



Food safety knowledge, attitudes and practices of street food vendors and consumers in Ho Chi Minh city, Vietnam



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ABSTRACT

This study had the major objective of evaluating the food safety knowledge, attitudes and practices of consumers and vendors of street foods in Ho Chi Minh City (MCMC), Vietnam. There were three main surveys performed in this study. A total of 120 consumers and 40 street food vendors from four districts [Binh Thanh (BT), Thu Duc (TD), district 3 (D3) and district 8 (D8)] in HCMC contributed to the study on a voluntary basis. The surveyed consumers had adequate levels of food safety knowledge and attitudes. No significant difference ($p > 0.05$) occurred between the food safety knowledge levels of the consumers on the basis of gender. However, significant differences ($p < 0.05$) occurred on the basis of age, education level, food safety training status and location. In contrast, the street vendors had poor food safety knowledge and attitude levels. No significant differences ($p > 0.05$) were observed in the food safety knowledge levels of the vendors on the basis of gender and age. However, significant differences ($p < 0.05$) were found on the basis of food safety training status and education level. It was also noted that the vast majority (95%) of the vendors had not received any food safety training. With regards to the practices, it was determined that 52.5% of the vending sites were open air stands without any protection from the sun, wind and dust. 52.5% the vending stalls had no direct access to potable water, while 47.5% did not have adequate hand washing facilities and a further 30% lacked proper waste water and food disposal facilities. In addition, 52.5% of the vendors did not separate raw, partially cooked food and cooked food products. These findings highlighted that street food vendors in HCMC generally have poor food handling practices and most are operating under unhygienic conditions. These results should provide the Vietnamese government with even more reasons to increase their current efforts to improve the safety of street foods and food safety awareness of the consumers.

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1. Introduction

Street foods are described as ready-to-eat foods and beverages prepared and sold by vendors or hawkers in streets and other public places (FAO, 1989; FAO, 2013). Street foods contribute significantly to the diets of many people in the developing world (FAO, 2010; Suneetha, Manjula, & Depur, 2011). Worldwide, an estimated 2.5 billion are estimated to consume street foods every day (FAO, 2007). In addition, the sale of street foods supports the livelihoods of millions of the urban poor and can make a sizeable contribution to the economies of developing countries.

The safety of street food in third world and in developing

countries is still of major concern (FAO, 2013; Muinde & Kuria, 2005; Rheinländer et al. 2008). It is widely acknowledged that street vendors in these countries often operate under conditions which are unacceptable for the purposes of preparing and selling of food (Hanashiro, Morita, Matté, Matté, & Torres, 2005; Muyanja, Nayiga, Namugumya, & Nasinyama, 2011; Sharma & Mazumdar, 2014). In addition to this, the street food sector is in most cases informal and not strictly regulated. The street food vendors themselves have in most studies performed in developing countries found to often be uneducated and show little concern towards the safe handling of foods (Lues, Mpeli, Venter, & Theron, 2006; Mensah, Yeboah-Manu, Owusu-Darko, & Ablordey, 2002). Street food vendors have frequently been observed to use improper food preparation and selling practices (Bryan, 1988; Ekanem, 1998; Mosupye & von Holy, 1999). In particular, previous studies in some developing countries have highlighted the lack of clean

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(potable) water at vending sites, waste water and garbage being discarded in the streets, and exposure of food materials to dust and flies which may harbour harmful pathogens (Bryan, 1988; Ekanem, 1998). As a consequence, street foods have been implicated in some outbreaks of food-borne illnesses in several countries (Aluko, Ojeremi, Olakele, & Ajidagba, 2014; Bryan et al. 1992; Dawson & Canet, 1991). With regards to pathogens, several studies have identified high levels of coliforms and the presence of various pathogens in street foods in several countries (Hanashiro et al. (2005); Ghosh, Wahi, Kumar, & Ganguli, 2007; Hanashiro et al. (2005); Mankee et al., 2003). Street foods have also been reported to be an appropriate medium for the transmission to people of antimicrobial-resistant pathogens such as *Salmonella* spp., *Escherichia coli*, and *Staphylococcus aureus* (Güven, Mutlu, Gulbandilar, & Cakir, 2010; Harakeh et al., 2005).

Most countries in South east Asia, including Vietnam are famous for their large variety of cheap street foods. The demands for street foods in Asia have increased due to rapid urbanization and its associated social and structural changes (Jayasuriya, 1994), despite the social health concerns associated with the vending of street foods. Vietnam issued for the first time specific regulations to control the safety of street foods in 2011 in their revised Law on Food Safety (Resolution 55/2010/Q12). The regulation stipulates specific guidelines on how to operate a street food stall. In brief, the five key conditions for street food safety that need to be satisfied by vendors in Vietnam are i) the stall must be located in a non-polluted site ii) clean water must be used to cook the food and clean kitchen utensils iii) the origin of the produce used to make the food must be clear iv) vendors must have a waste collection system in place and v) vendors should only use approved additives. To our knowledge no studies have yet reported or been performed to assess the food safety knowledge, attitudes and practices of street food vendors and consumers in Vietnam. The data provided in this study is of significant concern as it can provide insight into the development of more effective strategies to improve the safety of street foods in Vietnam.

2. Materials and methods

This study investigated the food safety knowledge and attitudes of vendors and consumers of street foods in Ho Chi Minh City (HCMC), Vietnam's largest industrial city. In addition, the food handling and hygiene practices of the vendors were also evaluated. The studies were performed in July and August 2014. The study was conducted in four popular districts, namely District Binh Thanh (BT), District Thu Duc (TD), District 3 (D3) and District 8 (D8). Districts BT and TD are located at the edge of the city while D3 and D8 are in the center of the city. The procedures followed to perform each study are described below in detail.

2.1. Food safety knowledge and attitudes questionnaire

The questionnaires used to assess the food safety knowledge and attitudes of the consumers and vendors of street foods was according to Samapundo, Climat, Xhaferi, and Devlieghere (2015). These are shown in Tables 7–10. In order to apply this questionnaire in Vietnam, it was first translated into Vietnamese after which a pilot test was conducted with 100 people to ensure that all the questions were clear and properly structured. The questionnaires were divided into two sections – i) demographic information and ii) the food safety knowledge or attitudes.

In more detail, the demographic information consisted of gender, age, location, and level of educational and food safety training. The food safety knowledge section was designed to evaluate the awareness of street food vendors and consumers about

food pathogens, food hygiene, high risk groups and proper cleaning. This section contains 18 questions with 3 possible answers 'yes', 'no' and 'do not know'. Each correct answer was awarded one mark (one point) whilst each incorrect and 'do not know' answer was awarded no points (0 points). A maximum of 18 points could be attained in this section. The compiled scores were converted to their equivalents on a basis of 18 = 100. A score <50 was considered as depicting a poor level of food safety knowledge, 50 to 75 was considered as indicating median (adequate) food safety knowledge and >75 was considered as indicating a good food safety knowledge level. On the other hand, the food safety attitudes section evaluated how much consumers and street food vendors understand about food safety via 16 questions. The method of evaluation (scoring system) used for this section was similar to that used for assessing the food safety knowledge level.

To select the consumers the researcher stationed himself in areas in and around supermarkets, schools, universities or parks which are frequented the most by local inhabitants of HCMC. The researcher identified those pedestrians who appeared to be ≥ 18 years old and asked them to voluntarily participate in the study. The purpose of the study was fully explained to all potential participants after which those who volunteered were asked to sign an informed ethical consent form before they completed the questionnaire. This exercise was repeated until 30 consumers (≥ 18 years of age) had been interviewed in each of the four districts, giving the study a total of 120 consumers. For selection of the street food vendors, highly frequented streets in each of the four districts were selected for the survey. In order to make ensure that each vendor in these streets had an equal chance of being selected as a study subject, the researcher assigned each vendor a unique number. These numbers were written on separate pieces of papers which were then mixed in a hat. The numbers were picked from the hat and the order was noted. The vendors were then approached in this order and asked to participate voluntarily until 10 vendors had been interviewed from each of the four districts. As for the customers, the purpose of the study was explained to the street food vendors after which those who volunteered were asked to sign an informed ethical consent form before they completed the questionnaire. When the participants were not literate enough to fill in the questionnaire themselves, they were aided by the researcher.

2.2. Food handling practices checklist

The checklist used to assess the food safety practices was according to Samapundo et al. (2015) (see Table 11). The first part of the form concerns the general demographic information of participants – sex, age, location, and level of education and food safety training. The rest of the checklist covers five sections: i) details (nature) of the facilities ii) nature of the environment around the stall iii) personal hygiene iv) food storage facilities at the stall and v) maintenance of the utensils. The 10 street food vendors who participated in this part of the study from each of the four districts (40 in total) were selected using the same method described above to select the vendors who participated in the food safety knowledge and attitudes study. An ethical consent form was carefully explained to the vendors, after which observation only took place after they had signed the form.

2.3. Statistical analysis method

Statistical analysis of the data collected from the study was performed entirely in Spotfire S+ 8.2 (TIBCO Spotfire, Boston, MA, US). The age and score results were split into different categories. For descriptive analysis, cut-off points of 25, 35, 45 and 55 years were used. With regards to the scores, cut-off points of <50, 50–75,

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