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Original Article

Sanitary status and associated factors among food and drink establishments in Hawassa city

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Abstract

Background: Foodborne diseases are major public health issues both in developed and developing countries. Food borne illness is mostly associated with poor sanitation and hygiene environment of food outlets. However, there is limited evidence regarding the sanitary status of food and drink establishment in Hawassa city. Therefore, the objective of this study was to determine the sanitary status and associated factors among food and drink establishments.

Methods: A cross-sectional study design was used to perform this study which was done from February to March 2020. All food and drink establishments in Hawassa city were eligible for the study. Hence, 388 food and drink establishments were selected via simple random sampling technique. Data were collected by five environmental health students through structured interviewer-administered questionnaire and observation checklist. Coded and cleaned data from EpiData version 3.5 were transferred to IBM SPSS version 23 for analysis. Univariate and multivariable logistic regression analyses were used to determine the sanitary status and associated factors, respectively.

Results: The overall level of poor sanitary status among food and drink establishments was 48.5%. In the multivariable analysis, private in ownership of building (AOR=1.83), manager/owner not trained about basic food safety and hygiene (AOR=5.0), monthly income of ≤10000 ETB (AOR=2.46), no medical checkup in past six month (AOR=5.8)] and food handler not trained about basic food safety (AOR=2.1) were the predictors of poor sanitation status.

Conclusion: Nearly half of the food and drink establishments had poor sanitary status. Hence, formal and informal training on sanitation and hygiene should be provided to managers and handers of food and drink establishments for improving the sanitary status and ultimately for reducing the occurrence of foodborne diseases.

Keywords: associated factors, food and drink establishment, sanitary status, Ethiopia

Introduction

Food and drink service establishments is a place where food and drink is offered for individual portion service directly to the consumer (1). Hence, the most common food and drinking establishments can be Hotels, Restaurants, Cafeteria, Pastry, Fruit Juice house and Snack bars. Currently, the availability of food and drinking establishments become increased in cities of the world (2). However, most of them were characterized by poor sanitary conditions, such as an unclean kitchen, improper food handling procedures, limited access to water supplies, and inadequate management of liquid and solid waste (3, 4). Hence, poor hygiene and sanitation practice of food and drinking service establishments had a significant impact to the high prevalence of food-borne diseases (5).

Food-borne illnesses play a significant part in global public health issues (2). The consumption of unsafe foods may result illness, also referred to as food borne disease. which are major public health problems in worldwide and millions of people become sick each year and thousands die after eating contaminated food specifically children and elderly people with weakened immune systems (6). For instance previous studies were revealed that around 10–20% of food-borne diseases were caused by improper food handling techniques (7). Water and sanitation were emerged as a primary health care component with the view to alleviate the associated morbidity and mortality(8). Despite the international and local efforts towards improving sanitary status modifications are not satisfactory in many African Countries (9). Nutritional problems and communicable diseases are leading causes for the outpatient attendance and causes of hospitalization most of which are attributed to poor sanitation (10). and realizing food safety measures (11). The reports from Africa and South East Asia showed that highest incidence and death rates associated with consumption of unsafe food among all ages (10). Hence, the incidence of consumption of unsafe food was associated with lack of access to clean water, poor government structural arrangement, population growth and other communicable diseases and poor environmental conditions particularly in African countries (12). According to the studies conducted in Ethiopia, major contributor of poor sanitary conditions of were poor liquid and solid waste management facilities, absence of proper dish washing facilities and poor management of toilet facilities (13, 14). An absence of sanitary facilities and poor sanitary conditions of food and drinking establishments are major problem for majority of establishments (2). For instance, a study conducted in Adwa, about 58.8% of food and drinking establishments in Addis Ababa were under poor sanitary conditions (13). Achieving safe food service is one of the major issues for producers, consumers, and public health officials. Currently, there is evidence for increment of food and drinking establishments in Hawassa city (15). Therefore, maintaining the safety and wholesomeness of food is important to prevent food and water borne diseases acquired from the establishments. However, there is limited evidence related to the sanitary status particularly the magnitude and its associated factors of poor sanitation status of food and drink establishments in the study area. Therefore, this study was aimed to determine the sanitary status and associated factors of poor sanitation conditions among food and drink establishments in Hawassa City.

Methods and materials

Study Area

This study was conducted in Hawassa city, which is the capital city of Sidama regional State, Ethiopia. The city lies in between 7^0 and 5^0 latitude N and 38^0 and 29^0 longitude E of the

country. A total surface area of city 157.2 km^2 divided in to 8 sub cities and 32 kebeles. According to the recent data (unpublished data source Hawassa City Trade and Investment bureau in 2019) the total food and drink establishment in the city were 4500. Of these 2372 exist in 4 selected sub Cities (Menhariya, Tabor, Mesrake and Bahel adarash). 247 Hotels, 551 Restaurants, 526 Cafeterias, 79 Pastry, 51 Fruit and juice house, 918 Tea/Snack house. Hawassa hosts several events that attract the attention of tourists throughout the year. Lake Hawassa is the mover of the socio-economic engine of the city and fishing is a major local industry.

Study Design and Period

A cross-sectional study design was used to perform the study which was done from February to March 2020 in Hawassa City among food and drink establishments.

Source and Study population

The source populations were all the food and drink establishments in Hawassa city. The study populations were those who fulfilled the inclusion criteria of this study

Eligibility criteria

All food and drink establishments such as, hotels, cafeterias, restaurants, tea/snack house, pastry, fruit and juice house were included in the study. Whereas, the Street food vendors or hawkers, the establishments which provide service temporarily around market place and bus stations and those who provide packed and canned foods were excluded from the study.

Sample Size Determination

The sample size for first objective was calculated by using single population proportion formula:

$$n = \frac{z^2(1-\alpha/2)p(1-P)}{d^2} = \frac{(1.96)^2*0.533*0.467}{(0.05)^2} = 382;$$

Where n = the required sample size, z = critical value for standard normal distribution (z-statistic) at 95% confidence level (z = 1.96), 5% margin of error, p = expected prevalence of sanitary condition (taken to be 53.3% from previous study done in Adwa town, Northern Ethiopia (2)).

Since, the population size is small we apply Population correction formula as:

$$fn = \frac{n}{1+n/N} = \frac{382}{1+382/4500} = 352$$ + non response rate(10%) = 388

The sample size for second objective was calculated by using double population proportion formula and assuming 95% confidence interval, 80% power, taking AOR of the significance variables from the previous studies and Unexposed to the exposed ratio of 1. Then it was calculated via Epi info version 7 as Table 1 below. Finally, a sample size of 388 obtained from first objective was used, because it is relatively the larger sample size and sufficient for study.

Sampling Procedures

Hawassa city have total number of 4500 food and drink establishments in 8 sub cities. A simple random sampling technique was used to select the representative 4 Sub-Cities from 8 Sub-Cities, The establishments were classified by the type of service they provide into the following: Hotel, restaurant, tea or snack house, cafeteria, pastry, juice and fruit house. The main purpose of classification is to avoid over or under representation of certain types of establishments. The total samples of 388 foods and drink establishments were allocated proportionally to each selected Sub-Cities by using proportion to size allocation, the number of food and drink establishments were then calculated for each selected sub-city.

Table 1: Sample size calculation for assessing factors associated with sanitation status

Risk factors for sanitary condition	Percent of outcome in an unexposed group	AOR	Non response rate	Sample size	Reference
Availability of license	44	2	10%	317	(16)
Manager trained about food hygiene	31	2.6	10%	178	(16)
Regular inspection	42	1.95	10%	341	

Proportional to size allocation formula = $\frac{nfx\ ni}{N}$

Where:

ni = number of food and drink establishments in each selected 4 sub cities

nf = final sample of the study = 388.

N = total number of food and drink establishments in the selected 4 sub cities = 2372

Finally, simple random sampling technique was used to select study units from the list of selected 4 sub cities.

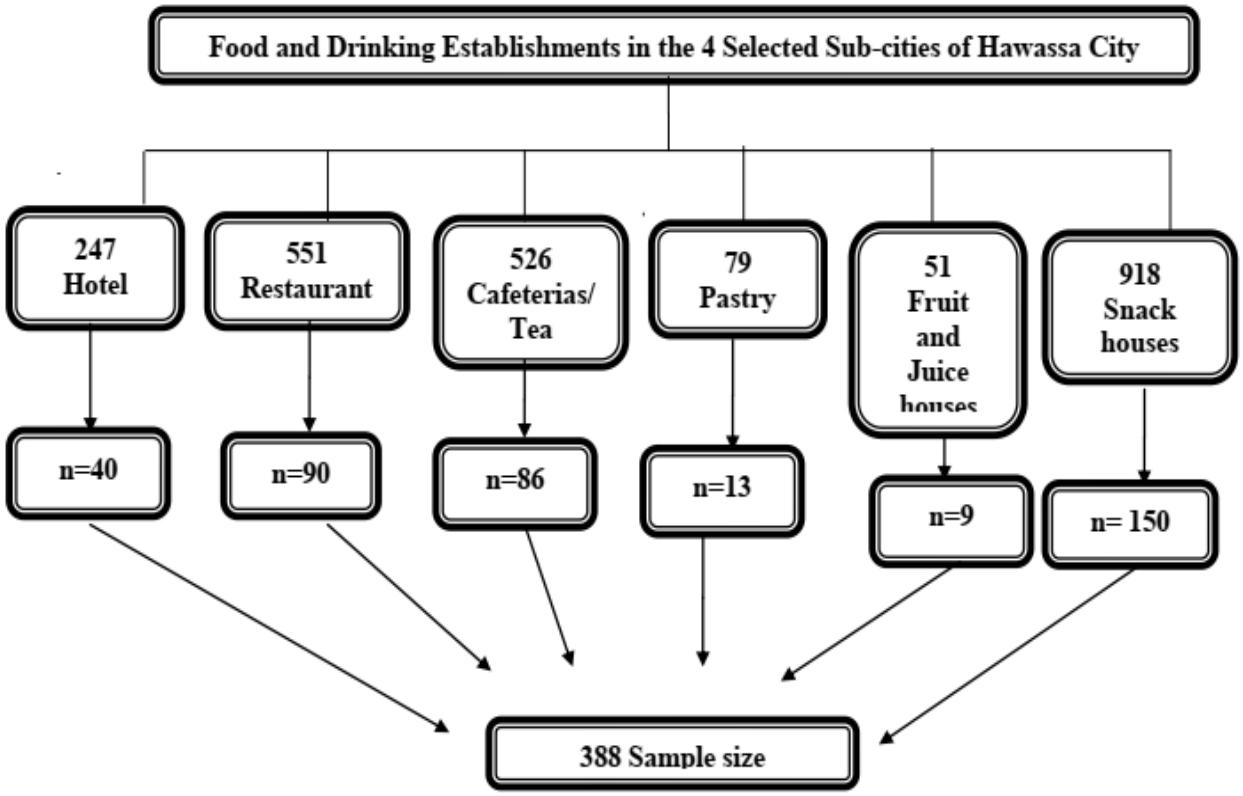

Figure 1: Proportional allocation of sample size among different groups of food and drink establishment in the selected four sub-cities, in Hawassa city

Variables

Dependent variables:

Sanitary status of food and drink establishments

Independent variables:

Socio- Demographic factors of manager/ owner:

Sex of respondent (manager or owner); age of respondent (manager or owner); marital status of respondent (manager or owner); educational level of respondent (manager or owner); monthly income of the establishment; ownership of the building serving the food and drinking establishment

Environment characteristics:

Type of establishments; Service year of the establishment; Licensing condition of the establishment; Regulatory inspection to the establishment; Staffs Trained about sanitation and hygiene of food; Managers trained on sanitation and hygiene of food.

Operational Definitions

Sanitary status: Sanitary status was computed by taking summation of 22 items regarding the basic sanitation criteria's (Building conditions, Equipment washing facilities, Solid waste management, Liquid waste management, Food servicing hygiene practice, Water supply and hygiene facility, Excreta management system, Food handlers' personal hygiene). The sum of these conditions was calculated then, achieving 70% and above of questions was used as a cut-off point to categorize establishments as good sanitary status (2, 13)

Food and drink establishments: provide food and drink services to a relatively large number of users in the form of breakfast, lunch, dinner or beverages (2).

Restaurant: is food establishments that provide lunch and dinner with accompanying soft and alcohol drinks (2).

Cafeterias: provide hot drinks and snacks. Hot drinks include tea, coffee, milk, or a blend of milk and coffee (macchiato). The cafeterias must have water boiling equipment for coffee and tea preparation. Cakes and doughnuts (such as bumbling, chornake and sambusa) are served as snacks

Tea/snack houses: provide tea and snacks. Snacks are usually plain bread, sambusa and Bumbling. Tea is served after mixing with boiled water in a kettle.

A hotel: is a food establishment that offers food and drinks of all types.

Pastry: is the name given to various kinds of baked products made from ingredients such as Flour, sugar, milk, butter, shortening, baking powder, and eggs.

Fruit and juice: beverage and other fruit-related products produced by squeezing or crushing fruit.

License: establishments are considered licensed if certificate issued by responsible government institution is placed at a visible site or presented on request.

Food handlers: are kitchen personnel who are involved in the preparation and handling of food in the kitchen(17).

Wear of appropriate outer gown: the worker worn gown/ over coat and hair cover which is purposely prepared to be worn on normal food handling practice(17)**.**

Adequate ventilation: refers to food and drink establishments feeding room and kitchen which had windows that can be approximately 10% of its floor area(17).

Adequate lighting: is to mean that a healthy person (without major visual problem) can see or easily identify objects in the room comfortably without straining of the eye(17).

Properly managed toilet: means when a toilet/latrine was found free of litters, tissue paper, fly access and other dirty materials like feces or urine around the latrine(17).

Proper solid waste disposal: in this study context when solid wastes are disposed in municipal container and donkey cart(17).
Proper liquid waste disposal: in this study context when liquid wastes are disposed in septic tank and latrine(17).

Data collection tools and procedures

A Semi structured questionnaire was used to collect socio-demographic data through interview with the managers and/or owner of establishments. Furthermore, data regarding the physical condition of establishments, the hygienic condition of food handlers, the handling cleanliness and arrangement of utensils, and the supply of sanitary services, such as restrooms and facilities for handling and disposing of waste was collected via observation checklist, which was adopted from similar studies for evaluating (2, 17, 18). Data was collected by five graduated environmental health students through interview and direct observation. The questionnaire was constructed in English, translated into Amharic language and back to English.

Data quality control

To assure data quality, questionnaires, and checklist were developed after reviewing available literatures of similar studies. Training was given to data collectors and supervisors for a day by the principal investigator. The training was including an explanation of all the questions and practical session. Two Environmental health officers and principal investigators were conduct intensive supervision. After checking for consistency and completeness, the filled questionnaire was submitted to the principal investigator.

A pre-test was done by taking 30 food and drink establishments in the selected sub-Cities, which was not includes in the actual study. Then any deviation identified during pre-test was checked again and readjusted.

Data entry and analysis

Data were entered using Epi Data version 3.5. Then the data was exported into IBM SPSS version 23 for analysis. Descriptive statistics were used to calculate the poor level of sanitary status. Bivariate logistic regression was conducted to determine the crude association between poor level of sanitary status and independent variables. Then, independent variables that have a bivariate relationship of significance with $p < 0.25$ were entered into multivariate binary logistic analysis. Finally, in the multivariable binary logistic regression analyses variables with $p < 0.05$ and whose 95% confidence intervals (CIs) do not include 1 were considered the independent predictor of poor sanitary status. Model fitness was checked by using omnibus tests of model coefficients in which -2LL is significantly different from the base model Hosmer-Lemeshow's goodness-of-fit test greater than 0.05 was considered as good model fit for final prediction. Cox and Snell and the Nagelkerke R-square (pseudo R square statistics) were also observed to model prediction (0 to 1 scale), in which the higher value indicated that the model predicts well.

Results

Socio-Demographic Characteristics of study participants

A total of 388 food and drink establishments were assessed with response rate of 100%. More than half (54.6%) of the respondents were males. The mean age of managers/owners was 32.45±7.273 with the median age of 31 years. Considering the educational level of respondents the highest proportion (39.2%) was constituted by secondary school, followed by primary school (33.2%). Regarding marital status, majority (70%) of them was married (Table 2).

Table 2: Sociodemographic characteristics of the study participants, Hawassa city, July 2020

Variables	Category	Frequency	Percent
Sex	Male	212	54.6
	Female	176	45.4
Age	18-24	29	7.5
	25-34	219	56.5
	≥35	140	36
Educational status	Illiterate	10	2.6%
	Read and write only	39	10.1
	Primary school	129	33.2
	Secondary school	152	39.2
	Diploma	43	11.1
	Degree and above	15	3.9
Marital status	Single	87	20
	Married	296	70
	Divorced	4	10
Monthly income	≤10000	293	75.5
	>10000	95	24.5

Environmental characteristics of food and drinking establishments

Out of the total 388 establishments, the highest number of establishments type were snack bar (38.7 %) followed by Restaurant (23.2 %), Cafeteria(fast food), Hotel (10.3 %) and Fruit and juice (2.2 %). Furthermore, most (93.6%) of the establishments were owned by individual, and the remaining few proportions were owned by organization (3.4%) and association (3.1%). More than half (54.1 %) of the food establishment were available in private building. The mean service year of the food and drink establishments was 4.9 years [ranges from 1 to 20 years]. In addition majority (84.3%) of the establishment manager/owners were not trained about basic Food safety and hygiene. Furthermore, most (89.4%) of the establishments were not inspected by regulatory body within a month; however the higher proportion (79.9%) of the establishment had no license. Similarly, more than half (54.4%) of Food handler were trained about basic food safety and hygiene, however more than half (61.1%) of them had no medical checkup in past six month (Table 3).

Table 3: Food and drink establishment dining room floor is constructed, Hawassa city, July 2020

Variable	Category	Frequency	Percent
Type of establishment	Hotel	40	10.3
	Cafeteria (fast food)	86	22.2
	Restaurant	90	23.2
	Snack bar	150	38.7
	Fruit and juice	9	2.2
	Pastry	13	3.4
Establishment ownership	Individual	363	93.6
	Organization	13	3.4
	Association	12	3.1
Owner of building	Rented	178	45.9
	Private	210	54.1
Service years of establishment	<5 years	173	44.6
	>=5 years	215	55.4
Manager/owner trained about basic Food safety and hygiene	Yes	61	15.7
	No	327	84.3
Inspected by regulatory body within a month	Yes	41	10.6
	No	347	89.4
License	Yes	78	20.1
	No	310	79.9
Medical checkup in past six month	Yes	151	38.9
	No	237	61.1
Food handler trained about basic food safety and hygiene	Yes	211	54.4
	No	174	44.8

Sanitation status of food and drinking establishment

Building conditions

Majority (76.8%) of the establishment's wall, Ceiling, tables, and chairs of dining room were found in good condition. Similarly, Majority (70.9%) of the establishments had separate kitchen room (Table 4*)*.

Equipment washing facilities

More than half (66.5%) of the establishment were uses Detergent for washing drinking glass or dish. Majority (70.6%) of the establishment had no three drinking glass or dishwashing systems and almost half (51.8%) of them were not using hot water while dishwashing. Furthermore, majority (72.9%) of them had no running tap water for food preparation and equipment washing. Consequently, more than half (58.0%) of them had not disinfecting the washing water storage equipment (Table 4).

Solid waste management

Almost all (99%) the establishment had temporary solid waste storage containers and from the majority (82.2%) of establishments solid wastes disposed within 7 days. However, more than half (61.9%) of them were not properly segregate combustible and noncombustible solid wastes (Table 4).

Liquid waste management

Most (87.6%) of the establishments were used septic tank or latrine for liquid waste management. In the majority (75%) of establishments there was no visible site of insect breeding (Table 4).

Food servicing hygiene practice

Most of the establishments (90.2%) have functional refrigerator for storing perishable foods and hot foods were served immediately. In contrast, more than half (65.2%) of them had no storage room for nonperishable foods (Table 4).

Water supply and hygiene facility

More than half (66.2%) of the establishments had private piped water supply. Furthermore, most (92%) of them had functional hand washing facility. However, majority (72.2%) of them had no functional shower facility (Table 4).

Excreta management system

Majority (78.6%) of the establishment had Functional gender based toilet at least 10-m away from kitchen. In addition more than half (53.4%) of them had functional hand-washing facility near toilet (Table 4).

Food handlers' personal hygiene

More than half (66.5%) of the Food handlers' hair and their fingernails were covered and cut short during work. In contrast, more than half (57.5%) of them worn not clean outer garment (apron/gown) (Table 4). Considering the overall sanitation status nearly half of the establishment had poor level of sanitation (48.5%)(Table 4).

Factors associated with poor sanitary status of food and drink establishments

In Bivariate-analysis eight variables such as ownership of the building, Manager/owner trained about basic Food safety and hygiene, Inspected by regulatory body, License, Monthly Income, Service year, Medical checkup in past six month, Food handler trained about basic food safety and hygiene were significantly associated with poor sanitation status of establishments.

After controlling confounding variables via multivariate binary logistic regression, private in ownership of building (AOR=1.83; 95%CI [1.09-3.04], manager/owner not trained about

Table 4: Sanitary status of food and drink establishments in Hawassa city, July 2020

Variables	Category	Frequency	Percent
Walls, Ceiling, Tables and chairs of room are good	Yes	298	76.8
	No	90	23.2
Availability of separate kitchen room	Yes	275	70.9
	No	113	29.1
Adequate lighting and ventilation	Yes	334	86.1
	No	54	13.9
Three drinking glass or dishwashing systems	Yes	114	29.4
	No	274	70.6
Use of detergent for washing drinking glass or dish	Yes	258	66.5
	No	130	33.5
Hot water for Dishwashing	Yes	187	48.2
	No	201	51.8
Running tap water for food preparation and equipment washing	Yes	105	27.1
	No	283	72.9
Disinfects the washing water storage equipment	Yes	163	42.0
	No	225	58.0
Temporary solid waste storage containers	Yes	384	99.0
	No	4	1.0
Segregation of combustible and noncombustible wastes	Yes	148	38.1
	No	240	61.9
Solid wastes disposed within 7 days	Yes	319	82.2
	No	69	17.8
Septic tank or latrine for liquid waste management system	Yes	340	87.6
	No	48	12.4
No visible site of insect breeding	Yes	291	75.0
	No	97	25.0
Functional refrigerator for storing perishable foods and hot foods served immediately	Yes	350	90.2
	No	38	9.8
Storage room for nonperishable foods	Yes	135	34.8
	No	253	65.2
Private piped water	Yes	257	66.2
	No	131	33.8
Functional hand washing facility	Yes	357	92.0
	No	31	8.0
Functional shower facility	Yes	108	27.8
	No	280	72.2
Gender based toilet at least 10-m away from kitchen	Yes	305	78.6
	No	83	21.4
Functional hand-washing facility near toilet	Yes	207	53.4
	No	181	46.6
Hair covered and Fingernails cut short during work	Yes	258	66.5
	No	130	33.5
Clean outer garment (apron/gown) worn	Yes	165	42.5
	No	223	57.5
Overall level of Sanitation Status	Good	200	51.5
	Poor	188	48.5

basic food safety and hygiene (AOR=5.0; 95%CI [2.54-9.96], monthly income of ≤10000 ETB (AOR=2.46; 95% CI [1.37-4.41], no medical checkup in past six month (AOR=5.8; 95% CI[2.99-11.28] and food handler not trained about basic food safety and hygiene (AOR=2.1; 95%CI [1.14-3.85] were identified as the five significant variables associated with poor sanitation status of establishment.

Accordingly, establishments opened in private in building were 83% more likely to have (AOR=1.83) poor sanitary status than the counterparts. Furthermore, food establishments which have no trained managers about sanitation and hygiene were 5 times more likely to have poor sanitary status when compared to food establishments that have trained managers (AOR= 5.0).

Food establishments with a monthly income of <10000 ETB were 2.5 times more likely to have poor sanitation status than the counterparts (AOR=2.46). The presence food handlers with no medical checkup in the past six month were 6 times more likely to have poor sanitation status than the counterparts (AOR=5.8). Furthermore, establishment with not trained food handlers on basic food safety and hygiene were 2 times more likely than those with trained ones (AOR=2.1).

Table 5: Factors associated with poor sanitary status of food and drink establishments, in Hawassa city, July 2020

Variables	Sanitary status		COR [95%CI]	AOR [95%CI]	P-value
	Poor	Good			
Ownership of building					
Private	76	134	1	1	
Rented	112	66	2.9[1.97-4.53]	1.83[1.09-3.04]*	0.020
Manager/owner trained about basic Food safety and hygiene					
Yes	17	44	1	1	
No	171	156	2.8[1.56-5.17]	5.0[2.54-9.96]**	0.001
Inspected by regulatory body					
Yes	11	30	1	1	
No	177	170	2.8[1.38-5.85]	0.59[0.25-1.44]	0.252
License					
Yes	19	59	1	1	
No	169	141	3.7[2.12-6.54]	1.57[0.63-3.95]	0.331
Monthly Income					
>10000	39	56	1	1	
≤10000	149	144	1.45[0.93-2.37]	2.46[1.37-4.41]**	0.002
Service year					
≥5 years	89	126	1	1	
<5 years	99	74	1.89[1.26-2.84]	1.10[0.62-1.99]	0.731

Table 5 continued

Variables		Sanitary status		COR [95%CI]	AOR [95%CI]	P-value
		Poor	Good			
Medical checkup in past six month						
	Yes	30	121	1	1	
	No	158	79	8.1[4.98-13.06]	5.8[2.99-11.28]**	0.001
Food handler trained about basic food safety and hygiene						
	Yes	66	145	1	1	
	No	122	55	4.87[3.16-7.50]	2.1[1.14-3.85]*	0.018

* Significant at p <0.05; ** Statistically significant at p<0.001; Hosmer and Lemeshow test=0.684; 1 shows reference category

Discussion

In the current study the poor sanitation status of food and drink establishments was 48.5%. Furthermore, private in ownership of building, manager/owner not trained about basic food safety and hygiene, monthly income of ≤10000 ETB, no medical checkup in past six month and food handler not trained about basic food safety and hygiene were associated with poor sanitation status of establishment.

The prevalence of poor sanitary status (48.5%) obtained from the current study was high. however, this finding was lower than the previous studies conducted in Ethiopia such as in Arba Minch town (67.40%) (19), Addis Ababa (58.8%) (20), and Adwa town (53.3%) (2).The possible reasons for this lower prevalence of poor sanitation status in the current study could be explained by the presence of improved latrines, adequate drinking water supply with container, good solid waste and liquid waste management practice than the above comparative studies.

The presence of soot on walls and ceilings, disease vectors (especially cockroaches), and uncovered food items are important sanitary faults that can contaminate food at its point of departure for consumption by customers (21). Considering the building conditions majority (76.8%) of the establishment's wall, Ceiling, Tables and chairs of dining room were found in good condition. Similarly, Majority (70.9%) of the establishments had separate kitchen room.

In the current study majority of the establishments (78.6%) had toilet facility. This finding is consistent with the result of study done in Awash, Afar (78.7%). In contrast, it was lower than the findings from Adwa (98.4%)(2), and Addis Ababa (100%)(20). The possible reason for this discrepancy could be explained by the difference in commitment of administrative issue such as lack of license and poor medical checkup in the current study than the contrast one. On the other hand, More than half (66.2%) of the establishments had private piped water supply. Furthermore, most (92%) of them had functional hand washing facility. However, majority (72.2%) of them had no functional shower facility and 75.0% of establishments had no visible site of insect breeding. This finding is in line with a study conducted in Addis Ababa (71%)(20). Mere availability of toilet facilities does not ensure good sanitary conditions; unsanitary and soiled toilets create favorable breeding environments for insects and rodents which will carry pathogenic micro-organisms and intestinal parasites. Even though, the accessibility of toilet facility does not insure

satisfactory sanitary situations of establishments, improper managed toilet facilities would create suitable conditions for insects to multiply, and this resulting in food and utensil contamination.

One of the most widely used and accepted methods of food utensil washing method is the three compartment sink or washing basin, which can be used to wash, rinse and sanitize food utensils and equipment's (12). Considering the Equipment washing facilities more than half (66.5%) of the establishment were uses Detergent for washing drinking glass or dish. Majority (70.6%) of the establishment had no three drinking glass or dishwashing systems and almost half (51.8%) of them were not using hot water while dishwashing. In contrast to this result, in Delhi, India, report that 46.2% of establishments used hot water in the kitchen for washing dishes and drinking cups (3).

Furthermore, majority (72.9%) of them had no running tap water for food preparation and equipment washing. Consequently, more than half (58.0%) of them had not disinfecting the washing water storage equipment. This figure is much higher than the findings from studies conducted in Afar (51.2%) and Adwa town (47.1%)(2). Inappropriate dishwashing practices contribute to the transmission of various diseases such as TB, influenza, typhoid and other feco-oral diseases.

To avoid unsanitary conditions, refuse receptacles must be constructed and maintained in a manner that will not be damaged due to the moist content of garbage and sharp materials. In the current study almost all (99%) the establishment had temporary solid waste storage containers and from the majority (82.2%) of establishments solid wastes disposed within 7 days. However, more than half (61.9%) of them were not properly segregate combustible and noncombustible solid wastes. This finding is in line with study conducted in Addis Abeba (46.8%) (13).

In the present study, most of the establishments engage in the proper managements of liquid waste. Hence, 87.6% of the establishments were used septic tank or latrine for liquid waste management. In the majority (75%) of establishments there was no visible site of insect breeding these proportions are higher than the previous study in Hawassa. This finding is in line with the results of a study done in Woldiya (63.5%) (18).

Furthermore, the odds of poor sanitary status were almost two times more likely among food and drinking establishments opened in rented building than the counterparts (AOR=1.83). This may be due to the fact that a rental house may not be fitted for food establishment and then have lack of suitable formal permission of renovation and additional cost for renovation of the building (17).

Furthermore, food establishments which have no trained managers about sanitation and hygiene were five times more likely to have poor sanitary status when compared to food establishments that have trained managers (AOR= 5.0). This finding was supported with the study done at Woldiya town (18), and Adwa town (2). Moreover, establishment with not trained food handlers on basic food safety and hygiene were two times more likely than those with trained ones (AOR=2.1).This might be due to training programs are important for improving the knowledge of food handlers (22). This finding is also supported with a study conducted in Addis Ababa, Ethiopia (17).

On the other hand, Food establishments with a monthly income of <10000 ETB were 2.5 times more likely to have poor sanitation status than the counterparts (AOR=2.46). This may be due to average monthly income influences the accessibility of sanitation and hygiene facilities.

On the other hand, the presence food handlers with no medical checkup in the past six month were 6 times more likely to have poor sanitation status than the counterparts (AOR=5.8). This finding is in line with studies conducted in Arba Minch and Dessie towns (23, 24).This could be

the health care workers provide advice for food handlers during examination.

Conclusion

Nearly half of the food and drink establishments had poor sanitary status. In the current study private in ownership of building, manager/owner not trained about basic food safety and hygiene, monthly income of ≤10000 ETB, no medical checkup in past six month and food handler not trained about basic food safety and hygiene were significantly associated with poor sanitation status of establishment.

Therefore, formal training should be arranged and provided to managers/owners and food handlers by the authorized body or Hawassa City Health office, which is important for reducing the occurrence of foodborne diseases. Likewise, licensing of the food and drink establishments should be improved by the authorized body of Hawassa city. In addition, health inspectors (concerned regulatory bodies) should conduct random and schedule supervision to the establishments. Furthermore, the mangers/owners of the food and drink establishments should provide fulfill hygienic facilities and promote the health check-up of food handlers (every three months).

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Ethical considerations

Ethical clearance was obtained from Institutional Review Board (IRB) of Hawassa University College of Medicine and Health Science. An official letter of permission was obtained from the Department of Environmental health. Informed written consent or permission was obtained from all Sub-cities. Establishments' managers/owners were well informed about the purpose of the study and verbal consent was obtained from them. Their privacy was also maintained. They were also informed that the information obtained from their establishment would not be disclosed to third person/body to assure confidentiality.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author via correspondence e-mail: eyasu3648@gmail.com

Conflicts of interest

The authors declared no conflicts of interest exist.

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References

1. Davis B, Lockwood A, Pantelidis IS, Alcott P. Food and beverage management: Routledge; 2018.
2. Gebremariam B, Asmelash B, Tetemke D. Determinants of sanitary status among food establishments in urban setup in Adwa town, Tigray, Ethiopia: a cross-sectional study. BMC Res Notes. 2019;12(1):399.
3. Deshpande JDP, Deepak B. The sanitary condition of food establishments and health status and personal hygiene among food

handlers in a rural area of Western Maharashtra, India. Asian Journal of Medical Sciences. 2013;4(2):23-9.
4. WHO (World Health Organization). estimates of the global burden of foodborne diseases. 2018.
5. Aliyo A, Daba J, Legese M. Sanitary and Hygienic Status and Associated Factors Among Food and Drinking Establishments of Burayu Town, Oromia, Ethiopia. Health Serv Res Manag Epidemiol. 2023;10:23333928221144553.
6. Elbehiry A, Abalkhail A, Marzouk E, Elmanssury AE, Almuzaini AM, Alfheeaid H, et al. An Overview of the Public Health Challenges in Diagnosing and Controlling Human Foodborne Pathogens. Vaccines (Basel). 2023;11(4).
7. Akabanda F, Hlortsi EH, Owusu-Kwarteng J. Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. BMC Public Health. 2017;17(1):40.
8. Bouzid M, Cumming O, Hunter PR. What is the impact of water sanitation and hygiene in healthcare facilities on care seeking behaviour and patient satisfaction? A systematic review of the evidence from low-income and middle-income countries. BMJ Glob Health. 2018;3(3):e000648.
9. Ministry of Health and Long-Term Care. Food Safety: A Guide for Ontario's Food Handlers. September 2018.
10. WHO. The Global Burden of Foodborne Disease: Overview and Implications in Africa and South East Asia. Lancet. 2015.
11. Addis M, Sisay D. A review on major food borne bacterial illnesses. J Trop Dis. 2015;3(4):176-83.
12. 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;14:571.
13. Mendedo EK, Berhane Y, Haile BT. Factors associated with sanitary conditions of food and drinking establishments in Addis Ababa, Ethiopia: cross-sectional study. Pan African Medical Journal. 2017;28(1).
14. Asmelash B, Abay, Mebrahtu,Tetemke, Desalegn,Gebremariam, Brhane. Assesement of sanitary conditions and associated factors among food and drinking establishemens in Adwa Town. International Journal of Advanced Technology & Science Research. 2019,;1(1).
15. Richard Pluke ECoP. Global Alliance for Improved Nutrition. A USAID EatSafe Project Report. USAID Technical Office; 2018.
16. Gebremariam B, Asmelash B, Tetemke D. Determinants of sanitary status among food establishments in urban setup in Adwa town, Tigray, Ethiopia: a cross-sectional study. BMC Research Notes. 2019;12(1):1-5.
17. Girmay AM, Gari SR, Mengistie Alemu B, Evans MR, Gebremariam AG. Determinants of Sanitation and Hygiene Status Among Food Establishments in Addis Ababa, Ethiopia. Environ Health Insights. 2020;14:1178630220915689.
18. Reta M, Tesfa M, Adere A. The sanitary conditions of food and drink establishments in Woldia town, Northeastern Ethiopia. Ethiopian Journal of Health Development. 2018;32.
19. 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 (Sunnyvale). 2017;7(302):2161-1165.1000302.
20. Mendedo EK, Berhane Y, Haile BT. Factors associated with sanitary conditions of food and drinking establishments in Addis Ababa, Ethiopia: cross-sectional study. Pan Afr Med J. 2017;28:237.
21. Donkor ES. Cockroaches and Food-borne Pathogens. Environ Health Insights. 2020;14:1178630220913365.
22. Yoseph A, Tamiso A, Ejeso A. Knowledge, attitudes, and practices related to COVID-19

pandemic among adult population in Sidama Regional State, Southern Ethiopia: A community based cross-sectional study. PLoS One. 2021;16(1):e0246283.
23. Adane M, Teka B, Gismu Y, Halefom G, Ademe M. Food hygiene and safety measures among food handlers in street food shops and food establishments of Dessie town, Ethiopia: A community-based cross-sectional study. PloS one. 2018;13(5):e0196919.
24. Azanaw J, Gebrehiwot M, Dagne H. Factors associated with food safety practices among food handlers: facility-based cross-sectional study. BMC Research Notes. 2019.