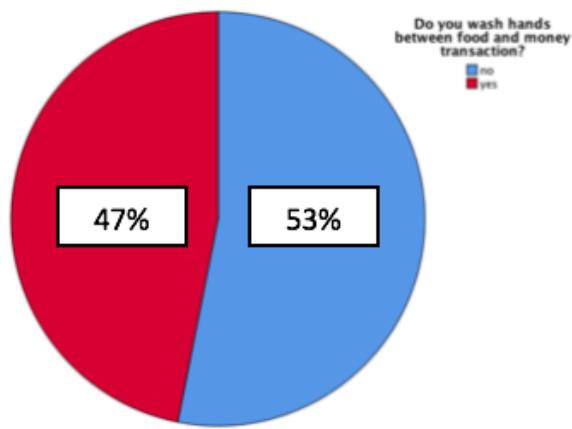
Figure 7: Cleanliness of utensils after use



Source: Researcher Field Work, 2019

Regarding storing food, only 38% (n=36) of the vendors use ice or cooler box when transporting perishable goods and 53% (n=51) of the vendors indicated that they provide proper food storage. When the participants were asked if they wash their hands between food and money transactions, only 47% (n=45) wash their hands and 53% (n=51) do not as shown in figure 12 below.

Figure 8: Wash of hands between food and money transactions



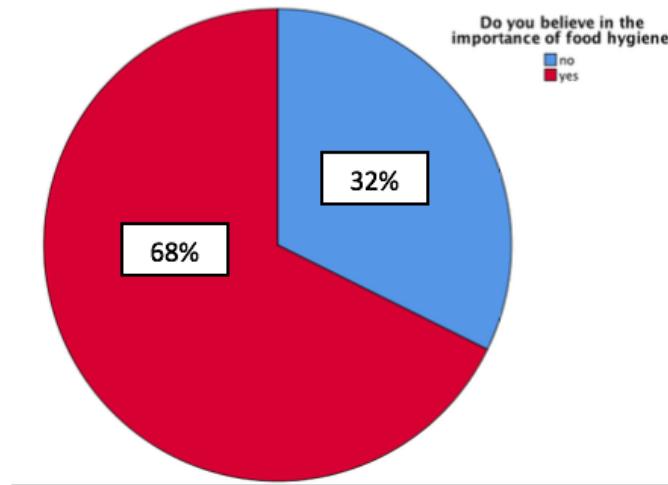
Source: Researcher Field Work, 2019

In situations where the vendor has a cut on the hand, 60% (n=58) of the vendors wrap their cuts when handling food and 40% (n=38) do not believe in hand washing after every gap.

4.1.4 Attitudes of street food vendors towards food hygiene and their food safety practices.

Data was collected to assess the attitude of street food vendors towards food hygiene and their food safety practices. Figure 13 below shows that 32% (n=31) of the vendors do not believe in the importance of food hygiene while 68% (n=65) of the food vendors believe in food hygiene. From the 65 vendors who believe in food hygiene, only 28 (43%) vendors have undergone training on food handling and preparation while from 31 vendors who do not believe in food hygiene, 19 (61%) vendors.

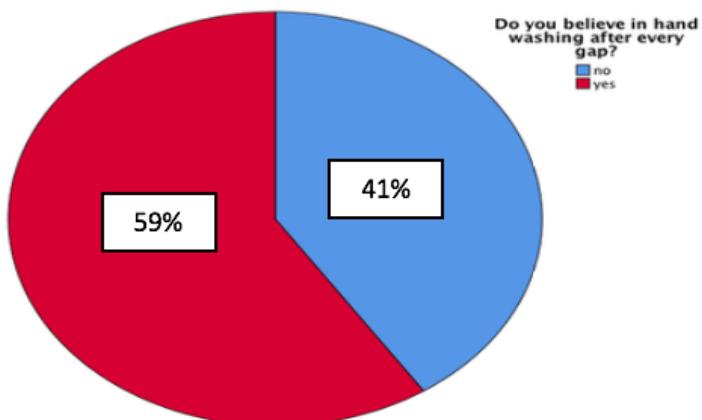
Figure 9: Believes in the importance of food hygiene



Source: Researcher Field Work, 2019

The results also show that 41% (n=39) of the vendors do not believe in hand washing after every gap while 59% (n=57) believe in the importance of hand washing after every gap as shown in figure 14 below.

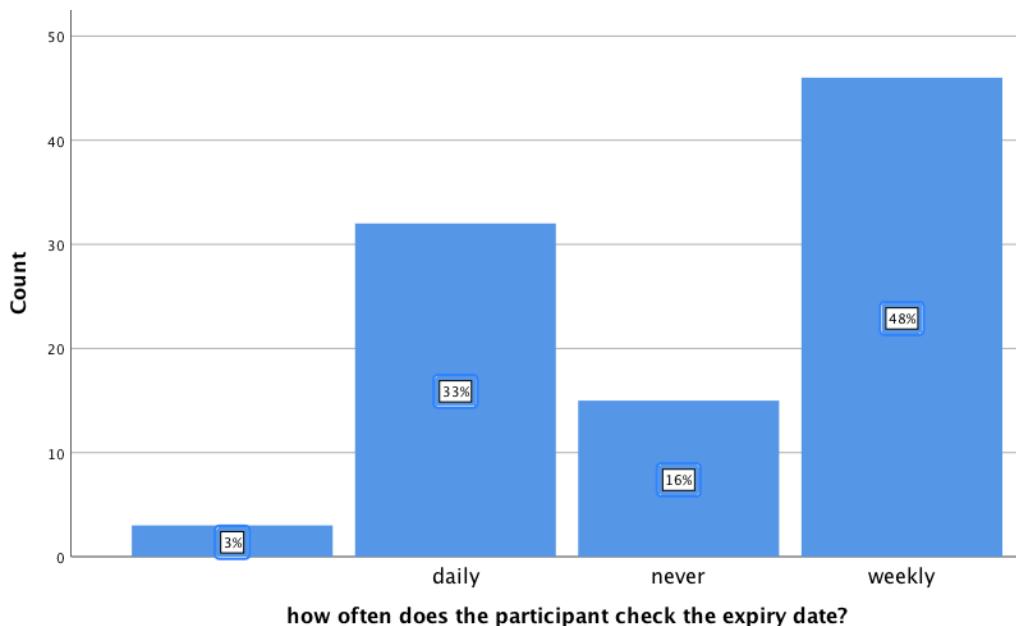
Figure 10: Believes in hand washing after every gap



Source: Research Field Work, 2019

In addition, 56% (n=54) do not dispose water after each time they wash their utensils, (77%), (n=74) of the vendors prepare the food at home and 51% (n=49) of the vendors sell food which is commercially processed. The results show that 48% (n=46) of the participant check the expiry date weekly, 33% (n=32) check the expiry date daily, 16% (n=15) never check the expiry date and 3% (n=3) did not specify as shown in figure 15 below.

Figure 11: How often the vendor checks the expiry date



Source: Research Field Work, 2019

4.1.2 Practices of food vendors regarding food hygiene and safety

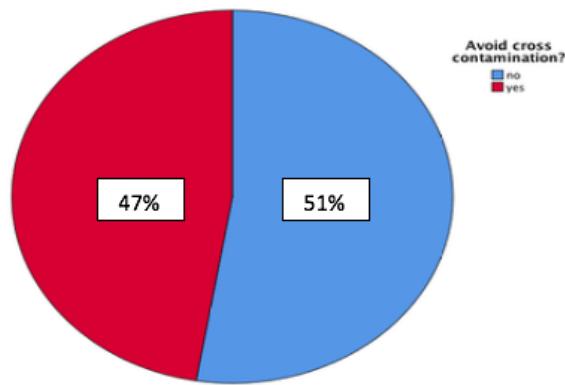
The researcher carried out an observation in order to observe the street food vendors adherence to good hygiene practices. Observations were done using a checklist in the questionnaire to collect data on practices related to food hygiene and safety. The researcher observed that 70% (n=67) of the vendors provide clean cutlery serving spoons and plates to the customers and 29% (n=28) do not. From the vendors who provide clean cutlery, 38 of

them either went to school until secondary level or tertiary level and also 32% of them went through training on food handling and preparation. On the other hand, out of 28% vendors who do not provide clean cutlery, 21% of them did not go through training on food handling and preparation.

The results also show that 58% (n=56) of the vendors provide a water basin to wash hands compared to the 40% (n=38) of the vendors do not provide water to wash hands as shown in the figure 16. Additionally, 57% (n=55) provide clean hand drying towels and also 69% (n=66) of the vendors have a bowl of water available for washing dishes and utensils. The vendors who provide water to wash hands are the ones who provide clean spoons and plates to customers, clean water to wash fruits and they also have clean hand drying towels available. The researcher also observed that only 55% (n=53) of the vendors keep black rubbish bags and 60% (n=58) wear aprons. 74% (n=43) of the vendors who wear aprons are the owners of the business and they also have their nails cut short and clean. The nails of 61% (n=59) of the vendors are cut short and clean and also only 53% (n=51) of the vendors have head caps available, for food protection against hair.

When it comes to food preparation, it was observed that 69% (n=66) of the vendors cook their food adequately while 29% (n=28) of the vendors do not. Vendors who cook food adequately are mostly above the age of 30 and 29 of them went to school until secondary level. As shown in figure 16, only 47% (n=45) vendors are observed that they avoid cross contamination and 51% (n=49) do not.

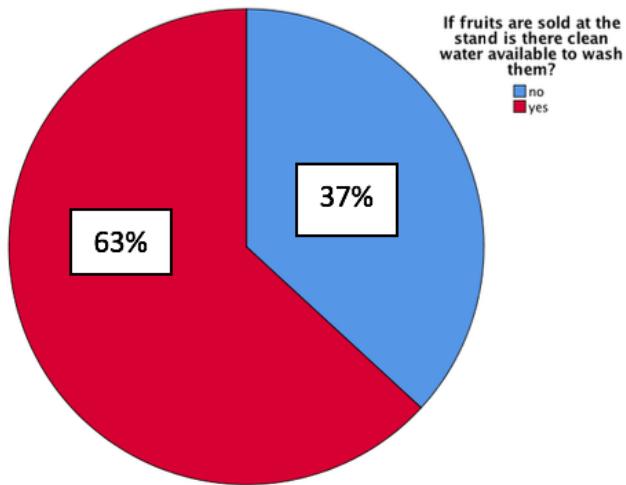
Figure 12: Avoidance of cross contamination



Source: Research Field Work, 2019

On the other hand, 54% (n=52) of the vendors have storage available to cover the food covered to be kept at a safe temperature. The results also show that 63% (n=60) of the vendors who sell fruits have clean water available for washing the fruits as shown in figure 17 below.

Figure 13: Availability of water to wash fruits



Source: Research Field Work, 2019

Table 1: below show the regression of age against adherence to good food handling practices

	Food handling	Coeff.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+-----						
Age	.0221303	.0067511	3.28	0.001	.008722	.0355386
_cons	2.376206	.1046849	22.70	0.000	2.168293	2.584119

From the above table, the null hypothesis is that age has no effect on adherence to good food handling practice. Rejection of the null hypothesis because the p-value is low (p value 0.001). Age has effect on good food handling practice.

**Table 2 : Shows Cross Tabulation between Food preparation
and participants undergone a training on food handling and
vending**

CROSS TABULATION

		Participants undergone training on food handling and vending			Total	
		1	No	yes		
FP	No	Count	1	1	0	2
		% within good food preparatio n	50.0%	50.0%	0.0%	100.0%
	No	Count	0	14	14	28
		% within food preparatio n	0.0%	50.0%	50.0%	100.0%
	Yes	Count	0	22	44	66
		% within FP	0.0%	33.3%	66.7%	100.0%
Total		Count	1	37	58	96
		% within FP	1.0%	38.5%	60.4%	100.0%

FP=FOOD PREPARATION

Table 3: Chi-Square Tests

	Value	Food preparation	Asymp. Sig. (2-sided)
Pearson Chi-Square	50.624 ^a	4	.001
Likelihood Ratio	12.527	4	.014
Linear-by-Linear Association	7.304	1	.007
N of Valid Cases	96		

Table 4: Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	.277	.118	2.798	.006 ^c
Ordinal by Ordinal	Spearman Correlation	.217	.105	2.155	.034 ^c
N of Valid Cases		96			

From the above chi-square test table the p –value is less than 0.05 then we reject the null hypothesis and conclude that there is dependence between the two variables.

4.2 Summary

In summary, it can be generally concluded that street foods are vended in Tobias Hainyeko constituency WindhoekCity under largely unsafe (unhygienic) conditions consisting of the dirty open air environments in which the foods compounded by poor food handling practices and often inadequate storage conditions.

CHAPTER 5: DISCUSSIONS

5.1 INTRODUCTION

In this chapter, the researcher discusses the results of the data collected through the self-administered questionnaire and observation from a sample of street food vendors at Tobias Hainyeko constituency Windhoek, Khomas region, Namibia.

5.1.1 Demographic characteristics of the respondents

The study results revealed that majority (63%) of the street food vendors are female compared to males who are 36%. This could be due to the fact that man may tend to shy and ashamed of selling foods in the street thus why woman are more involved in street food vendors, it can also be that some men are not supporting their family financial and woman tend to find ways of surviving by involved in the business of selling food. From the ages of the participants, the youngest vendors were male children of 13 and 14 years old. These children are supposed to be in school but have dropped to go sell in the streets. Results have shown that the vendors have been to school, with majority having secondary level education (40%) and 20% of the vendors are graduates who have not gotten jobs in their professions. Participants indicated that they turned to selling food in the streets because of several reasons. Half of the participants (50%) started selling because they are unemployed. Because of the lack of jobs in Namibia, the results reveal that most people, especially the youth sells in the streets in order to get an income. Other participants (25%) sell with the aim of increasing their income, as the income they receive from other sources is not enough to sustain themselves and their families.

5.1.2 Observations on Study Area

Questionnaire studies have been conducted in order to examine knowledge, attitudes, and self-reported practices of food handlers. Direct observation of food handlers is a more accurate way to assess the compliance of food handlers and food safety practices in foodservice establishments, and studies have shown lower compliance with food safety recommendations when relying on self-reports. The use of direct observation through checklists, inspection forms, paper and pencil, and notational analysis (recording frequency of observed events in an ordered sequence) are all useful, but there are limitations, because people tend to answer with what they think the observer deems appropriate and tend to change their behavior in order to please the observer.

Previous research states that food handlers tend to overestimate the frequency with which they carry out food safety practices either from being optimistic or social. Furthermore, mystery shopping through the use of direct observations is a way for the observer to observe a food handler without the food handler knowing they are being watched.

A variety of methods for recording and analyzing observed food safety practices has been used for the evaluation of consumer food safety behavior in recent times. In the UK, a risk-based checklist and scoring system has been developed to enable quantitative assessment of food safety in the domestic kitchen.¹⁹ Risk scores based on recent epidemiological data have been allocated to specific food-handling malpractices, using a logarithmic scale. A higher risk score represents implementation of more cumulative food safety errors and fewer control measures implemented.⁸⁵ Use of this technique has enabled comparisons to be made between different meal preparations, between specific behaviors and between and within meals.⁸⁶ In addition to this, comparisons between participant risk scores have enabled evaluation of a hierarchy of food safety education interventions. In addition, it has been considered that use

of a predetermined checklist should yield highly reliable results by virtue of its replicability.⁸² Use of notational analysis is another technique that has been used for the evaluation of observed consumer food safety behaviour.⁸⁷ The technique is used for objectively and systematically monitoring, recording and studying actions and events. Notation of actions has been frequently used for sports analysis, however, its approach has been applied to consumer food safety using a specially designed computer program, thereby providing detailed data denoting food handling malpractices.

5.1.3 Level of knowledge of street food vendors with regard to food hygiene and safety

The vendors were asked about their knowledge and practices regarding food hygiene and safety. An average amount fifty-three percent ($n=51$) of street food vendors have knowledge about food preparation and vending and only forty-two percent ($n=40$) have participated in a training on food handling and preparation. From the forty percent vendors who have participated in a training on food handling and preparation, thirty percent of them cook food adequately when preparing food. Additionally, twenty-two percent vendors of the 40% vendors who have participated in training on food handling and preparation also have knowledge, beliefs concerning risk of food-borne illness and they have storage available with food covered and kept at a safe temperature. The percentage of vendors who have gone under training is less, as FAO has recommended that every vendor of food should undergo a basic training in food hygiene before licensing(3). Additionally, only fifty-one percent of the food vendors are aware of laws about food security, 61% have the knowledge and beliefs concerning risk of food-borne. Only, 5% of the vendors rated their knowledge on the importance on hand wash after toilet at a scale of 10. This is worrisome as the vendors who work with food are expected to know the importance of washing hands after using the toilet. The lack of knowledge and training about preparing and handling food that the vendors possess could be the biggest contributing factor to the cases of food contamination.

Only 67% of the vendors indicated that their surrounding vicinity is free of sources of contamination which shows that the risk of food contamination is less and 66% of the vendors indicated that they have proper waste management. When asked how the vendors consider their cleanliness, only 32% of the vendors considered their cleanliness to be good. This percentage is worrisome as food vendors are expected to be clean, personal hygiene and it is important because human beings are the largest contamination sources of food. Some vendors in this study did not wear aprons or caps, and they handled food with bare hands.

The participants were asked about the ways they treat leftover food and the results show that 53% of the food vendors dispose the left-over food, 15% consume the food, 29% recycle and the other 3% of the vendors chose the other option. The results also show 21% of the participants keep the food for 48 hours before disposal which is worrisome as this can contribute to the growth of bacteria which may cause food borne illness to the consumers.

Only forty-seven percent of the vendors wash their hands between food and money transactions and fifty-three percent do not. This shows a bad attitude of vendors as not washing hands after handling money may cause contamination of food as it was pointed out in a study by Mensah et al. The results show that fifty-nine of the vendors have their utensils cleaned at all times after use. Regarding storing food, sixty-two percent of the vendors do not use ice or cooler box when transporting perishable goods. This is not a good attitude as this may lead to the food being spoilt while transporting them their marketing place. In addition, fifty-three percent of the vendors indicated that they provide proper food storage which is good for food not to get bad and avoid food contamination. In addition, forty-one percent of the vendors also do not believe in hand washing after every gap. The attitude of vendors not believing in washing hands is very dangerous as this may contribute to the risk of food borne illness to the consumers as the risk of food contamination is high. With the knowledge that the vendors possess, it is clear that the knowledge is not turned into safe practices (9).

5.1.4 Attitudes of street food vendors towards food hygiene and their food safety practices

Street food vendors have different attitudes towards food hygiene and their food safety practices. The results show that thirty-two percent of the vendors do not believe in the importance of food hygiene and forty-one percent do not believe in hand washing after every gap. These are bad attitudes of food vendors as this may increase the risk of food being contaminated. Checking the expiry date of food is important and yet 16% of the vendors never check the expiry date. This attitude could result in the street vendors selling expired food to their customers which can cause health risk issues. This situation can also be driven by the lack of or no law enforces to check on the activities of food vendors and probably food vendors do not see the need for providing soap. Proper hand and bowl washing should be done with soap under running water. Washing hands with clean water alone cannot prevent the transmission of microorganisms unless soap is added yet the study showed a significant number 41% not using clean water to wash hands.

5.1.4 Practices of food vendors regarding food hygiene and safety

The researcher observed that most vendors (70%) provide clean cutlery serving spoons and plates to the customers. The vendors had no choice but to mostly give clean cutlery as the customers are mostly watching them when they put food in the plates and therefore will demand to get clean cutlery. Because of this reason, the vendors (69%) have a bowl of water available for washing dishes and utensils after use. This could be because as Alimi et al. reported in their study that some consumers are more conscious of possible health risks inherent in street food, especially the ones with higher education. Even though clean cutlery are provided, an average (40%) number of vendors do not provide a water basin for their customers to wash hands which is less when it came to importance of hand washing this can be due to the fact that the vendors do not understand the importance of washing hands e, g

avoiding of cholera, hepatitis E and other food borne illness. The researcher also observed that the nails of some vendors (61%) are cut short and clean but 47% of the vendors did not have head caps available, for food protection against hair which is less percentage when it came to important of wearing hand cap as way of avoiding cross contamination of food, those hair may fall into foods and food may be contaminated and consumers may get sick.

When it comes to food preparation, it was observed that 69% of the vendors cook their food adequately and this can be that vendors are not getting ready on time, neither to plan or never had any training on how to cook adequately food. The way food vendors handle food in the street is a public health concern as this can contribute to the food being contaminated if food hygiene is not properly maintained. Only few vendors (47%) have shown that they avoid cross contamination by washing their utensils, by washing their hands between money handling and food, others did not avoid cross contamination as they were selling food that were not covered and others are sitting near the sewage drain.

In most cases the street food is uncovered for the whole day and the researcher observed that only 54% of the vendors have storage available to cover the food and of course food need to be covered to avoid contamination of food that may cause a health risk to the consumers. Therefore, there is need for intervention to make the street vendors cover their food. On the other hand, the researcher observed that 63% of the vendors who sell fruits have clean water available for washing the fruits. The customers mostly ask for water to wash their fruits from the street vendors, especially if they want to consume the fruit at that moment. This forces the vendor to always have water in order not to lose customers.

The results show that not all the street foods vendors understand the basic hygiene practices when selling and preparing foods as they do not wash their hands when handling food, some do not provide water for their customers to wash their hands and fruits. Due to the lack of

hygiene practices, some vendors tend not to avoid cross contamination of foods and they let the food uncovered, exposed to germs.

5.1.5 Observation of the handling practices of street food vendors in order to assess if the methods of food preparation, storage and presentation meet the required food safety standards.

This study observed the handling practices such as places where food is stored, sources of water for food preparation, source of meat, treatment of left-over food, exact kitchen or site for food preparation, poor hand washing practice among other factors are ways by which street foods could get contaminated due to lack of practice among street food vendors. It was observed that less than 50% of the respondents follow the due practice process and laid-down procedures. Researcher's observation which indicates that hand washing at each time during handling, preparing and serving foods and after toilet visits was exercised by only less than half of the respondents respectively which contradicts their responses. Furthermore the findings indicate that the handling of food with bare hands was practiced by great majority of the respondents.

5.1.5 Summary

In Summary, ninety six street food vendors participated in this study. Seventy seven percent entered the business due to unemployment. Sixty seven percent had been trained in food safety and eighty six percent were certified. Although most of the vendors could not list the 5 Keys to Safer Foods, their knowledge of the actual behaviors associated with each key was good. Attitude towards food safety was also positive since 81% percent strongly agreed with seven principles relating to food safety. Seventy one percent reported always observing the practice to ensure the prevention of cross contamination with a further eleven percent practicing this most times.

CHAPTER 6

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

6.1 Introduction

In this chapter the conclusions and recommendations emanating from the findings of this study are given. The possible limitations encountered in this study are also given.

The purpose of the study was to assess the knowledge, attitudes and practices of street food vendors with regard to food hygiene and safety in Tobias Hainyeko Constituency Windhoek, Khomas region, Namibia.

The specific objectives of the study were to;

- To assess the level of knowledge of street food vendors with regard to food hygiene and safety.
- To determine the attitudes of street food vendors towards food hygiene and their food safety practices.
- To determine the practices of food vendors regarding food hygiene and safety
- Observation of the handling practices of street food vendors in order to assess if the methods of food preparation, storage and presentation meet the required food safety standards.

6.2 Conclusions

The conclusions for this study are based and linked to the specific objectives as follows:

Objective 1: To assess the level of knowledge of street food vendors with regard to food hygiene and safety.

The study has shown that 35% of the vendors had no formal education, 58% taught themselves food preparation. The proportion of food vendors who have not been trained in food safety from the study population was 58% and 42% had been trained once ever since they joined the food vending business. Any intervention should therefore target organizing periodic training on food safety, food preparation, means of contaminating food, strictly regulating and monitoring activities of food vendors and organizing routine screening for food vendors on some selected medical conditions.

Objective 2: To determine the attitudes of street food vendors towards food hygiene and their food safety practices.

The study has shown that 47% of the vendors started food vending without going through the appropriate procedures. Poor environment of food vending site is a major determinant of food safety in the food vending industry. The planned intervention shall be aimed at improving the personal hygiene of food vendors and improving upon the sanitation conditions under which foods are prepared within the municipality.

Objective 3: To determine the practices of food vendors regarding food hygiene and safety.

This study identified factors such as places where food is stored, sources of water for food preparation, source of meat, treatment of left-over food, exact kitchen or site for food

preparation, poor hand washing practice among other factors are ways by which street foods could get contaminated due to lack of practice among street food vendors

Objective 4: Observation of the handling practices of street food vendors in order to assess if the methods of food preparation, storage and presentation meet the required food safety standards. This study observed the handling practices such as places where food is stored, sources of water for food preparation, source of meat, treatment of left-over food, exact kitchen or site for food preparation, poor hand washing practice among other factors are ways by which street foods could get contaminated due to lack of practice among street food vendors. Researcher's observation which indicates that hand washing at each time during handling, preparing and serving foods and after toilet visits was exercised by only less than half of the respondents respectively which contradicts their responses. Furthermore the findings indicate that the handling of food with bare hands was practiced by great majority of the respondents.

In conclusion, the results of this study show that food vending is one of the most popular businesses in Tobias Hainyeko constituency settings which employ a substantial fraction of the population of the urban dwellers. Similarly, the majority of food vendors had primary school education and only a small number of them had tertiary education, which implies their marginalization in the formal sector. This is further justified by the fact that the majority of them had no any formal training on food safety and hygiene, which is an important requirement for safe guarding consumers.

The findings of this study indicated that the majority of food vendors (96.4%) were aware that poor or lack of hand washing could lead to food borne illnesses and also the engagement of sick people in food handling, which implies food vendors are only partially and not completing ignorant of the very basic food hygienic practices. This could also be attributed to the findings that they had formal training in food safety and hygiene. However, over half did not know that eating undercooked food can cause same problem. Also, food vendors were not

aware of cross-contamination, improper cooking and lack of cleaning and sanitization of equipment's in triggering food borne illnesses. The results also indicate that the majority of food vendors could identify only 5 sources of food contamination (dirty equipment, foreign matter, food handler, poor storage / uncovering and contaminated water) and could not identify the other 6 sources of contamination (poorly cooked food, stale food, food ingredients, raw food, dish towel and cooking well in advance) except the few minority. The other food vendors' were completely ignorant of any source of food contamination.

6.3 Recommendations

The following recommendations are made based on the results and conclusions of the study.

6.3.1 Municipal Assembly

The practices of food vendors regarding food hygiene and safety

- Licensed street food vendors must be provided with facilities such as push cart by the municipal assembly for conducting their trade since some of the street vendors do not sell under decent environmental conditions.
- The municipal assembly should provide incentives for food vendors who are doing a good job in terms of personal and environmental hygiene.

The level of knowledge of street food vendors with regard to food hygiene and safety

- Health education which focuses on personal and environmental hygiene must be organized by the Municipal Assembly in collaboration with the Health Directorate for food vendors at every quarter. This recommendation, when implemented will help address the challenge the study found with poor personal and environmental hygiene.
- The municipal assembly must increase awareness about the benefits of observing proper food hygiene practices by food vendors.

6.3.2 The Environmental Health Department in City of Windhoek

The practices of food vendors regarding food hygiene and safety

- Medical examination of the street vendors should be done at least four (4) times a year and the law ensuring it must be enforced. This recommendation when implemented will improve upon the number of food vendors who have been screened to work in the food vending industry.

The level of knowledge of street food vendors with regard to food hygiene and safety

- The environmental health department should promote improved methods of preparing and selling food through the available media houses in order to reach most of the food vendors to improve upon food vendors 'knowledge on food preparation.

The attitudes of street food vendors towards food hygiene and their food safety practices

- Food vendors who have successfully undergone training must be given tag / certificate to be displayed at their vending stalls. This recommendation will help to easily identify food vendors who are not complying with the by-law which states that food vendors must be trained on food hygiene and safety before they are certified to sell food.

6.3.3 MINISTRY OF HEALTH AND SOCIAL SERVICES

The practices of food vendors regarding food hygiene and safety

- The government should encourage healthy food vending services, as it provides employment, cheap food, and wide variety of foods for the urban dwellers. The ministries of Health and Local government, legislation should be developed to recognize the street food industry by developing code of practice for street food vending.

- There should be an establishment of sub-units of committees like National Food and Drugs Board that would be involved in the regular checkup of sanitary conditions of fast food centers just like the Food Safety and Inspection Service (FSIS) UK.

6.4 Limitations

The study was limited to Tobias Hainyeko Constituency and cannot be generalized beyond this area.

6.5 Summary

The purpose of the study was to assess the knowledge, attitudes and practices of street food vendors with regard to food hygiene and safety in Tobias Hainyeko Constituency Windhoek, Khomas region, Namibia. It is of bad attitudes that most street foods vendors started food vending without going through the appropriate procedures. Poor environment of food vending site is a major determinant of food safety in the food vending industry. Health education which focuses on personal and environmental hygiene must be organized by the Municipal council of Windhoek in collaboration with the Health Directorate for food vendors at every quarter. Licensed street food vendors must be provided with facilities by the municipal assembly for conducting their trade since some of the street vendors do not sell under decent environmental conditions.

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ANNEXURE 1 : Unam Permission Letter

CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park
+264 61 206 3275/4662; Fax +264 61 206 3290; URL: <http://www.unam.edu.na>



RESEARCH PERMISSION LETTER

Date: 25/09/2018

Student Name: Shaanika E S

Student number: 201000644

Programme: Master in Public Health

Centre for Postgraduate Studies
Office of the Director
2018 -10- 05
University of Namibia
UNAM

Approved research title: Assessing the Knowledge, Attitudes and Practices of street food vendors with regard to food hygiene and safety in Windhoek, Khomas region, Namibia

TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

A handwritten signature in black ink, appearing to read "Hedimbi".

05 Oct 18

Date

Prof Marius Hedimbi

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail: directorpgs@unam.na

ANNEXURE 2 : MoHSS Permission Letter



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: 061 - 203 2537
Fax: 061 - 222558
E-mail: btjivambi@mhss.gov.na

OFFICE OF THE PERMANENT SECRETARY

Ref: 17/3/3 ES

Enquiries: Mr. B. Tjivambi

Date: 20 November 2018

Mr. Eliaser Shaanika
PO Box 62260
Katutura
Windhoek

Dear Mr. Shaanika

Re: Assessing the knowledge, attitudes and practices of Street food vendors with regard to food Hygience and safety in Tobias Hainyeko Windhoek, Khomas Region, Namibia.

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
 - 3.1 The data to be collected must only be used for academic purpose;
 - 3.2 No other data should be collected other than the data stated in the proposal;
 - 3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;

A handwritten signature in black ink, appearing to read "M".

- 3.4 A quarterly report to be submitted to the Ministry's Research Unit;
- 3.5 Preliminary findings to be submitted upon completion of the study;
- 3.6 Final report to be submitted upon completion of the study;
- 3.7 Separate permission should be sought from the Ministry for the publication of the findings.
4. All the cost implications that will result from this study will be the responsibility of the applicant and **not** of the MoHSS.

Yours sincerely,



"Health for All"

ANNEXURE 3 : Consent to participate in Research

**UNIVERSITY OF NAMIBIA
CONSENT TO PARTICIPATE IN RESEARCH**

**TITLE: ASSESSING THE KNOWLEDGE, ATTITUDES AND PRACTICES OF
STREET FOOD VENDORS WITH REGARD TO FOOD HYGIENE AND SAFETY IN
TOBIAS HAINYEKO DISTRICT WINDHOEK, KHOMAS REGION, NAMIBIA**

Researcher: ES SHAANIKA

Dear participant

I am ELIASER SHAANIKA registered with University of Namibia, doing a Master degree in Public health. I wish to conduct a research project on the above titled. The study will be conducted under the supervision and guidance of Dr. H, IITA and MR D.HAUFIKU School of Public Health, University of Namibia.

Your participation will provide information that might enable decision makers to assist in this regard. Participation in this study will take approximately 25-30 minutes. The procedure includes responding to questions on demographic, knowledge and practices. Meanwhile a check list will be used by the researcher.

Your participation in this study is voluntary and you have the right to withdraw at any time should you feel so. You should feel free to ask the researcher to clarify the question where you don't understand and you will be expected to answer all questions. You will receive the questionnaire and fill it on your own at the time of study and hand it to the researcher. The study data will be coded so they will not be linked to your name. Your identity will not be revealed during the study or when the study is being reported or published with the permission granted by the Ministry of Health and Social Services for the benefit of improving waste

UNIVERSITY OF NAMIBIA CONSENT TO PARTICIPATE IN RESEARCH

segregation in the two hospitals. The researcher and the supervisors are the only people that will have access to the data collected.

You are among the study population of the building construction workers in Windhoek area. This company is selected on a randomly selection criteria.

Should you agree to participate, please sign your consent with full knowledge of the nature and purpose of the study?

If you have any questions or concerns about the research, please feel free to contact Mr. ELIASER SHAANIKA cell 0816414737 or E-mail: shaanikaelly@gmail.com. The main supervisor Dr. H, IITA and Co-Supervisor: Dr.D.HAUFIKU at: Faculty of Health Science, School of Public Health, at the University of Namibia.

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims or rights because of your participation in this research study.

Should you agree to participate, please sign the consent provided. If you have any question that need clarification you are welcome to contact me.

**UNIVERSITY OF NAMIBIA
CONSENT TO PARTICIPATE IN RESEARCH**

I.....Ndlalimelke P - I Canine.....

Agree to participate in this research project on my own will.

Signed atWindhoek.....

.....Ndlalimelke.....

.....1 Dec 2018

Date

Thanks for your corporation

ANNEXURE 4: Data Collection Tool

RESEARCH QUESTIONNAIRE

TITLE: ASSESSING THE KNOWLEDGE, ATTITUDES AND PRACTICES OF STREET FOODS VENDORS WITH REGARD TO FOOD HYGINE AND SAFETY.

COMPILED BY: ELIASER S SHAANIKA

STUDENT: 201006644

COURSE: MASTER OF PUBLIC HEALTH

QUALIFICATIONS: HONORS DEGREE IN NURSING

INSTITUTION: UNIVERSITY OF NAMIBIA

SUPERVISOR: DR H.IITA

MR D.HAUFIKU

Dear Respondent

My name is Eliaser, I am a student at University of Namibia Mastering in public Health. I will undergo a research study on a topic entitled “Assessing knowledge and Attitude on food practice and safety amongst street food vendors”, this will help assess knowledge on food hygiene, safety and practices. This structured questionnaire and checklist will be provided in an interview to which is aimed at soliciting information on the topic under study. I will therefore be grateful if you would take time off your busy schedule and answer the questions for me. We assure you that any information provided will be treated with maximum confidentiality.

Your participation will be highly appreciated.

Eliaser S Shaanika

The questionnaire will consist of two Section: Section A & B

Read through carefully and please adhere to the following instructions:

1. Complete by making **X** in the applicable column.
2. Answer all question in section **A** and **B**.
3. You are highly required to answer all questions accurately and honestly.
4. Please do not write your name on the paper, to remain anonymous.

SECTION A: General Information

(Mark with an **X** at the appropriate answer.)

No	Questions	Answers			
1.	Are you the Owner or Manager of the business?	Yes.....		No.....	
2.	How many employees do you have?	1	2	3	4 or more
3	How long have you been running this business?	1	2	3	4 or Years
4	Why did you start this business?	i) Family business... ii) Unemployed..... iii) To increase income..... Iv) Uneducated.....			
5	What's your highest level of education?	i) Illiterate..... ii) Primary..... iii) Secondary..... IV) Tertiary..... v) Others.....			
6.	Age of Respondent	i).....			
7.	Gender	Female			

		Male	
8.	Language	English	
		Afrikaans.....	
		Oshiwambo...	
		Others (specify)	

SECTION B

1. Adherence to good hygiene practices on street food vendors (Observed the Researcher).

(Tick in the appropriate box/ space below)

Questions	Yes	No
1.1 Food handling, are clean “cutlery” serving spoons and plates provided?		
1.2 Water basin to wash hands and sanitary available?		
1.3 Food preparation, is food cooked adequately?		
1.4 Personal hygiene, are nails cut short and clean?		
1.5 Head cap available, for food protection against hair?		
1.6 A bowl or bucket for washing dishes and utensils?		
1.7 Are there black rubbish bags available?		
1.8 Avoid cross contamination?		
1.9 Storage available, is the food covered and kept at a safe temperature?		
1.10 If fruits are sold at the stand is there clean water available to wash them?		
1.11 Aprons		
1.12 Clean hand drying towels available?		

2. Knowledge and practices of food hygiene, safety amongst street food vendors.

2.1 Surrounding vicinity free of sources of contamination. **YES/NO**

2.2 Acquisition of knowledge on food preparation and vending. **YES/NO**

2.3 Has the participant undergone a training on food handling and preparation? **YES/NO**

2.4 Awareness of laws on food 5 keys of food safety. **YES/NO**

2.5 Knowledge, beliefs concerning risk of food-borne illness. **YES/NO**

2.6 Proper waste management available? **YES/NO**

(Answer by crossing the answer provided by participant. E.g.-~~good~~)

2.7 On the scale of 0-10 Rate their knowledge on the importance on hand wash after toilet use

0

2.8 Vendor cleanliness. **Average, Fair, Good.**

2.9 Duration of food keeping, before dispose. **10ahour, 24Hr, 48Hr, Others.....**

2.10 Ways of treating left over food. **Consume, Recycle, Dispose, Others.....**

3. Attitudes and practices of food hygiene, safety amongst street food vendors.

Cross with an X the appropriate answer:

3.1 Do you wash hands between food and money transaction? **YES/NO**

3.2 Do you use Ice/cooler box when transporting perishable goods? **YES/NO**

3.3 Are utensils cleaned at all times after use? **YES/NO**

3.4 Is proper food storage provided? **YES/NO**

3.5 If any abrasion or cuts on fighter or hands are they wrapped when handling food?

YES/NO 3.6 Do you believe in hand washing after every gap? **YES/NO**

3.7 Do you believe in the importance of food hygiene. **YES/NO**

3.8 Do you dispose water after each time you wash your utensils? **YES/NO**

3.9 Is the food home prepared? **YES/NO**

3.10 If No, is the food sold commercially processed, **YES/NO.**

If Yes how often does the participant check the expiry date? **Daily, weekly, never.**

The End

Thank you!!!!

ANNEXURE 5: Ethical Check List

ETHICAL CHECKLIST
THE UNIVERSITY OF NAMIBIA
School of Public Health

Name of Student: Eliaser Shaanika

Student Number: 201000644

**Research Title: ASSESSING THE KNOWLEDGE, ATTITUDES AND PRACTICES
OF STREET FOOD VENDORS WITH REGARD TO FOOD HYGIENE AND
SAFETY IN TOBIAS HAINYEKO DISTRICT WINDHOEK, KHOMAS REGION,
NAMIBIA.**

Date: 24 JULY 2018

Main supervisor: Dr. H.Iita

Co-Supervisor: Mr. D. HAUFIKU

Ethical Principles and Guidelines for the protection of human subjects of research

Representatives and committees can assess the following principles and its compliance within research proposals of Post graduate students in the recommendation of ethical approval by UNAM RPO.

1. PREVENTION OF HARM AND ENSURING GOOD TO RESEARCH PARTICIPANTS

1.1 Can this study be done without using human subjects?

Yes	
No	X

1.2 Are vulnerable persons participating in the study? (Infants, children, prisoners, Mentally impaired, non- autonomous persons, over exposed research subjects)

Yes	
No	X

1.3 Did student motivate the appropriateness of including vulnerable subjects in study?

Yes	X
No	

1.4 Did the student ascertain and explicitly described the possible harm that may ensue from the research?

(Physical, emotional, psychological, social, economic, legal harm, should be considered) It is not acceptable to just state that no harm will follow because being embarrassed or uncomfortable is also harmful)

Yes	X
No	

1.5 Did the student consider and describe the benefits of the research to the participants?

(Not the significance of the study, but advantages to participants).

Yes	x
No	

1.6 Is the description of risks/benefits included into the informed consent?

Information to participants?

Yes	X
No	

1.7 Does the committee think that the students' assessment of 1.1 - 1.6 is reasonable?

(Depending on the risks involved in the study, the benefits to participants should be Satisfactory = risk/benefit ratio must be considered)

Yes	x
No	

2. RESPECT FOR RESEARCH PARTICIPANTS

Did the student indicate the following in the research proposal?

2.1 The information that will be provided to research participants (purpose; risks; benefits; procedures; expectations from participants; opportunity to ask questions and seek Clarification; why participants were selected and research responsible for research and his/her contact number)

Yes	x
No	

2.2 How researcher will ensure that participants and third parties (children and challenged comprehension situations) understand the information that is provided.

Yes	x
No	

2.3 How informed consent will be obtained from participants/third parties

(Preferably by written consent form that provides all information and contact details of the researcher. Researcher and participant get copies of document)

Yes	x
No	

2.4 Considerations of voluntariness of research participation (by ensuring no undue reward, coercion and opportunity to withdraw from study)

Yes	x
No	

3. FAIRNESS TO RESEARCH PARTICIPANTS.

3.1 Did the student motivate the appropriateness of including specific Participants to the study? (Adults before children; non-institutionalized persons before institutionalized persons; overburdened participants; researched fatigue classes of persons)

Yes	x
No	

3.2 Is any researcher biases present with the selection of research participants?

(These include any social, racial, sexual, cultural biases. Students should have Considered fairness regarding any unjust social patterns e.g. selecting racial Minorities, the economically disadvantaged, sick and dependent persons; readily Available) persons; administrative convenient reasons for selection or easily manipulated persons)

Yes	
No	x

Supervisors should assist students in considering all these ethical issues before research proposals are submitted for ethical assessment and clearance of proposals.