



Compliance of University Canteen with International Standards

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Abstract

Safe food is a basic human right even with many foods are often contaminated with naturally occurring pathogenic microorganisms. Such pathogens cannot be detected organoleptically (seen, smelled or tasted), but can cause disease of varying severity, including death especially if the way they are conserved during exposition for sales provides conditions for those microorganisms to grow and reach considerable levels of contamination. The application of a systematic approach, such as the hazard analysis critical control point (HACCP) system, to the identification, evaluation and control of food safety hazards must be carried out to achieve food safety.

Manager-respondents of selected university canteens in Cavite mostly have college degree with varied length of service as manager of university canteen and all have participated in trainings related to food safety. On the other hand, food handler-respondents occupied different positions in the canteen with most of them working as food servers or waiting staff. Most of the food-handler respondents have high school education and employed in the canteen for only two years or less. It was also shown that a significant number of the food handlers have never participated in any training related to food safety.

Results revealed that the respondents' knowledge on food safety was generally higher than their actual practice with mean of 4.51 and 4.32 respectively. In terms of attitudes toward food safety, an overall high positive attitude towards food safety was recorded and when these attitudes were translated into practice, a slightly lower practice was obtained. Nevertheless, the overall rating on attitude as mandated was highly positive and as practiced, the rating was completely practiced. With regards to practice, respondents were fully aware of the HACCP standards of food safety. However, the practices of the respondents on food safety were significantly lower than food safety practices as mandated in HACCP.

Test statistics showed that no significant difference exists in the level of compliance with HACCP standards between and among food safety knowledge, attitudes and practices of university canteen managers. This means that the null hypothesis of no significant difference in the level of compliance with HACCP standards of university canteen managers is accepted. This suggests that the food safety knowledge, attitudes and practices of university canteen managers are generally the same.

On the other hand, a high significant difference exists in the level of compliance with HACCP standards between and among food safety knowledge and attitudes of food handlers. Moreover, test statistics showed that there is no significant difference on the practice of food handlers. Thus, the null hypothesis of no significant difference in the food handlers' level of

compliance with HACCP standards according to knowledge and attitudes is rejected and the null hypothesis and the null hypothesis of no significant difference in the level of compliance with HACCP standards according to practice is accepted. This means that there was a substantial difference in the food safety knowledge and attitudes and no significant difference in the food safety practice of food handler.

Keywords: Food safety, Food Security, HACCP, Food Safety Standards.

1. Introduction

Safe food is a fundamental human right even with many foods are often contaminated with naturally occurring pathogenic microorganisms.

The hazard analysis and critical control point system (HACCP) is the internationally agreed approach to food safety control. An essential tool in combating the worldwide escalation of foodborne disease. Despite wide dissemination and support of these principles, successful HACCP implementation was limited.

University canteens play a significant role in the lives of thousands of student customers (Manalang-Canlas, 2015). The majority of students on school campus do not prepare food themselves or take it along with them to the University. This demand for food gives the opportunity to the university canteens to serve as the significant vending sites where students purchase food daily. It is one of the reasons that the researcher is inquisitive to pursue this study because there is now a growing concern about the food safety of students regarding institutional food service.

More importantly, practices on food safety in school campuses are of great concern in the current situation where food poisoning and foodborne illnesses have been on the rise in the Philippines as evidenced by a strong case of food poisoning in the Philippines for only a week.

Therefore, this study is very timely and vital since this study will investigate the knowledge, attitude, and practices of food handlers in university canteens. Food handlers have been directly linked to some food-borne disease outbreaks (Barrabeig et al., 2010; Beatty et al., 2009; Hundy & Cameron, 2002). Food handlers are integral to the improvement of food safety.

2. Related Literature

Food Safety Act 2013

The Food and Safety Act of 2013 (Republic Act No. 10611): An Act to Strengthen the Food Safety Regulatory System in The Country To Protect Consumer Health And Facilitate Market Access Of Local Foods And Food Products, And For President Benigno Aquino signed other Purposes on 23 August 2013. Its provisions should be attractive to both consumers and food business operators.

In like manner, the new law lays down a comprehensive framework that sets the benchmark for food safety in various stages from the harvest to the manufacture, processing, handling, packaging, distribution, marketing, food preparation to its consumption.

In the same way, the government is adopting the measures to protect the public from foodborne and water-borne illnesses and unsanitary, unwholesome, misbranded or adulterated foods, the law said. The state also works to enhance industry and consumer confidence in the food regulatory system.

Food Safety Case and Incidents

At least 350 elementary school students in Calamba were rushed to different hospitals on Friday (July 24, 2015) in the city after showing symptoms of possible food poisoning. City Health Office chief, Dr. Dennis Labro, said the students of Real Elementary School felt dizzy and vomited after eating cupcakes and ice candy given to them during a storytelling program. Moreover, 100 students were rushed to Pangasinan Provincial Hospital (PPH) in Bolingit here due to alleged food poisoning. Dr. Policarpio Manuel, PPH chief said, the students were admitted to the hospital after complaining of severe abdominal pain, vomiting, and dizziness due to food poisoning.

Also, the provincial and city governments of Surigao del Norte and Surigao City ordered a probe on the alleged food poisoning of 21 students who participated in the first 2012 Provincial Youth Summit at the Provincial Convention Center.

Food Safety and Sanitation

The word *food safety* (Roldan & Edica, 2008) covers practices to: prevent the growth and multiplication of bacteria; prevent food from contamination of bacteria, toxin, and other harmful substances; prevent food spoilage. (Ang & Balanon, 2010). Todd et al. (2007) formed a workgroup and analyzed 816 foodborne outbreaks where food workers have been implicated in the spread of foodborne diseases. They categorized the factor contributing to epidemics into food worker error factors, bacterial proliferation factors, and essential survival factors for pathogens.

In the United Kingdom, a time-series experimental study was conducted because of the identification of unsatisfactory conformance to food safety standards following inspections (Rudder, 2006). A further risk assessment was done, and Rudder (2006) reported that 65% of the businesses had improved their risk profile, 15% had remained the same, 10% had some deterioration and a further 10% had deteriorated entirely (Rudder, 2006).

Hazard Analysis and Critical Control Points (HACCP)

HACCP is a structured and rational approach to the analysis and prevention of potential hazard points at every stage of food operation. It ensures the safety of food and nutrition products while creating a process for corrective action and continuous improvement rather than relying on spot checks of manufacturing processes and random sampling of finished products to ensure safety (Nyamari, 2013).

This program, first developed for the National Aeronautic and Space Administration food space program consists of seven main principles namely: 1) Identify hazards and assess their severity and risks; 2) Identify the Critical Control Points (CCP) in food preparation; 3) Establish critical limits for preventive measures associated with each identified CCP; 4) Establish procedures to monitor CCPs; 5) Establish the corrective action to be taken when monitoring shows that a critical control limit has been exceeded; 6) Establish efficient record keeping system that document the HACCP system; and 7) Establish procedures to verify that the system is working HACCP principles have since become a widely used reference standard for safe food practices (Nyamari, 2013).

In the same fashion, HACCP system concentrates on prevention strategies on known hazards; it focuses on process control, and the steps within that, rather than structure and layout of premises (Worsfold and Griffith, 2003 mentioned in Nyamari, 2013). HACCP establishes procedures whereby these hazards can be reduced or eliminated and requires documentation

and verification of these control procedures (CAC, 1999 cited in Nyamari, 2013). Local and international agencies are acting to encourage better public health protection against foodborne diseases. One of the principal actions has been the development of HACCP based regulations or by federal agencies and the United Nations Codex Alimentarius Commission (Sperber, 1998 cited in Nyamari, 2013).

Demographics of Food Handlers

In the study of Callao (2014) studied the attitude of food handlers towards food safety and sanitation, and the compliance in 12 fast food restaurants in Iloilo City she found out that educational attainment and industry experience were factors found to significantly influence the attitude towards food safety and sanitation of food handlers. Those who have higher education have more understanding of the importance of providing safe food.

Also, Hislop and Shaw (2009) determined the food safety knowledge of food handlers in the food service industry in Edmonton, Canada found that, of the certified food handlers, 68% had the training of 5 years and below. Also, 98% achieved scores higher than 50%, and 94% had scores higher than 70%. Coaching had a positive impact on food safety knowledge, and recertification was necessary at intervals as knowledge retention decreased with the passage of time.

Knowledge, Attitudes, and Practices on Food Safety

Knowledge. Hislop and Shaw (2009) conducted a study in Edmonton, Canada to determine the food safety knowledge of food handlers in the foodservice industry. A score of less than 50% was considered a failure by the researchers. Ratings were also cut off by 70%, which is minimum score set by the health authorities in Edmonton for certification.

A recent study by Ko (2013) who investigated the relationships among food safety knowledge, attitudes on hazard analysis critical control point (HACCP) practices in restaurant employees in Taiwan. Participants scored an average 84.7% correct in food safety knowledge, with highest and lowest actual scores in, respectively, the food poisoning and good hygienic practices (GHP) constructs.

Also, Martins et al. (2012) conducted a study to assess food hygiene knowledge of food handlers employed by a catering company in Portugal. Martins et al. found that the average score was 56.5%, with scores ranging from 87% to just over 4%. Knowledge level scores for temperature control questions were significantly lower than the average rating for the full questionnaire ($p < 0.001$).

Attitudes. Such as person thinks that preparing and handling food hygiene is essential and necessary, they likely intend to engage the behavior. Vladimirov (2011) point out the correlation of positive behavior, attitudes and continued education of food handlers towards the maintenance of safe food handling practices. According to Nieto-Montenegro, Brown, and Labarde (2008), general food handling mistakes besides serving contaminated raw food also includes inadequate cooking, heating, or reheating of food consumption of food from unsafe sources, cooling food inappropriately and allowing too much of a time lapse. Those errors might lead to food poisoning.

Another noteworthy study of Aziz and Dahan (2013) focusing on food handlers' attitude towards safe food handling in school canteens. The study demonstrated that food handlers' attitude has positive and significant relationships with safe food handling. Food handlers moderately agree that they face barriers to carry out food safety behavior especially with the

unavailability of food handling guideline, kitchen equipment in an inconvenient location and small working space to prepare food.

Practices. Ilagan-Manzano (2013) assessed the food safety practices among food service establishments to increase awareness among students about the dangers of food poisoning. The respondents of the study were the supervisors of selected fast-food chains and deluxe hotels in Manila. At the end of the study, she developed a set of proposed competency-based modules in food sanitation and safety.

In the same manner, Lubran and colleagues (2010) conducted an observational study to examine the behavior of food employees in deli departments in nine stores in Maryland and Virginia and to ascertain the level of compliance with the Food Code. Found out that all employees used gloves on all occasions when handling ready-to-eat foods. However, hand washing was observed in 17% of recommended times at the independent stores. The majority of times hands were washed were when gloves were changed. Food employees cleaned and sanitized food contact surfaces 100% of the recommended intervals.

3. Research Methodology

The respondents of this study were university food canteen managers and food handlers. Since there were only less than seven managers and 55 food handlers, total enumeration of the managers and food handlers was covered in this study.

A survey instrument prepared by the researcher will be used in gathering information from the respondents based on the objectives of the study and the existing standard of Hazard Analysis and Critical Control Point (HACCP).

To ascertain the validity and clarity of the instrument, a one-sample t-test will be tested using ten non-sample respondents. For reliability test, the result of the responses of the ten non-sample respondents was tested using Cronbach α .

Descriptive statistical methods were used to analyze the data that were obtained from the survey questionnaire. The data from the survey questionnaire were analyzed using the Statistical Software Package for Social Sciences (SPSS) software.

Research question 1 was analyzed using frequency distribution and percentages and mean.

Research question 2 was analyzed using ANOVA to determine sample significant differences in response by designation.

Research question 3 was the proposed model

4. Result and Discussions

Problem 1. Demographic Profile of the Respondents

Manager-respondents of selected university canteens in Cavite mostly have a college degree with the various length of service as manager of the university canteen and all have participated in training related to food safety. On the other hand, food handler-respondents occupied different positions in the canteen with most of them working as food servers or waiting staff. Most of the food-handler respondents had high school education and employed in the cafeteria for only two years or less. It was also shown that a significant number of the food handlers have never participated in any training related to food safety.

Problem 2: Difference in the Level of Compliance with HACCP Standards when they Respondents are grouped according to Designation

Difference in the Level of Compliance with HACCP Standards of Food Safety of the Managers in terms of Knowledge, Attitudes, and Practices

Table 1

Group	Mean	sd	F-value	F-Critical	p-value	Remarks
Knowledge	4.6414	.18685	2.742	3.55	.091	Not significant
Attitudes	4.6729	.17134				
Practices	4.4071	.31170				

F-test showed that no significant difference at F-value of 2.742 at five percent level ($p = .091$) exists in the level of compliance with HACCP standards of food safety in terms of knowledge, attitudes, and practices of university canteen managers.

Difference in the Level of Compliance with HACCP Standards of Food Safety of the Food Handlers in terms of Knowledge, Attitudes, and Practices

Table 2

Group	Mean	sd	F-value	F-Critical	p-value	Remarks
Knowledge	4.2813	.58749	11.578**	3.00	.000	Significant
Attitudes	4.4744	.37674				
Practices	3.9342	.76205				

** Significant at 1% level

Table 3

Compared Groups	p-value	Remarks
Knowledge vs. Attitude	.240	Not significant
Knowledge vs. Practice	.011*	Significant
Attitudes vs Practice	.000**	Significant

** Significant at 1% level; *Significant at 5% level

Test statistics showed that a highly significant difference exists in in the level of compliance with HACCP standards of food safety in terms of knowledge, attitudes, and practices of food handlers as shown in Table 2. The computed F -value of 11.578 is significant at one percent level ($p = <.000$). This means that there was a substantial difference between the knowledge, attitudes, and practices on food safety of food handlers. Comparing the mean scores between and among knowledge, attitudes and practices of food handlers on food safety using Scheffé's test, able Above revealed that the knowledge and attitude scores on food safety of food handlers were not significantly different. This suggests that the high level of knowledge of the food handlers on HACCP standards of food safety also resulted in a high positive attitude on food safety.

Meanwhile, a significant difference was found between the mean scores of knowledge and practices ($p = .011$) on food safety, and highly significant difference between the mean scores of attitudes and practices ($p = <.000$) on food safety. These results suggest that the high knowledge of food handlers on food safety was not fully converted into actual practices.

Problem 3. Proposed Intervention Plan and Food Practices Model to increase the Level of Compliance to Food Safety Standards as mandated in HACCP



Figure 1. Food Safety Model

Knowledge. Continues enhancement of knowledge thru training and seminars. To improve food handlers' knowledge on food Safety, University canteens must undertake an annual HACCP training program on food safety.

Food handlers are subject to an annual appraisal and one progress review which tracks and identify training and development needs.

Attitude. Continue a positive attitude thru values enhancement program and promotional activities. To enhance the attitudes of food handlers on food safety educational and promotional activities are considered to be essential aspects of improving food handlers' food safety attitudes, and it can be achieved in the following ways:

- a. Targeted seminars and training sessions to be undertaken on various food safety subjects.
- b. Food safety advice to food handlers to develop a 'food safety award' scheme for food handlers who consistently display the best food safety practices

Practice. Continues the correct practice and monitoring of the compliance with the standard. Strengthen Teamwork and Communication among Team Members. Reinforce the practice of compliance with the standard. Reward system must be imposed to ethical practices.

Rewards can be in the form of recognition or certificate of full compliance.

5. Conclusions

Managers of university canteens in Cavite are educated with different years of service as manager of the university canteen. On the other hand, their food handlers are less trained with the majority of them only having a high school education. Food handlers occupy different positions in the university canteen with most of them holding the food server or waiting for a staff position.

Regarding training on health and food safety, almost all managers complied with the HACCP standard that they must attend or participate in this type of training. As revealed in this study, nearly 40 percent of the food handlers have never involved in any discipline related to food safety. This implies that although it is required under the Food Safety Act of 2013 and mandated in HACCP that all food service employees should attend food safety training, a large number of food handlers were not able to comply with this mandate.

Evidence showed the overall knowledge of the respondents on food safety was “very high” and their overall attitude towards food safety was “highly positive.” However, their overall practice was slightly lower registering only a “mostly practiced” rating. This means that the knowledge they have about food safety standards mandated in HACCP, as well as their highly favorable attitudes toward food safety, are not sufficiently translated into actual practice.

6. Recommendations

It is highly recommended that university canteens provide a regular comprehensive training to its entire staff to include technical know-how, delivery system and food safety and sanitary practices to improve their compliance with international standards of food safety.

Managers of university canteen should also have an evaluation system among its personnel that will assess their compliance with the standard practices on food safety. The cafeterias must have an approved policy in place, which is known and widely disseminated to its entire staff containing the food safety standards to be followed, and how it will be monitored and maintained.

University administration should conduct a rigid screening of the application for canteen concessionaires should likewise be considered. University administration should also aspire that all canteens operating in their campus premises should be HACCP, ISO 22000 certified to upgrade their food safety programs.

For the government, it is recommended that HACCP standards must be adopted with Food Safety Act 2013 and implemented in all food service operations. This is to ensure that all food service industry complied with FSA and HACCP standards.

For future studies, the study area can be extended, and the food safety knowledge, attitudes, and practices of food handlers and managers from different university canteens can be compared.

Finally, another study can be done on the safety in the kitchen which included first aid, necessary fire prevention and occupational health and safety to expand the scope of the present study.

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