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Assessment of Knowledge and Practices of Food Hygiene and Safety of Caterers in Senior High Schools in Ghana: A Case Study of Two Senior High Schools in Koforidua

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Abstract

Food handlers have a major role in ensuring safe food in both the commercial and welfare sectors of the catering industry, and that is to guarantee that meals served in institutional catering are hygienic for student's consumption. The study assessed the knowledge and practice of food safety and hygiene among catering staff of two different Senior High Schools (SHS) in Koforidua in the Eastern Region of Ghana. A total of forty (40) caterers were selected from two (2) SHS using purposive sampling technique. The study was descriptive and the main instruments used were questionnaires. Responses were analyzed using SPSS. The results indicated that caterers' practices of personal hygiene such as hand washing before cooking and regular bathing were both high (95%). Again, their safe food production practices such as maintaining clean working area and wearing of protective clothing were high (95%) , however, most of

them (42.5% ; 70%) agreed that they kept ready – to – eat food at 20°C and thaw food at room temperature. The translation of this assertion into practice is critical factors which could lead to the production and service of unsafe food to the students.

Keywords: *Institutional Catering, Knowledge, Unsafe practices, Food Handlers*

INTRODUCTION

Analyses of food-borne disease notifications throughout the world have shown that the majority of outbreaks result from practice during food preparation in small food businesses, canteens, residential homes, and other places where food is prepared for human consumption (Seaman & Eves, 2006). Mishandling of food contributes significantly to the occurrence of food borne illness and may be implicated in 97% of all of food-borne illness in catering establishments (Egan et al., 2007; Ehiri, Morris, & McEwen, 1997). Hygiene practices among food handlers, mostly food vendors and catering services have been reported to be below standard (Addo, Mensah, Bonsu, & Akyeh, 2007; Afoakwa, 2005; Feglo & Sakyi, 2012; Tomlins et al., 2002). In Ghana, research covering the hospitality industry has been around hotels, restaurants and street food vendors mostly in the capital city, Accra (Ackah et al., 2011; Addo et al., 2007; Donkor, Kayang, Quay, & Akyeh, 2009).

Restaurants and individual food vendors were identified sources of food borne diseases. Schools stand out from the data to be another suspected source of food hygiene problems among institutional catering services. Report by (FDA, 2013) indicated that, schools constitute a percentage of the food establishments which are responsible for 77% of all traceable food borne diseases in the country.

There have been a number of reported cases of rejection of meals by students, food contamination, and in some cases hospitalization of dozen pupils as a result of food poisoning from meals served by caterers in Senior High School (SHS). (Daily Guide, 2007; Ghana Health

Services, 2007; Joy News, 2008; Anon, 2010; Der et al., 2010; Ctifm online 2013). Most studies conducted in Ghana over the past decade concerning various aspects of poor hygiene knowledge and attitudes are related to caterers of street food vending, however, the safety and quality of meals from institutional catering units in the country have not been reported (Ababio & Lovatt, 2015). When students consume contaminated food, they are likely to contract food borne illness and can lead to absenteeism and poor academic performance. It is against this backdrop that this study was undertaken to explore the hygienic knowledge and practices of caterers in senior high schools and how this knowledge influences their hygiene practices and safe food production of food served to students. Specifically, the research objectives of this study were to:

1. Profile catering staff in senior high schools;
2. Determine the knowledge of safe food production among caterers in senior high schools;
3. Examine catering staff practices of personal hygiene;
4. Examine catering staff practices of safe food production.

This study reveals the knowledge that caterers in the senior high schools have concerning safe food production. The study consequently provides a general idea of knowledge and the practice of personal hygiene and safe food production among catering staff of senior high schools in Ghana and specifically in Koforidua. This will help institution heads, to understand the possible causes of food-borne disease incidents in their institutions. It will also give hospitality educators idea on where training and development deficits may be. They will therefore be able to develop programs, seminars and other developmental projects to increase knowledge and practices of the best food hygiene and safety in order to reduce the occurrences of food-borne illness and diseases.

METHODOLOGY

A structured questionnaire, which can be found in the Appendix, was specially designed to meet the objective of assessing the knowledge and practices of food safety and hygiene of the

caterers in SHS. The data was collected from the catering department with the help of two research assistance who were given orientation on the final draft of the questionnaire from May 3rd to 4th 2016. The questionnaire was a modified version of studies conducted by Angelillo, Viggiani, Greco, and Rito (2001); Walker et al. (2003); Çakiro_glu and Uçar (2008); Tokuç et al. (2009); Sanlier (2009); and Giritlioglu, (2011). It comprises generally of four (4) sections. The first section, looked at the socio-demographic profiles of the caterers with four (4) questions. The second section, determined the level of their knowledge on food safety and this comprised of eleven (11) questions. Options in this section to choose from were “true”, “false” or “I do not know”. Section three (3) included nine (9) questions which determined the caterers’ practices relating to safe food production. The caterers were asked to respond to 9 items, using the terms “agree”, have no idea” or do not agree”. The final part, assessed the caterers’ practice of personal hygiene, eleven (11) items were rated using a 5-point likert scale, ranging from “always (1)” to “never (5)”. The sample chosen in this study includes domestic bursars, matrons, cooks and pantry men who were staff of the School canteens in Pope John and Oyoko Methodist Senior High Schools in Koforidua, the Eastern Region of Ghana. All the questionnaire sent to these two SHS, were retrieved. This represents a high response rate of 100 percent.

RESULTS AND DISCUSSIONS

Findings were analyzed under four sections: (1) socio- demographic profile of caterers (2) caterers knowledge about safe food production; (3) caterers practices of safe food production; and, (4) caterers practices of personal hygiene.

Table 1: Socio demographic profile of caterers

Gender	Frequency (f)	Percentage (%)
<i>Male</i>	9	22.5
<i>Female</i>	31	77.5
Total	40	100.0
Age		
<i>Below 25 years</i>	10	25.0
<i>25 years- 34 years</i>	19	47.5
<i>35 years-44 years</i>	8	20.0
<i>45years - 60 years</i>	3	7.5
Total	40	100.0
Education		
<i>Primary education</i>	1	2.5
<i>Secondary education</i>	23	57.5
<i>Tertiary education</i>	16	40.0
Total	40	100.0
Years of Service		
<i>One to three years</i>	24	60.0
<i>Four to six years</i>	10	25.0
<i>Eight to ten years</i>	1	2.5
<i>More than ten years</i>	5	12.5
Total	40	100.0

Socio demographic profile of caterers

As shown in Table 1, more than half (77.5%) of the catering staff were female and 22.5% were male. Nearly half (47.5%) of the catering staff were between 25 - 34 years old. A quarter of the staff were below 25 years with about 20% of them within age 35 and 44. Only a few (7.5%) of the staff were quite close to retiring. As for the level of education, more than half (57.5%) of the catering staff have attained secondary level education. About 40% of the staff had a tertiary level education, an indication that almost all the catering staff used for the study has an appreciable level of education. This finding is contrary to a study by (Ababio, Adi, & Commey, 2012; Ackah et al., 2011; Tomlins, Johnson, Aseidu, Myhara, & Greenhalgh, 2002) in which the

level of education (formal) among food handlers in Ghana were all low and was considered to have direct negative effect on good hygiene practices.

Table 2: Caterers knowledge about safe food production

	<i>Answers given by catering staff</i>					
	<i>True</i>		<i>False</i>		<i>I Don't Know</i>	
	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>
<i>Ignoring food hygiene rules causes foodborne illness</i>	26	65.0	14	35.0	-	-
<i>Improper heating of food causes food borne illness</i>	23	57.5	16	40.0	1	2.5
<i>*Ready-to-eat-food are kept at temp. of 20°C</i>	17	42.5	11	27.5	12	30.0
<i>Germes stop multiplying at approx. at 90°C</i>	13	32.5	15	37.5	12	30.0
<i>*Only sick people carry bacteria</i>	10	25.0	27	67.5	3	7.5
<i>*Germes stop multiplying at human temp. 37°C</i>	12	30.0	19	47.5	9	22.5
<i>*Frozen meat is defrost at room temperature</i>	28	70.0	11	27.5	1	2.5
<i>Refreezing defrost food can cause food borne illness</i>	12	30.0	20	50.0	8	20.0
<i>Raw & cooked food together causes food borne illness</i>	15	37.5	24	60.0	1	2.5
<i>*Meat and fish can be cut on the same board</i>	19	47.5	21	52.5	-	-
<i>*Meat and vegetables can be cut on the same board</i>	16	40.0	22	55.0	2	5.0
<i>Salmonella is a kind of bacteria</i>	25	62.5	6	15.0	9	22.5
<i>Food should be served within two hours of prepa'tion.</i>	29	72.5	4	10.0	7	17.5
<i>Food handlers should be screened every year</i>	32	80.0	1	2.5	7	17.5

* *Questions to which answers were expected to be in the Negative (False).*

Findings on caterers' knowledge of safe food production

Frequency and percentage levels of the catering staff knowledge of safe food production are presented in Table 2. As this table shows, more than half of the catering staff (65.0%) agreed that ignoring the rules of food hygiene during food production causes food-borne disease. These findings are similar to a study conducted in hospitals by Tokuc et al., in 2009 and Giritlioglu et al in 2010. In their study staff working in the food and beverage departments of hospitals and cookery students studying in Turkey respectively, had ample knowledge as those in this study. Another finding pertains to the conservation of hot ready-to-eat food. As mentioned in some studies (Omemu & Aderoju, 2008; Angelillo et al., 2001; Walker et al., 2003), the ideal temperature for keeping hot ready-to-eat food needs to be approximately 60°C. This result

showed that most (42.5%) of the catering staff had incorrect knowledge of the correct temperature for conservation. This finding is contrary to a study in the United Kingdom by Walker et al. (2003), which indicated that less than half of food handlers knew the correct temperature of food conservation. Another study carried out by Jevsnick et al. (2008) in Slovenia showed that about 56.9% of respondents had correct information on conserving food. Thirty seven point five percent of the caterers knew that bacteria stop multiply at 90°C. While more than quarter of them (32.5%) had incorrect knowledge about the temperature at which bacteria multiply, 30% had no idea about it. Also, with respect to the item “only sick people carry bacteria, a quarter of the caterers failed to identify the statement as incorrect, however, 67% of them knew this subject. In regard to the statement that “germs stop the multiplying process at human temperature,” 47.5% correctly identified this as false, while 30% gave the wrong answer. Walker et al. (2003) also found out in their study that most (76%) of food and beverage staff knew that bacteria continue to multiply at human temperature. Foods should never be defrosted at room temperature, on the counter or in hot water as bacteria multiply rapidly between 40° F and 140°F (46°C). There are three safe ways to defrost food: in the refrigerator (approximately a full day to thaw), in cold water (approximately an hour by changing the water every 30 min), and in the microwave (Food Safety and Inspection Service, <http://www.fsis.usda.gov>), yet, most of the catering staff (70%) were unaware that frozen meat should not be defrosted at room temperature. On the other hand, majority (60%) of the catering staff were unaware that raw and cooked food should be kept separately. This practice is ideal as Egan et al., (2007) posit that keeping them together is the most prevalent cause of food poisoning. The study revealed that more than half of the catering staff (52.5%; 55%) respectively, knew that it is unsafe to cut meat and fish and also meat and vegetables to be cut on the same cutting board. Unfortunately, close to half (47.5%; 45%) of the catering staff are unaware that using the same cutting board for different food can be hazardous. Salmonella is one of the most notable and deadliest food-borne pathogens in the United states of America and theworld <https://www.foodsafety.gov/poisoning/causes/bacteriaviruses/salmonella/index.html>), (<http://scribol.com/science/biology/7-deadliest-bacteria-on-earth/>), (Tietjen & Fung, 1995), In this

study, more than half (62.5%) of the catering staff were aware that salmonella is a kind of bacterium which causes food poisoning. This result is similar to the findings of Ehiri et al., (1997). They indicated in their study that most of the people who took part in food hygiene education in Scotland knew about the salmonella bacterium. Some (22.5%) of the catering staff however had no idea. Seventy- two point five percent of the catering staff knew that food must be served within two (2) hours of its preparation. Again, majority (80%) of the catering staff are aware that food handlers should be medically screened every year. The District Water and Food Hygiene unit of the Environmental Health Department in Ghana is responsible for the health monitoring and certification of food vendors and is subject to renewal on a yearly basis (Ababio and Lovatt, 2015).

Table 3. Caterers practices of personal hygiene

Hygiene practices	<i>Always</i>		<i>Often</i>		<i>Sometimes</i>		<i>Hardly</i>		<i>Never</i>	
	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>
<i>Washing hands before cooking</i>	37	92.5	-	-	3	7.5	-	-	-	-
<i>Washing hands after visiting toilet</i>	33	82.5	4	10	3	7.5	-	-	-	-
<i>Washing hands after coughing & sneezing</i>	26	65.	4	10	7	17.5	2	5.0	1	2.5
<i>Washing and changing of uniforms</i>	35	87.5	1	2.5	2	5.0	1	2.5	1	2.5
<i>Washing and changing of apron</i>	33	82.5	2	5.0	2	5.0	1	2.5	-	-
<i>Washing and changing of hair net</i>	33	82.5	2	5.0	2	5.0	1	2.5	2	5.0
<i>Wearing (using) of hand gloves</i>	29	72.5	7	17.5	3	7.5	1	2.5	-	-
<i>Keeping finger nails short</i>	25	62.5	6	15	8	20	-	-	1	2.5
<i>Keeping hair tidy and covered</i>	28	70	9	22.5	1	2.5	2	5.0	-	-
<i>Visiting the Dentist</i>	24	60	1	2.5	2	5.0	6	15	7	17.5
<i>Regular bathing (2X daily)</i>	38	95	2	5.0	-	-	-	-	-	-

Findings on caterers practices of personal hygiene

Personal hygiene practice is inevitable in ensuring food is produced safely. The results from questions pertaining to personal hygiene presented in this study indicated that most of the catering staff (92.5%) indicated that they always washed their hands before cooking. The hand is the main part of the body which transfers microorganisms from various parts of the body into food (FAO, 1995), so it is important that it is washed before handling food. Again, majority of the staff (82.5%) washed their hands after using the toilet, which is extremely important to safe food production. This is similar to (Martins and Com, 2006; Tokuç et al. (2009) study, where 93.2% of the food staff washed their hands after using the toilet. Proper hand washing after using the toilet has the tendency to prevent food-borne diseases like typhoid (WHO, 2003). Eighty- Seven point five percent of the caterers also indicated that they always wash and changed their uniform after food preparation. Majority of the catering staff (82.5%) also said that they always wash and changed their aprons. This can help to prevent contaminants in their clothes from transferring into the food they cook. A greater number of the catering staff (82.5%) of the catering staff always washed and changed their hair net; this is very commendable as it will prevent hair and dandruff from dropping into the food thereby contaminating it. The study also showed that most of the catering staff (72.5%) wore hand gloves during food preparation. This can prevent the contamination of food prepared (Foskett et al., 2003). On the issue of finger nails short, Sixty Two point five percent of the caterers responded always while 20% answered sometimes. This is similar to the results of some previous studies in Kenya. (Muinde and Kuria, 2005; Muoki et al., 2008), where, most respondents, 56.1% had clean fingernails and 43.9% had dirty fingernails. Dirty fingernails can transfer bacteria into food to cause contamination (Foskett et al., 2003). Adequate bathing will prevent the transfer of germs onto clothes and then onto food and in addition give them a pleasant smell (Foskett et al., 2003). In this study, almost all of the catering staff (95%) stated that they bath twice daily. Importantly, most (60%) of the catering staff also visits the dentist always, however, a few (17.5%) had never visited the dentist.

Table 4. Caterers practices of safe food production

	<i>Answers given by catering staff</i>					
	<i>Agree</i>		<i>No idea</i>		<i>Do not agree</i>	
	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>	<i>(f)</i>	<i>(%)</i>
<i>I pay attention to hygiene because of its important to the sector</i>	36	90	3	7.5	1	2.5
<i>I care to use fresh raw materials in food preparation</i>	36	90	2	5.0	2	5.0
<i>I don't handle food when I have cuts</i>	27	67.5	5	12.5	8	20
<i>I wear protective clothing to prevent food borne illness</i>	38	95	1	2.5	1	2.5
<i>I always keep my working area clean</i>	38	95	-	-	2	5.0
<i>I use different clothing in different areas</i>	29	72.5	9	22.5	2	5.0
<i>I don't touch raw foods without wearing gloves</i>	30	75	10	25	-	-
<i>I don't wear jewellery when cooking</i>	36	90	2	5.0	2	5.0
<i>I don't cook when I have diarrhea</i>	37	92.5	2	5.0	1	2.5

Caterers practices of safe food production.

As presented in table 4.4 majority (90%) of the catering staff showed high level of attention to personal hygiene. This assertion is similar to a study conducted in Turkey by Giritlioglu et al., (2010) where 97.6 % of cookery student revealed that they pay attention to hygiene because of its importance to the catering industry. Additionally most of the catering staff (90%) uses fresh produce in food production. A substantial number of the catering staff (67.5%) of the catering staff agreed that handling food with injuries may be a potential cause of food-borne illnesses. Though most of the catering staff showed high level of awareness to the risk in cooking with cuts, the result is comparably lower to results of Giritlioglu et al.,2010, (86%); Tokuc et al.,2009, (93.2%) and Angelillo et at., 2001, (99%). Wearing protective clothing is one of the most important measures to ensure prevention of contamination. Majority of the staff (95%) wore protective clothing during food production. Giritlioglu et al., (2010), Çakirogu and Uçar (2008)

also found similar results in their study where 97.6 % and 82.9% of staff wore protective clothing respectively in order to prevent contamination. A clean environment discourages food pests such as flies from coming into food premises (Foskett et al., 2003). A greater proportion of the catering staff (95%) ensured that their working area are kept clean during food production. The results is consistent with Chukuezi, (2010) and Giritlioglu et al., (2010), where most food vendors and cookery students in Nigeria and Turkey prepared food in clean environment. Also most of the staff (72.5%) agreed they avoided using the same clothes both within and outside the food production area. A considerable number of the staff (22.5%) however used their clothes in and outside the food production area. A considerable number of them stated that they wear protective clothes before handling raw food. This finding is similar to Giritlioglu et al., (2010) where cookery students stated that they did not touch raw food with their bare hands. Furthermore a lot (90%) of the staff indicated that they did not wear jewellery when preparing food. Similarly, Giritlioglu et al., (2010), and Walker et al., (2003) in their study showed that food handlers took off their jewellery before preparing food. However, a study in Philippines by Azanza, Gatchalin, and Otega, (2002) showed a contrasting practice. In the study, little over half street food vendors did not know that wearing jewellery has a potential of causing contamination. Nevertheless, most (92.5%) of the staff indicated that they don't cook when they had diarrhea and this is parallel to Giritlioglu et al., (2010) assertion that about 89% of university cookery students desisted from cooking when they had diarrhea because they had been instructed that infections could easily be transmitted under such conditions.

CONCLUSIONS

The results indicated that caterers' practices of personal hygiene such as hand washing before cooking and regular bathing were both high (95%). Again, their safe food production practices such as maintaining clean working area and wearing of protective clothing were high (95%), however, most of them (42.5%) agreed that they keep ready – to – eat food at 20°C whiles (70%) and thaw food at room temperature. The translation of this assertion into practice is critical factors which could lead to the production and service of unsafe food to the students. The

caterers may require training in temperature and temperature controls. Further studies could look at the microbial safety of the food to ascertain how their practices lead to safe food production consumption by the students.

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APENDIX**SECTION I: Socio- Demographic Characteristics of Respondents****1. Age:**(a) Below 25 years [] (b) 25 - 34 years [](c) 35 - 44 years [] (d) 45 - 60 years []

(e) Others:.....

2. Gender: (a) Male [] (b) Female []**3. Education level:**(a) No formal education [] (b) Primary education [](c) Junior Secondary [] (d) Secondary education [](e) Tertiary education [] (f) Others:.....**4. How long have you been working as catering staff?**(a) Less than 1 year [] (b) 1 – 3 years [] (c) 4- 6 years [](d) 8 – 10 years [] (e) More than 10 years []**SECTION II: Knowledge of Food Hygiene and Safety**

Please indicate your agreement with the following statement by ticking (✓) in the appropriate box where; **T = True** **F = False** **DN = Do not Know**

Statement	T	F	DN
Preparation of food ignoring hygiene rules causes food-borne illnesses			
Improper heating of food causes food-borne illnesses			
Hot ready-to-eat food should be kept at 20 °C			
Germs multiply at approximately 90 °C			
Only sick people carry bacteria which causes food poisoning			
Germs stops reproduction at human temperature (37 °C)			
Frozen meat should be defrosted at room temperature			

Refreezing defrosted food causes food-borne illnesses			
Keeping cooked food and raw food together causes food-borne illnesses			
Different kind of meat and fish (beef, chicken, emule etc.) can be cut on the same cutting board			
Meat can be cut or chopped with vegetables on the same cutting board			
Salmonella is a kind of germ which causes food poisoning			
Food should be served not later than two hours after preparation			
Staff who cook or handle food should have health check-ups every year			

SECTION III: Practices Relating to Safe Food Production

Please indicate your agreement with the following statement by ticking (√) in the appropriate box where; **A = Agree** **NI = No Idea** **NA = Do not Agree**

Statement	A	NI	NA
I pay attention to my personal hygiene because food safety is very important to the ready food sector			
I care to use fresh raw materials in food production			
I do not touch food when my hand or fingers are cut			
I wear cap, masks and protective gloves during food production in order to prevent food-borne illnesses			
I always keep my work area clean for safe food preparation			
I do not wear the same shoes and clothes both outside and inside of the food production area			
I do not touch raw food without wearing protective gloves			
I do not wear jewellery (ring, earrings, etc.) during cooking			
I do not cook if I get flu or catch cold or have diarrhea, etc.			

SECTION IV: Practice of Personal Hygiene

Please indicate your agreement with the following statement by ticking (√) in the appropriate

box where; **AW = Always** **OT = Often** **ST = Sometimes** **HL = Hardly** **NV = Never**

Statement	AW	OT	ST	HL	NV
How often do you wash your hands before cooking?					
How often do you wash your hands after using toilet?					
How often do you wash and change your uniform?					
How often do you wash your apron?					
How often do you wash your hair net?					
How often do you wear hand gloves?					
How often do you wash your hands after coughing or sneezing?					
How often do you keep your nails short?					
How often do you keep your hair clean, tidy and covered?					
How often do you visit the dentist?					
How often do you bath twice (2X) daily?					