RESEARCH ARTICLE

FOOD SAFETY AWARENESS AND FOOD HYGIENE PRACTICES OF FOOD PROCESSING STUDENTS OF SAN JOSE NATIONAL AGRICULTURAL AND INDUSTRIAL HIGH SCHOOL

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ABSTRACT

The main purpose of this study was to determine the level of food safety awareness and food hygiene practices of food processing students of San Jose National Agricultural and Industrial High School. It also sought to examine the relationship between these variables. In this study, a descriptive-correlational research design was employed to analyze the relationship between food safety awareness and food hygiene practices. There were seventy respondents in the study, and they were chosen purposively. Furthermore, the findings of the study revealed that food processing students have a high level of food safety awareness and a high level of food hygiene practices. The correlation analysis showed that food safety awareness in terms of purchasing and cooking has a significant correlation with food hygiene practices in terms of personal hygiene. Meanwhile, food safety awareness in terms of purchasing, cooking, and reheating showed a strong connection with food hygiene practices in terms of hand washing. Additionally, food safety awareness in terms of cooking and storing revealed a favorable link with food hygiene practices in terms of personal protective equipment. In general, the results of the study revealed that food safety awareness has a positive significant relationship with food hygiene practices. It implies that respondents with sufficient awareness of food safety demonstrated proper handling practices for foods.

Keywords: *Food safety awareness, food hygiene practices, food processing students*

INTRODUCTION

Food processing has become a rewarding career option; it is an area of food science where a variety of technologies and procedures are employed to transform raw ingredients into finished goods. It is a process by which food is made ready for ingestion by both humans and animals. Additionally, it entails the skills necessary to treat food by salting, curing, and smoking, fermentation and pickling, sugar concentration, drying and dehydration, and thermal application. Each of the aforementioned skills includes the responsibility of packing processed food and using basic packing machinery (Amit et al., 2017).

Furthermore, in this discipline, food processing students are involved in food handling, packaging, and operating common food processing equipment. Students practice food safety and sanitation before packaging processed or finished products, likewise implementing good manufacturing procedures. In addition, they are qualified to become food processors, producers, packers, and quality control personnel in the food industry (Şanlıer & Konaklıoğlu, 2012).

However, foodborne diseases (FBDs) have been a concern for all civilizations since the beginning of time and are a rising global public health issue. Foodborne infections are serious, ongoing problems that cause significant morbidity and frequent death. Each year, millions of people are anticipated to get sick, and thousands of them pass away after consuming contaminated food as a result of improper food handling. Diarrheal infections account for around half of all foodborne illnesses worldwide, sickening 550 million people annually and killing 230,000 people (Azanaw et al., 2019). To reduce the risk of foodborne illnesses, it is crucial to understand the knowledge, attitudes, and practices of food handlers in the areas of food safety. As a commodity where consumption is not only a question of choice but ultimately a matter of life and death, food safety is a corporate social duty. Food handlers are crucial individuals to consider when thinking about food safety. Their sanitation measures impact the consumers, who rely on them for their meals (Assob et al., 2012).

Thus, children should also be aware of the risks associated with food to protect their health as well as the welfare of others, especially as they become more responsible for food preparation as they grow older. However, self-reported practices revealed unsafe habits for cross-contamination, food preservation, hazardous food reheating, and preparing food with open wounds on the hands. These findings show that it is still vital to teach children about fundamental food safety concepts in a systematic manner beginning in elementary school (Ovca et al., 2014).Therefore, this study aimed to determine the food safety awareness and food hygiene practices among Grade 8 to Grade 12 food processing students of San Jose National Agricultural and Industrial High School, as they have a high possibility of engaging in important societal sectors like the food service industry in the future.

METHODOLOGY

Research Design

This study used a descriptive-correlational research design. It sought to describe characteristics of the variables in the study through systematic collection of information about the variables and careful measurement of it. The design was considered suitable for the study

as it involves gathering data from members of the population in order to determine its current status with regard to the descriptive statistics of food safety awareness and food hygiene practices and the relationship between these variables.

Study Site

This study was conducted at San Jose National Agricultural and Industrial High School since the chosen respondents are the Grade 8 to Grade 12 food processing students located at Yaw Yawi I, Murtha, San Jose, Occidental Mindoro. It is 14 kilometers away from the town and near Yaw Yawi I Elementary School and Occidental Mindoro State College-Murtha Campus.

Sample

The respondents of the study were the Grade 8 to Grade 12 food processing students which consist of 70 students out of its total population of 229 students. They were the chosen respondents because they are exposed to food preparation and food handling as part of their curriculum. In the selection of the respondents, purposive sampling was utilized.

Research Instrument

In this study, a questionnaire was used in gathering data. It consists of two parts which were preceded by the letter for the respondents that states the purpose of conducting the study. The first part of the tool is the questionnaire for measuring the level of food safety awareness of the respondents consists of 25 items and is divided into five subcategories which are purchasing, method of washing, cooking, storing, and reheating. The respondents were asked about the degree of their awareness in the items provided using the 5-point Likert Scale form.

The second part of the instrument is the questionnaire for measuring the extent of food hygiene practices of the respondents. It consists of 15 items and is divided into 3 subcategories which are personal hygiene, hand washing, and utilizing of personal protective equipment. The original questionnaire was developed by Akabanda et al. (2017) which consists of 11 items and has a good reliability index of between 0.70 and 0.78. For this instrument, some items were modified and some were added by the researchers.

Data Collection

The researchers collected data through online survey questionnaires. A letter seek permission from the Principal of San Jose National Agricultural and Industrial High School was sought to conduct the study. Upon approval, links to the questionnaires were provided to the selected respondents. Following that, the data were collected, tabulated, and analyzed.

Ethical Consideration

Participation in the study was voluntary and the participants received assurances from the researchers that their answers would be kept private. They were also given enough time to complete the questionnaire. Additionally, access to data was limited only to the researchers.

Data Analysis

In the analysis and interpretation of the data, Microsoft Excel and statistical software were used. Descriptive statistics used frequency, standard deviation, and mean. To determine the level of food safety awareness and food hygiene practices, frequency and mean were used. The standard deviation was used to describe the homogeneity of the responses. Moreover, to determine if there is a significant relationship between level of food safety awareness and food hygiene practices of the respondents, Pearson Product Moment Correlation was used with the aid of statistical software.

RESULTS

With grand mean of 3.86, it can be noted that the respondents have a high level of food safety awareness. Among all the factors of food safety awareness, the results revealed that purchasing is the highest with an weighted mean of 4.12 interpreted as "high". Conversely, the lowest weighted mean is reheating with an weighted mean of 3.60 interpreted as "high" [Table 1].

Table 1. Level of food safety awareness of the respondents.

Indicators	Mean
Purchasing	
Cracked, dirty, broken raw materials should not be purchased.	4.03
Food that has some changes in appearance should not be purchased.	3.86
Labels on food should give information about allergic content.	4.33
Integrity of food package and expiration date should always be checked to ensure the quality of foods.	4.27
During purchase freshness of food should always be considered.	4.10
Weighted Mean	**4.12**
Method of Washing	
Wash cutting board used to cut raw meat or poultry with cold water before using it to chop vegetables.	3.79
Wash knife used to cut raw meat or poultry with water and soap then apply sanitizer before using it to chop vegetables.	3.83
Proper cleaning and sanitization of utensils decrease the risk of food contamination.	4.00
Washing hands before work reduce the risk of food contamination.	4.30
Hands after touching raw meat or poultry should be washed.	4.20
Weighted Mean	**4.02**
Cooking	
Poultry should be checked if sufficiently cooked by thermometer.	3.80
It is necessary to use proper attire when serving and cooking.	4.13
Well-cooked foods are free of contamination.	3.71
Using gloves while handling food reduces the risk of food contamination.	4.20

Food handlers who have abrasions or cuts on their hands should not touch foods without gloves during cooking.	3.83
Weighted Mean	**3.94**
Storing	
The correct temperature for storing perishable foods is 5°C.	3.39
Raw and uncooked foods should be stored separately to reduce the risk of food contamination.	3.84
Raw meat or chicken should be stored in clean, sealed containers on the bottom shelf of the fridge.	3.97
Hot, ready-to-eat food should be kept at temperature of 65°C.	3.40
It is necessary to check thermometer setting of refrigerators, freezers and store at least twice a day.	3.54
Weighted Mean	**3.63**
Reheating	
Reheat food to temperature of 74°C.	3.34
Improper heating of food causes foodborne illnesses.	3.61
Leftover foods should be reheated before consumption.	3.68
The correct way of reheating the leftover food is until boiling.	3.47
Reheating food will make the food safe to eat.	3.87
Weighted Mean	**3.60**
Overall Mean	**3.86**

The extent of food hygiene practices of the respondents is high with the grand mean of 4.39. Among all the factors of food hygiene practices, the results revealed that hand washing is the highest with an weighted mean of 4.70 interpreted as "very high" [Table 2].

Table 2. Extent of food hygiene practices of the respondents.

Indicators	**Mean**
Personal hygiene	
Cutting of nails before food processing.	4.57
Wearing of nails polish in handling food.	3.74
Taking a bath before preparing food.	4.07
Wearing of jewelry when preparing food.	4.03
Tying or trimming of hair before food preparation.	3.86
Weighted Mean	**4.06**
Hand washing	
Washing hands with water and soap before starting work or handling food.	4.79
Washing hands after using the toilet.	4.86
Washing hands after blowing nose, sneezing or coughing.	4.59
Washing hands after touching garbage like food waste or bin bags.	4.63
Washing hands after handling uncooked meat, poultry, seafood, flour, or eggs.	4.65

	Weighted Mean	**4.70**
Utilization of personal protective equipment		
Using apron while working to hinder clothes from coming in contact with food.		4.46
Wearing of hairnet to prevent hair from falling into the food.		4.39
Using facemask to avoid splashing of saliva on food.		4.39
Wearing of gloves to reduce the risk of cross-contamination.		4.49
Using of protective shoes during food preparation.		4.34
	Weighted Mean	**4.41**
	Overall Mean	**4.39**

Relationship between Food Safety Awareness and Food Hygiene Practices

Food safety awareness of food processing students has a positive significant relationship with food hygiene practices with r-coefficient of .381 (p=.001) [Table 3].

Table 3. Correlation analysis between food safety awareness and food hygiene practices.

Variables	r-coefficient	p-value	Interpretation
Food Safety Awareness vs. Food Hygiene Practices	.381**	0.001	Significant

*Legend: **p-value is significant under 1% level of significance*

DISCUSSIONS

The food processing students have a high level of food safety awareness which implies that they have satisfactory knowledge in areas of food safety. This finding relates with the previous studies wherein a high level of food safety knowledge was observed among the participants (Ferk et al., 2016; Stratev et al., 2017; Samuel & Lucy, 2021). When it comes to purchasing, the level of food safety awareness among the respondents was high. This signifies that respondents pay attention to the physical characteristics, labeling, and packaging of food products when making a purchase (Jain et al., 2018; Del Carmen et al., 2020; Esguerra et al., 2017). Moreover, in terms of method of washing, the respondents have a high level of food safety awareness. This indicates that students have sufficient knowledge of the right cleaning methods to stop the spread of harmful bacteria and viruses that could result in food poisoning (Chellaiyan et al., 2018; Asmawi et al., 2018; Chen et al., 2018). Furthermore, respondents have a high level of food safety awareness in terms of cooking. This finding implies that respondents are aware of the importance of using thermometer and wearing protective clothing to guarantee food safety (Evans et al., 2021). The respondents have a high level of food safety awareness in storing. This signifies that respondents are knowledgeable of the proper food storage to maintain the quality of raw materials, extend the shelf life of food and reduce the risk of food contamination (Esguerra et al., 2017; Munir & Ali, 2019; Evans et al., 2021). Lastly, the respondents have a high level of food safety awareness in heating which indicates that they

are aware of the proper way of reheating food, its importance and the negative effects of improper reheating (Grappasonni et al., 2018; Gautam & Curtis, 2021).

Apart from that, the extent of food hygiene practices of the respondents is high. This signifies that food hygiene is often practiced by the respondents in food preparation. In relation to this, food handlers in the study of Akabanda et al. (2016) demonstrated satisfactory practices about hygiene measures, cleaning, and sanitation processes. In their study, most food handlers understand the need of general hygienic measures such as hand washing at work, wearing gloves, thorough cleaning, and detergent use. Moreover, the respondents have high food hygiene practices in terms of personal hygiene. This relates to the findings of the study conducted by Dajaan et al. (2018) where a greater number of respondents had a neat appearance and the majority kept their fingernails short. In addition, the respondents also have a very high extent of hand washing practices. This indicates that the respondents always practice hand washing throughout the food preparation to reduce the risk of contamination. According to the study of Hossen et al. (2020), all respondents highly believe in hand washing before work, as well as in hand washing after work. The majority have the awareness that washing hands could adequately reduce the risk of contamination and almost all are aware that merely water could not thoroughly clean their hands. Furthermore, the respondents' extent of utilization of personal protective equipment is high. This implies that the participants have an outstanding practice in utilizing personal protective clothing to ensure food safety. In support to this, the majority of food handlers in the study of Gador (2021), reported satisfactory practices with respect to handling practices related to proper attire when handling foods such as wearing gloves, apron, mask, hat or head covering.

In the context of food processing education, it is found that higher levels of food safety awareness among students are significantly and positively associated with the implementation of effective food hygiene practices. Therefore, food handlers with sufficient knowledge in food safety demonstrated proper handling practice of foods (Alquarashi et al., 2019; Gador, 2021).

CONCLUSIONS

The study findings indicate that food processing students exhibit a satisfactory level of knowledge in the realm of food safety, actively engage in food hygiene practices during food preparation, and are cognizant of the importance of these practices. Moreover, those students possessing a heightened awareness of food safety demonstrated proficient food handling techniques. Consequently, this study recommends that educators incorporate hands-on activities to enable students to apply their robust food safety awareness in practical settings, diversify food processing exercises to consistently reinforce food hygiene skills, and organize seminars to augment their knowledge and practices. In addition, educational institutions are encouraged to integrate food safety training within their curricula as a means of sustaining and enhancing students' adherence to food safety and hygiene principles.

REFERENCES

Akabanda, F., Hlortsi, E. H., & Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. BMC Public Health. 17(1). https://doi.org/10.1186/s12889-016-3986-9

Alqurashi, N. A., Priyadarshini, A., & Jaiswal, A. K. (2019). Evaluating food safety knowledge and practices among foodservice staff in Al Madinah Hospitals, Saudi Arabia. Safety, 5(1), 9. https://doi.org/10.3390/safety5010009

Amit, S. K., Uddin, M. M., Rahman, R., Islam, S., & Khan, M. S. (2017). A review on mechanisms and commercial aspects of food preservation and processing. Agriculture & Food Security, 6(1). https://doi.org/10.1186/s40066-017-0130-8

Asmawi, U. M. M., Norehan, A. A., Salikin, K., Rosdi, N. A. S., Munir, N. A. T. A., & Basnir, N. B. M. (2018). An assessment of knowledge, attitudes and practices in food safety among food handlers engaged in food courts. Current Research in Nutrition and Food Science Journal, 6(2), 346-353. https://dx.doi.org/10.12944/CRNFSJ.6.2.09

Assob, J. C., Nde, P. F., Nsagha, D. S., Njimoh, D. L., Nfor, O., Njunda, A. L., & Kamga, H. L. (2012). The incidence of feco-oral parasites in street-food vendors in Buea, south-west region Cameroon. African health sciences, 12(3), 376–380. https://doi.org/10.4314/ahs.v12i3.20

Azanaw, J., Dagne, H., Andualem, Z., & Adane, T. (2021). Food Safety Knowledge, Attitude, and Practice of College Students, Ethiopia, 2019: A Cross-Sectional Study. BioMed research international, 2021, 6686392. https://doi.org/10.1155/2021/6686392

Chellaiyan, V. G., Fasna, L., & Mallika, S. V. (2018). Food safety awareness and food handling practices among rural population of Tamil Nadu. International Journal of Community Medicine and Public Health, 5(4). https://doi.org/10.18203/2394-6040.ijcmph20181214

Chen, Y., Ji, H., Chen, L. J., Jiang, R., & Wu, Y. N. (2018). Food safety knowledge, attitudes and behavior among dairy plant workers in Beijing, Northern China. International Journal of Environment Research and Public Health, 15(1), 63.https://doi.org/10.3390/ijerph15010063

Dajaan, D. S., Addo, H. O., Luke, O., Eugenia, A., Amshawu, A., & Kwasi, N. A. (2018). Food hygiene awareness and environmental practices among food vendorsin basic schools at Kintampo Township, Ghana. Food and Public Health, 8(1), 13-20. https://doi.org/10.5923/j.fph.20180801.03

Del Carmen, D. R., Esquerra, E. B., and Gerance, A. A. (2020). Consumer purchasing behavior for fresh soursop (Annona Muricata L.): Evidence from Metro Manila and CALABARZON, Philippines. The Philippine Agricultural Scientist, 103(2).

Esguerra, E., Carmen, D. & Rolle, R., (2017) Purchasing patterns and consumer level waste of fruits and vegetables in urban and peri-urban centers in the Philippines. Food and Nutrition Sciences, 8, 961-977. https://doi.org/10.4236/fns.2017.810069

Evans, E. W., Redmond, E. C., Alwan, N., & Ilic, S. (2021). Awareness and attitudes of student dietitians in Lebanon, UK and USA towards food safety. Foods, 10(8). 1875. https://doi.org/10.3390/foods10081875

Ferk, C. C., Calder, B. L., & Camire, M. E. (2016). Assessing the food safety knowledge of university of Maine students. Journal of Food Science Education, 15(1), 14-22. https://doi.org/10.1111/1541-4329.12076

Gador, S. M. (2021). Food safety knowledge and handling practices of food handlers in food establishments in Siquijor, Philippines. International Journal of Social Science Research, 3(4), 168-182.

Gautam, O. P., & Curtis, V. (2021). Food Hygiene Practices of Rural Women and Microbial Risk for Children: Formative Research in Nepal. The American journal of tropical medicine and hygiene, 105(5), 1383–1395. https://doi.org/10.4269/ajtmh.20-0574

Grappasonni, I., Petrelli, F., Scuri, S., Mahdi, S. S., & Amenta, F. (2018). Knowledge and attitudes on food hygeine among food services staff on board ships. Ann Ig, 30(2). https://doi.org/10.7416/ai.2018.2207

Hossen, M., Ferdaus, M., Hasan, M., Lina, N. N., Das, A. K., Barman, S. K., Paul, D. K., & Roy, R. K. (2020). Food safety knowledge, attitudes and practices of street food vendors in Jashore Region, Banglaesh. Food Science and Technology, 41, 226-239. https://doi.org/10.1590/fst.13320

Jain, S. Gomathi, R., & Kar, S. S. (2018). Consumer awareness and status of food puducherry: an exploratory study. International Journal of Advanced Medical and Health Research, 5(1), 36. https://doi.org/10.4103/IJAMR.IJAMR_48_17

Munir, S., & Ali, S. H. (2019). Assessing awareness, attitude, and practices of food safety among the population of Quetta, Pakistan. Advances in Bioscience and Bioengineering, 7(3), 43. https://doi.org/10.11648/j.abb.20190703.14

Ovca, A., Jevšnik, M., & Raspor, P. (2014). Food safety awareness, knowledge and practices among students in Slovenia. Food Control, 42, 144–151. https://doi.org/10.1016/j.foodcont.2014.01.036

Samuel, G. K., & Lucy, A. (2021). Knowledge and practice of food safety among local restaurant operators in Ogba/Egbema/Ndoni local government area of Rivers State. African Journal of Health, Nursing and Midwifery.

Şanlıer, N., & Konaklıoğlu, E. (2012). Food safety knowledge, attitude and food handling practices of students. British Food Journal, 114(4), 469–480. https://doi.org/10.1108/00070701211219504

Stratev, D., Odeyemi, A., Pavlov, A., Kyuchukova, R., Fatehi, F., Bamidele, F. (2017). Food safety knowledge and hygiene practices among veterinary medicine students at Trakia University, Bulgaria, Journal of Infection and Public Health, Volume 10, Issue 6, 2017, Pages 778-782, ISSN 1876-0341, https://doi.org/10.1016/j.jiph.2016.12.001