

# Food Hygiene Status of Cooks in the Eastern Region of Ghana: A Case of Selected Basic Schools in School Feeding Programme in Koforidua

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## Abstract

The research design adopted for the study was descriptive survey. The study basically aimed at effectiveness of the personal and environmental hygiene of the caterers in the school feeding program in Koforidua Municipality. Population of the study consisted of individuals within selected schools as well as the communities in New Juaben Municipality in Koforidua of the Eastern Region of Ghana. Purposive sampling method was used to select 60 participants for the study. Interview and observation were the main instruments used for the study. The findings of the study concluded that, caterers/cooks, none used easy cleanable surfaces for their activities. It was also revealed that, none of the caterers/cooks used hot and cold water to wash utensils. The same provision of hot water was not provided for school children to wash their hands before eating. It is recommended that, Ghanaian School Feeding Program National Secretariat, District Assemblies and other actors should take the personal hygiene and medical examination of caterers and cooks seriously and should be a pre-requisite requirement to becoming a caterer or a cook. It is also recommended that, caterers and other health providers/promoters in the schools should be supporting children's hygiene by role modeling hygienic practices such as thorough hand washing.

## Keywords

Food Hygiene, Cooks School Feeding Programme, Koforidua, Ghana

Received: May 2, 2021 / Accepted: May 31, 2021 / Published online: June 29, 2021

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## 1. Introduction and Background

Nutritional and health status are powerful influences on a child's learning and on how well a child performs in school. Children who lack certain nutrients in their diet (particularly iron and iodine), or who suffer from protein-energy malnutrition, hunger, parasitic infections or other diseases, do not have the same potential for learning as

healthy and well-nourished children. Weak health and poor nutrition among school-age children diminish their cognitive development either through physiological changes or by reducing their ability to participate in learning experiences or both [1].

Contrary to conventional wisdom, nutritional status does not improve with age. The extra demands on school-age children (for example, to perform chores or walk long distances to school) create a need for energy that is much

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greater than that of younger children. Indeed, available data indicate high levels of protein-energy malnutrition and short-term hunger among school-age children. Moreover, deficiencies of critical nutrients such as iodine, vitamin A and iron among the school-age children are pervasive [2]. It is estimated that 60 million school-age children suffer from iodine deficiency disorders and that another 85 million are at risk for acute respiratory disease and other infections because they are deficient in vitamin A [3]. The number suffering from iron deficiency anemia is greater still – 210 million [4]

While universal primary school attendance is a stated goal by many governments and the millennium development goals (MDG), enrollment rates continue to be low in many developing countries [3]. To foster enrolment, many governments have eliminated primary school fees, as well as established programs such as school feeding food program or conditional cash transfers more recently to increase the demand for schooling [5, 6].

The United Nations Hunger Task Force (UNHTF) has made seven recommendations on how to achieve the first MDG. These are stated in their- report “Halving Hunger, it can be done” [7]. One of the strategies identified by the UNHTF to achieve this goal is the implementation of school feeding programs (SFPs) with locally produced foods rather than imported food (aid). The UNHTF considers school feeding programs as a good combination of education and agriculture. Their point of view is that SFPs could increase school attendance, especially of girls and, furthermore, the implementation can stimulate the market demand for locally produced foods. The UNHTF especially recommends comprehensive community- and school-based feeding programs that include not only school feeding, but also systematic de-worming, micronutrient supplementation, take-home rations, safe cooking facilities, clean drinking water and improved sanitation [7].

In Ghana the initiative has led to an increase in enrolment, attendance and retention of children of both kindergarten and primary schools within public schools in rural areas which clearly shows that if the program is to target the pro-poor schools, districts and communities, poverty will be significantly reduced in these communities and eventually the country at large. It has been observed that health and hygiene education still remains one of the challenges in the implementation of Ghana school feeding program to the limited knowledge of some caterers and cooks [1]. Most of them have limited information on basic health, hygiene and nutrition issues that enhance the quality of food they prepared under hygienic conditions. Although most caterers do have relevant knowledge and experience in healthy and hygienic food preparation, the

selected cooks often have not.

Most of the cooks are mothers of the school children who engaged themselves in the school feeding program voluntarily on a very small allowance. Their access to information on health and hygiene as well as health facilities can generally be regarded as low. Although many countries as well as Ghana are carrying out school feeding program, they are not being rigorously evaluated or assessed to find out if this feeding program has translated into better results. The purpose of the study was to ascertain the effectiveness of the personal and environmental hygiene of the caterers in the school feeding program in Koforidua Municipality. The study was guided by this research question - What are the personal and environmental hygiene of the caterers in the school feeding program?

## 2. Review of the Literature

### 2.1. Knowledge of Cooks/Caterers on Food Safety and Personal Hygiene

The term food handlers apply to a person who prepares food and those who sell it, if they are different persons [8]. Examination on knowledge on food handling and health problems of some food handlers proved that they did not fully understand hazards, their risk and methods of managing such hazards in the preparation and handling of food [9]. Food handlers have very important role to ensure food safety throughout the chain of food production, processing, storage and preparation. Any disregard for safety including mishandling of food and abuse of hygienic measures on the part of food vendors may cause unpleasant consequences. In the course of packaging the food, food handlers blow air into the polythene bags to open them and in the process a number of pathogens can be passed onto the consumer [8]. Many food handlers introduce biological and physical hazards through cross-contamination and mishandling of food. The use of bare hands to serve food increases the level of contamination as entero-pathogens survive on the hands for three hours or longer [10].

Pathogens can be harboured and transmitted on to others by individuals who themselves are healthy. Such carriers may have recently suffered an attack of food poisoning and still be carriers of the organisms in their body. In some instances, carriers of food pathogens such as salmonella, Typhi and *Bacillus cereus* acts as a host over a longer period of time as they acquire immunity to the organism concerned. Such individuals might end up transmitting the organisms to other people through food without being aware of it. It is thus important that food handlers are educated on routes and means through which pathogens invade the food they prepare

and sell to the public. Food vendors who prepare and sell food are important factors that contribute significantly to food borne related diseases as they have very little or no educational background and hence have low understanding of food safety issues [10]. Most often food handlers are unaware of their roles as a reservoir of infection [11]. Improper handling of cooked foods and sanitation practices may therefore lead to person to person, person to food and utensils to food cross contamination resulting in outbreaks and infection from food borne pathogens. Hand-washing a simple but very effective means to reduce cross contamination is all too often forgotten by food handlers [12].

## 2.2. Food Hygiene and Handling in the School Feeding Programmes

Food hygiene involves all conditions and measures necessary to ensure the safety and quality of all stages of food chain. These include sourcing of raw materials from the right supplier, good storage system, temperature control, maintenance, proper waste management and pest control system, available cleaning regime, personnel training and good personal hygiene, transporting and distribution food under safe condition. With these measures, food hazards (physical, chemical, biological) could be controlled and thus lead safe food and safety of the consumer [13].

Food handlers usually cross-contaminate processed foodstuff and are likely to under-cook food properly and improperly store food. It is possible that in most cases, they contaminate processed foodstuffs without being aware that they are doing so. Continuous training and education thus become very essential if food handlers are to handle food in a hygiene and safe manner with the best preventive measures being educating the food handler on good personal hygiene and food safety [14]. Food handlers are usually young, itinerant and inexperienced people who usually stay on the job for a year and hence it becomes extremely difficult to find and educate them whiles actively working [15]. In relation to this, there is a high probability that the absence of continuous training and reinforcement is to be blamed for lack of food hygiene knowledge concerning a number of aspects in safe food production [14]. A lot of studies have confirmed the rather low level of knowledge of food handlers on hygienic and microbial safety to ready-to-eat foods [14]

Inadequate hygienic knowledge and lack of understanding of the basic principles of food hygiene is therefore a major bottleneck to the implementation of good hygiene practices in the handling of ready-to-eat foods in our schools and other public places. In this connection, there is the need to conscientiously prevail upon and motivate food handlers to

put to practice their knowledge in food hygiene [16]. In contrast to assertion, it is a common place knowledge that ignorance coupled with reluctance by food handlers to apply the acquired knowledge also contribute in no small measures to food poisoning by food handlers [14, 17]. A study conducted in Italy that although food handlers had positive attitude towards food safety, it was not supporting their practice in food handling. There seem therefore to be no collaboration between good knowledge in food handling and the actual practice in food processing among food handlers [18].

Hygienic aspect of food vending operation is also a major source of concern [10]. For example, food stands (structures on which foods are displayed) are often crude structures, and running water may not be available in the canteen. Also toilets and washing facilities are rarely available. The washing of hands, utensils and dishes is often done in buckets or bowls. Disinfection is not usually carried out and insects and rodents may be attracted to sites where there is no organized sewage disposal [10].

Food handling as manufacturing, processing, producing, packing, preparing, keeping, storing, transporting or displaying food for sale or for serving. Increased handling of food is responsible for a more complicated and critical challenge of protecting food from contamination [19]. Good hygiene practice in food preparation and food service plays an important role in ensuring food safety. This is achieved by following the general rules of good food hygiene and other approaches like HACCP. Poor hygienic practices can contribute to outbreaks of food borne illnesses [20]. It is therefore important that food establishment management/owner provides methods and means of handling that prevent damage to or deterioration or contamination of any food product.

## 3. Methodology

The research design adopted for the study was descriptive survey. Population for the study consists of sixty (60) respondents including caterers/cooks, head teachers and PTA (Parent Teacher Association) chairmen in charge of the school feeding programme of the qualified deprived schools. Purposive sampling technique was used to select fifteen (15) main caterers and fifteen (15) head cooks from the selected fifteen (15) schools in the New Juaben Municipality: Apimpoa Islamic Primary A & Kg 2, K'dua Khalid Ibn Walid Islamic Primary, Bornya King Of Glory Presby Basic, Trom Nyerede M/A Prim/Kg, Korle Nkwanta Good Shepherd A&B, Akwadum Methodist Basic School, Akwadum Islamic Kg/Prim, Akwadum M/A Basic School, Asokore Methodist Kg/Primary "A",

Asokore Salvation Army Primary/Kg, Effiduase R/C Primary/Kg “B”, Jumapo Presby Basic School, Jumapo St. Stephen’s Anglican Primary/Kg, Oyoko Methodist Primary/Kg “B”, Oyoko Presby Basic School ), fifteen (15) head teacher and fifteen (15) PTA chairmen for the study. The main instruments used for the study were observation checklist and structured interview guide. Data collected from the field was analyzed using descriptive statistics. The data were sorted, edited, analyzed and presented statistically using the Statistical Package of Social Sciences (SPSS). Descriptive statistics was used to summarize the data. The results were presented in themes

using tables and percentage of respondents.

## 4. Findings and Discussions

This section presents findings and discussions on personal, environmental and food hygiene status of the caterers/cooks in the school feeding program. The above theme was used to derive research question - *What are the personal and environmental hygiene of the caterers in the school feeding program?* Responding to research question, the researchers posed a number of questions to respondents. The responses are presented in Table 1 below.

**Table 1.** Personal hygiene of the caterers in the school.

Statements	Yes		No		Total	
	N	%	N	%	N	%
Cooks and caterers put on clean cloth or dresses	19	66.7	11	33.3	30	100
Wear protective clothing	14	45.8	16	54.2	30	100
Caterers ensure cooks put on clean cloth or dresses	24	87.5	6	12.5	30	100
sanction them for not practicing proper personal hygiene that can cause food infestation	27	93.7	3	6.3	30	100
Undertaken any medical checkup	24	87.5	6	12.5	30	100
Received any training in food hygiene and safety	22	79.6	8	20.4	30	100

Referring to Table 1, 66.7% of the cooks and caterers responded ‘Yes’ to the question that posed to find out if ‘Cooks and caterers put on clean cloth or dresses’. Also, 54.2% of the cooks and caterers responded ‘No’ when they were asked whether they wear protective clothing while going about their responsibilities as far as the school feeding program is concerned. This indicates that the cooks are not adequately protected when they are performing their responsibilities with respect to preparing food for school feeding purposes. About 87.5% of the cooks and caterers resoundingly indicated in their response that they ensured that both the cooks and caterers put on clean cloth or dresses. Again, 93.7% majority of the respondents indicated that they are sanctioned for not practicing proper personal hygiene that can cause food infestation. Furthermore, 87.5% and 79.6% also responded ‘yes’ to the questions that sought to find out whether they undertake any medical checkup and whether they received any training in food hygiene and safety respectively.

**Table 2.** Where did you receive the training?

Responds	Frequency	Percentage (%)
From home (from mother)	7	23.33
From formal training (vocational school)	13	43.34
From health professional/environmental and sanitation officers	10	33.33
Total	30	100

When respondents were asked where they received their training in food hygiene and safety, 23.33% of both caterers and cooks indicated that they had their training from home (from their mothers) and another 43.34% had formal training from a vocational school as represented in Table 2. The remaining 33.33% indicated they had their training from

health professional/environmental and sanitation officers.

**Table 3.** Treatment of foodstuffs (vegetables from the market) before using.

Responds	Frequency	Percentage (%)
I wash them with water	18	60.0
I use vinegar to wash them	12	40.0
Total	30	100.0

Table 3 shows that 60% of those who responded to this question indicated that in preparing the food, they washed vegetables and other foodstuff with water. However, the remaining 40% said they used vinegar to treat vegetables before using them.

Table 4, shows the results of how some of the cooks/caterers store leftover foods after serving.

**Table 4.** Store leftover food after cooking and serving?

Responds	Frequency	Percentage (%)
Yes	13	43.4
No	17	56.6
Total	30	100

From Table 4, 56.6% of the cooks/caterers indicated they do not store leftover foods, while 43.4% alluded that they store leftover food after cooking. Inference from table 4 indicated that 43.7% of the respondents stored the leftover foods, 33.2% stored the leftover foods in a refrigerator with the remaining 23.1% indicating that they put them in a kitchen and re-heat them the following day. This postulates that cooling food items in refrigerators, frozen and dry storage are among the methods of food preservation. Cool storage refers to storage at temperatures above freezing point from about 16°C down to -2°C while frozen refers to storage at temperatures -18°C or below to maintain food [20]. Most disease causing bacteria can grow

within a temperature range of 5°C to 60°C, commonly referred to as the food temperature danger zone [21, 22]. It is further recommended that all cold foods must be stored at 5°C or below and all hot foods held at 63°C or above. Ghana's law requires that storage of food should be under such conditions as shall prevent contamination, including development of pathogenic or oxygenic microorganisms or both [19].

**Table 5.** If your answer is yes, where do you store the left over foods?

Responds	Frequency	Percent
In a refrigerator	13	43.7
It is put it in a kitchen and heat the following day	10	33.2
Total	30	100.0

Table 5, did indicate that 43.7% of the respondents stored the leftover foods. Out of this, 33.2% of stored the leftover foods in a refrigerator with the remaining 23.1% indicated they put them in a kitchen and re-heat them the following day.

**Table 6.** How do you store raw food items and cooked items in the house and in the school?

Storage	Frequency	Percentage (%)
Together	11	37.0
Separately	19	63.0
Total	30	100.0

To find out how raw food and cooked items were stored, the caterers/cooks were asked how they store raw food items and cooked items in the house and in the school. Table 6 indicates that 11 respondents representing 37% of the total population said they store both raw and cooked food items together and 19 respondents representing 63% of the total population said they store both raw and cooked food items separately. From table 7 below, 23% of the respondents posit that they ensure maintenance of flavor in food and 77% of them also indicated that they stopped bacteria transfer and infestation in cooking. This implies that when cooked foods are kept well, separated from raw food and covered, they reduce the risk of cross-contamination. Also when proper arrangement of items in stores are done and coded/marked, it eases their identification and removal for use.

**Table 7.** If stored separately, why?

Storage	Frequency	Percentage (%)
To ensure maintenance of flavor in food.	7	23.0
To stop bacteria transfer and infestation.	23	77.0
Total	30	100.0

**Table 8.** Which method do you use for cooking food?

Method	Frequency	Percentage (%)
Frying	0	0.0
Grilling	0	0.0
Baking	0	0.0
Roasting	0	0.0
Boiling	30	100.0
Total	30	100.0

From table 8, above the respondents declined not using Frying, grilling, baking, roasting methods in cooking but all thirty (30) respondents said they used boiling method to cook food. Table 8 infers that respondents declined the use of frying, grilling, baking and roasting methods in cooking but all thirty (30) respondents said they used boiling as a method to cook food to ensure that micro-organisms that are harmful in food items are destroyed. Proper cooking of potentially hazardous foods destroys harmful micro-organisms that may be present in the food however, different foods and the methods, by which they are cooked, require different end point temperatures to be safe. The range of safe cooking temperatures can vary from 63°C to 74°C, but it is recommended that the core temperature of all parts of the food must reach at least 70°C within a period of 2 hours [21, 22]. Time and temperature of cooking should be sufficient to ensure destruction of non-spore forming pathogenic micro-organisms [23]. However, spores of certain bacteria like *Clostridium botulinum*, *Clostridium perfringens* and *Bacillus cereus* can survive cooking temperatures [22]. This postulate that proper cooking method should be adopted by all cooks and caterers to ensure destruction of pathogenic micro-organisms in food items.

**Table 9.** Do you use menu guide for cooking?

Menu Guide	Frequency	Percentage (%)
Yes	25	83.0
No	5	17.0
Total	30	100.0

From table 9, above 83% alluded that they menu guide for their cooking while 17% postulate that they do not use menu guide for their cooking activities. Table 9 shows that 83% of the respondents alluded that they use menu guide for their cooking while 17% postulate that they do not use menu guide for their cooking activities. The most enjoyable part of their work, for many caterers, is the time they spend creating menus, dishes and plans for parties, banquets, cocktail hours, weddings and other events. This is where you can create a brand around your unique personality. As a cook or caterer you need to check out the competition to determine what others are selling and what your target audience is buying. Any caterer is a people person, works with potential clients to create the best menus within their budgets. If you work for a planner or want to avoid sales, you can spend more of your time creating food after contracts are booked.

**Table 10.** If yes, who provides it?

Method	Frequency	Percentage (%)
District Assembly	14	56.0
Head teachers/teachers	1	4.0
PTA	3	12.0
Caterer	7	28.0
Total	25	100.0



From table 10 the 56% of the respondents said district assembly provided with the menu guide, 4% confirmed that head teacher/teacher served them with menu guide for cooking, while 12% were with the view that PTA furnished them with menu guide. Also 28% respondents attested that caterers provided them with menu guide for their daily activities.

**Table 11.** How do you hold prepared dishes before serving?

Method	Frequency	Percentage (%)
In a food warmer	11	37.0
In clean bowls	19	63.0
Total	30	100.0

From table 11, 37% of the respondents alluded that they served the prepared dishes in a food warmer, while 63% of the caterers and cooks said they kept the prepared dishes in clean bowls before serving. From table 10, 37% of the respondents alluded that they served the prepared dishes from a food warmer, while 63% of the caterers and cooks said they kept the prepared dishes in clean bowls before serving. Food should be handled, served or sold with clean equipment and utensils that is tongs, forks, spoons or disposable gloves and never handled with bare hands. Utensils/cutlery should be clean and dry and not handled by touching the food contact surfaces and plates filled with food should not be stacked on top of the other during display, storing or serving [21]. Clean tongs, forks, spoons or disposable gloves should be used when handling street – vended foods. Good personal hygiene should always be practiced when serving food, by wearing a clean uniform and hair restraint and wash hands after handling money and before handling food again [24]. This implies that, when all these practices are done by caterers and cooks it will promote good healthy eating of food.

**Table 12.** How often do you touch food with bare hands?

Method	Frequency	Percentage (%)
Always	9	30.0
Sometimes	14	47.0
Not at all	7	23.0
Total	30	100.0

Table 12 above shows that 30% said they always touch the food with bare hands, 47% were with view that they sometimes touch the food with bare hands, but 23% of the respondents confirmed that they do not use their hands to touch the food. Table 12 shows that 30% said they always touch the food with bare hands, 47% were with view that they sometimes touch the food with bare hands, but 23% of the respondents confirmed that they do not use their hands to touch the food. Many food handlers introduce biological and physical hazards through cross-contamination and mishandling of food [10]. The use of bare hands to serve food increases the level of contamination as entero-pathogens survive on the hands for three hours or longer. Pathogens can be harbored and transmitted on to others by individuals who themselves are healthy. Such carriers may have recently suffered an attack of food poisoning and still be carriers

of the organisms in their body. In some instances, carriers of food pathogens such as salmonella, Typhi and Bacillus cereus acts as a host over a longer period of time as they acquire immunity to the organism concerned. Such individuals might end up transmitting the organisms to other people through food without being aware of it. It is thus important that food handlers are educated on routes and means through which pathogens invade the food they prepare and sell to the public. Food vendors who prepare and sell food are important factors that contribute significantly to food borne related diseases as they have very little or no educational background and hence have low understanding of food safety issues [10]

**Table 13.** When do you clean the equipment for cooking and serving?

Method	Frequency	Percentage (%)
Immediately	25	83.0
After the day's work	5	17.0
Total	30	100.0

From table 13, 83% of the respondents were with view that they clean the equipment soon after cooking and serving, but 17% said they clean the equipment after the day's work.

**Table 14.** How do you clean the equipment?

Method	Frequency	Percentage (%)
Wipe with napkin	13	43.0
Wash with soap under running water	5	17.0
Wash with soap and water in a bowl	12	40.0
Total	30	100.0

From table 14 above 43% of the respondents indicated that they wipe the equipment with napkin, 17% of the respondents also posit that they wash the equipment with soap under running water. Whiles 40% of caterers and cooks affirmed that they wash the equipment with soap and water in a bowl.

**Table 15.** How do you get water for cooking food?

Source	Frequency	Percentage (%)
Reservoirs/tank	5	17.0
Well	3	10.0
Pipe	15	50.0
Borehole	7	23.0
Total	30	100.0

Table 15 above presented how respondents used to get water for cooking food under school feeding program. 17% of the caterers and cooks posit that they had water from reservoirs/tanks for cooking. 10%, 50%, 23% had water from well, pipe and borehole respectively for their cooking activities.

**Table 16.** How do you dispose off refuse?

Source	Frequency	Percentage (%)
In a dustbin	07	23.3
At the school's refuse dump	15	50.0
In the school garden	04	13.3
Bury it	01	03.4
Burn it	03	10.0
Total	30	100.0

Concerning how refuse is disposed after cooking and serving of meals, 23.3% said they dispose rubbish into a dustbin, 50% said they dispose rubbish at the school's refuse dump,

13.3% said they dispose rubbish in the school's, 3.4% said they bury it and 10% said they burn it.

**Table 17.** Summary of Observation of Caterers/Cooks.

Item	Yes		No	
	F	%	F	%
Caterers/cooks used a container with a cover for storing water	20	67	10	33
Caterers/cooks used washing powder or liquid soap to wash dishes	22	73	08	27
Caterers/cooks used waste bins with cover	23	77	07	23
Caterers/cooks wore apron and hair covering	18	60	12	40
Caterers/cooks kept clean environment	22	73	08	27
Caterers/cooks observed proper solid and liquid waste disposal	13	43	17	57
Caterers/cooks used plastic table cloth	08	27	22	73
Caterers/cooks used cooking pot lids	17	57	13	43
Caterers/cooks used clean hand drying towels	19	63	11	37
Caterers/cooks washed their hands under running water	11	37	19	63
Caterers/cooks observed correct ways of tasting food when cooking	14	47	16	53
Caterers/cooks used easy to clean work surfaces	0	0	30	100
Caterers/cooks washed utensils in hot and cold water	0	0	30	100
Caterers/cooks provided customer with hot water for hand washing	13	43	17	57
Caterers/cooks stored food properly after cooking	14	47	16	53
Caterers/cooks checked for the correct temperature of food for serving	22	73	08	27
Caterers/cooks ensured the availability of portable water at the food vending sites	25	83	05	17
Caterers/cooks used separate equipment and work surfaces for raw and cooked food	08	27	22	73
Caterers/cooks kept work surfaces clean	18	60	12	40
Caterers/cooks washed their hands frequently	22	73	08	27
Caterers/cooks used utensils for serving food	10	33	20	67
Caterers/cooks checked for the equipment and tools that are rusted, cracked, or chipped	14	47	16	53
Caterers/cooks discarded water for washing utensils frequently	28	93	02	07

From Table 17, it was observed that 67% of the respondents used containers with covers to store water used in preparation. The remaining 33% had containers but without covers which exposed the water to contaminants. Majority of the caterers/cooks representing 73% used washing powder or liquid soap while 27% used cake soap. Furthermore, 77% were in possession of covered dustbins had registered with the Zoom Lion Ghana Limited. However, 23% had dustbins but without covers. It was observed that 60% of the caterers/cooks wore apron and hair covering during preparation and sale of food with the remaining 40% did not wear any aprons and hair coverings. Most of the caterers/cooks representing 73% of the respondents kept their environment clean with 27% not meeting the researcher's expectation of clean environment. The researchers observed how both solid and liquid waste were disposed off at the cooking sites. Forty-three percent 43% of the caterers did not dispose waste properly with 57% disposing theirs properly. Majority of the caterers/cooks, 73% did not use plastic table cloth but 27% used plastic Table cloth. Of the 30 caterers/cooks used for the study, 57% covered their cooking pots with fitting lids when preparing food whereas 43% did not cover the cooking pots when cooking. On account of availability of hand drying towels, 63% of the caterers/cooks provided clean hand drying towels but 37% provided towels that were not sufficiently clean. Concerning the washing of hands, 37% out of the 30 caterers/cooks washed their hands under running water. It was observed that 47% of the caterers/cooks tasted food the right

way with 53% not tasting food properly. Out of the 30 caterers/cooks, none used easy cleanable surfaces. It was observed that, none of the caterers/cooks used hot and cold water to wash utensils. The same was also observed with the provision of hot water that it was not provided for school children to wash their hands before eating.

A few of the caterers/cooks representing 47% stored cooked food properly but 53% did otherwise. It was observed 73% served cooked food while it was hot and the remaining 27% served food that was not hot. 83% of the caterers/cooks used portable water but 17% did not have access to portable water in their operations. Furthermore, only 27% of the caterers/cooks used separate equipment and work surface for both raw and cooked food with 73% of them using the same equipment and surfaces for both raw and cooked food. Sixty percent 60% of the caterers/cooks kept work surface clean while cooking but 40% did not keep clean work surfaces. With regard to frequent hand washing by caterers/cooks during food preparation and services, 73% of the caterers/cooks washed their hands frequently while 27% did not. Again, the table revealed that 33% used appropriate utensils when serving cooked food whereas 67% did not. Forty-seven percent (47%) of the caterers/cooks used equipment and tools that were chipped or rusted but 53% did not use equipment and tools that were rusted, cracked or chipped. However, with regards to frequent discarding of water for washing utensils, 93% of the caterers/cooks

discarded water for washing utensils frequently, only 7% of the caterers/cooks did not discard their water often.

## 5. Conclusions and Recommendations

The study concluded that, caterers and cooks were aware of the rules governing the catering industry. Notwithstanding the study also indicated that, the cooks and caterers had knowledge of personal and environmental hygiene. The findings of the study concluded that, caterers/cooks, none used easy cleanable surfaces for their activities. It was also revealed that, none of the caterers/cooks used hot and cold water to wash utensils. The same provision of hot water was not provided for school children to wash their hands before eating.

It is recommended that, Ghanaian School Feeding Program National Secretariat, District Assemblies and other actors should take the personal hygiene and medical examination of caterers and cooks seriously and should be a pre-requisite requirement to becoming a caterer or a cook. Vaccination should be given as a preventive measure.

It is also recommended that, caterers and other health providers/promoters in the schools should be supporting children's hygiene by role modeling hygienic practices such as thorough hand washing. Setting good models and hygiene rules with children and providing them with positive feedback, information and support, children will develop good personal hygiene skills.

## References

- [1] Musa, O. I. and Akande, T. M. (2003) Food Hygiene Practices of Food Vendors in Secondary Schools in Ilorin. *Nigerian Postgraduate Medical Journal*, 10, 192-196.
- [2] Partnership for child development (1998). *The Proceedings of the Nutrition Society: The anthropometric status of schoolchildren in five countries in the Partnership for child development*. Feb; 57 (1): 149-58.
- [3] UNESCO (2007). *Global Education Digest 2007: Comparing Education Statistics Across the World*. Technical report, UNESCO Institute for Statistics, Montreal: Quebec, Canada.
- [4] Jamison, D. T., Mosley, W. H, Measham, A. R, & Bobadilla, J. L. (1993). *Disease Control Priorities in Developing Countries*. New York: Oxford University Press.
- [5] Levinger, B. (1986). *School Feeding Programs in Developing Countries: An Analysis of Actual and Potential Impact, Aid Evaluation Special Study 30*, U.S. Agency for International Development
- [6] Schultz, P. T. (2004) "School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program. *Journal of Development Economics*, 74 (1), 199-250.
- [7] Annor, A. G., & Baiden, A. E. (2011). Evaluation of Food Hygiene Knowledge Attitudes and Practices of Food Handlers in Food Businesses in Accra, Ghana. *Food and Nutrition Sciences*, 2, 830-836
- [8] WHO (1989). *World Health Organization, Global Strategy for Health for all by the year 2000*. Geneva.
- [9] Amponsah, S. K., Ofosu, J. B., & Opoku-Sarkodie, R. (2011). Optimum Production Scheduling for a Beverage Firm Based in Accra. *Research Journal of Applied Sciences, Engineering and Technology*, 3 (2), 74 80.
- [10] Mensah, P., Yeboah-Manu, D., Owusu-Darko, K., & Ablordey, A. (2002). Street foods in Accra, Ghana: how safe are they? *Bulletin of the World Health Organization*, 80 (7), 546-554.
- [11] Nichol TH, Salek, H. D. (2007). *Clinical Microbiology Procedures Handbook, Vol. I & II*. American Society for Microbiology, Washington, D.C.
- [12] Rippel, R. (2000). Local Anesthetics, *Ullmann's Encyclopedia of Industrial Chemistry*. DOI: 10.1002/14356007.a15\_415.
- [13] FAO and WHO (2009). *Food hygiene: Basic texts* (4<sup>th</sup> Ed.). Rome: Support Branch Communication Division
- [14] Tuncer, A., & Akoğlu, A. (2020). Food safety knowledge of food handlers working in hotel kitchens in Turkey. *Food and Health*, 6 (2), 77-89.
- [15] Marth, H., & Liewen, B. (1985). Growth and Inhibition of Microorganisms in the Presence of Sorbic Acid: A Review. *Journal of Food Protection*: April 1985, Vol. 48, No. 4, pp. 364-375.
- [16] Ehiri, J. E., & Morris, G. P. (1994). Food safety control strategies: A critical review of traditional approaches. *International Journal of Environmental Health Research*, 4(4), 254-263.
- [17] Byrd-Bredbenner, C., Schaffner, D. W., and Mauer Abbot, J. (2010). How safe is your home kitchen? A self-directed home kitchen audit. *Journal of Nutrition Education and behavior*, 42 (4), 286-289.
- [18] Angellilo, I. E, Viggiani, N. M. A, Rizzo, L., and Bianco. (2003). *Food handlers and foodborne disease: knowledge, attitudes and reported behaviour in Italy*. *J. Food Prot.*, 63, 381-385.
- [19] Ghana Public Health Act (2012). Food and Drug Board Act 851, *Government printer assembly press Accra: GPC/A753/350/11/12* www.ghanapublishingcompany accessed (2019).
- [20] Fosket, D. & Ceserani, V. (2007). *The Theory of Catering* (11<sup>th</sup> ed.). London. Hodder Arnold.
- [21] McSwane, D., Rue, N. & Linton, R. (2000) *Essentials of food safety and sanitation*. New Jersey: Princeton Hall Inc.
- [22] Frazier, W. C. & Westhoff, D. C. (1988). *Food Microbiology*. New York; McGraw-Hill.
- [23] Murwira, T. S., Amosu, A. M., & Nemathaga, L. H. (2017). The Level of Compliance of Food Handlers with National Regulations on Food Hygiene and Safety Practices: A Case of Selected Fast Food Outlets in Thohoyandou, South Africa. *Universal Journal of Public Health* 5 (3), 85-92.
- [24] National Board of Experts – HACCP (2002). *Requirements for a HACCP Based Safety System. 3<sup>rd</sup> version, The Netherlands*. The Hague, the Netherlands.