International Journal of Applied Engineering Research ISSN 0973-4562 Volume 12, Number 24 (2017) pp. 15292-15297

Food Safety Knowledge and Hygiene Practice of Street Vendors in Mekong River Delta Region

Nguyen Phuoc Minh

Faculty of Food Technology - Biotech, Dong A University, Da Nang City, Vietnam.
**Corresponding author*

Abstract

Street food vending is a common feature of most cities and towns in developing countries. Hygienic conditions are frequently not ideal, and may result in microbial contamination and foodborne diseases. Our research focused on evaluation of food safety knowledge and hygiene practice of street vendors in Mekong river delta region, Vietnam. Our results showed that only 54.4% of street vendors reaching the food safety condition. Meanwhile, the infrastructure with 67.9% and document with 73.1% were recorded. Most of street vendors had knowledge of food safety with 73.0%. Whereas, group of food selection and preservation ability acquired with 83.5%; group of general knowledge about food safety acquired with 55.8%.

Regarding to handling, street vendors had hygiene practice with 98.5%, the maid had 98.5% and personal hygiene had the lowest precentage with 33.1%.

Keywords: Food safety, knowledge, hygiene practice, street vendor, Mekong delta region

INTRODUCTION

Street food trading solves major social and economic problems in developing countries through the provision of ready-made meals at relatively inexpensive prices and employment for teeming rural and urban populace along its value chain (Buliyaminu Adegbemiro Alimi, 2016). Street food vending activities in most developing countries are mostly outside the regulation and protection of the governments. The economic importance of the activities is not well appreciated due to the informal nature of the enterprise and lack of official data on volume of trade involved (B.A. Alimi, 2016). Hiemstra et al. (2006) also mentioned the significant contribution of microbusinesses made up largely of street food sector to the economy of Vietnam. These activities have been reported to pose serious concerns over the safety of the practitioners, especially the health of the consumers (S.O. Akinbode, 2011).

There were several studies mentioned to food safety of street vendor. A survey on food safety knowledge and practices of streetfood vendors from a representative urban university campus in Quezon City, Philippines was done (Ma. Patricia V. Azanza et al., 2009). S. Samapundo et al. (2015) determinined the food safety knowledge, attitudes and practices of vendors and consumers of street food in Port-au-Prince, Haiti. In general, consumers and vendors exhibited average food safety knowledge and attitude levels. Gender, training, level of education and location did not have a significant effect ($p < 0.05$) on the level of food safety knowledge of the consumers. Vendors were determined to have higher levels of food safety knowledge than consumers, whilst trained vendors had better food safety knowledge and attitudes compared to untrained vendors. The majority of vendors and consumers were aware of the importance of washing hands and proper cleaning with regards to the prevention of foodborne diseases. Charles Muyanja et al. (2011) investigated 225 street food vendors to assess risk factors, practices and knowledge with respect to food safety and hygiene. Mobile food vendors in Bronx County, NY were interviewed (S.C. Lucan et al., 2013). Majority of vendors (75% of those responding) felt most comfortable speaking Spanish; 5% preferred other non-English languages. Nearly a third of vendors changed selling locations (streets, neighbourhoods, boroughs) day-to-day or even within a given day. Fiona H. McKay et al. (2016) investigated the hygienic practices of food vendors and the context of their socioeconomic and living circumstances. Structured interviews were conducted with 31 street food vendors in Patna, India. The interviews explored issues around vending, hygiene practices, planning, and financial stability. Findings from this study indicate that food vendors are aware of good basic hygiene practices despite having low levels of literacy, low incomes, and limited job security. Rayza Dal Molin Cortese (2016) assessed the compliance of street foods sold in an urban center in a major capital of Brazil with international standards for food safety and to provide data that could be used for the elaboration of specific legislation to ensure the safety of street food. Chioma V. Asiegbu, et al. (2016) conducted a survey of the food safety knowledge and microbial hazards awareness of consumers of ready-to-eat street-vended food. The objective of this study was to determine the food safety knowledge based on microbial hazard awareness of street food consumers in the Johannesburg municipality, South Africa. Caroline Isabel Kothe, et al. (2016) evaluated the microbiological quality and sanitary conditions of hot dog vendors of Southern Brazil .

Results demonstrated that 75% of the hot dogs were contaminated with total coliforms, 30% of them presented fecal coliforms while 25% coagulase-positive staphylococci levels above the maximum limit permitted by Brazilian regulations.

Our surveillance focused on investigation of food safety knowledge and hygiene practice of street vendors in Mekong river delta region, Vietnam. It's believed that this study would contribute the important data for the govermental agencies in policy planning.

METERIAL & METHOD

Research scope

We focused on a survey of food safety condition by street vendors located in the Mekong delta, Vietnam. Samples were the street vendors (SVs) via interview. Total of 340 and 1040 street vendors were selected for this surveillance (knowledge and hygiene practice as equivalent).

Research method

Method of sampling

We carried out the observation of food safety condition and personal hygine of street vendors. A master check list was also prepared to interview some general information, knowledge and hygiene practice of street vendors (SVs). Cross-sectional assessment of food street vendors through direct observations and brief interviews was conducted.

Statistical analysis

After receiving raw data, we continued doing the statistical analysis via SPSS software to perform the discriptive analysis by frequency

RESULT & DISCUSSION

Food safety condition of street vendor trollies (SVTs)

Table 1: General information street vendor trollies (n=340)

Number	Variable		Frequency	Percentage %
1	Scale of street vendor bussiness	Below 200 meals	277	81.5
		≥ 200 meals	62	18.2
2	Type of bussiness	Company	43	12.6
		Household	298	87.6
3	License of food safety approval	Yes	185	54.4
		No	153	45.0

From table 1, we noticed that the scale of supplying meal under 200 units accounted for 81.5% and over 200 units accounted for 17.6%. Regarding to type of street vendor bussiness, the company accounted for 11.8% and private household accounted for 82.2%. Meanwhile, the SVs having the food safety approval accounted for 54.4%.

Table 2: Food safety condition of street vendor trollies (n=340)

Description	Acceptance	
	Frequency	Percentage %
Location of street vendor trollies (SVTs)	297	87.4
Structure and arrangement of SVTs	239	70.3
Material of SVTs	302	88.8
Dustbin	338	99.4
Surrounding environmental hygiene	311	91.5
Cooking table	340	100.0
Pest control	297	87.4
Hand wash basin	239	70.3
Dish wash basin	302	88.8

From table 2, we saw the SVTs having dustbin, cooking table, hand wash basin, dish wash basin with 100% acceptance. Among other criteria, they ranged from 70.3% to 99.4%

Table 3: Hygiene condition of cooking utensil (n=340)

Variables	Acceptancce	
	Frequency	Percentage %
Food processing utensil	340	100
Appropriated utensil to store clean raw material	340	100
Barrel to store clean water	340	100
Utensil of cuisine: cup, bowl, dish, spoon, chop stick	340	100
Portable water	340	100

From table 3, we realized that 100% of variables were acquired the food hygiene requirement.

Table 4: Hygiene condition in food production and preservation (n=340)

Variables	Acceptance	
	Frequency	Percentage %
Water source	328	96.5
Raw food material	340	100.0
Equipment for preservation	331	97.4
Food additives for preservation	333	97.9

From table 4, we saw that 100% of SVTs meeting the food safety requirement regarding to raw food material. Other criteria such as water source, equipment for preservation and food additives for preservation reached 96.5% to 97.9% of acceptance.

Table 5: Document record (n=340)

Variables	Acceptance	
	Frequency	Percentage %
Document record to track the raw food origin and sample keeping in 24 hours	252	74.1
Contract of raw food supplier	239	70.3

From table 5, we noticed the document record met 74.1% of acceptance. Meanwhile the contract of raw food supplier reached 70.3% of acceptance.

Table 6: General evaluation about food safety condition of the SVTs (n=340)

No	Food safety condtion	Acceptance	
		Frequency	Percentage %
1	Infrastructure	231	67.9
2	Equipment and tool	337	99.1
3	Hygien condition in production and preservation	306	90.0
4	Document record	192	56.5

From table 6, we noticed that 99.1% of the SVTs having the equipment and tool suited for food safety. Other criteria such as infrastructure, hygiene condition in production and preservation, document records were reached 67.9%, 90.0% and 56.5% in equivalent.

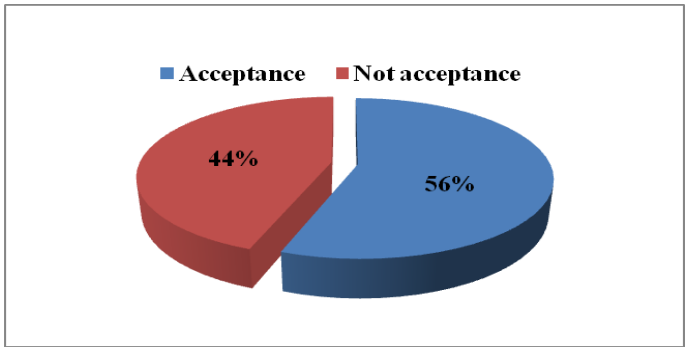

Figure 2: Ratio of street vendor trollies meeting the food safety requirement (n=340)

From the summary of 4 criteria of food safety in SVTs, we realized that ratio of SVTs acquired the food safety requirement was 56%, and non-acceptance was 44%.

Knowledge and hygiene practice of street vendors

General information

Table 7: General information of the street vendors (n=1040)

Number	Varibles	Description	Frequency	Percentage %
1	Age (age group)	≤ 40	304	29.2
		> 40	736	70.8
2	Gender	Male	32	3.1
		Female	1008	96.9
3	Education	≤ Junior high school	368	35.4
		>Junior high school	672	64.6
4	Food processing skill	Trainning	522	50.2
		No trainning	518	49.8
5	Food processing time	≤ 5 years	496	47.7
		> 5 years	544	52.3
6	Food safety trainning	< 2 times	462	44.4
		≥ 2 times	578	55.6

There were 1040 street vendors in this research. From table 7, we clearly noticed that 70.8% of street vendors over 40 years old; 29.2% of street vendors below 40 years old; 3.1% of male; 96.9% of female; 64.6% of street vendors educated over junior high school; 50.2% of trainning for food processing skill; 51.3% of processing time with more than 5 years; 55.6% of street vendors having food safety trainning with more than 2 times.

Knowledge about food safety of street vendors

Table 8: General knowledge about food safety of street vendors (n=1040)

Number	Variables	Acceptance	
		Frequency	Percentage %
1	Concept of food safety	983	**94.5**
2	Reason of contaminated food	897	**86.3**
3	Effect of contaminated food	134	**12.9**
4	Knowledge about the reason of contaminated food	457	**43.9**
5	Insect harmful to food	644	**61.9**
6	Critical control point	922	**88.7**
7	Reason caused the contaminated food (n=920)	638	**61.3**
Evaluation on general knowledge about food safety of street vendors		**582**	**56.0**

From table 8, we noted that the general knowledge of food safety was accepted for 56%.

Table 9: Knowledge about food selection and preservation of street vendors (n=1040)

Number	Variables	Acceptance	
		Frequency	**Percentage %**
1	Available information on packaged product label	294	28.3
2	Way of fresh meat selection	695	66.8
3	Way of fresh fish selection	562	54.0
4	Way of fresh egg selection	968	93.1
5	Way of fresh vegetable selection	1040	100.0
6	Way of food preservation in refrigerator	1026	98.7
7	Way to treat with left food	1040	100.0
8	Duration of food usage	1014	97.5
Evaluation about food selection and preservation of street vendors		**868**	**83.5**

From table 9, we noticed the percentage of street vendors having knowledge of food selection and preservation was quite high (83.5%).

Table 10. Knowledge of governmental regulation about food safety of the street vendor (n=1040)

Number	Variables	Acceptance	
		Frequency	Percentage %
1	No infectious disease of street vendors	344	33.1
2	Way to treat the infectious disease	1015	97.6
3	Duration of food keeping	968	93.1
4	Location for announcement of food poisonous case	987	94.9
5	Food samples, infectious samples should be kept in case of food poison.	785	75.5
6	Regulated document about food safety	466	44.8
Evaluation on the awareness of the governmental regualtion on food safety of street vendor		**773**	**74.3**

From table 10, we noticed the percentage of street vendors having awareness of the governmental regualtion on food safety was rather high (74.3%).

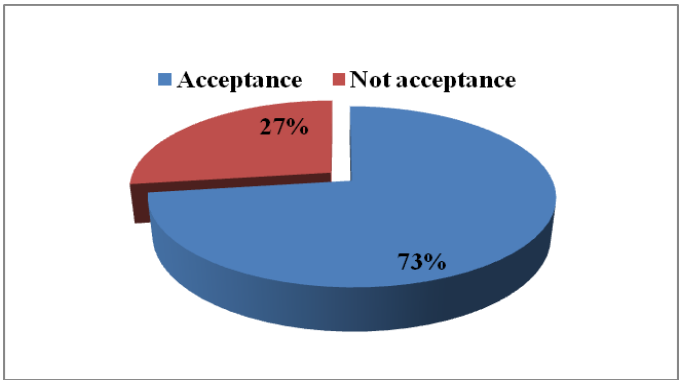

Figure 3: General evaluation on food safety of street vendors (n=1040)

After summarizing variables of knowledge including 21 variables, we realized that numbers of accepted answers about food safety about 73.0%.

Hygiene practice about food safety of the street vendors

Table 11: Personal hygiene practice of the street vendors (n=1040)

Number	Variables	Acceptance	
		Frequency	**Percentage %**
1	Costumes during processing and catering	508	48.8
2	Trainning course about food safety	812	78.1
3	Health check	853	82.0
4	Shit analysis	677	65.1
5	Dedicated costumes	478	46.0
6	Nails	892	85.8
7	Jewelry	981	94.3
8	Hand wash	658	63.3
Evaluation about personal hygiene of street vendor		**344**	**33.1**

From table 11, we recognized that personal hygiene practice of street vendors was quite low (33.1%).

Table 12: Food safety practice of street vendors (n=1040)

Number	Variable	Acceptance	
		Frequency	Percentage %
1	Processing flow chart	923	88.8
2	Way of vegetable washing	1040	100.0
3	Way of using frozen foodstuff	975	93.8
4	Location for food primary treatment	988	95.0
5	Document record for food reception	1014	97.5
Evaluation about food safety practice of street vendors		**992**	**95.4**

From table 12, we saw the percentage of food safety practice of street vendors was rather high (95.4%).

Table 13: Food hygiene practice about food preservation of street vendors (n=1040)

Number	Variables	Acceptance	
		Frequency	Percentage %
1	Way to keep cooked food	1017	97.8
2	Food distribution	1040	100.0
3	Way of using tool for food distribution	1040	100.0
4	Way to keep food for age group	1040	100.0
5	Using of food scraps for next day	1040	100.0
6	Way to treat food scraps	1040	100.0
7	Food keeping	985	94.7
8	Location for food keeping (n=990)	982	94.4
Evaluation about hygiene practice of food preservation		**1020**	**98.5**

From table 13, our result showed that percentage of hygiene practice of food preservation was rather high (98.5%).

Table 14: Hygiene practice about kitchen cleaning, garbage of street vendors (n=1040)

Number	Variables	Acceptance	
		Frequency	Percentage %
1	Kitchen cleaning	1040	100.0
2	Dustbin	1025	98.6
3	Time of garbage disposal	1018	97.9
Evaluation about hygiene practice of kitchen cleanin, garbage of street vendors		**1024**	**98.5**

From table 14, percentage of hygiene practice of street vendors was 98.5%.

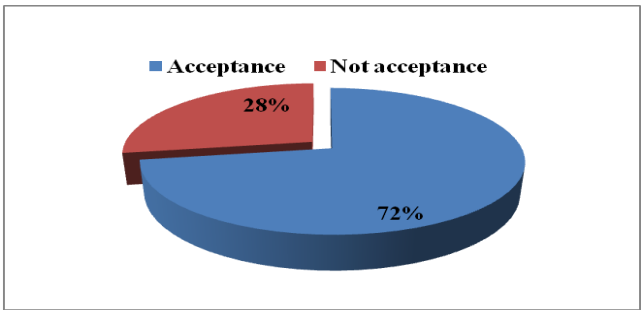

Figure 4: General evaluation of hygiene practice of street vendors (n=1040)

After summarizing 24 variables of hygiene practice, we decided that percentage of acceptance would be 72%.

CONCLUSION

Controlling and ensuring the safety of street-vended foods in many countries is a challenge considering that these foods are often less expensive and readily available. We successfully established an investigation about food safety of street vendors in Mekong river delta, Vietnam. Regarding the knowledge, we devided it into three groups (general awareness, food selection and preservation, governmental regulation). In respect of hygiene practice, we devided it into four groups (personal hygiene, production, preservation, kitchen and garbage cleaning). All data were summarized by the discriptive analysis with frequency, percentage of each group.

REFERENCE

[1] A.M. Hiemstra, K.G. Van der Kooy, M. Frese, Entrepreneurship in the street food sector of Vietnam – assessment of psychological success and failure factors. *J. Small Bus. Man.* 44 (1): 474–481 (2006).

[2] B.A. Alimi, T.S. Workneh, Consumer awareness and willingness to pay for safety of street foods in developing countries: a review. *Int. J. Consum. Stud.* 40 (1): 242–248 (2016).

[3] Buliyaminu Adegbemiro Alimi, Risk factors in street food practices in developing countries: A review. *Food Science and Human Wellness* 5 (1): 141–148 (2016).

[4] Charles Muyanja, Leontina Nayiga, Namugumya Brenda, George Nasinyama, Practices, knowledge and risk factors of street food vendors in Uganda. *Food Control* 22(10): 1551-1558 (2011).

[5] Chioma V. Asiegbu, Sogolo L. Lebelo, Frederick T. Tabit, The food safety knowledge and microbial hazards awareness of consumers of ready-to-eat street-vended food. *Food Control* 60 (1): 422-429 (2016).

[6] Caroline Isabel Kothe, Clarissa Henses Schild, Eduardo César Tondo, Patrícia da Silva Malheiros, Microbiological contamination and evaluation of sanitary conditions of hot dog street vendors in Southern Brazil. *Food Control* 62(1): 346-350 (2016).

[7] Fiona H. McKay, Arbind Singh, Sangeeta Singh, Suvajee Good, Richard H. Osborne, Street vendors in Patna, India: Understanding the socio-economic profile, livelihood and hygiene practices. *Food Control* 70 (1): 281-285 (2016).

[8] Ma. Patricia V. Azanza, Corazon F. Gatchalian, Melba P. Ortega, Food safety knowledge and practices of streetfood vendors in a Philippines university campus. *International Journal of Food Sciences and Nutrition* 51(4): 235-245 (2009).

[9] Rayza Dal Molin Cortese, Marcela Boro Veiros, Charles Feldman, Suzi Barletto Cavalli, Food safety and hygiene practices of vendors during the chain of street food production in Florianopolis, Brazil: A cross-sectional study. *Food Control* 62 (1): 178–186 (2016).

[10] S.C. Lucan, M. Varona, A.R. Maroko, J. Bumol, L. Torrens, J. Wylie-Rosett, Assessing mobile food vendors (a.k.a. street food vendors)—methods, challenges, and lessons learned for future food-environment research. *Public Health* 127 (8): 766-776 (2013).

[11] S.O. Akinbode, A.O. Dipeolu, P.A. Okuneye, Willingness to pay for street food safety in Ogun State, Nigeria. *J. Agric. Food Inf.* 12 (1): 154–166 (2011).

[12] S. Samapundo, R. Climat, R. Xhaferi, F. Devlieghere, Food safety knowledge, attitudes and practices of street food vendors and consumers in Port-au-Prince, Haiti. *Food Control* 50 (1): 457-466 (2015).