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# Food Safety Practice and Associated Factors Among Street Food Vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia, 2021

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**BAHIR DAR UNIVERSITY**  
**COLLAGE OF MEDICINE AND HEALTH SCIENCES**  
**SCHOOL OF PUBLIC HEALTH**  
**DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND**  
**HEALTH ECONOMICS**

**FOOD SAFETY PRACTICE AND ASSOCIATED FACTORS**  
**AMONG STREET FOOD VENDORS IN CITY ADMINISTRATIONS**  
**OF WEST GOJJAM ZONE, NORTHWEST ETHIOPIA, 2021**

**By**  
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**June, 2021**

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**THESIS PAPER SUBMITTED TO DEPARTMENT OF HEALTH**  
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**MASTER OF PUBLIC HEALTH IN GENARAL PUBLIC HEALTH**

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## ABSTRACT

**Background:** The street foods provide a source of affordable nutrients to the majority of people, especially in developing countries including Ethiopia. But, since street foods are prepared and sold under unhygienic conditions, they are prone to be contaminated. So, vender's practices towards food safety under this environment should be strictly studied. Thus, the aim of this study was to determine the level of safety practice and determinant factors of street food vendors.

**Methods:** A cross sectional study was conducted among 422 street food vendors to assess food safety practices and associated factors in City Administrations of West Gojjam Zone from February to March 2021. Epicollect5 software was used for data collection through smart phones. The data was bringing to MS-Excel and then to SPSS version 23 for analysis. Bivariable and Multivariable logistic regression analysis was done to identify associated factors and to control the effect of confounding variables, respectively. Significance of association was identified by p-value of  $< 0.05$  and its strength was described using odds ratio and 95% CI.

**Results:** Of 422 street food vendors, 418 (99%) responded to the questions. From 418 street food vendors, 418 (100%), 232 (55.51%), 271 (64.83%), 418 (100%) and 361 (86.36%) were females, aged 20-24 years, single, orthodox, and income of 1500-5000 ETB, respectively. About 215 (51.40%) street food vendors had good food safety practice. Primary educational status (AOR=0.57, 95% CI=0.35-0.99), cannot read and write (AOR=0.17, 95% CI=0.08-0.37), monthly income 5001-8500 ETB (AOR=2.57, 95% CI=1.06-6.22), inspection (AOR=3.64, 95% CI=2.05-6.46), training (AOR=3.73, 95% CI=1.94-7.16), vending experience 4-6 years (AOR=1.89, 95% CI=1.14-3.13), vending experience 7-9 years (AOR=3.67, 95% CI=1.21-11.11) and poor knowledge of food safety (AOR=0.48, 95% CI=0.30-0.78) were factors showed statistical significance.

**Conclusion:** In this study, half of the study subjects were found in practicing a beter way to keep food safety and healthy. Regular training and improving knowledge level, support in improving economic status and inspection are important activities to be held to improve food safety practices of street food vendors.

**Keywords:** Street Foods, Food Safety, Food Safety Practice, West Gojjam, Ethiopia

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## ACRONYMS

AMI	Average Monthly Income
AOR	Adjusted Odds Ratio
CDC	Center of Disease Control
CI	Confidence Interval
COR	Crude Odds Ratio
EHI	Environmental Health Inspectors
ETB	Ethiopian Birr
FBD	Food Borne Disease
OR	Odds Ratio
RTE	Ready To Eat
SFV	Street Food Vendor
SVF	Street Vended Food

# 1. INTRODUCTION

## 1.1. Background

Street vended foods are defined as ready-to-eat (RTE) foods and beverages that are sometimes prepared by vendors in the streets and other public places, and mostly sold to consumers for immediate or later consumption without any further preparation or processing (1-3). Street-vended foods include foods as diverse as meat, fish, fruits, vegetables, grains and cereals based ready to eat foods, frozen produce and beverages (2). Food obtained from a street side vendor are often from a makeshift or portable stall and it feeds millions of people daily with a wide variety of foods that are relatively cheap and easily accessible (2, 4, 5).

Globally about 2.5 billion people consume street foods on daily basis (6, 7). The street food industry is therefore growing at a very fast rate worldwide (8). It has become a source of employment and income for individuals and homes. Increasing unemployment rates and poverty are also major factors that influence people to venture into street food business (9). The street food industry plays an important role in cities and towns of many developing countries (6). It also contributes substantially to meeting food demands of city dwellers and provides an income to many households (6, 9-11).

However, Street foods, as those are generally prepared and sold under unhygienic conditions, with limited access to safe water, sanitary services, or garbage disposal facilities they are exposed to food poisoning, food borne diseases and food safety problems (2, 12). Food safety is to mean protect food from any hazard or contamination. Food borne illnesses are diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of contaminated food (13). Most of the foods provided by street vendors are not protected against insects, dust etc which may harbor foodborne pathogens (14). Pathogens present in street vended foods come from different sources and practices, such as, improper food handling, improper waste disposal, contaminated water and improper storage temperature and reheating (4). The rising concern about food-borne illness has questioned the knowledge of the street food vendors to constitute safety practices for food handling (7). Food safety problems are particularly becoming an increasingly serious threat to public health in developing countries (15).

Street food vendors are also deprived of information education and communication services regarding personal and food hygiene. They are forced to sell food in unhygienic environment. Previous studies in abroad had shown poor hygienic and environmental conditions among food vendors (16). Notably, the context of safe food handling practices is shaped by a number of factors that include vending experiences, personal hygiene, cultural characteristics, availability of resources and the vending environment (17).

Street-vended foods have significant public health problems due to Inadequate public awareness of hazards posed by certain street foods; Poor knowledge of street vendors in basic food safety measures and lack of factual knowledge about the microbiological status or the precise epidemiological significance of many street-vended foods (2). Previous studies abroad assured that street foods are contaminated with pathogenic bacteria with some of them have more than 3 genera on a single food item. However, those researches have not say anything about the food handlers practice to keep food in safe way. Therefore, it is in this vein that this research was conducted, critically to find vendor's level of practices towards food safety and associated factors that determine their practices.

## **1.2. Statement of Problem**

Foodborne diseases (FBD) are an important cause of morbidity and mortality worldwide. The burden arising from unsafe food handling and chemical and parasitic contaminants in the food (18). World Health Organization, Foodborne Disease Burden Epidemiology Reference Group (FERG) estimated that 31 foodborne diseases (FBDs) resulted in over 600 million illnesses and 420,000 deaths worldwide in 2010 (19). Reports showed that an estimated 48 million illnesses, 128 000 hospitalizations, and 3000 deaths occur in the United States each year due to foodborne diseases (20).

Studies from different parts of the world approved that street vended foods have remarkable contribution to the increased burden of foodborne diseases. Bacteriological assessments done on street vended food in the globe indicates about 80 - 93% were contaminated with pathogenic bacteria including *E. coli*, *S. aureus*, *Klebsiella sp.*, *Pseudomonas sp.*, *Salmonella spp.*, and Yeast (21, 22).

It was also estimated that about 700 000 deaths per year in Africa were caused due to foodborne and waterborne diseases (23). About 3 to 5 genera of bacteria were isolated and identified from the food samples that include *Staphylococcus*, *Klebsiella*, *Bacillus*, *Proteus*, *Yersinia*, *Enterobacter* and *Salmonella* (24). In developing countries, up to an estimated 70% of cases of diarrheal disease are associated with consumption of unwholesome food (25, 26). In Ghana, about 65,000 people die annually from food-borne diseases resulting in the loss of some US\$69 million to the economy (5).

It also further indicated that in sub-Saharan Africa foodborne disease and foodborne disease eruptions are routinely attributed to poor personal hygiene of street food vendors and food handlers in food settings (27). Street-vended foods may cause significant community health problems owing to lack of basic infrastructure and services (28, 29). Investigators have established that street vendors do not observe food handling practices leading to pathogenic cross contamination and hence unsafe food products for consumption (30).

In Ethiopia, as in other developing countries, it is difficult to evaluate the burden of food borne pathogens because of the limited scope of studies and lack of coordinated epidemiological surveillance systems. In addition, under-reporting of cases and the presence of other diseases considered to be of high priority may have overshadowed the problem of foodborne pathogens (31-33). Microbiological quality of street vended foods in Ethiopia found about 9.9 - 61% of street foods were positive for *S. aureus* and 13.13% of street foods were positive for various types of bacteria like *S. aureus*, *Salmonella* isolates and *E.coli* (12, 34, 35).

Research findings on microbiological assessment of street vended foods collectively push us to think over as how much the food handlers understand the situations on their hand as a critical public health problem. Hence, looking into the presence of gap on food safety practices among street food vendors are a prime footstep for proper planning and performing requisite interventions.

### **1.3. Significance of the Study**

Unsafe food-production processes and food safety practices aggravate the burden of food borne diseases. To the best of our awareness, food handlers' safety practices have a great role in the

production of healthy food for consumers; so as to minimize the level of contamination and the burden of food borne diseases. In urban areas like City Administrations in West Gojjam Zone, dining outside home in street vendors observed as a common practice among numerous consumers due to increased urbanization, increased number of labor workers and seeking of low cost foods for low income groups.

Studies deals about Bacteriological Quality Assessment have declared as Selected Street Foods are highly contaminated but practice of venders in those city Administrations have not been assessed yet. Accordingly, street food vender's practices towards food safety have to be assessed.

Therefore, the finding of this study is important for respective health offices to know the gap of Street Food Vendor's on Food Safety practices so as to formulate intervention mechanisms. This research can add new knowledge in the area about the practice of street vendors. The finding also important for west Gojjam health department to plan successful monitoring and evaluation systems of district health offices on methods formulated to improving food safety among street food vendors. For researchers, it serves as source of information concerning vendor's status of practice and factors associated to conduct other researches in the area for the future.

## **2. LITERATURE REVIEW**

### **2.1. Food Safety Practice of Street Food Vendors**

The quality and safety of street vended foods are of great concern for public health, as consumers are constantly exposed to the risk of illness every time, they consume these foods (36). Study conducted in Vietnam regarding to food handling, street vendors had safety practice with 98.5%, and personal hygiene practice had the lowest percentage with 33.1% (28). Based on the research done on vendors' Food safety practices in brazil, 95% did not wash hands between food and money transactions and restroom breaks; 91% did not have hair coverings; 33% did not wash their hands at all, whereas 24% only used water to wash their hands (37).

Due to the unsafe practices reported among SFVs, the scarce funds in the developing countries that could have been utilized for infrastructural growth are being harnessed to treat disease outbreaks that could have been prevented through practicing of safe foods production processes (26). Study conducted in Kenya to determine food safety practice of SFVs shows as poor personal hygiene practices like wearing of jewelry 37%, having long and unclean nails 43% and lack of protective clothing 36% (38). Another research in Kenya also shows as 53% of SFVs wore protective clothing, 21% worked without protective garments and 31.5% wore dirty uniform as well as 75% of the vendors did not wear protective clothing, they handled money and sold food simultaneously (39).

In Ethiopia also research findings on food handling practice of street food vendors showed low level of good food safety practices 27.5% (40) while in (41) 49.0% of food handlers had good food safety practice in a facility-based cross-sectional study conducted in Gondar city. In addition 72% (27) and 49.6% (42) of food handlers had good food safety practice in study conducted at Desse and Debarq town, Ethiopia respectively. Another study on food handlers study also found 52.5% of food handlers had good food safety practices (43).

## **2.2. Factors Associated with Practice of Food Safety**

### **2.2.1. Socio Demographic Characteristics**

Poor food safety practices are generally associated with low incomes and poverty. In India, Education of street-food vendors plays an important role in improving food safety practices (44). Based on (7, 45) food-handling practices were found to be associated with socio demographic characteristics like level of educational and (45) also states as age, marital status, and monthly income were identified as factors affecting food safety practices. As recommendation the study (46) puts that regular education for SFVs to be given on hygienic practices to minimize the gaps seen on food preparation practices.

### **2.2.2. Knowledge of Street Food Vendors on Food Safety**

According to (40, 45) the level of knowledge was identified as independent predictor variable to food safety practice. These studies reveals that food handlers who had low level of knowledge may have a chance to have poor practice while those who have good level of knowledge have a chance of having good safety practice.

The rising concern about food-borne illness has questioned the knowledge of the street food vendors to food handling practices (7). Study conducted in china states that 77% of vendors have good understanding of reducing contamination risk by hand washing before work and 79% of SFVs knew that proper cleaning and disinfection of food utensils reduced the risk of contamination and it also indicates that the mean knowledge score was 58%. In addition about 62% of vendors knew that microbes were in the skin, nose, and mouth of healthy food handlers while only 48% of vendors were aware of those reheating cooked foods contributed to food contamination (47). A research done in Vietnam shows us that the general knowledge of street food vendors on food safety was 56% while only 12.9 % of vendors knew about the effect of food contamination (28). The finding of research done in India shows that overall awareness about food safety standards remained low with only 50% of SFVs knowing about standards despite this being mandatory (44) which results from lack of any training on food hygiene and safety (48).

In Africa study conducted in Ghana indicates that the most effective measures taken to increase knowledge on food safety can enhance food-handling practices (7). Another studies show that most of the vendors have unhygienic behavior and poor knowledge of food hygiene and safety (36, 38). Study done on vendors' knowledge assessment about food hygiene in Zanzibar shows that 58.1% of the respondents were aware of the food hygiene (30) while the other study conducted in Ghana gives as the level of knowledge of the majority (98.8%) of the participants was good, while only 1.2% had poor knowledge on food safety (7). In the study indicated above in Zanzibar about 70.6% knew the importance of food hygiene and safety, which is, safeguarding the consumers whereas 29.1% linked it with cleanliness(30). The research done in Nigeria also showed as only 28.7% of vendors were aware of the term 'foodborne disease' while 71.3% of



them had not heard of the term before (49). A research done in Gondar also show as food safety practice was significantly associated with their food safety knowledge (42).

### **2.2.3. Access to Information and Regulation**

Street food vending, due to informal nature of the enterprise, the activities and practices of the practitioners is not regulated. This gives ample room for unwholesome practices. The results are the risks such activities pose to the health and safety of practitioners along the value chain (26, 50, 51). In Brazil, the research done for the elaboration of specific legislation to ensure the safety of street food recommends that specific local and national laws for street food need to be created to protect the consumer, and continuous training of vendors on legal issues could help to address the lack of food quality and safety (37). The study finding in India also tells us that practice of wearing hand gloves and apron is almost absent with these finding regular supervision and regulating their practice are put as recommendations (44). A research done in Bangladesh states that there was no even a single vendor recorded as having any training on hygiene practice for food preparation (22).

In Africa, street vendors are among the largest subgroups in the informal economy (52, 53). Based on the study conducted in Nigeria, street vendors are responding by adopting a range of spatial, relational and temporal tactics to be out of regulations (54). Different scholars recommend that Licensing, inspection and supervisory actions of street food vendors should be conducted regularly to enable them practicing safe food handling activities (37, 38, 55). Study conducted in Kenya shows about 93% of the SFVs had not received any formal training on food hygiene and safety (36). Based on the study conducted on bacteriological profile among street vended foods and hygienic practice 58.3% of vendors have no any information about foodborne illness (12).

Vendors who have been in business for a long time are expected to have better food hygiene and safety practices, although this may not always the case (56). The research done in Kenya indicates that 73% of the SFVs had not obtained a food handlers' medical certificate. For the vendors who had a food handler's medical certificate, 42% of them never renewed it while about 1% of them renewed it within 3 months, 30% within 6 months and 27% within 12 months (36).

In Ethiopia a study done in Addis Ababa assures that a lot of unethical practices done by street food vendors, like about 90.7% was used recycled paper to serve the consumers, no health certificate from authorized dignitary (11). Another study in the same area also approves those problems and recommends having strong food and water safety policy with committed regulation strategies (57). Adoption of safety approaches that permeates the entire chain of street food business from good agricultural practices through hazard analysis critical control points strategy to good hygiene practices by vendors and consumers would significantly reduce risks in street food consumption (9, 26).

#### **2.2.4. Conditions of Vending Environment**

Globally, the environment notably influences street vending (56). As stated by (58) Street foods from place of preparation to roadsides where the foods are sold, the chances of contamination by pathogens are significantly high. Based on the study done in United States of America/USA/, in developing countries most vendors do not have good sources of portable water for the preparation of products. It is not unlikely that some of these products are prepared with faecally contaminated water taken from local ponds and open streams (58). According to the research done in Vietnam, in developing countries where SFVs are manipulating their activity under areas with poor infrastructure, mostly street foods result in microbial contamination and foodborne diseases (28).

In Africa findings from different scholars commonly agreed on vending sites such as those close to waste disposal sites provide ideal breeding sites for rodents and insects which can easily contaminate the foods with food safety hazards especially pathogenic microorganisms (1, 36). Based on the study in Ghana, vending locations can also affect the quality and safety of street vended foods (59). Another study in the same area also states that 68% vendors are vending on dirty sites, 20% on very dirty sites but only 12% vending sites were clean (60). Moreover, Garbage collecting bins were only found in 53.8% of the vendors of which only 36.4% were adequately covered and 20.9% were overfilled (36). Scholars come in line as poor waste management results in contamination of the environment which in turn increases the chance of contamination of the RTE food during handling (36, 38, 44).

In Ethiopia, studies approve that like many other African and world countries, SFVs are vending in more unhygienic environment due to several reasons which results in exposing the food for several types of pathogens come from different sources and practices, such as, improper food handling, improper waste disposal, contaminated water and improper storage temperature and reheating (4, 11). Based on the study done in Addis Ababa, the way of street food preparation and vending is in unsanitary environment although it is a means of income generation at the household level (11).

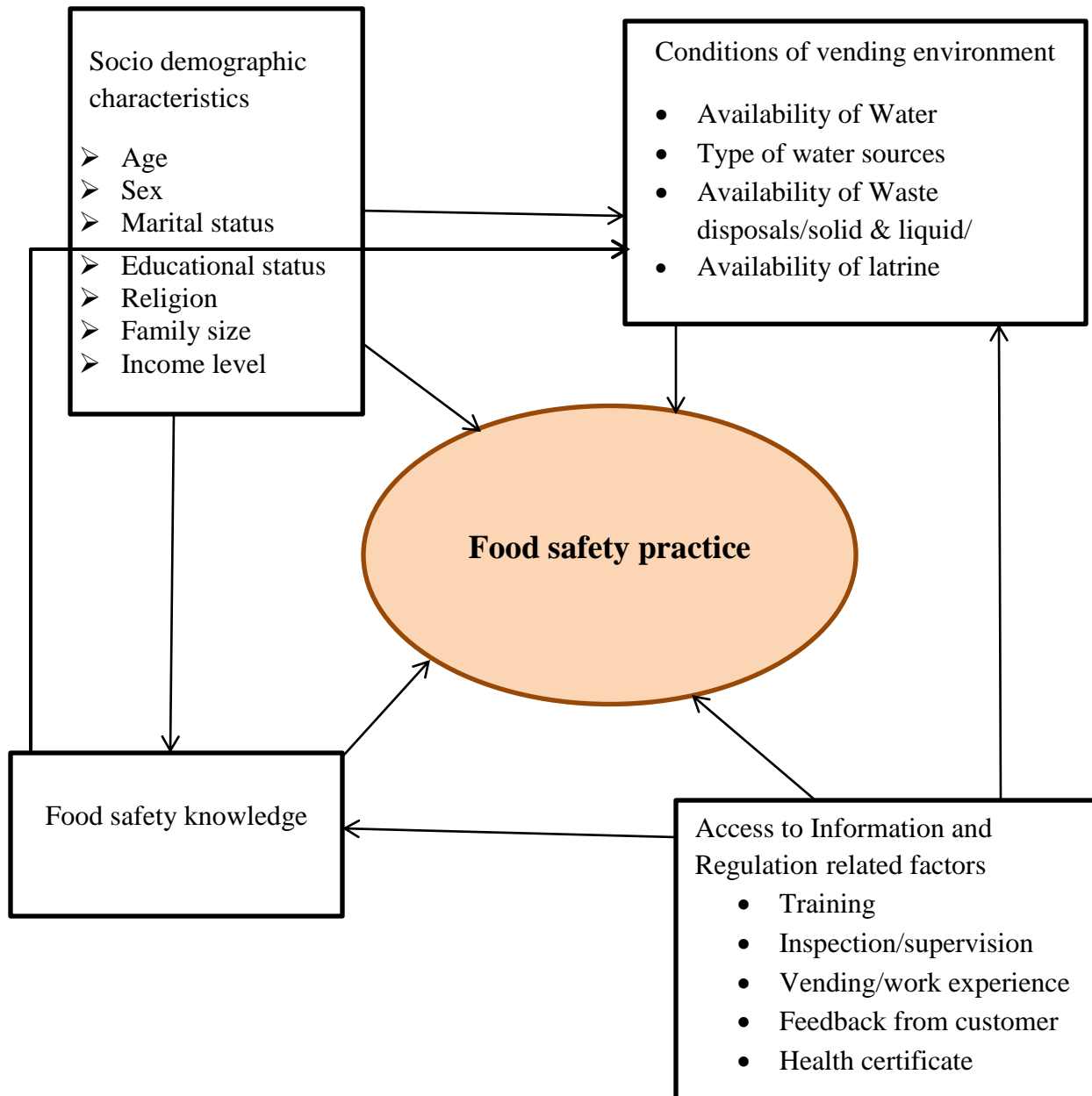


Figure 1: Conceptual framework on food safety practice and associated factors of street food vendors, in City Administrations of West Gojjam Zone /developed from literature/

## **2.1. Objectives of the Study**

### **2.1.1. General Objective**

- To assess food safety practices and associated factors among street food vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia, 2021.

### **2.1.2. Specific Objectives**

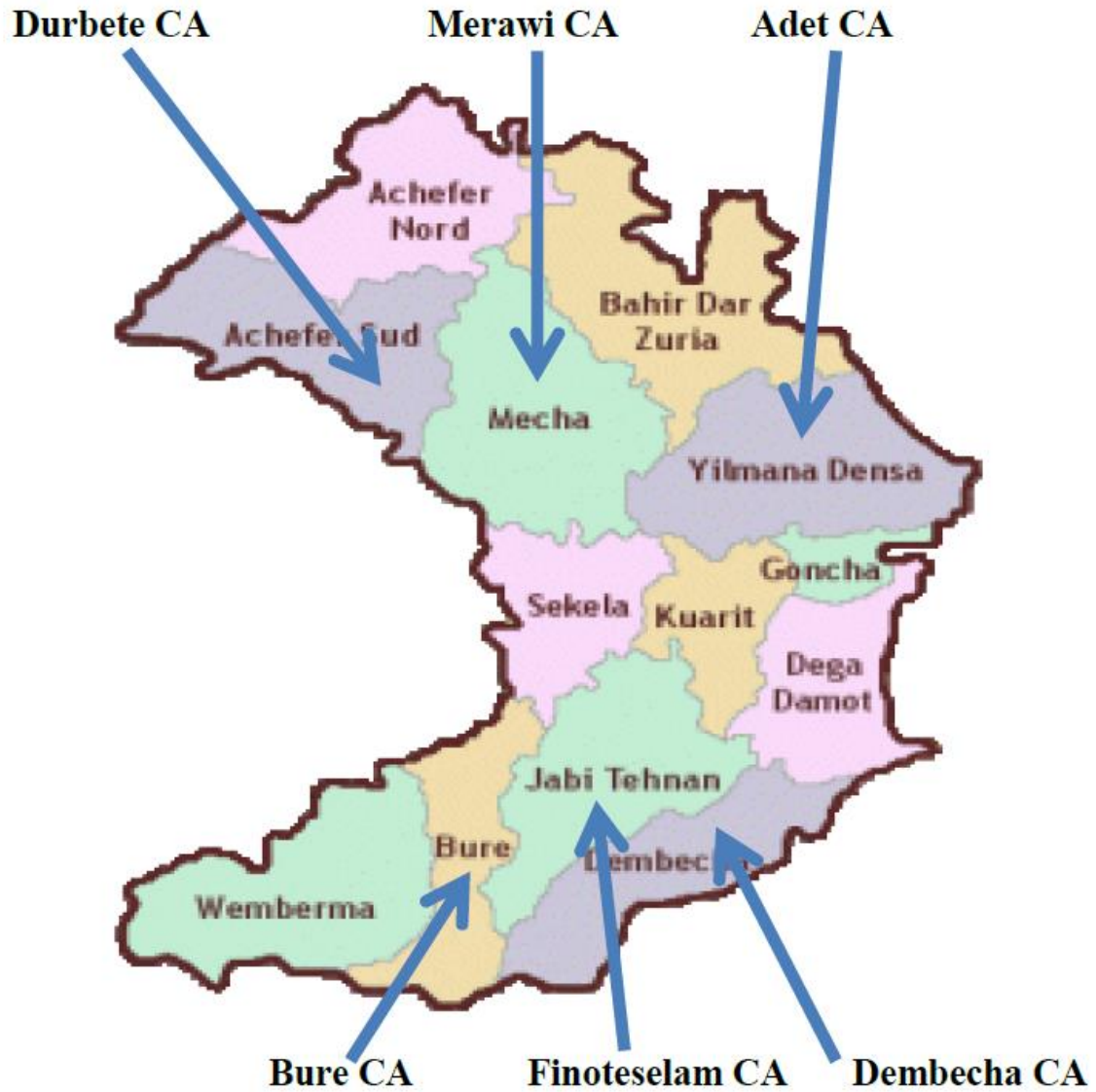
- To determine the level of food safety practices of street food vendors in West Gojjam Zone City Administrations.
- To identify factors associated with food safety practices among street food vendors in West Gojjam Zone City Administrations.

## **3. METHODS AND MATERIAL**

### **3.1. Study Area and Settings**

The study was conducted in City Administrations in West Gojjam Zone, Amhara Regional State. West Gojjam Zone has six/6/ city administrations namely Adet, Merawi, Durbete, Bure, Finoteselam and Dembecha city administrations. They all are found about in northwest of Addis Ababa with different distance and to west and South directions from Bahir Dar. The total population in six City Administrations is 164 292, of which about 81 137 are males while 83 155 are females. The out dining establishments observed in West Gojjam are hotels, restaurants, and street/small scale/ food vendors. From those establishments, maximum numbers of customers flow to small scale/street/ food vendors due to their fair costly and easily accessibility of those establishments around working areas. The total numbers of licensed street food vendors in those Cities are 1096 /Sources: respective City Administrations Trade and Market development office/. Due to dramatic increment of unemployment and expansion of urbanization, both the number of street food vendors and the customers for street foods become increased. Shero, Firfir, Pasta,

Mekoreni, Tomato, Egg, Ambasha, Vegetables etc... are the common street food types provided by vendors in the study area.



**CA- City Administration**

Figure 2: Map of Study Area/City Administrations in West Gojjam Zone, Ethiopia, 2021.

### **3.2. Study Design and Period**

A cross-sectional study was conducted to assess food safety practice and associated factors among street food vendors in City Administrations in west Gojjam zone. The study was conducted from February to March, 2021.

### **3.3. Source Population**

Street food vendors found in City Administrations of West Gojjam Zone are the source population.

### **3.4. Study Population**

Street food vendors found in six Cities, which are on work during the data collection time, are the study population.

### **3.5. Inclusion and Exclusion Criteria**

#### **Inclusion criteria**

Street food vendors in Dembecha, Finote selam, Bure, Durbete, Merawi, and Adet City Administrations were included in the study.

#### **Exclusion criteria**

Street food vendors who are licensed but not functional due to different reasons during data collection have been excluded from the study.

### **3.6. Sample Size Determination**

To calculate the sample size, we have tried to consider the practice scores and factors identified as determinant on food safety practices in previous studies that can give the maximum sample size as indicated in the table below.

Table 1: proportion and factor-based sample sizes determined.

No		Proportion and factors	Sample size	Sources
1	Proportion of practice	53%	383	(27)
2	Identified factor to practice	Average monthly income >\$21US:95% CI, 80% power, 3.2 AOR, 1.4 ratio	331	(27)

Then, the largest sample size was sample size determine by using proportion of practice via using single population formula( $n = (z\alpha/2)^2 * p(1-p)/d^2$ ) with the assumptions of 95% CI, 5% marginal error, 53% of the study units have good practice of food hygiene and safety and 10% non-response rate. Based on this 383 subjects and when add 10 % none response rate the sample units become **422**. But since the target population is below 10000, the sample size was adjusted by correction formula  $N*n/N+n$ . Then total street food vendors in the study area are 1096, so adjusted sample size was 305. However, in order to increase accuracy and precision, the first sample size as it is (**422**) was used.

### 3.7. Sampling Procedures

List of street food vendors in all six Cities were taken from Trade and Market Development office, Registration and Licensing unit. Then all street food vendors from six/6/ Cities were merged and numbered together. The study subjects then selected by using simple random sampling technique.

### 3.8. Data Collection Tools and Techniques

Data was collected through a face-to-face interview using structured questionnaires and observational checklists. The questionnaire and checklist designing processes was guided by relevant information from previous literatures and the guidelines provided by WHO regarding street food vending safety practices. The questionnaire and checklist was prepared in English first and then translated into the local language (Amharic) to have a clear and common understanding of all respondents who have been participated in this study. The data collectors



and supervisors were degree holder officers/Environmental Health/Sanitary Officers/ in the Health Sector of those City Administrations. Smart mobile was used as a tool for data collection through Epicollect5 Software. The project template was created on Epicollect5 software by the investigator carefully with all required indicators. The purpose and objectives of the study have been clearly explained to each study participants before beginning of data collection.

### 3.9. Study Variables

- Dependent/outcome variable
  - Food safety Practice of street food vendors (Good or Poor)
- Independent variables/study variables
  - ✚ Socio demographic variables
    - Age
    - Sex
    - Marital status
    - Educational status
    - Religion
    - Family size
    - Income level
  - ✚ Food safety knowledge of street food vendors
  - ✚ Access to information and regulation variable
    - Training
    - Inspection by supervisors
    - Vending/work experience
    - Feedback from customer
    - Health certificate
  - ✚ Conditions of vending environment
    - Availability of Water
    - Type of water source
    - Availability of Waste disposal system

- ✓ Liquid waste disposal system
- ✓ Municipal solid waste collection
- Availability of latrine

### 3.10. Operational Definitions

**Food Safety Knowledge:** The knowledge on food safety was measured by providing 14 questions for the participants. The answers were registered as one for correct responses and zero for incorrect responses. The scores then changed to percent. Vendors who can give true answer for at least 8 or above questions (>50%) have been classified as having good knowledge whereas vendors who can answer 7 or below questions correctly ( $\leq 50\%$ ) was considered as having poor knowledge.

**Food Safety Practice:** The food safety practice was assessed by providing 22 questions for participants. Participants practicing correctly were score 1 while those practicing incorrectly were score 0. The result from 22 questions was again changed to 100 (percent). Vendors who are practicing 12 or more correctly (> 50%) have been considered as having good practice while those vendors who are practicing 11 or bellow ( $\leq 50\%$ ) was considered as having poor practice.

**Availability of water:** Based on WHO guideline for street food vendors, to say there is access for water, the production and sales unit should have their own supplies of potable water whether it is from a central system or an individual source, such as a hand pump (2).

#### **Availability of waste disposal systems:**

- **Liquid waste disposal:** Based on WHO standard for street food vendors, to the liquid waste is disposed in appropriate way; it should be emptied into the nearest sewer or drain. Some form of a trap should be used to ensure that only liquid waste is discharged into the sewer or the drain (2).
- **Solid waste disposal:** Based on the standard provided by WHO, solid waste generated from street food production should be kept in covered containers on site to be removed at least once daily by the public garbage collection system provided by the municipalities (2).

**Availability of latrine:** In small food establishments, the minimum requirement is one toilet for every 30 women and every 60 men employee and customers. Sources:

<https://smallbusiness.chron.com/restroom-requirements-restaurants-41132.html>

### **3.11. Data Quality Assurance**

Quality of data was assured by designing the template intensively and pre-testing of the questionnaires/template in 5% of participants on street food vendors selected from Jiga town and completeness of the template was assessed before the actual data collection. The data collectors and supervisors were first take training about data collection to have common understanding and let them to practice on Epicollect5 Software until become perfect to collect the required data by already prepared template. At every moment the collected data was uploaded and the supervisors were checking each sample immediately after collection for its completeness. If anything found that to be corrected, then the supervisors were informing the data collector immediately before the completion of data collection.

### **3.12. Data Management and Analysis**

The data collected through Epicollect5 were exported directly to MS-Excel and then exported to SPSS version 23 for analysis. To describe the study subjects, descriptive statistics, including frequencies, mean, standard deviation, and percentage have been used. Bivariable logistic regression analysis was done to identify factors associated with knowledge and practice of food safety and hygiene. Multivariable logistic regression analysis was used to control the effect of confounding variables. Variables with p-value  $< 0.05$  have considered as statistically significant. The association and its strength also noticed by using odds ratios with 95% confidence interval/CI/. Variables with significant association were identified by the basis of, CI and p-value. Data presentation of the results after analysis has done by using graphs, tables, and narration.

### **3.13. Ethical Considerations**

Ethical clearance was obtained from Bahir Dar University College of Medicine and Health Sciences Institutional Review Board (IRB). Written permission was also taken from Health and Trade Department in west Gojjam zone, and then oral permission from each City Administration health and trade sector leaders was obtained to get important information and to collect the data. Informed consent was again obtained from each study participant after explaining the objective of the study. All the information about the study participants have been kept in a file without name but a code for each and not be given to anyone except the principal investigator. Participation was voluntary based.

### **3.14. Results Dissemination**

The final report will be presented and submitted to the school of Public Health, College of Medicine and Health Sciences, Bahir Dar University. In addition, the result will also be disseminated to the respective city administrations, and woreda health offices so as to enable formulating programs for intervention mechanisms. A peer reviewed manuscript of this research will also be submitted to journal publishers for publication to make our findings publically available.

## 4. RESULTS

### 4.1. Socio Demographic Status of Street Food Vendors

About 422 respondents were proposed to participate in the study, but 418 participants were participated which indicates about 99% of response rate. From the total vendors participated, all of them were females in gender and orthodox followers in religion. The age group of 20-24 years was 232 (55.51%) while others were below and above this. Regarding educational level, 171 (40.91%) had primary school education and 361 (86.36%) of the respondents earned 1500 -5000 Ethiopian Birr (ETB) monthly (Table 2).

Table 2: Socio-demographic characteristics of SFVs in City Administrations of West Gojjam Zone, Ethiopia, 2021.

Socio-demographic characteristics		Frequency	Percent
Sex	Female	418	100.00
Age group /in year/	15-19	34	8.13
	20-24	232	55.51
	25-29	152	36.36
Marital status	single	271	64.83
	married	105	25.2
	divorced	42	10.05
Religion	orthodox	418	100.00
Educational status	can't read and write	68	16.27
	can read and write	43	10.29
	Primary level	171	40.91
	can't read and write	136	32.54
Family Size	1-3	404	96.65
	4-6	14	3.35
Income	1500-5000	361	86.36
	5001-8500	51	12.20
	8501-12000	6	1.44

## 4.2. Access to Information and Regulations Related Issues of SFVs

From 418 respondents, 391 (93.54%) did not know the inspectors. Only 105 (25.12%) and 95 (22.73%) street food vendors had been supervised by EHIs and took training on food safety, respectively (figure 3).

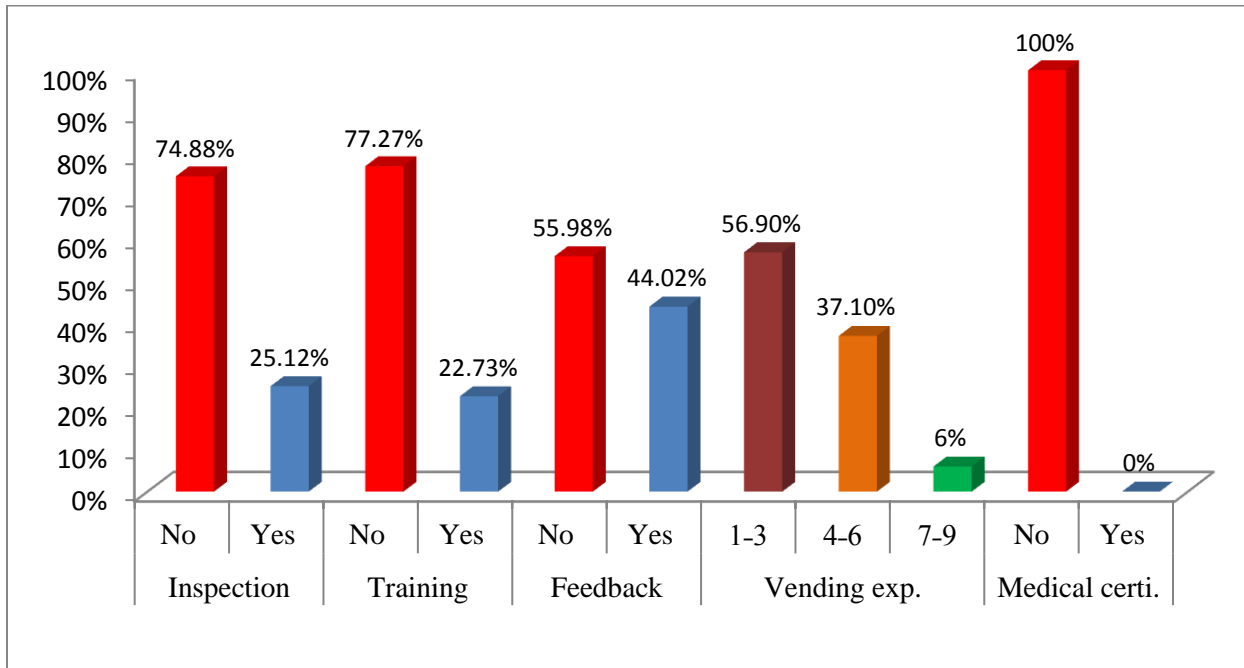


Figure 3: Access to Information and Regulation Related Issues of SFVs in City Administrations of West Gojjam Zone, Ethiopia, 2021.

## 4.3. Vending Environmental Situations of SFVs

All street food vendors have a pipe water sources and some of them are supplemented with spring and river sources. Only 78 (18.66%) street food vendors have functional latrine and vendors who did not have latrine their customers used public latrine and shared from their neighbors (table 3).

Table 3: Vending Environmental Situations of SFVs in City Administrations of West Gojjam Zone, Ethiopia, 2021.

		Frequency	Percent
Nearby water sources	Yes	351	83.97
	No	67	16.03
Source of water	Pipe	139	33.25
	pipe, river	175	41.87
	pipe, spring	104	24.88
Functional latrine	No	363	86.84
	Yes	55	13.16
If no latrine Where to go to defecate	public latrine	228	62.81
	Share with neighbor	128	35.26
	open field	7	1.93
liquid waste disposal system	open field	215	51.44
	soak pit	203	48.56
Municipal Solid waste collection	yes	320	76.56
	no	98	23.44

#### 4.4. Knowledge of SFVs about Food Safety

The level of knowledge about food safety have determined by giving a score as the answer true scored as 1 while answers false scored 0. The maximum knowledge score found was 85.71% while the minimum score was 35.71%. The mean score of knowledge was 57.13% with standard deviation of 13.62.

Table 4: Knowledge of SFVs about Food Safety in City Administrations of West Gojjam Zone, Ethiopia, 2021. (N=418)

		<b>No</b>	<b>Percent</b>
Wiping Cloths can spread microorganisms	False	317	75.84
	True	101	24.16
Refrigeration reduces/inhibits MOs in food	False	31	7.42
	True	387	92.58
The same cutting board used for raw foods and cooked foods	False	257	61.48
	True	161	38.52
Raw foods stored separately from cooked foods	False	187	44.74
	True	231	55.26
Cooked foods do not need to be thoroughly reheated	False	55	13.16
	True	363	86.84
Skin infections can contaminate food	False	94	22.49
	True	324	77.51
Leaking saliva during holding paper and counting money may contaminant the food	False	280	66.99
	True	138	33.01
Mouth, nose and hair should be covered	False	255	61.00
	True	163	39.00
Food borne diseases causing microorganisms are found every where	False	297	71.05
	True	121	28.95
Microorganisms are present on human skin	False	230	55.02
	True	188	44.98
Human beings emit microorganisms during sneezing and talking	False	137	32.78
	True	281	67.22
Food may be contaminated during sneezing, taking and touching by our hands	False	115	27.51
	True	303	72.49
Microorganisms cannot survive in clod and cooked foods	False	206	49.28
	True	212	50.72
Leftover foods can cause diseases	False	50	11.96
	True	368	88.04
Over all Knowledge level	Good	264	63.20
	Poor	154	36.80



#### 4.5. Food Safety Practice of SFVs

The food safety practice had determined by giving a score as the correct answer scored to 1 while wrong answers scored 0. On this base, the maximum practice score was 77.27% while the minimum score was 31.82%. The mean score of food safety practice was 52.69% with standard deviation of 12.90. Among participants 215(51.40%) vendors have good level of food safety practice while 203 (48.60%) SFVs found to have poor level of food safety practices.

Table 5: Food safety practice of SFVs in City Administrations of West Gojjam Zone, Ethiopia, 2021.

		No	Percent
Tap/water container to carry water	correct	414	99.04
	wrong	4	0.96
Basin/sink/bucket for hand wash	correct	347	83.01
	wrong	71	16.99
Soap for hand wash	correct	120	28.71
	wrong	298	71.29
Bowl/bucket for utensil washing	correct	259	61.96
	wrong	159	38.04
Soap to wash utensil	correct	332	79.43
	wrong	86	20.57
Clean cloth to cover food	correct	34	8.13
	wrong	384	91.87
Wearing of apron	correct	160	38.28
	wrong	258	61.72
Separate knife and cutting board	correct	191	45.69
	wrong	227	54.31
Separate store for raw and cooked food	correct	149	35.65
	wrong	269	64.35
Utensil and food store 60cm above ground	correct	60	14.35
	wrong	358	85.65
No crack/scratched on utensil	correct	294	70.33

	wrong	124	29.67
Hair cover during working	correct	266	63.64
	wrong	152	36.36
No decorated hand nail or jewelries	correct	177	42.34
	wrong	241	57.66
Short nail and clean hand	correct	290	69.38
	wrong	128	30.62
Temporary solid waste storage container	correct	363	86.84
	wrong	55	13.16
Wash hands after money hair skin touch	correct	110	26.32
	wrong	308	73.68
No fingering nose and ear	correct	300	71.77
	wrong	118	28.23
No leaking of fingers to pick paper or money	correct	185	44.26
	wrong	233	55.74
No wiping hands on dirty cloth	correct	207	49.52
	wrong	211	50.48
No touch inside and rim of cups/glasses	correct	78	18.66
	wrong	340	81.34
No chewing gum	correct	337	80.62
	wrong	81	19.38
Store food in refrigerator	Correct	173	41.39
	wrong	245	58.61
Over all practice level	Good	215	51.40
	poor	203	48.60

#### 4.6. Factors Affecting Food Safety Practices of SFVs

Based on multivariable logistic regression analysis, street food vendors/handlers who had primary level educational and those who can't read and write were 41.4% (AOR=0.586, 95% CI=0.345-0.993) and 82.9% (AOR=0.171, CI=0.079-0.370) respectively, less likely to have good food safety practice as compared with those who had secondary educational. SFVs who

have average monthly income (AMI) of 5001-8500 ETB were 2.6 times more likely to have good food safety practice as compared with those having AMI less than 5000 ETB (AOR=2.566, 95% CI=1.059-6.217).

SFVs who have got the chance of inspection, and received training on food safety were 3.6 (AOR=3.639, 95% CI=2.050-6.460), and 3.7 (AOR=3.729, 95% CI=1.942-7.159) times more likely to have good food safety practice as compared with their counterparts food handlers, respectively. The odds of having good food safety practice were 1.9 and 3.7 times higher among SFVs who had vending experience of 4-6 and 7-9 years (AOR=1.887, 95% CI=1.139-3.125; AOR=3.671, 95% CI=1.213-11.112), respectively, than SFVs having experience of less than 3 years. As well as SFVs who have poor knowledge on food safety were 51.7% less likely to have good food safety practice as compared with SFVs who had good knowledge on food safety (AOR=0.483, 95% CI=0.299-0.780) (Table 6).

Table 6: Factors associated with practice of food safety of SFVs in City Administrations of West Gojjam Zone, Ethiopia, 2021.

Variables	Practices		COR/95% CI	AOR/95% CI
	Poor N (%)	Good N (%)		
Age group				
25-29	57 (37.50)	95 (62.50)	1	
20-24	127 (54.74)	105 (45.26)	0.496 (0.327 – 0.753)*	
15-19	19 (55.88)	15 (44.12)	0.474 /0.223 – 1.005/	
Marital status				
Single	138 /50.92/	133 (49.08)	1	
Married	44 /41.90/	61 (58.10)	1.439 (0.913 – 2.267)	
Divorces	21 /50.00/	21 (50.00)	1.038 (0.542 – 1.988)	
Educational status				
Secondary level	48 /36.09	88 (63.91)	1	1
Primary level	81 /47.37/	90 (52.63)	0.606 (0.382 – 0.962)*	0.586 (0.345 – 0.993)*
Can read and write	23 /53.59/	20 (46.41)	0.474 (0.237 – 0.950)*	0.527 (0.234 – 1.189)
Can't read	51 /75/	17 (25)	0.182 (0.095 – 0.349)*	0.171 (0.079 – 0.370)*
Family size				
1-3	200 /49.50/	204 (50.50)	1	
4-6	3 /21.43/	11 (78.57)	3.595 (0.988 – 13.078)	
Average monthly income				
1500-5000	193 /53.46/	168 (46.54)	1	1
5001-8500	9 /17.65/	42 (82.35)	5.361 (2.535 – 11.339)*	2.566 (1.059 – 6.217)*
8501-12000	1 /16.67/	5 (83.33)	5.744 (0.664 – 49.657)	2.903 (0.290 – 29.112)
Inspection				
No	181 /57.83/	132 (42.17)	1	1
Yes	22 /20.95/	83 (79.05)	5.173 (3.073 – 8.708)*	3.639 (2.050 – 6.460)*
Training				
No	187 /57.89/	136 (42.11)	1	1
Yes	16 /16.84/	79 (83.16)	6.789 (3.798 – 12.137)*	3.729 (1.942 – 7.159)*

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Feedback from customer				
No	130 (55.56)	104 (44.44)	1	
Yes	73 (39.67)	111 (60.33)	1.901 (1.284 – 2.813)*	
Vending experience/ yrs/				
1-3	142 (59.66)	96 (40.34)	1	1
4-6	53 (34.19)	102 (65.81)	2.847 (1.869 – 4.337)*	1.887 (1.139 – 3.125)*
7-9	8 (32)	17 (68)	3.143 (1.305 – 7.573)*	3.671 (1.213 – 11.112)*
Presence of nearby water sources				
Yes	165 (47.00)	186 (53.00)	1	
No	38 (56.72)	29 (43.28)	0.677 (0.400 – 1.146)	
Types of water sources				
Pipe	74 (53.24)	65 (46.76)	1	
Pipe, river	85 (48.57)	90 (51.43)	1.205 (0.772 – 1.883)	
Pipe, spring	44 (42.31)	60 (57.69)	1.552 (0.930 – 2.591)	
Liquid waste disposal system				
Soak pit	94 (43.72)	121 (56.28)	1	
Open field	109 (53.69)	94 (46.31)	0.670 (0.456 – 0.985)*	
Municipal Solid waste collection				
Yes	148 (46.25)	172 (53.75)	1	
No	55 (56.12)	43 (43.88)	0.673 (0.427 – 1.061)	
Knowledge				
Good	104 (39.39)	160 (60.61)	1	1
Poor	99 (64.29)	55 (35.71)	0.361 (0.239 – 0.545)*	0.483 (0.299 – 0.780)*

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## 5. DISCUSSION

This cross-sectional study was conducted to assess the food safety practice and associated factors of street food vendors in west Gojjam zone city administrations, Ethiopia. The quality and safety of street vended foods are of a great concern for public health. Street food vendors feed a large group of population so that the health of those costumers again falls on the hand of those vendors. Due to this, the practice of street food vendors become questioned to constitute safety measures for food handling (7, 39).

The level of street food safety practice was found to be approximately consistent with the research findings from Dangila (52.5%) (43), facility based cross sectional study in Gondar (49%) (62), community based study in debark (49.6%) (42). However, this finding is higher than the findings of cross sectional study conducted in Shashemane (27.5%) (40). The reason for this variation can be the difference in legality of street food vendors. The study conducted in Shashemane had incorporated informal/not licensed/ street food vendors. Those informal traders are out of regulations and working with very limited dining and cleaning materials which in turn leads for poor safety practices.

On the other hand, the practice level in the current study was found to be lower as compared with the research findings from Brazil and study in Vietnam (98.5%) (37, 63). The reason for this discrepancy expected to be geographical difference that is the demographic characteristics observed in Brazil and Vietnam and their level of understanding and controlling systems might have visible difference with our community. Variation in the time of study can also be an important reason for the observed difference since the flow of information and level of understanding are found to be changing through time.

In this study concerning personal hygiene, about 61.72% of vendors do not wear protective cloth/apron/, 36.36% do not have hair cover during food processing, 57.66% have decorative on nail and jewelries, 30.62% do not have short nail and clean hand. These findings were found to be lower than findings from research done in Ethiopia, Addis Ababa in which about 95% had uncovered hair, 88.6% of vendors did not wear

aprons and 100% of them handled money with bare hands (11). However, Long nails (20.9%) as well as nail polish (15.5%) were found lower than the report in the current study. These differences might be due to variations in study area (being capital city vs district towns), chance of obtaining training and monitoring and inspection activities from responsible officers.

The practice level of vendors on separate storage for raw and cooked foods were only 35.65% which is very low as compared with the finding of a cross sectional study conducted in Brazil (91%) (37) and which is high as compared with the report in Nigeria (12.2%) (25). Differences on geographic locations, demographic characteristics and awareness of both vendors and customers are the possible reasons for the observed variations on storage activities. Moreover, in the current study higher number of vendors (73.68%) found no to wash their hands after touching money. This finding is lower as compared with the finding conducted in different scholars (36-39). The possible reasons for these differences may come from geographical differences, individuals' perception differences, as well as it may also be affected by customer type.

In this study vendors with educational status of primary level and those who can't read and write were found to be statistically significant with the level of food safety practice. The current report also supported by different scholars that identify education as independent predictor (42, 57, 60, 62). This comes in line with theoretical truth that education brings a change in thinking and understanding ability on everything in life. In addition, in the current finding SFVs who have average monthly income of 5001-8500 ETB were also found to be independent predictor with food handling practice. Similar studies also described that vendors with better income level have better safety and hygienic practices (44, 45, 62). The possible justifications may be SFVs who have better income level can afford to avail different sanitary materials and equipment, these can in turn leads to have good practice. They will also have independent toilet services, access to water and protective equipment.

Based on the finding of this research, SFVs having history of supervision/inspection by EHI and took training about food safety were positively associated with food safety practice. This finding was also supported by former researches (7, 38, 45). The possible

reasons for these can be; first, inspection by inspectors and training are mechanism to bring improvements from the usual and traditional activities by giving important information about food safety. Second, vendors that do not bring change after comments given during inspection/supervision can also be exposed for penalty. So the only options they will have are either stopping their business or working based on recommendations given during inspection. This can be improving the practice of food safety practice. Whereas training on food safety provides good information on activities towards food safety and creates motivation to bring with a better practice.

We have also found out that vending/working experience became determinant factor for food safety practice of SFVs. This finding also supported by different articles (17, 36, 45, 62). It is theoretically acceptable that work experience brings an improvement on usual activities, because individuals can learn from their daily activities as well as from their neighbors. In addition, at each and every day, the customers can give a feedback about what is good and bad which gives a chance to make corrective measures for customer satisfaction.

Moreover, knowledge about food safety showed statistically significant association with food safety practice of SFVs. Different research findings also described as knowledge have a significant effect on food safety practice level of vendors (42, 45). Normally, it is the usual truth that if SFVs have good knowledge about food safety and its importance on consumers, it is expected that they can apply in the way of that it could be good. In addition, since it is a business, SFVs expected to do the best as much as they know to attract the customer; as well as to hold their customer for longer period.



## **6. LIMITATION OF THE STUDY**

This study did not include informal (those who do not have registered and licensed) street food vendors. The reason was these illegal vendors are highly moveable and their working time is not constant (at morning and evening). This nature of work needs to follow and make registration before sampling to prevent missing and double sampling which needs extra resource and time.

## **7. CONCLUSION AND RECOMMENDATIONS**

### **7.1. Conclusions**

In this study, the food safety practice of street vendors were assessed by using list of activities. Based on this half of study subjects had good food safety practices. Factors such as educational status, monthly income, inspection, training, vending experience and knowledge level on food safety were identified as determinant food safety practices of Street Food Vendors.

### **7.2. Recommendations**

Based on the findings of this study, the following recommendations are forwarded:

- The health offices of those city administrations shall better to do regular training, inspection and supervision on targeting food safety practices of street food vendors.
- Zonal health department need to support and regularly monitor activities of city health offices on safety of foods provided by street food vendors.
- Trade and market development office need to have enough support for street food vendors in the way as improving the economic status so as to improve food safety practice.

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## **9. ANNEXES**

### **9.1. Questionnaire (English and Amharic Versions)**

#### **Consent Form**

Information Sheet and Consent Form Prepared for street food vendors who are going to participate in the research project, food safety practices and associated factors of street food vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia, 2021.

#### **Title of the Research Project**

Food safety practices and factors associated with it among street food vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia, 2021.

**Name of principal Investigator:** Chalachew Chekol

**Name of the Organization:** Bahir Dar University college of Medicine and Health Sciences, school of Public Health.

#### **Introduction:**

This information sheet and consent form is prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study. This research team includes one principal investigator, six data collectors, and two supervisors.

#### **Purpose of Research Project**

The purpose of this research is to determine food safety practices and associated factors of street food vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia. The study will be helpful to determine practices and to identify associated factors of street food vendors on food safety in City Administrations of West Gojjam Zone, Northwest Ethiopia. It also contributes much to design appropriate intervention strategies. It also will serve as a source of information for subsequent studies in the area.



**Procedure**

To determine food safety practices and associated factors of street food vendors, we invite you to take part in this project. If you are willing to participate in this project, you need to understand and sign the agreement form. Then after, you will be interviewed by the data collector to give your response. You do not need to tell your name to the data collector and all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your response.

**Risk/ Discomfort**

By participating in this research project, you may feel that it has some discomfort especially on wasting your time about 20 - 30 minutes. We hope you will participate in the study for the sake of the benefit of the research result. There is no risk in participating in this research project.

**Benefits**

If you participate in this research project, there may not be direct benefit to you but your participation is likely to help us in determining practices and associated factors of street food vendors on food safety. Ultimately, this will help us to work on intervention strategies.

**Incentives/Payments for Participating**

You will not be provided any incentives or payment to take part in this project.

**Confidentiality**

The information collected from you will be kept confidential and will be stored in a file without your name but a code number assigned to it. And it will not be revealed to anyone except the principal investigator and will be kept.

**Right to refuse or withdraw**

You have full right to refuse from participating in this research. You can choose not to respond if you do not want to give your response. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

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**የአማራኛ ስምምነት መጠየቂያ ቅጽ**

በመንገድ ላይና በመንገድ አካባቢ ጊዜአዊ በሰሩት መከለያ ውስጥ የተለያዩ ምግቦችን የሚሸጡ ነጋዴዎች ምግብን በንጽህና ለማዘጋጀት፣ ለመያዝና ለማቅረብ፣ ምግብን ከተለያዩ ብክለቶች ለመከላከል የሚተገብራቸውን ተግባራት ለማወቅ የሚደረግ ጥናት የመረጃ መስጫና ስምምነት መግለጫ የተዘጋጁ ቅጽ.

**ዋና ተመራማሪ:** ቻላቸው ቸኮል

**የተቋሙ ስም:** ባ/ዳር ዩኒቨርሲቲ፣ ህክምናና ጤና ሳይንስ ኮሌጅ፣ የህብረተሰብ ጤና አጠባበቅ ት/ት ቤት

**መግቢያ**

ይህ የማብራሪያና የስምምነት ቅጽ አሁን እርስዎ እንዲሳተፉበት የምንጠይቅዎትን የምርምር ጥናት የሚያብራራ ነው። እባክዎ በዚህ ጥናት ለመሳተፍ ከመወሰንዎ በፊት ይህንን ቅጽ መረጃ ሰብሳቢዎቹ በሚያነቡልዎት ጊዜ በጥንቃቄ በማድመጥ ጥያቄዎች ካለዎት ይጠይቁ። በዚህ ጥናት መሳተፍ ከጀመሩ በኋላም በማንኛውም ጊዜ ጥያቄዎች ካሉዎት መጠየቅ ይችላሉ።

**የጥናቱ አላማ**

የዚህ ጥናት አላማ በምዕራብ ጎጃም ዞን ባሉ ከተማ አስተዳደሮች ውስጥ የሚገኙ በመንገድ ላይና በመንገድ አካባቢ ጊዜአዊ በሰሩት መከለያ ውስጥ የተለያዩ ምግቦችን የሚሸጡ ነጋዴዎች ምግብን በንጽህና ለማዘጋጀት፣ ለመያዝና ለማቅረብ፣ ምግብን ከተለያዩ ብክለቶች ለመከላከል የሚተገብራቸውን ተግባራት ለማወቅ ነው። እንድሁም የምግብ ደህንነት ችግሮችን ለመቅረፍ በሚደረገው ሂደት ትልቅ አስተዋጽኦ ያደርጋል። በተጨማሪም በአካባቢው ለሚደረጉ ሌሎች ተከታታይ ጥናቶች እንደ መነሻ መረጃ በመሆን ይጠቅማል።

**የአሰራር ሂደት**

በምዕራብ ጎጃም ዞን ከተማ አስተዳደሮች ውስጥ የሚገኙ በመንገድ ላይና በመንገድ አካባቢ፣ ጊዜአዊ በሰሩት መከለያ ውስጥ የተለያዩ ምግቦችን የሚሸጡ ነጋዴዎች ምግብን በንጽህና ለማዘጋጀት፣ ለመያዝና ለማቅረብ፣ ምግብን ከተለያዩ ብክለቶች ለመከላከል የሚተገብራቸውን ተግባራት ለማወቅ በተዘጋጀ ፕሮጀክት ላይ እንድሳተፉ ጋብዘንዎታል። በዚህ ጥናት ውስጥ ለመሳተፍ ከተስማሙ ስምምነቱን መረዳትና መስማማትዎን መግለጽ ይገባዎታል። ከዚህ በኋላ መረጃ ሰብሳቢው መጠይቁ ላይ ያሉትን ጥያቄዎች ይጠይቅዎታል። ስምዎን መናገር አያስፈልግዎትም። የሚሰጡት መረጃ ሚስጥራዊነቱ ይጠበቃል።

**አደጋዎች ወይም የማይመቹ ነገሮች**

በዚህ ጥናት በመሳተፍዎ የተወሰነ የማይመቹ ነገሮች ወይም ጥሩ ያልሆነ ስሜት ሊሰማዎት ይችላል። በተለይ የስራ ጊዜዎትን ከ20 - 30 ደቂቃ ያህል ይሻማዎታል። ነገር ግን ጥናቱ ከሚሰጠው ጥቅም አኳያ እንደሚሳተፉ ተስፋ አደርጋለሁ።

**ጠቀሜታ**

በዚህ ጥናት ላይ በመሳተፍዎ ቀጥተኛ የሆነ ጥቅም ላያገኙ ይችላሉ፤ ነገር ግን የእርስዎ ተሳትፎ ነጋዴዎቹ ምግብን በንጽህና ለማዘጋጀት፣ ለመያዝና ለማቅረብ፣ ምግብን ከተለያዩ ብክለቶች ለመከላከል የሚተገብራቸውን ተግባራት ለማወቅ ይረዳናል። በተጨማሪም ችግሮቹን ለመከላከል በሚደረጉ ስትራቴጂካዊ ርምጃዎች ላይ እንደ መነሻ ያግዘናል።

**የተሳትፎ ክፍያዎች /ጥቅሞች/፡ በጥናቱ በመካፈልዎ የሚሰጡት ክፍያ የለም።**

**ሚስጥር ስለመጠበቅ**

ለዚህ ጥናት የሚሰበሰብ መረጃ በሚስጥር ይጠበቃል። የሚሰበሰበው መጠይቅ የእርስዎ ለመሆኑ መለያ አይኖረውም። መረጃው በዋናው ተመራማሪ ፋይል ተደርጎ የሚቀመጥ በመሆኑ ሌላ ሰው ሊያገኘው አይችልም።

**በጥናቱ ያለመሳተፍ ወይም ራስን ከጥናቱ የማግለል መብት፡** በጥናቱ ላለመሳተፍ ከፈለጉ በዚህ ጥናት ያለመሳተፍ ሙሉ መብት አለዎት።

**የሚገናኙዎቸው ሰዎች**

ስለዚህ ጥናት ጥያቄ ካለዎት የሚከተሉትን ሰዎች ማነጋገር ይችላሉ።

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- 3. አቶ ሙሃመድ ሁሴንስ    ስ.ቁ: +251920272128

## English Version of Questionnaire

### **Bahir Dar University, College of medicine and health sciences, School of public health**

Questionnaire designed to determine food safety practices and associated factors of Street food vendors in City Administrations of West Gojjam Zone.

#### **Verbal consent form before conducting interview**

##### Greeting

Hello, I am\_\_\_\_\_. I am from Bahir Dar University, college of medicine and health science, school of public health. I would like to ask you few questions about practices and associated factors on food safety. Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obliged to answer any question you do not wish to answer. If you feel discomfort with the interview please feel free to drop it any time you want. But, your willingness to answer all of the questions would be appreciated. Your correct answer to the questions can make the study to achieve the goals. Therefore, you are kindly requested to respond genuinely and voluntarily with patience.

Do I have your permission to continue?

1. Yes
2. No

1. If yes, continue to the next page

2. If no, skip to the next participant by writing reasons for his/ her refusal

Name and Signature of the data collector \_\_\_\_\_

Date of interview \_\_\_\_\_ Time started \_\_\_\_\_ Time completed \_\_\_\_\_

Checked by Supervisor: Name \_\_\_\_\_ signature \_\_\_\_\_ Date \_\_\_\_\_

### **Instruction to Interviewers**

1. The questionnaire must be completed at the business address. If a respondent refuses to co-operate, make a note for the researcher.
2. Interview the owner of the business. Conduct the interview at the business site. Please hand the respondent your letter of introduction or read it out if necessary. Confirm to the respondent (owner) that the information supplied will be treated strictly confidential. Obtain signed/verbal Consent.
3. Follow the instruction to the interviewers carefully to ensure that the questions are asked according to sequence. Indicate the response by means of a tick or circle in the blocks provided for closed ended questions or write down the exact response where applicable.
4. Do not try to influence respondents. Should the respondents give you wrong answers deliberately, make a note of this next to the relevant question.
5. Check the completed questionnaire thoroughly to ensure that no question has been skipped and all the questions have responses.
6. Complete the Observation Checklist.
7. Upon completion of the Questionnaire, thank the respondent for agreeing to participate and remind them that they will receive feedback.

No	Question	Possible Response	Skipping
<b>I. Socio – demographic information</b>			
1	Sex	1. Male 2.Female	
2	Age	_____years	
3	Religion	1. Orthodox 2. Catholic 3. Protestant 4. Muslim 5. Others specify	
4	Marital status	1. Married 2. Single 3. Divorced 4. Widowed	
5	Educational status	1. No formal education 2. Primary education (1-8) 3. Secondary (9 - 12) 4. higher education (12+)	
6	Family size		
7	Monthly income in birr (ETB)	_____	
<b>II. Access to Information and Regulations Related Issues</b>			
1	Do you know who the EHP/Inspector is?	1. Yes 2. No	
2	Does the inspector supervise/inspect your premises	1. yes 2. no	
3	Have you ever received any training in Food Safety?	1. Yes 2. No	
4	Did you receive feedback from your customers about your hygiene?	1. Yes 2. No	
5	How long have you been running the business/in years?	-----	
6	Have you been taking medical checkup and certificate	1. Yes 2. No	
<b>III. Conditions of Vending Environment</b>			
1	Did you have nearby water source	1. Yes 2. No	
2	If yes, what Type of water source	1. pipe 2. spring 3. river	
3	Is there functional latrine?	1. Yes	

		2. No	
4	If no Q3, where do you and your customer use?	1. Open field 2. Shared with neighbor 3. Public latrine	
5	How do you dispose your liquid wastes?	1. Open field 2. Septic tank 3. Soak pit	
6	Is there regular solid waste collection from municipals?	1. Yes 2. No	

<b>IV. Knowledge on food safety</b>			
1	Wiping Cloths can spread microorganisms	1. True 2. False	
2	Refrigeration reduces/inhibits MOs in food.	1. True 2. False	
3.	Using the same cutting board for raw foods and cooked foods can expose cross contamination	1. True 2. False	
4.	Raw foods need to be stored separately from cooked foods	1. True 2. False	
5	Cooked foods need to be thoroughly reheated	1. True 2. False	
6	Skin infections can contaminate food	1. True 2. False	
7	Leaking saliva during holding paper and counting money may contaminant the food.	1. True 2. False	
8	Mouth, nose and hair should be covered	1. True 2. False	
9	Food borne diseases causing microorganisms are found everywhere	1. True 2. False	
10	Microorganisms are present on human skin	1. True 2. False	
11	Human beings emit microorganisms during sneezing and talking	1. True 2. False	
12	Food may be contaminated during sneezing, taking and touching by bare hands	1. True 2. False	
13	Microorganisms cannot survive in clod and cooked foods	1. True 2. False	
14	Leftover foods can cause diseases	1. True 2. False	



<b>VI. Check List for Food Safety Practices</b>			
	<b>Activities</b>	<b>Options</b>	
		<b>correct</b>	<b>wrong</b>
1	Tap or a water container to carry water		
2	A basin or sink or bucket for washing hands		
3	Soap for hand washing		
4	A bowl or bucket for washing dishes and utensils		
5	Soap powder or liquid to wash dishes		
6	Clean Cloths to cover all food		
7	Wearing of clean apron		
8	Separate knife and cutting board for raw and cooked foods		
9	Separate store for raw and cooked foods		
10	Cleaned utensils and foods are stored 60 cm above the ground		
11	No cracked and scratched utensils		
12	Hair is covered during service		
13	No decorated hand nails and jewelries		
14	Short nails, clean hand		
15	Temporary solid waste storage container		
16	Washed hands after touching money, skin and hair		
17	No fingering nose and ear while at work		
18	No lick fingers to pick paper/ money		
19	No wiping hands on a dirty cloth		
20	No touch the inside and rim of cups or glasses		
21	No chewing gum at work		
22	Store food in refrigerator		

That is the end of our questionnaire. Thank you very much for taking time to answer these questions. We appreciate your help!!

**የአማርኛ ቃለ መጠይቁ**

በምዕራብ ጎጃም ዞን ከተማ አስተዳደር ውስጥ በሚገኙ የመንገድ ዳር ምግብ አገልግሎት በሚሰጡ ድርጅቶች ውስጥ የሚሰሩ ሰራተኞች የምግብ ደህንነት ለመጠበቅ እየተገበሯቸው ያሉትን ተግባራት ለማጥናት የተዘጋጀ መጠይቅ ነው።

**ቃለ መጠይቁ ከመደረጉ በፊት የተሳታፊዎችን ፍቃደኝነት መጠየቂያ ቅጽ**

ሰላምታ፣ እንደምን አሉ? እኔ አቶ/ወሮ/ወ/ሪት \_\_\_\_\_ እባላለሁ።  
የመጣሁት ከባ/ዳር ዩኒቨርሲቲ ህክምናና ጤና ሳይንስ ኮሌጅ የህብረተሰብ ጤና አጠባበቅ ት/ት ቤት ነው። እዚህ የመጣሁት የምግብን ደህንነት ለመጠበቅ እየተገበሯቸው ያሉትን ተግባራት ለማጥናት ነው። ከዚህ በመቀጠል የምግብ ደህንነት ለመጠበቅ እየተገበሯቸው ያሉትን ተግባራትና ሌሎች ተያያዥ የሆኑ ነገሮችን በተመለከተ የተወሰኑ ጥያቄዎችን ልጠይቅዎት ነው። ከእርስዎ የምናገኛቸውን ማንኛቸውንም መልስ በሚስጥር እንጠብቃለን። ከዚህ ጥናት ጋር በተያያዘ በማንኛውም ቦታና ጊዜ ስምዎ እንደማይጻፍና እንደማይጠቀስ ልገልጽልዎ እወዳለሁ። በጥናቱ የማሳትፍዎት የእርስዎን ሙሉ ፈቃደኝነት ሳገኝ ብቻ ነው። በመጠይቁ ሂደት ለመመለስ የማይፈልጓቸውን ጥያቄዎች ያለመመለስ መብትዎ የተጠበቀ ነው። ይሁን እንጂ የእርስዎ ትብብርና ትክክለኛ ምላሽ ጥናቱን ምርምሩ እንዲሳካ ያደርገዋል። ስለዚህ ለማቀርብልዎት ጥያቄዎች በትእግስት መልስ እንድሰጡኝ እጠይቃለሁ።

በጥናቱ ለመሳተፍ ፍቃደኛ ነዎት? 1. አዎ 2. አይደለሁም

- 1. ፈቃደኛ ከሆኑ መጠይቁን ጀምር
- 2. ፈቃደኛ ካልሆኑ ወደ ሌላ ሰራተኛ ይሂዱ

የመረጃ ሰብሳቢው ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_  
መጠይቁ የተሞላበት ቀን \_\_\_\_\_ የተጀመረበት ሰአት \_\_\_\_\_ ያለቀበት ሰአት \_\_\_\_\_  
መጠይቁ በትክክልና ሙሉ በሙሉ መሞላቱን ያረጋገጠው ተቆጣጣሪ  
\_\_\_\_\_ ፊርማ \_\_\_\_\_

መመሪያ ለቃለ-መጠይቅ አቅራቢዎች

1. መጠይቁ በንግድ አድራሻው መጠናቀቅ አለበት ። ተጠሪ ለመተባበር ፈቃደኛ ካልሆነ ለተመራማሪው ማስታወሻ ይያዙ ።
2. የንግዱን ባለቤት ያነጋግሩ ። ቃለ-መጠይቁን በቢዝነስ ጣቢያ ያካሂዱ ። እባክዎን ለተጠሪ የመግቢያ ደብዳቤዎን ያስረክቡ ወይም አስፈላጊ ከሆነ ያንብቡት ። የተሰጠው መረጃ በጥብቅ በሚስጥር እንደሚያዝ ለተጠሪ (ባለቤቱ) ያረጋግጡ ። የተፈረመ / የቃል ስምምነት ያግኙ።
3. ጥያቄዎቹ በቅደም ተከተል እንዲጠየቁ ለማረጋገጥ ለቃለ-መጠይቆች የተሰጠውን መመሪያ በጥንቃቄ ይከተሉ ። ለዝግ ጥያቄዎች የተዘጋጁትን ብሎኮች በማክበብ ምላሹን ያመልክቱ ወይም የሚመለከታቸውን ትክክለኛ ምላሽ ይጻፉ።
4. ምላሽ ሰጪዎች ላይ ተጽዕኖ ለማሳደር አይሞክሩ ። ተጠሪዎች ሆን ብለው የተሳሳቱ መልሶችን ሊሰጡዎት ከፈለጉ ፣ ከሚመለከተው ጥያቄ ጎን ለጎን ማስታወሻ ይያዙ ።
5. የተጠየቀውን መጠይቅ ምንም ጥያቄ እንዳልዘለለ እና ሁሉም ጥያቄዎች ምላሾች እንዳሉ በደንብ ያረጋግጡ ።
6. ለእይታ/የታዛቢነት ማረጋገጫ ዝርዝር መረጃዎችን ያጠናቅቁ ።
7. መጠይቁ ሲያጠናቅቁ ተሳታፊው ለመሳተፍ በመስማማቱ አመስግን እና ግብረመልስ እንደሚቀበሉ አስታውሳቸው ።

ተ.ቁ	ጥያቄ	አማራጭ መልሶች	ምርመራ
<b>ክፍል 1: ማህበራዊ ስነህዝባዊ ገጽታዎችን በተመለከተ</b>			
1	ጾታ	1. ወንድ 2. ሴት	
2	ዕድሜ	_____ አመት	
3	እምነት	1. ኦርቶዶክስ 2. ካቶሊክ 3. ፕሮቴስታንት 4. ሙስሊም 5. ሌላ ካለ -----	
4	የትምህርት ሁኔታ	1. ያልተማረ/ች 2. የመጀመሪያ ደረጃ ትምህርት/1-8/ 3. ሁለተኛ ደረጃ ትምህርት /ከ 9 —12/ 4. የከፍተኛ ትምህርት (12+)	
5	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የትዳር አጋር በሞት ያጣ/ች/	
6	የቤተሰብ ብዛት	_____	
7	ወርሃዊ ገቢ በአማካይ/በብር/	_____	
<b>ክፍል 2: የመረጃ ተደራሽነትና ቁጥጥርን የተመለከቱ ጉዳዮች</b>			
1	የአካባቢ ንጽህና አጠባበቅ ባለሙያዎች እነማን እንደሆኑ ያውቃሉ	1. አዎ 2. አላውቅም	
2	የአካባቢ ንጽህና አጠባበቅ ባለሙያዎች በየጊዜው የምትሰሩትን ስራ እየመጡ ያያሉ/ ይቆጣጠራሉ	1. አዎ 2. አላውቅም	
3	የምግብ ንጽህናን በተመለከተ ስልጠና ወስደው ያውቃሉ	1. አዎ 2. አላውቅም	
4	ስለምግብ ንጽህና ከደንበኛዎ አስተያየት ይቀበላሉ	1. አዎ 2. አላውቅም	
5	በአጠቃላይ ይህን ስራ ለምን ያክል ጊዜ ስራ-ህ/ሽ/በዓመት?	----	

6	የጤና ምርመራ አካሂደው የምስክር ወረቀት ወስደዋል?	1. አዎ 2. የለም	
<b>ክፍል 3: የመስሪያና መሸጫ አካባቢ ሁኔታን በተመለከተ</b>			
1	የውሃ አማራጭ በቅርብ እርቀት ያገኛሉ	1. አዎ 2. የለም	
2	መልስዎ አዎ ከሆነ፣ የውሃ አማራጭዎ ምንድን ነው	1. ቧንፎ ውሃ 2. ምንጭ 3. ወንዝ	
3	በመስሪያ አካባቢዎ አገልግሎት የሚሰጥ መፀዳጃ ቤት አለ	1. አዎ 2. የለም	
4	መልስዎ የለም ከሆነ፣ እርስዎም ሆነ ደንበኞችዎ የት ነው የሚጠቀሙ	1. ከውጭ 2. ከጎረቤት 3. ከጋራ መፀዳጃ ቤት	
5	የፍላጎት ቆሻሻ እንዴት ነው የሚያስዎግዱ	1. ከውጭ 2. ሴፕቲክ ታንክ 3. የፍላጎት ማስረጊያ ጉድጓድ	
6	ማዘጋጃ ደረቅ ቆሻሻ በወቅቱ ይሰበስባል	1. አዎ 2. የለም	
<b>ክፍል 4: በምግብ ደህንነት ላይ ያለዎትን እውቀት በተመለከተ</b>			
1	የመወልወያ ጨርቅ የበሽታ አምጭ ተዋህሲያንን ካንዱ እቃ ወደ ሌላው እቃ ያሰራጫል/ ያስተላልፋል	1. እውነት 2. ሐሰት 3. አላውቅም	
2	ምግብን ማቀዝቀዝ የበሽታ አምጭ ተዋህሲያንን ከምግቡ ያስወግዳል .	1. እውነት 2. ሐሰት 3. አላውቅም	
3	ለበሰሉና ላልበሰሉ ምግቦች አንድ መክተፊ ያጣውላ ወይም ቢለዋ መጠቀም ምግብን ለብክለት ያጋልጣል	1. እውነት 2. ሐሰት 3. አላውቅም	
4	የበሰሉ ምግቦች ካልበሰሉ ምግቦች ተለይተው መቀመጥ አለባቸው።	1. እውነት 2. ሐሰት 3. አላውቅም	
5	የበሰሉ ምግቦች እንደገና ማሞቅ ያስፈልጋቸዋል።	1. እውነት 2. ሐሰት	

		3. አላውቅም	
6	የቆዳ በሽታ ምግብን ይበክላል።	2. ሐሰት 3. አላውቅም	
7	ወረቀት ሲያነሱ ወይም ብር ሲቆጥሩ ጣትን ምራቅ እያስነኩ ማንላት ወይም መቁጠር ምግብን ይበክላል	1. እውነት 2. ሐሰት 3. አላውቅም	
8	በምግብ ዝግጅት ጊዜ ሰራተኞች አፋቸውን፣ አፍንጫቸውንና ጸጉራቸውን መሸፈን አለባቸው።	1. እውነት 2. ሐሰት 3. አላውቅም	
9	የምግብ ወለድ በሽታን የሚያመጡ ረቂቅ ተዋህሲያን በየትኛውም ቦታ ይገኛሉ።	1. እውነት 2. ሐሰት 3. አላውቅም	
10	በሽታ አምጭ ተዋህሲያን በሰው ቆዳ ላይ ይገኛሉ	1. እውነት 2. ሐሰት 3. አላውቅም	
11	ምግብ ሰው በሚያስነጥስበት፣ በሚያወራበትና በእጅ በሚነካበት ጊዜ ሊበክል ይችላል	1. እውነት 2. ሐሰት 3. አላውቅም	
12	ሰው በሚያወራበት፣ በሚስቅበትና በሚያስነጥስበት ጊዜ የበሽታ አምጭ ተዋህሲያንን ወደ አየር ይለቃል።	1. እውነት 2. ሐሰት 3. አላውቅም	
13	በሽታ አምጭ ተዋህሲያን በቀዘቀዘና በተቀቀለ ምግብ ውስጥ መኖር አይችሉም።	1. እውነት 2. ሐሰት 3. አላውቅም	
14	ትራፊ ምግቦች በሽታን ያመጣሉ።	1. እውነት 2. ሐሰት 3. አላውቅም	

<b>ክፍል 5: የምግብ ደህንነት ለመጠበቅ እየተገበራቸው ያሉትን ተግባራት በተመለከተ</b>			
የምግብ ደህንነትን ለማረጋገጥ እየተሰሩ ወይም እየተተገበሩ ያሉ ተግባራት		አማራጭ መልሶች	
		አለ ወይም ይተገበራል	የለም ወይም አይተገበርም
1	የውሃ ቧንቧ ወይም የውሃ ማጠራቀሚያ አለ		
2	የእጅ መታጠቢያ ገንዳ ወይም ሳፋ አለ		
3	የእጅ መታጠቢያ ሳሙና አለ		
4	የምግብ እቃዎችን ማጠቢያ ገንዳ ወይም ሳፋ አለ (ሁለት ወይም ሶስት መሆኑን ተመልከቱ)		
5	የእቃ ማጠቢያ ፈሳሽ ወይም ዱቄት ሳሙና አለ		
6	የምግብ መሸፈኛ ንጹህ ጨርቅ አለ		
7	ንጹህ የስራ/የደንብ ልብስ መልበስ		
8	ለበሰሉና ላልበሰሉ ምግቦች የተለየ መክተፊያና ቢለዋ አለ		
9	ለበሰሉና ላልበሰሉ ምግቦች ማስቀመጫ የተለየ ቦታ አለ		
10	የታጠቡ የምግብ እቃዎችና ምግቦች ከወለሉ ቢያንስ በ60 ሳ.ሜ ከፍታ ላይ ተቀምጠዋል		
11	የተሰነጠቁ፣ የተላላጡ ወይም የተሸራረፉ የምግብ እቃዎች የሉም		
12	ሰራተኞች በስራ ወቅት ጸጉራቸውን ሸፍነዋል		
13	ሰራተኞች የጥፍር ቀለም ወይም የእጅ ጌጣጌጥ አይጠቀሙም / የላቸውም።		
14	የሰራተኞች የእጅ ጥፍር በአጭሩ የተቆረጠ ነው። እንድሁም እጃቸው ንጹህ ነው።		
15	ጊዜያዊ የደረቅ ቆሻሻ ማጠራቀሚያ እቃ አለ		
16	ብር ወይም ፀጉር ከነኩ በኋላ እጅ የመታጠብ ልምድ አለ		
17	አፍንጫንና ጆሮን የመንካት ልምድ የለም		
18	ወረቀት ሲያነሱ ወይም ብር ሲቆጥሩ ጣትዎን ምራቅ አያስነኩም		
19	እጅዎትን በልብስዎ ላይ ይጠርጋሉ ወይም ያዳርቃሉ		
20	ብርጭቆዎችን በውስጥ በኩል ይነካሉ		
21	ምግብ እያዘጋጁ ወይም እያቀረቡ ማስተካ ያኝካሉ		
22	ምግብን በማቀዝገፍ ያስቀምጣሉ		

ቃለ መጠይቁን ጨርሰናል። ለጥያቄዎቼ መልስ ለመስጠት ጊዜ ስለሰጡኝ በጣም አመሰግናለሁ።  
ትብብርዎን እናደንቃለን !!

## 9.2. Declaration

This is to certify that the thesis entitled as “Food Safety Practice and Associated Factors Among Street Food Vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia 2021”, submitted in partial fulfillment of the requirements for the degree of Master of Public health in General Public Health of Department of Health System Management and Health Economics, in School of Public Health, College of Medicine and Health Sciences, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Chalachew Chekol Zegeye

Name of principal investigator

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Signature

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Date



### 9.3. Advisors' Approval Sheet

The undersigned examining committee certify that the thesis presented by Chalachew Chekol Zegeye entitled as ‘‘Food Safety Practice and Associated Factors Among Street Food Vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia 2021’’, submitted to Bahir Dar University, College of Medicine and Health Sciences, School of Public Health, Department of Health System Management and Health Economics in partial fulfillment of the requirements for master degree in General Public Health compiles with the regulation of the University and meets the accepted standards with respects to originality and quality.

Place of submission: Health System Management and Health Economics Department, College of Medicine and Health Sciences, Bahir Dar University.

Date of Submission: \_\_\_\_\_

<u>Chalachew Chekol Zegeye</u>	_____	_____
Name of Principal Investigator:	Signature	Date

Advisors:

1. <u>Dr. Mulusew Andualem</u>	_____	_____
Advisor's Name	Signature	Date

2. <u>Mr. Mohamed Hussien</u>	_____	_____
Advisor's Name	Signature	Date

#### 9.4. Examiners' Approval Form

We hereby certify that we have examined this thesis entitled as “food safety practices and associated factors among street food vendors in City Administrations of West Gojjam Zone, Northwest Ethiopia, 2021” by Chalachew Chekol Zegeye. We recommend and approve the thesis for a degree of “Master of Public Health in General Public Health”

Board of Examiners

Examiner's Name

1. Desta Debalkie (MPH/HSM, Ass't Professor)

Signature \_\_\_\_\_

Date \_\_\_\_\_