



# Food hygiene practices and attitudes of the street food vendors at KwaDlangezwa, Northern KwaZulu Natal

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## Abstract

The main aim of the study was to assess food hygiene practices and attitudes of a sample of street food vendors at KwaDlangezwa in KwaZulu Natal, South Africa. The study adopted a qualitative research approach and purposive sampling. Data was collected by means of interview questionnaires and an observation schedule and it was collected in the form of face-to-face communications. The data analysis was conducted using Excel for Microsoft office to formulate graphs and tables from the responses of the various participants. Very few of the vendors in this study acknowledged that it was important to store food at its correct temperature so as to prevent spoilage and some of them said improper storage of food may be hazardous to health. This calls for the urgent training on hygiene practices and food safety of street vendors and governmental support at the local levels.

**Keywords:** food borne illnesses, food contamination, food hygiene, food safety, food vendors.

## Introduction

Street food vending is an issue of major concern when it comes to health issues. This is mainly as a result of the growing prevalence of food borne diseases, due to food vendors lacking an understanding of even the most basic food safety issues. The risk of foodborne infection associated with cross-contamination depends on two factors, namely the level of contamination on the surfaces and the probability of its transfer to the foods being consumed. Those involved in food preparation and service have a vital role to play in the prevention of foodborne disease and their actions can be critical in preventing an outbreak of infections. The importance of effective cleaning and disinfection of food surfaces for reducing the potential of cross-contamination is well recognised and is an important component of food safety management systems globally. Street vended foods are often appreciated for their unique flavours, convenience and the role they play in the cultural and social heritage of societies and have also become important and essential for maintaining the nutritional status of the population, hence, food vending plays a vital role in developing countries in meeting the food demands of urban dwellers (Muinde & Kuria, 2005, Chukuezi, 2010 and Rane, 2011). It has however become an important public health issue and a great concern to everybody due to a widespread growth of food borne diseases caused by lack of adequate understanding of basic food safety (Rane, 2011). In studies conducted by Latham (1997) and Muinde & Kuria (2005), it is stated that street foods feed millions of people daily with a variety of foods that are relatively cheap and easily accessible.

According to Hanashiro, Marisa, Glavur, Matt-e Maria, Matt-e and Torres (2005), the safety of street foods is affected by several factors starting from the quality of the raw materials to food



handling and storage practices. In most cases, the flow of water from taps is not regular enough for suitable hand and dishwashing, cooking or drinking, leading street vendors to store water under vulnerable conditions in which it is subjected to severe contamination. The foods that are prepared on the street, known as street foods are exposed to appalling environmental conditions such as the presence of insects, rodents, domestic animals or other animals and air pollution. Most food vendors do not observe good food handling practices, exposing foods to dangerous conditions such as cross contamination, unsafe storage and poor time-temperature conditions (Ekanem, 1998). Rane (2011) also elaborates on the major sources that contribute to microbial contamination which include place of preparation, utensils for cooking and serving, raw materials, time and temperature abuse of cooked foods and the personal hygiene of street food vendors.

There are perceptions that street vended foods are mainly unsafe because of the environment under which they are prepared, sold and consumed, which exposes the food to contamination (Muinde & Kuria, 2005). There are various factors that may be causing food borne disease in a foodservice environment which include foods from unsafe sources, inadequate cooking, contaminated equipment and poor personal hygiene (Sani & Siow, 2014). The authors further elaborate that there are other additional factors such as improper holding times or temperatures during processing, for instance of ready-to-eat foods because they are often prepared in advance before consumption and are subjected to temperature abuses during serving and distribution thus allowing bacterial growth. Contamination of street food is often linked to the waste generated by food processing, that is usually dumped near the vending site (Rane, 2011). Evans, Madden, Doudlas, Adak, Obrien, & Djuretic (1998), argues that good personal hygiene and proper food handling practices can minimise the transfer of pathogens from food handlers to consumers. The risk of foodborne infection associated with cross-contamination depends on two factors, namely; the level of contamination on the surfaces and the probability of its transfer to the foods being consumed (Bloomfield & Scott 1997). Those involved in food preparation and service have a vital role in prevention of foodborne disease and their actions can be critical in preventing an outbreak of infection. The importance of effective cleaning and disinfection of food surfaces for reducing the potential of cross-contamination is well recognised and is an important component of food safety management systems (Sagoo, Little, Griffith & Mitchel, 2003).

Street food has also been associated with causing food borne illnesses in the population owing to the difficulties inherent in ensuring that food is prepared and sold under hygienic conditions (Ameida, Schuch, Ceuller, Diez & Escamilla, 1996; Bryan, Michanie, Alvarez, & Paniaywa, 1988; Umoh & Odoaba, 1999). The safety of street foods is affected by several factors starting from the quality of the raw materials to food handling and storage practices. In most cases, the flow of water from taps is not always available to wash hands and dishes, cooking or drinking, thus leading street vendors to store water under vulnerable conditions subjected to contamination. As a result, most food vendors do not observe good food handling practices, exposing foods to dangerous conditions such as cross contamination, unsafe storage and poor time-temperature conditions. Those involved in food preparation and service have a vital role to play in the ongoing prevention of foodborne disease and their actions can be critical in preventing an outbreak of infection. The importance of effective cleaning and disinfection of food surfaces for reducing the potential of cross-contamination is well recognised and is an important universally accepted component of food safety management systems.

The unlimited and unregulated growth of street vended foods has placed a severe strain on resources such as water, sewage systems and interference with the plans through congestion and littering adversely affecting daily life (Canet & N'diaye, 1996; Chaulliac & Gerbouin-Renolle, 1996). Therefore, these conditions of street food and vending raise many concerns for a consumer's health (Mosupye and von Holy, 1999). Chukuezi (2010) also states that the rise of



street food vending has created health problems like improper and unhygienic handling of food. The author further elaborates that street vendors are often unlicensed, untrained in food safety, food hygiene and sanitation and work under unsanitary conditions. Rane (2011) coincides that unsanitary handling of street foods by some of the vendors has been commonly found to be the source of contamination. Omemu & Aderoju (2008), emphasises that cooked foods should not be handled with bare hands but clean food tongs, forks, spoons or disposable gloves should be used when handling, serving or selling food. Food handlers have a major role in the prevention of food poisoning during food production and distribution. They can be vectors in the spread of foodborne diseases because of poor personal hygiene or cross-contamination. Foodborne illness has been associated with improper storage or reheating, food stored inappropriately and cross-contamination (Bean & Griffin, 1990). These contributory factors are due to the lack of food hygiene awareness or implementation (Walker, Pritchard, & Forsythe, 2003). Food handlers should refrain from handling money and food at the same time, if it is not avoidable, the food handler should wash his/her hands after handling money before handling food (Annon, 1999).

Food business operators are required to keep their premises clean, maintain them in good repair and condition, and ensure that food handlers are trained or instructed in good hygiene practices. Effective cleaning and the prevention of cross-contamination are both essential in ensuring that ready-to-eat food served by mobile food vendors is safe for consumption (Food Standard Agency (FSA), 2006). According to Favero, Gabis & Vesley (1984), the effectiveness of cleaning practices can be monitored and/or verified by environmental sampling. However, few standards or guidelines have been published on what is an acceptable level of microbiological contamination on surfaces. Muzaffar (1998), states that street vending is a prevailing and distinctive part of a large informal sector. The author further states that it is commonly viewed in public spaces, particularly in the cities and distinctive in the sense that it provides a basic need to the urban inhabitants. The street food enterprise is generally small in size, requires relatively simple skills, basic facilities and small amounts of capital. As such, such enterprises hold tremendous potential for generating income and employment for the rapidly growing population of KwaDlangezwa.

Food poisoning is a devastating ailment and bacteria, moulds and viruses found in food can cause food poisoning which may often result in severe inflammation of the stomach and bowels and a severe condition known as gastroenteritis. In extreme cases it may even lead to blood poisoning and kidney failure. It is important to note that food can easily become contaminated at any stage of the production process by a wide range of both waterborne and food-borne illnesses such as salmonella or e-coli. Salmonella bacteria infection is a major food-borne illness that causes nausea, vomiting, diarrhoea and high fever but we should note that salmonella food poisoning is not limited to roadside stalls alone.

General lack of factual knowledge about the epidemiological significance of many streets vended foods, poor knowledge of basic food safety measures and inadequate public awareness of hazards posed by certain foods has severely hampered the deployment of a precise scientific approach to the issue of public health and safety (Rane, 2011). The author further states that street foods are perceived to be a major public health risk due to the lack of basic infrastructure and services, difficulty in controlling the large numbers of street food vending operations because of their diversity, mobility and temporary nature. Panisello & Quantick (2001), states that small businesses may lack the in-house knowledge and resources to identify foodborne microbial hazards and therefore incorrectly implement Hazard Analysis Critical Control Point (HACCP). A study done by Walker *et al.* (2003) shows that many food handlers are not aware of the basic temperature control requirements for the control of microbial hazards.



According to Bas, Ersun & Kivanc (2006), the limited research related to food safety knowledge, practices and attitudes of food handlers in food businesses indicates that food-handling problems needs to be addressed. Ehiri & Morris (1996), have pointed out that data on risk factors of foodborne diseases imply that most outbreaks result from improper food handling practices. In order to reduce foodborne illnesses, it is crucial to gain an understanding of the interaction of prevailing food safety beliefs, knowledge and practices of food handlers (WHO, 2006). Howes, McEwen, Griffiths, & Harris (1996); Powell, Attwell & Massey (1997), have also indicated that although training may bring about an increased knowledge of food safety, it does not always result in a positive change in food handling behaviour. Walker *et al.* (2003), also confirms that knowledge in food safety alone does not lead to changes in food handling practices as such.

Most of the food vendors who sell both raw and cooked food items are not regulated; they operate haphazardly without any monitoring of what they prepare and how the food is prepared (Omemu & Aderoju, 2008). Muinde & Kuria (2005), states that street food vendors practice minimal hygienic and sanitary practices. The authors' further state that the minimal hygiene practices of street food vendors is due to the lack of proper knowledge and guidance on street food vending, preparation of food in explicitly unhygienic and insanitary conditions. According to Sani and Siow (2014), effective food safety trainings from supporting organisations as well as adequate resources will strengthen food handling and workplace safety practices. Food handlers should have skills and knowledge needed to ensure the safety of foods prepared for consumption.

In a study that was done by Onyeneho and Hedberg in Owerri, Nigeria in 2013, it stipulates that food safety issues in Africa are mostly centered on illnesses that are linked to poor hygiene but food hygiene in homes, schools and markets remains an area of concern. Although outbreaks are frequent in the African region, individual countries have done little to implement surveillance systems for food-borne diseases. Symptoms of foodborne illnesses such as vomiting, diarrhoea, fever are regarded as common diseases. There is lack of proper monitoring and supervision by food safety officers and the enforcement of food hygiene regulations. Most of the eating stalls around markets in Nigeria are characterized by unsanitary conditions, including poor water supply and poor drainage systems, unsanitary waste disposal and overcrowding, resulting in poor personal and environmental hygiene.

Sani & Siow (2014), states that apart from food safety knowledge, attitude is also a crucial factor that may influence food safety behaviour and practice, thus decreasing the occurrence of foodborne diseases. Personal hygiene is also extremely vital to ensure production of safe food to consumers. Food handlers should always wash their hands at every stage of food production, particularly before handling food, after eating, touching contaminated materials, using the bathroom, smoking, sneezing, coughing, handling money, and engaging in activities that may contaminate food. The hands are the most important vehicle for the transfer of organisms from faeces, nose, skin or other sites to food (WHO, 1989; Rane, 2011). In a study done by Walker *et al.* (2003), they confirm that a majority of food handlers know the reason of separating cooked and raw foods but their knowledge of keeping work surfaces hygienically clean to avoid cross-contamination is poor. The authors further state that, food handlers need to be able to identify high-risk foods that support survival and multiplication of pathogens and intended for consumption without further treatment.

According to Kumar (2012), food safety is a scientific discipline describing the handling, preparation, and storage of food to prevent food borne illness. Since food safety is of utmost importance. Amongst others, it can be ensured by maintaining proper hygiene standards and personal and work area hygiene. Food preparation plays an increasingly important part in our experience of food quality and safety. Annor & Baiden (2011) observe that, food businesses have



become widespread in recent times in response to the lifestyle and food consumption of people. Street food vendors offer convenience and ease of access to food to busy individuals and guests and tourists, who are unable to prepare their own meals regularly. In a large scale when cooking, food passes through many hands, thereby increasing the chances of food contamination due to improper handling. Foods handlers have a prime role to play in ensuring meals served are hygienic and safe for consumption by their clients. Many of the food handlers are not aware of the importance of basic temperature control requirements in controlling microbial growth in food and if it is inadequately performed, it will lead to multiplication of microbial hazards and thereafter food borne diseases (Adams & Moss, 2008; WHO, 2006).

## **Methodology**

The study adapted a qualitative research approach and the emergent research design was used. The data was collected by the use of interview questionnaires and observation schedule and was done in the form of a face-to-face communication. Purposive sampling was used because of the knowledge of the number of food vendors in the area of KwaDlangezwa. The instruments that were used for collecting data were an observing schedule, and also interview questions with open format questions. By including open format questions in the interview, the researcher was able to obtain true, insightful and even unexpected suggestions from the food vendors.

The questionnaire was divided into various sections where demographic information and food hygiene practices were assessed. Participants were interviewed using the unstructured interview method based on their business practices (Mjoka, Selepe & du Preez, 2016) and observation based on their food hygiene practices. The observation was done for a duration of forty minutes per food vendor and the interview did not have a specific time for completion.

The analysis of data was conducted using the Excel to capture the data on a soft copy, measure the data and convert to tables and graphs. This had a great advantage of increasing the validity in the instrument being used where vendors' obscurity can be better guaranteed with confidentiality maintained. The data analysis method used was the inductive method for theory development generated by the research, where findings were analysed after the data collection.

## **Ethical Considerations and Limitations**

An assurance of confidentiality and protection of the information obtained from the participants was given. The interview questionnaire and observation schedule did not include any names or surnames of the participants. A consent form was drafted and given to participants for signature ensuring that they agree to participate in the project and they were not given any form of incentive or payment, and they were free to opt out at any stage if that was their wish. Random sampling was not possible to accomplish due to insufficient resources and it prevented the generalization of the results, hence, purposive sampling was used instead.

## **Data interpretation and analysis**

The following data analysis refers to the responses from data collected and reflects the views and perceptions of respondents with regards to the investigated topic. This data was analysed using the Excel for Microsoft office to formulate graphs and table from the responses of participants. This paper consists of all the findings from the research sample of eight food vendors in KwaDlangezwa. The main aim of the study was to explore food hygiene practices and attitudes of selected food vendors at KwaDlangezwa with a view of food safety.



### Characteristics of respondents (N=8)

The socio-demographic of respondents is basically the gender, age, occupation, ethnic group the respondent belongs to, the place of residence and main language spoken at home of the participant. In table 1 the socio-demographic characteristics of respondents are summarised. Five of the food vendors (62.5%) were males and the average age of the respondents was 35.6. All the respondents (food vendors) were Black Africans and their main language spoken at home was IsiZulu, and they all resided off campus (Mjoka *et al.*, 2016).

### Results and discussion

A food handler must take all reasonable measures not to handle food or surfaces likely to come into contact with food in a way that are likely to compromise the safety and suitability of food. Table 1 below shows a summary of the attitudes of food vendors concerning food safety.

**Table 1 Attitudes of food handlers on food safety (adopted from Bas *et al*, 2006).**

Statements	Agree	Disagree
Safe food handling is not an important part of my job responsibilities	3	5
Learning more about food safety is important to me	8	0
I believe that how I handle food relates to food safety	6	2
It is not necessary to keep raw foods and cooked foods separately	3	5
Defrosted foods may be refrozen only once	1	7
Using cap does reduce the risk of food contamination	3	5
Using protective gloves reduces the risk of food contamination	1	7
Adequate clothing reduces the risk of food contamination	4	4
It is important to know the temperature at which I keep the food to prevent it from spoiling	6	2
Improper storage of foods may be hazardous to health	5	3
Food-services staff with abrasion or cuts on fingers or hands should not touch unwrapped foods.	8	0
It is not important to clean the table tops after food preparation	1	7
It is important to clean the table tops before food preparation	8	0
It is not important to wash the cloths regularly	0	8
It is important to wash my hands after using the toilet or bathroom	8	0
It is important to use clean Utensils at all times	8	0

All the food vendors agreed that learning about food safety was important to them, and that staff with abrasions should not touch unwrapped foods, it is important to clean table tops before the food is prepared, wash hands after using the lavatory or bathroom and to use clean utensils all the times. They also disagreed that it is not important to wash cloths regularly. One of the food vendors agreed that using protective gloves reduces the risk of food contamination while others disagreed.

In table 2 on the following page, the practices toward food-borne disease prevention are summarised.



**Table 2 Practices of food handlers towards prevention of cross contamination (adopted from Bas *et al*, 2006).**

Vendor	Hands washed <sup>a</sup>	Work station cleaned <sup>b</sup>	Face is touched <sup>c</sup>	Body is touched <sup>d</sup>	Head is scratched <sup>e</sup>	Money is touched <sup>f</sup>
1	3	0	12	15	3	0
2	3	0	7	8	1	25
3	3	3	5	8	1	4
4	0	2	7	4	1	16
5	0	2	5	15	2	3
6	4	6	8	9	0	0
7	0	3	0	13	0	6
8	0	4	3	8	2	5
Statements	Never	Rarely	Sometimes	Often	Always	
Do you use gloves when you touch or distribute unwrapped foods?	8	0	0	0	0	
Do you wash your hands before using gloves?	8	0	0	0	0	
Do you wash your hands after using gloves before touching food again?	8	0	0	0	0	
Do you use protective clothing when you touch or distribute unwrapped foods?	2	1	1	2	2	
Do you wear a cap or cover your hair when you touch or distribute unwrapped foods?	3	1	1	1	2	
Do you wash your hands before touching unwrapped raw foods?	0	0	4	1	3	
Do you wash your hands after touching unwrapped raw foods?	0	0	0	2	6	
Do you wash your hands before touching unwrapped cooked foods?	0	0	6	0	2	

It is clear that not all the food vendors wear gloves at all when preparing food. Six of them always wash their hands after touching unwrapped raw foods and two always wash their hands before touching unwrapped cooked foods. All the food vendors in the study were observed for a period of forty minutes on successive days. The observation was based on the food vendors' practices of food hygiene.

Table 3 shows a summary of the evaluation of food hygiene practices.

<sup>a</sup> Number of times vendor washed hands.

<sup>b</sup> Number of times vendor cleaned the work station.

<sup>c, d, e, f</sup> Number of times face, body, head was scratched and money was touched the same time as food.

Of the eight food vendors, three of the vendors had running tap water and five of them had a tap close by where they fetched water from and stored it in containers. Four of them did not wash their hands at all, two of them did not clean their work stations, one did not wash hands after touching his face, and two did not wash hands after scratching their heads and handling money.



Six of the food vendors believe that they have adequate information on hygiene and two of them did not. The use of the bathroom and smoking during preparation without washing hands before preparing food was also observed, but no one went to the bathroom during the observation period. One of the food vendors does smoke during food preparation and does not wash hands. The food vendors were also asked how they deal with cuts or abrasions, and the responses are listed below:

- **Food vendor 1-** Cleans the cut and puts an Elastoplast or bandage depending on how deep the cut is.
- **Food vendor 2-** Cleans the cut and puts an Elastoplast or bandage depending on how deep the cut is and also put plastic on the finger and wrap it tightly.
- **Food vendor 3-** Puts Elastoplast or bandage.
- **Food vendor 4-** Have first aid kit and use it if someone has a cut or bruise. The injured person is assisted by someone in the office.
- **Food vendor 5-** Wash the cut and put medical spirit on the cut and clean it, then puts an Elastoplast.
- **Food vendor 6-** Uses Elastoplast or bandage depending on the cut.
- **Food vendor 7-** Also uses Elastoplast on the cuts.
- **Food vendor 8-** Asks someone close by to assist in covering the cut or bruise with an Elastoplast or bandage.

Table 4 shows a summary of the evaluation on what the vendors wear during preparation, if they cover food and store it at its correct temperature, use clean cloths and utensils always.

**Table 4 Hygiene practices of food vendors during food preparation.**

*Y=Yes, all the time; N=No, not at all; P=Part of the time*

Vendor	Hairnets <sup>1</sup>	Chef jackets/a prons <sup>2</sup>	Gloves <sup>3</sup>	Store food at correct temperature	Cover food	Cloths always clean	Utensils clean before use
1	N	Y	N	N	Y	Y	Y
2	Y	Y	N	N	P	Y	Y
3	N	Y	N	N	Y	N	Y
4	Y	N	N	N	P	N	N
5	N	N	N	Y	P	N	N
6	N	N	N	N	Y	N	N
7	N	N	N	N	P	N	N
8	N	P	N	N	N	N	N

<sup>1,2,3</sup> Food vendors wear hairnets, chef jackets or aprons and gloves.

None of the food vendors wears gloves. Seven of the food vendors do not store food at the correct temperature, six of them do not wear hairnets but always had clean cloths, and five of food vendors do not always use clean utensils. Only one food vendor had an appropriate area for waste disposal while the other vendors did not, and they tended to use boxes, bin bags and plastic bags. It was also observed that only one food vendor did not have storage facilities, but used containers to store food while the others had freezers, fridges and cupboards or shelves. Food





vendors five and eight, did not use oil. Food vendor one and four only used oil for one week, while food vendors two and three used oil for some weeks before discarding it. Food vendor six used oil for four days then discarded it. Food vendor seven used the oil for one or two days before discarding it depending on how busy he was.

We consequently suggest some basic hygienic food preparation ideas for street vendors to observe when preparing their products. It is essential first and foremost, that vendors wash their hands with soap after using the toilet and that they remove any watches and rings since these often harbour bacteria. The counter tops must be clean. In addition, they should cover their hair and use disposable gloves which need to be replaced on a regular basis. The counter tops at the stalls must be clean and the vendors need to cover their hair and food should be handled with gloves which must be changed regularly. Some food types need to be frozen or refrigerated as needed as well.

### **Conclusion and Recommendations**

Street food vendors are not completely ignorant of the basic food hygiene practices they should follow but practicing street food vending the way it suits them and this is most likely due to the fact that no one is complaining about the unsafe food produced by the. From the interviews and observations of the study, it is clear that there is still much way to go in terms of hygiene practices, temperature control and food safety practices. All the vendors acknowledged that the tables should be clean before food preparation when observed, and it was discovered that two of the food vendors did not clean their working stations at all. Health hazards from street food vending may be minimised by avoiding poor handling and greater awareness of the need for personal hygiene, care in preparation, storage, accessibility to clean water, taking care of wounds or cut in the appropriate manner and provision of street foods. All food vendors agreed that learning about food safety and hygiene (both personal and food hygiene) is important to them. Most of the vendors disagreed that defrosted foods may be refrozen and also acknowledged the significance of storing food at correct temperatures to prevent spoilage and foodborne illnesses.

Food handlers should be trained and supervised by governmental health officials to ensure proper hand washing, adequate cleaning and good sanitation procedures (Sneed et al., 2004). Chukuezi (2010) recommends basic training in food hygiene in order to ensure that food vendors follow the required rules for proper hygiene and sanitation. The authors further recommend training on hygiene and sanitation issues, continuous food safety education and the provision of basic water and waste management facilities aligned to their vending spaces.

This paper recommends that every street food vendor, helper or food handler should undergo basic training in food hygiene and safety in order to ensure that they follow the required and correct procedures of proper hygiene and sanitation relating to food production. The government should invest in the street food industry as it provides employment, affordable food and a wide variety of foods for the urban dwellers (Muinde and Kuria, 2005). Legislation should also be developed in order to recognise the street food industry by developing a code of practice for street food vending, and this should be driven by the ministries of Health and Local government. The Local Government ministries should also consider the establishment of street food centres with adequate facilities and utility services. These centres will provide an environment for storing, preparing and serving safe food and serve as food vending areas

Food handlers should attend a training and education programme on hygiene and safety at least quarterly, thus improving their knowledge of food safety and awareness of hygiene practices. The training programmes should be compulsory for all street food vendors. The training should include inter alia, the procedures to prevent food contamination, risks of foodborne pathogens, and



perception of good food handling practices and personal hygiene, proper sanitation of food, cleaning of utensils and the environment, and also ensure that food handlers are kept updated about the required procedures in maintaining quality and safety of the food produced (Campos *et al.*, 2009) by them.

## References

- Adams, M. R. & Moss, M. O. (2008). *Food Microbiology*. Cambridge: The Royal Society of Chemistry.
- Ameida, C.R., Schuch, D.M.T., Ceuller, J.A., Diez, A.V. & Escamilla, J.A. (1996). *Microbial contamination of street foods sold by street vendors in cities of Latin America*. Geneva, Switzerland: World Health Organisation.
- Annor, G. A. & Baiden, E. A. 2011. Evaluation of Food Hygiene Knowledge Attitudes and Practices of Food Handlers in Food Businesses in Accra, Ghana. *Food and Nutrition Sciences (Online)*, 2:8. Available: <http://www.jourlib.org> (Accessed 12 April 2015).
- Bas, M., Ersun, A.S. & Kivanc, G. (2006). The evaluation of food hygiene knowledge, attitudes and practices of food handler's in food businesses in Turkey. Baskent University.
- Bean, N.H., Griffin, P.M. (1990). Foodborne disease outbreaks in the United States 1973-1987: pathogens, vehicles and trends. *Journal of Food Protection (Online)*, 51:9.
- Bloomfield, S. & Scott E. (1997). Cross-contamination and infection in the domestic environment and the role of chemical disinfectants. *Journal of Applied Microbiology (Online)*, 83:1. Available: <http://onlinelibrary.wiley.com> (Accessed 12 April 2013).
- Bryan, F.L., Michanie, S., Alvarez, P. & Paniaywa, A. (1988). Critical control points of street vended foods in the Dominican Republic. *Journal of Food Protection (Online)*, 51:5. Available: <http://www.ingentaconnect.com> (Accessed 15 March 2012).
- Campos, A. K. C., Cardonha, A. M. S., Pinheiro, L. B. G., Ferreira, N. R., Medeiros de Azevedo, P. R. & Stamford, T. L. M. (2009). Assessment of personal hygiene and practices of food handlers in municipal public schools of Natal, Brazil. *Food Control (Online)*, 20:9. Available: <http://www.sciencedirect.com> (Accessed 23 May 2016).
- Canet, C. & N'diaye, C. (1996). *Street Foods in Africa*. Foods, Nutrition and Agriculture. 17:18. Rome: FAO. (Online). Available: <http://agris.fao.org> (Accessed 04 March 2012).
- Chaulliac, M. & Gerbouin-Renolle, P. (1996). Children and street foods. *Foods, Nutrition and Agriculture*. 17:18. FAO, Rome. (Online). Available: <http://agris.fao.org> (Accessed 04 March 2012).
- Chukuezi, C.O. (2010). Food safety and hygiene practices of street food vendors in Owerri, Nigeria. *Journal of Sociology Science (Online)*, 1:1. Available: <http://www.cscanada.net> (Accessed 15 February 2016).
- Ehiri, J. E. & Morris, G.P. (1996). Hygiene training and education of food handlers: Does it work? *Ecology of Food Nutrition (Online)*, 35:4. Available: <http://www.tandfonline.com/> (Accessed 23 March 2012).



Ekanem, E.O. (1998). The street food trade in Africa: safety and socio-environmental issues. *Food Control* (Online) 9:4. Available: <http://www.sciencedirect.com> (Accessed 04 March 2012).

Evans, H.S., Madden, P., Doudlas, C., Adak, G.K., Obrien, S.J. & Djuretic, T. (1998). General outbreaks of infectious intestinal disease in England and Wales: 1995 and 1996. *Journal of Communicable Disease and Public Health* (Online) 1:3. Available: <http://www.researchgate.net> (Accessed 12 March 2016).

Favero, M., Gabis, D. & Vesley, D. (1984). Environmental monitoring procedures. In *Compendium of methods for the microbiological examination of foods*. Washington, DC.

Food Standards Agency. (2006). *Safer food, better business for caterers*. (Online). Available: <http://www.food.gov.uk> (Accessed 10 August 2012).

Hanashiro, A., Marisa, M., Glavur, R., Matt-e Maria, H., Matt-e, E. & Torres, A.F.S. (2005). Microbiological quality of selected street foods from a restricted area of Sao Paulo City. Brazil. *Food Control* (Online), 16:5. Available: <http://www.sciencedirect.com> (Accessed 05 March 2012).

Howes, M., McEwen, S., Griffiths, M. & Harris, L. (1996). Food handler certificate by home study: measuring changes in knowledge and behaviour. *Dairy, Food and environmental Sanitation* (Online), 16:11. Available: <http://cat.inist.fr/?aModele=afficheN&cpsid=10075806> (Accessed 12 March 2016).

Huq, I., Mallik, B. V. & Muzaffar, A. T. (2009). Entrepreneurs of the streets: an analytical work on the street food vendors of Dhaka City. *International Journal of Business and Management* (Online), 4:2. Available: <http://www.ccsenet.org/journal.html> (Accessed 10 February 2016).

Kumar, A. (2012). Food Safety and Quality: an Overview of Practical Implementation in Selected Hotels of Haryana Tourism. *International Journal of Hospitality & Tourism Systems* (Online), 5:1. Available: <http://eds.b.ebscohost.com> (Accessed 20 April 2015).

Latham, M.C. (1997). *Human Nutrition in Tropical Africa. A Textbook for Health Workers with special reference to Community Health Problems in East Africa*. (Online) Available: <http://www.cabdirect.org/> (Accessed 26 April 2016).

Mjoka, J., Selepe, M. & du Preez, C. 2016. An investigation into business practices of selected street food vendors at KwaDlangezwa, Northern KwaZulu Natal. *African Journal of Hospitality, Tourism and Leisure* (Online), 5:2. Available: [http://: www.ajhtl.com](http://www.ajhtl.com) (Accessed 03 April 2016).

Mosupye, F.M. & von Holy, A. (1999). Microbiological quality and safety of ready-to-eat street-vended foods in Johannesburg, South Africa. *Journal of Food Protection* (Online), 62:11. Available: <http://www.ingentaconnect.com> (Accessed 03 March 2012).

Muinde, O.K. & Kuria, E. (2005). Hygienic and sanitary practices of vendors of street foods in Nairobi, Kenya. *African Journal of Food Agriculture and Nutritional Development* (Online), 5:1. Available: <http://www.ajfand.net> (Accessed 15 February 2016).

Muzaffar, A. (1998). *An Economic Survey of the Informal Sector in Sutrapur Thana, Dhaka*, Unpublished Research Paper, North South University, Dhaka, Bangladesh.

Omemua, A.M. & Aderojub, S.T. (2008). Food safety knowledge and practices of street food vendors in the city of Abeokuta, Nigeria. *Food Control* (Online), 19:4. Available: <http://www.sciencedirect.com> (Accessed on 15 February 2016).



Onyeneho, S.N. & Hedberg, C.W. 2013. An Assessment of Food Safety Needs of Restaurants in Owerri, Imo State, Nigeria. *International Journal of Environmental Research and Public Health* (Online) 10:8. Available: [www.mdpi.com/journal/ijerp](http://www.mdpi.com/journal/ijerp) (Accessed on 13 March 2015).

Panisello, P.J. & Quantick, P.C. (2001). Technical barriers to hazard analysis critical control point (HACCP). *Food Control* (Online), 18:3. Available: <http://www.sciencedirect.com> (Accessed on 25 April 2016).

Powell, S.C., Attwell, R.W. & Massey, S.J. (1997). The impact of training on knowledge and standards of food hygiene Eth a pilot study. *International Journal of Environmental Health Research* (Online) 7:4. Available: <http://www.tandfonline.com> (Accessed 13 March 2016).

Rane, S. (2011). Street vended food in developing world: Hazard analyses. *Indian Journal Microbiol* (Online) 51:1. Available: <http://www.springer.com> (Accessed 16 February 2016).

Sagoo, S., Little, C., Griffith, C. & Mitchel, I R. (2003). A study of cleaning standards and practices in food premises in the United Kingdom. (Online) Available: [http:// www.food.gov.uk](http://www.food.gov.uk) (Accessed 12 April 2013)

Sani, N. A. & Siow, O.N. (2014). Knowledge, attitudes and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control* (Online) 37. Available: <http://www.sciencedirect.com> (Accessed on 10 December 2015).

Sneed, J., Strohbehn, C., Gilmore, S. A. & Mendonca, A. (2004). Microbiological evaluation of foodservice contact surfaces in Iowa assisted- living facilities. *Journal of the American Dietetic Association* (Online), 104:11. Available: [http:// www.sciencedirect.com](http://www.sciencedirect.com) (Accessed 14 February 2016).

Umoh, V.J. & Odoaba, M.B. (1999). Safety and quality evaluation of street foods in Zaria, Nigeria. *Food Control* (Online), 10:1. Available: <http://www.sciencedirect.com> (Accessed 04 April 2012).

Walker, E., Pritchard, C. & Forsythe, S. (2003). Food handler's hygiene knowledge in small food businesses. *Food Control* (Online), 14:5. Available: <http://www.sciencedirect.com> (Accessed 28 April 2016).

World Health Organization WHO. (1989). Health surveillance and management procedures for food handling personnel. WHO technical report series, 785. (Online). Available: <http://apps.who.int/iris/handle> (Accessed 25 April 2016).

World Health Organization (WHO). (2006). *Five keys to safer food manual*. Geneva, Switzerland: Department of Food Safety, Zoonoses and Food Borne Diseases- World Health Organization.