

Food safety practices and associated factors among food handlers in food establishments of Dire Dawa, Ethiopia

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Abstract

Introduction: WHO reports that up to 30% of the populations suffer from foodborne diseases each year. More than 200 diseases were spreading through contaminated food and 76 million cases, 350000 hospitalizations, and 5000 deaths each year are due to foodborne illnesses. One of the aspects of food contamination is unsafe/unhygienic food handling services provided in food service establishments. Food handlers contribute 10 to 20 % of foodborne disease outbreaks.

Objective: To assess the status of food safety practice and associated factors among food handlers in selected types of food establishments of Dire Dawa, Ethiopia

Methods: Institutional based cross-sectional study design was conducted among 356 food handlers who were selected from 104 food establishments. The Source population was food handlers working in 401 food establishments. Data was analyzed using SPSS version 20.00 statistical software. The binary logistic regression model was employed and variables having p-value of < 0.05 were exported to a multi-variable logistic regression model and Variables having a p-value ≤ 0.05 were taken as significantly associated with good food handling practice.

Result: Satisfactory status of food safety practice of food handlers was 52.4%. In multivariable logistic regression analysis, educational status with AOR=0.231 and 95% CI (0.06, 0.84); food safety training with AOR=2.436 and 95% CI (1.06, 5.58) were statistically significant factors for food safety practice. In a similar manner, food safety attitude with AOR=0.37 and 95% CI (0.17, 0.79), and AOR=0.495 and 95% CI (0.26, 0.95); and selected types of food establishments practicing three compartments dishwashing system with AOR=2.567 and 95% CI (0.97, 6.77) were statistically significant factors for food safety practice.

Conclusion: Among food handlers, 47.6% did not safely handle foods. Stakeholders, Dire Dawa Health Bureau; and Cultural and Tourism Bureau, in particular, need to facilitate awareness-raising activities to prevent foodborne diseases.

Keywords: Food handlers, food safety, food hygiene, knowledge, attitude, practice

Introduction

According to World Health Organization (WHO), food safety was defined as the assurance that when food is consumed in the usual manner does not cause harm to human health and wellbeing (WHO 2002). The food consumed does not cause harm if it is safe, hygienic and free of any hazards, in the reality, however, people all over the world get sick each day related to the food, they eat. This sickness is called foodborne disease and is caused by dangerous microorganisms and/or toxic chemicals (WHO 2006).

WHO estimates that up to 30% of the global population suffer from foodborne diseases each year, among whom two million deaths are estimated in developed countries (Havelaar et al. 2013). Infected food handlers are an important source of foodborne disease because of poor food handling/safety practice (Royal College of physicians 2008). Almost 75% of foodborne illness outbreaks are assumed related to improper food handling practiced by employees in

food establishments (Practical stuff 2004). The transmission of foodborne diseases aggravated by unsafe food handling practices made by food handlers and symptoms like diarrhea or vomiting and possibly passes the disease through the food they are serving. Others can be asymptomatic and unaware of the increased risk of passing infection to others via the food they handle (Royal College of Physicians 2008). A study conducted in Jamaica identified that gender, education; job position, training and experience in food industry were associated with the practice level of food handlers (Thelwell 2014). According to a study conducted in Malaysia, a relationship was found between knowledge about food safety and practice (Rosani et al. 2014). Data regarding foodborne diseases in the African Region are still extremely scarce (WHO 2000). However, as per some studies conducted in the region, food safety practice of food handlers is not satisfactory. This has been attributed to different contributing factors. A study conducted in Nigeria indicated that 37% of restaurant managers

were directly engaged in cross-contamination practices that are potential causes of foodborne illness. Education and training on food safety were among the factors responsible for poor food preparation (Mokhtar 2013). According to a study conducted in Gondar, Ethiopia, only 30.3% of food handlers in food establishments exercise good food safety practices to prevent foodborne diseases. Socio-demographic characteristics and level of knowledge and attitude of food handlers were among the factors identified as having significant associations with food safety knowledge and practice (Gizaw et al. 2014). Another study from North West Ethiopia showed that the presence of insects and rodents had significant association with food handling (Ayehu et al. 2014). Therefore, those findings need to be further strengthened by conducting other studies in areas where not previously considered. In Dire Dawa, Ethiopia, there are no studies conducted on food safety practices and factors that show the local context regardless of some influencing factors. Those influencing factors include the existing large number of food establishments and food handlers serving large consumers as well as hot weather condition in the area. As per daily observations, the hot weather makes both cooked and non-cooked foods out of use easily unless safely handled. Therefore, the study will assess the status of food safety practices and associated factors among food handlers in selected types of food establishments.

Materials and Methods

Institutional based cross-sectional study was conducted from March 1 to 7, 2016 in Dire Dawa City Administration. Dire Dawa is located in the Eastern part of Ethiopia, around 515 km from the capital city Addis Ababa. There are 38 rural and 9 urban kebeles in the city. According to the Cultural and Tourism Bureau of Dire Dawa City Administration, there are 69 hotels, 98 restaurants, and 112 cafeterias that are registered and regulated in Dire Dawa. Simple random sampling technique was followed to select 31 cafeterias, 24 restaurants, 12 hotels, and 37 butcher shops selected for the study. The study populations were food handlers working in 104 randomly selected types of food establishments of Dire Dawa. Food handlers who were working in the selected types of food establishments were included. The required sample size (n) was determined using a single population proportion formula considering (p) of 30.3% (Gizaw et al. 2014), margin of error (d) of 5% and non-response rate of 10%, the total sample size calculated was 356. The respondents from the sampling frame of the eligible food establishments were selected by lottery method. Data were collected by face-to-face interview using pretested, standardized

questionnaire originally adopted from Thelwell (2014). The questionnaire was initially prepared in English then translated to local languages (Amharic, Oromiffa, and Somali) and translated back to the English language to keep consistency of the questionnaire. Existing food safety practice of food handlers and institutional facilities was also observed using observation checklist. Data were collected by trained data collectors who are fluent in Amharic language. Mock interviews and practical field exercise was given to data collectors to ensure the quality of the field operation. During data collection, the supervisors followed data collectors and performed quality checks with the principal investigator. Furthermore, an observational study on food safety by food handlers was conducted using an observational checklist (WHO 1989). Data were coded, cleaned, entered, and analyzed using SPSS window version 20 statistical packages for descriptive and inferential analysis. The binary logistic regression model was employed and variables having p-value of < 0.05 were exported to a multi-variable logistic regression model and Variables having a p-value ≤ 0.05 were taken as significantly associated with good food handling practice. Before data collection, ethical clearance was found from the Research Ethics Review Committee of Haramaya University College of Health and Medical Sciences. Moreover, permission was obtained from Dire Dawa Health Bureau and Cultural Tourism Bureau. All study participants were briefed about the purpose of the study and then verbal consent was obtained. Privacy and confidentiality was ensured during the process of data collection and storage.

Results

Socio-demographic Characteristics: The study was done with 100% response rate. The mean age of the respondents was 23 years (SD $\pm$ 5.17 years). Among the four types of food establishments, 33 (50.8%) participants from the hotels were females and 32(49.2%) were males. From restaurants, 56(50.9%) were males and 54(49.1%) were females. Concerned with educational background, 31 (47.7%) and 25 (38.5%) of hotels, 43 (39.1%) and 47 (42.7%) of restaurant, 43(44.3%) and 39 (40.2%) of cafeteria and 47(56%) and 19 (22.6%) of butcher shops had completed primary and secondary education respectively. In terms of income, those from the hotels were better with 52 (80%) earning more than 500 Birr. Nearly 90% of participants had work experience of less than 10 years with median work experience of one year. Moreover, 22 (33.8%) from hotels, 45(40.9%) from restaurants, 24(24.7%) from cafeterias and 13(15.5%) from butcher shops reported that they had participated in food safety training (Table 1).

Table 1: Socio-demographic characteristics of food handlers in Dire Dawa, Ethiopia, 2016

		Hotel No (%)	Food Establishment Type			Total
			Restaurants No (%)	Cafeterias No (%)	Butcher shop No (%)	No (%)
Sex	Male	32(49.2)	56(50.9)	35(36.1)	60(71.4)	183(51.4)
	Female	33(50.8)	54(49.1)	62(63.9)	24(28.6)	173(48.6)
Age	18-28	48(73.8)	71(64.5)	66(68)	60(71.4)	245(68.8)
	29-39	12(18.5)	24(21.8)	21(21.6)	19(22.6)	76(21.3)
	40-49	3(4.6)	7(6.4)	5(5.2)	4(4.8)	19(5.3)
	50+	2(3.1)	8(7.3)	5(5.2)	1(1.2)	16(4.5)
Marital status	Single	37(56.9)	66(60)	52(53.6)	52(61.9)	207(58.1)
	Married	26(40)	36(32.7)	37(38.1)	27(32.1)	126(35.4)
	Divorced	2(3.1)	6(5.5)	5(5.2)	2(2.4)	15(4.2)
	Widowed	0	1(0.9)	2(2.1)	1(1.2)	4(1.1)
	Living together	0	1(0.9)	1(1)	2(2.4)	4(1.1)
Educational status	Informal education	3(4.6)	8(7.3)	4(4.1)	9(10.7)	24(6.7)
	Primary School	31(47.7)	43(39.1)	43(44.3)	47(56)	164(46.1)
	Secondary School	25(38.5)	47(42.7)	39(40.2)	19(22.6)	130(36.5)
	College Diploma	3(4.6)	8(7.3)	6(6.2)	6(7.1)	23(6.5)
	Degree or more	3(4.6)	4(3.6)	5(5.2)	3(3.6)	15(4.2)
Income	<200 Br	0	0	1(1)	1(1.2)	2(0.6)
	200-500 Br	13(20)	38(34.5)	34(35.1)	33(39.3)	118(33.1)
	501-1000 Br	38(58.5)	48(43.6)	46(47.4)	28(33.3)	160(44.9)
	>1000 Br	14(21.5)	24(21.8)	16(16.5)	22(26.2)	76(21.3)
Work experience	<1 yr	17(26.2)	31(28.2)	34(35.1)	28(33.3)	110(30.9)
	1-10 yrs	46(70.8)	72(65.5)	55(56.7)	52(61.9)	225(63.2)
	11-20 yrs	1(1.5)	4(3.6)	6(6.2)	4(4.8)	15(4.2)
	21+yrs	1(1.5)	32.7	2(2.1)	0	6(1.7)
Food safety	Yes	22(33.8)	45(40.9)	24(24.7)	13(15.5)	104(29.2)
Training	No	43(66.2)	65(59.1)	73(75.3)	71(84.5)	252(70.8)

Table 2: Knowledge on Food Safety Practice of food handlers in Dire Dawa, Ethiopia, 2016 (n=356)

		Correct No (%)	Incorrect N (%)	Don't know N (%)
Transmission of food borne diseases				
	Fresh meat always has microbes on the surface	191(53.7)	116(32.6)	49(13.7)
	Canned foods may have harmful microbes	201(56.5)	110(30.9)	45(12.6)
	Healthy people can cause illness by carrying germs to food	145(40.7)	174(48.9)	37(10.4)
	Lettuce and other raw vegetables might have harmful microbes	284(79.8)	54(15.2)	18(5.0)
	Cooked foods do not have microbes	230(64.6)	114(32)	12(3.4)
Personal health and hygiene				
	Food can be prepared with a a bandage covered wound on the hand	117(32.9)	223(62.6)	16(4.5)
	Only wash hands with water alone after handling raw meat	40(11.2)	311(87.4)	5(1.4)
	A must to wash hands with soap and water after toilet	338(94.9)	13(3.7)	5(1.4)
	Hands should be washed if fondling body parts happen	327(91.8)	22(6.2)	7(2)
	Handle cooked foods in a gloved hand after handling raw meat	64(18)	256(71.9)	36(10.1)
	Wearing clean uniform and cap while cooking or serving	323(90.7)	20(5.6)	13(3.7)
	A must to wash hands sneezing or blowing your nose	347(97.5)	3(0.8)	6(1.7)
Contamination/cross contamination				
	Food-borne diseases from storing raw meat and cooked foods in the same refrigerator	210(59)	111(31.2)	35(9.8)
	Foods contamination with microbes by coming contact with unsafe foods	313(87.9)	32(9)	11(3.1)
	Possibility to use the same cutting board for meat and ready to eat foods	72(20.2)	273(76.7)	11(3.1)
	Cutting boards, meat slicers and knives should be sanitized after each use	327(91.9)	22(6.1)	7(2)
Temperature control				
	Foods that need to be kept hot should be at 60°C or above	144(40.4)	56(15.8)	156(43.8)
	Leftovers should be reheated to a minimum temp of 75°C	154(43.3)	75(21)	127(35.7)
	Foods should be slowly cooled at room temperature before storage in the refrigerator	265(74.4)	47(13.2)	44(12.4)
	Refrigeration kills all the bacteria that might cause food-borne illnesses	180(50.5)	132(37.1)	44(12.4)
	Frozen foods should be thawed on the counter or in the sink	231(64.9)	100(28.1)	25(7)
	After thawing, meat might be held for 5 hours at room temperature	139(39.1)	151(42.4)	66(18.5)
	Foods stored at 40° C are being held in the temperature danger zone	166(46.6)	73(20.5)	117(32.9)
Over all knowledge		Adequate		
Food safety knowledge of food handlers		80 (22.5)		
		Inadequate		
		276(77.5)		

Food Safety Knowledge of Food Handlers:

Concerning knowledge level, 80(22.5%) of food handlers had adequate knowledge and 276(77.5%) have inadequate knowledge. The mean food safety knowledge score of the respondents on foodborne diseases was 2.6 from a total of 5, personal health and hygiene was 5.9 from a total of 7, cross-contamination was 3.1 from a total of 4 and temperature control were 2.5 from a total of 7 (Table 2).

Food Safety Attitude of Food Handlers: The result of attitude assessment shows that 256(72.3%) of the respondents had a positive attitude followed by 57 (16.1%) neutral. The least number of food handlers, 41(11.6%), had a negative attitude toward food safety practice.

Status of Food Safety Practice of Food Handlers:

Food safety practice of participants with scores greater than or equal to 70% were classified as satisfactory and those with a score less than 70% as unsatisfactory status (Thelwell 2014). Accordingly, it was found that

185 (52.4%) food handlers had satisfactory food safety practices and 168 (47.6%) had unsatisfactory practice.

The study further revealed that 227(63%) food handlers reported as they always practice thawing frozen foods at room temperature and 80 (22.4%) sometimes practice. Towards temperature control, 262 (73.6%) of food handlers reported as they never use thermometer to control the temperature of the food. Moreover, 204 (57.1%) respondents reported as they never practice using gloves when serving unwrapped foods; and 153(43%) did report as they never wash hands before glove use. Furthermore, 37(10.4%) food handlers reported as they always come to work while having illnesses like diarrhea, and 46(12.9%) do so sometimes.

Concerning leftover food management, 190 (54%) food handlers reported discarding leftover food. Details of reported food safety practice, and leftover food-management are respectively presented in Table 3.

Table 3: Self-Reported Food Safety Practice of Food handlers in Dire Dawa, Ethiopia, 2016 (n=356)

Food safety/hygiene	Always N (%)	Sometimes N (%)	Never N (%)
Washing hands after touching unwrapped raw foods	285(80.1)	53(14.9)	18(5)
Washing your hands before touching cooked foods	298(83.7)	47(13.2)	11(3.1)
Use separate utensils when preparing raw and cooked foods	280(78.9)	61(17.2)	14(3.9)
Thaw frozen foods at room temperature	227(63.8)	80(22.5)	49(13.8)
Check the expiry dates of all products	287(80.6)	38(10.7)	31(8.7)
Use a thermometer to check temperature	55(15.4)	39(11)	262(73.6)
Use gloves while serving unwrapped foods	95(26.6%)	57(10)	204(57.1)
wash your hands before using gloves	170(47.8)	33(9.3)	153(43)
wash your hands after using gloves	193(54.2)	35(9.8)	128(36)
Wear uniform when serving food	287(80.6)	50(14)	19(5.3)
Come to work when ill a fever, upset stomach	37(10.4)	46(12.9)	273(76.7)
Wear a hat or head covering when serving food	237(66.6)	65(18.2)	54(15.2)
Wear jewelry when serving food	80(22.5)	72(20.2)	204(57.3)
Disinfect cutting boards after each use	323(90.7)	24(6.8)	9(2.5)
Sanitize utensils after washing them	327(92.2)	14(4)	13(4)
Over all reported practice	Satisfactory		unsatisfactory
Food safety practice of food handlers	185(52.4%)		168(47.6%)

Observations of food safety practice: The actual food safety practice of food handlers was observed in all the visited food establishments. Among 104 food handlers observed, 24(23%) had long nail, 42(40%) had

jewelers while working, 59(57%) didn't wear clean uniform and 4(3.9%) work while having skin problem. Only 53(51%) of them wear headgear and 66(63.5%) practice hand washing before food handling.

Table 4: Observed Institutional Facilities in Food Establishments of Dire Dawa, Ethiopia, 2016

Variables	Yes		No	
	No	%	No	%
Have functional piped water supply	85	81.7	19	18.3
Three Compartment dish washing system	70	67.3	34	32.7
Separate dressing rooms available	46	44.2	58	55.8
Soap or detergents available for hand washing	81	77.9	23	22.1
Food safety/hygiene guidelines availability	3	2.9	101	97.1
presence of contaminants	48	46.2	56	53.8
Supervision by owner/Manager	77	74	27	26

Institutional Facilities: A total of 104 selected types of food establishments (12 hotels, 24 restaurants, 31 cafeterias, and 37 butcher shops) were visited and 85(81.7%) had functional piped water supply for food

handlers and customers and 70(67.3%) practice three-compartment dishwashing system. While looking for separate dressing rooms for food handlers, it was absent in 58(55.8%) of the selected types of food

establishments. The majority of food establishments, 101(97.1%), don't have food safety/hygiene guidelines available for food handlers (Table 4).

Factors associated for Food Safety/Hygiene Practice: In the bivariate logistic regression analysis, variables which showed significant association to have satisfactory food safety practice were educational status, work experience, food safety training, food safety knowledge, food safety attitude, functional piped water line, practicing three-compartment dish-washing system, separate dressing room presence, and availability of food safety guideline were statistically significant. In the multivariable logistic regression, food handlers who attended primary education were 77% less likely to have satisfactory food safety

practice as compared to food handlers holding diploma or degree (AOR=0.231, 95% CI (0.06, 0.84)). Besides, food handlers who obtained food safety training were two times more likely (AOR=2.436, 95% CI (1.06, 5.58)) to have satisfactory food safety practice as compared with those without food safety training. Moreover, food handlers with neutral and negative attitude towards food safety were 63% and 51% less likely to have satisfactory food safety practice, respectively (AOR=0.37, 95% CI (0.17, 0.79) and (AOR=0.495, 95% CI (0.26, 0.95)) as compared to food handlers with positive attitude. Food handlers working in establishments where three-compartment dishwashing system functions were twice more likely to practice satisfactory food safety (AOR=2.567, 95% CI (0.97, 6.77)) (Table 5).

Table 5: Associated factors for food Safety Practice of Food Handlers in Dire Dawa, Ethiopia, 2016

Variable		Food Safety Practice		95% CI	
		Satisfactory (%)	Unsatisfactory (%)	COR	AOR
Educational status	No formal education	8(33.3)	16(66.7)	0.204(0.07,0.62)*	0.324(0.09,1.08)
	Primary education	64(39.5)	98(60.5)	0.266(0.123,0.574)*	0.327(0.14,0.75)*
	Secondary educ	86(66.7)	43(33.3)	0.815(0.369,1.797)	0.852(0.37,1.97)
	Diploma&Degree	27(71.1)	11(28.9)	1	1
	<1 yr	87(48.1)	94(51.9)	1	1
Work experience	1-5 yrs	75(59.1)	52(40.9)	1.558(0.98,2.47)*	1.279(0.76,2.14)
	6-10 yrs	14(58.3)	10(41.7)	1.513(0.64,3.58)	1.492(0.57,3.93)
	>10 yrs	9(42.9)	12(57.1)	0.81(0.32,2.02)	0.874(0.33,2.34)
Food safety training	Yes	73(70.9)	30(29.1)	2.998(1.83,4.91)*	2.436(1.06,5.58)*
	No	112(44.8)	138(55.2)	1	1
Food safety knowledge	Adequate	50(63.3)	29(36.7)	1.775(1.06,2.97)*	0.774(0.43,1.39)
	Inadequate	135(49.3)	139(50.7)	1	1
Food safety attitude	Positive	150(59.1)	104(40.9)	1	1
	Neutral	21(36.8)	36(63.2)	0.404(0.223,0.732)	0.37(0.17,0.79)*
	Negative	14(34.1)	27(65.9)	0.36(0.18,0.71)	0.495(0.26,0.95)*
Have functional piped water supply	Yes	170(55%)	139(45%)	2.365(1.22,4.59)	0.804(0.25,2.56)
	No	15(34.1%)	29(65.9%)	1	1
Practice 3 compartment dish washing system	Yes	163(57.6%)	120(42.4%)	2.964(1.69,5.17)	2.567(0.97,6.77)*
	No	22(31.4%)	48(68.6%)	1	1
of separate dressing rooms	Yes	74(59.7%)	50(40.3%)	1.573(1.01,2.45)	0.657(0.32,1.36)
	No	29(52.7%)	26(47.3%)	1	1
Availability of food safety guidelines	Yes	18(75%)	6(25%)	2.91(1.13,7.52)*	0.862(0.25,3.03)
	No	167(50.8%)	162(49.2%)	1	1

Discussion

The present study showed that satisfactory food safety practice of food handlers in Dire Dawa food establishments was (52.4%), which is consistent with studies conducted in Dangila, Ethiopia (52.5%) (Ayehu et al. 2014), and Jamaica (50%) (Thelwell 2014). On the other hand, the finding was found to be higher than the study report from Addis Ababa (47.7%) (Asrat et al. 2015), and Gondar (30.3%), (Gizaw et al. 2014), Ethiopia. Higher food safety practices in Dire Dawa could be attributed to better knowledge of food handlers on the sensitivity of foods

due to the hot weather of the city. The study further showed that 86% of food handlers always or sometimes thaw frozen foods with room temperature. The finding is similar to the study results from Jamaica where 73% of food handlers always or sometimes practiced thawing (Thelwell, 2014). In this study, 23.3% of respondents reported that they always or sometimes continue working with having illnesses like diarrhea, which is, in fact, the potential channel for transmission of foodborne diseases. This finding is almost consistent with the study findings in Malaysia (25.5%) (Sharif et al. 2013) and India (22.4%)

(Mukhopadhyay et al. 2012). However, this finding is higher than the study report in Jamaica (19.1%) (Thelwell, 2014). The possible reason for the similarities could be due to lack of awareness-raising activities on the risk of the practice on health by concerned authorities in the respective study areas. In temperature control of food, 73.4% of food handlers in this study reported as they never use thermometer which is different from the practice in Jamaica, which was 33% (Thelwell 2014), and this difference could be related to the local trend in the study area in which thermometers not available with refrigerators in the market.

In this study, 26.6% of respondents use gloves while touching/serving unwrapped foods whereas which is lower than the study done in Saudi Arabia, the practice was (88.9%)(Mokhtar, 2013). The possible reasons should be the low assessability of resources like gloves and difference in awareness when compared to Saudi Arabia. In this study, (40.6 %) food handlers did report as they always or sometimes wear jewelry while serving food, which was less than the study done in Bahir Dar, Ethiopia (53.2%) (Mulugeta and Bayeh, 2012). The difference could be related to interventions like training where 29% of food handlers attended whereas 21.8% in the referenced study.

Food handlers who attended primary education were 77% less likely to have satisfactory food safety practice compared with food handlers holding Diploma or Degree. This finding was supported by the study done in Addis Ababa University, food handlers who had a better level of formal education had a good food handling and preparation practice than those who had a lower level of formal education (Asrat et al. 2015). The reason behind may be education enables/supports/ food handlers to improve knowledge and awareness about the nature of work they are assigned. Food handlers who took food safety training were two times more likely to have satisfactory food safety practice compared with those without food safety training, this finding is consistent with study done in Gondar Town, Food handlers who received food hygiene and safety training compared with handles who didn't receive training were more 1.7 times more likely to have good food safety practice than poor or fair level (Gizaw et al.2014). The possible reasons could be the training raises their awareness and concern for foodborne diseases.

Food handlers with neutral and negative attitudes toward food safety were 63% and 51% less likely to have satisfactory food safety practice respectively compared to food handlers with a positive attitude. This finding is supported by the study done in Gondar town, Food handlers. Who has positive attitude may

have a chance to have 7 times had good practice than poor or fair (Gizaw et al. 2014). This could arise from the fact that food handlers with positive attitude try their best to handle foods safely regardless of challenges. Furthermore, food handlers working in establishments where three Compartment dishwashing system functions were twice times more likely to practice satisfactory food safety. The reason could be the availability of practical institutional facilities pave the way to practice safe food handling.

Conclusion

Food safety practice among food handlers in this study was nearly half, educational background, food safety training, food safety attitude, and practical three Compartments s dish/utensil washing system were identified. Therefore, acting accordingly on those factors could have its own contribution to food safety practice of food handlers. Authorities like (FMHACA) need to set national wide specific standards to improve the food safety practice by food establishments.

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