JSET

Journal of Science, Engineering and Technology 7:58-67 (2019)
Southern Leyte State University, Sogod, Southern Leyte, Philippines

Knowledge, Attitudes and Practices (KAPs) on Food Safety Among Food Handlers in School Canteens in Eastern Visayas, Philippines

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Abstract

The present study was conducted to evaluate the levels of knowledge, attitudes and practices (KAPs) on food safety among food handlers in different high school canteens in Eastern Visayas, Philippines. Of the 26 respondents, the were between 36-45 years (23.1%), are females (76.9%), reached tertiary education (73.1%), and obtained food safety-related trainings (50%). When it came to foodborne disease transmission, 96.2%, 88.5%, and 73.1% of the respondents know that Salmonella, hepatitis A virus and Staphylococcus aureus, respectively, are foodborne pathogens. Yet some of the respondents (38.4%) did not know that microbes can be in the skin, nose and mouth of a healthy food handler. The overall satisfactory knowledge of food safety among the respondents did not however translate into positive attitudes and satisfactory practices on food safety. The majority of the respondents were unaware of the appropriate way in thawing meat products (57.7% wrong answers); 53.8% of the respondents practiced refreezing of defrosted food products, and washing of eggs soon after purchase. Although the majority of the respondents (80.8%) knew that eating and drinking in the workplace increased the risk of food contamination, 53.8% of these respondents still report eating and drinking during working hours. Overall, findings revealed that adequate knowledge on food safety will not necessarily translate into positive attitudes and good practices on food safety. Thus, continuous food safety education and subsequent monitoring and evaluation are a must. Strategies to motivate food handlers in pursuing food safety procedures are also recommended.

Keywords: *Food handlers; Food safety; Knowledge; Attitude; Practices*

Introduction

The emergence of resistant strains of foodborne microorganisms and the rapid change in demographics and lifestyle of people have created alarming situations, potentially leading to major foodborne outbreaks (Mead et al., 1999). Having mentioned this, enhanced food safety programs among food handlers and

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consumers must be in place (Haapala & Probart, 2004).

Human handling errors hadbeen implicated in most foodborne outbreaks in the world. Soares et al. (2012), reported that the inappropriate handling of foods by the food service industry resulted in 97 % of food poisoning cases worldwide with several cases involving school children such as those reported in Japan (Michino & Otsuki, 2000), Brazil (Santana et al., 2009), Malaysia (Aziz & Dahan, 2013) and the Philippines (Avanza, 2004). In a report released by the World Health Organization (WHO) in 2005, the ingestion of contaminated food and drinking water resulted in 1.8 million deaths from diarrheal diseases. Thus, good personal hygiene and sanitary practices are essential components in any food safety program (Bartleson & Michaels, 2007).

Meals prepared and sold in school canteens (Santana et al., 2009), should be given utmost attention as these foods are intended for young children who are at high risk for foodborne illnesses. To ensure safe meals being served to students, school food services are expected to follow the multiple regulations set upon by the Department of Health (DOH) or the corresponding local government unit (LGU). Despite the presence of various regulations to assure safe meals offered in school canteens, safety measures taken during school meal preparation are still inadequate. In an earlier study, Pascual & Abenis (2016) found 60% of the selected public high schools classified under “poor” in terms of sanitary conditions and hygienic personnel practices, 29% of the school canteens from private high schools were also classified “poor”. These authors further found that only one cafeteria has successfully complied with the sanitary license and health certificates issued to their respective food handlers. The generally low compliance on sanitary permit and heath certificates among school canteens in the Eastern Visayas could be due to the lenient implementation of existing regulations relating to food safety.

The role of food handlers in the occurrence of food poisoning must not be underestimated. Hence, their knowledge, attitudes and practices (KAPs) on food safety should be sufficient (Sharif & Al-Malki, 2010). Since knowledge alone does not always lead to positive changes in food handling behaviors (Ansari-Lari et al., 2010), it is essential for any government intervention to provide continued education among food handlers to assure delivery of high quality and safe food (Soares et al., 2012). In considering these issues, the study aimed at evaluating the levels of knowledge, attitudes, and practices in food safety among food handlers in public and private high schools in the Eastern Visayas region of the Philippines.

Materials and Methods

Conduct of Survey

A descriptive, cross-sectional study was conducted among 22 canteens coming from 15 public and 7 private high schools in the provinces of Leyte and Samar, Eastern Visayas, Philippines. The food handlers’ knowledge, attitudes, and practices (KAP) were assessed using a structured questionnaire. A total of 26 food handlers participated in the research survey. Informed consent, previously approved by the Ethics Committee of the Eastern Visayas Health Research Development Consortium (EVHRDC), was provided to each participant.

The research survey proceeded following a structured questionnaire adapted from the works of Soares et al. (2012) and Angelillo et al. (2001) with slight modification. Prior to the actual conduct of the research survey, the contents of the questionnaire were peer-reviewed and went through a pilot study before the final survey forms were distributed to the food handlers. Contents were also explained thoroughly by the researchers before being handed over to the participants. The data collection period was conducted between February and April 2016.

KAP Questionnaire

The research questionnaire is composed of four distinct sections, these are: Section 1: demographic information consisting of participant's gender, age, level of education, length of employment and trainings/seminars participated; Section 2: knowledge on food safety; Section 3: attitudes on food safety; and Section 4: food safety practices. Specifically, Section 2 consisted of 18 close-ended questions that could either be answered "true", "false" or "do not know". A scale ranging from 0 to 18 points was used to evaluate the participants' responses. Scores equal to or less than 12 were regarded as "insufficient" knowledge and those that had scores which was equal to or greater than 13 points (70% accuracy) were considered to have "good" knowledge (Soares et al. 2012). For Section 3, participants' attitudes toward food safety were evaluated using a 16-point questionnaire which can be answered either by "agree", "disagree" or "do not know." Participants who answered equal or lesser than 11 items correctly were considered to have a "negative attitude" while participants who answered equal or higher than 12 were considered as having a "positive attitude" toward food safety (Soares et al. 2012). In Section 4, the level of hygienic practices was assessed using a 15-point questionnaire which can be answered either with "always", "often", "sometimes", "seldom" or "never". One point was given to every correct practice. Answers like "seldom", "sometime", or "often" were not scored. 70% or more correct responses were considered as "good".

Data Analysis

The data obtained was analyzed using SPSS version 16 software for Windows. Descriptive statistics were used to summarize the demographic characteristics of the respondents and their respective scores in knowledge, attitudes, and practices. Spearman's correlation coefficient was used to determine the association between the demographic characteristics of the food handlers and their food safety knowledge, attitudes, and practice scores. Results with a p-value <0.05 were considered to have a statistically significant relationship.

Results and Discussion

This study provides valuable information on the level of knowledge, attitudes and practices among food handlers coming from select high school canteens in the Eastern Visayas.

Demographic Characteristics of Food Handlers

In Table 1, the demographic profile of the respondents is presented. Out of the 26 respondents who participated in this study, 20 (76.9%) are females while only 6 (23.1%) are males. The higher proportion of female respondents are also evident in various literature (Akabanda et al. 2017; Soares et al. 2012; Baluka et al. 2015). The majority of the respondents in this study (n = 9; 34.6%) are coming from Ormoc City, Leyte, Philippines. A greater number of the respondents were in the age bracket of 36-45 (23.1%) years with an average age of 38 years. Approximately, 19 (73.1%) of the respondents in this study have attained tertiary education. According to Webb & Morancie 2015, the level of education, however, does not always translate to a satisfactory performance in food safety knowledge. Thirteen (50%) of the respondents self-reported that they have received food safety training in the past. Although reports in the literature have indicated that prior food safety-related trainings may contribute to upgrading the food safety knowledge among food handlers, this does not guarantee a positive change in food handling attitudes and practices (Powell et al., 1997).

Table 1. Demographic characteristics of food handlers employed in select high school canteens in Eastern Visayas

Characteristics	*Number (%)*
Sex	
Female	20 (76.9%)
Male	6 (23.1%)
Age (years)	
15-25	4 (15.4%)
26-35	3 (11.5.%)
36-45	16 (23.1%)
56-60	1 (3.8%)
>60	2 (7.7%)
Educational attainment	
No education	0
Primary school	1 (3.8%)
High school	6 (23.1%)
University	19 (73.1%)
Food safety training	
Yes	13 (50.0%)
No	13 (50.0%)
Location	
Tacloban City	7 (26.9%)
Ormoc City	9 (34.6%)
Catbalogan City	2 (7.7%)
Baybay City	4 (15.4%)
Maasin City	4 (15.4%)

Food Safety Knowledge

In general, respondents have shown adequate knowledge of food safety (Table 2). Majority of the respondents know that hygienic practices such as using gloves (88.5% correct answers), washing hands before work (96.2% correct answers), proper cleaning of utensils (76.9% correct answers) and washing of utensils with detergent (73.1% correct answers) reduce risk of contamination. The majority of respondents (80.8%) also agreed that eating and drinking in the workplace could further increase the risk of contamination. The respondents' knowledge of these hygienic procedures is important since, according to Bas et al. (2006), poor sanitary practices among food handlers can significantly contribute to the spread of foodborne diseases. When it comes to knowledge on foodborne disease transmission, 96.2, 88.5, 73.1% of the respondents know that Salmonella, hepatitis A virus, and Staphylococcus aureus, respectively, are foodborne pathogens. Still, many of the respondents (38.4%) did not know that microbes can be present in the skin, nose and mouth of a healthy food handler. The majority of the respondents are also knowledgeable that bloody diarrhea (76.9%) and typhoid fever (65.4%) can be transmitted by food. However, 38.4% of the respondents believe that HIV/AIDS can also be transmitted through food, indicating that public education must be placed to sufficiently address modes of HIV transmission. Over 96.2% of the respondents agreed on the necessity of taking leave from work when experiencing infectious disease on skin. Surprisingly, the majority of the respondents (73.1%) are unaware that children, healthy adults, pregnant women and old individuals are at equal risk of contracting a foodborne illness. The majority of the respondents (69.3%) are also unaware that reheating of foods can contribute to food contamination.

Food Safety Attitudes

Considering the report in the literature that reduction in the incidence of foodborne illnesses is strongly influenced by the attitudes of food-handlers (Akabanda et al. 2017), the study evaluated the food safety attitudes of the respondents. As presented in Table 3, the majority of the respondents (84.6%) agreed that proper handwashing could prevent foodborne diseases, which is consistent with the report in Table 2. Proper handwashing was found to significantly contribute to the reduction of diarrheal disease in child care facilities (Xavier et al., 2007). Thus, this inexpensive strategy should be encouraged not only among food handlers but also among consumers to help minimize the risk of foodborne illnesses. Similarly, practices such as wearing gloves, masks and hair caps are reported to have significantly contributed in the reduction of foodborne diseases (Akabanda et al. 2017; Montville et al. 2001). These practices along with proper handwashing are considered effective strategies in minimizing the risk of contamination during food handling.

Table 2. Assessment of food safety knowledge among food handlers in select high school canteens in Eastern Visayas

Question	Number of responses (%)		
	Correct	Wrong	Do not Know
1. Abortion in pregnant women can be induced by foodborne diseases.	11 (42.3)	7 (26.9)	8 (30.8)
2. Bloody diarrhea can be transmitted by food.	20 (76.9)	3 (11.5)	3 (11.5)
3. Can swollen cans contain microorganisms?	20 (76.9)	0 (0)	6 (23.1)
4. During infectious disease of the skin, it is necessary to take leave from work.	25 (96.2)	0 (0)	1 (3.8)
5. Eating and drinking in the work place increase the risk of food contamination.	21 (80.8)	4 (15.4)	1 (3.8)
6. Hepatitis A virus is among the foodborne pathogens.	23 (88.5)	0 (0)	3 (11.5)
7. Microbes are in the skin, nose and mouth of healthy handlers.	11 (42.3)	5 (19.2)	10 (38.4)
8. Salmonella is among the foodborne pathogens.	25 (96.2)	1 (3.8)	0 (0)
9. Staphylococcus aureus is among the food borne pathogens.	19 (73.1)	1 (3.8)	6 (23.1)
10. Typhoid fever can be transmitted by food.	17 (65.4)	7 (26.9)	2 (7.7)
11. Using the gloves while handling food reduces the risks of food contamination	23 (88.5)	0 (0)	3 (11.5)
12. Washing hands before work reduces the risk of food contamination.	25 (96.2)	1 (3.8)	0 (0)
13. AIDS can be transmitted by food risk for food poisoning.	10 (38.4)	8 (30.8)	8 (30.87)
14. Children, healthy adults, pregnant women, and older individuals are at equal risk	4 (15.4)	19 (73.1)	3 (11.5)
15. Food prepared in advance reduces the risk of food contamination.	17 (65.4)	7 (26.9)	2 (7.7)
16. Proper cleaning and sanitation of utensils decrease the risk of food contamination.	20 (76.9)	6 (23.1)	2 (7.7)
17. Reheating cooked foods can contribute to food contamination.	7 (26.9)	18 (69.3)	1 (3.8)
18. Washing utensils with detergent leaves them free of contamination	19 (73.1)	4 (15.4)	3 (11.5)

All respondents agreed that temperature in refrigerators/freezers must be checked periodically and that the health status of the workers should be evaluated before employment. Specifically, the former is a crucial aspect of food handling as most of the foodborne disease outbreak are accounted for time-temperature controls (Akabanda et al. 2017). However, the majority of the respondents may have answered wrongly when asked on the ideal way of thawing chicken meat (57.7% wrong answers), whether refreezing of defrosted foods are healthy (53.8% wrong answers), whether the ideal place to store raw meat in the refrigerator is on the bottom shelf (50% wrong answers), and whether eggs should be washed soon after purchase (53.8% wrong answers). Freezing of food products does not necessarily kill the present pathogen (Julie, 2012) and refreezing of thawed food products will only increase the growth of contaminating bacteria. This practice is, therefore, discouraged.

Food Safety Practices

In Table 4, the food safety practices of the respondents are presented. The

Table 3. Assessment of food safety attitudes among food handlers in select high school canteens in Eastern Visayas

Question	*Number of responses (%)*		
	Correct	Wrong	Do not Know
1. Proper hand hygiene can prevent foodborne diseases	22 (84.6)	4 (15.4)	0 (0.0)
2. Raw and cooked foods should be stored separately to reduce the risk of food contamination	25 (96.2)	0 (0.0)	1 (3.8)
3. It is necessary to check the temperature of refrigerators/freezers periodically to reduce the risk of food contamination.	26 (100)	0 (0.0)	0 (0.0)
4. The health status of workers should be evaluated before employment.	26 (100)	0 (0.0)	0 (0.0)
5. The best way to thaw a chicken is in a bowl of cold water.	6 (23.1)	15 (57.7)	5 (19.2)
6. Wearing masks is an important practice to reduce the risk of food contamination.	25 (96.2)	1 (3.8)	0 (0.0)
7. Wearing gloves is an important practice to reduce the risk of food contamination	25 (96.2)	1 (3.8)	0 (0.0)
8. Wearing caps is an important practice to reduce the risk of food contamination	24 (92.3)	0 (0.0)	2 (7.7)
9. Dish towel can be source of food contamination	23 (88.5)	1 (3.8)	2 (7.7)
10. Knives and cutting boards should be properly sanitized to prevent cross contamination.	25 (96.2)	1 (3.8)	0 (0.0)
11. Food handlers who have abrasions or cuts on their hands should not touch foods without gloves.	23 (88.5)	2 (7.7)	1 (3.8)
12. Well-cooked are free of contamination	13 (50.0)	10 (36.5)	3 (11.5)
13. Can a close can/jar of cleaning product be stored together with closed cans/jars of food products?	20 (77.0)	5 (19.2)	1 (3.8)
14. Defrosted foods can be refrozen.	10 (38.5)	14 (53.8)	2 (7.7)
15. The ideal place to store raw meat in the refrigerator is on the bottom shelf.	12 (46.2)	13 (50)	1 (3.8)
16. Eggs must be washed after purchase as soon as possible	8 (30.8)	14 (53.8)	4 (15.4)

majority of the respondents reported that they wash their hands before (100%) and after (96.2%) touching raw food products. All respondents (100%) reported that they practice cleaning the storage area before storing raw products. Although the majority of the respondents agreed that eating and drinking in the workplace could increase the risk of contamination, still, 53.8% of these respondents have reported to eat and drink during working hours. Various practices such as using the cooking ladle for tasting, non-sanitizing of cutting boards between preparation of raw foods and cooked foods, thawing of frozen food in room temperature, non-checking of products' internal tempera

Association among the Demographic Characteristics of the Food Handlers, Food Safety Knowledge, Attitudes and Practices

In analyzing the association between the demographic profile of food handlers and level of their food safety knowledge, attitudes, and practices (Table 5), results revealed that previous food safety trainings, as well as their educational attainment, have a significant positive correlation on the level of food safety

Table 4. Assessment of food safety practices among food handlers in select high school canteens in Eastern Visayas

Question	***Number of responses***					***Remarks n (%)***	
	always	often	sometimes	Seldom	never	**Correct**	**Wrong**
1. Do you wash your hands properly before using gloves?	16	8	2	0	0	*16(61.5)*	*10(38.5)*
2. Do you wear an apron or gown while working?	20	2	4	0	0	*20(76.9)*	*6(33.1)*
3. Do you wear a hairnet while working?	23	3	0	0	0	*23(88.5)*	*3(11.5)*
4. Do you wear a mask when you distribute unwrapped foods?	15	7	0	4	0	*15(57.7)*	*11(42.3)*
5. Do you wash your hands properly before touching raw foods?	26	0	0	0	0	*26(100)*	*0(0)*
6. Do you wash your hands properly after touching raw foods?	25	1	0	0	0	*25(96.2)*	*1(3.8)*
7. Do you eat or drink in your work place?	0	0	4	10	12	*12(46.2)*	*14(53.8)*
8. Do you wear nail polish when handling food?	0	1	9	2	14	*14(58.8)*	*12(46.2)*
9. Do you taste the food using the ladle used in cooking?	18	0	2	0	6	*6(23.1)*	*20(76.9)*
10. Do you use cutting boards of different colors or do you sanitize a cutting board between preparation of raw foods and cooked foods?	6	2	0	2	16	*6(23.1)*	*20(76.9)*
11. Do you thaw food outside the refrigerator (i.e., room temperature)?	20	4	0	0	2	*2(7.7)*	*24(92.3)*
12. Do you check the shelf life and packing integrity of foods at the time of delivery?	24	2	0	0	0	*24(92.3)*	*2(7.7)*
13. Do you check the internal temperature of meat with a thermometer?	0	0	1	0	25	*1(3.8)*	*25(96.2)*
14. Do you use leftover food?	0	2	7	5	12	*12(46.2)*	*14(58.8)*
15. Do you properly clean the food storage area before storing new products?	26	0	0	0	0	*26(100)*	*0(0)*

knowledge and practices. Their educational attainment also has a positive correlation to their attitudes toward safer foods. On the other hand, sex, age and the food handler's location do not have significant effects on knowledge, attitudes, and practices levels.

Results of correlation for the levels of knowledge, attitudes and practices showed

Table 5. Correlations among demographic profile, knowledge, attitudes and practices level of respondents

Variables	*Spearman's rho*	*Significance (p-value)*
Sex – Knowledge level	-0.123	0.549
Age – Knowledge level	-0.313	0.119
Training – Knowledge level	0.435*	0.026
Educational attainment – Knowledge level	0.547**	0.004
Location – Knowledge level	0.154	0.454
Sex – Attitude level	-0.049	0.810
Age – Attitude level	0.039	0.848
Training – Attitude level	0.235	0.249
Educational attainment – Attitude level	0.414*	0.036
Location – Attitude level	0.292	0.147
Sex – Practices level	-0.197	0.335
Age- Practices level	-0.258	0.204
Training – Practices level	0.586**	0.002
Educational attainment – Practices level	0.492*	0.011
Location - Practices level	-0.043	0.834
Knowledge level – Attitude level	-0.069	0.736
Knowledge level - Practices level	0.164	0.423
Attitudes level - Practices level	0.504**	0.009

**correlation is significant at the 0.05 level (2-tailed)*
***correlation is significant at the 0.01 level (2-tailed)*

no significant correlation of food handler's knowledge to their attitudes and food safety practices. However, a significant positive correlation between attitudes and practices of food handlers was observed. These findings indicate the knowledge of food safety does not necessarily translate to better attitudes and practices in handling foods. On the other hand, food handlers having positive attitudes towards food safety exhibit good food handling practices. Research by Clayton et al. (2002), also show that knowledge on handling food are seldom applied by food service employees. Moreover, knowledge acquired from training courses cannot be translated into desired changes in food handlers' attitudes and practices (Pilling et al., 2008). Hence, Philip and Anita (2010) suggested that foodservice operators and managers should be proactive and support the food service employees in transforming the acquired knowledge into safe food handling practices by providing the necessary support and resources that they need. Facilities such as hand sinks, soaps, and towels as well as temperature monitoring tools like food thermometer, are of utmost importance in the success of any food safety training.

Conclusion

The study showed the knowledge, attitudes, and practices of food handlers operating in select school canteens in the Eastern Visayas. Although the majority of the food handlers reached tertiary education and reported having a fair knowledge of food safety, and previously attended several food safety trainings, these do not necessarily translate to satisfactory attitudes and practices

in food safety. Thus, continuous food safety education and subsequent monitoring and evaluation are a must. Strategies to motivate food handlers in pursuing general and personal hygiene, cleaning, and sanitation procedures, including food safety procedures are recommended.

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