



Food Hygiene Practices among Food Handlers in Government Tertiary Institutions in Enugu State

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Abstract

This study investigated food hygiene practices among food handlers in government tertiary institutions in Enugu State. Five research questions and one hypothesis guided the study. A cross-sectional survey research design was adopted. All 571 (male, 135, female, 436) food handlers in government tertiary institutions in Enugu State were used for the study. A self-developed structured questionnaire titled: Food Hygiene Practices Questionnaire (FHPQ) was used as an instrument for data collection. The instrument had an overall reliability coefficient of $r=0.95$. Mean and standard deviation were used to answer the research questions while t -test statistic was used to test the research hypothesis at 0.05 level of significance. Results showed that food handlers in government tertiary institutions in Enugu State had very good hand washing and personal practices but had good environmental sanitation and culinary hygiene practices. Female had very good food hygiene practices ($\bar{X} = 3.25 \pm 0.20$) while male had bad hygiene practice ($\bar{X} = 2.22 \pm 0.41$). Furthermore, there was a significant difference in the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State based on gender ($p < 0.05$). Based on the findings, the study recommended among others that educational programmes targeted to change the practice of food handlers need to be offered by health educators especially to male ones and to transform the high practices of food hygiene practices of the food handlers in the study areas into concrete actions to maximize or to sustain this practices.

Keywords: Food, Hygiene, Food hygiene, Practices, Food Handlers, Tertiary Institutions

Introduction

Food hygiene practice is a very important aspect of public health because many diseases have been transmitted to humans through unsafe food. World Health Organization (2010) stated that about 2-4 million food handlers who cook and serve food globally for either private or public use in the restaurants, fast food shop, hotels, food manufacturing industries, brewery plant setting carried it out under highly unsanitary conditions and in poor hygienic practices. These exposed workers to the risks of infections. World Health Organization (2014) reported that more than 2 million deaths occur every year in developing countries due to poor food hygiene practices. In Africa, over 91 million people are affected by foodborne illness and 36 million people are possibly affected every year in Nigeria (Odeyemi & Bamidele, 2016).

Food hygiene practices are measure food handlers frequently engage in to promote, protect and preserve food meant for human consumption (World Health Organization, 2010). It can be referred to as the many practices needed to safeguard the quality of food from production to consumption (Alkon & Cole, 2011). Food hygiene prevents customers from suffering food poisoning, and allergic reactions, help minimize food waste and boost efficiency, improve the health condition of the consumers and this is depending on the hygienic practices of food handlers (Kestebrihan, 2016).

Food handlers are those people that handle food meant either for private use or public use. Such people include restaurants operators, food vendors, fast food producers, hotel operators and food manufacturing industries, brewery plant (Pilling, 2008). Concerning this study, food handlers are those people that cook and serve food in the tertiary institutions. A tertiary institution is defined as a setting that provides education beyond the secondary levels, especially education at colleges of education, polytechnics, monotechnics and university level (Brick & Jean, 2016). To make food consumed free from contamination, World Health Organization (WHO) (2010) suggested food hygiene practices for food preparation, cooking, serving and management such as hand washing, personal hygiene, environmental sanitation and culinary food hygiene practices.

Handwashing involves the mechanical removal of microorganisms/chemical from contaminated hand surfaces using soap or detergent (Kestebrihan, 2016). Handwashing involves washing of hands with soap and warm water for at least 20 seconds before and after handling food, after a bath, toilet, or handling pets (Haiyenlee, 2012). A study conducted by Wah, Rohana, Hishamodin, Abd and Foong (2005) among food handlers in Malaysia

revealed that food handlers had high hand washing practices. Md, Mohd, Kamaluddin, and Zainab (2012) study equally submitted that street food vendors in Northern Kuching City, Sarawak Malaysia had very good hand washing practices. However, Fraser (2017) found that Michigan child care provider had low hand washing practices. Bamidele, Odebimpe, Odadele, and Adeoye (2015) study found that food handlers in Orolu Community in Nigeria had a low level of good practices.

Personal hygiene is another aspect of food hygiene practice in the food industry and it involves food handlers' shower daily, wear a clean uniform and apron, and when entering the kitchen and whenever they touch the face, hand, pocket, dirty towels, take out the garbage, eat, drink, use the restroom, remove apron and Chef's jacket (Donald, 2016). In Makerere University in Uganda Sylvia, RoseAnna, and John (2015) found that food handlers had very good personal hygiene practices. Ennie (2014) equally found that food handlers in restaurants in Kabwe urban district had very good personal hygiene practices.

Environmental sanitation practice is a package of measures that eliminate factors that encourage the proliferation of flies, rodents and the spread of disease such as provision of safe water, toilets, waste management and health education programmes (Rabiu, Alhassan, Ejere, & Evan, 2012). Marcia (2014) identified that food handlers in Jamaica practice very good level of sanitation practices. A study conducted by Breuda (2017) found that food handlers in San Juan, Puerto Rico had a very good level of environmental sanitation practices.

Culinary hygiene practices pertain to the practices related to food management and cooking to prevent food contamination, food poisoning and minimize the transmission of disease to other foods, humans or animals (Curtis, 2003). Culinary hygiene practices specify safe ways to handle, store, prepare, serve and eat food like cleaning and disinfection of food-preparation area and equipment. Ilija, Nada, Eleni, Ada, Lam, Prini, and Rita (2014) study among European Cities food handlers reported very good culinary practices.

Gender has been suggested as one of the demographic variables that may determine food hygiene practices among food handlers (Campos, 2012). Hannan (2001) found that male and female differ in food hygiene practices that women are likely to practice high food hygiene because culturally they are responsible for domestic activities while domain for men was to engage in other work activities that are not domestics. Fraser (2017) found a significant difference in the level of food hygiene practices based on gender. A significant difference was also reported by Tolulope, Zuwaira, Danjuma and Zaman (2015) among food vendors in primary schools in Jos, Plateau State. However, Egar et al. (2007) indicated no significant difference in the level of food hygiene practices among male and female food handlers in the commercial sector of a university in the UK.

A study showed that the characteristics in the demographic variable of being male and female of the food handlers might directly relate to the level of food hygiene practices and they are integral to the improvement of food hygiene practices (Barrabeig, 2010). Havelaar (2013) estimated that in developed countries, up to 30% of the population of tertiary institution communities suffer from foodborne diseases each year. Such diseases include diarrhoea, campylobacteriosis, cryptosporidiosis, Escherichia, giardiasis, salmonellosis fish poisoning whereas in developing countries up to million deaths are estimated per year. National Institutes of Health (2011) noted that some institutional workers have suffered from food poisoning causes symptoms such as nausea, vomiting, cramps, health complains and diarrhoea as a result of bad food hygiene practices among food handlers in an institutional setting. Beatty (2013) submitted that food hygiene practices among food handlers in Nigeria tertiary institutions are directly related to the number of foodborne diseases outbreaks like diarrhoea, cholera, abdominal cramps, nausea, fever, joint/ backaches and fatigue. In Enugu, Ojide (2017) reported foodborne diseases outbreaks like diarrhoea, vomiting and cholera which resulted to many deaths and more spreading of the diseases in the community, and some workers in the institutions were hospitalized, absent in the office during the periods and lost their lives. Against this background, the researchers, therefore, investigated food hygiene practices among food handlers in government tertiary institutions in Enugu State.

Purpose of the Study

The purpose of this study was to investigate food hygiene practices among food handlers in government tertiary institutions of Enugu State. Specifically, the study sought to determine level of:

1. handwashing practices among food handlers in government tertiary institutions in Enugu State;
2. personal hygiene practices among food handlers in government tertiary institutions in Enugu State;
3. environmental sanitation practices among food handlers in government tertiary institutions in Enugu State;
4. culinary hygiene practices among food handlers in government tertiary institutions in Enugu State;
5. level of food hygiene practices among food handlers in a government tertiary institution in Enugu State based on gender.



Research Questions

The following research questions guided the study:

1. What is the level of handwashing practice among food handlers in government tertiary institution in Enugu State?
2. What is the level of personal hygiene practices among food handlers in government tertiary institutions in Enugu State?
3. What is the level of environmental sanitation practices among food handlers in government tertiary institutions in Enugu State?
4. What is the level of culinary hygiene practices among food handlers in government tertiary institutions in Enugu State?
5. What is the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State by gender?

Hypothesis

1. There is no significant difference in the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State based on gender ($p < .05$).

Methods

This study employed a cross-sectional survey research design. The study was conducted in Enugu State using food handlers in government tertiary institutions. The population of this study comprised of 571 registered food handlers (male, 135, female, 436) in government tertiary institutions in Enugu State. Thus: University of Nigeria, Nsukka (UNN) has a total number 213 food handlers (male, 34, female, 179), Enugu State University of Science and Technology (ESUT) has 152 (male 41, female 111), Institute of Management and Technology (IMT) has 132 food handlers (male, 35, female, 97), Federal College of Education Eha-Mufu (FCEE) 34 food handlers (Male, 9, female, 25), Enugu State College of Education (ESCE) has 21 food handlers (male, 8, female, 13) and Enugu State College of Agriculture (ESCA) 19 food handlers (Male, 8, female, 11) (Association of Drinks and Food Operators of Nigeria, 2016). The entire population was used in this study since the number of subjects that constitute the population is of manageable size.

The instrument for data collection was a self-structured questionnaire titled: Food Hygiene Practices Questionnaire (FHPQ). The instrument consisted of 45 items meant to elicit information on food hygiene practices. The questionnaire contains five sections, A to E. Section A contain 1 item on demographic variables of the respondents, B contained 9 items (1-9) meant to elicit information on handwashing practices, C contained 15 items (10-24) which elicited information on personal hygiene practices, D contained 9 items (25-33) meant to elicit information on environmental sanitation practices and E contained 11 (34-44) meant to elicit information on culinary practices. The respondents were required to indicate on a four-point scale of Always (4), Often (3), Seldom (2), and Never (1), in each of the items.

Face validity of the instrument was established through the judgment of five experts from the Department of Human Kinetics and Health Education and Science Education Department of Ebonyi State University. To determine the reliability of the instrument, the Food Hygiene Practices Questionnaire (FHPQ) was administered on 30 food handlers at Ebonyi State University. The internal consistency of the instrument was computed using Cronbach alpha procedure and overall reliability coefficient was 0.95 was obtained. The internal consistency of each subscale was equally computed separately to determine the reliability in which handwashing practices had a reliability coefficient of 0.76, personal hygiene practices 0.88, environmental sanitation practices 0.71 and culinary practices 0.85 which is higher than a coefficient of 0.60 for a good instrument (Ogbazi & Okpala, 1994).

Four research assistants were used in administering and collection of the questionnaire. To gain access to the respondents by the researchers and their research assistants, a letter of introduction attached in the questionnaire was presented to the different managers of each restaurants in each University used in the study. Subsequently, the manager of each food handler restaurants introduced the researchers and their research assistants to the respondents and thereafter, the researchers and their research assistants administered the questionnaire to the respondents in their respective restaurants in each day of visits. The respondents were requested to complete the questionnaire and return same to the research assistants immediately.

The returned copies of the questionnaire were cross-checked for completeness of responses. Out of 571 copies of the questionnaire distributed 570 were retrieved and this yield 99% return rate. Mean and standard deviation were used to answer all the research questions. The criterion mean of 3.1-4.0 was adjudged very good practice, 2.50-

2.99 is good practice and <2.50 bad practice. The t-test statistic was used to test the hypothesis at 0.05 alpha level of significance.

Results

Table 1: Mean Scores and Standard Deviation of Level of Hand Washing Practices among Food Handlers in Government Tertiary Institutions in Enugu State

S/N	Items	\bar{x}	SD	Decision
1	Wash hands thoroughly before preparing a meal	3.53	0.33	Very good
2	Wash hands after touching uncooked food	2.82	0.02	Good
3	Wash hands with soap and warm water for at least 20 seconds before and after handling food.	2.95	0.03	Good
4	Rinse hands well with clean running water	3.13	0.03	Very good
5	Dry hands in the air or use a clean towel after washing hands to avoid recontamination on a dirty towel	3.27	0.03	Very good
6	Avoid touching things after washing hand till hands are dry	3.12	0.03	Very good
7	Wash hands when entering the kitchen	2.85	0.03	Good
8	Wash hands whenever the face is touched	2.70	0.4	Good
9	Wash hands after removing the apron	2.89	0.03	Good
	Grand mean	3.03	0.02	Very good

Table 1 showed that respondents responses on items 1, 4, 5, and 6 indicated very good practices while 2,3,7 and 8 had good practices. Similarly, the mean score on overall handwashing practices $\bar{x} = 3.01 \pm 0.02$, was very good practices, suggesting a very good level of handwashing practice among food handlers in government tertiary institutions in Enugu State.

Table 2: Mean Scores and Standard Deviation on Level of Personal Hygiene Practices among Food Handlers in Government Tertiary Institutions in Enugu State

	Items	\bar{x}	SD	Decision
10	Shower before cooking food	3.44	0.03	Very good
11	Wear a clean apron	3.28	0.03	Very good
12	Remove apron when going on break or to the restroom	2.87	0.03	Good
13	Wear gloves when there is a cut on the hand	3.01	0.04	Very good
14	Change after any possibility Y of contamination	3.12	0.03	Very good
15	Change gloves when there is a small rip or tear in it	2.93	0.03	Good
16	Wear a hat or hair net before cooking	3.11	0.04	Very good
17	Do not spit in the garbage can	3.10	0.04	Very good
18	Use plastic spoons to taste food and then throw them away	3.06	0.03	Very good
19	Do not lick fingers while cooking	2.99	0.04	Good
20	Keep fingernails trim	2.85	0.04	Good
21	Avoid cooking food with wound hands	2.85	0.03	Good
22	Use tissue when sneeze	2.81	0.03	Good
23	Avoid bare hand contact with ready to eat food	2.79	0.04	Good
24	Use tissue when coughing	2.91	0.04	Good
	Grand mean	3.01	0.02	Very good

Table 2 showed that the respondent in items 10, 11, 12, 13, 16, 17 and 18 obtained mean scores obtained indicated very good hygiene practices while other items had good practices. The grand mean of $\bar{x} = 3.01 \pm 0.02$ showed that food handlers in government tertiary institutions in Enugu State had a very good level of personal hygiene practice.

Table 3: Mean Scores and Standard Deviation on Level of Environmental Sanitation Hygiene Practices among Food Handlers in Government Tertiary Institutions in Enugu State

	Items	\bar{x}	SD	Decision
25	Provision of facilities for the sanitary disposal of waste	3.56	0.03	Very good
26	Disposals of heaps of refuse like garbage in and around the kitchen	3.21	0.03	Very good
27	Have enough ventilation in the cooking place and serving place.	2.97	0.03	Good
28	Cleaning and disinfection of food preparation areas before and after cooking	2.64	0.04	Good
29	Separating raw food from cooked one	2.97	0.04	Good
30	Provision of safe water	2.72	0.03	Good
31	Properly dispose unclean food	2.82	0.03	Good
32	Clean or sanitize food contact surfaces every 4 hours when in continuous use	2.61	0.03	Good
33	Change gloves between handling raw and cooked products	3.06	0.04	Very Good
	Grand mean	2.95	0.02	Good

Table 3 showed that the mean scores for items 25 and 26 and 33 had a mean score of very good hygiene practices while 27, 28, 29, 30 and 32 were good practices with grand mean of $\bar{x}=2.95\pm 0.02$ which implies that food handlers in government tertiary institutions in Enugu State had a good level of environmental sanitation practice.

Table 4: Mean and Standard Deviation of Culinary Practices among Food Handlers in Government Tertiary Institution in Enugu State

	Items	\bar{x}	SD	Decision
34	Reheat heat at 165 ^{of}	3.33	0.04	Very good
35	Cook foods to the appropriate temperature to kill pathogens	3.14	0.03	Very good
36	Cook food for finishing later	3.05	0.04	Very good
37	Keep food out of the danger zone at 40-140 ^{0c}	2.92	0.04	Good
38	Use keeping hot food hot-at or about 140 ^{0c}	2.94	0.04	Good
39	Use clean cutting board	2.92	0.03	Good
40	Wash knife and sanitize it after use	3.21	0.05	Very good
41	Use separate kitchen utensils to prepare raw and cooked food	2.90	0.04	Good
42	Reheat that leftover food at 76.6 ^{0c}	2.93	0.04	Good
43	Use the same cutting board to cut raw meat or poultry and to clop vegetable	2.90	0.03	Good
44	Wash knife used to cut raw meat or poultry without water before using it to clop vegetable	3.17	0.04	Very Good
	Grand mean	2.95	0.02	Good

Table 4 showed that items 34, 35, 36, 40 and 44 obtained mean scores of very good practices while 37,38, 41, 42,23, 43 and grand mean obtained a mean score of good practice. This means that food handlers in government tertiary institutions in Enugu State had good culinary hygiene practices.

Table 5: Mean and Standard Deviation on the Level of Food Hygiene Practices among Food Handlers in Government Tertiary Institution in Enugu State by Gender

Variables	Gender	N	\bar{x}	SD	Decision
HWP	Male	135	2.30	0.49	Bad
	Female	434	3.26	0.34	Very good
PHP	Male	135	2.24	0.46	Bad
	Female	434	3.25	0.27	Very good
EHP	Male	135	2.18	0.43	Bad
	Female	434	3.19	0.39	Very good
CHP	Male	135	2.18	0.47	Bad

FHP	Female	434	3.30	0.39	Very good
	Male	135	2.22	0.41	Bad
	Female	434	3.25	0.20	Very good

HWP= Hand Washing Practices; PHP = Personal Hygiene Practices; EHP= Environmental Hygiene Practices; CHP= Culinary Hygiene Practices; FHP=Food Hygiene Practices

Table 5 showed male and female mean scores for each of the four dimensions of food hygiene practices, namely hand washing, personal, environmental sanitation and culinary practices. On each of these dimension male had $\bar{X}=2.30 \pm 0.49$ on HWP, $\bar{X} = 2.24 \pm 0.46$ on PHP, $\bar{X} = 2.18 \pm 0.43$ on EHP and $\bar{X} = 2.18 \pm 0.47$ on CHP which indicated bad hygiene practice.

On HWP, female had $\bar{X} = 3.26 \pm 0.34$, PHP $\bar{X} = 3.25 \pm 0.27$, EHP $\bar{X} = 3.19 \pm 0.39$ and CHP $\bar{X} = 3.30 \pm 0.39$ which showed very good food hygiene practices. However, in overall food hygiene practices male had bad food hygiene practices with $\bar{X} = 2.22 \pm 0.41$ while the female had very good practice with $\bar{X} = 3.25 \pm 0.20$. This implies that male food handlers in government tertiary institutions in Enugu State had bad food hygiene practice while the female had very good.

Table 6: Mean and Summary of t-test Analysis of Level of Food Hygiene Practices among Food Handlers in Government Tertiary Institution in Enugu State by Gender

Variables	Gender	N	\bar{X}	SD	t-cal	df	p-value	Decision
Food hygiene Practices	Male	135	2.22	0.41	38.43	567	0.00*	Significant
	Female	434	3.25	0.20				

*Significant P<0.05

Table 6 showed that male food handlers in Enugu State had bad food hygiene practice ($\bar{X} = 2.22 \pm 0.41$) while the female had very good food hygiene practice ($\bar{X} = 3.25 \pm 0.20$). Summary of t-test on the level of food hygiene practices showed that there was a significant difference in the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State based on gender. This is evident from the t-value which was 38.431 and p-value of 0.000 which was less than 0.05 level of significance. However, the hypothesis was rejected. Thus, males had bad food hygiene practices while females had very good hygiene practices.

Discussion

Results in Table 1 indicated that food handlers in government tertiary institution in Enugu State had very good hand washing practices. This finding was expected since experts in the institutions might usually organize seminar, workshop and conferences for food handlers in order to bring them abreast with global best practices and current trend in food handling business. These findings agreed with the study carried out by Wah, Rohana, Hishamodin, Abd, and Foong (2005) among Malaysia food handlers which indicated that food handlers in Malaysia had high hand washing practices. However, Fraser (2017) who found that Michigan child care provider had low handwashing practices disagreed with this finding. The reason could be attributed to the different setting of the study.

In Table 2, the respondents indicated very good personal hygiene practices. This result was expected because, in tertiary institutions, the workers are interested in the personal hygiene of the food handlers and do not patronize anyone that is not neat. Hence, food handlers in the environment are up and doing to ensure that the workers patronize them. This result is in agreement with Sylvia, RoseAnna, and John (2015) found that Makerere University in Uganda food handlers had very good personal hygiene practices.

Result in Table 3 indicated that food handler in government tertiary institutions in Enugu State had good environmental sanitation practices. This finding is surprised one because it is expecting that the respondents should have very good environmental sanitation practices since they had earlier indicated a very good hand and personal hygiene practices. This implies that very good hand and personal hygiene practice does not translate to environment hygiene practices. This finding disagreed with the findings of other researchers. For instance, Marcia (2014) identified that food handlers in Jamaica practice very good level of sanitation practices.

Result in Table 4 indicated that the respondents had good culinary practices. This finding disagreed with Ilija, Nada, Eleni, Ada, Lam, Prini, and Rita (2014) which found that food handlers in European Cities very good



culinary practices. Result in Table 5 showed that female food handlers in Government tertiary institutions in Enugu State that had very good food hygiene practices while males had bad food hygiene practices. This finding was expected since traditionally, women do most of the activities related to food preparation and therefore, must have developed skill related to proper food hygiene more than the male folks. This finding agrees with the finding of some other researchers such as Hannan (2001) which found that male and female differ in food hygiene practices that women are likely to practice high food hygiene because culturally they are responsible for domestic activities while domain for men was to engage in other work activities that are not domestics. This finding is in line with the study by Cecilia, Alexander, Santo, and Caterian (2007) among food handlers of two hospitals in Sicily and Italy which indicated that female had very good food hygiene practices than male.

Result in the Table further showed that there was a significant difference in the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State based on gender. The finding is supported by Fraser (2017) who found a significant difference in the level of food hygiene practices based on gender. The significant difference found by Tolulope, Zuwaira, Danjuma, and Zaman (2015) among food vendors in primary schools in Jos, Plateau State agreed with the finding in this study. However, Egar, Raats, Grubb, Eves, Dean, and Adams (2007) which indicated no significant difference in the level of food hygiene practices among male and female food handlers in the commercial sector of a university in the UK disagreed with the finding in this study.

Conclusion

Based on the findings of this study, it was concluded that food handlers in tertiary institutions in Enugu State had very good food hygiene practices while males had a bad practice. Hence, there was a significant difference in the level of food hygiene practices among food handlers in government tertiary institutions in Enugu State based on gender.

Recommendations

Based on the findings from this study, the following recommendations are proffered:

1. Enugu State government should employ health inspectors to carry out inspections and sensitization programmes on food hygiene practices, especially with the males.
2. Periodic food safety training sessions and supervision should be organized by government tertiary institutions management health team to equip food handlers with the necessary knowledge and skills in food handling practices to sustain the good practice in the institutions using health educators.

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