Available online at www.elixirpublishers.com (Elixir International Journal)

Food Science

Elixir Food Science 41 (2011) 5807-5811

ISSN: 2229-712X

Evaluation of hygiene practices among street food vendors in Accra metropolis, Ghana

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ARTICLE INFO

Article history:

Received: 28 September 2011;

Received in revised form:

18 November 2011;

Accepted: 29 November 2011;

Keywords

Food,

Hygiene,

Food-safety,

Vendors.

ABSTRACT

The rapidly growing and changing food demands by urban dwellers has resulted in the need for cheaper and convenience foods. Street vended foods have shown epidemiological links with illness. Concerns have also been raised about these foods with respect to their potential for food poisoning outbreaks. The study sought to assess aspects of hygiene practices such as food preparation area, environment of food vendors, personal hygiene, handling and storage of food. A standardized questionnaire was used to collect data on the current status of food hygiene and sanitation practiced by street food vendors in Accra. Results indicated that out of the 50 respondents, 66% were in the age range of 26 to 30 years, of which 76% were females. Most of the vendors (54%) were senior high school graduates. Majority (76%) of the respondents were stationary vendors. Of the total respondents interviewed, 36% have not had any form of formal training in catering, 64% of the vendors prepare food at home and send to the premises to be sold, and 80% of the surroundings were clean. Fifty-eight percent (58%) dispose of refuse twice daily. Most of the respondents (86%) had short and clean nails. Forty percent (40%) of the vendors serve the food in polyethylene bags. Unsold food is stored by 56% of the respondents for sale the next day. Reheating (50%) and refrigeration (44%) are methods used by respondents to preserve unsold food. A large number (70%) of the vendors use sachet water to serve their customers as a source of drinking water. This study indicates that majority of food vendors in Accra exhibited good food hygiene practices. However there is a need for the vendors to be given regular education on hygienic practices to avoid food contamination and food poisoning.

Introduction

In developing countries, drinks, meals and snacks sold by street food vendors are widely consumed by millions of people (El-Sherbeeny, *et al.*, 1985; Abdussalam and Kaferstein, 1993). In the Greater Accra Region, the capital, Accra is estimated to have about 60,000 vendors of ready-to-eat foods (Afale, 2006). These street foods provide an affordable source of energy and nutrients to many people (FAO, 1997; FAO, 1988; Ohiokpehai, 2003). The street food sector also contributes to the economy of an urban and peri-urban agricultural sector (Amoah *et al*, 2006). Street foods are well appreciated by consumers, because of their taste, reasonable price and availability at the right time (Barro, *et al.*, 2002; Canet and N'diaye 1996b).

Food poisoning and other food borne diseases could occur through poor hygiene practices in institutions such as schools, hostels and hospitals, where foods and drinks are served or sold to groups by food vendors. Outbreaks of certain diseases have been attributed to consumption of street foods (Todd *et al.*, 2007; Dawson and Canett, 1995). Several factors are known to favour food borne disease or food poisoning during food handling processes. These are poor hygiene practices such as poor personal and environmental hygiene, inadequate storage of food and drinks, improper preparation and cooking.

Street foods are ready-to-eat foods and beverages prepared and or sold by vendors on the street and in public places for immediate consumption or consumption at a later time without further processing or preparation (Muleta & Ashenafi, 2001; WHO 1996). Street foods include meat, fish, fruits, vegetables, grains, cereals, frozen produce and beverages (WHO-1996). In Ghana, street foods are diverse and include cooked beans, "koko", "kenkey", "banku", soups, stews, rice,' "waakye", salad, "fufu" and plantain (Table 1). Studies done in Africa on street foods have shown that their tremendous unregulated growth has placed a severe strain on city resources, such as water, sewage systems and interference with city planning through congestion and littering, adversely affecting daily life (Canet, and N'Diaye, 1996a; Chaulliac and Gerbouin-Renolle, 1996). Types of vending sites encompass stalls, a variety of push-carts, roadside stands, and hawkers depending upon the ingenuity of the individual, resources available, type of food sold and the availability of other facilities (Chaulliac and Gerbouin-Renolle 1996).

It appears food vendors have been allowed to operate without any periodic checks to ascertain whether they are practicing food hygiene. In a related study by King *et al*. (2008) results indicated that, among 160 street food stalls in

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Ghana, only three (1.85%) of the proprietors met the requirements for basic hygiene based on a five-point check-list. Even though they offer numerous advantages, there are a few health hazards associated with this sector of the economy. Multiple lines of evidence reveal that foods displayed for sale by the roadside may become contaminated by pathogenic microorganisms due to poor hygiene practices (FAO, 1990; Bryan *et al.*, 1992; Ashenafi, 1995).

The street food industry plays an important role in developing countries in meeting the food demands of urban dwellers. Street foods provide millions of people daily with a wide variety of foods that are relatively cheap and easily accessible. Therefore there is a need to look into the operations of food vendors to ascertain whether they are adhering to good hygiene practices. This would prevent food borne illness that would affect the labour force of the country, and thus increase productivity in all sectors of the economy.

The objectives of this study were to evaluate aspects of hygiene practices such as food preparation area, environment and location of food vendors, personal hygiene, handling and storage of food.

Methodology

The study was conducted in the Accra Metropolis which is the regional capital of Ghana and also a cosmopolitan region with diverse groups of culture and nationals. The city has a high number of street food vendors hence being chosen for the study. Approval was obtained from the food vendors prior to data collection, after the purpose of the study had been explained to all potential participants in their own language. They were assured of total confidentiality.

Sample size and sampling

A convenience sampling technique was used to select a sample size of fifty (50) street food vendors from the population of all food vendors in the Accra Metropolis. Both stationary and mobile food vendors were included.

Data collection

A standardized semi-structured questionnaire was used to collect data on the current status of food hygiene and sanitation practiced by street food vendors. Hygiene, food safety and sanitation were determined by the use of structured interviews as well as through observations. Practices such as acquiring cooking skills, handling of food, food preparation area, personal hygiene, environmental conditions, methods of washing utensils and preservation methods of unsold food were studied. Location and environment surrounding the street food vendors, utensils used, general processing of the food and hygienic practices were observed and recorded in an observation checklist. Other information captured included demographic data such as age, sex, and educational background. The types of ready-to-eat food sold by street vendors are shown in Table 1.

Data analysis

Scores for each question were calculated by assigning correct responses, using the Likert scale. Data analysis was captured using Statistical Package for Social Sciences (SPSS).

Results and Discussion

Table (2) shows the type of environment and the location of food vendors. Seventy six percent (76%) of the respondent were stationary whiles 24% were mobile. Forty two percent (42%) of the respondents sell on the road side, twenty eight (28%) sell in a store or kiosk, 18% sell in front of their house and 12% sell at other places.

Street food vending provides employment to many, especially women. In most towns and cities in Ghana, selling of snacks and whole meals on the streets is an important means to generate income. The easy availability of these foods has helped workers cope with long periods of absence from home. Street foods contribute significantly to food security and nutrition by providing nutritious, relatively inexpensive and tasty food to millions of working women, men, children and students. Unfortunately, the emergence of informal food businesses can cause health problems if the foods are not prepared and handled properly.

Findings from the study (table 3) showed that majority of the vendors (66%) were in the age range 26 to 30 years, 26% were between 18 and 25 years and 8% of them were between 31 and 35 years. A wide variation in the age of street food vendors has been observed in both developed and developing countries. The average age of the vendors in Asian countries was 20-45 years. Only 5% of the vendors were children, younger than 20 years, and they were usually involved with vending only during special events (Bhat & Waghray, 2000a:58). In South Africa, majority of street food vendors were aged 21-50 years with similar trends being reported in Asian countries and most Latin American countries ((Bhat & Waghray, 2000c).

Majority (76%) of the vendors were females, an observation similar to findings by Donkor *et al.* (2009) and Mensah *et al. (*2002). In developing countries women seemed to play a prominent role in all stages of street food vending such as preparation, serving and selling. An increase in women's overall participation in street food vending had been reported in some parts of Africa. More than 80% of street food vendors in countries such as Kinshasa, Lesotho and South Africa were female (Martins and Anelich, 2000; FAO, 1997a). The high proportion of female vendors compared to male vendors is typical of most developing countries where women cooked the food they sell in the street themselves, thus promoting their own products (Matalas & Yannakoulia, 2000:13). This however contrasts reports in India and Bangladesh where street food vending was male dominated and the percentage of male vendors ranged from 90-99% (Bhat & Waghray, 2000a:57).

With regards to education, the findings showed that out of 50 respondents, 54% of them were senior High graduates, 18% were HND holders, 14% were JHS graduates, 10% had never been to school and only 4% had been to the university. Thus food selling as a profession cuts across educational qualification. However the impact assessment for food safety training and practice among vendors is not influenced by education (Donkor *et al*., 2009).

Seventy six percent (76%) of the respondents were stationary whiles 24% were mobile vendors. From table 3, 36% of the food vendors acquire their cooking skills by experience, 32% were taught by their parents, 18% have the knowledge through observation and only 14% acquired the knowledge of food preparation through formal training. Thus majority of the vendors have no formal training in food preparation and safety issues.

Condition of immediate environment where food is sold is an important issue in food hygiene. From table 3, 80% of the surroundings where the vendors sold food were clean while 20% were dirty. This is at variance with a similar study by Donkor *et al.*(2009) in which vendors in a suburb of Accra were scored 16.5 percent rating in environmental hygiene practice. Also, 42% of the respondents sell on the road side, 28% sell in a store

or kiosk, 18% sell in front of their house and 12% sell at other places. This agrees with the findings made by WHO survey of street foods which showed that, vending facilities varied from mobile carts to fixed stalls and food centers and Infrastructural developments were relatively limited (WHO, 1984).

It was noticed from the study that vendors observed high personal hygiene practices. For example most of the respondents (86%) had short nails while 14% had long nails, this indicates that most of them know the importance of keeping their nails short in order not to contaminate the food. The study also investigated the source of water provided by the vendors to consumers. This is because the potential of drinking water to transport microbial pathogens to great number of people, causing subsequent illness is well documented in countries at all levels of economic development (Payment, 1997; Dufour *et al*, 2003). A high proportion (70%) of the vendors use sachet water to serve their customers, 14% use pipe borne water, 6% use borehole or well water and 4% serve customers with harvested water.

Also, majority of the vendors (84%) used waste bins, 10% throw food waste it into the bush and 6% elsewhere. It was also observed that 58% of the vendors dispose of waste twice daily, 24% once daily and 18% once weekly. There were no houseflies at places where the environment was clean, that is food was not exposed to flies at these locations. This is important because use of improper utensils, inappropriate cooking and vending area and low-level personal hygiene practiced by food handlers may cause food poisoning (Harmayani, 2010).

Some vendors (40%) served the food in polyethene bags, 36% serve in plates or bowls, 18% serve in polystylene containers, 4% still serve in leaves and two percent serve in newspaper. This practice has improved because the use of newspapers and leaves were very frequent in the early 90s.

The conditions under which street foods are prepared, especially the storage and reheating could contribute to the potential hazard of street foods. Information obtained on storage identified reheating (50%) and refrigeration (44%) as methods used to preserve unsold food. Fifty-six percent (56%) of the vendors store food for vending the next day, 30% consumed it and 12% disposed of it.

Conclusion

The street food vendors were mainly females. Majority of food vendors in Accra exhibited good food hygiene practices. However the street food sector is rapidly expanding and has become a necessary source of food for many people. There is therefore a need to for the vendors to be given regular education on hygienic practices to avoid food contamination and food poisoning.

Reference

Abdussalam, M & Kaferstein, F. K. (1993). Safety of street foods. *World Health. Forum, 14*:191-194.

Ashenafi, M. (1995). Bacteriological profile and holding temperature of ready-to-serve food items in an open market in Awassa, Ethiopia. *Trop. Geogr. Med, 47*: 1-4.

Barro, N., Ouattara, C.A.T., Nikiéma, P., Ouattara, A.S, Traoré, A.S. (2002b). Evaluation de la qualité microbiologique de quelques aliments de rue dans la ville de Ouagadougou au Burkina Faso. Cah. Santé 12: 369- 374.

Bhat, R.V. & Waghray, K. (2000a). Profile of street foods sold in Asian countries. In: Simopoulos, A.P. & Bhat, R.V. (eds.), *Street foods.* World Review of Nutrition and Dietetics. Basel: Karger, 86: 53-99.

Bhat, R.V. & Waghray, K. (2000b). Street foods in Africa. In: Simopoulos, A.P. & Bhat, R.V. (eds.), *Street foods.* World Review of Nutrition and Dietetics. Basel: Karger, 86: 100-122.

Bhat, R.V. & Waghray, K. (2000c). Street foods in Latin America. In: Simopoulos, A.P. & Bhat, R.V. (eds.), *Street foods.* World Review of Nutrition and Dietetics. Basel: Karger, 86: 123-137.

Bryan, F. L., Teufel, P., Riaz, S., Roohi, S., Qadar, F and Malik, Z. (1992). Hazards and critical control points of vending operations at a railway station and a bus station in Pakistan. *J. Food Protect.55:*334-541.

Cakiroglu, F. P. & Ucar, A. (2008). Employees' perception of hygiene in the catering industry in Ankara (Turkey). Food Control, 19: 9-15.

Canet C and C N'diaye. (1996). Street foods in Africa. *Foods, Nutrition and Agriculture. 17/18*. *FAO, Rome,* 18.

Canet, C., N'Diaye, C. (1996). L'alimentation de rue en Afrique. FNA/ANA 17/18: 4-13.

Chaulliac M and Gerbouin-Renolle P (1996). Children and street foods. *Foods, Nutrition and Agriculture. 17/18. FAO, Rome. 1996*: 28.

Dufour A, Snozzi M, Koster W, Bartram J, Ronchi E & Fawtrell L (2003). Assessing microbial safety of drinking water, improving approaches and methods, WHO/OECD, p.11.

Donkor Eric S., Kayang Boniface B., Quaye Jonathan & Akyeh Moses L, (2009). Application of the WHO keys of safer food to improve food handling practices of food vendors in a poor resource community in Ghana. Int. J. Environ. Res. Public Health 2009, 6, 2833-2842.

El-Sherbeeny, M.R., Saddik, M. F. and Bryan, F. Z. (1985). Microbiological profiles of food served by street vendors in Egypt. *Int. J. Food Microbiol. 2*:355-362.

FAO, (1988). Street foods. Report of an FAO expert consultation, Yogyakarta, Indonesia. FAO Rome, Food Nutr. Paper 1988 n° 46.

FAO, (1990). Street foods. *Report of an FAO expert consultation. Jogjakarta, Indonesia, 5-9 December, 1998. FAO Nutr. Pap; 46*:3-30.

FAO, (1997). Street foods. *FAO report, Rome*.1-4.

FAO/WHO Expert Committee on Food Safety (2006). *Technical Report Series, No. 705*.

FAO. (1997a). *Percentage of women street food vendors.* [Online]. Available at:
<http://www.fao.org/NEWS/FACTFILE/FF9708-E.HTM>.
Accessed: 17/08/2004.

Harmayani, E. (2010), Improving the Safety of Urban Street Food, Faculty of Agricultural Technology, Gadjah Mada University, Yogyakarta, Indonesia.

King L.k, Awumbila B, canacoo E.A, Ofosu-Amaah S. *An assessment of the safety of street foods in the Ga district, of Ghana; implication for spread of zoonoses*. Act Trop.2000;76:39-43

Martins, J.H. and Anelich, L.E. (2000). *Improving street foods in South Africa*. FAO report TCP/SAF/8924(A). Food and Agriculture Organisation of the United Nations, Rome. (Pp 1-92).

Matalas, A. and Yannkoulia, M. (2000). Greek street food vending: an old 41 habit turned new. In: Simopoulos, A.P. & Bhat, R.V. (eds.), *Street foods.* World Review of Nutrition and Dietetics. Basel: Karger, 86: 1-24.

Muleta & Ashenafi. (2001). Salmonella, Shigella and Growth potential of other food-borne pathogens in Ethiopian street

vended foods. *East African Medical Journal, Vol. 78 No. 11*, 576-580.
Ohiokpehai, O. (2003). Nutritional Aspects of street foods in Botswana. Pakistan J. Nutr. 2 (2): 76-81.
Payment, P., (1997). Epidemiology of endemic gastrointestinal and respiratory diseases-incidence, fraction attributable to tap water and cost to society. Water Sci. Technol., 35: 7 – 10.
WHO. (1984). The role of Food Safety in Health and Development: Report of a joint World Health Organization (WHO, 1996). Essential safety requirements for street vended foods. Food Safety Unit, Division of Food and Nutrition, WHOIFNUIFOSf96.7

Table 1: Types of ready-to-eat food sold by street vendors

Food	Description	Mode of Cooking	Handling after cooking
Koko (porridge)	Fermented maize dough	Boiling	Served with spoon
Koose	Fried bean cake	Frying	Served hot
Kenkey	Fermented maize dough	Wrapped in maize husks and boiled	Served hot
Banku	Fermented maize dough dumpling	Heating with continuous stirring	Dumpling made by hand in plate or calabash with cold water
Rice	Boiled rice	Boiling	Dished into bowls and served with spoon and hands
Waakye	Rice and beans	Boiling	Scooped into bowls and served with spoon and hands
Fufu	Cassava with plantain/cocoyam	Boiling and pounding with pestle while turning over by hand in mortar.	Served into bowls with hands.
Omotuo	Boiled rice dumpling	Boiling and stirring	Dumpling made by hand in plate or calabash with cold water
Beans	Cooked beans	Boiling`	Served with spoon
Okra soup	Okra and other vegetables; palm oil added	Boiling	Idem
Yam and plantain	Boiled or fried	Boiling or frying	Served hot with hands or spoon
Chofi	Turkey meat	Fried	Stored at ambient temperature until sold Served with hand or fork
Salad	Mixture of leafy vegetables	No cooking	Served with spoon

Table 2: Environment and location of food vending

Characteristic	Frequency	Percentage
Type of vendor		
Stationary	38	76.0
Mobile	12	24.0
Type of vending site	4	8.0
Roadside	21	42.0
In front of house	9	18.0
In a store/kiosk	14	28.0
Other	6	12.0
Place of food preparation		
At home	32	64.0
At the premises	18	36.0
State of surrounding where food is sold		
Dirty	10	20.0
Clean	40	80.0
How often waste is disposed of		
Daily	12	24.0
Twice weekly	29	58.0
Weekly	9	18.0
Acquisition of cooking skills		
Experience	18	36
Taught by parents	16	32
Observation	9	18
Formal training	7	14

Table 3: Demographic characteristics of respondents

Characteristic	Frequency	Percentage
Age		
18-25	13	26.0
26-30	33	66.0
31-35	4	8.0
Sex		
Male	12	24.0
Female	38	76.0
Educational background		
Junior High	7	14.0
Senior High	27	54.0
Polytechnic	9	18.0
University	2	4.0
Never been to school	5	10.0

Table 4: Handling and storage of food

Characteristic	Frequency	Percentage
State of fingernails		
Short	43	86.0
Long	7	14.0
What food is served in		
Bowls/Plates	18	36.0
Polyethylene bags	20	40.0
Leaves	2	4.0
Newspaper	1	2.0
Take away containers	9	18.0
Unsold food		
Consumed	15	30.0
Store for use next day	28	56.0
Thrown away	6	12.0
Others	1	2.0
Storage of unsold food		
Refrigerated	22	44.0
Reheated	25	50.0
Other	3	6.0
Source of drinking water supply		
Pipe borne	7	14.0
Borehole	3	6.0
Well water	3	6.0
Rain water	2	4.0
Sachet water	35	70.0