



UNIVERSITI PUTRA MALAYSIA

***FOOD HYGIENE PRACTICE AND ITS ASSOCIATED FACTORS AMONG
STREET FOOD VENDORS IN SELECTED FOOD VENDING LOCATIONS
IN BAUCHI METROPOLIS, NIGERIA***

FARIDA YAHAYA

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By

FARIDA YAHAYA

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfillment of the Requirements for the Degree of Master of Science**

April 2018

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DEDICATION

This work is dedicated to my extended family.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

FOOD HYGIENE PRACTICE AND ITS ASSOCIATED FACTORS AMONG STREET FOOD VENDORS IN SELECTED FOOD VENDING LOCATIONS IN BAUCHI METROPOLIS, NIGERIA

By

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April 2018

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Faculty : Medicine and Health Sciences

Street food vendors (SFVs) contribute immensely in providing relatively nutritious food and livelihoods to many people in developing countries. However, there is a growing concern over the safety of the foods, particularly considering the vendors' characteristics and operational mode. This study evaluated the food hygiene practice and its associated factors among SFVs in selected food vending locations in Bauchi metropolis, Nigeria.

A cross-sectional study was performed on samples of 300 SFVs operating in selected food vending locations in Bauchi metropolis, which were selected and interviewed face to face from May to June, 2016. The data was collected using pre-tested structured questionnaire, containing four sections: SFVs' characteristics, knowledge regarding food hygiene, attitude towards food hygiene and food hygiene practices. Statistical Software for Social Sciences (SPSS) version 21 was used throughout data analyses in this study. Both descriptive (frequencies, percentages, mean, standard deviation) and inferential statistics (chi-square and logistic regression) were employed to achieve robust results.

Out of 300 SFVs that participated in this study, 174 (58.0%) are females, average aged 31 ± 6.68 years, mainly characterized with low level of education 277 (92.3%), non-attendance of food hygiene training 244 (81.3%), and uncertified food businesses 246 (82.0%). Most of them 175 (58.30%) have poor level of knowledge regarding food hygiene, 189 (63.0%) have good level of attitude towards food hygiene and 151 (50.3%) have poor level of food hygiene practice. The chi-square test revealed that certain SFV's characteristics including gender ($\chi^2 = 10.094$, $p < 0.05$), education

($\chi^2 = 8.147, p < 0.05$), experience ($\chi^2 = 9.071, p < 0.05$), food hygiene training ($\chi^2 = 23.011, p < 0.05$), level of food hygiene knowledge ($\chi^2 = 42.754, p = 0.001$) and attitude towards food hygiene ($\chi^2 = 16.785, p = 0.001$) are associated with the level of food hygiene practice. From multiple logistic regression model as well, gender (AOR = 1.935, 95%CI = 1.129-3.317, $p < 0.05$), experience (AOR = 2.537, 95%CI = 1.270-5.070, $p < 0.05$), training (AOR = 3.649, 95%CI = 1.542-8.636, $p < 0.05$), knowledge (AOR = 3.487, 95%CI = 1.976-6.154, $p < 0.05$) and attitude towards food hygiene (AOR = 2.386, 95%CI = 1.371-4.153, $p < 0.05$) are the factors predicting good food hygiene practice among SFVs.

These findings showed that only less than half of the SFVs have good food hygiene practices, therefore it is recommended that relevant stakeholders should put much emphasis on all possible means for improving food hygiene practices among the SFVs which eventually safeguards the quality of the vended food. This should be done while taking into cognisance the factors found to be associated with food hygiene practice among the surveyed SFVs.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**AMALAN KEBERSIHAN MAKANAN DAN FAKTOR-FAKTOR
BERKAITAN DALAM KALANGAN PENJUAL MAKANAN JALANAN DI
LOKASI JUALAN MAKANAN TERPILIH DI METROPOLIS BAUCHI,
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Penjual makanan jalanan (SFVs) memberi sumbangan yang sangat besar dalam menyediakan makanan yang agak berkhasiat dan mata pencarian kepada ramai orang di negara-negara membangun. Walau bagaimanapun, kebimbangan terhadap keselamatan makanan semakin meningkat, terutamanya melihat kepada ciri-ciri penjual dan mod operasi. Kajian ini menilai amalan kebersihan makanan dan faktor-faktor yang berkaitan dalam kalangan SFVs di lokasi jualan makanan terpilih di metropolis Bauchi, Nigeria.

Kajian keratan rentas telah dijalankan terhadap 300 SFVs sampel yang beroperasi di lokasi jualan makanan terpilih di metropolis Bauchi, dimana mereka dipilih dan ditemubual secara bersemuka dari Mei sehingga Jun 2016. Data kemudiannya dikumpul menggunakan soal selidik berstruktur prauji, yang mengandungi empat bahagian: ciri-ciri SFVs, pengetahuan kebersihan makanan, sikap terhadap kebersihan makanan dan amalan kebersihan makanan. *Statistical Software for Social Sciences* (SPSS) versi 21 telah digunakan sepanjang analisis data kajian ini. Kedua-dua statistik deskriptif (kekerapan, peratusan, purata, sisihan piawai) dan inferensi (khi kuasa dua dan regresi logistik berganda) telah digunakan untuk mencapai hasil yang teguh.

Daripada 300 SFVs yang terlibat dalam kajian ini, 174 (58.0%) merupakan perempuan, purata berumur 31 ± 6.68 tahun, dicirikan mempunyai tahap pendidikan yang rendah 277 (92.3%), tidak menghadiri latihan kebersihan makanan 244 (81.3%), dan mempunyai perniagaan makanan yang tidak berlesen 246 (82.0%). Kebanyakan daripada mereka 175 (58.30%) mempunyai tahap pengetahuan kebersihan makanan

yang rendah, 189 (63.0%) mempunyai sikap yang baik terhadap kebersihan makanan dan 151 (50.3%) mempunyai tahap amalan kebersihan makanan yang rendah. Ujian khi kuasa dua menunjukkan bahawa terdapat beberapa ciri-ciri SFVs termasuk jantina ($\chi^2 = 10.094, p < 0.05$), education ($\chi^2 = 8.147, p < 0.05$), pendidikan ($\chi^2 = 9.071, p < 0.05$), latihan kebersihan makanan ($\chi^2 = 23.011, p < 0.05$), tahap pengetahuan kebersihan makanan ($\chi^2 = 42.754, p = 0.001$) dan sikap terhadap kebersihan makanan ($\chi^2 = 16.785, p = 0.001$) menunjukkan perkaitan dengan tahap amalan kebersihan makanan. Dapat dilihat juga daripada model regresi logistik berganda, jantina (AOR = 1.935, 95%CI = 1.129-3.317, $p < 0.05$), pengalaman (AOR = 2.537, 95%CI = 1.270-5.070, $p < 0.05$), latihan (AOR = 3.649, 95%CI = 1.542-8.636, $p < 0.05$), pengetahuan (AOR = 3.487, 95%CI = 1.976-6.154, $p < 0.05$) dan sikap terhadap kebersihan makanan (AOR = 2.386, 95%CI = 1.371-4.153, $p < 0.05$) merupakan faktor yang meramalkan amalan kebersihan makanan yang baik dalam kalangan SFVs.

Hasil kajian ini menunjukkan bahawa hanya kurang daripada separuh SFVs yang mempunyai amalan kebersihan makanan yang baik, oleh itu adalah dicadangkan bahawa pihak berkepentingan perlu memberi penekanan kepada semua kaedah yang boleh membantu meningkatkan amalan kebersihan makanan dalam kalangan SFVs yang akhirnya akan memastikan kualiti baik makanan yang dijual. Perkara ini perlu dilakukan dengan mengambil kira faktor-faktor yang dilihat berkait rapat dengan amalan kebersihan makanan dalam kalangan SFVs yang dikaji.

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I certify that a Thesis Examination Committee has met on 25 April 2018 to conduct the final examination of Farida Yahaya on her thesis entitled "Food Hygiene Practice and its Associated Factors Among Street Food Vendors in Selected Food Vending Locations in Bauchi Metropolis, Nigeria" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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LIST OF ABBREVIATIONS

ATBU	Abubakar Tafawa Balewa University
BASEPA	Bauchi State Environmental Protection Agency
BLGA	Bauchi Local Government Authority
KAP	Knowledge, Attitude and Practice
CDC	Centre for Disease Control
RTE	Ready to Eat
SD	Standard Deviation
SFVs	Street Food Vendors
SPHCDA	State Primary Healthcare Development Agency
SPSS	Statistical Package for Social Sciences
UPM	Universiti Putra Malaysia

CHAPTER 1

INTRODUCTION

This chapter provides a background of the study by emphasizing on the significance of street food vending as well as its associated food safety issues, particularly in developing worlds. This is followed by problem statement which eventually leads to the formulation of research questions, objectives and hypothesis. Lastly, the chapter discusses the contributions of the research under the significance of the study.

1.1 Background of the Study

In recent years, considerable attention has been given to the activities of street food vendors (SFV), particularly in developing countries where their number increases every day. This growing attention has to do with the benefits derived from street food vending on one hand, and the profound concern over the safety of the street vended foods on the other. The current increase in the number SFV may be attributed to the associated financial benefits, low capital requirement for running street food vending business, consumer satisfaction, lack of job opportunities as well as increase in rural-to-urban migration (Lues et al., 2006; Rane, 2011).

Street vended foods are ready-to-eat foods and drinks, prepared and/or sold on the streets and other public places, for prompt or later consumption without further processing (Muyanja et al., 2011; Gadaga et al., 2014). They also include foods prepared at vendors' homes or at small scale food establishments and brought to the street for sale (Alimi, 2016). The sellers of such foods are called street food vendors, and considered as small-scale business owners that contribute to the informal sector (Martins, 2006; Chukuezi, 2010; Gadaga et al., 2014). While this informal food vending sector is expanding, getting wider patronage in various urban centres, particularly among developing countries across the globe, interest towards hygienic status of street foods increases (Umoh & Odoaba, 1999; Omemu & Aderoju, 2008; Rane, 2011).

The types and nature of street vended foods differ across countries, cultures and amongst vendors. Due to their diversity, street vended foods types are in most cases not documented in many countries. Typical street food dishes include the main meals, snacks, soups, stews, meat and fruit or flavour juices among others (Omemu & Aderoju, 2008; Muzaffar et al., 2009; Tambekar et al., 2011). These foods are often prepared daily from a variety of ingredients to suit local taste and demand. The foods often display traditional cultures based on local products and are prepared and modified differently to suit the target consumer needs (Lues et al., 2006; Omemu & Aderoju, 2008; Isara et al., 2014).

The mode and places of SFVs operations are relatively similar in most developing countries (Lues et al., 2006; Akinbode et al., 2011; Muyanja et al., 2011; Alimi, 2016). Street food vendors' business units are either stationary or mobile sited in public places including train stations, motor parks, major markets, construction sites, shopping complexes, work places, near streets, factories, schools and hospitals among others (Canini et al., 2013; Alimi, 2016; Cortose et al., 2016). However, due to lack of basic facilities such as portable water, cooling systems, waste disposal facilities and toilets, the hygienic condition at these locations is doubtful, making the consumers' health at risk (Canini et al., 2013; Alimi, 2016; Cortose et al., 2016).

Generally, the risk factors associated with street foods cut across all stages, including procurement and selection of raw materials, transportation, preparation, cooking, storing and serving (Rane, 2011; Alimi, 2016; Cortose et al., 2016). The role of food handlers in safeguarding public health at these critical stages is crucial, as more than 97% of street foods contamination incidences were attributed to their practices (Howes et al., 1996; Bas et al., 2006; Sumner et al., 2011; Lalit et al., 2015). Some studies also noted that, the rate of foodborne disease occurrence in developing countries increases with the prevailing patronage and expansion of food vending activities (Muyanja et al., 2011).

Studies have shown the importance of evaluating food handlers' practices, particularly with much emphasis for improving the situation (Lalit et al., 2015; Legesse et al., 2017). For instance, studies regarding SFVs' practices in countries like Ghana (Apanga et al., 2014; Dun-Dery & Addo, 2016), Ethiopia (Tessema et al., 2014; Legesse et al., 2017) and Nigeria (Omemu & Aderoju, 2008; Okojie & Isah, 2014; Pepple, 2017), stress the need for conducting similar related studies among SFVs in different regions, countries and continents around the globe in order to have clear picture of street food vending associated challenges for necessary interventions.

Food borne diseases commonly occur in developing countries including Nigeria owing to poor food hygiene practices, weak enforcement of food hygiene laws, inadequate supervision and monitoring as well as lack of food hygiene education among vendors (Omemu & Aderoju, 2008; Okojie & Isah, 2014). Hence, as street food vending grows and becoming a profitable occupation that competes with formal sector and providing meals to the wider population in many developing nations, SFVs' poor food hygiene practices arising from certain factors such as inadequate knowledge, low educational level, poor attitude, lack of training, lack of certification and poor sanitary condition of street food vendors locations are worthy of evaluation (Umoh & Odoaba, 1999; Toh & Birchenough, 2000; Codjia, 2000; Muinde & Kuri, 2005; Omemu & Aderoju, 2008). The current study aimed at evaluating the food hygiene practice and its associated factors among street food vendors in selected food vending locations in Bauchi Metropolis, Nigeria.

1.2 Problem Statement

The multiple contributions of street food vending are widely acknowledged, particularly in low-income countries. It provides employment and relatively nutritious food at low-cost to consumers (Lues et al., 2006; Gadaga et al., 2014). Street food vending is a common engagement, growing rapidly at most metropolitan areas of developing countries (Ekanem, 1998; Alimi, 2016). Street foods are highly patronized in these areas, particularly with the current trend of industrialization which necessitates lot of people to eat outdoor (Alimi et al., 2014). Akinyele, (1998) stressed the substantial contribution of street foods to nutrition and food security to the consumers. Similarly, Draper, (1996) described street foods among the major sources of nutrition among the low-income earners in developing countries.

Street food vending is often outside the regulation and protection of authorities in most developing countries (Alimi, 2016). Its informal nature and lack of accurate statistics on the volume of trade involved in it, makes its economic significance less valued (Alimi et al., 2016). Street food vending contributes a considerably in the informal sector of the economy of many developing countries. For instance, around 28.5% workforce in Mexico were reportedly employed in the informal sector, where 30.8% of the employments in this sector were in the street food vending which employed over 120,000 vendors in Mexico city alone in 1998 (Estrada-Garcia et al., 2002).

According to Dawson and Canet, (1991) street food vending has a workforce of over 100, 000 vendors in Malaysia, having gross annual sales volume of about 2 billion US dollars. Hiemstra et al., (2006) also revealed the substantial contribution of small-scale businesses made up mainly of street food vending to the economy of Vietnam. Although, the statistics indicating the accurate contribution of street food vending in Nigerian informal sector is currently inaccessible, Dipeolu et al., (2007) in their related studies underscored the lucrative nature of street food vending in some African countries, including Nigeria.

However, while deriving a lot of benefits from street food vending sector, the safety of street vended foods have been a topic of discussion in recent decades. This concern arises particularly with the continuing manifestation of evidences regarding the unhealthiness of street vended foods (Muyanjaet al., 2011; Alimi, 2016). Many studies conducted around the world to examine the quality of street vended foods have reported the presence of certain microorganisms in street foods that have potential risks of causing foodborne diseases (Mosupye & Von Holy 2000; Lues et al., 2006; Mosalagae et al., 2011; Kharel et al., 2016). Many studies from Nigeria including Edema & Omemu, (2004), Omemu et al., (2005), Ofukwu et al., (2008), Aliboh, (2009) and Salihu et al., (2010) reported comparable results from their assessments of the quality of street vended foods at different location in the country.

Furthermore, foods can be mishandled in the course of processing, storage or serving (Medeiros et al., 2001). In food preparation settings, several factors may cause foodborne diseases. These could be foods from unsafe sources, inadequate cooking, improper holding times or temperatures, contaminated equipment, and poor personal hygiene among others (Rosset et al., 2004; Egan et al., 2007). Proper food handling practices and good personal hygiene can reduce the transfer of pathogens from food handlers to consumers (Isara et al., 2014; Sani & Siow, 2014).

Street food vendors are integral part of food handlers who serve as an important link between food and consumers. However, due to the challenging nature of the setting at which street foods are prepared and/or served, much concern increases regarding the hygienic status of street vended foods (Hanashiru et al., 2005; Muinde & Kuria, 2005). The vending points are in most cases in an open-air, around busy areas including traffic, bus stations and construction sites (Lues et al., 2006; Muyanja et al., 2011). Due to the temporary nature of street food vending locations, they lack basic infrastructure and services such as clean water, adequate waste disposal facilities, and effective cooling/heating systems (Hanashiru et al., 2005). Consequently, in most street food vending sites hand and appliance washing water often reused, sometimes washing is done without detergents, waste water is released to flow and trash are often discarded around the vending stall (Mosupye & Von Holy 2000; Kubheka et al. 2001; Muinde & Kuri, 2005; Lues et al., 2006; Omemu & Aderoju, 2008). Only in rare cases that vending points have adequate cooling facilities, the lack thereof airs a health risk, especially in the warmer periods when food is displayed for quite long time (Martínez-Tomé et al. 2000; Walker et al. 2003). Besides, the huge number, mobility, variability, temporary and dispersed nature of street food vendors particularly in developing countries make them difficult to be managed by relevant regulatory bodies at different levels (Lues et al., 2006).

Many studies were conducted to evaluate food hygiene practice and its associated factors among street food vendors in many countries including Ethiopia (Kibret & Abera, 2012; Lalit et al., 2015), Philippines (Patricia et al., 2000), Ghana (Rheinländer et al., 2008; Monney et al., 2014), India (Choudhury et al., 2011; Thakur et al., 2013) and Uganda (Mitullah et al., 2003; Muyanja et al., 2011). However, a review of the existing literature revealed that only few studies were conducted regarding food hygiene practice among street food vendors in Nigeria. Moreover, most of these studies concentrated at particular axis, mainly in south-east (Chukuezi, 2010), south-south (Okojie & Isah, 2014) and south-west (Omemu & Aderoju, 2008; Aluko et al., 2014) regions of the country. Thus, no previous studies have been so far identified in the north-eastern region. It is based on the abovementioned background that the idea of this study was conceived. The aim of this study is to evaluate food hygiene practice and its associated factors among street food vendors in selected food vending locations in Bauchi metropolis, Nigeria. This is also with particular emphasis on the importance of Bauchi metropolis as a capital city of Bauchi State and door-way to the north-eastern region of Nigeria.

1.3 Significance of the Study and Expected Outcomes

Good food hygiene practices by street food vendors will assure safeguarded public health through hygienic food preparation, storage and servicing, which eventually lead to prevention of food disease epidemics. The outcomes of this study are envisioned to contribute to literature, policy and to guide relevant authorities on possible intervention required to regulate and sanitize street food vending in order to safeguard consumers' health.

Firstly, there are only few studies that evaluated food hygiene practices in Nigeria, and particularly in Bauchi metropolis, this study will add to the thin existing literature on food hygiene practices and associated factors among food handlers, specifically street food vendors. Thus the piece will serve as a reference material for future studies.

Secondly, the outcome of this study is expected to be of special importance to the relevant authorities, Non-Governmental Organizations (NGOs) and donor agencies including United Nations' Children Funds (UNICEF), World Health Organization (WHO) and World Bank in their efforts to ensure food safety. It is expected to guide the regulatory agencies on the necessary intervention needed and in coming up with strategies to ensure strict demonstration of good hygiene practices by street food vendors in Bauchi, Nigeria. In other words, information gathered from this study could be used by the state and local authorities in the development of strategic plans towards regulating safe street food handling, preparation and vending within the metropolis and the state as a whole.

Thirdly, the study revealed some factors relevant in predicting good food hygiene practices among street food vendors. Having known such factors by the relevant authorities, each is then be considered as a priority issue as it holds a predictive strength in encouraging good food hygiene practices among the vendors. This is important as it does give signals on the relevant areas that require intervention via awareness and campaign programmes.

1.4 Research Questions

The problems stated for this study lead to the following research questions:

1. What are the characteristics of street food vendors in selected food vending locations in Bauchi metropolis, Nigeria?
2. What is the level of the street food vendors' knowledge regarding food hygiene in selected food vending locations in Bauchi metropolis, Nigeria?
3. What is the level of street food vendors' attitude towards food hygiene in selected food vending locations in Bauchi metropolis, Nigeria?

4. What is the level of street food vendors' food hygiene practice in selected food vending locations in Bauchi metropolis, Nigeria?
5. What is the association between street food vendors' characteristics and level of food hygiene practice in selected food vending locations in Bauchi metropolis, Nigeria?
6. What is the association between street food vendors' level of food hygiene knowledge and level of food hygiene practice in selected food vending locations in Bauchi metropolis, Nigeria?
7. What is the association between street food vendors' level of food hygiene attitude and level of food hygiene practice in selected food vending locations in Bauchi metropolis, Nigeria?
8. What are the factors predicting level of food hygiene practice among street food vendors in selected food vending locations in Bauchi metropolis, Nigeria?

1.5 Objectives of the Study

1.5.1 General Objective

The general objective of this study is to evaluate the food hygiene practice and its associated factors among street food vendors in selected food vending locations in Bauchi metropolis, Nigeria.

1.5.2 Specific Objectives

The specific objectives of this study include:

1. To describe the characteristics of street food vendors in selected food vending locations in Bauchi metropolis, Nigeria
2. To examine the street food vendors' level of knowledge regarding food hygiene in selected food vending locations in Bauchi metropolis, Nigeria.
3. To assess the level of street food vendors' attitude towards food hygiene in selected food vending locations in Bauchi metropolis, Nigeria.
4. To determine the level of street food vendors' food hygiene practice in selected food vending locations in Bauchi metropolis, Nigeria.
5. To determine the association between street food vendors' characteristics and level of food hygiene practice, level of food hygiene knowledge and level of food hygiene practice, level of food hygiene attitude and level of food hygiene practice among street food vendors in selected food vending locations in Bauchi metropolis, Nigeria.
6. To determine the factors predicting level of food hygiene practice among street food vendors in selected food vending locations in Bauchi metropolis, Nigeria.

1.6 Research Hypothesis

The alternative hypotheses for this study are:

H_1 : There is a significant association between street food vendors' characteristics and their level of food hygiene practice.

H_2 : There is a significant association between street food vendors' level of food hygiene knowledge and their level of food hygiene practice.

H_3 : There is a significant association between street food vendors' level of food hygiene attitudes and their level of food hygiene practice.



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