

FOOD SAFETY KNOWLEDGE, ATTITUDE AND HYGIENE PRACTICES AMONG THE STREET FOOD VENDORS IN NORTHERN KUCHING CITY, SARAWAK

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ABSTRACT. *Street food vending is a prevailing and distinctive part of a large informal sector in both developed and developing countries. Food safety is a key public health concern, because a large number of people take their meals outside the home and are exposed to food borne illnesses. Food handlers play an important role in ensuring food safety throughout the chain of storage, processing production, preparation and retailing. The objective of the study is to assess the level of knowledge, attitude and practice of food safety among the food vendors in Kuching City, Sarawak and to determine the factors affecting them. A cross sectional study was conducted among the street vendors in Kuching City. A total of 361 street food vendors were selected using non-probability sampling technique. Data were collected by face to face interview using a structured questionnaire. All completed questionnaires were validated manually and data analysis carried out by computer using SPSS version 19.0 software package. Multinomial regression analysis revealed that age and ethnicity appeared to be important factors for food safety knowledge ($p < 0.05$), whereas food safety knowledge and training appeared to be influencing factors for attitude ($p < 0.05$). On the other hand, food safety knowledge, attitude, training and age of the food vendors influence the food safety practice, but duration of food vending had an inverse relationship with food safety practice ($0 < 0.05$). Findings of this study may help in planning health intervention programs for food handlers for their improvement of knowledge, attitude and practice towards food-borne diseases and food safety. Furthermore, this will in turn reduce the morbidity and mortality of food-borne diseases.*

KEYWORDS. Attitude, food safety, knowledge, practice, Sarawak

INTRODUCTION

The term "street food" refers to a wide variety of ready-to-eat foods and beverages sold and sometimes prepared, in public places. Street food may be consumed where it is purchased or can be taken away and eaten elsewhere (WHO, 1996). Street food vending is a prevailing and distinctive part of a large informal sector. It is commonly seen in public places, particularly in the cities and is distinctive in the sense that it provides a basic need to the urban inhabitants (Muzaffar *et al.*, 2009). This sector is flourishing rapidly due to growing and changing food demands by the urban dwellers needing cheaper food in the face of a harsh economy. Apparently, many people prefer eating foods from vendors to preparing or cooking the food at home. There are different types of food vending sites including mobile 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 (FAO, 1990). Women are often owners or employees of street food businesses. According to FAO study, 70%-90% vendors are women, and they sell food in the street primarily to improve the food security of their family and for a degree of financial independence (FAO, 1997). Study also showed that street food consumers come from all levels of society, from low income to high

income groups. Even school children depend on street food (FAO, 1997). However, issues of food safety due to food borne illnesses have led to an increase in global concern (Van Tonder *et al.*, 2007). Several food-borne disease outbreaks have been reported to be associated with poor personal hygiene of foodstuff handlers. Food borne diseases are increasing in both developed and developing countries. Diarrhoeal diseases, mostly caused by food borne microbial pathogens, are the leading causes of illness and deaths in the developing countries, killing an estimated 1.9 million persons annually at the global level (Schlundt *et al.*, 2004).

Food safety is a vital issue both in developed and developing countries; given that food borne illnesses contribute to millions of illnesses and thousands of deaths annually (Pilling *et al.*, 2008). It is becoming a key public health priority, because a large number of people take their meals outside the home. As a result, they are exposed to food borne illnesses that originate from food stalls, restaurants and other food outlets. Food service employees are a crucial link between food and consumers. World Health Organization (WHO) has developed five main keys to safer food, which include keeping clean, separating raw and cooked food, cooking thoroughly, keeping food at safe temperatures, and using safe water and raw materials (WHO, 2007). These five keys to safer food are of immense importance in developing countries, and equipping food vendors in countries with such information could impact significantly on food safety. However, very little is known about how street food vendors themselves perceive and prioritize food safety knowledge and practice. This study aims to obtain the current information of the food safety knowledge, attitude and practices of the street food vendors in Kuching City and the factors influencing them.

MATERIALS AND METHODS

Study Design and Sampling Procedure

This was a cross-sectional study conducted in selected areas of Kuching city with a view to assessing the level of knowledge, attitude and food safety practice among the street food vendors. The survey was conducted from June 2011 to September 2011. Sample size was calculated based on the proportion of food handlers in previous studies in Malaysia (Zain & Naing, 2002). The required sample size was 355 with 10% relative precision. The sample size was further increased to 390 taking into account 10% non-response rate. However, a total of 361 food handlers interviewed. Reliability analysis was done on 30 data samples to test validity and reliability of the questionnaire. A non-probability sampling technique was applied to select the respondents. Those who were unwilling to participate were excluded from our study.

Instrument Development and Data Collection Procedure

A structured and modified interview schedule was developed keeping in mind the objectives of the study (Lin & Sneed, 2010). Initially an English version of the questionnaire was developed then it was translated into Bahasa Malaysia (BM) for field operation. The questionnaire was divided into five parts consisting of personal and socio-demographic characteristics, knowledge, attitude, practice and training on food safety. Part I was designed to determine the food handlers' socio-demographic characteristics including age, sex, academic qualification, ethnicity and income. Part II was on knowledge related to food safety and included 9 multiple-choice questions. These questions covered general food safety knowledge such as personal hygiene, definition of food borne illness, time and temperature control, cross contamination, glove use, and sanitizing. Part III of the questionnaire included 12 questions to determine the food handlers' attitudes toward food safety. A 5-point Likert-type rating scale, ranging from one (1) "strongly disagree" to five (5) "strongly agree", was

used. Part IV of the questionnaire consisted of 18 questions measuring vendors' self-reported on-the-job food safety practices. A 3-point rating scale was used to indicate frequency of food safety practices: always; sometimes; and never. An option of "not applicable" was provided for each practice question. Part V of the questionnaire was developed to identify food safety topics taught to food handlers during orientation or on-the-job training, curriculum contents and others. Two data collectors were appointed. The collected data were checked and verified by the team members. Informed written consent was taken from each respondent. Ethical clearance was also obtained from Universiti Malaysia Sarawak (UNIMAS).

Data Processing and Analysis

The data entry was started immediately after completion of data collection. The collected data was checked, verified and then entered into the computer. Only fully completed questionnaires were entered into the computer for final analysis. The analysis was carried out with SPSS (Statistical Package for Social Science), version 19.0. For statistical analysis, univariate, bi-variate and multi-variate analyses were done to relate the knowledge, attitude and practice and training components with other selected characteristics. p value less than 0.05 with 95% confidence interval was considered as statistically significant.

RESULTS

Socio-Demographic Characteristics

The mean age of the respondents was 30.9 (95% CI: 29.69, 32.07 years) years. Among the interviewed respondents, 52.6% were female, while the remaining 47.4% were male with female to male ratio 1.2:1. Three-fifths (61.2%) had SPM level of education followed by PMR (18.3%), STPM (11.9%). The majority of the respondents were Muslim (94.7%) and Malays (89.5%) and the rest were non-Malays (10.5%). The mean family size of the respondents was 5.7 (95% CI: 5.50, 5.96). More than half (52.4%) of them were single. The median duration of food vending was 5.1 years (95% CI: 4.5, 5.7 years). More than two-thirds (70.4%) of the respondents received food safety training (Table 1).

Table 1. Socio-demographic and personal characteristics of the respondents

| Characteristics | n | % | 95% CI | |
|--|-----|------|-------------|-------------|
| | | | Lower bound | Upper bound |
| Age in years | | | | |
| <20 | 40 | 11.1 | 8.0 | 14.4 |
| 20-29 | 156 | 43.2 | 38.5 | 48.5 |
| 30-39 | 78 | 21.6 | 17.5 | 26.3 |
| 40-49 | 60 | 16.6 | 12.7 | 20.5 |
| 50 | 27 | 7.5 | 4.7 | 10.5 |
| Gender | | | | |
| Male | 171 | 47.4 | 41.8 | 52.6 |
| Female | 190 | 52.6 | 47.4 | 58.2 |
| Level of education | | | | |
| Primary school completed | 31 | 8.6 | 5.8 | 11.6 |
| PMR/SRP/LCE (Lower secondary) | 66 | 18.3 | 14.4 | 22.4 |
| SPM/MCE/O' level (secondary School) | 221 | 61.2 | 56.0 | 66.5 |
| STPM/HSC/A' level and above (Upper secondary School) | 43 | 11.9 | 8.9 | 15.2 |
| Religion | | | | |
| Islam | 342 | 94.7 | 92.2 | 96.7 |
| Others | 19 | 5.3 | 3.3 | 7.8 |
| Ethnicity | | | | |
| Malays | 323 | 89.5 | 86.1 | 92.5 |
| Non-Malays | 38 | 10.5 | 7.5 | 13.9 |
| Citizenship | | | | |
| Malaysian | 355 | 98.3 | 97.0 | 99.4 |
| Non-Malaysian | 6 | 1.7 | .6 | 3.0 |
| Family size | | | | |
| 1-3 | 43 | 11.9 | 8.6 | 15.2 |
| 4-5 | 154 | 42.7 | 37.4 | 47.9 |
| 5-6 | 99 | 27.4 | 23.0 | 32.4 |
| 7 | 65 | 18.0 | 14.1 | 22.2 |
| Marital status | | | | |
| Married | 172 | 47.6 | 42.4 | 52.4 |
| Single | 189 | 52.4 | 47.6 | 57.6 |
| Duration of food vending (yrs) | | | | |
| <2 | 133 | 36.8 | 31.6 | 42.1 |
| 2-4 | 74 | 20.5 | 16.3 | 24.9 |
| 4-6 | 45 | 12.5 | 9.1 | 16.1 |
| 6 | 109 | 30.2 | 25.2 | 35.2 |
| Training on food safety | | | | |
| Yes | 254 | 70.4 | 65.4 | 75.1 |
| No | 107 | 29.6 | 24.9 | 34.6 |

Knowledge, Attitude and Practice of Food Safety

There were 9 items to assess the respondents’ knowledge of food safety and hygiene practice. Response to each item was ‘yes’, ‘no’ or ‘don’t know’. One mark was given for correct answer; zero mark was given for those who gave a response of either no or ‘don’t know’. The total knowledge scores were obtained by summing up the marks gained for each item. Mean (SD) score of knowledge 6.7 (2.3) with minimum 1.0 and maximum (9.0). A total of 12 items were included to assess the attitude. Each item was assessed using strongly agree, agree, disagree, strongly disagree and no response giving the highest score four for strongly agree and the lowest score zero. The mean (SD) attitude score of the respondents was attitude 38.4 (4.4) with score minimum 15.0 and maximum (48.0). Similarly, 15 questions were included to assess food safety and hygiene practice. Each item was assessed using the response ‘never’, ‘sometimes’ and ‘always’. Those who practice ‘always’ scored two and ‘never’ zero. The Mean (SD) score of practice was 25.5 (3.8) with minimum 8.0 and maximum (30.0) (Figure 1).

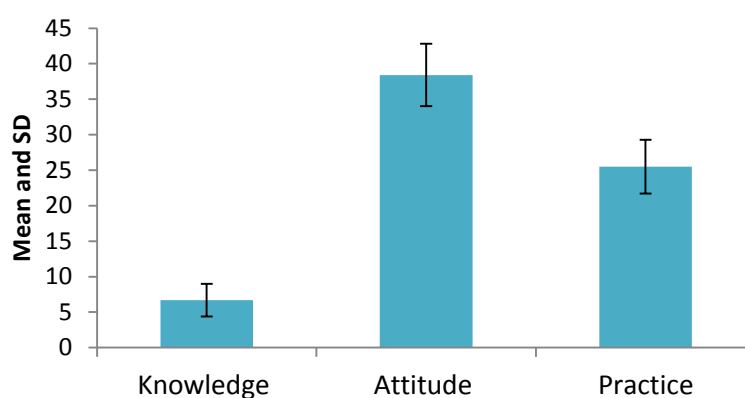


Figure 1. Mean and SD of knowledge, attitude and practice score on food safety.

All the individual items of knowledge, attitude and practice variables were analyzed using factor analysis and ranked into three categories namely poor, average and good by Blom’s formula. Analysis revealed that all the respondents had consistently poor knowledge (20.5%), attitude (17.2%) and practice (16.9%). However, average attitude (62.9%) and food safety practice (71.5%) was high compared to knowledge (41.6%), but the good attitude (19.1%) and practice (10.8%) were low compared to knowledge (36.8%) (Figure 2).

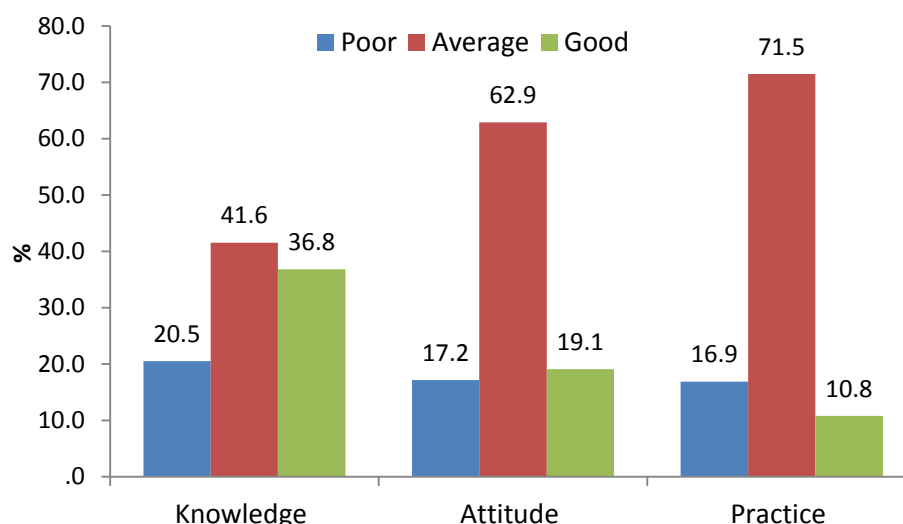


Figure 2. Percentage distribution of level of knowledge, attitude and practice of food safety.

Factors Influencing Food Safety Knowledge, Attitude and Practice: Multinomial Regression Analysis

To identify the factors influencing knowledge, attitude and practice of food safety, a multinomial regression model was fitted with knowledge, attitude and practice (polychotomous) being the dependent variables. In regression analysis, age and ethnicity appeared to be important factors for good knowledge of food safety. This indicated that Malays had 2.898 (95% CI: 1.111, 7.558) times good knowledge compared to poor knowledge ($p < 0.05$). However, no statistically significant association was found with average knowledge. On the contrary, the attitude to food safety practice showed that food safety training and knowledge of food safety appeared to be important factors ($p < 0.05$). This indicated that attitude to food safety practice was 2.949 (95% CI: 1.368, 6.359) times higher (average attitude) and 3.657 (95% CI: 1.506, 8.878) times higher (good attitude) among the vendors having food safety training ($p < 0.001$). Similarly, one unit changes of food safety knowledge, attitude to food safety practice increase 1.166 (95% CI: 1.000, 1.360) times. Considering the current practice of food safety, food safety training and knowledge of food safety appeared to be influencing factors for average food safety practice ($p < 0.05$) compared to poor practice, whereas, age, food safety training, knowledge, attitude and duration of food vending appeared to be influencing factors for good food safety practice ($p < 0.05$) compared to poor practice. Training in food safety significantly increased the food safety practice and it was 2.834 (95% CI: 1.270, 6.321) times on average and 4.039 (1.369, 11.916) times higher in good practice compared to no training in food safety. Though analysis revealed that age, knowledge and attitude were significantly related to food safety practice, the duration of food vending had inverse relation with food practice ($p < 0.05$). This indicated that short duration of food vending maintained better food safety practice (Table 2).

Table 2. Factors influencing knowledge, attitude and practice of food safety: Multinomial regression analysis.

| Variables | Level of knowledge | | Level of attitude | | Level of practice | |
|---|--------------------|---------------|--------------------|----------------|---------------------|-----------------|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Average | | | | | | |
| Age in years | 1.013 | (0.976,1.052) | 0.979 | (0.953, 1.005) | 1.006 | (0.974, 1.040) |
| Training | | | | | | |
| No (RC) | - | - | - | - | - | - |
| Yes | 0.854 | (0.450,1.623) | 2.949** | (1.368, 6.359) | 2.834** | (1.270, 6.321) |
| Knowledge score | - | - | 1.160* | (1.024, 1.314) | 1.456*** | (1.267, 1.674) |
| Attitude score | - | - | - | - | 1.045 | (0.976, 1.118) |
| Duration of vending (yrs) | - | - | - | - | 0.965 | (0.909, 1.024) |
| Ethnicity | | | | | | |
| Non-Malays(RC) | - | - | - | - | - | - |
| Malays | 1.276 | (0.570,2.857) | - | - | - | - |
| Marital status | | | | | | |
| Married (RC) | - | - | - | - | - | - |
| Single | 0.681 | (0.314,1.479) | - | - | - | - |
| Good | | | | | | |
| Age in years | 1.045* | (1.005,1.087) | 0.969 | (0.938, 1.002) | 1.050* | (1.005, 1.097) |
| Training | | | | | | |
| No (RC) | - | - | - | - | - | - |
| Yes | 0.741 | (0.378,1.455) | 3.657** | (1.506, 8.878) | 4.039*** | (1.369, 11.916) |
| Knowledge score | - | - | 1.166* | (1.000, 1.360) | 1.732*** | (1.383, 2.171) |
| Attitude score | - | - | - | - | 1.166** | (1.043, 1.303) |
| Duration of vending (yrs) | - | - | - | - | -0.910* | (0.829, 0.998) |
| Ethnicity | | | | | | |
| Non-Malays (RC) | - | - | - | - | - | - |
| Malays | 2.898* | (1.111,7.558) | - | - | - | - |
| Marital status | | | | | | |
| Married(RC) | - | - | - | - | - | - |
| Single | 2.293 | (0.996,5.280) | - | - | - | - |
| Model Chi-Square | 22.537(8); p<0.001 | | 64.434(6), p<0.001 | | 68.764(10), p<0.001 | |
| n | 357 | | 358 | | 358 | |
| Reference category : Poor ; CI= Confidence Interval | | | | | | |
| *p<0.05; **p<0.01; ***p<0.001 | | | | | | |

DISCUSSION

Street foods are an integral part of urban life. In many cities worldwide, street vendors are a particularly important source of convenient, affordable food for the urban poor and working classes in both developed and developing countries. Street vending has a major economic impact in many countries and is a major source of employment (Mahon *et al.*, 1999). This study provides information and reveals many critical issues about the knowledge, attitudes and food safety practices of food vendors in Kuching city, Sarawak. Kalua (2001) opined that knowledge positively influences attitude formation, and the recipient's comprehension of health facts. Positive attitude formation leads to positive behaviour. On the contrary, superficial knowledge leads to misconception and development of negative attitudes. As a result, it increases harmful practice. In fact, many vendors have sufficient knowledge to ensure hygienic handling of food, such as the knowledge of the dangers of contamination, storage, preparation of food. According to Hines *et al.*, (1987) both declarative (knowledge of issues) and procedural knowledge (knowledge of action strategies) are essential for behaviour change. However, knowledge was not turned into safe practices, not even by those vendors

who had obtained formal training in food safety. Our study did not find any statistically significant association between knowledge score and socio-demographic characteristics except for age, race and marital status ($p < 0.05$) that is overall, young food vendors have less than optimal levels of food safety knowledge and safe food handling best practices. Similar findings were reported by Byrd-Bredbenner *et al.*, (2007). A study in Turkey found that the majority of the food vendors had no previous training in food safety and had poor knowledge of hygiene practice in preparation and distribution of food (Bas *et al.*, 2006). In Bangladesh, most of the food vendors are illiterate, doing their business haphazardly. They had poor knowledge and practice in food safety (Faruque *et al.*, 2010). However, our study found a good score of knowledge about food safety and practice among the food vendors. Rheinländer *et al.*, (2008) concluded that neither the gender of vendors nor vendors' knowledge about health and hygiene is closely related to safe food practices. They also found that the wider social, cultural, and everyday context seemed to have a greater influence on handling of food risks and hygiene. The present study found a significant association between level of knowledge and race ($p < 0.05$) indicating the Malays had good knowledge of food safety. However, this might be due to the fact that the food vendors in the northern part of Kuching city are predominantly Malays. On the contrary, our study found a positive correlation with food hygiene practice and knowledge of food safety ($p < 0.05$). This might be because training helps to improve overall food vendors' practice of food safety. Our analysis revealed that it was 4.039 times higher with good practice and 2.834 times higher with average practice of food safety among respondents with history of food safety training. Similar finding was reported in previous studies (Costello *et al.* 1997; Finch & Daniel, 2005; Roberts *et al.*, 2008). But Luby *et al.*, (1993) reported that training is not consistently associated with knowledge. The present study did not find any significant association between knowledge and food safety training ($p > 0.05$). But training itself increased the food safety attitude and practice ($p < 0.05$). It might be their desire for procedural knowledge that enhances behavioural practice. Training is critical to any system of food hygiene. Training, instruction and proper supervision increase the potential of the food vendors. On the other hand, inadequate hygiene of any person involved in food-related operations represents a potential threat to the safety of food and its suitability for consumption.

A limitation of this study is that the sample was restricted to the northern area of Kuching City where the community is predominantly Malay, where the sample size was purposively selected. Another important limitation is that food safety practices are somewhat more difficult to evaluate because of self-reported bias. Further exploration is needed on food safety practices and cognition among the street food vendors. For example, the food vendors had sufficient "good knowledge" but their attitude and practice was not up to the level. This aspect is very important for programme implementation and policy implication. Food safety training appeared to be a strong predictor for attitude and food hygiene practices. Continuous monitoring and periodic training incorporating basic principles of food safety and microbial surveillance of foods is essential to optimizing food hygiene in the food vending business.

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