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## ***ASSESSING FOOD HYGIENE KNOWLEDGE, ATTITUDE, AND PRACTICES AMONG FOOD VENDORS IN GADAU TOWN, BAUCHI STATE***

Aminu Samaila Lassi<sup>1</sup>, Usman Adamu Gaskuwa<sup>2</sup>, Yau Adamu<sup>1</sup>, Mohammed Haruna Barma<sup>3</sup>,  
Isyaka Jibrin<sup>4</sup>

### Abstract

*This study assessed the knowledge, attitude, and practices towards food hygiene among food vendors in Gadau town, Bauchi State. A total of 75 questionnaires were returned, representing a 90% response rate. The results showed that most food vendors were young, with a mean age of 25, and predominantly female (65%). Many had secondary education as their highest level of education (47%), and lacked formal food safety training, contributing to unhygienic conditions. While most respondents understood the importance of safe food handling, they performed poorly in key practices, such as proper handwashing and food storage. The study highlights the need for regular training, medical examinations, and enforcement of food safety regulations to protect public health..*

**Keywords:** *Food hygiene, poisoning, public health, Bauchi, disease, diarrhea, handwashing*

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<sup>1</sup> Department of Public Health, Saadu Z|ungur University, Bauchi State, Nigeria

<sup>2</sup> Department of Human Physiology, Saadu Z|ungur University, Bauchi State, Nigeria

<sup>3</sup> Yobe State College of Agriculture Science and Technology Gujba Damaturu, Yobe State, Nigeria

<sup>4</sup> Medical Center, Federal Polytechnic Bauchi, Bauchi state, Nigeria

## 1.0 INTRODUCTION

### 1.1 Background of the Study

Food hygiene means a certain condition or measure that is needed to ensure the safety of our food from production to consumption (Barth et al., 2021). Food basically work to satisfy hunger and biological needs. It is likewise important to sustain our life in order to do works such as house chores, study, working and exercising. Food now can be rejoicing in either at home or outside (Akonor and Akonor, 2013; Barth et al. 2021). This is because increasing in individuals' numbers eating out have begun the emergence of food borne illness due to unhygienic preparation. According to Public Health Specialist, providing food in an unsafe and inadequate manner at food premises also cause unsafe food that can cause illness such as food poisoning, typhoid, hepatitis A, cholera and dysentery. Apart from diarrhoea, serious complications also can be triggered by food-borne illnesses like kidney and liver failure, brain and neural disorders, reactive arthritis, cancer and even death. Over 100 countries have been reported using "the five keys to food safer" as an international reference sources. It being was recognized as a standard way of producing and maintaining safe food (Alapati, 2013). They are kept clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures and use safe water and raw materials. Can cause foodborne illness such as Salmonella that can be present on egg shells or inside the eggs and *Shigella*, a bacterium spread from individual to individual (Santra, 2017).

With the mushrooming of street hawkers, restaurants or other food stalls, individuals will most presumably look for the place to fulfill hunger after tired of working and did not have time to prepare the meals at home. Previous research has indicated that some people may not have enough knowledge and practice about ways to stop food-borne illnesses. Nigeria has proven to be a country that has very serious focus on their food, but the people do not care much for their food safety. Educated consumers are needed in this country as they can become food safety inspectors with high level of knowledge in their own right. Currently, food safety is delivered through mass media and sometimes is focused on schools to teach young children about food safety (Omemu and Aderoju, 2018; Barth et al. 2021).

Street food vendors in low and middle-income countries are at even greater disadvantages than restaurant food workers because they regularly have inadequate or no access of running water for cleaning hands or equipment, for hand washing before commencing food preparation or after defecation. Unfortunately, not much change can be seen through this method. There is still a never-ending threat to the general public that is constantly growing. A major problem that remains the same is the food safety awareness among consumers in both developed and developing countries, but developing countries are getting the brunt of the problem more because of their poor standard of living, poor personal hygiene and not getting access to proper medical treatment. The purpose is to determine the food safety knowledge, attitude and practices among food vendors in gadau town and). This is because the majority of street food vendors are unaware of the basic food safety requirements, exposing these foods to a variety of unsafe abuses throughout the food manufacturing process (Barth et al. 2021).

Food borne diseases are an important cause of morbidity and mortality worldwide with significant public health impact. The global burden of food borne diseases in 2010 was 33 million Healthy life years lost (DALY) with about 600 million food borne illnesses and 420,000 deaths, of which food borne diarrhea diseases. In Sub-Saharan Africa especially Nigeria, despite the efforts of Government through its National Agency for Food and Drug Administration and Control (NAFDAC), to improve the safety of food supply, food safety still remains a major issue that has been exacerbated by the peoples' ignorance of food hygiene, Government's uncoordinated approach to food safety control and the poor enforcement of food safety legislation and regulations. In addition, climate change resulting in temperature changes has been predicted to influence the risks associated with food production, storage and distribution and therefore has placed greater responsibility on food vendors to ensure the safety of food that they prepare for public consumption (Magaret et al., 2015). Unsafe food creates a vicious cycle of disease, diarrhea and malnutrition which significantly impedes public health and socioeconomic development. The number of people buying and consuming food prepared in public places has increased as a result of population migration, changes in consumer demand and behavior with urban dwellers needing cheaper foods in the face of harsh economic realities and as a consequence, the risk of food borne illnesses is more prevalent due to challenges in food safety especially in regions where adequate resources have not been allocated for food safety control and intervention efforts (Nnam, n.d).

**Food** is a substance consisting essentially of protein, carbohydrate, fat, and other nutrients used in the body of an organism to sustain growth and vital processes and to furnish energy (Mulueta and Bayeh, 2015) Assessing the knowledge and practice of food hygiene among food handlers have become important due to increase in reports of health problems associated with poor food hygiene. It is therefore, important, to adhere to food hygiene principles. Food hygiene is one of the three aspects of hygiene, with the others being environmental and personal hygiene. Food hygiene is a conscious effort to keep food safe from potential contamination and protect the sale of street food is regarded as a significant contributor to the economies of many developing countries. As a result of rapid urbanization, many people now eat outside the home, increasing the importance of food establishments (Michigan WIC Program, 2022). Because of the availability of jobs and readily available cooked meals at relatively low prices, the food chain industry has grown to be a significant contributor to the economies of many nations. Nonetheless, despite its importance, many people have expressed concerns about the cleanliness, quality, and safety of street food. Consumption of street food has been linked to food poisoning and other food-borne illnesses. This is because the majority of street food vendors are unaware of the basic food safety requirements, exposing these foods to a variety of unsafe abuses throughout the food manufacturing process (Santra, 2017).

According to decades of scientific research on food safety and sanitation, street food vendors are a weak link in food safety supervision (Sarkingobir, 2025). Concerns about the quality and safety of street food have grown over time. Because of the unsanitary conditions in which some food vendors prepare, sell, or serve their food, street food is sometimes thought to be of low quality (Santra, 2017). Accordingly, food hygiene procedures include protecting supplies from microbiological, chemical, and physical hazards that may arise during the processes of food preparation, handling, and serving. Customers' health is jeopardized due to a lack of wholesome food production, and sadly, the majority of street food is becoming one of the most common hazards linked to the rise in outbreaks of food-borne illnesses in developing countries. Having meals away from home increases your risk of contracting a foodborne illness (Santra, 2017; Barth et al., 2021).

Hygiene refers to behaviors that can improve cleanliness and lead to good health, such as frequent hand washing, facial cleanliness, and bathing with soap and water. Many diseases can be prevented through proper hygiene practices (Santra, 2017). Food hygiene can be defined as the clean way of handling food and food products to avoid contamination or food poisoning at all stage of production, collection, preparation/manufacturing, transportation, storage and sales of foods. Food handlers are key players in the prevention and control of food contamination hence, any knowledge deficiency on food hygiene by the food handlers poses a stern challenge to food safety. Proper food hygiene is an important practice needed to ensure that food is safe for consumption (Michigan WIC Program, 2022).

## 1.2 Statement of the Problem

Food safety is a fundamental element of good health and essential for sustainable development. In very recent times, the street food vending business has attracted a lot of interests from public health practitioners, local and international organizations including social science researchers. Food vendors provide essential diet to numerous individuals in the developing world. It also plays an important role in developing communities as they provide the employments of millions of the urban poor. However, street foods have turned out to become one of the most typical risks associated with the increase in outbreaks of foodborne illnesses in developing countries in recent years. There have been a few reported cases of food poisoning outbreaks related to street foods (Santra, 2017). In Nigeria food and water borne disease such as cholera, dysentery, typhoid and Hepatitis A were reported low ranging from 1.56 to 0.14 cases per 100,000 populations in year 2010. In contrast, food poisoning is on the rise as evident by the incident rate of 36.17 in 2009 and 44.18 in 2010 per 100,000 populations (MOH, 2010).

Despite its importance in terms of providing employment and meeting the food needs of many people in developing countries, many have expressed concerns over the quality and safety of street vended food. It is an undeniable fact that there are millions of microorganisms that are found in the environment at any given time. Hence, there is the possibility of food being contaminated at all stages of its preparation and serving (Sarkingobir, 2025ab). This statement is quite true considering the fact that food is being prepared and served in the open spaces. Street food is often considered unhygienic and low in quality partly due to the poor environmental conditions under which it is prepared or sold, and also because food vendors lack adequate knowledge on food preparation and handling. Whereby food is prepared or sold at public places, the handlers of the vendor are responsible in serving safe food for the profit of their customer. About 50% of the food borne illnesses was caused by poor food preparation practices, where food was stored for more than 4 hours at room temperature, cooking raw materials over the previous day and unsafe food storage. Other than that, it also occurs from unhealthy food preparation, wounds, always touching the face and not washing hands correctly that become a carrier of bacteria and effect foodborne illness (Santra, 2017; Barth et al., 2021).

Inadequate food hygiene practices can result to foodborne illnesses and even death of the consumer. This is why the World Health Organization helps Member nations and states in advocating for safer food handling via well thought-out disease prevention strategies and health education programmed which are directed to food handlers, including the consumers. Consumers in most developing countries have access to only foods that are desirable and affordable to them and therefore, are exposed to unhealthy foods in their diet (Barth et al., 2021). It has been further indicated that food vending increases the concerns with regard to the possibility of serious food poisoning outbreaks as a result of not using additives properly; the presence of adulterants including environmental

contaminants as well as poor food handling practices among food vendors. There are people who prepare and sell food along roadsides yet are not trained with the right skills and knowledge to handle food, these people do not practice food hygiene protocols even the condition of the environment where they operate is very unsanitary.

It is estimated that water and foodborne illnesses are one of the major causes of illness and even death in under developed nations causing the death of close to 1.8 million people yearly (Santra, 2017). Thus, have the possibility of seriously endangering the health status of the people and subsequently creating a huge social burden on the communities and their health system. In this study however, the focus of the research is on the external factors. The enterprise of selling food on the street is mostly outside the regulation and protection of the governments in most developing nations. The lack of effective education, training of food vendors on health and hygiene, non-provision of needed infrastructure as well as non-regulation and enforcement of by-laws governing street food vending by local authorities has been observed to contribute to the low hygiene level of street vended food (Michigan WIC Program, 2022; Sarkingobir, 2025ab). Certainly unhygienic street food is associated with the outbreak of serious food poisoning in most parts of the world. Several epidemics of foodborne illnesses with some high level of severity have been documented across the globe in the past few years, indicating both the public health and social relevance of these diseases. Consumers all over the world view foodborne disease epidemics with ever-increasing concern Food, being the most important and only substance that is universally consumed by all humans and animals to stay alive, need to be handled or safe guarded properly because contamination anywhere along the food chain can have far reaching effects and sometimes fatal consequences. Food borne illnesses is a burden in terms of incapacitating people, causing discomfort, cost of pain, grief and suffering, disruption to industry and commerce and strain on the health service, (Santra, 2017).

### **1.3 General and specific Objectives**

The main objective of this research is to determine the knowledge, attitudes and practice of food hygiene among food vendors in Gadau town, Itas/Gadau Local Government Area of Bauchi State.

#### **1.3.1 Specific Objectives**

- i. To assess the knowledge of food hygiene among the food vendors in Gadau town.
- ii. To assess the attitudes of food vendors towards food hygiene in Gadau Town.
- iii. To assess the practice of food hygiene among food vendors in Gadau town.
- iv. To determine the relationship between knowledge and practice of food hygiene among food vendors in Gadau town of Bauchi State

## **2.0 METHODOLOGY**

### **2.1 STUDY AREA**

The study was conducted in Gadau town, Itas/Gadau Local Government Area of Bauchi State Nigeria, located at 11<sup>o</sup>50'08"N and 10<sup>o</sup>10'02"E. Gadau town shares border with Melandige village to the North, Kashuri village to the East, Katsinawa village to the South and Gulmo to the West. Itas/Gadau LGA has a total population of 229, 996 as at 2006 National Population Census (NPC, 2006). The projected

population as at Dec, 2020 was 332,638 using the respective National population growth rates of 2007-2020 and the 2006 census as reference value. (NPC, NBS).

The predominant ethnic groups in the area are Hausa and Fulani. The major occupations in the area are farming, civil servant and business. The major religion in the area is Islam and few Christians. There are two primary schools, a secondary school and many Qur'anic schools. The main campus of Bauchi State University is located in Gadau town. There are 2 health facilities (the town primary health care and a dispensary) located in the town.

## 2.2 Study Design

Cross-sectional descriptive study design was used for this study.

## 2.3 Study Population

The study was conducted among food vendors who work in restaurants and semi-restaurants in Gadau town.

### 2.3.1 Inclusion criteria

All food vendors in the selected restaurants including those in Bauchi State University Gadau main campus  
 Managers of the selected restaurants  
 Drivers and cleaners of the selected restaurants  
 Those consented

### 2.3.2 Exclusion criteria

Customers  
 Those that refused to participate

## 2.4 Sample Size Determination

$$N = \frac{Z^2PQ}{d^2}$$

Were

N = the desire sample size

Z = the standard deviation at the required confidence interval

P = the proportion in the target population estimated to have the desire characteristics

Q = 1 - p

D = the level of statistically significant set

For the previous study 95% have inadequate knowledge (Onee and Sani 2011)

$$P = \frac{95}{100} = 0.95$$

Data

$$P = 0.95$$

$$Z = \text{at } 95\% = 1.95$$

$$Q = 1 - P = 1 - 0.95 = 0.05$$

$$D = 0.05$$

$$N = \frac{Z^2PQ}{d^2}$$

$$N = \frac{(1.96)^2 \times 0.95 \times 0.05}{(0.05)^2}$$

$$N = \frac{3.8416 \times 0.95 \times 0.05}{0.0025}$$

$$N = \frac{0.182476}{0.0025}$$

$$N = \underline{73}$$

With non response rate of 10%

$$N = \underline{83}$$

## 2.5 Sampling Technique

Multi stage sampling technique was used;

### Stage 1: Selection of restaurant

There are 13 restaurants in Gadau town namely; A.A.Y. Ghali Special restaurant Gadau, Food and snacks faculty of art BASUG, promise special restaurant Gadau, Lil restaurant BASUG, Gaji restaurant Gadau, Shakallo restaurant BASUG, Y.M Karanga joint BASUG, Aisha eatery BASUG, Bomi Adesa special restaurant BASUG, De-victoria restaurant Gadau, Ladi Dogara restaurant Gadau, Baba Yayale Food and snacks Gadau and Mubarak Special Gurasa BASUG

Thus, 50% were selected by simple random sampling by balloting namely; A.A.Y. Ghali Special restaurant Gadau, Food and snacks faculty of art BASUG, Gaji restaurant Gadau, Lil restaurant BASUG, De-victoria restaurant Gadau, Y.M Karanga joint BASUG and Baba Yayale Food and snacks Gadau.

### Stage 2: Selection of respondents

Of the selected restaurants, all the food vendors (100%) in each of the restaurants were selected.

## 2.6 Study Instrument

The instrument used for the study was a semi-structured interviewer administered questionnaire adapted from the previous study.

## 2.7 Data Collection Method

The objectives of the study were explained to the participants before being interviewed. Information will be collected using semi-structured interviewer administered Questionnaire developed for the study. The Questionnaire has four parts; section A consisted of socio-demographic variables, section B consisted of knowledge of food hygiene, section C consisted of attitudes regarding food hygiene and D sought for the practice of food hygiene.

## 2.8 Data Analysis

Questionnaires were coded, checked for completeness immediately after interviewing the participant and data entered in Microsoft excel for windows. Data was then exported to SPSS Version 20, where

it was analyzed. Descriptive statistics was performed and displayed in tables, graphs, pie-charts and bar graphs inform of frequencies and percentages.

## 2.9 Ethical Considerations

Ethical clearance obtained from department of public health, faculty of basic medical sciences, Bauchi State University Gadau and permission was obtained from the district head of Gadau town. Participation based on acceptance and free to decline at any point during data gathering. They were also assured of anonymity and confidentiality and informed consent form signed.

## 3.0 RESULTS

In this section, an attempt was made to categorize responses according to demographic information, knowledge, attitude and practice of food hygiene among food vendors in Gadau town, Itas/Gadau LGA of Bauchi State.

Data was analyzed using statistical package of social science (SPSS) version 20 and descriptive statistics via table frequency and percentage. Out of 83 questionnaires distributed to various respondents, 75 questionnaires were received.

### 3.1 Socio-Demographic Information

Table 1: Distribution of socio-demographic information of the respondents

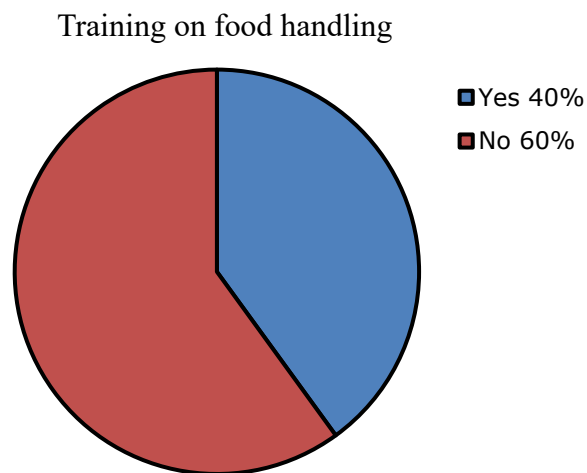
Variables	frequency (n=75)	percentage (%)
<b>Age</b>		
18 – 25	15	20
25 – 35	40	53
Above 35	20	27
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Gender</b>		
Male	26	35
Female	49	65
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Marital status</b>		
Single	10	13
Married	15	20
Divorced	21	28
Widowed	12	16
Separated	17	23
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Level of education</b>		
None	14	19
Primary	19	25
Secondary	35	47
Tertiary	7	9
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Religion</b>		
Islam	48	64

Christianity	19	25
Others	8	11
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Ethnicity</b>		
Hausa	48	64
Fulani	2	3
Others	25	33
<b>Total</b>	<b>75</b>	<b>100.0</b>
<b>Monthly Income</b>		
N 5,000 – 20,000		
	36	48
N 20,000 – 35,000	22	29
N 35,000 – 50,000	17	23
Above N 50,000	0	0
<b>Total</b>	<b>75</b>	<b>100.0</b>

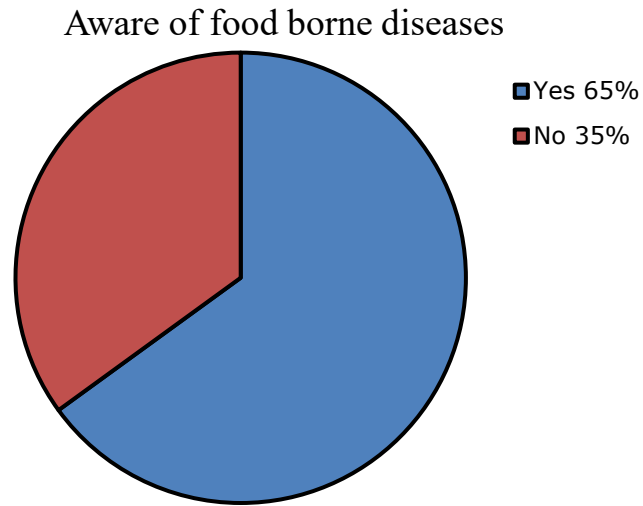
The socio demographic characteristic of food vendors are presented in table 1 above. Majority of the respondents were aged 25 – 35 years (53%), of female gender (65%), divorced (28%), at least secondary level of education (47%), (64%) of the respondents are Muslims and Hausa by tribe (64%), also N5,000 – 20,000 (48%) as a monthly income of the respondents.

### 3.2 Knowledge on food hygiene among the food vendors

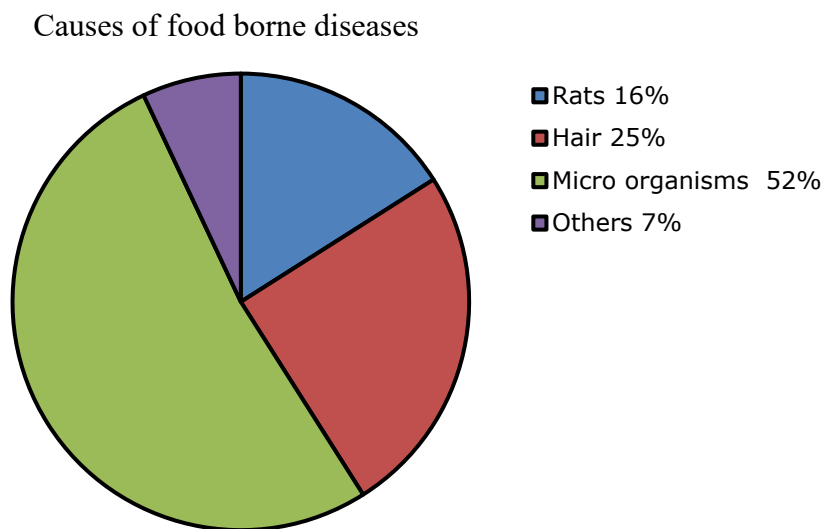
Below are Chart figures showing summary of interview guide on knowledge toward food hygiene



**Figure 1: Training on food hygiene, Source: Field Work (2025)**

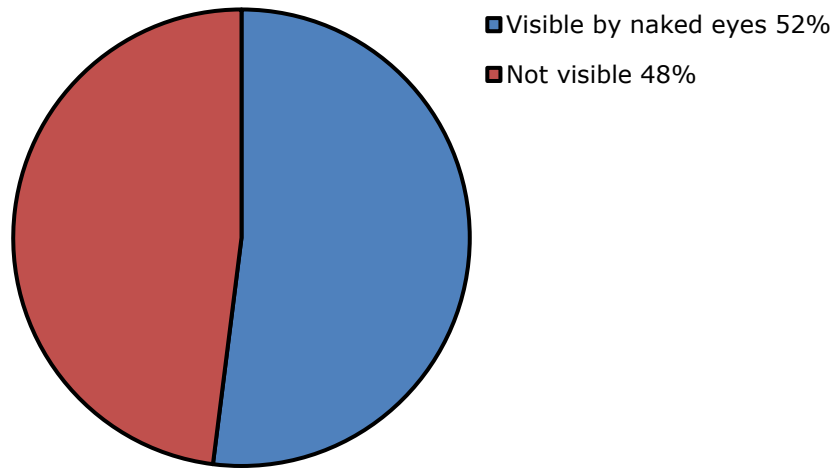


**Figure 2: Aware of food borne diseases; Source: Field Work (2025)**



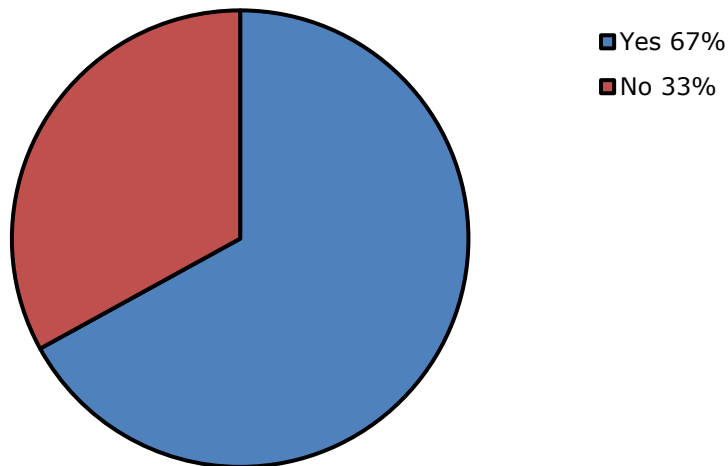
**Figure 3: Causes of Food borne diseases Source: Field Work (2025)**

Visibility of micro-organisms

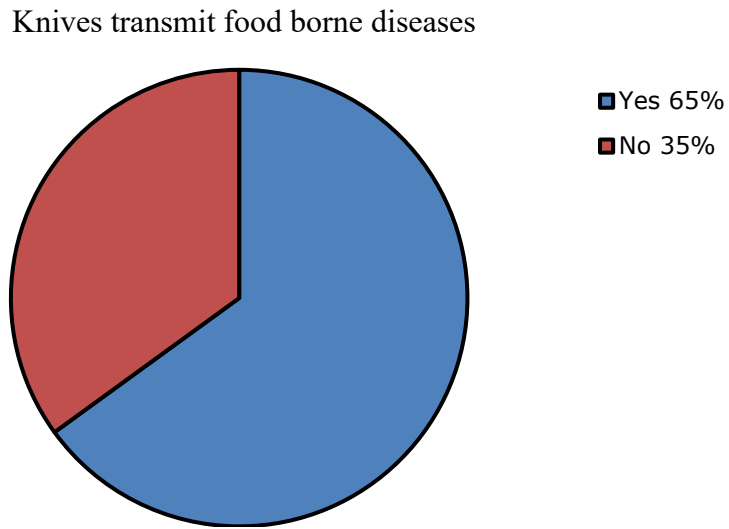


**Figure 4: Visibility of microbes; Source: Field Work (2025)**

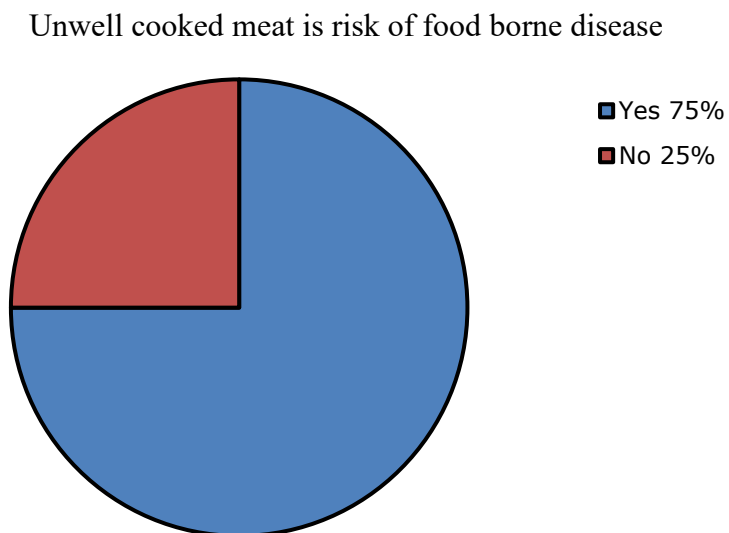
Washing hands reduces food borne diseases



**Figure 5: Hand washing reduces diseases; Source: Field Work (2025)**

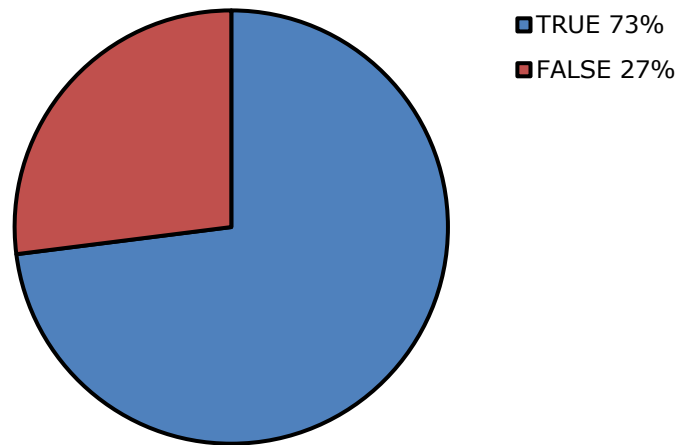


**Figure 6: Knives transmit foodborne diseases; Source: Field Work (2025)**



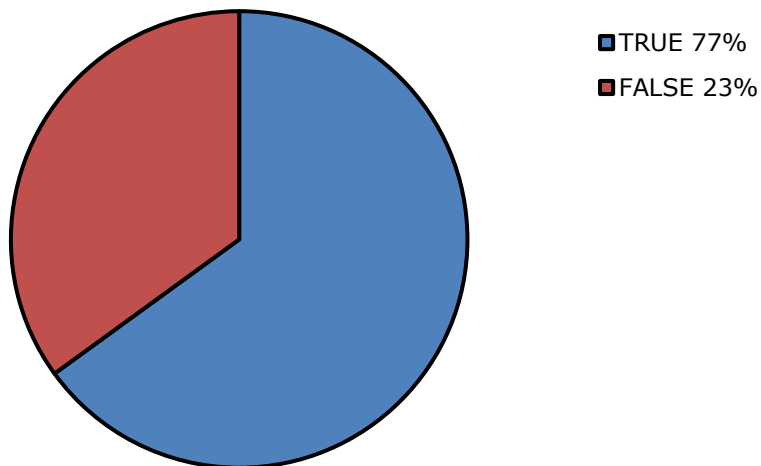
**Figure 7: Improper meat cooking is a risk factor of foodborne disease; Source: Field Work (2025)**

Unwashed vegetables is a risk for food borne disease



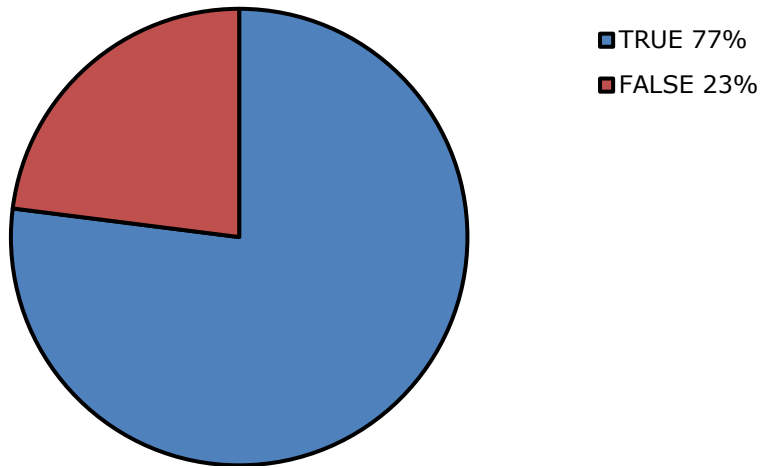
**Figure 8: Unwashed vegetables is risk factor of food borne diseases; Source: Field Work (2025)**

Unhygienic practices of food vendors can be a source of food borne disease



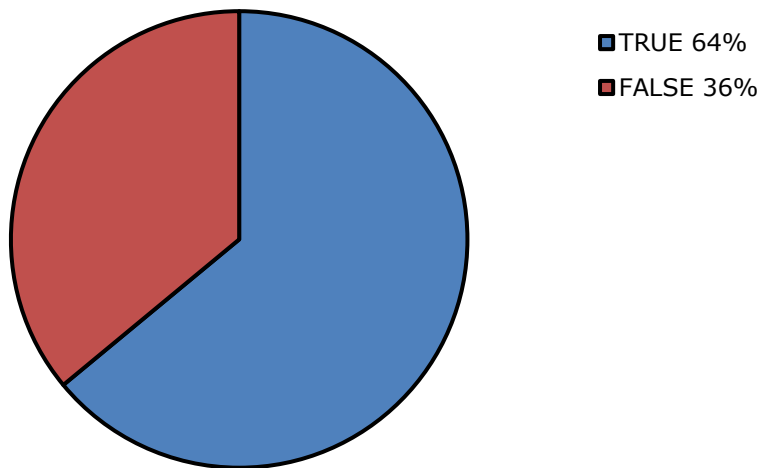
**Figure 9: Unhygienic practices of food vendors can be a source of food borne disease; Source: Field Work (2025)**

Correct refrigerator temperature is key in preventing food poisoning



**Figure 10: Correct refrigerator temperature is key in preventing food poisoning; Source: Field Work (2025)**

Food poisoning can cause serious illness



**Figure 11: Food poisoning can cause serious illness**

Bacteria multiply quickly at room temperature

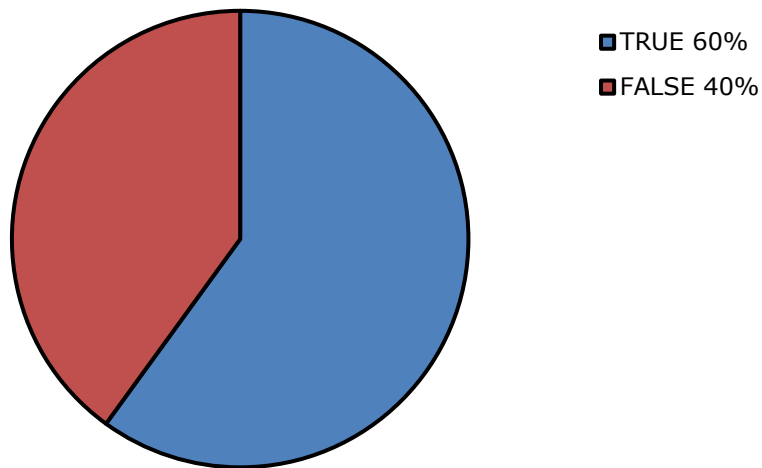


Figure 12: Bacteria multiply quickly at room temperature

Left overs should be well cooked before consumption

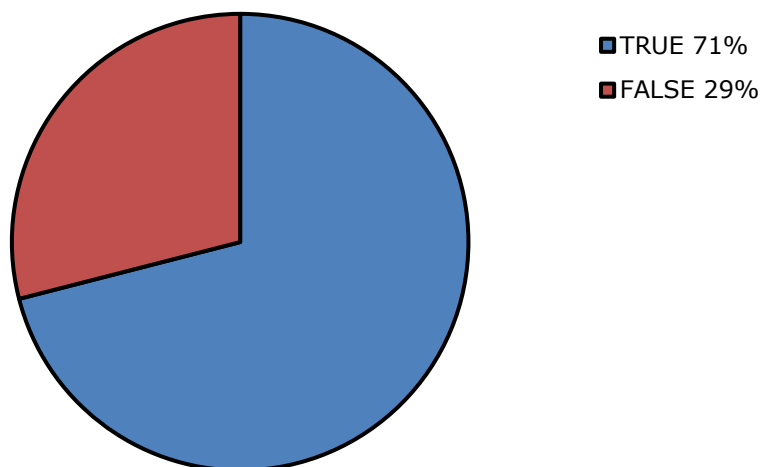


Figure 13: Left overs should be well cooked before consumption; Source: Field Work (2025)

### 3.3 Knowledge SCORE

#### Distribution of knowledge score

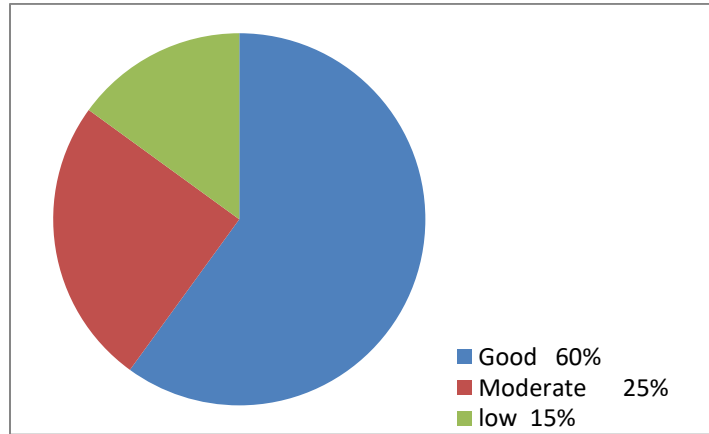


Figure 14: Distribution of knowledge score; Source: Field Work (2025)

#### 3.4 Attitude towards food hygiene among the food vendors

Table 4: Distribution of attitude towards food hygiene among the food vendor

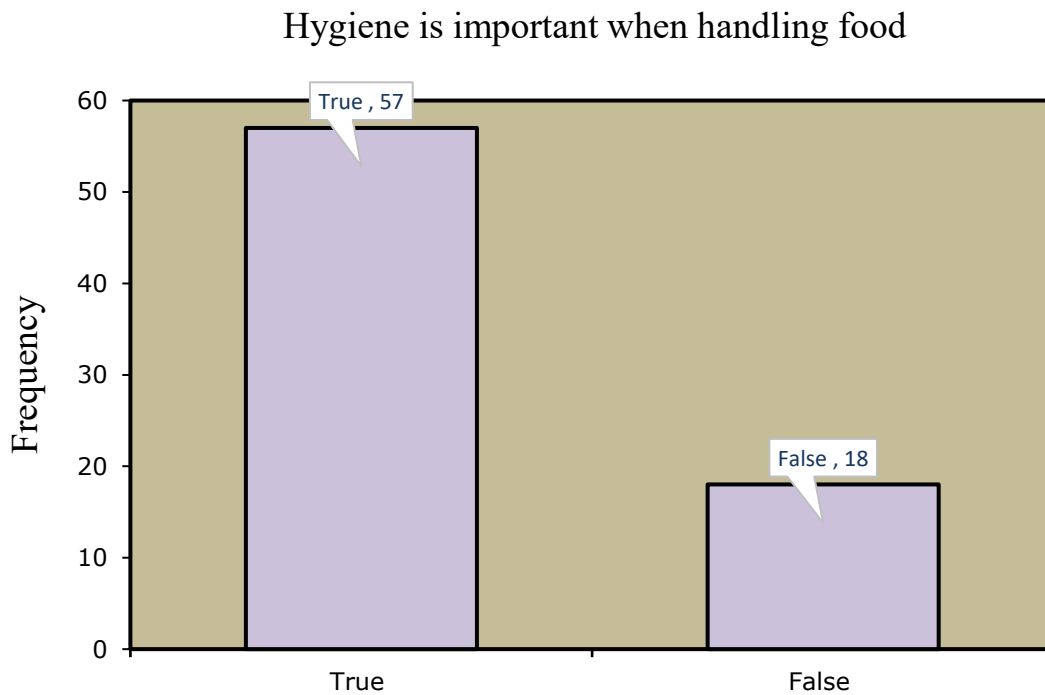
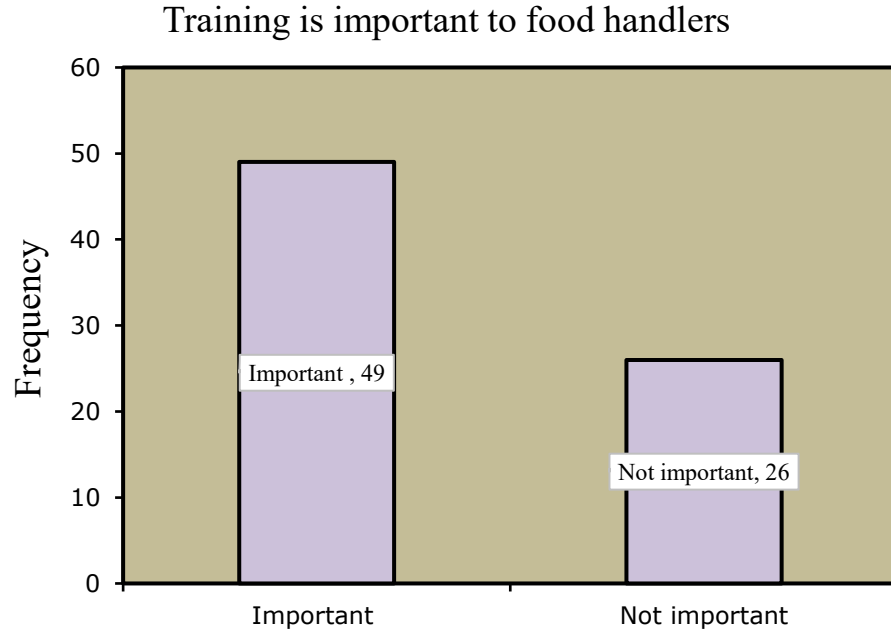
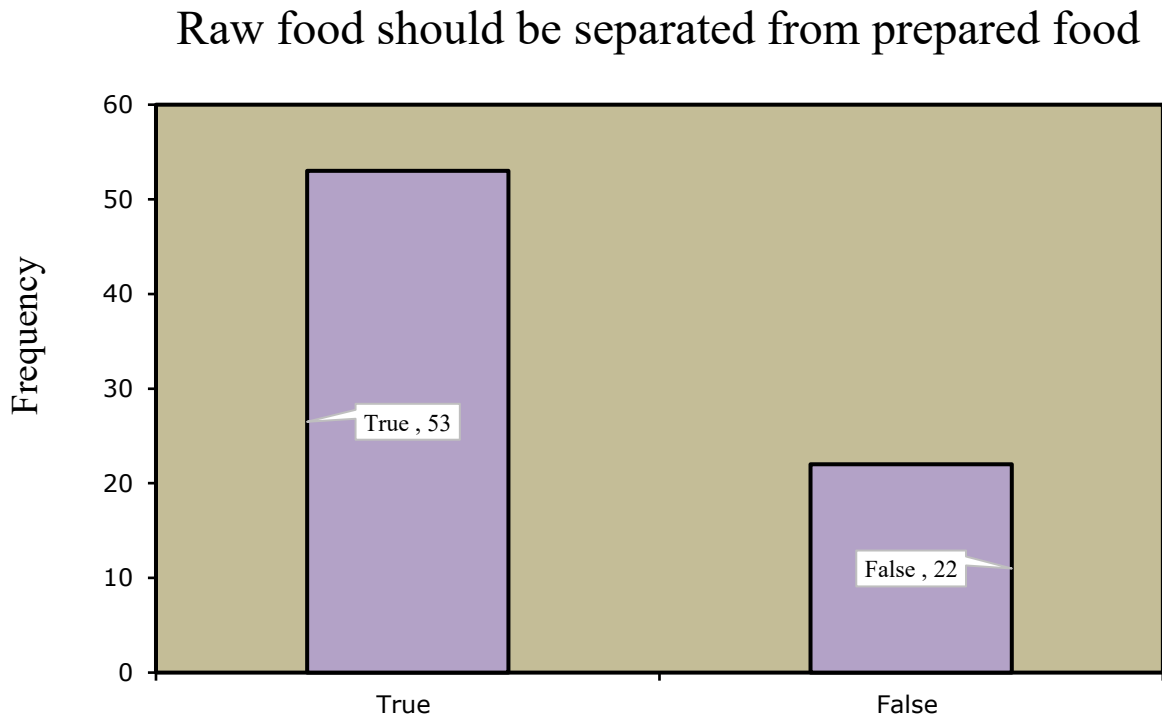


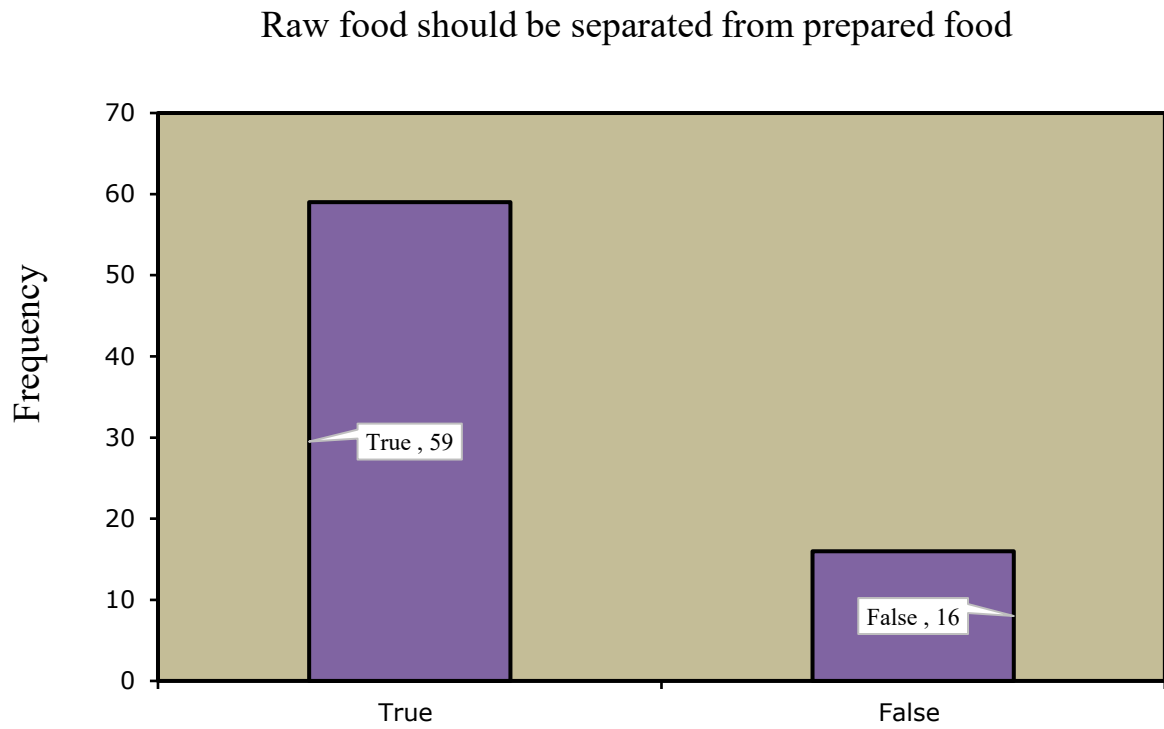
Figure 15: Hygiene is important when handling food; Source: Field Work (2025)



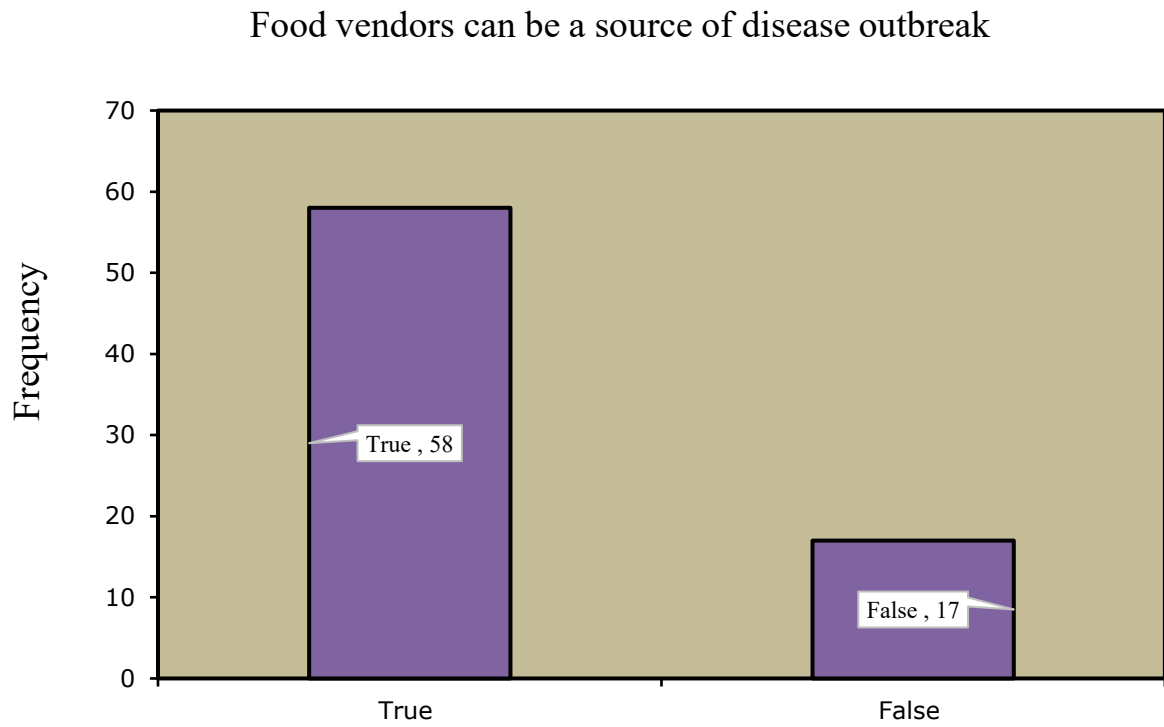
**Figure 16: Training is important to food handlers; Source: Field Work (2025)**



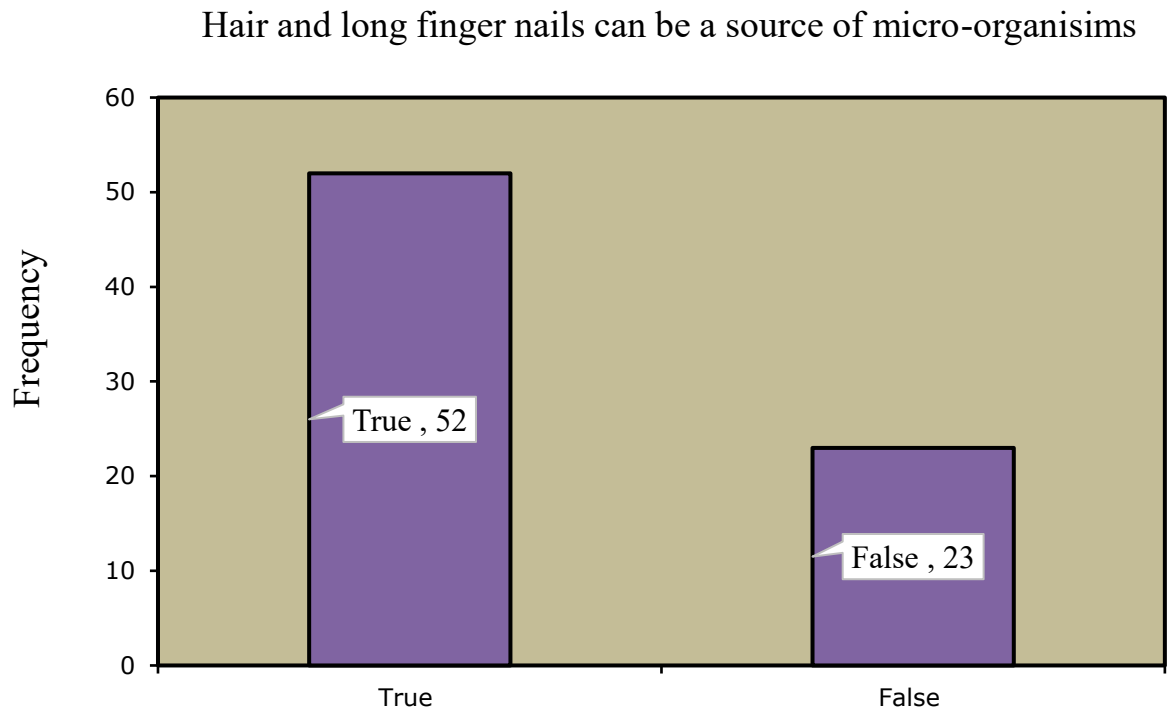
**Figure 17: Raw food should be separated from prepared food; Source: Field Work (2025)**



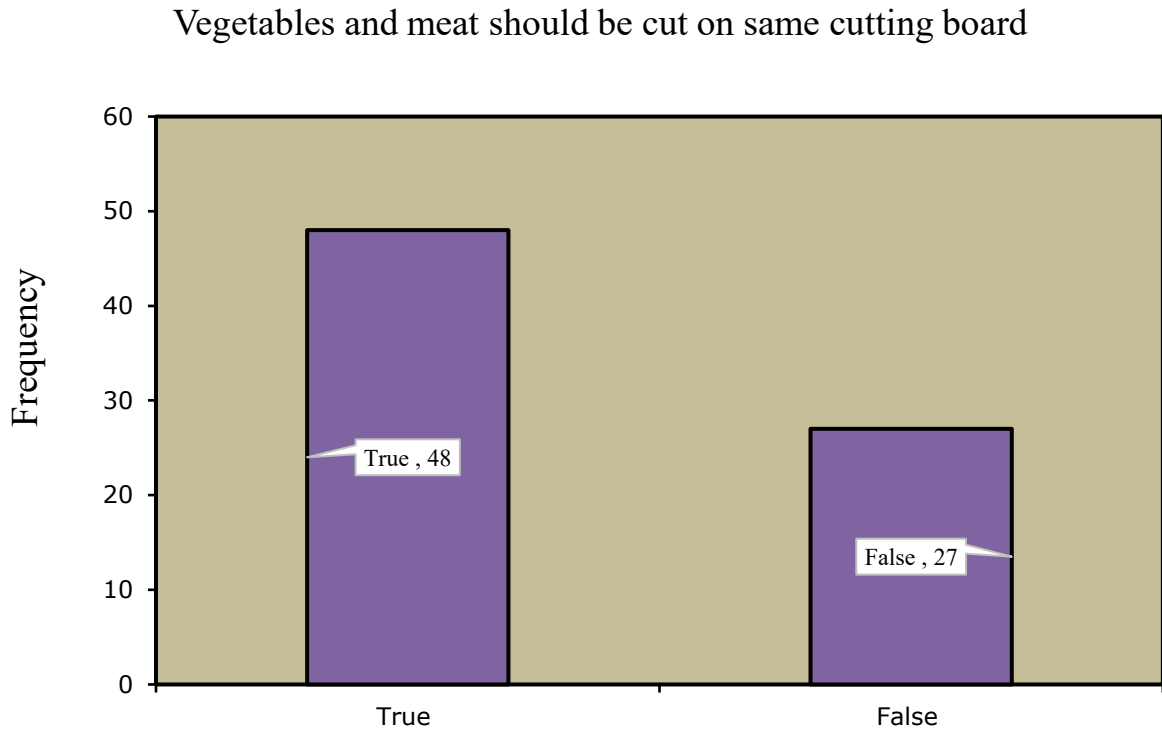
**Figure 18: Raw food should be separated from prepared food; Source: Field Work (2025)**



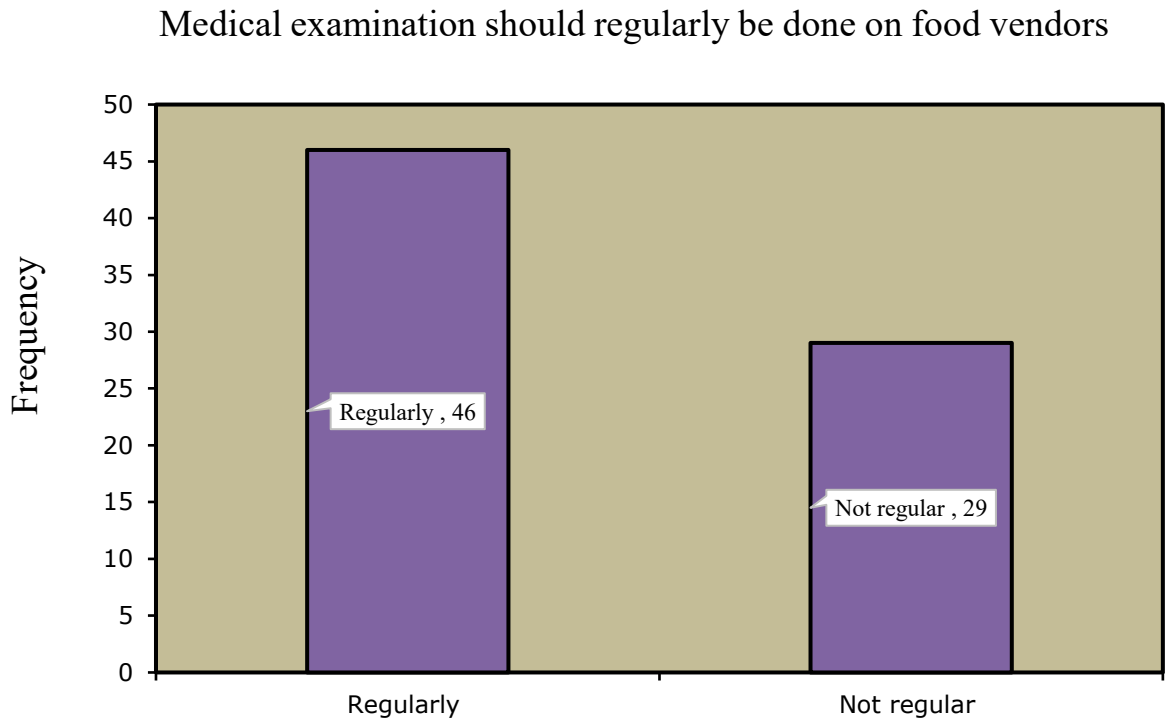
**Figure 19: Food vendors can be a source of disease outbreak; Source: Field Work (2025)**



**Figure 20: Hair and long finger nails can be a source of micro-organisms; Source: Field Work (2025)**

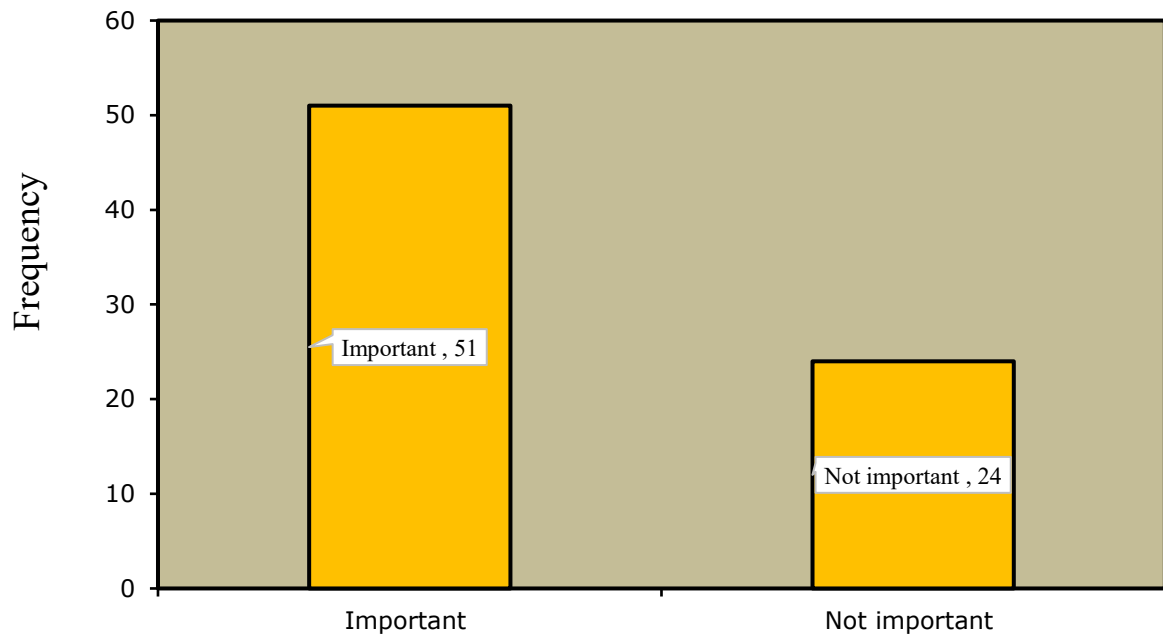


**Figure 21: Vegetables and meat should be cut on same cutting board; Source: Field Work (2025)**

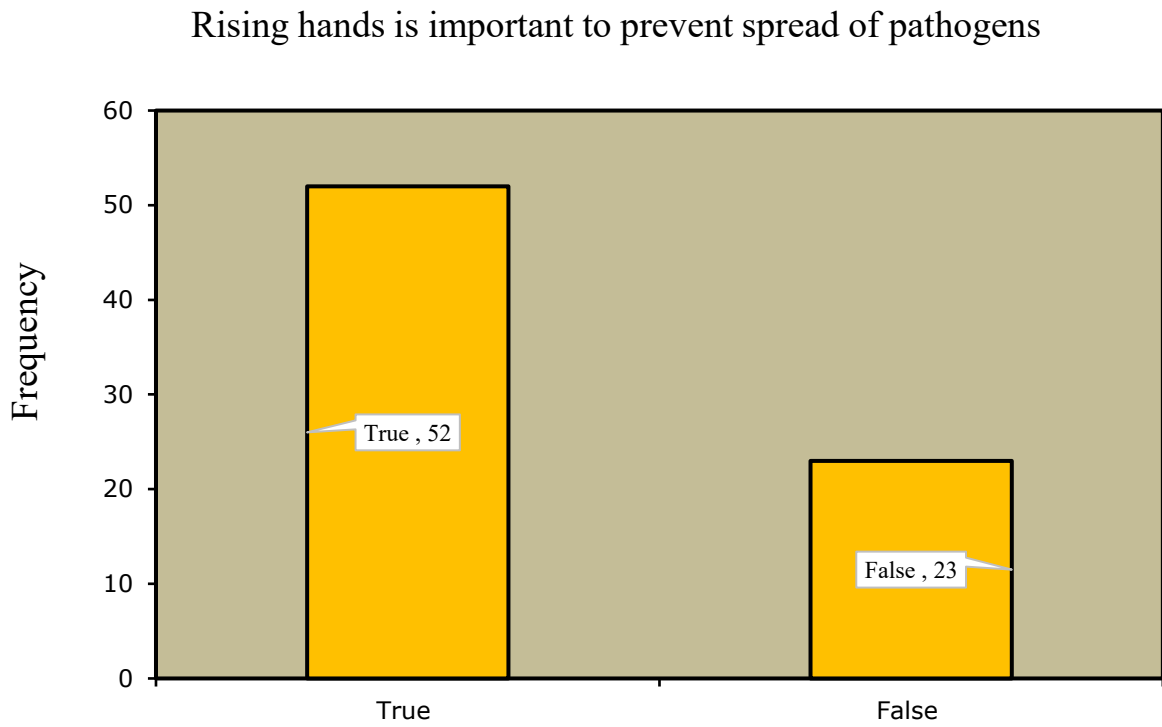


**Figure 22:Medical examination should regularly be done on food vendors; Source: Field Work (2025)**

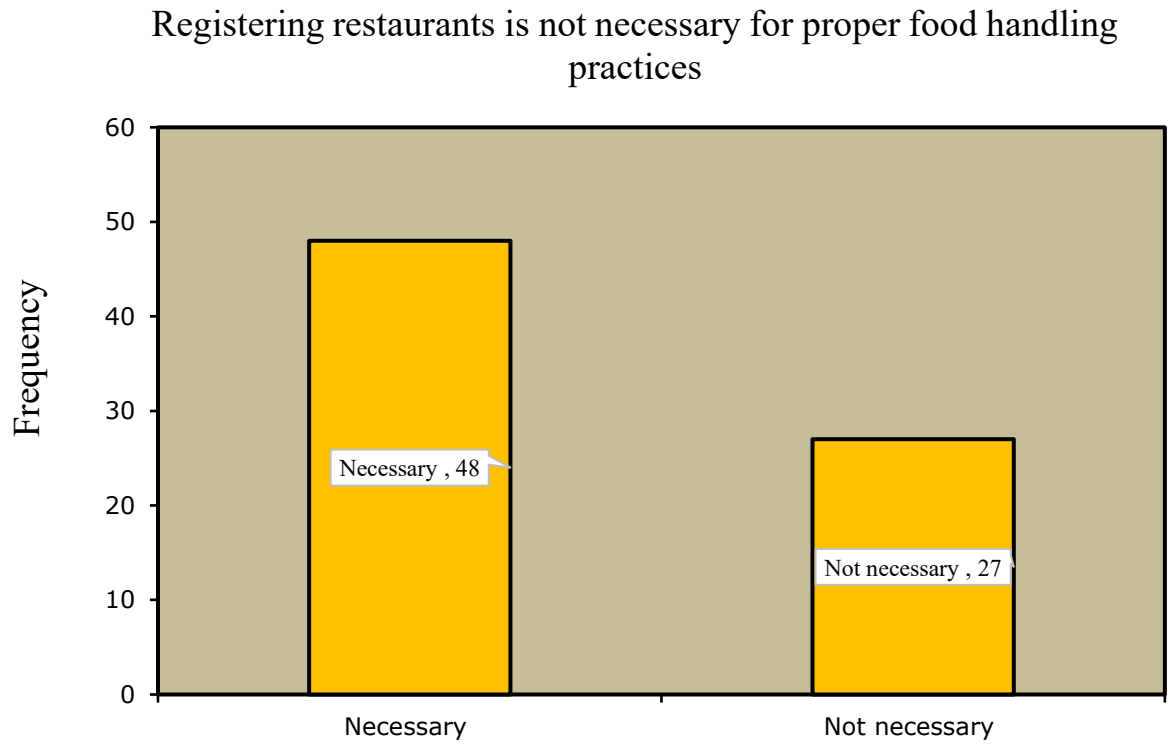
Wiping of cutting board is important to prevent spread of micro-organisms



**Figure 23: Wiping of cutting board is important to prevent spread of micro-organisms;**  
**Source: Field Work (2025)**

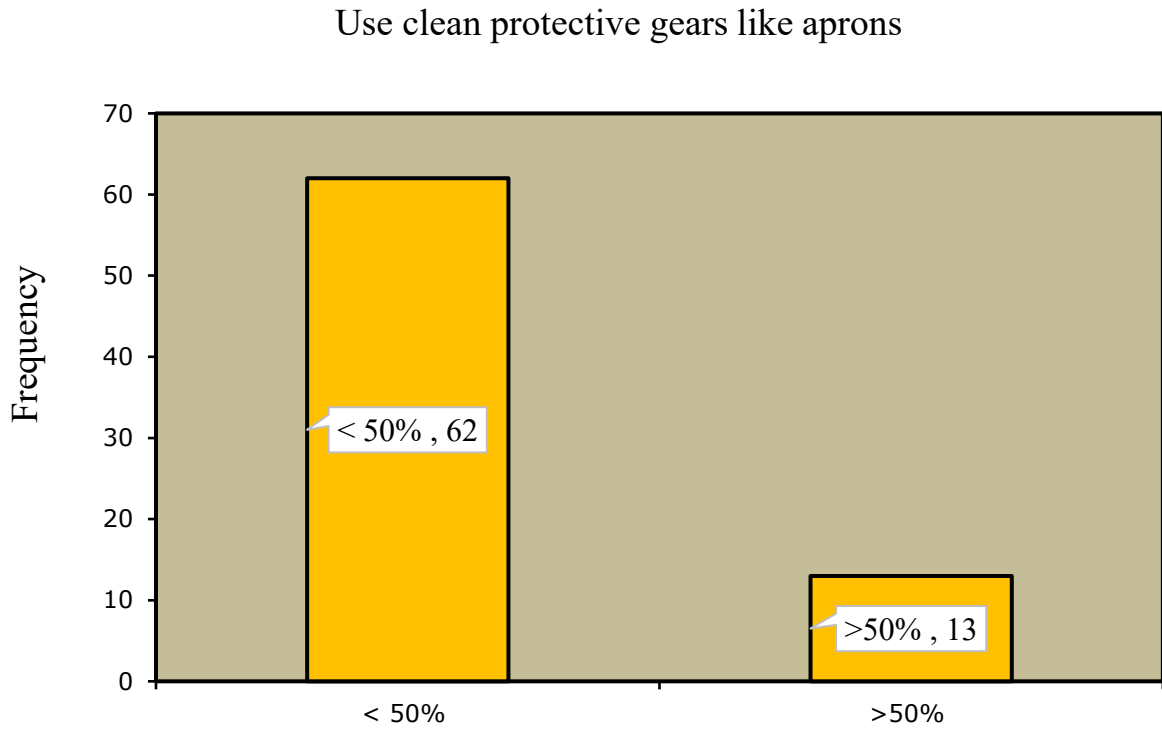


**Figure 24: Rising hands is important to prevent spread of pathogens; Source: Field Work (2025)**

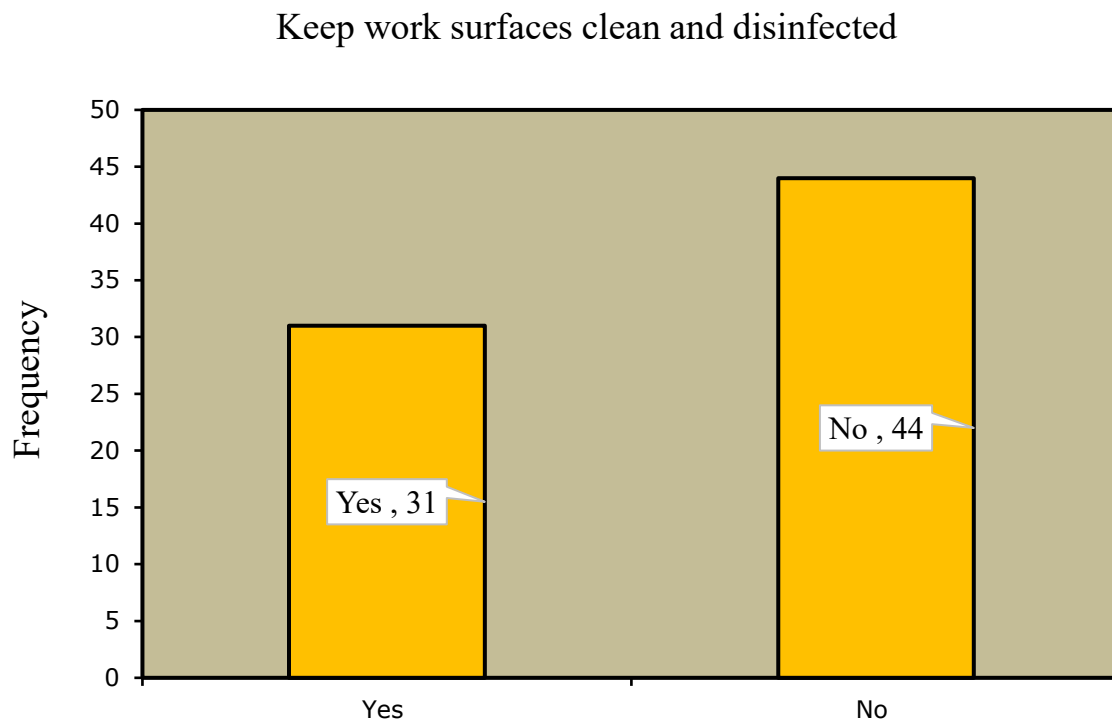


**Figure 25: Registering restaurants is not necessary for proper food handling practices;  
Source: Field Work (2025)**

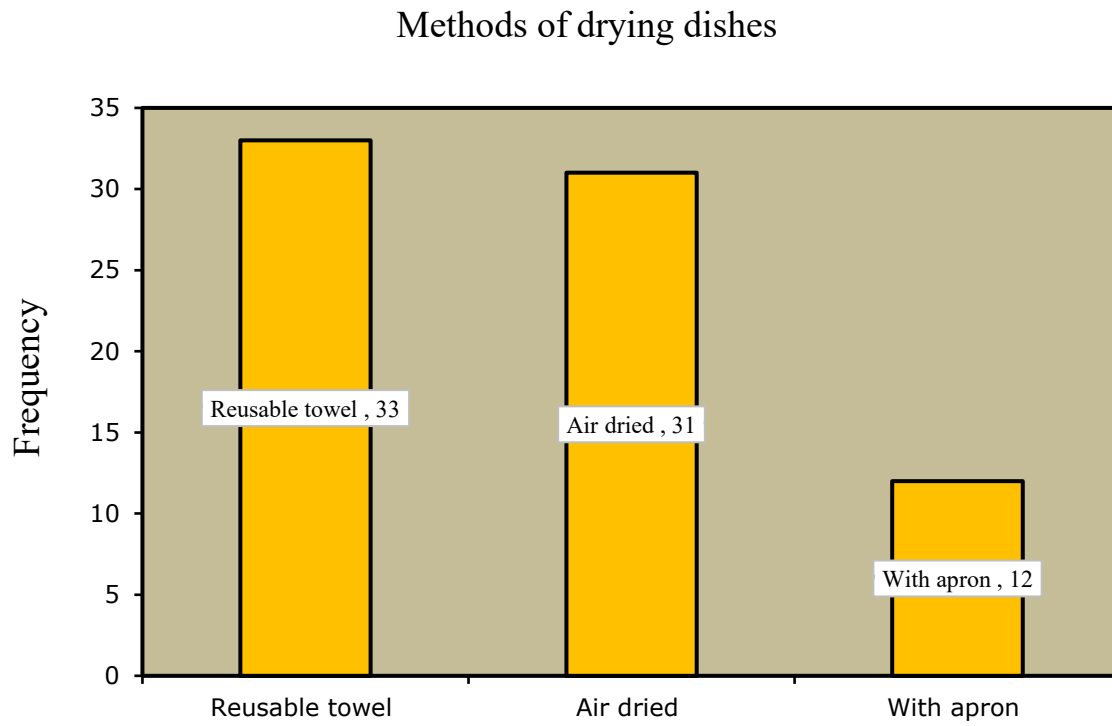
### 3.5 Practices of food hygiene among the food vendors



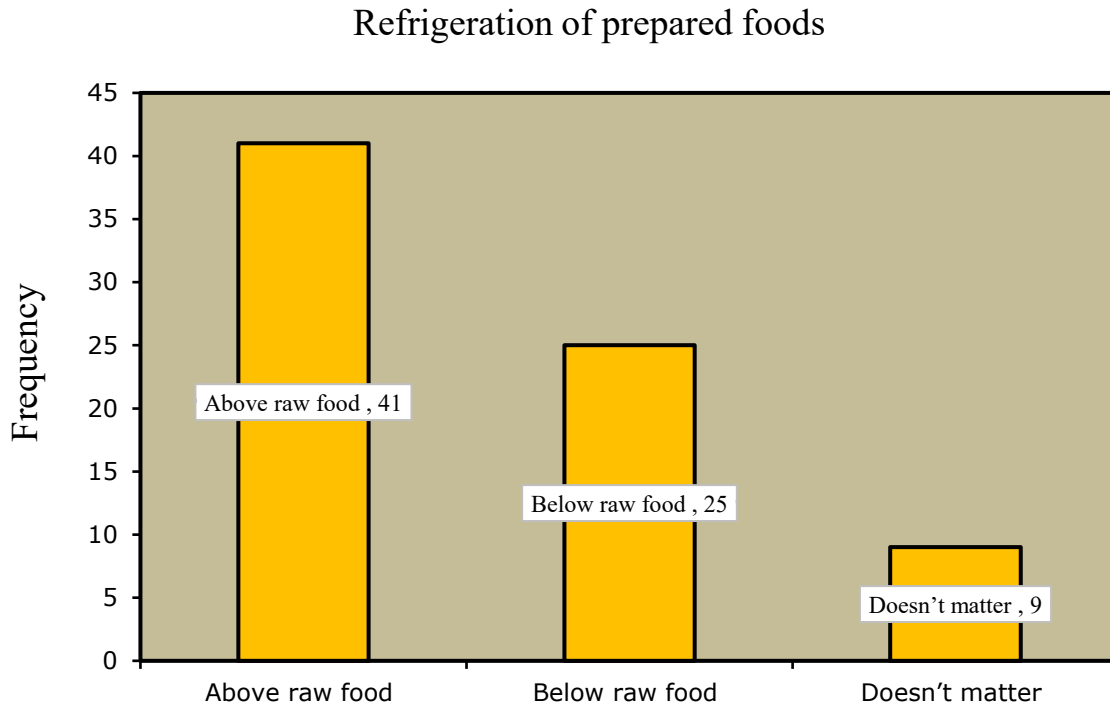
**Figure 26: Use clean protective gears like aprons; Source: Field Work (2025)**



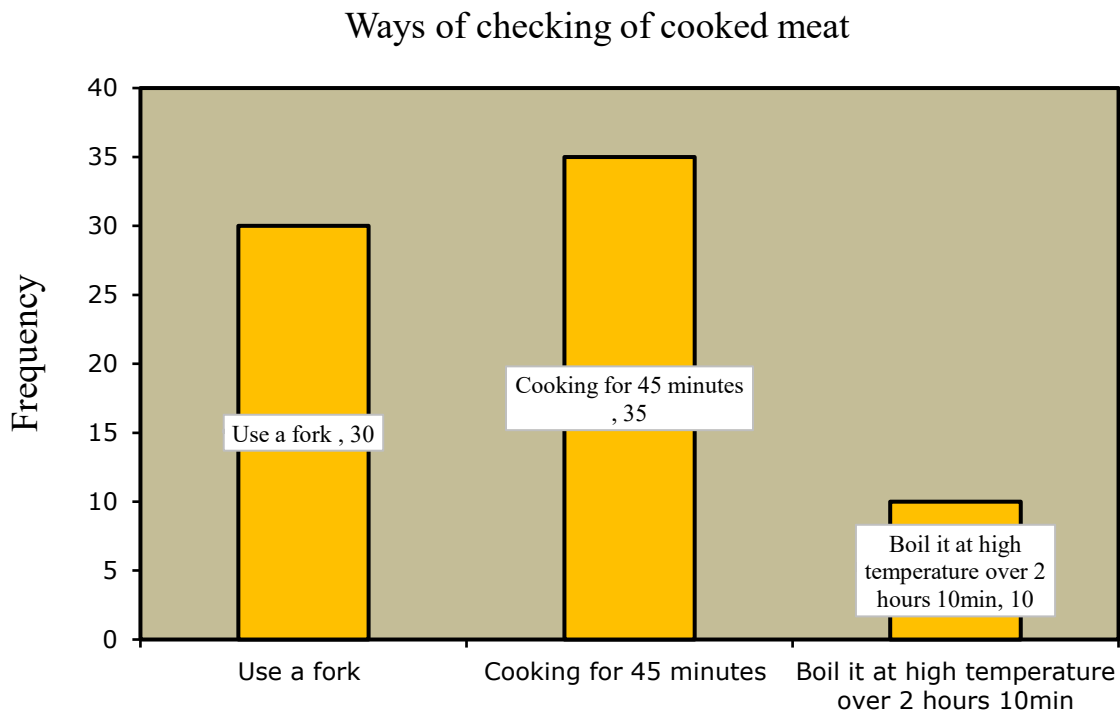
**Figure 27: Keep work surfaces clean and disinfected; Source: Field Work (2025)**



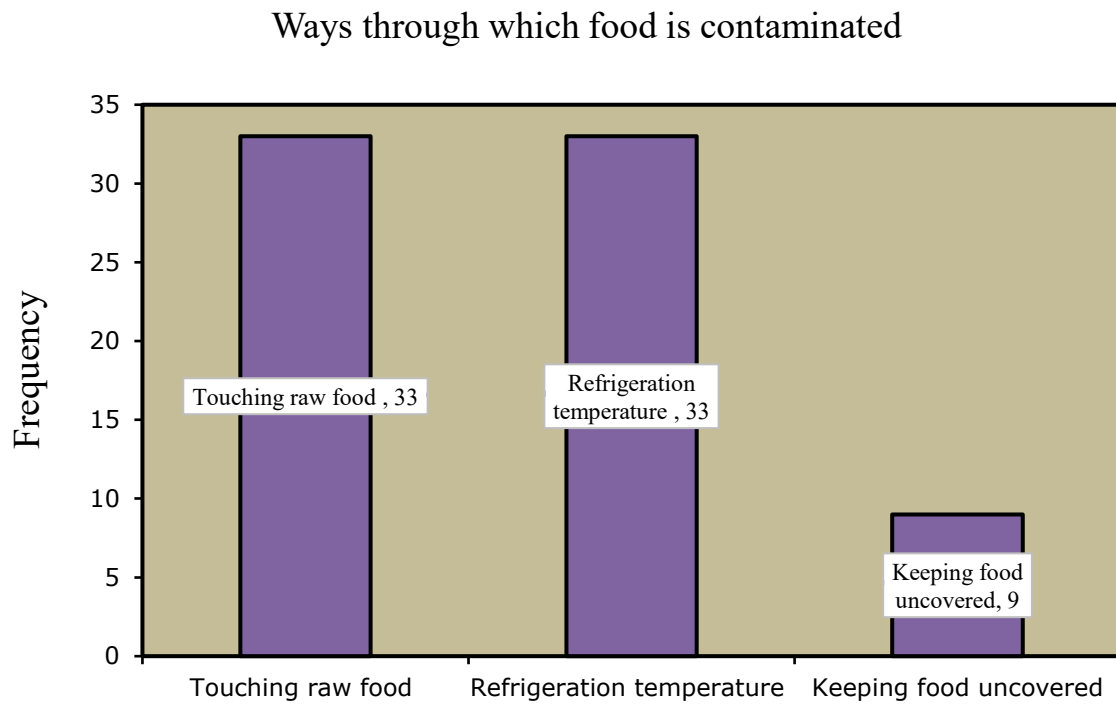
**Figure 28: Methods of drying dishes; Source: Field Work (2025)**



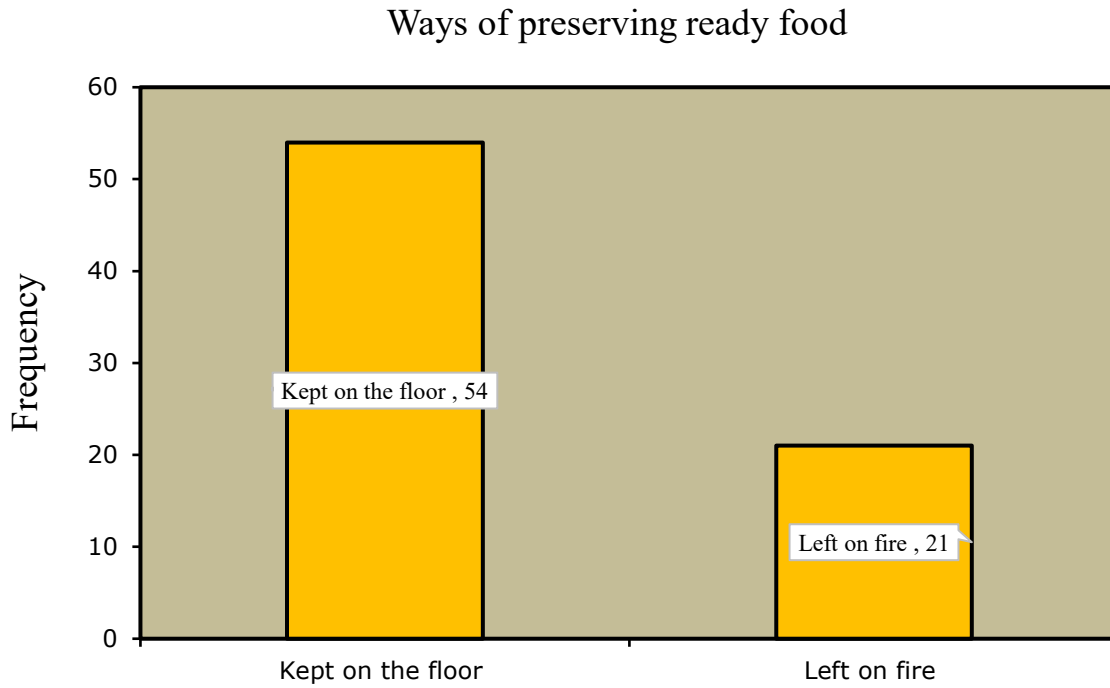
**Figure 29: Refrigeration of prepared foods; Source: Field work (2025)**



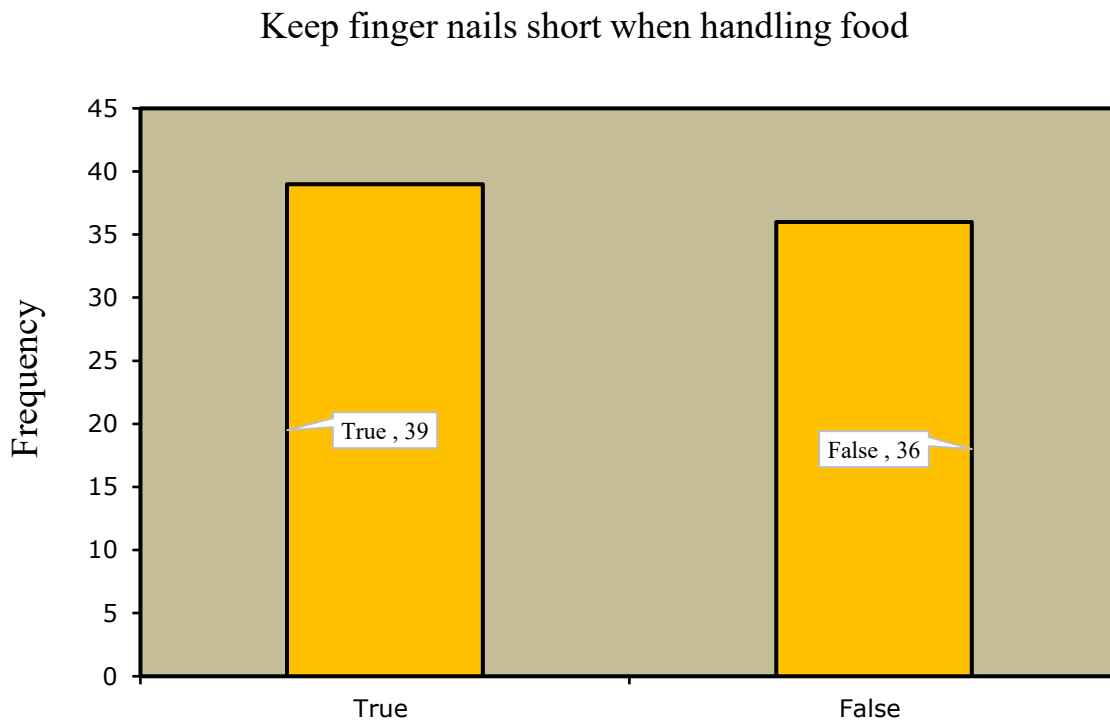
**Figure 30: Ways of checking of cooked meat; Source: Field Work (2025)**



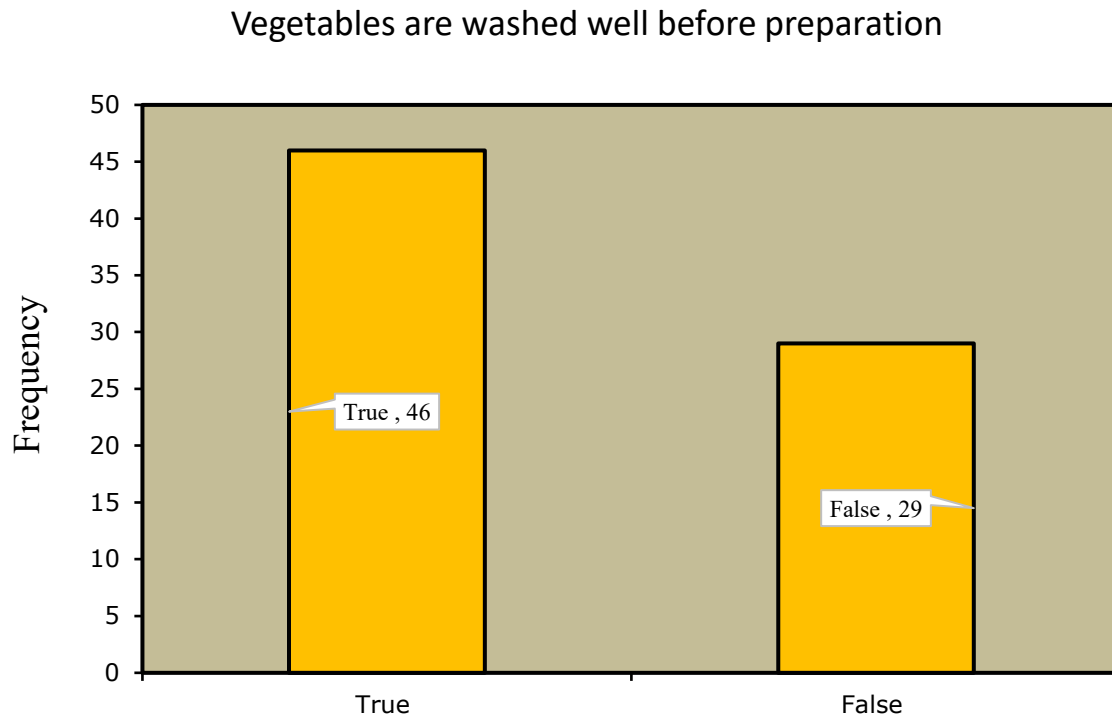
**Figure 31: Ways through which food is contaminated; Source: Field Work (2025)**



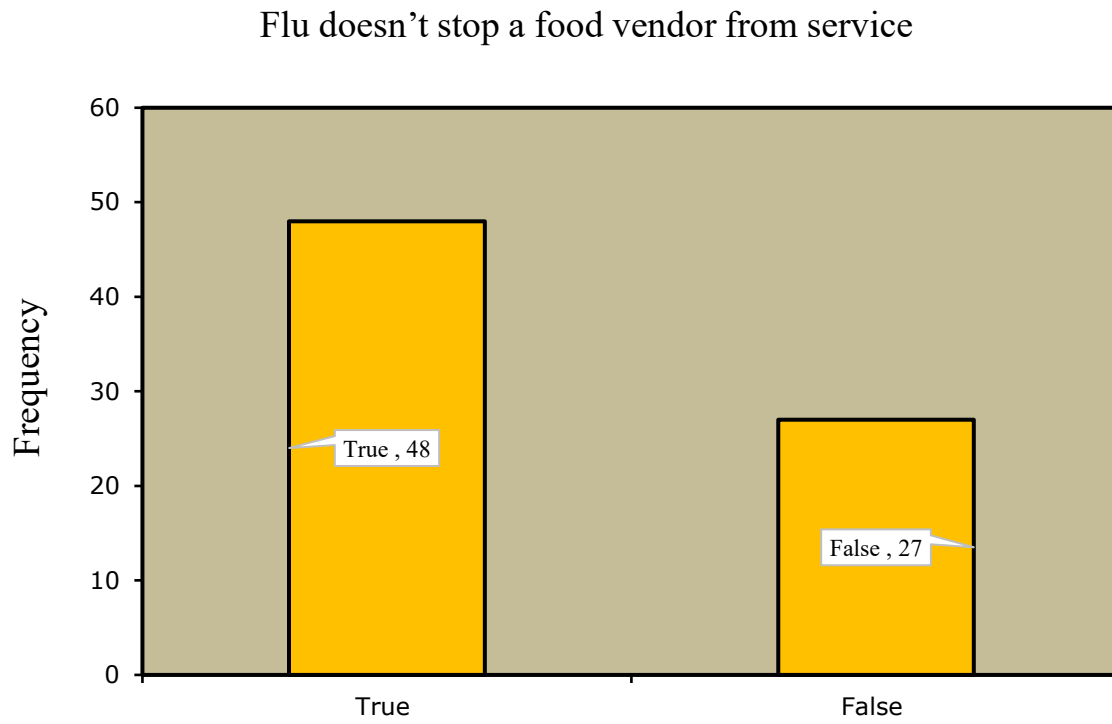
**Figure 32: Ways of preserving ready food; Source: Field Work (2025)**



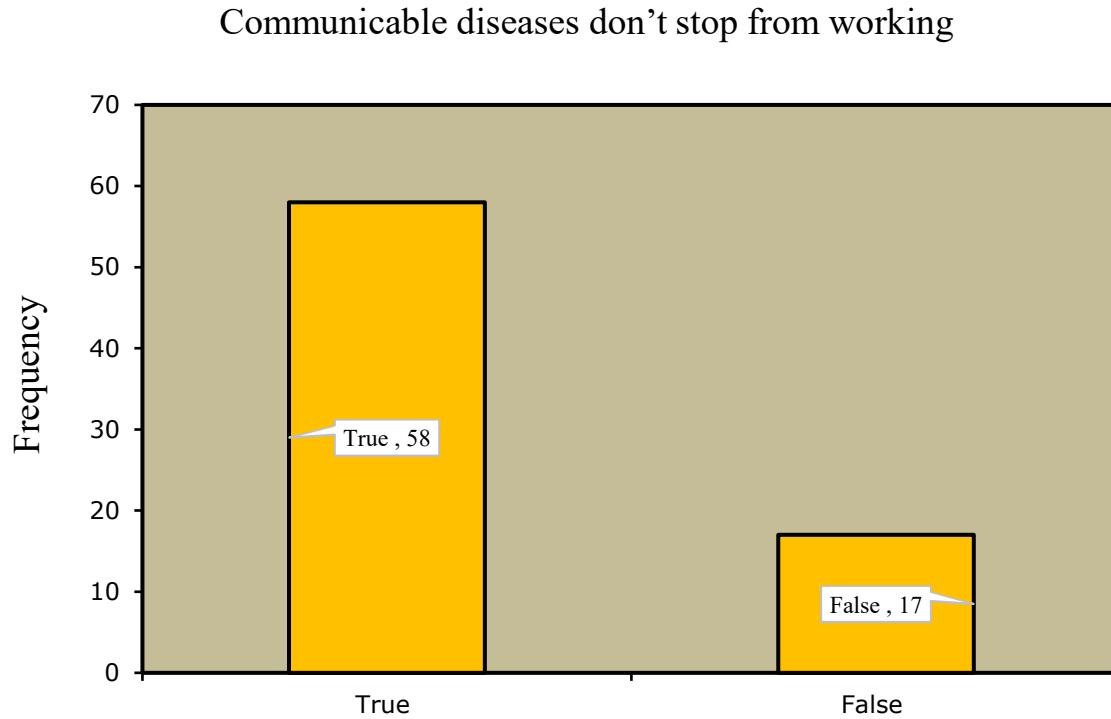
**Figure 33: Keep finger nails short when handling food; Source: Field Work (2025)**



**Figure 34: Vegetables are washed well before preparation; Source: Field Work (2025)**



**Figure 35: Flu doesn't stop a food vendor from service; Source: Field Work (2025)**



**Figure 36: Communicable diseases don't stop from working; Source: Field Work (2025)**

#### **4.0 DISCUSSION:**

The aim of the study was to assess the level of knowledge, attitude and practices towards food hygiene among the food vendors in Gadau town of Bauchi State. 75 questionnaires returned which represent 90% response rate.

From Socio demographic factors, it can be clearly observed that the mean age of the respondents was 25. The age group of 25 – 35 years had the highest number of food handlers which implies that food handling business is mainly run by the youth. This was in line with a study done by Baluka et al. (2014). However, this was not in line with a study done by Aygen, (2012) revealed that there was no association between age and food vendor.

There were more females (65%) than males practicing food vendors from this study which confirms a claimed general trend that cooking is mainly a female business. This was compared with a study by Baluka et al, (2014) which found out that (65%) of the food vendors were female. However, this was not in line with a study by Mizanur et al, (2012) that found out that there was no significant association between food vendors and gender.

The largest proportion of the food handlers were those who had secondary education as their highest education attained (47%). It is obvious that lack of higher education made them un aware of food hygiene guidelines and they also have little understanding of the risk of microbial or chemical contamination of food and how to avoid them.

The majority of the respondents indicated that they understood the importance of safe food handling and their personal responsibility for food hygiene but knowledge and attitude about some aspects of food hygiene was mixed. The highest percentage of respondents acknowledged that it was important to separate raw and cooked food; using personal protective equipment like masks, aprons, covering hair reduces food contamination and improper food heating and storage indicated in other studies (Bas et al, 2006; Baluka et al, 2014).

However, (23%) of the study participants indicated that refrigerator temperature is not important in preventing food poisoning which was also indicated in a study by Onyeneho and Hedberg, (2013). (76%) of the respondents reported that food handling affects food hygiene but only (24%) of the respondents understood that a food handler is not supposed to work when having an infectious disease like flue and that food handlers should not wear jewellery during food preparation and (31%) of the respondents did not acknowledge that food handlers should keep their finger nails short. This study was in line with a study done by Baluka et al (2014), where by high number of food handlers lacked the same information.

Also, (61%) of the food handlers acknowledged that medical examination should be done to all food handlers regularly so as individuals found with infectious diseases can be treated so as they do not transmit infection to other members of the public. However; none of the respondents had under gone any medical examination before commencing work. This contradicts with a study done by Musa and Akenda, (2013) which showed that 76.2% of the respondents had undergone a medical examination before starting to work.

Education and training of food handlers is associated with a positive influence on food hygiene. Food handlers who receive training have better hygiene scores than those who do not have training (Baluka et al, 2014).

In this study, majority of the respondents acknowledged that training was important in food handling however (35%) indicated that job trainings were not important and they had never attended any training ever since they started working as food handlers. However, this was contrary to studies by Bas et al, (2006); Onyeneho and Hedberg, (2013), which indicated that most food handlers had obtained training before commencing work.

The majority of food vendors (90%) washed their hands properly and frequently under running water, appeared in good condition, kept finger nails clean, washed vegetables before cooking however, majority of food vendors did not have uniforms, they did not have hair caps, most restaurants did not have soap at the water taps, serving utensils were being cleaned by same towel, vegetables and meat were being cut from the same board which could easily lead to cross contamination. This was compared to a study by Nkere et al, (2011) which indicated that food that had been properly prepared can become contaminated by serving utensils. Although the most respondents indicated that they understood the importance of safe food handling, they performed poorly in important food hygienic practices which has also been reported in other studies (Ondyeneho and Hedberg, 2013; Isaac et al., 2014).

## **5.1 CONCLUSION**

This study achieved the main objective which was to assess the level of knowledge, attitude and practices towards food hygiene among the food vendors in Gadau Town of Bauchi State.

The study found out that there was a gap in food hygiene knowledge, attitude and practices by food vendors which was also reflected in their unhygienic practices during preparation, storage and serving of food. The results showed that most of the food vendors (75%) had a low education level and did not have any formal food safety training which contributed to unhygienic conditions under which food was prepared and stored. Results also showed that food handlers lacked knowledge and training related to proper hand washing procedure, food storage temperature and cross contamination.

## **5.2 RECOMMENDATIONS**

### **5.2.1 Recommendation to Food Managers/Vendors**

1. Food vendors should be subjected to a thorough medical examination before commencing work;
2. Managers should arrange an efficient training programmed on food hygiene for all employees so as to ensure employees gain appropriate levels of food hygiene knowledge and positive attitude and also demonstrate it into practice;
3. Managers should arrange training programs periodically at least every after 3 months for all workers;
4. Managers should come-up with check list to ensure that all food safety components are covered during trainings;

### **5.2.2 Recommendation to Itas/Gadau LGA PHC Department**

1. There should be good communication system whereby the health team or the body charged with the responsibilities of managing all the eateries should be informed on time whenever a new food handler is to be employed by the manager/manageress of any eatery.

### **5.2.3 Recommendation to Bauchi State University**

1. Any prospective food handler seeking to operate an eatery in Gadau Town including Bauchi State University Gadau main campus should be compulsorily made to have pre-employment examination to assess his/her level of knowledge of food hygiene by the sanitary health officer(s) of the environmental health unit in conjunction with the medical officer(s) of the University Health Services Department. This would enable the Health Department screen out those who might pose some threat to the university community as far as food safety is concerned;
2. After the individual has successfully scaled through the pre-employment examination, he/she should undergo a comprehensive medical examination, which the medical officer(s) of the university health services department should request and perform, to confirm or refute eligibility to run such a business. What is being done presently is not really encouraging as some food handlers get to undergo only periodic medical examination and not pre-employment medical examination.
3. The university's rules and regulations concerning choice of site for restaurant, the requirements of the structure, standard hygiene practice etc should always be enforced by the health team of the

environmental health unit of University Health Department through regular visitations to the restaurants and sanctioning of offenders to serve as deterrent;

4. Regular and periodic medical examinations, by the medical officers, for the food vendors should be a norm rather than the present unscheduled and infrequent examination being done. Also, the periodic inspection, by the university health team, of the various eateries should be improved upon. This should also include a check on the source(s) of water the restaurant uses for domestic activities and for drinking coupled with periodic microbial testing of prepared foods, fish, meat, vegetables/fruits and drinking water which the microbiologist would undertake;

#### **5.2.4 Recommendation to Bauchi State Government**

1. There should be a cohesive revised policy on the need for a mandatory food hygiene detection across the state on food vendors.
2. The state should liaise with Consumers Protection Council for a collaborative approach towards a proper standardization of food supplies by food vendors.

#### **5.3 Future Research**

Lack of food hygiene practices among food vendors and unhygienic premises in Gadau Town including Bauchi State University Gadau main campus will pose a health risk to customers and the general public, it is important for future researchers to carryout continuous research on food hygiene surveillance and risk assessment on the KAP of food handlers.

#### **5.4 Funding Source**

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