

Food Safety Practice and Associated Factors Among Food Handlers in Public Food Establishments of Batu Town, Oromia Region, Southern Ethiopia

Shumi Atina^{1*}, Godana Arero²

¹Department of Food Science, Haramaya university, Ethiopia.

*Corresponding author: Shumi Atina, Department of Geography, Hebrew University of Jerusalem, Israel, Tel: 251911545678; E-mail: atinafshumii@gmail.com

Received date: August 17, 2021; Accepted date: November 17, 2021; Published date: November 28, 2021

Citation: Atina S, Godana A (2021) Food Safety Practice and Associated Factors Among Food Handlers in Public Food Establishments of Batu Town, Oromia Region, Southern Ethiopia J Med Res Health Vol: 5 No: 5.

Abstract

Background: Food safety is a scientific discipline describing handling, preparation, and storage of food in ways that prevent foodborne illnesses. This includes the number of routines that should be followed to avoid potentially severe health hazards. Food can transmit diseases from one person to the other as well as serve as a growth medium for bacteria that can cause food poisoning. Food safety is of the utmost health concern and a significant challenge in both low-income and industrialized countries.

Objective: To Study the magnitude of food safety practice and associated factors among food Handlers working in public food establishments of Batu town, Oromia region from May 11- 31, 2020.

Methods and materials: Institutional based cross sectional study design was used, on 302 Food handlers working in all 151 public food establishments in Batu town that were selected by simple Random Sampling method. Then Data collection was done by two diploma nurse by using structured pretested questionnaire and institutional observation checklist. Data was entered in to Epi info version 7.0 computer software and exported to SPSS version 20 computer software for analyzes. Accordingly, descriptive statistics were used to describe the independent variables in relation to the outcome variable. Bivariable, logistic regression analyses will be done to see the association between each independent variable and the outcome variable. All variables with p-value <0.25 during bivariable was entered in to multiple logistic regression models to control for all possible confounders and to identify factors associated with the outcome variable. Odds ratio along with 95%CI were estimated to measure the strength of the association. Finally, level of statistical significant was declared at p-value <0.05.

Results: In this study a total of 302 food handlers were participated with a response rate of (99%). Proportion of good food safety practice was 176(58.3%) within 95% confidence interval from 52.3% to 63.6% whereas 126(41.7%) of the study participants had poor food safety practice. Knowledge on food safety [AOR =3.897, 95%CI (2.280, 6.663)] and food safety training [AOR =3.108, 95%CI (1.309, 7.382)] were factors statistically associated with good food safety practice. Food Handler those had good

knowledge on food safety practice was 3.897 times higher odds of food safety practice as compared to those who had poor knowledge on food safety practice [AOR =3.897, 95%CI (2.280, 6.663)]. This study indicated that food safety practice was relatively medium.

Keywords: Food safety practice; factors; public food establishments; Batu town; Ethiopia

Introduction

Background of the study

Food safety is the utmost public health concern. It is a scientific discipline describing handling, preparation, and storage of food in ways that prevent foodborne illnesses(1). An adequate supply of safe, wholesome and healthy food is essential to the health and well-being of humans. Sometimes, food itself can cause a threat for health People can get sick when they eat food contaminated with hazards; this is referred to as food borne disease (2).

Now days, more than 200 foodborne diseases caused by 31 pollutants (bacteria, viruses, parasites, toxins and chemicals) have been identified, whose manifestations range from gastrointestinal symptoms such as diarrhea to long-term chronic diseases such as cancer(3).Further more Food safety continues to be a public health problem worldwide because food borne illnesses are widespread. Consequently, consumers are increasingly concerned about food safety and quality; and demand more transparency in production and distribution. Thus Governments all over the world are intensifying their efforts to improve food safety. These efforts are in response to an increasing number of food safety problems and rising consumer concerns. The action of monitoring food to ensure that it will not cause food- borne illness is known as food safety (4)

Food contamination in developing countries is caused by many factors such as inappropriate handling of food, holding temperatures, and poor personal hygiene of food handlers(7).It is mainly occurs through poor food handling practice which results in numerous food borne diseases. These diseases are a major cause of morbidity and mortality, constituting one of the greatest dangers to health worldwide and becoming a significant impediment to socioeconomic development in the countries.

Therefore, the safety of food handling is one of the most important health and safety issues facing most developing countries since it leads to both public health and social Problems (8)

Statement of the problem

Everyone is entitled to the food they eat to be safe, that is, they do not cause them harm to health when they are ingested because of physical contaminants (metals, stones, etc.), microbiological (bacteria, viruses, parasites) or harmful chemicals(3). It is the fact that Food is any substance which when eaten nourishes the body and sustains life. However, problems may arise on its preparation thereby affecting the safety of foods available for consumption. Such problems are common and has persisted which resulted in morbidity and mortality cases. It's also the fact that Food may be contaminated at any time during production, distribution and preparation as a result of the use of contaminated water for preparation, poor hygiene during handling or improper conditions during processing and storage(5). In addition to this, even though food handlers have great responsibility in ensuring the safety of food, particularly, in public food establishments, food handlers are the first responsible bodies to contaminate food by acting as either a biological or a physical carrier for many pathogenic organisms (6). Food contamination mainly occurs through poor food handling practice which results in numerous food borne diseases (7).

The global burden of food borne diseases is large, 600 million cases and 420,000 deaths occur each year due to poor food handling practice, affecting health, agricultural production and trade, thus limiting human economic development . Among ten people, one becomes ill from ingestion of contaminated food(9).

In developed countries food-related illnesses impose an increasingly important public health problem. It is estimated that 76 million illnesses, 325,000 hospitalizations and 5,000 deaths result from food borne disease annually-with a cost of \$23 billion(10). In developing countries, approximately 10 to 20% of food-borne disease (FBD) outbreaks are due to food contamination. Around 700,000 people die due to FBD in sub-Saharan Africa.

In the WHO African Region, more than 91million individuals are estimated to fall ill and 137,000 die every year due to food-borne diseases. Diarrheal diseases contribute for 70% of food-borne illness in the region(11). In Ethiopia, though there is limited data, there were 280,458 out-patient cases in 2013(12).

Unless food safety standards such as good food hygiene practices and supervisory system, sufficient food safety law, regular food safety surveys and good food safety practice is maintained, poor food handling practice can results in numerous food borne diseases cause of morbidity and mortality, constituting one of the greatest dangers to health worldwide and becoming a significant obstruction to socioeconomic development in the countries.

Therefore, the safety of food handling is one of the most important health and safety issues facing most developing

countries since it leads to both public health and social Problems(8).

In Ethiopia, the coordination activities particularly at lower levels of government bodies are so weak. There is no clearly defined responsibility to control, monitor and evaluate food handlers of food establishments (12).In addition to this, there are gaps in Ethiopian food safety system on food-borne diseases surveillance, coordination of organizations involved in food safety management, and legal and policy frame work.

According to Several previous studies conducted in different towns of Ethiopia such as Gonder, Diredawa, Debarq , Arba minch and Asosa, showed that prevalence of good food handling practice was 30.30%, 52.4% , 40.1% ,32.6% and 67.8%, respectively revealed that there were the high rates of improper food handling in food and drink establishments (13), (14), (3), (15), (16)

This study aimed to fill the information gaps to planners, policy makers and environmental Health officers about food safety practice of Batu town of food handlers working in Food and Drinking Establishments. Furthermore it is useful for initiating the establishment of non- overlapped National food safety policy, regular food-borne diseases surveillance, and monitoring and evaluation system of food establishments. More importantly, Batu town, the focus of this study, is urbanizing at a very fast rate. It is center of training for many governmental and Non-Governmental Organizations (NGOs). And the public at large travelling to and from Moyale, yebelo, Dilla, Arbamich, Awassa, Hosena andsheshemene cities. Hence, many people make use of the food, drink and accommodation services in the town. It also receives many tourists due to its proximity to many rift valley lakes that attracts many tourists.

Justification

As many part of the world, today's in many urban centers of our country's Food establishments are prepare, handle and serve large quantities of food and drink to large groups of people within a short period of time. Hence, unless food safety standards are not seriously implemented, they will expose users to the risk of foodborne infection(11).

According to Several previous studies conducted in different towns of Ethiopia revealed that there were the high rates of improper food handling in food and drink establishments. (3), (13), (14), (15), (16). Poor food handling practice can results in numerous food borne diseases cause of morbidity and mortality, constituting one of the greatest dangers to health worldwide and becoming a significant obstruction to socioeconomic development in the countries. Therefore, the safety of food handlers is one of the most important health and safety issues facing most developing countries since it leads to both public health and social Problems(8).

Moreover, low financial resources, inadequacy food safety law, in availability of food establishment guideline and standards, as well as poor monitoring and evaluation system of food establishments play an important role in food handling practice(13).

In Ethiopia, the coordination activities particularly at lower levels of government bodies are so weak. There is no clearly defined responsibility to control, monitor and evaluate food handlers of food establishments(12). In addition to this, there are gaps in Ethiopian food safety system on food-borne diseases surveillance, coordination of organizations involved in food safety management, and legal and policy frame work(17).

Many of the literature reviewed indicated that the existing food practice in Ethiopia was major risk factor to cause food borne diseases, Even if the responsible body made a great effort likes supportive Supervision, inspection and licensing for the establishments (17)

So this study aimed to fill these information gaps to planners, policy makers and environmental Health officers about food safety practice of Batu town of food handlers working in Food and Drinking Establishments. Furthermore it is useful for initiating the establishment of non-overlapped National food safety policy, regular food-borne diseases

surveillance, and monitoring and evaluation system of food establishments.

Significance of the Study

This study will have a significant input, for planner and policy makers in the formulation of appropriate strategy, to modify and facilitate the overall regulatory activity. As a result of this, Batu city Administration Health office , cultural and tourism office for tourism attraction are stakeholders who can use the findings.

Finally, the study will serve as baseline data for university, for researchers as a reference material to subsequent studies under similar research topic and relevant for further studies in the area

Literature Review

Prevalence of Food Safety practices among food handlers

There are many researchers conducted research on the topic of food safety practices among food handlers in food establishment in the parts of the world and in our country to assess food safety practice. Most of the literatures on Food Safety practices conducted on food handlers are assessed by the observing the activities which the food handlers engage themselves in as they acquire raw food items, prepare food or serve food to consumers. This is the core in all studies done by researchers to assess food safety practices by food handlers. To ascertain the actual practice of food safety, observation of food handlers" activities while doing their work in the food establishment is crucial and this involves the use of observational checklist. A few of the studies discussed below made some observations regarding food safety practices of the studied populations.

Practice of food safety among food handlers is not satisfactory in the world and it varies from country to country. For instance the study conducted in Turkey by the year 2004 on the evaluation of food hygiene knowledge , attitudes and practice of food handlers in food business among 764 food handler indicate that mean food safety practice score was only 43.4 % + or -16.3. The study demonstrated that food handlers in Turkish food

businesses often have lack of knowledge regarding the basic food hygiene (critical temperatures of hot or cold ready-to-eat foods, acceptable refrigerator temperature ranges, and cross-contamination (18)

By the year Between November 2010 and January 2011 the study conducted in Switzerland on 100 food handlers in Restaurant showed that mean knowledge score of the participating food handlers was 71%. None of the food handlers knew the correct temperatures for cooking chicken and holding potentially hazardous hot foods, and the range of temperatures for pathogen growth(19)

The study conducted in Iran by the year 2013 on 141 food handlers about knowledge, attitude and practice of food safety in restaurant indicated that, majority (92.9%) of the

respondents stated that prepared food was safe for customers. Almost all of food workers were aware of the critical role of general sanitary practices in the work place, such as hand washing 85.1% of respondents gave correct answers, using gloves 78.01% of respondents gave correct answers and proper cleaning of the instruments 83.68% of respondents gave correct answers(20)

Evidence conducted in Jamaica by the year 2014 on 1,109 food handlers about food safety knowledge and practice, showed that only 50% of the food handlers had satisfactory practice towards food safety. In this study, 77% of food handlers reported as always or sometimes thawed frozen foods at room temperature and 19.1% of them reported as they always/ sometimes continue working with illness like diarrhea, 71 % never wore jewelry when serving food, 76% used separate utensils for raw and cooked foods, and 75% checked expiry dates of all products (21)

The study by Mizanur, Muhammad Taha and Kamaluddin in Malaysia titled: food safety knowledge, attitude and hygiene practices among the street food vendors in northern Kuching city, Sarawak, Malaysia, which was earlier discussed noted that, out of the 361 street food vendors recruited, only 10. 8% of them practices good food hygiene, 71.5% had fair practice whereas 16.9% had poor practice. They found out also that training increased the food safety attitude and practice ($p < 0.05$). They finally recommended that continuous monitoring and periodic training incorporating basic principles of food safety and microbial surveillance of foods is essential to optimizing food hygiene in the food vending business(22).

There are Different studies conducted in Africa concerning food safety practice among food handlers. Although some studies conducted in the region, food safety practice of food handlers is not -satisfactory. Study conducted in Nigeria by the year 2013 indicated that 37% of food handlers were directly engaged in cross contamination practices that are potential to cause food borne illness. Education and training on food safety were among the factors responsible for poor food preparation practice(23).

Another study conducted in Nigeria by 2013 among 134 food handlers indicates that 49% of food handlers reported that they would allow a sick person by bloody diarrhea to handle

food(24). In the same country in Nigeria the study done by the year 2014 on Four categories of food handlers in 45 food establishments indicated that one hundred and fifty (89.3%) of them wash their hands after the use of toilets, whereas only 44 (26.7%) change their hand gloves at work. One hundred and twenty (71.4%) of them undergo regular medical checkup, whereas 53 (31.5%) are isolated from workplace when ill. A few of them, 51 (30.4%) use disinfectants at workplace, whereas 38 (22.6%) check food temperature with thermometer. Also, 103 (61.3%) use ideal waste disposal methods at workplace(25).

Other study conducted in Sudan in 2016 by cross-sectional study design on the level of cooking hygienic practices among 40 food handlers in Restaurant indicate that 33.21% of them were good, 47.57% of them were poor and 27.71% of them were bad based on their score was reported. However, regarding personal hygiene practices, neither training in personal hygiene among the study workers has been noticed nor usage of hand gloves(26).

The study conducted in Ghana by the year 2017 by using the cross-sectional study design on Food safety knowledge, attitudes and practices of institutional 235 food-handlers that Almost all of the food-handlers were aware of the critical role of general sanitary practices in the work place, such as hand washing (98.7%) were gave correct answers, using gloves (77.9%), proper cleaning of the instruments/utensils (86.4%) and detergent use (72.8%). On disease transmission, the results indicates that 76.2% of the food-handlers did not know that Salmonellais a food borne pathogens and 70.6% did not know that hepatitis A is a food borne pathogen. However, 81.7% handlers agreed that typhoid fever is transmitted by food and 87.7% agreed that bloody diarrhea is transmitted by food(27).

In Ethiopia also the practice of food safety is not such satisfactory with different factors. Looking the previously discussed study by Mulugeta and Bayeh captioned „the sanitary conditions of food service establishments and food safety knowledge and practices of food handlers in Bahir Dar town, Ethiopia, the following observations were made, after investigating the 455 subjects: 66% of the establishments had flush toilets whereas 5.9% of the establishment had no toilet. Only 149 (33.6%) of the establishments had a proper solid

waste collection receptacle. The study also noted that there was statistically significant difference between trained (professional) handlers and non-trained handlers with regard to food hygiene practices ($p < 0.05$). While more than 50% of the handlers prepare meals ahead of the peak selling time, more than 50% of the left over was poorly managed. They concluded that food hygiene practices among the studied group was poor likewise the sanitary conditions under which they practice and recommended that educational programs aimed at improving the attitude of handlers be made available coupled with licensing of food establishments and regular inspection of activities of such establishments. They also reason out that, inadequate food safety laws, weak regulatory systems, lack of financial resources to invest safer equipment, and lack of education for food Handlers are the main contribution factor for food contaminations in public food catering establishments (28)

Other study conducted in Northern parts of Ethiopia in Gondar Town only 30.3% of food handlers had good food handling practice and socio demographic characteristics , level of knowledge, attitude of food handler were identified factors for food safety practice(13). Other study in Dangla Town in northern part of Ethiopia indicate that only 52.5% of food handlers had good food handling practices and presence of insects and rodents were among the factors identified as having significant associations with food safety practice(6).

The studies indicated that the existing food practice in Ethiopia was major risk factor to cause food borne diseases, Even if the responsible body made a great effort likes supportive Supervision, inspection and give licenses for the establishments(17). Recently the study conducted by the year 2018 in Debar town northern part of Ethiopia to assess food handling practice and associated factors among food handlers in public food establishments on a total of 416 food handlers with Proportion of good food handling practice was 167 (40.1%) They concluded that food handling practice was relatively poor. They find out that Work experience, good attitude, level of education, use of three compartment dishwashing systems and refrigerator were factors associated with food handling practice. Hence, structuring the kitchen with modern dish washing system and refrigerator would enhance good food handling practice(5).

The study conducted in Asosa town, western Ethiopia to assess food safety knowledge, Attitude, handling practice and associated factors among food handlers of Restaurants by the year 2018 indicates that the level of knowledge among food handlers was (75.8%). The overall practice of food handlers in Asosa town was (67.8%) (16).

According to the study conducted in northern part of Ethiopia in Mekele town by the year 2014 among 369 food handlers by using cross-sectional study design showed that Magnitude of hygienic practices of food handlers almost all 99.5% of the respondents had hand washing habit. Most of the food handlers trimmed their fingernails and not use nail polish with 269 (72.9%) and 219 (59.3%) respectively. Moreover, the food handlers wear their clean gown and did not wear hand jewelries when preparing food were 230 (62.3%) and 280 (75.9%) respectively(30).

Factors Associated With Food Safety Practice

Socio Demographic and Institutional Factors on Food Safety

The evidence of study conducted by the year 2005 in Washington showed that lack of accesses to potable water; poor government structural arrangements and incontinent environmental condition were notable reason (31). The study conducted in Jamaica by 2014, identified that factors like gender, education, job position, training and experience in the food industry were associated with the practice level of food handlers (20).

According to study conducted in Dubai 2015 Eighty two percent of food handlers received adequate training in personal or general hygiene. Hygiene practices elaborated significant differences observed by sex, education, occupation, monthly income and by training. (32). According to study conducted by

the year 2015 on KAP of 361 street food vendors were in Kuching city, Sarawak indicated that, age and ethnicity appeared to be important factor for Food safety knowledge ($p < 0.05$), on the other hand food safety knowledge attitude, training were influence food safety practice ($p < 0.05$) (21).

Evidence conducted in Sudan by the year 2017 showed that there is statistically significant differences were observed by gender and education on food safety practice (25). In Ethiopia there were also different studies which showed the association between socio

demographic factors and food safety practice, for instance the study done in Arba Minch town by the year 2015 showed that food handler whose age ≥ 35 years with 3.45, times good practice than the others and the studies also showed that food handlers doing in where supervision held were 13 times had satisfactory food safety practice than those who were doing in where supervision not held. Those who take training on food sanitation in the past were 10 times more practice than those who had not took training (14).

Another study conducted in Gondar town by the year 2014, showed that marital status AOR=3.95, with service years of the food handlers AOR = 3.37, and monthly income AOR=0.2549, were found to be statistically associated variables with food safety practice (13).

According to study done in Dangla town by the year 2014 showed that those who had shower facility with AOR=1.89 time more practice than those who had not shower facility, food handlers who had separate dressing room AOR=1.97 times and presence of rodents or insect AOR =0.348, times good food handling Practice than the others. It also support the finding of Gondar town, which stated that marital status AOR=7.52, monthly income AOR= 0.4, knowledge about food handling with AOR=1.69, were found to be significantly associated with good food handling Practices (6).

Recently conducted study in Asosa on restaurant food handlers in 2018 factors that are associated with food safety practice of food handlers are: educational status AOR 3.40(1.90-6.08), Regular Supervision by concerned body AOR 7.25(3.83-13.65), ever had certificate in food safety/hygiene practice AOR 5.28(1.40-19.79) were found to be significantly associated with food safety practice (16).

The study conducted in Gondar city to assess factors associated with food safety practices among food handlers in Gondar city food and drinking establishments by th year 2018, on

384. One hundred and eighty-eight (49.0%) had good food handling practice out of three hundred and eighty- four food handlers. The study reveals that Marital status (AOR: 0.36, 95% CI 0.05, 0.85), safety training (AOR: 4.01, 95% CI 2.71, 9.77), supervision by health professionals (AOR: 4.10, 95% CI 1.71, 9.77), routine medical checkup (AOR: 8.80, 95% CI 5.04, 15.36), and mean knowledge (AOR: 2.92, 95% CI 1.38, 4.12) were the factors significantly associated with food handling practices. (2)(32)

The other study conducted in Debarq in 2018 on indicates that Work experience [AOR (adjusted odds ratio):1.95, 95% CI 1.11, 3.45], secondary school education level (AOR 2.91,

CI 1.20, 7.01), use of three compartment dish-washing system (AOR 2.47, CI 1.27, 4.80) and use of refrigerator (AOR 3.93, CI 1.79, 8.63) were factors statistically associated with good food handling practice (5).

Knowledge and Attitude Toward On Food Safety Practices

By the year 2010 the study conducted on 64 food handlers working in restaurant in Kuala Lumpur city Malaysia showed that there is significant association between knowledge and practice that those who were knowledgeable were more practice than those who have not knowledgeable with AOR=15.43, and attitude with practice with AOR, 9.1(33).

Another study conducted in Gondar, Ethiopia by the year 2014 the result of the study revealed that food safety practice is significantly related to the attitude of the workers.

Food handlers who have positive attitude were 7 times more food safety practice than those who had negative attitude (13). Other evidence conducted in Dangla Town in northern part of Ethiopia by the year 2013 showed that knowledge about food handling AOR=1.69, times good food safety practice than in adequate knowledge (6).

In most of the literatures reviewed above, it could be noted that most of the food handlers interviewed had good knowledge of food safety but this did not translate into good practice of food safety. From observations also, majority of these handlers had unacceptable practices especially with regards hand washing at the right time and with the right materials, wearing of protective apparels, proper cleaning of cutleries and utensils, knowledge of when not to handle food and good behavior while handling food, location of eating establishment in the right place, meeting the correct standard of a restaurant and provision of adequate and well maintained facilities for convenience. Most of the researchers recommended regular on-the job training for the food handlers.

Regular monitoring of the activities of the food establishment by designated authorities will ensure that high standards are maintained at all time. In addition to this, Food safety is such

an important issue because the import of improper food handling at catering establishment can be devastating where facilities are not readily available to tackle the challenge.

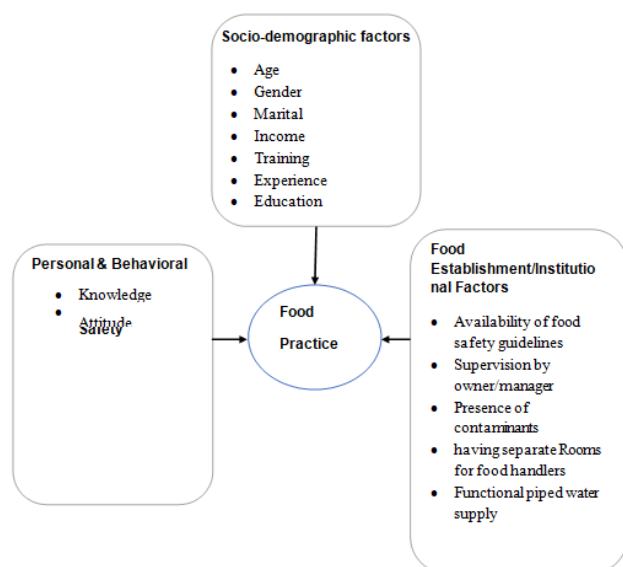
In many of the above reviewed literatures are given due attention on food safety practice of food handlers. Therefore conducting other study in order to strengthen the previous finding in areas where not previously done is very important. In current study area there is no studies conducted on food safety practice and factors associated to it as best of researcher knowledge. Moreover, it is aimed to provide information gaps to planners, policy makers and environmental Health officers about food safety practice of Batu town of food handlers working in Food and Drinking Establishments. Also it is useful for initiating the establishment of non over lapped National food safety

policy, regular food-borne diseases surveillance, and monitoring and evaluation system of food establishments.

More significantly, Batu town, is training center for many governmental and NGOs. And the public at large travelling to and from different towns such as Moyale, yebelo, Dilla, Arbamich, Awassa, Hosena and Sheshemene cities. Hence, many people make use of the food, drink and accommodation services in the town. It also receives many tourists due to its proximity to many rift valley lakes such as Dembel, Langeno, Shala and Abijata that attracts many tourists.

So, it is very crucial to conduct a study aiming at assessing food safety practice and associated factors among food handlers in public food establishments in Batu town, South-East Ethiopia.

Figure 1: conceptual frame work of magnitude of food safety practice and associated factors among food handlers in public food establishments in batu town, 2020. source of conceptual frame work: adapted from literature(16)



OBJECTIVES

General objective

To study the magnitude of food safety practice and associated factors among food Handlers of working in public food establishments of Batu town, Oromia Region, Southern Ethiopia, From May 11- 31, 2020

Specific objectives

To determine the magnitude of food safety practice among public food handlers

To identify the factors that associated with safe food practice among public food handlers

Methods and Materials

4.1 Study Area

Batu town is located in the state of Oromia and to the southeast of Addis Ababa, capital of Ethiopia, with a distance of 163kms. The town was established in 1950. It is a flat land area located at an altitude of average elevation of 1,646 meters above sea level, and it has hot and windy climate. Geographically, the town is located between 7056" latitude North and 38043" East longitude in the Great Rift Valley. Its total area is 5,306.73 hectares with total population of 73,312 .According to data obtained from the projection of central statistical Authority (CSA 1997), It has also population growth rate is 2.9% and crude population density of the town is

46 people per square Km. The town has a great potential for residential, tourist and investment attraction.

Within the town, there are 118 Bar & restaurants, 48 hotels, 7 cafes and 101 others like bakery, snack house which provide food for the catchment population and guests. According to data from the town's trade and industry, there are a total of 274 food establishments (restaurants, cafe and hotels in Batu town) which are containing about 1870 food handlers.

Study Design and period

Institutional based cross-sectional study design was applied from May 11-31, 2020

Population

Source of population

All food handlers who were working in Batu town Public food establishments during the study period

Study population

Those food handlers who were working in the randomly selected food establishments in Batu town and available during the study period were study population.

Inclusion and Exclusion Criteria

Inclusion Criteria: Food handlers who were working in preparation and service areas of food and drink establishments during the study period regardless of their sex, and employment status were included.

Exclusion criteria: Food handlers who were unable to hear, mental illness or generally those who could not communicate due to serious illness during data collection time were excluded

Sample size and sampling procedures

Sample size Determination:

Sample size is determined using the formula for single population proportion and assuming that the proportion of practicing safe food handling among food handlers is ($p = 30.30\%$) taken from similar institutional based cross sectional study conduct at Gonder, 95% level of confidence and 5% margin of error(13). Based on this assumption, the actual sample size for the first objective is determined by using single population proportion formula.

$$n = \frac{Z^2 \cdot p(1-p)}{d^2} = \frac{1.962^2 \cdot 0.303(1-0.303)}{0.052^2} = 325$$

Where n = required sample size, d = the margin of error (precision) 5% Z = standard score corresponding to 95% confidence interval

P = proportion of food handlers who have good food safety practice

Hence, the total population is less than 10,000; the final sample size needs to be corrected using the correction formula:

$$nf = \frac{n \cdot N}{n + N}$$

Where; n f= the desired sample size

$$nf = \frac{325 \cdot 1870}{325 + 1870} = 277$$

So the actual sample sizes for the first objective with 10% non-response rate will be n = 277 + 28 = 305

Sample size determination for specific objective two

The sample size for the second objective will be calculated using double population proportion formula using the Stat-calc Epi-Info statistical Software version 7.0 with the following assumptions: Confidence level = 95%, Power = 80%, Ratio (unexposed: exposed) = 1

Factor 1: Supervision

Proportion of good food safety practice among unexposed group (who had supervision) = 0.53, Proportion of good food safety practice among exposed group (who had no supervision)

= 0.14,

Factor 2: Training

Proportion of good food safety practice among unexposed group (who had training) = 0.54, Proportion of good food safety practice among exposed group (who had no training) = 0.37,

Table 1: Sample size calculation for different associated factors of food handler on food safety practice among food handler in Batu town, 2020

Variable	Magnitude	Power	CI	Ratio of unexposed to exposed	OR	Sample Size	Reference
	Exposed	Unexposed	level				

Supervision	0.14	0.53	80%	95%	1	2	138	-14
Training	0.37	0.54	80%	95%	1	1.75	23	-34

Since objective one (305) is greater than the sample size for objective two (Table 1). So the final sample sizes for this study will be 305.

The sampling procedure according to data from the town's trade and industry, there are a total of 274 food establishments (restaurants, cafe and hotels and others in Batu town) which are containing about 1870 food handlers. All lists of food establishments and their food handlers working during the study period were the sampling frame. At first step, the required number of establishments was selected by using simple random sampling technique. Secondly, two food handlers; one cooker and one waiter were selected by using simple random sampling from each of the selected food establishments.

Operational definitions

Food safety- Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.

Food safety practices: To assess the level of Practices, respondents were asked a total of 13 questions from the questionnaire and scored 1 for each Yes and 0 for each No, then those who score above average were considered as good food safety Practices and those who score below average were considered as poor food safety Practices.

Practice status: The reported food safety practice among food handlers in terms of food safety (good and poor).

Food handler - Any person who directly handles packaged or unpackaged food, food equipment and utensils, or food contact surfaces and is therefore expected to comply with food safety requirements(36).

Public Food Establishments: in this study public food establishment represents Hotels, Restaurants, Cafeterias, 'Kurs bets'/'Mana chire' and they are licensed

- Variables of the Study
- Dependent Variables:
- Food Safety Practice

Independent Variables

- Age
- Sex
- Educational Status
- Marital Status
- Religion
- Work Experience
- Training
- Toilet Facility
- Water Supply
- Food Storage Facilities/Shelf or Cupboard, Refrigerator
- Knowledge & Attitude of Safe Food practice
- Manager/Supervisor Inspection

Data collection procedures Instrument

Data were collected using structured and pre-tested standard questionnaire which have been developed based on the related published studies with certain modification. The questionnaires were prepared in English version and then translated to Afan Oromo and Amharic and back to English to confirm the correctness of the translation. The questionnaires were composed of five parts as the basic socio-demographic characteristics and questions related to the knowledge, Attitude and practice of the study population towards safe food practice as well as Observation checklist. Data collection was administered by data collectors.

The legal permission of the establishments to serve food and drink was checked by observing the approved certificate by legal authority. Interview was employed by data collectors to the selected Food and Drinking Establishments (FDE) to collect the data.

Personnel

Two supervisors having BSc degree in public health science and 2 diploma nurse data collectors were participated in the data collection process.

Quality control:

Training for data collectors and supervisor was also given for one day by the investigator. The

questionnaire was pre-tested to identify potential problem areas, unanticipated interpretations and cultural objections to any of questions for food handlers in Adami Tulu town by taking 10% of the sample size. Based on the pre-test results, the questionnaire was additionally adjusted contextually and terminologically, and administered on the whole sample size questioners.

Counter checking of daily filled questionnaire and regular supervision was made by supervisor and by the investigator. Structured questionnaire was developed for the purpose of data collection after reviewing relevant literature and views of professionals in the area. The questionnaire will be structured and designed to accommodate the response of respondents and physical observation by data collectors. And it was also design to generate such pertinent information as the basic socio-demographic characteristics and questions related to the knowledge and practice of the study population towards safe food practice. It was prepared originally in English and then translated to Afan Oromo and Amharic and again back to English in order to obtain content validity. Finally the questionnaires have been administered in Afan oromo and Amharic.

Data processing and analysis

Data was entered in to Epi info version 7.0 computer software and exported to SPSS version 20 computer software for analyzes. Descriptive statistics of the collected data were done for most variables in the study using statistical parameters: percentages, mean and standard deviations. Accordingly, descriptive statistics were used to describe the independent variables in relation to the outcome variable. Bivariate and multivariate analysis was used primarily to check which variables

have association with the dependent variable individually. Variables found to have association with the dependent variables have been entered in to multivariate logistic regression for controlling the possible effect of confounders and finally the variables which have significant association was identified on the basis of AOR, with 95%CI, AOR and p-value to fit into the final regression model.

All variables with p-value <0.25 during bivariable was entered in to multiple logistic regression models to control for all possible confounders and to identify factors associated with the outcome variable. Odds ratio along with 95%CI were estimated to

measure the strength of the association. Finally, level of statistical significant was declared at p-value <0.05.

Ethical Consideration

The ethical approval and clearance was obtained from Institutional Review Board of Addis Ababa Medical and Business College (AAMBC). Prior to data collection, the objective of the study was discussed with the concerned officials of the town administrative council, health desk, and municipality and written consent was obtained. Verbal consent was also obtained from owners/managers of the establishments and study subjects (food handlers). Their privacy was also maintained. Data were collected anonymously to ensure confidentiality. Informants were assured that only the investigator will access to the data and no third party would have access to their individual information and recognize them in the report. FDE owners/managers/ were advised to corrective measure when a gross sanitation and hygienic problem were observed during data collection.

Dissemination of finding

The findings of this study will be submitted and presented to Addis Ababa Medical and Business College (AAMBC) department of Public Health. The findings will be communicated to Batu city administration. Furthermore, finding of this study will also be communicated to different scientific communities through reports, seminars or workshops and finally, the thesis will be prepared for publication in scientific journal.

Results

Socio demographic characteristics

Out of the planned 305 respondents, 302 were achieved with response rate of 99%. A total of 302 food handlers in public food establishments were responded. About 147 (48.7%) of the age of the respondents were between 25-29. Their mean age was 28 years with (\pm SD) 28 \pm 5 years. Out of the total (n=302) interviewed, 149(49.3%) were male. About, 154(51%), 102(33.8%) and 36(11.9%) were Orthodox, Protestant and Muslim religion followers respectively. Concerning their educational status, more than half of them 155(51.3%) have primary(1-8) education. In the case of Ethnicity about one third, 111(36.8%) of the participants were Oromo in their ethnicity. Looking in to marital status, around 164 (54.3%) of participants were married. In case of food safety training, 257 (85.1%) of

food handlers were not attend food safety training (Table 2, n=302)

Table 2: Socio - Demographic Characteristics of Food Handlers Working In Public Food Establishments of Batu Town, May, 2020(n=302)

	Frequency	Percent
Age		
<25	65	21.50%
25-29	147	48.70%
≥30	90	29.80%
Sex		
Male	149	49.30%
Female	153	50.70%
Religion		
Orthodox	154	51.00%
Protestant	102	33.80%
Muslim	36	11.90%
Other	10	3.30%
Ethnicity		
Oromo	111	36.80%
Amhara	108	35.80%
Walaita	43	14.20%
Gurage	36	11.90%
Other	4	1.30%
Educational status		
No formal Education	51	16.90%
Primary 1-8	155	51.30%
Secondary 9-10	65	21.50%
College/above	31	10.30%
Marital status		
Married	164	54.30%
Not married	138	45.70%
Work experience in years		
<4	116	38.40%
≥4	186	61.60%
Monthly income in ETB		
<2000	133	44.00%
≥2000	169	56.00%
Had food safety training		
Yes	45	14.90%
No	257	85.10%

Knowledge of food handlers about food safety

Out of the total 302 respondents, 282(93.4%) did know as Food with enough pathogens to make sick may look smell or test good while 291(96.3%) mentioned that really fresh food can cause food Poisoning if it is not properly handled(Table 3)

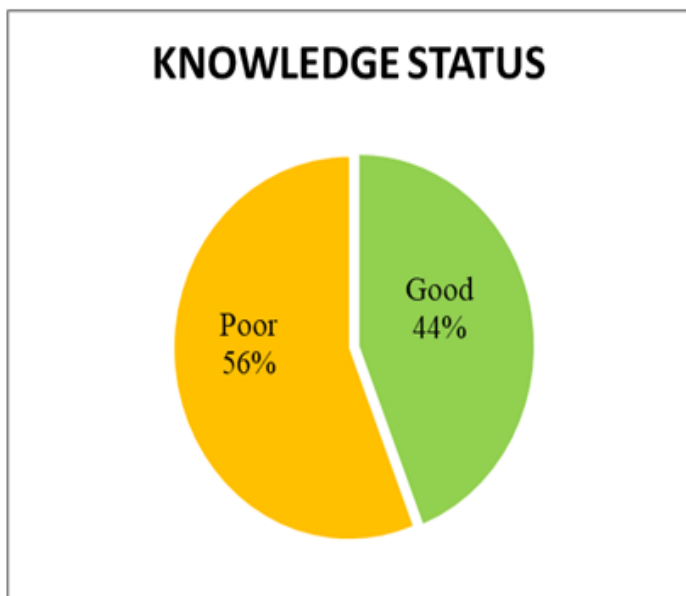
Table 3: knowledge about food safety practice of food handlers in Batu town public food Establishments May, 2020(n=302)

Variables	Knowledge status of the study participants		
	Correct N (%)	Incorrect N (%)	I don't know N (%)
Food with enough pathogens to make you sick may look smell or test well.	282(93.40)	19(6.3)	1(0.3)
Really fresh food can cause food Poisoning if it is not properly handled.	291(96.40)	11(3.60)	
Fresh meat always has microbes on the surface	281(93)	19(6.30)	2(0.70)
Canned foods may have harmful microbes	292(96.70)	8(2.60)	2 (0.70)
Lettuce and other vegetables raw might have harmful microbes	285(94.40)	16(5.30)	1(0.30)
Foods can be contaminated with microbes by coming in contact with unsafe foods	285(94.40)	16(5.30)	1(0.30)
Ready to eat foods (e.g.vegetables) cannot be Prepared on the same cutting board that was used to prepare meat	270(89.40)	32(10.60)	
Cutting boards, meat slicers and knives should disinfect after each use	272(90.10)	30(9.90)	
Refrigeration may not kills all the bacteria that might cause food-borne illness.	185(61.30)	103(34.10)	14(4.60)

Overall knowledge level

Food safety knowledge of food handlers was assessed based on 9 food safety knowledge questions. Each question has three options (correct, incorrect and don't know). The appropriate answer for all questions, were option correct. Over all knowledge status was calculated using the average score for question assessing the knowledge of respondents on food safety practice which was calculated 8.3. Based on the result of knowledge assessments, from the total (n=302) food handlers, 133(44%) had good knowledge while 169(56%) had poor knowledge (Figure 2).

Figure 2: Knowledge level on Food safety practice among food handlers at Batu town, Ethiopia, 2020



Attitude of food handlers towards food safety practice

Attitude on food safety practice of food handlers was assessed based on 5 attitude questions. The questions on Likert's scale had positive and negative responses that ranged from strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. As shown in Table 3, more than half, 202(66.9%), of the respondents agreed that Temperature Controls are an effective method of reducing the number of cases of food Poisoning. However, 29(9.6%) of the respondents agreed that it is not as such important. In another side, 199(65.9%) had agreed on the importance of all food handlers should have a food Safety training qualification. Around 190 (62.9%) agreed that lack of food safety training affects Safe food practice (Table 4).

Table 4: Attitude on Food Safety Practice of Food Handlers in Batu Town Southern Ethiopia, 2020(n=302)

Variables	Attitude status of the study participant on Likert scale				
	Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)
Temperature Controls are an effective method of reducing the number of cases of food Poisoning.	1 (0.3)	29(9.6)	42(13.9)	202 (66.9)	28 (9.3)
All food handlers should have a food Safety training qualification	0	22(7.3)	15(5)	199(65.9)	66 (21.9)
Lack of food safety training affects Safe food Handling	0	14 (4.6)	12(4)	190 (62.9)	85 (28.1)
Unavailability of food handling guideline can affect food safety	8 (2.6)	12 (4)	9 (3)	116 (38.4)	157 (52)
Lack of supervisor commitment affects Safe Food handling.	12(4)	16 (5.3)	12(4)	99 (32.8)	171 (56.6)
Insufficient dry and wet storage can affect food handling practice	3(1)	14(4.)	16 (5.3)	85 (28.1)	184(60.9)

Temperature Controls are an effective method of reducing the number of cases of food Poisoning.	1 (0.3)	29(9.6)	42(13.9)	202 (66.9)	28 (9.3)
All food handlers should have a food Safety training qualification	0	22(7.3)	15(5)	199(65.9)	66 (21.9)
Lack of food safety training affects Safe food Handling	0	14 (4.6)	12(4)	190 (62.9)	85 (28.1)
Unavailability of food handling guideline can affect food safety	8 (2.6)	12 (4)	9 (3)	116 (38.4)	157 (52)
Lack of supervisor commitment affects Safe Food handling.	12(4)	16 (5.3)	12(4)	99 (32.8)	171 (56.6)
Insufficient dry and wet storage can affect food handling practice	3(1)	14(4.)	16 (5.3)	85 (28.1)	184(60.9)

Food safety practice among Food Handlers

Of all the study participants, 300(99.3%) had wash their hands before starting work, 295(97.7%) use separate utensils when preparing raw and cooked food, 223(73.8%) no had ever medical checkup in the course of their work in the kitchen. The study also showed that only few of the participants 5(1.7%) didn't use separate utensil when they are preparing raw and cooked foods. To ward checking expire date of product, only 19(6.3%) they never checked the expiry date of the products. However, 283(93.7%) of participants didn't use a thermometer to check temperature. From the total participant majority of them

219(72.5%) said that they came to work when they have diarrhea. Furthermore 258(85.4%) participants reported that they always cover head during food serving while 44(14.6%) of

the participants did not. Few of them, 63(20.9%) participants reported that they have habit of making their nail long and 239(79.1%) of participants never did it. In addition from the total only few of them 40(13.2%) were reported that never disinfect cutting boards after each use (Table 5).

Table 5: Food Safety Practice of Food handlers in Batu town, 2020(n=302).

	Frequency	Percent
Do you have wash your hands before starting your Work?		
No	2	0.70%
Yes	300	99.30%
Do you wash your hands before touching cooked foods?		
No	7	2.30%
Yes	295	97.70%
Do you use separate utensils when preparing raw and cooked food?		
No	5	1.70%
Yes	297	98.30%
Do you check the expiry dates of all products?		
No	19	6.30%
Yes	283	93.70%
Do you wear uniform when serving food?		
No	34	11.30%
Yes	268	88.70%
Do you use a thermometer to check temperature?		
No	283	93.70%
Yes	19	6.30%
Do you sanitize utensils after washing them		
No	34	11.30%
Yes	268	88.70%
Don't you come to work when ill like upset of Stomach or diarrhea?		
No	83	27.50%
Yes	219	72.50%
Do you wear a hat or head covering when Serving Food?		
No	44	14.60%

Yes	258	85.40%
Do n't you wear jewelry when serving food?		
No	41	13.60%
Yes	261	86.40%
Do you disinfect cutting boards after each use?		
No	40	13.20%
Yes	262	86.80%
Don' make your nail long?		
No	63	20.90%
Yes	239	79.10%
Do you ever have medical checkup in the course of your work in the kitchen?		
No	223	73.80%
Yes	79	26.20%
Overall Food safety practice of food handlers		
Good	176	58.30%
Poor	126	41.70%

Overall From the total 302 respondents, 176(58.3%) had good food safety practice within 95% confidence interval from 52.3% to 63.6% whereas 126(41.7%) of the study participants had not satisfactory food safety practice (Figure 3).

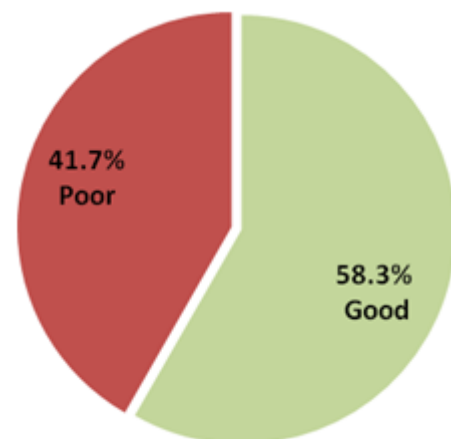


Figure 3: Overall food safety practice among food handlers at Batu town, Ethiopia, 2020

Observation was conducted on 151 public food establishments. Among these, 34 hotels, 87 restaurants, 27 'Mana Chire' and 3 Cafeteria. One establishment (restaurant) was involuntary for participation. More than half 232 (76.8%) institution had supervisions held for food handlers. About 81(26.8%) of institution had rodents in their kitchen. About

three-fourth, 229 (75.8%) and majority 291 (96.4%) of respondents handled food in an institution having Hand washing facility and Availability of functional toilet facility respectively. However, more than three-fourth, 231(76.5%) of respondents handled food in food establishments were had no food safety guideline (Table 6)

Table 6: Observed Institutional Facilities in Food Establishments of Batu town 2020

	Frequency	Percent
Availability of guideline for food		
Establishments		
Yes	71	23.50%
No	231	76.50%
Presence of Hand washing facility.		
Yes	229	75.80%
No	73	24.20%
Availability of latrine.		
Yes	291	96.40%
No	11	3.60%
Availability of Insects/rodents		
Yes	81	26.80%
No	221	73.20%
Supervision held		
Yes	232	76.80%
No	70	23.20%

Factors Associated with food Safety Practice

In order to identify factors associated with food safety practice, bivariate and multivariate binary logistic regression analysis were conducted. Univariable data analysis were checked for data completeness and missing value of the data.

At bivariate level nine variables: age, sex, monthly income, food safety training, knowledge, attitude, Presence of hand washing, Availability of rodents and supervisor were significantly associated (p-value less than 0.25) factors with food safety practice of food handlers. All of the variables with p-value less than 0.25 at bivariate analysis were incorporated in the final multivariable logistic regression model. After controlling for the effects of potentially confounding variables using multivariate logistic regression model, two variables: knowledge towards food safety practice and food safety training are associated (p-value less than 0.05) factors with food safety practice of food handlers.

Therefore, in the multivariable logistic regression analysis having food safety knowledge and Food safety training was statistically significant factors for food safety practice. Odds of having food safety practice among those had food safety training was 3.108 times higher as compared to those who had no food safety training with adjusted odds ratio [AOR =3.108, 95%CI

(1.309,7.382)]. Food Handler those had good knowledge on food safety had 3.897 times higher odds of food safety practice as compared to those who had poor knowledge on food safety practice [AOR =3.897, 95%CI (2.280, 6.663)] (Table 7).

Table 7: Bivariable and multivariable Logistic regression analysis to identify Factors Associated with Food Safety Practice among Food Handlers in Batu Town Oromia Region Southern Ethiopia, 2020.

Variable s	Food Safety Practice		COR (95%CI)	AOR (95%CI)	P-value
	Good (%)	Poor (%)			
Age					
<25	32(49.2)	33(50.8)	0.811(0.428,1.537)	.893(0.408,1.954)	0.776
25-29	95(64.6)	52(35.4)	1.529(0.895,2.611)	1.400(0.750,2.615)	0.291
≥30	49(54.4)	41(45.6)	RC	RC	
Sex					
Male	93(62.4)	56(37.6)	0.714(0.451,1.130)	1.498(0.881,2.548)	0.136
Female	83(54.2)	70(45.8)	RC	RC	
Monthly income					
<2000	72(54.1)	61(45.9)	0.738(0.465,1.170)	0.782(0.444,1.378)	0.395
≥2000	104(61.5)	65(38.5)	RC	RC	
Had training					
Yes	30(66.7)	15(33.3)	1.521(0.780,2.963)	3.108(1.309,7.382)	0.010**
No	146(56.8)	111(43.2)	RC	RC	
Knowledge					
Good	103(77.4)	30(22.6)	4.515(2.17,7.503)	3.897(2.280,6.663)	.000**
Poor	73(43.2)	96(56.8)	RC	RC	
Attitude					
Positive	105(64.4)	58(35.6)	1.734(1.092,2.5752)	1.654(0.994,2.753)	0.053
Negative	71(51.1)	68(48.9)	RC	RC	
Presence of hand washing					
Yes	143(62.4)	86(37.6)	2.016(1.283,3.434)	1.438(0.283,7.300)	0.661
No	33(45.2)	40(54.8)	RC	RC	

Available rodents					
Yes	36(44.4)	45(55.6)	RC	RC	
No	140(63.3)	81(36.7)	2.016(1.289,3.622)	2.018(0.686,5.937)	0.202
Supervisors					
Yes	145(62.5)	87(37.5)	2.097(1.220,3.603)	958(0.159,5.7761)	0.962
No	31(44.3)	39(55.7)	RC	RC	

RC= Reference Category, *Bold= P-value<0.05, **Bold= P-value<0.001

DISCUSSION

It is obvious that improper food safety practice is one of the major causes for food born disease transmission. An emphasis need to be given for food safety practice by the concerned bodies. Therefore, this study revealed the status of food safety practice and associated factors among food handlers in Batu town. The study revealed that good food safety practice was 58.3% (95%, CI 52.30, 63.6). Food safety training and knowledge on food safety practice were factors statistically had significant association with good food safety practice.

In this study the prevalence of good food safety practice was 58.3%. This study result was concordant with other similar studies from Malaysia 59.30% (33) as well as similarly with data in Addis Ababa (52.3%),(34),Dire Dawa 52.4%(15), Dangila town (52.5%)(6). However, this figure was also lower than the study conducted in Ethiopian towns such as Arba Minch(67.4%) (14), Bahir Dar (67.6%) (35),Asosa(67.8%) (16) and from UAE in Dubai (81.74%) (31). On the other side, the study result was higher than the study conducted in Gondar (30.30%), (49%)(13)and (2) (32), Turkey (48.4%) (18), Jamaica (50%) (21). and Imo State, Nigeria (50%,(24)).This differences may be due to different measurements of practices, variation of socio-demographic characteristics, regulatory system of food establishments, access to different facilities and the number of sample size variation that might come across due to study settings.

In assessing the food safety practice of food handlers, 300(99.3%) had wash their hands before starting Work, This finding is supported by study conducted in northern part of Ethiopia in Mekele town by the year 2014, 99.5% had hand washing (30) and in Ghana by the year 2017 hand washing (98.7%) (27). However, it is lower than study conducted in Iran by the year 2013, hand washing 85.1% , (20). The difference may be due to the variation of socio demographic variations and access to different facilities

The study finding showed that about 295(97.7%) use separate utensils when preparing raw and cooked food, this is similar nature with the study conducted in Ghana by the year 2017 , 86.4%(27) and in Iran by the year 2013, 83.68% (20) but higher than the study in Jamaica by the year 2014, 76% (21). About 223(73.8%) no had ever medical checkup in this study while in

contrary in Nigeria the study done by the year 2014 , (71.4%) of them undergo

regular medical checkup(25). The difference may be due to the variation of socio demographic variations and regulatory system of food establishments.

In this study, about three fourth of them 219(72.5%) said that they came to work when they have diarrhea, which is in fact the potential channel for food borne diseases transmission. This finding was supported by the study done by the year 2014, in Nigeria, (68.5%) (25). However, this result was higher than study conducted in Nigeria by 2013, 49% of food handlers reported that they would allow a sick person by bloody diarrhea to handle food(24) .The difference may be due to food safety training and regulatory system of food establishments.

In temperature control of food, 283(93.7%) of participants didn't use a thermometer to check temperature which is different from the practice in Jamaica which 33% (21) and this difference could be related to the local trend in the study area in which thermometers not available with refrigerators in the market. However, higher than study in Nigeria done by the year 2014, 77.4% didn't check food temperature with thermometer(25).

In this study, 239(79.1%) participants reported that they had no habit of making their nail long, in which it was supported by the study conducted in northern part of Ethiopia in Mekele town,75.9% (30) whereas 261(86.4%) didn't wore jewelry in this study that was supported by study conducted in northern part of Ethiopia in Mekele town by the year 2014 ,71 % never wore jewelry when serving food(30).

While looking in to the result of associated factors, Food safety knowledge and food safety training were factors associated with food safety practice among food handlers at Batu town food and drinking establishments. Food handlers with good knowledge were 77.4% more likely to have good food safety practice compared with food handlers of poor knowledge. This finding is supported by the study conducted in Asosa town, western Ethiopia by the year, 2018 indicates that the level of knowledge among food handlers was (75.8%) (16)

Regarding with factors associated with good food safety practice, knowledge on food safety practice was positively associated with the food safety practice. The probability of having a good food safety practice among participants with good knowledge was 3.897times higher with compared to those with a poor level of knowledge (AOR = 3.897, 95% CI (2.280,

6.663). This finding was supported with studies conducted in Dangla Town in northern part of Ethiopia by the year 2013(6), Gondar city by the year 2018(2)(32), kualapilah from Malaysia by the year 2010 (33), in Kuching city, Sarawak (22).This could be possible that having good knowledge on something would ensure uptake too.

Another variable identified statistically significant in this study was training, the food handlers with food safety training were 3.108 times more likely to have good food safety practice compared with those without food safety training. This finding was supported with different studies conducted in Jamaica by

2014, (20), Kuching city, Sarawak (22) Arba Minch town by the year 2015 (14), Asosa in 2018 (16) and Gondar city by the year 2018 (2) (32). This could be possible due to the fact that food handlers who received training would have a better understanding of safe food practice as they might get professional advice during training. Training could enhance food handlers overall performance in safe food practice (21).

Conclusion

The Magnitude of food safety practice among food handlers at Batu town public Food and Drinking establishment was medium as compared to previous studies. Almost all of the food handlers were washing their hands before starting work and use separate utensils when preparing raw and cooked food and as well making their nail short. However, majority of the food handlers didn't use a thermometer to check temperature and even came to work when they have diarrhea, which is in fact the potential channel for food borne diseases transmission. Food safety training and had good knowledge on food safety practice were factors associated with food safety practice.

References

- World Health Organization. Recommended International Code of Practice. General Principle of Food Hygiene. 1999.
- Azanaw J, Gebrehiwot M, Dagne H. Factors associated with food safety practices among food handlers: Facility-based cross-sectional study. *BMC Res* 2019;12(1):10–5
- Commission CA. Proposal for the Establishment of the World Food Safety Day 1-. 2017;
- Akonor PT, Akonor MA. Food safety knowledge: the case of domestic food handlers in Accra. *Eur J of Nutri & Food Safety* 2013;3(3):99-111.
- Chekol, F. A., Melak, M. F., Belew, A. K., & Zeleke, E. G. (2019). Food handling practice and associated factors among food handlers in public food establishments, Northwest Ethiopia. *BMC Research Notes*, 12(1), 1–7.
- Tessema AG, Gelaye KA, Chercos DH. Factors affecting food handling Practices among food handlers of Dangila town food and drink establishments, North West Ethiopia. *BMC Public Health*. 2014;14(1):571. 2014;
- Medeiros LC, Hillers VN, Chen G, Bergmann V, Kendall P, Schroeder M. Design and development of food safety knowledge and attitude scales for consumer food Safety education. *J Am Diet Assoc*. 2004; 104: 1671-1677.
- Format R, Lee HK, Abdul Halim H, Thong KL, Chai LC. Assessment of food safety knowledge, attitude, self-reported practices, and microbiological hand hygiene of food handlers. *Int J Environ Res Public Health*. 2017;14(1):55. :1–5.
- Organization WH. WHO estimates of the global burden of foodborne diseases: foodborne disease burden epidemiology reference group 2007–2015. Geneva: WHO; 2015. 2019;(August).
- WHO estimates of the global burden of foodborne diseases: foodborne disease burden epidemiology reference group 2007–2015. Geneva: WHO; 2015.
- Abate, M., Tesfa, M., & Adere, A. (2016). Original article The sanitary conditions of food and drink establishments in. The Sanitary Conditions of Food and Drink Establishments in Woldia Town, Northeastern Ethiopia, 2, 9–11. 2017.
- Ayalew H, Birhanu A, Asrade B. Review on food safety system: Ethiopian perspective. *Afr J Food Sci*. 2013;7(12)
- Gizaw Z, Gebrehiwot M, Teka Z. (2014), Food Safety Practice and Associated Factors of Food Handlers Working in Substandard Food Establishments in Gondar Town, Northwest Ethiopia, 2013/14. *Int J Food Sci Nutr Diet*. 3(7), 138-146.
- Neme K, Hailu B, Belachew T, Lalit I, Brkti G, Dejen Y, et al. SM Gr up Food Safety Knowledge, Handling SM Journal of Public Health and Practice and Associated Factors among Food Handlers of Hotels / Restaurants in Epidemiology. *BMC Res Notes* [Internet]. 2019;2(July)
- Azanaw J, Gebrehiwot M, Dagne H. Factors associated with food safety practices among food handlers: Facility-based cross-sectional study. *BMC Res Notes* [Internet]. 2019;12(1):10–5.
- Legesse D, Tilahun M, Agedew E, Haftu D. Food handling practices and associated factors among food handlers in arba minch town public food establishments in Gamo Gofa Zone, Southern Ethiopia. *Epidemiology*. 2017;7:2. 2020;
- Getachew M. Food safety practice and associated factors among food handlers in selected types of food establishments of Dire Dawa, Ethiopia. New York: FAO; 2016. p. 41. 2020;
- Admasu M and Kelbessa W. Food Safety Knowledge, Handling Practice and Associated Factors among Food Handlers of Hotels/ Restaurants in Asosa Town, North Western Ethiopia. *SM J Public Health Epidemiol*. 2018; 4(2): 1051.
- Temesgen M. Food Standards, Food Law and Regulation System in Ethiopia: A Review. 2015;5(3):58–73.
- Azmi Safak Ersun Gokhan Kivanc, Murat Bas (2004). The evaluation of food hygiene knowledge, attitude and practice of food handlers in food businesses in Turkey, *Journal of Food Control* 17 : 317–322. 2020;1–104.
- Palak K. Panchal, Pierre Bonhote and Mark S. Dworkin (2013). Food safety knowledge among Restaurant food handlers in Neuchâtel, Switzerland 2013, *IA 50 2864 Vol 33, No. 3*. p. 133–144.
- Abdolmajid Fadaei (2015). Assessment of Knowledge, Attitudes and Practices of Food workers about food hygiene in Shahrekord Restaurants Iran *World Applied Sciences Journal* 33(7): 1113-1117.
- Thelwell, M.R (2014). Result. Food Safety Knowledge and Self-Reported Practices of Food handlers in Jamaica, (unpublished doctoral dissertation), University of Walden. (Scholar works), Minneapolis, Minnesota. U.S.A. 2014;
- Mizanur Md and Rahman, Mohd (2016). Food safety practice among street food vendors in Northern Kuching city Sarawak 2016 *life science journal*:7(2). (39):1–11.
- Mokhtar, A.A (2013). Knowledge, attitudes, and practices of food service staff about food hygiene in hospitals in Makkah area. *Life Science Journal*; 10(3). :148–57.
- Sylvester N. O. and Craig, W. H., 2013. An Assessment of Food Safety Needs of Restaurants in Owerri, Imo State, Nigeria. *International Journal of Environmental Research and Public Health* 10, 3296- 3309. 2013;
- Chigozie Olftheadike, Okechukwu Clronkwe, Prosper O. U. Adogu, Chinomnso Nebue (2014) Assessment of the food hygiene practices of food handlers in the federal Capital Territory of Nigeria *tropical journal of medical research* 17:1,10-.

28. Abdelrazig A, Mustafa K, Mohamed M (2017). Hygienic Practices among food handlers in Restaurants of Al Nohod locality market west kordo fan Sudan-2017 *inj pub health* 2:129. 2019;
29. Akabanda F, Hlorts E. H. and Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes and practice of institutional food handlers in Ghana *BMC Public Health*, 17: 40-53. 2019;1-14.
30. Mulgeta K, and Bahay A (2012). The sanitary condition of food service establishments 'food Safety Knowledge and practice of food handlers in Bahirdar town Ethiopia *Healthsci* 22(1): 27-.
31. (Lalit, I. Brkti, G. and Dejen, Y (2015). Magnitude of hygienic practices and its associated factors of food handlers working in selected food and drinking establishments in mekele Northern Ethiopia *international food research journal* 22(6): 2650-2656.
32. E ASAH, Hussein H, W AF, E ES, Wasfy A. Hygienic Practices Among Food Handlers in Dubai. 2015;1(3):101-8.
33. Ab. Hamid, Rosnani, Radu, Son, Othman, Mohhidin, Poh See, Toh, Lay Ching Cha (2014). Assessment of Knowledge, Attitude and Practices Concerning Food Safety among Restaurant Workers in Kuala Lumpur, Malaysia *J Food Science and Quality Management* 32:2224.
34. Asrat M, AH, Worku T, Tafesse L. Assessment of the Sanitary Conditions of Catering Establishments and Food Safety Knowledge and Practices of Food Handlers in Addis Ababa University Students' Cafeteria. *Journal of Public Health* 2015; 3: 733-743. 2015;3:733. 2020;1-73.
35. Kibret M, Abera B: The sanitary conditions of food service establishments and food safety Knowledge and practices of food handlers in Bahir Dar town. *Ethiopian J Health Sci* 22(1):27.
36. Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson M-A, Roy SL, et al.
37. Foodborne illness acquired in the United States—major pathogens. *Emerg Infect Dis.* 2011;17(1):7.