

## Food Handling Practices and Associated Factors among Food Handlers in Arba Minch Town Public Food Establishments in Gamo Gofa Zone, Southern Ethiopia

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### Abstract

**Background:** Food borne diseases are common in developing countries including Ethiopia because of the prevailing poor food handling and sanitation Practices. Food handlers play an important role in ensuring food safety throughout the chain of production, processing, storage and preparation.

**Objective:** To assess food handling practices and associated factors among food handlers in Arba Minch town Public food establishments in 2015.

**Methods:** A facility based cross sectional study was employed on 383 food handlers who work in selected 42 public food Service establishments. Data was collected from each food handler's by direct interviewing and observation of their personal hygiene. Binary logistic regression and multivariable logistic regression analysis was conducted. The strength of the association was measured by Adjusted odds ratio with 95% confidence level, and p-value <0.05 will be considered statistically significant.

**Result:** Among 383 respondents 125 (32.6) has good practice and 258 (67.40%) have poor practice towards food sanitation. From all interviewed food handler 150 (39.2%) were clean gown, 109 (28.5%) wear head cover, 352 (91.9%) has short finger nail and 135 (35.2%). Food handler whose age greater than 29-34 and  $\geq 35$  years AOR 3.457 (1.63, 7.35), 3.454 (1.78, 6.69) respectively, having supervisor AOR 13.095 (1.71, 100.49), and medical cheek up AOR 4.81 (2.16, 10.73), those who take training on food sanitation in the past 10.27 (2.34-14.78) were the identified significant factors associated with food handlers practice.

**Conclusions:** The current study reveals that relatively low good practice of food handling practice was observed. Relatively low practice was observed in wearing clean gown and head cover, shorting of finger nails and medical screening. Continues sanitary inspection should be performed regularly on food handler's general personal hygiene practice and on environmental sanitation of food establishment. In addition recruiting supportive supervisor training, medical screening and cheek up is mandatory for food handlers to improve their practice in food sanitation.

**Keywords:** Food handling practices; Arba minch town; Food handlers

### Background

A food handler is anyone who works in a food business and who either handles food or surfaces that are likely to be in contact with food such as cutlery, plates and bowls. Food handler are anyone who works in a food and drink establishments and who handles food, or contact with any equipment or utensils that are likely to be in contact with food, such as cutlery, plates, bowls, or chopping boards [1].

Food can be subjected to contamination with toxic substances and pathogenic organisms during production, transportation, preparation, storage and service. The consumption of contaminated food that contains sufficient quantities of pathogenic organisms and toxic substances will result in food borne disease. The causes of food borne diseases are lack of knowledge in part of food handlers and negligence

in safe food handling. It is estimated that in developing countries up to 70% of cases of diarrheal disease may be caused by contaminated food. Food prepared in large quantity is liable to contamination and to the rise of food borne diseases if the strictest principles of hygiene are not maintained [2].

Unsafe food has a human health problem since history was first recorded and many food safety problems encountered are not new. Although governments all over the world are doing their best to improve the safety of the food supply, the occurrence of food-borne disease remains a significant health issue in both developed and developing countries [3].

Thousands of millions of people fall ill as a result of eating unsafe food and in the prevalence of food borne disease many die due to less knowledge and practice on the part of food handlers. Food contamination in developing countries is caused by many factors including traditional food processing methods, inappropriate handling of food, holding temperatures, and poor personal hygiene of food

handlers, the safety of food handlers is therefore one of the most important health and safety issues facing most developing countries since it leads to both public health and social Problems [4].

Food safety continues to be a public health problem worldwide because food borne illnesses are widespread. Food borne and water-borne diarrheal diseases together kill about 2.2 million people each year. Outbreak of food borne illnesses have been cited as being responsible for 5000 and 500 deaths each year, respectively in the USA, England and Wales. Reports from other parts of Europe and North America also depict quite a similar trend [5].

Food borne diseases are common in developing countries including Ethiopia because of the prevailing poor food handling and sanitation Practices, inadequate food safety laws, weak regulatory systems, lack of financial resources to invest safer equipments, and lack of education for food handlers. Recent study conducted in Northern parts of Ethiopia 30.3% and 52.5% of food handlers had good food handling practices in Gondar and Dangila town respectively [6-8].

Food handlers play an important role in ensuring food safety throughout the chain of production, processing, storage and preparation. This study is aimed to assess the pattern of socio demographic distribution and to determine practice of food handler's food handling practice. In addition Arba Minch town is visited by different tourists and money food establishment's area.

## Methods and Materials

### Study area

The study was conducted in Arba Minch town Public Food Service Establishments. Gamo Gofa Zone is one of the Zones in SNNPR located 505 km to South of Addis Ababa and 275 Km away from the Regional capital of Hawassa. It has 15 woreda and 2 town administrations. The town has 86 higher levels and 55 lower level Public Food Service Establishments. The health facility distribution in the town is 1 general hospital, 2 Health centers and 11 health posts.

### Study design

Institutional based Cross sectional study design was conducted among food handlers who work in Arba Minch town public food establishments, 2015.

### Source and study population

Source population-all food handlers who work in Arba Minch town public food establishments

Study population-Randomly Selected food handlers who work in selected Arba Minch town public food establishments during study period

### Sample size determination and sampling procedure

Since the study design is cross sectional analytic study the sample size is determined for prevalence based on the following assumption was taken into consideration desired precision (d)=5%, 95% confidence level and proportion of 71.4% prevalence of good practice food handling practice towards food sanitation [9,10].

$$N = Z^2 \cdot P \cdot (1-P) / d^2$$

$$N = 1.96 \times 1.96 \times 0.741(1-0.741) / 0.05 \times 0.05 = 314$$

The sample by taking 10% none response rate the final sample size is 345.

The second sample is size calculated for factors affecting food handling Practices By using Epi info version 3.5.1, by taking Power 80%, confidence level 95% and odd ratio 2. Factors which has significant association food handling Practices in different literatures [11,12] by using double population proportion formula.

The sample size for factors by adding 10% none response rate it become 387. The final sample size was determined by comparing all possible result from the two option for data collection is taken from second objectives to get maximum sample size 387.

Sampling procedure- the required sample size was taken from randomly selected public food establishments which include Hotels, restaurants, cafeterias, butcher shops, juice house and pastry. Food handlers will be allocated to participate in the study proportionately from each establishment. Finally study participants were selected by simple random method from each establishment.

### Data collection procedure and quality control

Data was collected from each food handler's direct interviewing. Pre-tested structured questionnaire adapted from different literature was used to collect socio demographic and others variables. First the questioners was prepared in English and translated to Amharic and pre tested on 5% food handler's out of the study area in shell town before actual data collection and correction and modification was done based on the gap identified during interview. Six diploma Nurses was recruited as data collectors and supervised by 3 public health professional. Two days training was given on the aim of the research, content of the questionnaire, and how to conduct interview for data collectors and supervisors to increase their performance in field activities. The Collected data was being checked every day by supervisors and principal investigator for its completeness and consistency. Data collection was conducted from December 1 to 20 for consecutive 20 days.

### Data analysis and management

Data was coded and entered in to Epi info Version 3.5.1 and exported to SPSS version 20 for analysis. Descriptive Frequencies was calculated to describe socio demographic characteristics of the study population. Bivariate logistic regression analysis was conducted to assess the crude association between dependent and independent variables. Finally Variables which shows association in bivariate logistic regression analysis and have P-value less than 0.25 was entered in to multivariate logistic regression model, to identify significant factors associated with outcome. Finally significant factors was identified based with 95% Confidence level which is not include none value and P-value less than 0.05.

### Study variables

**Dependent variable:** Practice of food handlers classified as good food handling practice and poor handling practice based on the measurement for food handling practice.

**Independent variables:** Socio demographic variables-age, sex, income, educational status, marital status, building ownerships, Religion food handlers, Ethnicity, service year, Knowledge, training, sanitary inspection and medical checkup. Environmental factors-Hand

washing facility, toilet facility, solid and liquid waste disposal sanitary facilities like water supply and utensil cleanliness

**Operational definition**

**Food handling practices:** To assess the level of Practices, respondents were asked 17 questions from the questionnaire and those who scored ≤ the mean value were considered as having poor Practices and those who scored > the mean value were considered as having good Practices [7,12].

**Knowledge:** To assess the level of knowledge, respondents were asked 9 questions questionnaire and those who scored ≤ the mean value were considered as having poor knowledge and those who scored > the mean value were considered as having good knowledge [12].

**Ethical consideration**

The proposal will be submitted to the Research ethics committee (REC) of Addis continental institute of public health. Ethical clearance will be obtained from Addis continental institute of public health. Permission letter will be obtained from Arba Minch town trade and industry office. Verbal informed consent from each study participant will be obtained after clear explanation about the purpose of the study. All the study participants will be reassured that they would be anonymous. Names or any personal identifiers will not record. Respondents will be clearly told about the study and the variety of information needed from them. They will be given the chance to ask anything about the study and made free to refuse or stop the interview at any moment they want.

**Results**

**Socio demographic characteristics of the respondents**

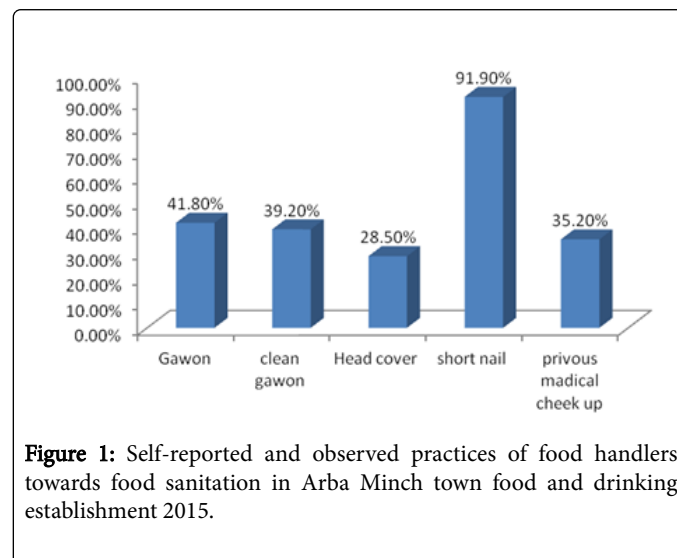
From 387 individuals only 383 were responded to the questionnaire making the response rate 98.97. The over all mean age of the food handlers was 29.97 years ± 7.724 SD. Majorities (92.4%) of the food handlers were urban in residence and more than half of them were male (Table 1).

Characteristic	Frequency	Percent
<b>Sex</b>		
Male	213	55.6
Female	170	44.4
<b>Age category</b>		
18-24	94	24.5
25-28	92	24
29-34	71	18.5
35-55	126	33
<b>Marital status</b>		
Married	235	61.4
Single	138	36
Divorced	8	2.1

Widowed	2	0.5
<b>Ethnicity</b>		
Gamo	272	71
Goffa	13	3.4
Wollayta	34	8.9
Amharra	44	11.5
Other	20	5.2
<b>Residence</b>		
Urban	354	92.4
Rural	29	7.6
<b>Educational status</b>		
Illiterate	20	5.22
Read and write only	57	14.88
Primary	186	48.56
Secondary and above	120	31.33
<b>Religion</b>		
Protestant	107	27.9
Orthodox	244	63.7
Muslim	32	8.4

**Table 1:** Socio demographic characteristics of food handlers in Arba Minch town, 2015.

**Practice of food handlers towards food sanitation in foods and drinking establishments**



**Figure 1:** Self-reported and observed practices of food handlers towards food sanitation in Arba Minch town food and drinking establishment 2015.

Among 383 respondents 125 (32.6%) has good practice and 258 (67.40%) have poor practice towards food sanitation. From all interviewed food hander 150 (39.2%) were clean gawn, 109 (28.5%)

wear head cover, 352 (91.9%) has short finger nail and 135 (35.2%) had previous medical checkup (Figure 1).

### Environmental condition of Food and drinking establishment in Arba Minch town

From all food and drinking establishment included in this study almost all have latrine facility, 80 (20.9%) have abattoir service, 246 (64.2%) have solid waste management facility, 372 (97.1%) dish washing facility and 151 (39.4%) have pipe water in kitchen area.

Among those who have dish washing facility 45 (11.7%) has fixed type with source of water and the 252 (65.8%) have facility without source of water (Table 2).

Variables	Frequency in number	Frequency in (%)
<b>Pipe water in kitchen area</b>		
Yes	151	39.4
No	232	60.6
<b>Dish washing facility</b>		
Yes	372	97.1
No	11	2.9
<b>Solid waste disposal facility</b>		
Yes	246	64.2
No	137	35.8
<b>Abater place</b>		
Yes	80	20.9
No	303	79.1
<b>Use hot water for cleaning</b>		
Yes	161	42
No	222	58
<b>Use detergent for washing utensils</b>		
Yes	376	98.2
No	7	1.8
<b>Supervisor</b>		
Yes	356	93
No	27	7

**Table 2:** Environmental characteristics of food handling Practices among food handlers working in food and drink establishments, 2015.

### Factors associated with food handlers practice towards food sanitation

After conducting univariate analysis to check data completeness and missing value of the data. The variables first analyzed by binary logistic regressions with 95% confidence level.

Variables	Practice		COR (95% CI)		AOR (95% CI)		P-value
	Good	Poor					
<b>Age category</b>							
18-24	48	46	1		1		0.112
25-28	33	59	0.536 (0.964)	(0.298,	1.669 (3.14)	(0.89,	0.001
29-34	16	55	0.279 (0.555)	(0.140,	*3.457 (7.35)	(1.63,	0.0001
35	28	98	0.274 (0.491)	(0.153,	*3.454 (6.69)	(1.78,	
<b>Knowledge</b>							
Good	13	59	2.554 (1.34, 4.86)		1.58 (3.48)	(0.716,	0.257
Poor	112	199	1		1		
<b>Presence of supervisor</b>							
Yes	121	229	3.89 (1.86, 4.63)		*2 (1.71, 4.49)		0.013
No	4	29	1		1		
<b>Educational status</b>							
Illiterate	1	19	0.070 (0.681)	(0.007,	4.0 (0.35, 46.26)		0.836
Read and write only	18	39	0.615 (2.037)	(0.186,	0.87 (0.24, 3.22)		0.267
Primary	52	134	0.517 (1.564)	(0.171,	1.77 (0.57, 5.49)		0.323
Secondary and above	54	66	1		1		
<b>Training on food handling</b>							
Yes	42	11	11.04 (17.63)	(8.22,	*10.27 (2.34-14.78)		0.001
No	83	240	1		1		
<b>Residence</b>							
Rural	11	18	1.287 (2.814)	(0.588,	1.42 (3.49)	(0.58,	0.445
Urban	114	240	1		1		
<b>Medical check up</b>							
Yes	116	181	5.48 (11.699)	(1.362,	*4.81 (10.73)	(2.16,	0.001
No	9	77	1		1		
<b>Service year</b>							
1year	84	213	1		1		0.342
>1 year	41	45	2.31 (1.41, 3.78)		1.24 (0.67-5.45)		

**Table 3:** Factors associated with practice of food handlers towards food sanitation in Arba Minch town public food establishments, 2015.

Variable which shows association in binary logistic and those with p value less than 0.3 entered into multivariate analysis. Finally food handler whose age greater than 29-34 and  $\geq 35$  years AOR 3.457 (1.63, 7.35), 3.454 (1.78, 6.69) respectively, having Hotel manager AOR 2 (1.71, 4.49), and medical cheek up AOR 4.81 (2.16, 10.73) were the identified significant factors associated with food handlers practice (Table 3).

## Discussion

The current study showed that there was poor practice of food handling in the majority of the handlers. From all the interviewed respondents 32.6% food handlers had good practice and 67.40% had poor practice towards food sanitation. This finding is relatively lower than study conducted in Southeast Asian (54.7%), 71.4 Ethiopia, in Alexandria University (72%) and higher than study done in Bangkok (15.2%). This variation in prevalence of food handler practice is due to difference in study setting, study population. For example a study conducted in Alexandria utilizes women working in Alexandria University and related socio demographic difference. The probable reasons for the differences might be due to difference in socio demographic, environmental factors difference and years of study and countries development difference.

Food handlers who were in age groups 29-34 and  $\geq 35$  years 3.457 (1.63, 7.35) and 3.454 (1.78, 6.69) more likely have good practice on food handling as compared to their counter parts, this is supported by study done in different setting [8,9]. This is might be food handlers who have long service years develop or acquire better experience on food handling practice due to repeated exposure of the work as compared to those who work for short duration in food establishment.

Food handler who work in food and drinking facilities who have supervisor 13.095 (1.71, 100.49) more likely have good food handling practice as compared to their counter parts, this finding is supported with study conducted [10,11]. Infect the presence of supportive supervisors improve the food handlers food handling practice by giving day to day practical support and feedback on food handling.

Food handlers who have medical cheek up 4.81 (2.16, 10.73) more likely have good food handling practice as compared to those who has no medical cheek up. This finding is in line with study done in Gonder [6,9]. This is due to the fact that food handlers who were examine their health status had better understanding about safe food handling, in addition to this they get professional advice during medical cheek up these enhance their overall performance in safe food handling practice.

Food handlers who attend food training in the past time 10.27 (2.34, 14.78) were more likely have good practice towards food sanitations. The result is supported by study conducted in Italy, Bankok, Gana, Gondar [9,12,13]. This is due to the fact that when food handlers were properly trained they can take the necessary precautions to avoid malpractice in food handling. Therefore food handlers should attend proper training in the basic principle of food safety and rules of personal hygiene in order to improve their practices in food handling. Previous training on food hygiene influenced the likelihood of medical examination among food establishments.

## Conclusion

The current study reveals that relatively low good practice of food handling practice was observed. Relatively low practice was observed in wearing clean gown and head cover, shorting of finger nails and

medical screening (medical cheek up). Lack of solid waste management facility, dish washing facility and pipe (running) water in kitchen area were the identified gap in Arba Minch food establishments. Food handler whose age greater than 29-34 and  $\geq 35$  years, having supervisor, medical cheek up and training on food sanitation in the past were the identified significant factors associated with food handlers practice. Continuous sanitary inspection should be performed regularly on food handler's general personal hygiene practice and on environmental sanitation of food establishment Giving training, medical screening and cheek up is mandatory for food handlers to improve their practice in food sanitation. Recruiting supportive supervisor for their facility should be considered for better and improved sanitation practice of food handlers. Maintaining and establishing solid west disposal and running water in kitchen area to improve the overall sanitation of food establishments is recommended.

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**Computing interest:** The authors declare that they have no computing interest.

## Authors Contribution

**Dejene Legesse:** Initiated the research, wrote the research proposal, conducted the research, did data entry and analysis and wrote the manuscript.

**Eskezyiaw Agedew, Desta Haftu and Marlign Tilahun:** Involved in the write up of methodology of proposal and research work. All authors approved the manuscript.

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