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Food Safety Knowledge and Handling Practices of Street Vendors

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ABSTRACT

A survey was done to determine food safety knowledge and food handling practices of street food vendors in Cagayan de Oro City between April-May 2014. Data on demographics, food safety knowledge and practices were collected from 50 street vendors using 26 questions. A few vendors (22%) acquired the knowledge of food preparation by formal training and only 30% of the respondents had the annual medical health certificate which indicated that they have carried out the recommended physical and medical examination, extension education, quality control information and knowledge of regulation for approval, food sale and preparation practices. Some of the food safety knowledge of the vendors could not be translated to practice due to the absence of basic facilities such as water and toilets at their vending sites. Training on hygiene and sanitation, provision of basic infrastructures for the street food industry recommended.

Keywords: Food safety knowledge, food handling practices, street vendors

INTRODUCTION

Rapid urbanization, increased demand for convenience food, new processing and handling technologies, immuno-compromised and susceptible populations and emerging pathogens, among others, point to the need for an effective national food safety program in the Philippines (Lizada, 2007). Food safety in the country,

including recent developments, emphasized the need to assure food safety, trade issues, scientific basis of food safety measures and the commitment to food safety. Although Philippine legislation and related issuance provide for various aspects of food safety, the absence of a clear statement of national policy on food safety and the number of agencies involved have led to overlaps and gaps in the implementation of this program. The author proposes forming an intervening task force on food safety to ensure that the ongoing rationalization of relevant agencies will adequately address food safety. This may also help strengthen consumer education towards effective consumer advocacy for food safety and may promote good complementation of mandatory and voluntary food safety measures.

Monitoring and surveillance programs covering food-borne diseases are already being implemented by the Department of Health (DOH). Unfortunately, these programs, which can provide the much-needed data for a robust economic analysis of the consequences of food-borne diseases and the potential benefits that can be derived from an effective national program on food safety, need to be expanded to cover major food-borne hazards. The DOH itself has identified the need to integrate these programs.

Street-vended foods are defined as those foods prepared on the street and ready to eat, or prepared at home and consumed on the street without further preparation (Bryan, Jermini, Schmitt, Chilufya, Mwanza, Matoba, Mfume, & Chibiya, 1997). Street-vended foods include foods as diverse as meat, fish, fruits, vegetables, grains, cereals, frozen produce, and beverages (World Health Organization [WHO], 1996). Each year, millions of people worldwide suffer from food-borne diseases (WHO, 2000), and illness resulting from the consumption of contaminated food has become one of the most widespread public health problems in contemporary society (Notermans, Gallhoff, Zweitering & Mead, 1995). Street foods, particularly in developing countries, have been reported to be contaminated by pathogenic bacteria (Arambolu, Almeida, Cuelar, Belotto, 1993; Bryan, Michanie, Fernadez, Vizcarra, Dora, Obulia, Alonso & Requejo, 1988a; Bryan, Michanie, Fernadez, Vizcarra, Dora, Obulia, Alonso & Requejo, 1988b; Bryan, Teufel, Riazj, Roohij, Quadar & Malik, 1992; and Desenclos, Klontz, Wolfe & Boecheri, 1991).

There is an increased interest worldwide in the importance of street food as part of a general concern for food security and health (Canet & N'Diaye, 1996). Such interest is attributable to the incidence of food-borne diseases in developing countries as well as in the developed world (Redmond & Griffith, 2003).

Most handlers of street-vended foods in Africa, and the developing world at large, are ignorant of basic food safety issues. Consequently, street foods are commonly exposed to dangerous abuses, often at all stages of handling. The washing of hands,

utensils, and dishes is often done in buckets or bowls. The health risk posed by street foods in various countries is frequently due to poor sanitary practices during preparation and selling (Arambolu et al., 1993; Bryan, 1978; and Roberts, 1982). At the global level, a WHO survey has shown that street foods constitute a significant part of the urban food supply of 74% of the countries reported (WHO, 1996). Since notification is not obligatory, data on food-borne infections and intoxications do not reflect the real situation (WHO, 2004).

OBJECTIVES OF THE STUDY

The study aimed to investigate the actual level of food safety knowledge and the relevant practices in food handling among street vendors in Cagayan De Oro City.

METHODOLOGY

A survey to evaluate the food safety knowledge and practices of street food vendors in Cagayan de Oro City was carried out between April-May 2014. In this study, a street food vendor refers to anybody selling ready-to-eat foods and/or drinks along streets and in public places within the area of the study. Fifty food vendors operating in places such as major streets, open-air market, schools, offices and general hospitals were recruited for the study. The questionnaire used in this study was a modified version of a questionnaire from the US Food and Drug Administration (FDA) about to food safety, nutrition, and cosmetics (FDA, 2003).

A structured questionnaire was developed to collect data from street food vendors. The questionnaire was pre-tested for clarity and validity on 10 randomly selected street food vendors in open-air market in Cagayan de Oro City. Results of the pre-test were used in the revision of the initial questionnaire. The final version of the questionnaire contained 26 questions pertaining to health and personal hygiene knowledge (hand washing, bathing, food handling) and food-borne diseases. Consent was obtained from the respondents and assurance was given that the data would be treated confidentially. All statistical analyses were done using SPSS for Windows (version 11.0, 2001, Chicago, Il.). Frequencies were computed for all variables.

RESULTS AND DISCUSSION

The socio-economic and demographic data including gender, age, marital status and educational level of the respondents are presented in Table 1. There were more female respondents (62%) than male respondents (38%). As to age, more than half (54%) of the respondents aged 23-27 years old. The rest aged 18-22 years old (28%), 28-32 years old (12%), and 33 years old and above (6%).

Table 1. Profile of Food Handlers

Variables	Frequency	Percentage
Age		
18-22 years old	14	28.00
23-27 years old	27	54.00
28-32 years old	6	12.00
33 years old and above	3	6.00
Total	**50**	**100.00**
Gender		
Male	31	62.00
Female	19	38.00
Total	**50**	**100**
Educational Attainment		
No schooling	2	4.00
Elementary School	7	14.00
Elementary Graduate	1	2.00
High School	11	22.00
High School Graduate	16	32.00
College	7	14.00
College Graduate	6	12.00
Total	**50**	**100.00**
Marital Status		
Single	27	54.00
Married	23	46.00
Separated	0	0.00
Total	**50**	**100.00**
Types of Vendors		
Stationary	26	52.00
Mobile	24	48.00
Total	**50**	**100.00**
Health Certificate		
With	15	30.00
Without	35	70.00
Total	**50**	**100.00**
Number of Years Vending		
1-5	30	60.00
6-10	16	32.00
11-15	2	4.00
16-ABOVE	2	4.00
Total	**50**	**100.00**
Source of Knowledge on Food Preparation		
Through observation	36	72.00
Formal training	11	22.00
Others	3	6.00
Total	**50**	**100.00**

Only 2% of respondents had no formal education while 98% finished at least education. As to marital status, 54% of the respondents of the street food vendors were married while 46% were singled. In terms of vending type, 54% of them were stationary while 48 % were mobile. Only 30% of the respondents had health certificate indicating that they underwent the annual medical check-up. The rest (70%) of the respondents failed to present a health certificate. Only very few (22%) of the respondents acquired knowledge on food preparation through formal training. The majority (72%) of them acquired knowledge through observation more than half (60%) of the respondents were eats food vending for less than 5 years, while 32% for 6-10 years, and 4% for 11-15 years got. Musa and Akande (2002), however, stated that periodic medical examination and health certificate must be obtained from authorized health centers and hospitals.

Table 2. Street Food Vended within Cagayan de Oro City

TYPE	Frequency	Percentage
Juice	14	28.00
Bread	7	14.00
Meat (chicken/beef)	18	36.00
Soup	5	10.00
Animal internal organs	19	38.00
Tempura/fishball	19	38.00
Porridge	1	2.00
Egg (ballot)	21	42.00
Shakes	10	20.00
Siomai	15	30.00

Table 2 shows types of street foods vended within Cagayan de Oro City. The street foods were processed and vendor-prepared foods such as siomai, soups, porridge, sauces, juice and shakes. Majority of the stationary food vendors sold almost all types of foods. The mobile food vendors, on the other hand were restricted to one or two types of foods. Vended the most was ballot (48%), followed by animal organs (proven, betamax), tempura/fishball, meat (chicken/beef), and siomai (30%). Vended the least was porridge (2%), followed by soup, bread, shakes, and juice.

Health and hygienic practices of the street food vendors are shown in Tables 3 and 4. Majority (70%) of the respondents had no knowledge of the need to wash hands after handling money. Very few (24%) were aware that it is necessary to wash hands even when handkerchief is used for sneezing.

Table 3. Food Handlers Knowledge on Health and Personal Hygiene

TOPICS	Frequency			Percentage		
	Yes	No	No Knowledge	Yes	No	No Knowledge
1. Hand washing is necessary for food handlers:	10	35	5	20.00	70.00	10.00
a.) After touching money						
b.) Even when handkerchief is used for sneezing	12	29	9	24.00	58.00	18.00
c.) Even when hands are not yet visibly dirty during continuous food handling	25	15	10	50.00	30.00	20.00
2. Bathe regularly	39	7	4	78.00	14.00	8.00
3. Wear hair restraints and aprons	3	46	1	6.00	92.00	2.00
4. Consider hands and arm jewelry as sources of contaminations	6	42	2	12.00	83.00	5.00
5. Cannot safely handle food	6	41	3	12.00	82.00	6.00
a. When having colds and cough						
b. When sick with diarrhea even if hands are washed after trip to toilet	27	10	13	54.00	20.00	26.00
c. When they have an open wound in the hands even if it is fully bandaged	21	19	10	42.00	38.00	20.00
d. When handling money	4	41	5	8.00	82.00	10.00

In this study, the vendors (73%) had knowledge of the need to wash hands after some activities. However, such knowledge was not put to practice, which could be attributed to the absence of washrooms in most of vending sites surveyed. Conversely, in the study of Azanza, Gatchalian and Ortega (2005), it was reported that the street relatively high level of knowledge on hand washing and its translation to practice were attributed to the availability of a number of hand washing facilities. The food vendors (86%) in this study used the tap water and might have considered using soap as additional cost. However, WHO (1984) advises the use of soap for effective hand washing. Many of the vendors (60%) were found to have touched food with their bare hands and handled money while serving food. Such practices compromise food safety (Anon, 1999; Bryan et al., 2003). Also, very few vendors (10%) wore hair restraints and aprons when vending. Some (9%) were found wearing hands and jewelry, which is a possible source of contamination (WHO, 1996).

Table 4. Food Handlers Health and Personal Hygiene Practices

TOPICS	Frequency	Percentage
1. Ailments that temporarily prevented vendors from vending or cooking food		
Cough and colds	31	62.00
Diarrhea	22	44.00
Nausea	4	8.00
Vomiting	9	18.00
Sore eyes	12	24.00
Stomach cramps	12	24.00
Sick member of family	11	22.00
2. Hand washing requirements		
Clean water	44	88.00
Soap	29	58.00
Clean hand towel	32	64.00
Disinfecting solution	17	34.00
3. Reasons for hand washing		
Touching money	39	78.00
Handling garbage	39	78.00
Blowing of nose	30	60.00
After eating meals	23	46.00
After using toilets	33	66.00
Handling raw food	25	50.00
Scratching	25	50.00
Continuous food handling	26	52.00

Less than half (46%) of the respondents felt that the use of soap is not always necessary for hand washing; however, but 86% indicated that they use clean water when washing hands. Only 2% of the respondents agreed that a clean towel or disinfecting solution is needed in hand washing. Results further reveal that magnify of vendors (70%) did not see the need to wash hand after scratching or after continuous handling of food; however, majority agreed that washing of hands after eating and after using a toilet is important. A very few (10%) agreed that sore eyes and stomach cramps are enough reasons to stop vending or cooking temporarily.

Shown in Table 5 are results of the survey on hygienic practices of the vendors show that more than a half (56%) of the respondents considered volume and price more important freshness than food to be vended. Many respondents (58%) cooked the food in the morning of the sale day and only 7% reheated the food before sale.

Only few (12%) thoroughly washed the food before cooking and adequately cooked the food. Very few (3%) respondents exposed their foods to flies and handled cooked food at ground level (5%). Majority (70%) of the respondents cooked and stores the food several hours before sale while only 14% reheated the food before sale.

Table 5. Food Handlers Knowledge on Food Handling Practices

PARAMETER	Frequency	Percentage
1. Parameters considered in buying food to be cooked or vended		
Price	18	56.00
Freshness	11	22.00
Clean food	24	48.00
Volume	28	56.00
Sold by reputable manufacturer/wholesaler	11	22.00
2. Food handling practices		
Food cooked during sale	9	18.00
Food cooked in the morning of sale day	29	58.00
Food sold from tray with covering	3	6.00
Food sold from tray with no covering	3	6.00
Food handled at ground level	5	10.00
Food exposed to flies	3	6.00
Food reheated before sale	7	14.00
Adequate cooking of food	7	14.00
Thorough washing of food to be cooked	12	24.00
Use of safe water for cooking	21	42.00
3. Serving of food		
Food served with fork/spoon	26	52.00
Food served with bare hands	14	28.00
Food served into cup/plate	28	56.00
4. Leftover food management		
Throw away	30	60.00
Eaten at home	9	18.00
Refrigerated and reheated	13	26.00
No leftover	13	26.00
5. Source of water for hand washing and cooking		
Tap	36	72.00
Mineral water	17	34.00
6. Methods used in cleaning utensils		
Washing with soap and water	39	78.00
Washing with hot water	19	19.00
Drying with clothes	10	20.00

Table 6. Food Handlers Knowledge on Food Contamination

TOPICS	Frequency	Percentage
1. Familiarity with the term food-borne illness	20	40.00
2. Types of food contaminants include worms and parasites		
Splinters of wood and shards of glass	9	18.00
Invisible germs in food	28	56.00
Kerosene oil, detergent or other similar products	10	20.00
Food coloring, flavoring and spices	24	48.00
Insects, insect droppings and dirt	17	34.00
3. Symptoms		
Stomach pain	36	72.00
Diarrhea	27	54.00
Vomiting	12	24.00
Nausea	7	14.00
Headache	14	28.00
4. Types of food-borne illness		
Typhoid from contaminated water	30	60.00
Cholera from contaminated water	28	56.00
Dysentery from contaminated water	7	14.00

The preparation of food before its consumption for long time, storage at ambient temperature or inadequate cooling and reheating contribute to food poisoning outbreaks (Roberts, 1982; WHO, 1989; Abdalla, Siham, Suliman, Alian, & Amel, 2008).

Results of the survey on the knowledge of food vendors on food-borne diseases are presented in Table 6. Less than a half (40%) of the respondents were familiar with the term "borne diseases" and aware that microorganisms can contaminate foods; however, few of the respondents were aware that food colorings, flavorings, and spices used in food preparation and preservation can contaminate food. Diarrhea (54%) and stomach pain (72%) were the most prevalent symptoms of food-borne diseases identified, followed by headache (14%), vomiting (12%), and nausea (7%). Many of them were aware of some common food-borne diseases and mode of transmission (Abdussalam & Kaferstein, 1993; Omemu, Edema & Bankole, 2005).

CONCLUSIONS

Food vendors should be adequately educated on the role of food in disease transmission as well as on personal hygiene and approved practices in handling food. The legal implications of selling unsafe food should be made clear to street food vendors. Also, there is a need for the local government to make available basic infrastructures such as washrooms, public supply of portable water, containers, and good drainage system.

LITERATURE CITED

Abdalla, M.A., Siham, E., Suliman, Y.Y., Alian, B.A. & Amel, O.B.
2008 A study of the microbial content of the domestic refrigerators in Khartoum area (Khartoum North). *Vet. Sci. Anim. Husb.* 47 (1 and 2). P15-23.

Abdussalam, M. & Kaferstein, F.K.
1993 Safety of street foods. *World Health Forum.* 14 (2) (1993), pp. 191-194.

Anon
1999 Revised regional guidelines for the design of control measures for street-vended foods in Africa CAC/GL-22 - Rev. 1. (pp. 1-22).

Arambolu, P., Almeida, C.R., Cuelar, J., Belotto, A.J.
1993 Some street food vending in Latin America: some insights into its socio-cultural imperatives and public health implications. Proceedings of 11th International Symposium of World Assoc. Vet. Food Hygienists (WAVFH), October, 24-29,1993, Bangkok, Thailand, pp. 405-425.

Azanza, M.A.P, Gatchalian, C.F. & Ortega, M.P.
2005 Food safety knowledge and practices of street food vendors in a Philippines university campus. *International Journal Of Food Science and Nutrition.* 51, pp. 235-246.

Bryan, F.L.
1978 Factors that contribute to outbreaks of foodbome disease. *J. Food. Prot.* 41 ,pp. 816-826. Medicine Net, Inc.

Bryan , F.L., Michanie, S., Fernandez, N.M., Vizcarra, M.M., Dora, T.P., Obulia, N.S., Alonso, A.B. & Requejo, E.C.
1988a Critical control points of street-vended foods in the Dominican Republic. J. Food Prot. 51, pp. 373-383.

Bryan , F.L., Michanie, S., Fernandez, N.M., Vizcarra, M.M., Dora, T.P., Obulia, N.S., Alonso, A.B. & Requejo, E.C.
1988b Hazard analysis of foods prepared by migrants living in a new settlement at the outskirts of Lima, Peru. *J. Food Prot.* 51, pp. 373-383.

Bryan, F.L., Teufel, P., Riazj, S., Roohij, S., Quadar, F. & Malik, Z.
1992 Hazards and critical control points of street-vended chat, a regionally popular foods in Pakistan. *J. Food Prot.* 55, pp. 708-713.

Bryan, F.L., Jermini, M., Schmitt, R., Chilufya, E.N., Mwanza, M., Matoba, A., Mfume, E. & Chibiya, B.
1997 Hazards associated with holding and reheating foods at vending sites in a small town in Zambia. *Journal of Food Protection.* 60: p391-398.

Bryan, M.B., Caroline, V. & Madelon, F.
2003 Safety of vendor-prepared foods: Evaluation of 10 processing mobile food vendors in Manhattan. *Public Health Reports.* 118, pp. 470-476.

Canet, C. & N'Diaye, C.
1996 Street foods in Africa. *Food Nutrition and Agriculture.* 17/18, pp. 4-13.

Desenclos, J.C.A., Klontz, K.C., Wolfe, L.E. & Boecheri, S.
1991 The risk of Vibrio illness in the Florida raw oyster eating population 1981-1988. *Am. J Epidemiol.* 13.4, pp. 290-297.

Food and Drug Administration Center for Food Safety and Applied Nutrition (FDA/CFSAN)
2003 How can I prevent food-borne illness?

Lizada, M.C.
2007 Food safety in thephilippines: problems, issuesand opportunities for thesmall farmers & producers. Retrieved at http://www.scribd.com/doc/4938633/Food-Safety-in-the-Philippines-Problems-Issues-and-Opportunities-for-

the-Small-Farmers-and-Produ

Musa, 0.I. & Akande, T.M.
2002 Routine medical examination of food vendors in secondary schools in llorin. *Nigerian Medical Journal*. 11 (I), pp. 9-12.

Notermans, S., Gallhoff, G., Zweitering, M. & Mead, G.
1995 Identification of critical control points in the HACCP system with a quantitative effect on the safety of food products. *Food Microbiology*. 12, pp. 93-98.

Omemu, A.M., Edema, M.O. & Bankole, M.O.
2005 Bacteriological assessment of street vended ready to eat (RTE) vegetables and pre-packed salad in Nigeria. *Nigerian Journal of Microbiology*. 19 (l-2,pp. 497-504 .

Redmond, E.C. & Griffith, C.J.
2003 Consumer food handling in the home: A review of food safety studies. *Journal of Food Protection*. 66 (1) pp. 130-161.

Roberts. D.
1982 Factors contributing to outbreaks of food poisoning in England and Wales, 1970-1979. J. Hyg. 89, pp. 491-498.

World Health Organization
1984 WHO Technical Report Series, No. 705, 1984 (The role of food safety in health and development): Report of a Joint FAOIWHO Expert Committee on Food Safety.

World Health Organization
1989 Health surveillance and management procedures for food handling personnel. WHO technical report series, 785. Geneva. 52pp.

World Health Organization
1996 Essential safety requirements for street vended foods. Food Safety Unit, Division of Food and Nutrition, WHOIFNUIFOSf96.7.

World Health Organization
2000 Food safety: Resolution of the Executive Board of the WHO. 105th session.

World Health Organization
2004 Surveillance Programme for Control of Food-borne Infections and Toxications in Europe 8th report 1999-2000, Country reports: Turkey.