

“From Preparation to Consumption.” Food Safety Practices among Public Food Handler’s in Enugu Metropolis

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Abstract

Background

Increased demand for public prepared food with numerous food handlers creates uncertainties in the quality of safe foods and possible food contamination. This study aimed to ascertain the food safety hygiene practices and associated factors among public food handlers in Enugu Metropolis, Nigeria.

Methodology

This was a cross-sectional study conducted among 400 public food handlers in Enugu Metropolis, Nigeria. Samples were selected using multistage sampling technique. Data was collected using pretested structured questionnaire and analyzed using proportion, mean and multiple regression. Statistical significance was set at < 0.05 .

Results

The mean age of respondents were 31.16 ± 8.242 years. About two – thirds, 66.5% of respondents were found to have good knowledge of food hygiene safety practices. The overall food safety hygiene practice mean score was 80.10 ± 10.25 with 70.5% showing good practice. Environmental safety hygiene had good practice of 35.0% and mean score of 24.17 ± 2.29 . The factors which statistically significantly predicted overall food safety practices, $F(11, 388) = 42.957, P < 0.0001, R^2 = 0.536$ were educational level ($\beta = 0.148, C.I = 0.860 - 3.082$), knowledge level ($\beta = 8.594, C.I = 5.635 - 8.979$) and safety trainings ($\beta = 0.517, C.I = 4.102 - 5.474$).

Conclusion

There was good knowledge of food safety hygiene practices with high mean scores except on environmental safety hygiene practices component. Safety training, knowledge level and educational level were the predictors of good practices. Frequent trainings are most needed to prevent or control food contamination and consequent food borne diseases.

Keywords: Food Safety, Food Contamination, Food Handling, Nigeria.

1. Introduction

Food safety is the state of certainty that food will not cause harm either from “farm to table” or from “preparation to consumption” [1]. Food safety practice is a public health measure to prevent and control food – borne illnesses caused by bacteria, viruses, parasites and chemicals through contamination of food or water. The practices involve keeping oneself and surfaces clean, separate raw and cook foods, cook food thoroughly, store at safe temperature and use of safe water and raw materials. It has become a public health priority due to urbanization and globalization with increased

demand for public prepared food, variety of food, complex and longer global food chain [2-4]. The safety practices comprise of personal hygiene practices such as personal cleanliness, safe handling of food, use of personal protective equipment; environmental hygiene practices such as general cleanliness and upkeep of premises, appropriate layout, adequate lightening, ventilation, pest and waste management and Quality control practices such as Hazard Analysis and Critical Control Points (HACCP), labelling, traceability, staff training [5]. The sum total of all the above practices constitute the Food safety system which

is the management system, establishment must have in place if they sell food [6]. It is most applicable in the well developed and established food and beverage production industries, large scale and multi – outlets food companies that ensures no weak link in the “farm to table” or “preparation to consumption” concept of food supply is allowed. However, because of the complexities of the quality control HACCP, small scale retail food outlets and street food vendors are limited to food hygiene without standardized quality control measures.

The “farm to table” concept best summarizes food supply chain management (FSCM) that once food is harvested or produced, should be stored, distributed, retailed and consumed [7]. The complexity to maintain food safety has allowed some companies and food outlets to enter the supply chain at some points mostly from market (retail) to consumption, hence the concept “preparation to consumption” as seen among domestic and public food handlers (away from home food consumption) [8]. Food preparation involves activities like purchasing, washing, trimming, peeling, grinding, blanching, boiling, cooking, roasting, frying etc. [9]. With increasing population, globalization and urbanization, there is consequent increase in public food consumption (the away – from – home food consumption) from sources like fast food, cafeterias and restaurants. The food preparation is done either in indoor kitchen or outdoor kitchen premises where the environmental hygiene practices could be a concern for contaminations [10]. Studies in Nigeria found a mix of poor and good knowledge of food safety hygiene practices with poor regulatory system in the food supply chain among domestic and / or public food handlers [11-13]. However, these findings were mainly on personal hygiene practices without much known of environmental hygiene practices, hence, undermining the weight of the safety hygiene practices for adequate safety control measures.

Unsafe contaminated food causes food borne illness of more than 200 diseases ranging from diarrhea to cancer. An estimated 600 million (1 in 10) and 420,000 people worldwide respectively fall ill and die from unsafe food annually resulting in loss of 33 million healthy life years. Children under 5 years contribute 40% of food borne diseases with 125,000 deaths each year [2]. About 10 to 20% of unsafe contaminated food by handlers results in outbreaks of which food poisoning and diarrheal diseases are the commonest. Diarrheal diseases from unsafe contaminated food causes 550 million illness and 230,000 deaths annually [2,14]. Estimated \$110 Billion is lost annually in productivity and medical expenses from unsafe food globally [2]. In Nigeria, 200,000 people die annually from unsafe food with \$3.6 Billion associated with cost of food borne illness [11,15].

Ensuring adequate food safety control measures among public food handlers, both the personal and environmental food safety hygiene practices must be encouraged. Looking into these practices strengthen the degree of confidence among food handlers and owners that food will not cause harm. It will further fill in the gap on knowledge of the environmental hygiene practiced by

food vendors. This study will help create awareness among food regulatory agency and policy makers on the degree of food safety hygiene practiced and help designed a standardized protocol for food hygiene training and practice for food handlers and vendors. This study aimed to ascertain the food safety hygiene practices and associated factors among public food handlers in Enugu Metropolis, Nigeria.

2. Methodology

2.1. Study Area

The study was conducted in Enugu Metropolis, the capital of Enugu State, Nigeria. The metropolis is constituted by three Local Government Areas which are Enugu North, Enugu South and Enugu East and is inhabited primarily by the Igbo ethnic group [16]. According to the 2016 estimated population, Enugu Metropolis had a total population of 820,000 representing 22.2% of the Enugu State population (4,411,100) with projected growth of 2.58% [17,18]. The metropolis is an administrative, educational and commercial city where the main occupation are civil service and trade with small scale business ranging from artisans to public services. Among the small scale business is food supply business either as stationed or mobile food outlets. This help to feed the teaming population of the city growth and help working people manage the time demand of their job.

2.2. Study Design

The study design is a cross – sectional descriptive study.

2.3. Study Population

This comprised of all public food handlers or vendors in Enugu metropolis who have been in the services of food supply for 6 months or more will be selected while those who are less than 6 months in food supply services, are seriously ill or absent from work will not be selected.

2.4. Sample Size Determination

The minimum sample size was calculated using a sample size determination for a single proportion [19]. The proportion of good food safety practices among food handlers in Owerri, Imo State, Nigeria was 37% and the margin of error was set at 5% [20]. The calculated minimum sample was 393.8 after adjusting for non – response rate. This was approximated to 400 food handlers / vendors to be studied.

2.5. Sample Size Selection

The total sample frame of public food vendors (hotels, hospital and school cafeterias, restaurants, food kiosks, road side food sellers and food hawkers) in Enugu metropolis were gotten from the trade unions and local governments. A proportionate sampling followed by simple random sampling was used to select the required samples size for the study.

2.6. Data Collection

A structured questionnaire pretested in the local government not selected was used. The questionnaire was adapted from the

literature. (References 1 – 5). It contains the socio – demographic, knowledge and practice sections. The data was collected using the aid of research assistance who were trained on the objectives and ethics of the study. They were trained for two days, 2 hours per day.

2.7. Data Analysis

Data were manually clean, entered and analyzed using IBM Statistical Produce and Service Solution (SPSS) version 25. The Knowledge questions has two responses, the right response was Yes while the wrong response was No. the right is coded as 1 while the wrong responses as 0. The total score is 14, those with score of 50% and above was noted as good knowledge while those with less than 50% was were noted as poor knowledge. The practice questions have responses in a Likert scale of never, rarely, sometime, often and always and were coded respectively as 1, 2, 3, 4 and 5. There were a total of 23 questions with total score of 115. Scores were summarized using mean and standard deviation. Those with scores above 60% were regarded as having good practice while those with scores of 60% and less as poor practice. Categorical variables were summarized using frequency table and proportions. Determinants of good practice were analyzed using multiple regression analysis.

2.8. Ethical Clearance

This was obtained from the Health Research Ethics Committee of University of Nigeria Teaching Hospital, Ituku / Ozalla, Enugu State, Nigeria. Informed consent was obtained from the food handlers.

3. Results

The mean age of respondents were 31.16 ± 8.242 years with age ranging from 18 to 60 years. More than half, 59.3% of respondents were females and about 41.5% had secondary education as the highest educational level. Majority, 64.5% of the respondents

were fully employed and more than one – fifth, 84.5% had stayed between one to ten years in their job.

About two – thirds, 66.5% of respondents were found to have good knowledge of food hygiene safety practices. More than three – quarter, 79.5 and 79% respectively noted that food equipment should be washed before or immediately after use, and hands frequently washed with soap and water. While less than one – third, 29.0 noted that contaminated food stuffs cannot be detected using sense organs.

The overall food safety hygiene practice mean score among public food handlers was 80.10 ± 10.25 with 70.5% showing good practice. Among the subscales, public food handlers practicing workplace safety hygiene had good practice of 66.5% and mean score of 28.52 ± 3.73 , personal safety hygiene had good practice of 62.5% and mean score of 27.40 ± 5.70 and environmental safety hygiene had good practice of 35.0% and mean scores of 24.17 ± 2.29 .

The factors which statistically significantly predicted overall food safety practices, $F(11, 388) = 42.957, P < 0.0001, R^2 = 0.536$ were educational level ($\beta = 0.148, C.I = 0.860 – 3.082$), knowledge level ($\beta = 8.594, C.I = 5.635 – 8.979$) and safety trainings ($\beta = 0.517, C.I = 4.102 – 5.474$). For the subscales, environmental safety health practices $F(11, 388) = 8.973, P < 0.0001, R^2 = 0.203$ was safety trainings ($\beta = 0.397, C.I = 0.619 – 1.027$), for personal hygiene safety practices, $F(11, 388) = 37.935, P < 0.0001, R^2 = 0.518$ were knowledge level ($\beta = 0.322, C.I = 2.922 – 4.844$) and safety trainings ($\beta = 0.534, C.I = 2.356 – 3.145$), for workplace safety health practices, $F(11, 388) = 45.919, P < 0.0001, R^2 = 0.360$ were educational level ($\beta = 0.256, C.I = 0.849 – 1.644$), knowledge level ($\beta = 0.424, C.I = 2.747 – 3.942$) and safety trainings ($\beta = 0.360, C.I = 0.969 – 1.459$).

Variables	Frequency	Percent
Age (years)		
16 – 25	103	25.8
26 – 35	195	48.8
36 - 45	75	18.8
46 – 55	24	6.0
56 – 65	3	0.8
Mean	31.16	
Standard deviation	8.242	
Sex		
Male	163	40.8
Female	237	59.3
Ethnicity		
Igbo	295	73.8
Hausa	39	9.8
Yoruba	66	16.5

Religion		
Christianity	325	81.3
Islam	62	15.5
Traditional	13	3.3
Marital status		
Single	188	47.0
Married	166	41.5
Divorced / separated	28	7.0
Widowed	18	4.5
Educational level		
Primary / none	110	27.5
Secondary	164	41.0
Tertiary	126	31.5
Employment type		
Full	258	64.5
Part time	142	35.5
Employment position		
Manager	102	25.5
Chef	153	38.3
Waiter / waitress	145	36.3
Job experience (years)		
1 – 10	338	84.5
11 – 20	51	12.8
21 – 30	9	2.3
31 – 40	2	0.5

Table 1: Socio – demographic and Occupational characteristics of respondents

Variables	Frequency	Percent
Uncooked meat should be stored in lower part of refrigerator	253	63.3
Chilled foods is best stored at refrigerating temperature (5°C or below	185	46.3
Frozen foods is best stored at freezing temperature	202	50.5
Temperature of 5°C or below slows or stop microbes from growing.	213	53.3
Maximum duration for chilled and refrigerated food is 3 – 4 days.	167	41.8
Microbes are killed at boiling or internal cooking temperature (70°C and above)	309	77.3
Temperature at which microbes grows rapidly is danger zone or risk zone (5°C - 60°C)	316	79.0
Contacts between cooked and uncooked foods causes cross – contamination.	265	66.3
Contamination of food stuffs cannot be detected using sense organs (Eyes, nose and tongue).	116	29.0
Wearing gloves, masks and headscarf will reduced contamination of food	309	77.3
Washing hand frequently with soap and water prevents food contamination.	316	79.0
Food equipment should be washed before use or immediately after use.	318	79.5
Contact surface cleaning should be done frequently	278	69.5
Commonest food borne disease is diarrhea.	207	51.8
Knowledge level		
Poor knowledge	135	33.8
Good knowledge	265	66.3

Table 2: Knowledge of Food safety practices among respondents

Variables	Never	Rarely	Sometimes	Often	Always
Food safety training	58 (14.5)	113 (28.3)	154 (38.5)	40 (10.0)	35 (8.8)
Environmental safety hygiene practices					
Open kitchen	44 (11.0)	113 (28.3)	138 (34.5)	81 (20.3)	24 (6.0)
Closed kitchen	48 (12.0)	69 (17.3)	134 (33.5)	123 (30.8)	26 (6.5)
Shelf	36 (9.0)	102 (25.5)	98 (24.5)	130 (32.5)	34 (8.5)
No shelf	60 (15.0)	113 (28.3)	100 (25.0)	107 (26.8)	20 (5.0)
Improved water	25 (6.3)	19 (4.8)	228 (57.0)	88 (22.0)	40 (10.0)
Unimproved water	67 (16.8)	77 (19.3)	214 (53.5)	28 (7.0)	14 (3.5)
Do you use same cutting board for raw meat, poultry and vegetables	9 (2.3)	57 (14.3)	210 (52.5)	85 (21.3)	39 (9.8)
Do you disinfect countertops?	8 (2.0)	2 (0.5)	253 (63.3)	97 (24.3)	40 (10.0)
Workplace safety hygiene practices					
Keeping cooked and raw food separately	11 (2.8)	11 (2.8)	118 (29.5)	160 (40.0)	100 (25.0)
Covering all cooked food	8 (2.0)	4 (1.0)	214 (53.5)	129 (32.3)	45 (11.3)
Do you thaw or defrost meat / food from morning to be used in the evening	7 (1.8)	40 (10.0)	168 (42.0)	94 (23.0)	91 (22.8)
Do you leave cooked food in the counter to be used the next day?	16 (4.0)	105 (26.3)	93 (23.3)	66 (16.6)	120 (30.0)
Do you refrigerate uncooked or left over food?	6 (1.5)	6 (1.5)	228 (57.0)	125 (31.3)	35 (8.8)
Do you make sure that foods are blocked or frozen at the right temperature for storage?	7 (1.8)	1 (0.3)	140 (35.0)	180 (45.0)	72 (18.0)
Do you use refrigerated foods after 3 – 4 days?	12 (3.0)	5 (1.3)	104 (26.0)	96 (24.0)	183 (45.8)
Do you make sure that food are fully cooked at the right temperature?	6 (1.5)	0 (0.0)	97 (24.3)	159 (39.8)	138 (34.5)
Do you check for manufacturing and expiry date of packed food?	89 (22.3)	31 (7.8)	123 (30.8)	105 (26.3)	52 (13.0)
Personal safety hygiene practices					
Do you wash hands with soap and water before handling cooked foods?	6 (1.5)	4 (1.0)	148 (37.0)	205 (51.0)	37 (9.3)
Do you wash your hands with soap and water before handling raw meat, poultry and sea foods?	6 (1.5)	4 (1.0)	219 (54.8)	120 (30.0)	51 (12.8)
Do you wash your hands after toilet	5 (1.3)	2 (0.5)	94 (23.5)	165 (41.3)	134 (33.5)
Do you wash your hands after handling money	62 (15.5)	108 (27.0)	89 (22.3)	95 (23.8)	46 (11.5)
Do you wash your hands after handling dirty things	5 (1.3)	3 (0.8)	244 (61.0)	104 (26.0)	44 (11.0)
Do you use gloves, apron and head tie during food preparation	58 (14.5)	66 (16.5)	127 (31.8)	108 (27.0)	41 (10.3)
Do you go for medical checkup?	57 (14.3)	44 (11.0)	137 (34.3)	107 (26.8)	55 (13.8)
Do you isolate from workplace when ill?	8 (2.0)	4 (1.0)	160 (40.0)	167 (41.8)	61 (15.3)

Table 3: Food hygiene practices

Variables (cronbach alpha)	Practice scores			Poor practice		Good practice	
	Mean	Standard deviation	Min - max	Frequency	Percent	Frequency	Percent
Overall Food safety hygiene practice (0.799)	80.10	10.25	37 – 103	118	29.5	282	70.5
Environmental safety hygiene practices (0.613)	24.17	2.29	8 – 30	260	65.0	140	35.0
Personal safety hygiene practices (0.877)	27.40	5.70	8 – 40	150	37.5	250	62.5
Workplace safety hygiene practices (0.414)	28.52	3.73	20 – 39	134	33.5	266	66.5

*good practice are scores above 60% (those who often and always practices food safety hygiene)

Table 4: Food safety hygiene practices among public food handlers in Enugu Metropolis

Variables	B	Std. Error	β	T – test	P – value	Lower C.I	Upper C.I
Overall food safety hygiene practices							
Constant	47.375	3.631		13.048	<0.0001	40.237	54.514
Age	0.059	0.071	0.047	0.828	0.408	-0.080	0.198
Sex	-0.912	0.733	-0.044	-1.245	0.214	-2.353	0.529
Ethnicity	0.364	0.553	0.027	0.660	0.510	-0.722	1.451
Religion	-0.214	0.869	-0.010	-0.246	0.806	-1.922	1.495
Marital status	0.231	0.636	0.018	0.363	0.717	-1.020	1.481
Educational level	1.971	0.565	0.148	3.487	0.001*	0.860	3.082
Employment type	1.227	0.908	0.058	1.351	0.178	-0.559	3.013
Employment position	0.097	0.662	0.007	0.146	0.884	-1.205	1.398
Job experience	0.106	0.090	0.058	1.180	0.239	-0.071	0.283
Knowledge level	7.307	0.850	0.338	8.594	<0.0001*	5.635	8.979
Safety training	4.788	0.349	0.517	13.722	<0.0001*	4.102	5.474
R = 741 R ² = 0.536 F(11, 388) = 42.957, P < 0.0001							
Environmental safety hygiene practices							
Constant	19.664	1.080		18.199	<0.0001	17.539	21.788
Age	-0.036	0.021	-0.128	-1.696	0.091	-0.077	0.006
Sex	0.166	0.218	0.036	0.760	0.448	-0.263	0.595
Ethnicity	0.296	0.164	0.098	1.803	0.072	-0.027	0.620
Religion	0.020	0.259	0.004	0.076	0.940	-0.489	0.528
Marital status	0.294	0.189	0.101	1.552	0.121	-0.078	0.666
Educational level	0.322	0.168	0.108	1.912	0.057	-0.009	0.652
Employment type	0.428	0.270	0.090	1.582	0.114	-0.104	0.959
Employment position	0.248	0.197	0.084	1.260	0.208	-0.139	0.635
Job experience	0.043	0.027	0.105	1.600	0.110	-0.010	0.096
Knowledge level	0.080	0.253	0.016	0.315	0.753	-0.418	0.577
Safety training	0.823	0.104	0.397	7.928	<0.0001*	0.619	1.027
R = 450 R ² = 0.203 F(11, 388) = 8.973, P < 0.0001							

Table 5a. Determinants of Overall Food and Environmental Safety Hygiene Practices and Among Public Food Vendors in Enugu Metropolis.

Variables	B	Std. Error	β	T – test	P – value	Lower C.I	Upper C.I
Personal hygiene safety hygiene practices							
Constant	11.588	2.087		5.551	<0.0001	7.484	15.692
Age	0.052	0.041	0.076	1.287	0.199	-0.028	0.132
Sex	-0.791	0.421	-0.068	-1.877	0.061	-1.619	0.037
Ethnicity	0.379	0.318	0.050	1.194	0.233	-0.245	1.004
Religion	-0.210	0.500	-0.018	-0.419	0.675	-1.192	0.773
Marital status	-0.086	0.366	-0.012	-0.235	0.814	-0.805	0.633
Educational level	0.403	0.325	0.054	1.239	0.216	-0.236	1.042
Employment type	0.852	0.522	0.072	1.631	0.104	-0.175	1.878
Employment position	-0.388	0.380	-0.053	-1.019	0.309	-1.136	0.360
Job experience	0.037	0.052	0.037	0.718	0.473	-0.065	0.139
Knowledge level	3.883	0.489	0.322	7.943	<0.0001*	2.922	4.844
Safety training	2.750	0.201	0.534	13.711	<0.0001*	2.356	3.145
R = 720 R² = 0.518 F(11, 388) = 37.935, P < 0.0001							
Workplace safety hygiene practices							
Constant	16.124	1.298		12.419	<0.0001	13.571	18.676
Age	0.042	0.025	0.093	1.658	0.098	-0.008	0.092
Sex	-0.287	0.262	-0.038	-1.095	0.274	-0.802	0.228
Ethnicity	-0.311	0.198	-0.063	-1.575	0.116	-0.700	0.077
Religion	-0.024	0.311	-0.003	-0.076	0.939	-0.635	0.587
Marital status	0.023	0.227	0.005	0.100	0.920	-0.424	0.470
Educational level	1.246	0.202	0.256	6.167	<0.0001*	0.849	1.644
Employment type	-0.053	0.325	-0.007	-0.162	0.872	-0.691	0.586
Employment position	0.236	0.237	0.049	0.998	0.319	-0.229	0.702
Job experience	0.026	0.032	0.040	0.815	0.416	-0.037	0.090
Knowledge level	3.344	0.304	0.424	10.999	<0.0001*	2.747	3.942
Safety training	1.214	0.125	0.360	9.730	<0.0001*	0.969	1.459
R = 752 R² = 0.566 F(11, 388) = 45.919, P < 0.0001							

Table 5b. Determinants of Personal Hygiene and Workplace Safety Health Practices and Among Public Food Vendors in Enugu Metropolis

4. Discussion

The complexities in carrying out quality control food hygiene has limited small scale public food handlers and vendors to personal and environmental hygiene practices. This study seeks to maximize the impact of these available practices and ensure food safety to the teeming population at all times. The study found about two – third of the respondents have good knowledge of food safety practices. Most of these were driven by knowledge on best food preparation and cooking practices otherwise knowledge on storage of cooked foods in refrigerator were poor. These findings agreed with studies in Nigeria, South Africa, Ethiopia and Brazil [14, 20-23]. These could be due to the increased awareness and health education campaigns on hand hygiene, personal cleanliness and environmental sanitation globally including infection, prevention and control in health and health related activities.

Consequently, the study found higher mean scores on the overall and subscales food safety hygiene practices. With about two – thirds of the practices on the overall food safety hygiene, personal safety hygiene and workplace safety hygiene subscales found to be good practices, however, about one – third of the practices in the environmental subscale were good. The poor practices found in the environmental subscale or component will continue to be a source of contamination in the food processes chain, hence, leading to unsafe food and consequent food borne diseases. It further shows that the weight of a component of the food safety hygiene practices may not be enough to tilt the scores to the left but practically could constitute to unsafe food. These findings disagreed with studies in Nigeria, Northwest Ethiopia but agreed with study in Brazil with very high proportion of good safety practices [14, 20, 22, 23]. Despite the difference and or similarity, the current findings methodologically, was different from previous

studies as the contributions of the component subscales were taken into consideration. Also, the responses were graded, that showed the weight of the safety practices. The public health importance of the findings is that safety practices scores of above 60% means practices that are “often and always” done to which minimizes the risk of food contamination, otherwise scores below such will maximize the risk of food contamination as safety practices are “sometimes, rarely and never” done. Hence, environmental safety hygiene practices are potential risk for contamination in the study population. More public health intervention measures through food safety trainings should be enforced targeting more of environmental practices, as this was “sometimes, rarely and never” done in this study.

The study further found that safety training, knowledge level and educational level were the predictors of good practices in the overall and subscales food safety hygiene practices. Safety training was the commonest predictor of food safety hygiene practices as it was consistent in both the overall scale and the subscales. This was found to agree with study in Ethiopia [24]. This is because with frequent trainings on food safety hygiene practices, there will be improved awareness and knowledge of the various safety practices including the degree of such practices. Hence, the need for frequent safety training in food safety management system from government to individual levels.

5. Conclusion

The study found that there is good knowledge of food safety hygiene practices, high mean scores in both the overall and subscales with good safety hygiene practices except on environmental safety hygiene practices component. Safety training, knowledge level and educational level were the predictors of good practices in the overall and subscales food safety hygiene practices.

6. Recommendation

Frequent trainings done often or always are needed as public health measures to maintain the level of food safety hygiene practices that will prevent or control food contamination and consequent food borne diseases.

Limitations: The study is limited to one site and therefore the results are not generalizable

Conflict of Interest: The authors declare that they have no conflicts of Interest.

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