Food Safety Knowledge, Attitude, and Hygienic Practices of Food Handlers in Yeka Sub-city, Addis Ababa, Ethiopia: A Descriptive Cross-sectional Study

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ABSTRACT

INTRODUCTION: Foodborne diseases pose a significant global public health threat, often originating from improper food handling practices. Given the crucial role of food handlers in preventing transmission of foodborne diseases, this study assessed the food safety knowledge, attitudes, and hygiene practices related to foodborne diseases among food handlers in food service establishments in Yeka Sub-city, Addis Ababa, Ethiopia.

METHOD: A descriptive cross-sectional study was conducted among 373 randomly selected food handlers. Data collection involved observing the kitchen hygiene practices and food handling practices through an observational checklist, and administering structured/standardized questionnaires. Statistical analysis was performed using SPSS version 20, with associations examined using the linear by linear association test. Spearman's correlation assessed relationships between knowledge, attitude, and practice cut points. Pre-testing and Cronbach's alpha were used to ensure the reproducibility, and reliability of the questionnaire.

RESULTS: Majority of food handlers (50.1%) were aged less than 25 years, with 78.8% being female, and attended secondary school (46.4%). The overall knowledge (65%), positive attitude (92.2%), and hygiene practices (44%) of the food handlers toward food safety were good. Regarding the knowledge perspective, gaps existed in understanding disease transmission, notably Hepatitis A and tuberculosis. Although positive attitudes toward food safety were reported, observed practices were inconsistent, with a significant proportion admitting to working while ill. Compliance with uniform and protective gear was lacking. Marital status, Experience in food safety, and Work satisfaction has been shown to affect the knowledge, attitude, and hygiene practices of food handlers in this study.

CONCLUSION: This study highlights critical gaps in understanding disease transmission, and hygiene practices of food handlers in Yeka sub-city. Addressing these gaps will necessitate targeted interventions, including continuous education and training programs. Enhanced regulatory oversight is also needed to ensure compliance with food safety standards in public food establishments.

KEYWORDS: Food handlers, food safety, knowledge, attitude, hygiene practice, Yeka sub-city

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Introduction

Food handlers play a critical role in maintaining the food hygiene standards within food service establishments,[1-3] and the food safety knowledge, attitude, and practices of food handlers is a vital factor in averting foodborne diseases.[4] Despite their pivotal role, a significant proportion of foodborne diseases, estimated at 10% to 20%, are attributed to food contamination by the food handlers,[5-7] and this would be higher in countries with poor resource like Ethiopia.[8] This is due to the poor personal hygienic practices, inadequate cooking methods, and improper storage and handling of food and equipment that allows pathogens to contaminate food and jeopardize consumers' health.[9-11] Thus, it is imperative for food handlers to possess a thorough understanding of food safety protocols and recognize potential factors contributing to foodborne illnesses.[12]

Various factors influencing the level of food hygiene practices among food handlers have been identified across different study settings. Factors such as advanced age,[13] marital status, with divorced individuals exhibiting lower hygiene practices.[14] In addition, good knowledge of food safety, formal education, work experience, food safety training, and positive attitude, are positively associated with improved hygiene practices.[1,15,16] Generally; the insufficient food safety laws, weak regulatory frameworks, lack of financial resources for investing in safety equipment and poor food handling practices among food handlers are some of the factors exacerbating the impacts of foodborne diseases.[17-19] By understanding these factors and their implications, interventions can be tailored to enhance food safety practices among food handlers, thereby reducing the risk of foodborne illnesses and promoting public health. Therefore,

this study aimed to assess the food safety knowledge, attitudes, hygiene practices, and associated factors among food handlers in food establishments in Yeka Sub-city, Addis Ababa, Ethiopia.

Materials and Methods

Study setting

A descriptive cross-sectional study was conducted between January 01 and March 30, 2018 in Yeka sub-city, Addis Ababa, Ethiopia. The sub-city is situated in the northeast part of Addis Ababa, covering an area of 85.98 km^2 with a population density of 5682 people per square kilometer. The sub-city is comprised of 13 woredas.[20] The total population of Yeka sub-city was projected to reach 488 537 by 2022, with females comprising 262 994 of this population.

Eligibility criteria

The study population consisted of all food handlers employed at public food establishments in Yeka Sub-city. From the strata of restaurants, hotels, cafeterias, juice houses, and bakeries/pastries, 384 food handlers were randomly selected during the study period. The sample size was determined based on an estimated 50% proportion of food handlers with a certain knowledge, attitudes, and food hygiene practices, along with a 95% confidence interval. Including the 10% non-response rate, the final sample size was 422. Food handlers employed at home-based and international/star hotels were excluded from the study.

Data collection and data quality

Data collection involved administration of a structured questionnaire, and observation of kitchen hygiene and food handling practices using an observational checklist. Questionnaire consisted of two components. The first component gathered socio-demographic information, including age, sex, level of education, marital status, religion, woreda, experience in food safety, experience in food-related work, type of food service establishment, and job satisfaction. The second component focused on knowledge, attitudes, and hygiene practices related to foodborne diseases. The questions pertaining to knowledge,[33] attitude,[36] and hygiene practices[31] were adapted from sources.[21-24]

The questionnaire underwent pre-testing at Arada sub-city by involving 40 food handlers. The Cronbach's alpha coefficients for knowledge, attitude, and practice were .84, .89, and .67, respectively. These results demonstrate the questionnaire's stability and reliability. For the analysis, correct answers on knowledge, attitude, and hygiene practices questions were scored 1, incorrect and neutral responses received 0; mean scores were converted to 100, with scores below 50 deemed poor, 50 to 75 acceptable, and above 75 good.[25]

Statistical analysis

Data were analyzed using SPSS version 20 (SPSS IBM, Chicago, IL). The association between knowledge, attitude, and hygiene practice regarding food handling and socio-demographic characteristics was tested by the linear-by-linear association test. Whereas the relationship between knowledge, attitude, and practice, was tested using the spearman's correlation test. A P-value less than .05 and a 95% confidence interval were considered indicative of a significant association.

Ethical approval and consent of participants

This study was approved by the Ethical Review Committee of Kotebe University of Education (Ref. KMU 017/2018). The research concept was explained to study participants, and written informed consent was sought from the respondents. In addition, all the information obtained from each study participant was coded to maintain information confidentiality. This research was carried out in line with the Helsinki declarations.

Results

Demographic characteristics of respondents

A total of 384 respondents took part in the study; 11 were excluded due to incomplete data. Half (n = 187; 50.1%) of the respondents aged below 25 years. Over three-quarters (n = 294; 78.8%) of the respondents were females. The majority (n = 234; 62.7%) were not married. The majority of the food handlers had experience in food safety (n = 287; 76.9%), and expressed satisfaction with their work (n = 274; 73.5%) (Table 1).

KAP of food handlers

The overall knowledge (65%), attitude (92.2%), and hygiene practices (44%) of the food handlers in Yeka sub-city were good. This study indicates the gap in hygiene practices, where 15.8% to 40.2% of the food handlers exhibit poor to acceptable hygienic practices in their food service establishments (Table 2). The full analysis of food safety knowledge, attitude, and hygienic practices is presented in Supplemental 1.

The specific gaps in the knowledge, attitude, and hygienic practices of the food handlers in Yeka sub-city were summarized as follows: A knowledge gap was evident as 60.3% of food handlers were unaware that tuberculosis, and 51.7% were unaware that Hepatitis A, can be transmitted by food; additionally, approximately 66% of food handlers reported continuing to work even when suffering from foodborne illnesses (Table 3).

There were gaps in food handlers' attitudes toward food hygiene and safety, including beliefs like 70.8% thinking aprons could substitute as hand towels, over three-fourths disagreeing with refraining from touching face or hair while working, 93.3% accepting wearing jewelry while handling food, 92.8% believing raw and cooked foods need not be separated, and

Table 1. Demographic characteristics of respondents at Yeka sub-city, Addis Ababa, Ethiopia, 2018 (n = 373).

DEMOGRAPHIC CHARACTERISTICS	CATEGORY	FREQUENCY	PERCENTAGE
Age in years	<25	187	50.1
	25-39	138	37.0
	⩾40	48	12.9
Sex	Male	79	21.2
	Female	294	78.8
Marital status	Not married	234	62.7
	Married	139	37.3
Educational qualification	No formal education	24	6.4
	Primary	94	25.2
	Secondary	173	46.4
	College and above	82	22.0
Religion	Muslim	90	24.1
	Orthodox	244	65.4
	Protestant	39	10.5
Type of food service	Restaurant	47	12.6
	Cafeteria	22	5.9
	Bar and restaurant	125	33.5
	Juice house	68	18.2
	Non-star hotel	111	29.8
Years of experience in years	<1	117	31.4
	1-5	134	35.9
	6-10	63	16.9
	>10	59	15.8
Experience in food safety	Yes	287	76.9
	No	86	23.1
Satisfaction of this work	Yes	274	73.5
	No	99	26.5

Table 2. KAP of food handlers at Yeka sub-city, Addis Ababa, Ethiopia, 2018 (n = 373).

CATEGORY	KNOWLEDGE N (%)	ATTITUDE N (%)	HYGIENE PRACTICES N (%)
Good	242 (64.9)	344 (92.2)	164 (44.0)
Acceptable	128 (34.3)	25 (6.7)	150 (40.2)
Poor	3 (0.8)	4 (1.1)	59 (15.8)

about 32% disagreeing with wearing gloves when handling ready-to-eat foods (Table 3).

Regarding the hygienic practices of the food handlers in Yeka sub-city, Addis Ababa: approximately 71% wore jewelry and did not use separate kitchen utensils for preparing raw and cooked food; 64.3% continued working while suffering from foodborne illnesses; 74.3% did not wash vegetables and fruits before slicing them; 52.8% worked even when experiencing

Table 3. KAP gaps of food handlers at Yeka sub-city, Addis Ababa, Ethiopia, 2018 (n = 373).

KNOWLEDGE GAP INDICATORS QUESTIONS	TRUE N (%)	FALSE N (%)	I DON'T KNOW N (%)
Reheating cooked foods can contribute to food contamination.	234 (62.7)	108 (29.0)	31 (8.3)
Bloody diarrhea can be transmitted by food.	216 (57.9)	77 (20.6)	80 (21.4)
Tuberculosis can be transmitted by food.	88 (23.6)	225 (60.3)	60 (16.1)
Hepatitis A can be transmitted by food.	68 (18.2)	193 (51.7)	112 (30.0)
Food handlers who are suffering from food borne illnesses can continue working without informing their manager.	102 (27.3)	245 (65.7)	26 (7.0)
Attitude indicating questions	Agree N (%)	Disagree N (%)	Neutral N (%)
Apron can be used as a towel to clean hand. 1. Apron can be used as a towel to clean hand.	98 (26.3)	264 (70.8)	11 (2.9)
We should not rub our hands on face, hair, etc. while working.	86 (23.1)	281 (75.3)	6 (1.6)
Jewelry (including wedding ring) and a watch can be worn while handling food.	348 (93.3)	19 (5.1)	6 (1.6)
Raw food and cooked food should not necessarily be separated.	346 (92.8)	25 (6.7)	2 (0.5)
Food handlers should wear gloves when touching ready-to-eat food foods.	222 (59.5)	118 (31.6)	33 (8.9)
Hygiene practice indicator questions		Yes N (%)	No N (%)
Do you rub your hands on your face, hair, etc. while working?		109 (29.2)	264 (70.8)
Do you use jewelry and a watch while working?		264 (70.8)	109 (29.2)
Do you use separate kitchen utensils to prepare raw and cooked food?		108 (29.0)	265 (71.0)
Do you touch food that does not wrapped up with wounded hand?		200 (53.6)	173 (46.4)
Do you cover your mouth and nose by mask when preparing food		264 (70.8)	109 (29.2)
Do you wash your hands after touching unwrapped raw foods?		258 (69.2)	115 (30.8)
Do you wash your hands after handling money?		234 (62.7)	139 (37.3)
Do you take leave if you are suffering from food borne illness?		133 (35.7)	240 (64.3)
Do you eat, drink or chew gum when preparing food?		194 (52.0)	179 (48.0)
Do you wash vegetables and fruits before slicing them?		96 (25.7)	277 (74.3)
Do you work when you have diarrhea?		197 (52.8)	176 (47.2)
Do you work when you have cold?		338 (90.6)	35 (9.4)

diarrhea, and approximately 91% worked despite having a cold (Table 3).

Observation of food safety practice

In an assessment of 96 food service establishments, various aspects of kitchen hygiene and food handling practices were observed. The findings revealed that 95.6% of food handlers cleaned their work areas before starting their work. However, during food preparation, there were notable lapses in proper attire: 49% of food handlers did not wear appropriate uniforms, 43% did not wear proper shoes, 30.2% did not wear aprons, and 38.5% did not wear caps. Additionally, none of the food handlers in any of the observed establishments wore masks or gloves during food preparation.

Nexus of knowledge, attitude and hygiene practice

There were a significant and positive correlation between the knowledge and attitude ($r = .261$, $P < .001$), knowledge and hygiene practice ($r = .232$, $P < .001$), and attitude and hygiene practice ($r = .282$, $P < .001$). However, the overall correlation was found significant, but the effect is small (Table 4).

Table 4. Correlation between food safety knowledge attitude and hygiene practices of food handlers at Yeka sub-city, Addis Ababa, Ethiopia, 2018 (n = 373).

LEVEL	SPEARMAN'S RHO	P-VALUE
Knowledge × attitude	0.261 ≈ 0.3	.0001
Knowledge × practice	0.232	.0001
Attitude × practice	0.282 ≈ 0.3	.0001

Effect of socio-demographic variables toward KAP

Marital status, and experience in food safety were factors affecting knowledge, attitude and hygiene practices. While work satisfaction affects the knowledge, and hygiene practices of the food handlers; while the educational qualification, and years of experience were related with attitude of food handlers. In addition, educational qualification was affecting the knowledge; while years of experience was affecting the hygiene practice of food handlers at Yeka sub-city Addis Ababa ($P < .05$) (Table 5).

Discussion

This study highlights food handlers' knowledge, attitudes, and hygienic practices, as well as the effect of socio-demographic variables on their food safety practices. In the present study, there were more female food handlers than male, and this could be due to the food service establishments' cultural preference of females for the job,[26] and the traditional thought that females are responsible for and skilled in food handling and preparation.[10] Majority of the food handlers attended secondary school. In Ethiopia, there is no clear legislation about the specific schooling level for food handlers at different food and drink establishments. However, it is quite mandatory food handler be subjected to frequent training on food safety.[23]

To the current study, the overall knowledge (65%), attitude (92.2%), and hygiene practices (44%) of the food handlers were found good. There was a gap in hygiene practices; displaying the context in developing countries like Ethiopia even in capitals like Addis Ababa. Either gaps in awareness or lack of essential facilities does not make the practice as per the standard. Our study found that food handlers with good knowledge and a positive attitude toward food safety did not necessarily adhere to hygienic practices. This finding is consistent with previous studies in Bishoftu and Southern Tigray, Ethiopia.[27,28] However, it contrasts with findings from a study in Nigeria.[29]

The hygienic practices (44%) in this study were comparable with the finding at University of Gondar (46.7%),[30] Woldia (48.8%),[21] and Gondar (37.6%) town.[31] However, it was lower compared with previous findings in Southern Tigray (57.7%) Ethiopia,[28] and higher relative with Bole sub-city, Addis Ababa (27.4%).[32] In contrast to the current study; the finding in Maldives showed relatively lower knowledge (60%) and attitude (75%), but higher (83.5%) hygienic practices.[25] The discrepancy in hygienic practices can be attributed to habitual actions, heightened risk perception from personal experiences, adherence to simpler guidelines, strong social or cultural influences, or by avoiding cognitive overload by focusing on core practices.[33,34]

Studies show that insufficiently boiled milk can cause foodborne illness, and consuming food prepared by food handlers infected with Hepatitis A leads to outbreaks.[35,36] However, many food handlers in the current study were unaware that tuberculosis (60.3%) and Hepatitis A (51.7%) can be transmitted through food, and a significant number (66%) reported continuing to work while suffering from foodborne illnesses, posing a potential risk for food-related outbreaks. So the regulatory bodies should take on a more proactive role here in Yeka sub-city, Addis Ababa the capital of the country.

Though knowledge, attitude and practices of food safety is the key tool in the prevention of foodborne illness, and food related outbreaks, nearly 71% of the food handlers think aprons could substitute as hand towels, 75.3% didn't refrain from touching face or hair while working, and about 93% believed raw and cooked foods need not be separated. We believe these activities are the source of cross-contamination,[25] which possibly increases the chance of foodborne illness in the study area. There was also a positive and significant association between knowledge and attitude ($r = .3$, $P < .001$), knowledge and hygiene practice ($r = .2$, $P < .001$), and attitude and hygiene practice ($r = .3$, $P < .001$) of the food handlers toward food safety in the present study. The finding of this study agrees with earlier study in Bangladesh that found a strong positive significant association between the knowledge, attitudes and practices.[37] Therefore, we can say that food handler's knowledge will influence their attitude, though their hygienic practices.[24,25] But our observation revealed that food handler's positive attitudes toward food safety did not guarantee their actual food hygienic practices.

Socio-demographic factors such as marital status and experience in food safety were found to affect the knowledge, attitude, and hygiene practices of food handlers. Additionally, work satisfaction significantly influenced both the knowledge and hygiene practices of the handlers, while educational qualifications and years of experience were associated with their attitudes at Yeka Sub-city, Addis Ababa ($P < .05$). Besides marital status, food safety training or experience also played a key role in shaping the knowledge, attitude, and hygienic practices of the handlers. In general, marital status, work experience, and job satisfaction have a substantial impact on individuals' knowledge, attitudes, and hygiene practices, as these factors shape personal responsibilities, professional competence, and motivation to maintain health standards. Therefore, effective food safety training is expected to enhance participants' knowledge, attitudes, and practices related to food safety.[22,25,38]

Table 5. Effect of socio-demographic variables toward knowledge, attitude, and hygiene practices of food handlers at Yeka sub-city, Addis Ababa, Ethiopia, 2018 (n=373).

		KNOWLEDGE				ATTITUDE				HYGIENE PRACTICE			
		GOOD	ACCEPTABLE	POOR	*P*-VALUE	GOOD	ACCEPTABLE	POOR	*P*-VALUE	GOOD	ACCEPTABLE	POOR	*P*-VALUE
Age in years	<25	122	63	2	.41	168	15	4	.21	83	77	27	.06
	25-39	94	44	0		133	5	0		72	45	21	
	⩾40	26	21	1		43	5	0		9	28	11	
Sex	Male	54	25	0	.44	71	8	0	.69	31	40	8	.93
	Female	188	103	3		273	17	4		133	110	51	
Marital status	Not married	142	89	3	.02	208	22	4	.002	95	96	43	.045
	Married	100	39	0		136	3	0		69	54	16	
Educational qualification	No formal education	10	11	3	.01	22	0	2	.63	5	16	3	.83
	Primary	46	48	0		85	9	0		42	45	7	
	Secondary	126	47	0		162	11	0		78	60	35	
	College and above	60	22	0		75	5	2		39	29	14	
Years of experience	<1	76	39	2	.34	105	10	2	.14	61	47	9	.011
	1-5	84	50	0		122	10	2		55	45	34	
	6-10	37	26	0		63	0	0		35	24	4	
	>10	45	13	1		54	5	0		13	34	12	
Experience in food safety	Yes	207	80	0	.01	270	17	0	.002	142	109	36	.001
	No	35	48	3		74	8	4		22	41	23	
Work satisfaction	Yes	187	85	2	.033	257	13	4	.27	141	90	43	.001
	No	55	43	1		87	12	0		23	60	16	

Conclusion and Recommendation

Despite the relatively good knowledge and highly positive attitudes toward food safety, more than half of food handlers exhibited poor to acceptable hygienic practices. This could be an insight of the challenges in translating knowledge and attitudes into proper hygienic behavior. Key issues identified include a lack of awareness about the transmission of diseases like tuberculosis and Hepatitis A through food, high rates of food handlers working while ill, and common misconceptions about hygiene practices. Socio-demographic factors such as marital status, education, and work satisfaction significantly influence knowledge, attitudes, and practices.

To improve food safety standards in Yeka sub-city, it is essential to implement regular and comprehensive training programs tailored to address gaps in knowledge and practice, focusing on hygiene and disease prevention.

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Author Contributions

MM conceptualize the study, material preparation, data collection and analysis, DJB validation, data curation and supervision of all the investigation process, TK & WMA reviewed and edited the manuscript, AG data analysis, data curation, formal analysis and wrote the main manuscript,WM validation, data curation, methodology and supervision. All the authors read and approved the final manuscript.

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Data Availability

The data used for analysis in the current study are available from the corresponding author and will be shared upon reasonable request

Supplemental Material

Supplemental material for this article is available online.

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