

# Sanitary and Hygienic Condition of Food Catering Establishments and Associated Factors in Asella Town, Arsi Zone, Oromia Regional State, Ethiopia

Niguse Abu Bekera<sup>1</sup>, Girma Worku Obsie<sup>2\*</sup> and MeleseTadessa Aredo<sup>2</sup>

<sup>1</sup>Sire Woreda Health Office, Assela Ethiopia

<sup>2</sup>Department of Public Health College of Health Science, Arsi University, Assela, Ethiopia

\***Corresponding author:** Girma Worku Obsie, Department of Public Health College of Health Science, Arsi University, Assela, Ethiopia, Tel: +251910256481, E-mail: [natigirmaw16@gmail.com](mailto:natigirmaw16@gmail.com)

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## Abstract

**Objective:** Assessing factors associated with poor sanitary and hygienic conditions of catering establishments as well as examined the washing efficiencies of food utensils through microbiological quality in Asella Town, Arsi Zone Oromia, Region, Ethiopia

**Methods:** institutional based cross-sectional study was conducted among 217 food catering establishment comprising laboratory investigation from January 01 to 28 / 2020 by using simple random sampling technique to select study unit. Collected data was entered into Epi-info version 7.0 and exported to SPSS version 21.0 for analysis. Logistic regressions were applied to assess association between dependent and independent variables using odds ratios with 95% CI at p-value <0.05.

**Results:** Overall the finding of this study indicated that based on observation checklist only 111 (51.2%) of the assessed food catering establishments had good sanitary & hygienic conditions with 95% CI (44.47%, 57.77%). Of the examined food utensils for bacteriological content were also found to be Staphylococcus aureus found in 2(3.7%), Escherichia Coli in 1 (1.8%).

Educational status of manager/owner (AOR = 5.038, at 95% CI: 2.348-10.807), received visiting /inspection in at least one in six months with authorized body (AOR= .063, at 95% CI: 16-.247) and number of washing compartments (AOR = 4.772, at 95% CI: 2.300-9.02) were found to be significantly associated with sanitary and hygiene condition of food catering establishments.

**Conclusion:** The finding was indicated that the sanitary and hygienic conditions of food catering establishments was relatively poor. Thus, the regularly inspection of food catering establishments should be adopted at food catering establishment.

**Keywords:** Sanitary & Hygienic condition, Food catering establishments, factors, Assela Town

**List of Abbreviations:** AOR: adjusted odds ratio; CI: Confidence interval; COR: crude odds ratio; FBD: food borne disease; SPSS: statistical package for social sciences and WHO: World Health Organization.

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## Introduction

Food catering establishments are the place where an individual get food in the breakfast lunch, dinner or snacks accompanied by some form of dirk. Hygiene is high degree of personals cleanliness and comfort hygiene practice and sanitation is effective use of tools in clean way [1].

An unhygienic practice in food catering establishment affects the health of client. Because of an urbanization and growing population at an incredible rate worldwide, thus the urbanpopulation of world were projected toreach 4.5 billion in2025 and megacities create tremendous demand for water and act as dense sources ofpollution and make difficult to manage health of the people [2].

Consequently, food borne diseases affect both developing and developed countries. Foods served at food catering establishments are known to have been the sources of outbreaks of gastro enteric infections, including cholera and salmonellosis, as well as food borne intoxications.Dirty or un maintain equipment, facility and inadequate hygiene practice of food handlers in food catering establishment increase the risk offood borne disease (FBD). As World health organization (WHO) 2007-2015 estimates the global burden FBD overall 29% of all 22 diseases were estimate to be transmitted by contaminated food. No valid data available for developing countries [3-5].

In the same way, the food borne illnesses disproportionately affect African countries, and data from the WHO showed that a third of the global deaths caused by food borne illnesses take place in the continent. Annuals global deaths for food borne disease were greater than 91 million. Of the total African accountedaround 33.3% and diarrheal disease is responsible for 70% of the burden of food borne disease [6].

Besides this epidemiological outbreak data repeatedly identify five major risk factors related to employee behaviors and preparation practices in retail and food service establishments as contributing to food borne illness: improper holding temperatures, inadequate cooking, contaminatedequipment, food from unsafe sources, and poor personal hygiene [7]. Even if the epidemiological data related food borne diseases are inadequate in Ethiopia but it can be evidence that are very common in the country because of the reasons lack of ample water supply, poor personal hygiene and environmental health sanitation. According to the 2002-2003 “Health and Health related Indicators” that published stated, Helminthes infections were the second leading cause of outpatient visits, Dysentery and different parasitic infections were also among the ten top causes of outpatient visits, Dysentery Was among the leading causes of hospital admissions and deaths, Typhoid fever, acute diarrheal diseases, bloody diarrhea and anthrax were reported as some of the major causes of outbreaks [8].Another the preliminary studies were conducted nationally indicated that communicable diseases contribute 60-80% to the total possible causes of illness, among which food borne diseases has been estimated to take the lion’s share [9].

Furthermore, the study done in Northern Ethiopia ,2020 found that a greater portion of the establishments 53.3% of sanitary condition was poor; this might be attributed to inadequate waste handling practice, improper latrines, and absence of suitable hand washing facility and inadequate ventilation of establishments.Likewise, the study was conducted in Addis Ababa, Ethiopia,2017 showedthata greater proportion 58.8% of food and drinking establishments were found to be poor sanitary condition; mainly due to inadequate solid and liquid waste management practice, poorly managed toilets, and absence of proper drinking water storage materials [10,11]. Regarding of Hygiene setting of catering establishment studied southwestern part of the country indicated in statistically association between pattern of inspection with availability of hand Washing and latrine facility of food catering establishments [12,13].

Overall there is a few studieswere addressed in the country prevail that poor sanitary and hygienic condition of food catering establishment, however there is no any article that was done on food catering establishment at Asella town. Therefore, this study was aim to assess the sanitary and hygienic condition of food catering establishments includingexamined the washing efficiencies of food utensils through microbiological quality.

## Methods and Materials

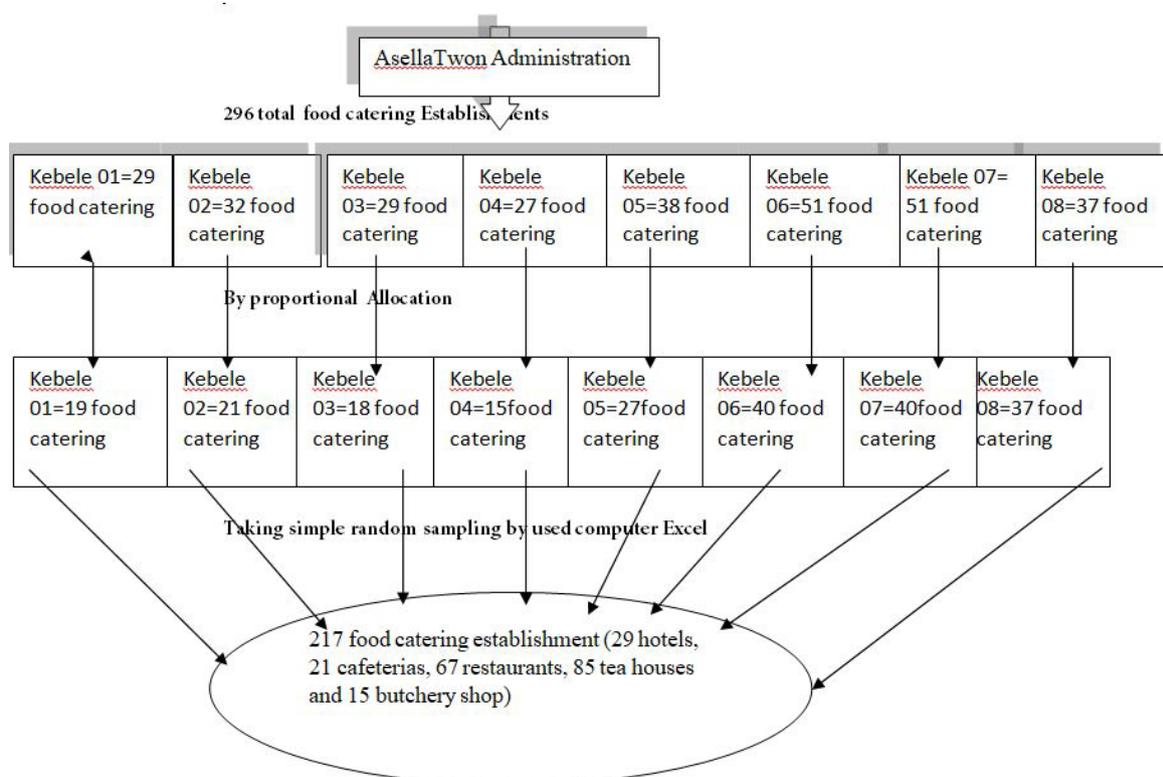
### Study design and setting

An institutional based cross-sectional study comprising laboratory investigation was conducted from January 1 to 28/2020 at Asella town which is the capital city of Arsi Zone Oromia regional state Ethiopia. Asella town is located 175km south east of Addis Ababa and the town is mainly characterized by highland climate condition. According to the population projections census of conducted by Center of statics Agency(CSA) in 2007, the town has a total of population of 108,307 of whom 53612 were males and 54695 were females. It has 8 kebeles administration and one governmental Referral&teaching hospital as well as two private hospitals. Furthermore, there are 296 food catering establishmentssuch as 38 hotels, 93 restaurants, 25 cafeterias 117 tea/snack house and 23 butcher shop are providing services for consumers in the town [14].

### Sample size and sampling procedure

Entirely food caters establishments such as hotels, cafeterias, restaurants, tea/snack house, and, butcher shops of the townwas including in the study. The actual sample size was determined using single population proportion by assuming 5% margin error and 95% confidence level ( $Z_{\alpha/2} = 1.96$ )with previous cross-sectional study conducted in Addis Ababa Arada sub city revealed that 58.8% of sanitary condition of food and drinkingestablishments was used for computed [11]. Calculating:  $n = z^2(1-\alpha/2) \frac{P(1-P)}{d^2}$  ;  $n = (1.96)^2 * 0.588 * (1-0.588) / (0.04)^2 = 582$ , since the total population size was less than 10,000, applied finite population correction and considering 10% of non-response rate the final maximum sample size was 217.

Simple random sampling technique was used in order to select study unit. Initially town was arranged with division of eight kebeles administration. Then the number of food catering found in each kebeles was listed and the sample size was distributed proportionally to each food catering establishments in the town.Finally, samples were draw using systematic random sampling method by computer Excel.



**Figure 1:** Schematic presentation of sampling procedure for assess the sanitary and hygienic condition of food catering establishments in Asella town from January 01 to 28, 2020

## Operational definitions

**Food catering establishment:** establishments those engaged in the work of providing food and drinks for the consumers such as hotel, bar, restaurant and snack bar [1].

**Sanitary condition:** means effective systems which help to ensure adequate and appropriate maintenance and cleaning, control pests, manage wastes and monitor effectiveness of maintenance and sanitation procedures [10, 15, 16].

**Food Handler:** A person involved in any activity that relates to food processing, transportation or storage, or who works with a surface likely to come into contact with food [6].

## Data collection instruments and procedures

Data were collected by face to face interview using structure and adapted questionnaires by four trained environmental health professionals. The questionnaires had two parts. The first part was interviewed the food establishment's owner/manager on socio-demography characteristics. The second part was observation checklist that assessed sanitary & hygiene condition of food catering establishments with eleven criterial elements. Observation was done on physical conditions of the premises (conditions of the wall, ceiling and floor), toilet facility, availability of water supply, solid and liquid waste management, dish washing facility. In addition, laboratory investigation was conducted on 25% (54) of the total (217) of food catering establishments which was randomly selected of 13 Cafeterias, 14 Restaurants, 15 Hotel and 14 Tea/Snack houses. Food utensils (dish plates or bowls) were randomly selected preferred for examination of Swab test.

Swab was inoculated on maconkey agar and further inoculated was under taken a different media and finally bio chemical test was conducted for bacterial identification. The samples of swap test were collected by researcher go together with data collectors but the researcher was managed and coordinates the overall activities of the swap test procedure and the swabbed samples was collected and transported to laboratory of Asella Hospitals by using ice box within two and a half hours by the researcher.

## Data quality control

Two days training was organized and provided for four data collectors and one supervisor on the objectives, contents of questionnaires including sample taking procedures for swab test. The questionnaires were developed initially in English language then translated to Amharic and again back-translated to English to ensure the consistency. Pre-testing of the questionnaire for clarity and ease of administration was done in other town and approved for actual data collection.

## Data analysis

The collected data coded and entered in to EPI-Info version 7.0 and exported to SPSS version 21 for analysis. Both bivariate and multivariate logistic regression were used to identify factors associated with sanitary and hygiene condition of food catering establishments. Variables with P-value less than 0.25 in the bivariate analysis were fitted in to a multiple logistic regression model to control the possible effect of confounders. Adjusted odds ratios (AOR) with 95% CI were used to compute factors associated with sanitary & hygiene condition. The P-value less than 0.05 considered to be declared that statistically significant of association with sanitary & hygiene condition of food catering establishments.

## Ethical considerations

Ethical clearance was obtained from institutional review board of Arsi University College of Health Science. Letter of permission was also write for the town health office and food catering establishments in Asella town. The purpose of the study was explained to the

respondents and data was collected after permission got from participant. Privacy and confidentiality maintained during the study process. The right of respondent to participate or not in the study was ensured during data collection by giving an opportunity to consent for refuse or take part in the study.

## Result

### Socio-demographic characteristics of study

According to Asella town health Office reported that 296 food catering establishments were currently working and 73% of them were included in this study. A total of 217 food catering establishments with 100% rate was conducted by the study. Regarding to their types of food catering establishments more than one-third 85 (39.2%) were tea/snack houses whereas around thirty-one percent 67 (30.9%) were restaurants. Of the total the majority 206 (94.6%) were Licensed and slightly more than two-third of manager/owners of food catering establishments' participants 149(68.7%) were males. According to age categories and marital status of respondents of food catering establishments, around three-fourth of respondents 158(72.85%) were range age 25-40 years and more than three-fourth 165(76.0%) were single. Likewise, educational status of manager/owners almost half percent 108(49.8%) were primary school. A total of about one-third of food catering establishment 66(34.4%) were serving 5-10 years (table 1).

| variables                               | Category                          | Frequency | Percent |
|---|-----------------------------------|-----------|---------|
| Type of establishment                   | Hotel                             | 29        | 13.4    |
|   | Cafeteria                         | 21        | 9.7     |
|   | Restaurant                        | 67        | 30.9    |
|   | Tea/Snack                         | 85        | 39.2    |
|   | Butcher shop                      | 15        | 6.9     |
| Sex of res.                             | Male                              | 149       | 68.7    |
|   | Female                            | 68        | 31.3    |
| Age                                     | <=24                              | 18        | 8.3     |
|   | 25-40                             | 158       | 72.8    |
|   | >=41                              | 41        | 18.9    |
| Marital Status of Manager/owners        | Married                           | 33        | 15.2    |
|   | Single                            | 165       | 76.0    |
|   | Divorced                          | 13        | 6.0     |
|   | Windowed                          | 6         | 2.8     |
| Educational status of Managers/owners   | Unable to read and write          | 8         | 3.6     |
|   | Read & write                      | 21        | 9.7     |
|   | Primary (1-8th grade)             | 108       | 49.8    |
|   | secondary(9-12th grade) and above | 80        | 36.9    |
| Ownership of the establishment building | Private                           | 64        | 29.5    |
|   | Rented                            | 153       | 70.5    |
| Licensing status of the establishment   | Unlicensed                        | 11        | 5.1     |
|   | Licensed                          | 206       | 94.9    |
| Service years it served                 | ≤1 year                           | 7         | 3.2     |
|   | 1-5 year                          | 102       | 47.0    |
|   | 5-10 year                         | 66        | 30.4    |
|   | >10 year                          | 42        | 19.4    |

Table1: Socio-demographic characteristics of study population in Asella town, Jan.2020(n=217)

### Sanitary and hygienic conditions

### Physical conditions of the premises of food establishments

Around three-fourth of premises of establishments 161(74.2%) were their floor easily cleanable construction, smooth, good repair

condition and the majority of them 201(92.1%) had adequate lighting system in the room. Besides this more than one-third of them 82(37.8%) had all rooms reasonably free of odors and condensation (Table 2).

| Variables  | Category | Frequency | Percent |
|--|----------|-----------|---------|
| Floor easily cleanable and construction, smooth, good repair | No       | 56        | 25.8    |
|  | Yes      | 161       | 74.2    |
| Walls and ceilings: clean and good repair                    | No       | 53        | 24.4    |
|  | Yes      | 164       | 75.6    |
| All Doors and windows have screen self-closing doors         | No       | 46        | 21.2    |
|  | Yes      | 171       | 78.8    |
| Room are adequate lighting system                            | No       | 16        | 7.4     |
|  | Yes      | 201       | 92.6    |
| All rooms reasonably free of odors and condensation          | No       | 135       | 62.2    |
|  | Yes      | 82        | 37.8    |
| Floor clean at time of visit                                 | No       | 67        | 30.9    |
|  | Yes      | 150       | 69.1    |
| Floor in good repair having no joints & cervices             | No       | 70        | 32.3    |
|  | Yes      | 147       | 67.7    |
| Cleanness kept & free from visible dirt, dust,               | No       | 100       | 46.1    |
|  | Yes      | 117       | 53.9    |

**Table 2:** Physical conditions of Food Catering Establishment in Assela town, Ethiopia, January, 2020(n=217)

Of the total above the half of the establishment's kitchen room 130(59.9%) was with wall of cornice maintained in good conditions. In the same way more than half of them 117(53.9%) had processing equipment cleanness kept & free from visible dirt & filth and connection of running water in the kitchen for preparation & washing equipment was around seventy percent 150(69.1%). Regarding to cooked food handled properly in kitchen indicated that 64(29.5%) and more than one-fourth of establishment 62(28.6%) had appropriate waste handling in kitchen. Moreover, slightly more than two-third of establishment 147(67.7%) had refrigerator available for storage and about forty-three percent 94(43.3%) had separated store rooms prior to study period (table 3).

| Variables  | Category | Frequency | Percent |
|--|----------|-----------|---------|
| The wall of cornies maintained in good conditions, which have no joint         | No       | 87        | 40.1    |
|  | Yes      | 130       | 59.9    |
| Kitchen provided with adequate lighting system                                 | No       | 49        | 22.6    |
|  | Yes      | 168       | 77.4    |
| Infestation of the kitchen observed at the time of visiting                    | Yes      | 72        | 33.2    |
|  | No       | 145       | 66.8    |
| Processing equipment cleanness kept & free from visible dirt & filth           | No       | 100       | 46.1    |
|  | Yes      | 117       | 53.9    |
| Connection of running water in the kitchen for preparation & washing equipment | No       | 67        | 30.9    |
|  | Yes      | 150       | 69.1    |
| Hood & chimney installed for ventilation                                       | No       | 151       | 69.6    |
|  | Yes      | 66        | 30.4    |
| Cooked food handled properly in kitchen  | No       | 153       | 70.5    |
|  | Yes      | 64        | 29.5    |
| Appropriate Waste handling in kitchen  | No       | 155       | 71.4    |
|  | Yes      | 62        | 28.6    |
| Refrigerator available for storage   | No       | 70        | 32.3    |
|  | Yes      | 147       | 67.7    |
| Establishments have separate store room?                                       | No       | 123       | 56.7    |
|  | Yes      | 94        | 43.3    |

**Table: 3.** Kitchen and food preparation site handling and cleanness of food catering establishments in Asella town, Ethiopia January, 2020.

### Dining room and Food handlers’ personal hygiene as well as Equipment washing facilities

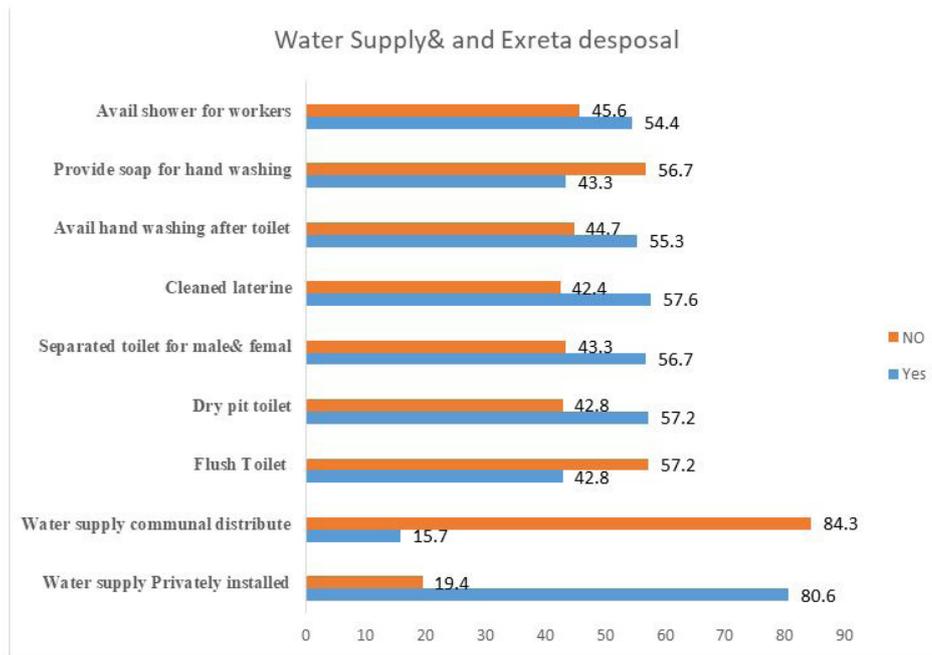
More than half of food catering establishments 116(53.5%) had floor dining room with tile and a little less than sixty percent 127(58.5%) of them had smooth easily cleanable dining room. Regarding to food handlers’ personal hygiene of establishment around forty-four percent 95 (43.8%) of them were wearing appropriate cloth and more than three-fourth 172 (79.3%) of them were their nail short trimmed & clean and one-third 73(33.6%) of them with nail paint during observed. Besides this the majority of establishments 212(97.7%) were with availability basin for washing of utensils and a few less than half 99(45.6%) of them had three washing compartments. Only just twelve percent 26(12%) of establishments used sanitized equipment’s& utensils soaked with sedase /barekinaat the study time (table 4).

| Variables  | Category                                     | Frequency | Percent |
|--|--|-----------|---------|
| Type of floor dining room  | Tile   | 116       | 53.5    |
|  | Concrete                                     | 17        | 7.8     |
|  | Wooden                                       | 2         | 0.9     |
|  | Plastered stone/bricks                       | 82        | 37.8    |
| Floor repaired in conditions which have no cracks & cervices in which dirt’s can lodge | No   | 46        | 21.2    |
|  | Yes  | 171       | 78.8    |
| Lighting of dining room  | No   | 11        | 5.1     |
|  | Yes  | 206       | 94.9    |
| Wall types   | Not easily cleanable                         | 44        | 20.3    |
|  | Smooth easily cleanable                      | 127       | 58.5    |
|  | Rough surface                                | 46        | 21.2    |
| Ceiling maintained in good condition   | No   | 50        | 23      |
|  | Yes  | 167       | 77      |
| Cleanness of ceiling kept & free from dust, soot & web of spider                       | No   | 58        | 26.7    |
|  | Yes  | 159       | 73.3    |
| Food handling wear appropriate cloth   | No   | 122       | 56.2    |
|  | Yes  | 95        | 43.8    |
| Worker wear appropriate over coat  | No   | 157       | 72.4    |
|  | Yes  | 60        | 27.6    |
| Nail short trimmed & clean   | No   | 45        | 20.7    |
|  | Yes  | 172       | 79.3    |
| Nail paint observed  | No   | 144       | 66.4    |
|  | Yes  | 73        | 33.6    |
| Wear of any jewelry or ring at time of visit   | Not observed                                 | 177       | 81.6    |
|  | Observed                                     | 40        | 18.4    |
| Manager trained about basic food safety  | No   | 181       | 83.4    |
|  | Yes  | 36        | 16.4    |
| Availability basin for washing of utensils   | No   | 5         | 2.3     |
|  | Yes  | 212       | 97.7    |
| Number of compartment  | One  | 23        | 10.6    |
|  | Two  | 95        | 43.8    |
|  | Three  | 99        | 45.6    |
| Type of compartment  | Fixed smooth surface with water tap          | 154       | 71      |
|  | Fixed rough concrete with water tap          | 11        | 5.1     |
|  | Dish bowls/bucket                            | 52        | 24      |
| Methods of cleaning & sanitizing of utensils   | Hot cold water & detergent used for cleaning | 24        | 11.1    |
|  | Only cold water with detergent used          | 15        | 6.9     |
|  | Only hot & cold water used                   | 2         | 0.9     |
|  | only cold water used                         | 3         | 1.4     |
|  | Only local soap & \cold water used           | 173       | 79.7    |
| Sanitized equipment’s& utensils soaked with sedase                                     | Yes  | 191       | 88      |
|  | No   | 26        | 12      |

**Table 4:** Dining room&Food handlers’ personal hygiene and washing facilities of food catering establishments in Assela town, Ethiopia, Jan. 2020(n= 217)

## Water supply and Excreta disposal of food catering establishments

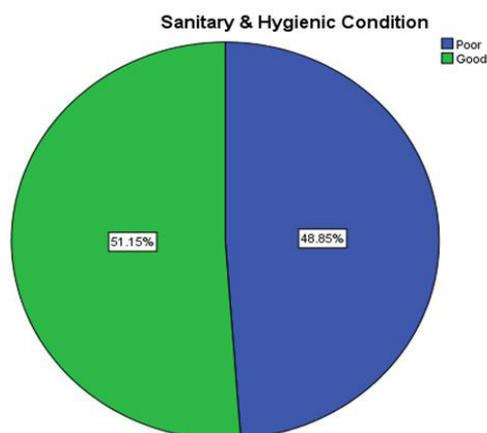
Around five in six of food catering establishments 175 (80.6) had privately installed from municipal supply source of water and the majority of them 207 (95.4%) had toilet for Excreta disposal. Of these more than half of them 124 (57.1%) had flush type toilets and then they had separate toilet for males & females 123 (56.7%). Likewise, greater than half of establishments 120 (55.3%) had hand wash basin together with soap provided for hand washing 94 (45.6%) of the total at all (Figure2).



**Figure. 2:** Water supply and Excreta disposal (for public use only) of food catering establishments in Asella town, Ethiopia, 2020

## Sanitary and Hygiene condition

Nationally, it is challenging to rate the sanitary condition of establishments as poor or good. However, the study selected a few variables to rate sanitary and hygienic situations of basic sanitary requirements of food establishments whereas 11 thematic area and were 55 variable related with thematic selected (on observation checklist Q201-Q1107 all including except questionnaires which have more than 2 chose) or “yes” score (1) and “no” score (0) the mean value were characterization of food catering establishment as good and poor [1, 10, 15]. Overall based on those checklists were used for assessment a little more than half of food catering establishments 111 (51.15%) had good sanitary & hygienic situations 95% CI (44.47%, 57.77%) (Figure3).



**Figure 3:** Sanitary and hygiene condition of food catering establishments in Asella town, Ethiopia, 2020

## Microbiological Swab test of food utensils in selected Establishments

Totally, various food utensils samples were collected from 54 food catering establishment. Fifty-four dish plates and different cups were examined for bacteriologic content by using swab tests via took from one dish plate or cups for the media of Mackonkey and Sheep Blood Agar. Finally, the laboratory result was indicated that above seventy percent 39(70.47%) was No Growth Bacteria Isolated whereas one in seven of food utensils 8(14.8%) was with Gram Positive CONS (Coagulase Negative staphylococcus) (table 5).

| S.NO | Bacterial isolate | Bacterial isolate                       | Quantity | %     |
|------|-------------------|---|----------|-------|
| 1    | Gram positive     | S.aureus                                | 2        | 3.7   |
| 2    | Bacterial isolate | CONS(Coagulase Negative Staphylococcus) | 8        | 14.81 |
| 3    | Gram Negative     | E.coli                                  | 1        | 1.8   |
| 4    | Fungal spp        | Yeast cells +Hyphae                     | 4        | 7.4   |
| 5    | No growth         | -----                                   | 38       | 70.37 |

Table 5: Microbiological Swab test of food utensils selected Establishments performed in Asella hospital, Asellatown, Ethiopia, Jan. 2020. (n= 54)

## Factors associated with sanitary and hygienic conditions of food catering establishments

In binary logistic regression both bivariate and multivariate analyses were fitted to identify the significant factors associated with sanitary and hygiene condition. Such as Educational status of manager/owner (secondary school) [AOR = 5.038, 95% CI:(2.348-10.807)], visiting /inspection in at least one in six months with authorized body [(AOR= 0.063, 95% CI: (0.16-0.247)] and number of compartment [(AOR = 4.772, at 95% CI:(2.300-9.02)] were significantly associated with a sanitary & hygiene condition of food catering establishments, with 95% Confidence Interval at p-value less than 0.05 (table 6).

## Discussion

The finding of this study revealed that 51.15% of foods catering establishments were found in good sanitary conditions whereas, 106(48.8%) were poor. This might be attributed to improper cleaning and sanitized, lack of kitchen facility like chimney installed for ventilation, lack separate room for store and lack of sanitary facility like hand washing facilities with soap and lack of separate latrines for men and female. This finding was comparable with study conducted at Adwa town, Tigray region, which shows 53.3% of good sanitary conditions [10].

But the finding of this study were with good sanitary conditions than the findings of previous studies conducted in Arada sub-city, Addis Ababa, Ethiopia, 58.8% were poor [11]. The possible difference might be due to the methods of assessments, geographical difference, climate condition, income level and availability of infrastructure.

Furthermore, this study higher than study conducted in Woldia town, Amara region, Ethiopia that showed only 16.8% of good sanitary conditions. The discrepancy might be due to the methods of sanitary and hygienic assessments of food catering establishment, the living, level of urbanizations and the socioeconomic standard of the study participants [17].

One of this study finding was also microbial result of swabs collected from selected food catering establishments; the food utensils showed that the presence of pathogenic bacteria such as *S. aureus* were isolated from 2(3.7%) of swabbed utensils and *E. coli* were 1(1.8%) detected from all the swabbed utensils. The finding was comparable with studies conducted in Addis Ababa University students' cafeterias. *S. aureus* were isolated from 1(2.8%) of swabbed utensils and *E. coli* were not detected [16]. Our study result may be because of the hygienic practice or improperly washing of food utensils at food catering establishment and also the presence of *Escherichia coli* in this study establishes indicated contamination from environmental fecal origin which may result from poor hygiene practices.

|   | Variables   |   | Sanitary hygienic condition |      | Frequency<br>Total | COR(95%CI)            | AOR(95%CI)            |
|---|---|---|-----------------------------|------|--------------------|-----------------------|-----------------------|
|   |   |   | Poor                        | Good |                    |                       |                       |
| 1 | Sex of manager/owner  | Male                                      | 63                          | 86   | 149                | 1                     | 1                     |
|   |   | Female                                    | 43                          | 25   | 68                 | 0.426(0.236-0.769)*   | 0.498(0.240-1.032)    |
| 2 | Marital status  | Married                                   | 18                          | 15   | 33                 | 0.712(0.336-1.57)     | 0.398(0.146-1.083)    |
|   |   | Single                                    | 76                          | 89   | 165                | 1                     | 1                     |
|   |   | Divorced                                  | 11                          | 2    | 13                 | 0.155(0.033-0.722)*   | 0.304(0.055-1.675)    |
|   |   | Windowed                                  | 1                           | 5    | 6                  | 4.27(0.488-37.4)      | 1.133(0.06-21.311)    |
| 3 | educational status of manager/owner                             | unable to read and write                  | 2                           | 6    | 8                  | 4.9(0.945-24.446)     | 61.58(0.47-109.28)    |
|   |   | Read & write                              | 14                          | 7    | 21                 | 0.817(0.305-2.192)    | 1.017(0.336-3.081)    |
|   |   | Primary (1-8th grade)                     | 64                          | 41   | 108                | 1                     | 1                     |
|   |   | secondary(9-12th grade)                   | 23                          | 57   | 80                 | 4.050(2.177-7.535)*   | 5.038(2.348-10.807)** |
| 4 | Manager related to establishment                                | Owner                                     | 70                          | 70   | 140                | 1                     | 1                     |
|   |   | Relative                                  | 35                          | 29   | 67                 | 0.878(0.484-1.593)    | 1.037(0.474-2.268)    |
|   |   | Employed                                  | 1                           | 12   | 13                 | 12.348(1.563-97.535)* | 3.6(0.382-33.924)     |
| 5 | Ownership of the establishment Building                         | Private                                   | 22                          | 42   | 64                 | 2.324(1.268-4.260)**  | (1.588(0.699-3.605)   |
|   |   | Rented                                    | 84                          | 69   | 153                | 1                     | 1                     |
| 6 | Visiting /inspection in the past six month with authorized body | No  | 25                          | 4    | 29                 | .121(.041-.362)*      | 0.063(0.16-0.247)**   |
|   |   | Yes                                       | 81                          | 107  | 188                | 1                     | 1                     |
| 7 | number of compartment   | One                                       | 12                          | 10   | 22                 | 1.593(.625-4.063)     | 2.098(.697-6.314)     |
|   |   | Two                                       | 25                          | 67   | 92                 | 5.124(2.759-9.514)*   | 4.772(2.39-9.02)**    |
|   |   | Three                                     | 65                          | 34   | 99                 | 1                     | 1                     |
| 8 | Manager trained about basic food safety                         | No  | 100                         | 81   | 181                | 1                     | 1                     |
|   |   | Yes                                       | 6                           | 30   | 36                 | 1.241(0.621-4.183)+   | 1.951(0.525-5.382)    |
| 9 | Service type of it serve  | It gives service for which it is licensed | 102                         | 104  | 206                | .334(.151-739)*       | 0.649(0.236-1.790)    |
|   |   | It gives other services inclusively       | 4                           | 7    | 11                 | 1                     | 1                     |

Table 6.A bi-variable and multi-variable logistic regression analysis output of associated factors of sanitary and hygiene condition of food catering establishments in Asella town, Ethiopia, 2020

Our study also showed that educational status of manager/owner who had above secondary (9-12th grade) about 5 times more likely to have good sanitary condition compared to who had primary 1-8th grade level. In fact, the educational qualification is one of the important factors which had the impact on socio-economic profile for thus a better sanitary and hygiene practice in their establishment [18]. This finding is supported by study was conducted in Asosa Town, North Western Ethiopia [19].

On other hand, the establishments which had no received visiting /inspection in at least one in six months with authorized body were 93.7% times less likely had good sanitary condition compared to those visited once in six months. This is because of inspection could help manager/owner of food catering establishment to acquire better knowledge and perception regarding good sanitary condition. This finding is agreed with other researchers conducted in Tigray Region North Ethiopia and Woldia town [10, 15].

Similarly, the odds performing of good sanitary condition of establishments which had two compartment washing sink around 4.8 times more likely to have good sanitary condition compared with establishment with three compartment. This might be due to installation of two sink during building of establishment and most of three compartments were as vats. Beyond of this finding the most widely used and accepted methods of washing food utensils was three compartment sink or vat system. But the current study revealed that washing compartments which had three compartment 99(45.6%) from those compartments which had cleanness of the basin kept 97(44.7%). This is in line with study conducted in Jimmatown that inspected only 290 (40.4%) of them had three sinks compartment used for washing utensils the rest single and double equipment compartments sinks [20] and higher than recent study in Delhi 16.5% [21].

In contrast the managerial training status of this study had no any significant effect on sanitary condition of food catering establishment. This might be due to the small numbers of respondents answered question as took training during interviews. But the others study conducted in Tigray Region and Arada sub-city of Addis Ababa, Ethiopia revealed that the odds of performing good sanitary condition among the trained managers were rate times more likely to keep up sanitary conditions of their establishments compared to those not trained [10, 11].

## Conclusion

In this study, the sanitary condition of the food catering establishments of the Asella town was observed that found to be relatively unhygienic and poor. Educational status of manager/owner, visiting /inspection in at least one in six months with authorized body and number of compartment were factors significantly associated with a sanitary & hygiene condition of food catering establishments besides this the examined food utensil indicated that *Staphylococcus aureus* were isolated from 2(3.7%) & *Escherichia Coli* were isolated from 1(1.8%). Therefore, the regularly inspection of food catering establishment should be adopting efficiently and effectively by the help of Town Health Office and the manager /owners of food establishment would take orientation and training for improvement of the skill of practice and food utensils cleaning procedure.

## Limitation

Since it is across-sectional study design temporal relationship cannot be established between the dependent and independent variables.

## Authors Contribution

NA contributed in the generation of the study topic, preparation of proposal, organized of data collection process and preparation draft data analysis and interpretation. GW & MT contributed in reviewing the proposal, data analysis and interpretation and development of the manuscript and critical review of final manuscript. All authors read and approved the final manuscript.

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## Competing Interests

The authors declare that they have no competing interests.

## **Availability of data and materials**

The datasets generated during the study can be available up on the request of the corresponding author.

## **Ethics approval and consent to participate**

Ethical clearance was obtained from Ethical Board Review of Arsi University, College of Health Sciences, Department of Public Health prior to data collection. Written informed consent was obtained from each study participants of food catering establishments after the purpose of the study explained Privacy and strict confidentiality were maintained during the interview process. Name of the establishments and personal identifiers of participants had not been included to maintain Anonymity.

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