

Keeping It Clean: The Role of Education in Food Safety Among Future Hospitality Professionals

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Abstract

Food safety practices are integral to achieving several of the United Nations' Sustainable Development Goals (SDGs), particularly those related to health, economic growth, and sustainable consumption. Ensuring the safety of food not only protects public health but also supports sustainable economic development by reducing food waste and minimizing the impact of foodborne diseases. This study aims to assess the knowledge, attitudes, and practices (KAP) related to food safety among Semester 1 Hospitality students at Sungai Petani Community College. A quantitative survey was conducted with 85 participants to gauge their understanding of various food safety practices, including food storage, hygiene, and preparation. Data analysis revealed that participants had a strong awareness of food safety, with mean scores for most survey statements exceeding 4 on a 5-point Likert scale. The students showed particularly high levels of agreement on the importance of safe food storage (Mean: 4.68, Standard Deviation: 0.493) and the necessity of handwashing before handling food (Mean: 4.64, Standard Deviation: 0.531). Moderate agreement was observed for practices such as preparing food too early (Mean: 3.85, Standard Deviation: 0.716) and reheating food (Mean: 3.84, Standard Deviation: 0.738), suggesting some variability in opinions. Overall, the level of food safety knowledge was high, with a mean score of 4.207 (Standard Deviation: 0.416), indicating a solid understanding of essential food safety measures. This study highlights the crucial role of food safety practices in preventing foodborne diseases and underscores the need for continuous food safety education in hospitality training programs. Further research is recommended to assess the long-term effectiveness of existing food safety training initiatives and ensure that the theoretical knowledge is consistently applied in practice.

Keywords: Food Safety Knowledge, Student Attitudes, Food Safety Practices, Sustainable Development Goals, Hospitality

Introduction

The Ministry of Health Malaysia has received more than 742 complaints related to food hygiene and safety across the country. Action has been taken on all these complaints, including the closure of premises and the enforcement of stricter regulations. This demonstrates the ministry's ongoing commitment to ensuring food safety in Malaysia (Harun, 2023). Good food safety practices are essential to reduce the incidence of food poisoning, which can negatively impact various tourist destinations and harm the country's image as a safe destination (Wan Nawawi et al., 2022). These practices are vital to protecting public health from foodborne diseases that can cause deteriorating health and increased mortality rates (Wan Nawawi et al., 2022). The lack of knowledge or awareness among consumers about food safety is a global challenge that needs to be addressed (Bolek, 2020). Therefore, food handlers are required to comply with local laws and regulations such as the Food Act 1983 to ensure food safety (Wan Nawawi et al., 2022). Good safety practices not only protect consumer health but also ensure high-quality food, increase consumer trust, and support the sustainability of food businesses (Wan Nawawi et al., 2022). Raising public awareness about food hygiene and safety is key to maintaining good food standards (Chen & Chen, 2023).

Knowledge about food safety is crucial for students as it helps prevent food poisoning, ensures good health, and supports their academic performance. By understanding proper hygiene practices, students can reduce the risk of foodborne illnesses that can affect their health and learning. Practicing food safety from a young age also helps build healthy eating habits, reducing the risk of chronic diseases associated with contaminated food. Students need to understand the dangers of bacteria and pathogens such as Salmonella, a leading cause of foodborne illness, to avoid contaminated food. For students interested in a career in the food or hospitality industry, this knowledge is a critical foundation and often a requirement for employment (Song Jing et al., 2021).

Problem Statement

Given the seriousness of food safety issues, this raises the question of how well Semester 1 students of the Culinary Certificate and Hotel Operations Certificate programs at Sungai Petani Community College clearly understand food safety practices, as these students will be directly involved in handling food throughout the teaching and learning process each semester and in their daily lives. Are the students applying the correct steps when handling food? At Sungai Petani Community College, Culinary Certificate and Hotel Operations Certificate students are required to take the SKU10142 Food Safety and Sanitation module, which covers topics related to hygiene principles, sanitation, quality, and safety practices in the food service industry. This course also discusses the causes and preventive measures of food poisoning, and the importance of Hazardous Analysis Critical Control Point (HACCP), Good Manufacturing Practice (GMP), and Good Hygiene Practice (BeSS) in the food service industry. With a better understanding of this module, students are expected to recognize the importance and key elements of food sanitation in food service operations and follow proper steps to prevent contamination in food service operations. Therefore, a study was conducted to identify the level of knowledge, attitudes, and practices of students toward food safety before undergoing the teaching and learning process (T&L) for the SKU10142 Food Safety and Sanitation module.

Research Objectives

1. To identify the level of students' knowledge toward food safety before undergoing the teaching and learning process (T&L) for the SKU10142 Food Safety and Sanitation module.
2. To identify the level of students' attitudes toward food safety before undergoing the teaching and learning process (T&L) for the SKU10142 Food Safety and Sanitation module.
3. To identify the level of students' practices toward food safety before undergoing the teaching and learning process (T&L) for the SKU10142 Food Safety and Sanitation module.

Literature Review

Food safety is a critical element in the culinary and hospitality industries, as unsafe practices can lead to food contamination and foodborne illnesses. Culinary and hotel operations students are at a crucial stage in their education, where they acquire valuable skills that will form the foundation of their future careers. Therefore, a deep understanding of food safety and proper practices is essential to ensure customer safety and maintain the industry's reputation (Ale et al., 2023). The knowledge, practices, and attitudes of students regarding food safety play a vital role in ensuring their well-being in the culinary and hospitality industries (da Cunha, 2021).

Students' Knowledge of Food Safety

Food safety knowledge is crucial for college students to ensure that their food is free from contaminants or pathogens that can cause illness (da Cunha, 2021). Students must have a basic understanding of how to store food at the correct temperatures, the importance of maintaining hand hygiene before handling food, and how to recognize signs of spoiled food. With this knowledge, they can make informed choices when selecting and preparing food. According to Islam et al. (2022), university students often lack knowledge on matters such as proper storage temperatures and how to avoid cross-contamination to prevent the spread of harmful bacteria. This deficiency can increase the likelihood of foodborne illnesses. Cross-contamination occurs when students are unaware of the correct steps to separate raw food from cooked food or unprocessed ingredients (Silva et al., 2023). Students also frequently do not know how to distinguish signs of spoiled or unsafe food, such as bad odors or changes in texture, which may lead to the consumption of potentially harmful food (Türkistanli & Sevgili, 2018). Despite this, many students show good awareness of the importance of personal hygiene, such as washing hands before and after handling food, even though there are weaknesses in some areas (Sofea et al., 2022).

Students' Attitudes toward Food Safety

Students' views on food safety influence how they handle food. Positive attitudes, such as a sense of responsibility for their own health and that of others, motivate students to take food safety procedures more seriously. On the other hand, a lackadaisical attitude or lack of knowledge can lead students to overlook important safety aspects, such as proper food storage or regular hand washing. Barrett (2021) found that students' attitudes play a significant role in the adoption of proper food safety practices, as students who care about

food safety are more likely to adhere to industry standards. Attitudes toward food safety influence how college students take care of themselves. A lackadaisical or indifferent attitude toward the importance of food safety is one of the main weaknesses of students. They consider it unimportant or unlikely to have serious consequences. A study by Batista et al (2023), identified that students generally have a low perception of the risks associated with foodborne illnesses, leading to inadequate practices. Students often believe that if food looks, smells, and tastes normal, it is safe. They do not consider the possibility of bacterial contamination that cannot be detected by ordinary sensory perception. Students are also seen as likely to ignore safety information, such as expiration dates or storage instructions. According to Sofea et al (2022), this attitude is often driven by habit or discomfort in changing usual practices. According to Shiau et al (2022), students with a positive disposition and high hygiene awareness are usually more disciplined in implementing their daily food safety practices.

Students' Food Safety Practices

Studying food safety practices among students is important due to their increasing independence and responsibility in handling food, often without prior formal training. Research shows that students generally have limited knowledge and inconsistent practices regarding food safety, which can lead to an increased risk of foodborne illnesses. For example, a systematic review emphasized that only a small percentage of school children exhibit safe food handling practices, with most showing weak or average knowledge about food safety. This underscores the critical need for targeted educational interventions to improve their food safety behaviors (Wanniarachchi & Abeyesundara, 2022). Furthermore, the practices of college students have also been studied, revealing that many students fail to adhere to recommended food safety practices, such as maintaining proper refrigerator temperatures and avoiding cross-contamination. A study on college students' knowledge and practices of food safety found that a significant number of participants did not meet the required standards, indicating a lack of awareness and the need for better education and training (Xiong, 2017). Additionally, determinants of food safety practices, such as the level of education and food safety training, have been identified as critical factors influencing the behavior of food handlers, including students. A study by Suyitno et al. (2024) suggests that enhanced education and training can significantly improve food safety practices, thereby reducing the risk of foodborne illnesses.

Methodology

This study was conducted to assess the level of knowledge, attitudes, and food safety practices among Semester 1 students at Sungai Petani Community College. A quantitative approach was employed, with a total of 85 students participating as respondents. The questionnaire used in this study was adapted from the research by Mohamad Salleh et al (2020), and utilized a 5-point Likert scale, where 1 represented "strongly disagree" and 5 represented "strongly agree." The questionnaire consisted of several sections measuring respondents' knowledge, attitudes, and food safety practices. The data collected were analyzed using descriptive statistics to determine the mean scores and standard deviations for each statement evaluated.

Findings

Based on the findings, the majority of respondents are from the Culinary Certificate class, with 64.7% (55 people), while the remaining 35.3% (30 people) are from the and Hotel Operations Certificate class. In terms of ethnicity, a large proportion of respondents are Malay, at 87.1% (74 people), followed by Indian at 10.6% (9 people), and both Chinese and Others at 1.2% (1 person each). Regarding gender, 68.2% (58 people) of respondents are female, while males account for 31.8% (27 people). In terms of age, the majority of respondents are between 18 and 19 years old, representing 89.4% (76 people), while 9.4% (8 people) are between 20 and 21 years old, and only 1.2% (1 person) is between 22 and 23 years old. These findings indicate that the respondents are predominantly Malay students from the SKU class, with the majority being females aged 18 to 19 years old.

Table 1

Demographic respondents

Item	Description	Frequency	Percent
Gender			
	Male	27	31.8
	Female	58	68.2
Pogramme			
	Culinary Certificate	55	64.7
	Hotel Operations Certificate	30	35.3
Race			
	Malay	74	87.1
	Chinese	1	1.2
	Indian	9	10.6
	Others	1	1.2
Age			
	18 - 19 tahun	76	89.4
	20 - 21 tahun	8	9.4
	22 - 23 tahun	1	1.2

The findings indicate that the respondents' level of knowledge regarding food safety is high, with an overall average score of 4.21 and a standard deviation of 0.416. The highest score was obtained for the statement that unsafe food storage poses a health hazard to customers (Mean = 4.68, SD = 0.493), followed by the practice of washing hands before handling food (Mean = 4.64, SD = 0.531). Conversely, the statements regarding early food preparation (Mean = 3.85, SD = 0.716) and reheating food (Mean = 3.84, SD = 0.738) received lower scores, indicating a possible lack of knowledge in these areas. These findings suggest that while overall food safety knowledge is good, there is room for improvement in awareness of specific risks associated with food safety practices.

Table 2

Students' knowledge level on food safety practices

No.	Item	Mean	SD
A1	Unsafe food storage poses a health hazard to customers	4.68	.493
A2	Refrigerator temperature is important for reducing the risk of food spoilage	4.33	.625
A3	Using caps, face masks, gloves, and aprons can reduce the risk of food spoilage	4.26	.657
A4	Washing hands before handling food can reduce the risk of infection to customers and other workers	4.64	.531
A5	Preparing food too early can contribute to food poisoning	3.85	.716
A6	Reheating food can contribute to food contamination	3.84	.738
A7	Using the wrong equipment cleaner affects food safety	4.21	.674
A8	Cross-contamination is a major factor contributing to food poisoning	4.16	.687
A9	The safe temperature for cooked food is > 63°C or < -5°C	3.93	.720
A10	Typhoid vaccination can prevent typhoid fever	4.18	.710
	Total Mean	4.21	.416

The findings also show that respondents' attitudes towards food safety are very positive, with high average scores for most of the statements evaluated. The strongest attitude was towards the prohibition of smoking while handling food, with the highest average score (Mean = 4.72, SD = 0.503), followed by the belief that hands should be washed before handling food (Mean = 4.68, SD = 0.517), and that food should not be touched with injured hands (Mean = 4.58, SD = 0.564). However, there was a slight lack of awareness among respondents regarding the statement that defrosted food should not be refrozen (Mean = 3.67, SD = 0.679), which recorded the lowest average score. Overall, these findings reflect a positive attitude towards food safety practices, although certain aspects may require more education and emphasis to ensure full compliance with best food safety practices.

Table 3

Students' attitudes towards food safety practices

No.	Item	Mean	SD
B1	Food should not be touched with injured hands	4.58	.564
B2	Defrosted food should not be refrozen	3.67	.679
B3	Separate kitchen utensils should be used for handling raw and cooked food	4.33	.585
B4	Raw and cooked food do not need to be stored separately	4.15	.764
B5	The same towel can be used to clean all areas	4.31	.724
B6	Jewelry, including rings and watches, can be worn while handling food	4.32	.694
B7	Scratching the face or touching hair while handling food can cause food poisoning	4.47	.609
B8	Smoking while handling food is wrong	4.72	.503
B9	Aprons can replace towels for drying hands	4.15	.748
B10	Covering the mouth and nose when coughing or sneezing should be done at all times	4.54	.589
B11	Hands should be washed before handling food	4.68	.517
	Total Mean	4.35	.362

The study also found that food safety practices among the respondents were good, with high average scores in most aspects. Respondents most frequently washed their hands before handling food, with the highest average score (Mean = 4.72, SD = 0.453), followed by the practice of cleaning the workspace before handling food (Mean = 4.56, SD = 0.522). This reflects a high level of awareness regarding the importance of hygiene in the food handling process. Conversely, the practice of refreezing defrosted food received the lowest average score (Mean = 3.68, SD = 0.602), indicating that there is confusion or lack of awareness about the risks associated with this practice. Overall, while there are good practices among the respondents, certain aspects, such as using the same towel to clean multiple workspaces (Mean = 4.14, SD = 0.819) and using an apron to dry hands (Mean = 4.01, SD = 0.748), require attention and improvement to ensure better food safety practices.

Table 4

Students' knowledge level on food safety practices Students' Food Safety Practices

No.	Item	Mean	SD
C1	I always refreeze food that has been defrosted	3.68	.602
C2	I touch unpackaged food with my hands	4.00	.724
C3	I use separate utensils for handling food	4.29	.633
C4	I use the same towel to clean multiple workspaces and equipment	4.14	.819
C5	I always wear jewelry or a watch while handling food	4.27	.762
C6	I always scratch my face and hair while handling food	4.47	.700
C7	I always clean the workspace before handling food	4.56	.522
C8	I use an apron to dry my hands	4.01	.748
C9	I chew gum while handling food	4.09	.811
C10	I wash my hands before handling food	4.72	.453
C11	I use tissues when coughing or sneezing	4.46	.589
	Total Mean	4.24	.405

Discussion

The findings of this study indicate that the respondents possess a good level of knowledge regarding food safety. This is consistent with previous studies that emphasize the importance of proper food storage in preventing foodborne illnesses and protecting consumer health (Wan Nawawi et al., 2022). Knowledge about handwashing practices before handling food was also high, reflecting respondents' awareness of the importance of hand hygiene in preventing cross-contamination and the spread of pathogens. This aligns with global guidelines on food safety practices, which emphasize hand hygiene as a fundamental step in food safety (Tamiru et al., 2022). However, there was a decline in scores related to knowledge about the risks associated with preparing food too early and reheating food. This may reflect a lack of awareness or deep understanding among respondents regarding the more subtle but critical risks in food safety, such as the risk of bacterial growth in food that is prepared too early or reheated. Studies suggest that a lack of understanding in these areas can increase the risk of foodborne illnesses (Chen & Chen, 2023).

The study also shows that respondents' attitudes towards food safety practices are very positive, as reflected by the high average scores in most aspects evaluated. The prohibition of smoking while handling food recorded the highest score, indicating high awareness among respondents of the dangers posed by smoking in food preparation areas. This attitude is consistent with global food safety guidelines that consider smoking in food areas as a significant risk to food hygiene and safety (World Health Organization [WHO], 2024). Respondents also showed very positive attitudes towards the importance of handwashing before handling food and not touching food with injured hands. This attitude reflects a good understanding of basic hygiene in food handling, which is a crucial step in preventing cross-contamination and the spread of pathogens like Salmonella and E. coli (Chen & Chen, 2023). However, the attitude towards the statement that defrosted food should not be refrozen recorded the lowest average score. This indicates a lack of sufficient awareness or knowledge about the risks associated with this practice, which can increase the risk of food poisoning due to bacterial growth in improperly processed food (Bolek, 2020).

Moreover, the findings of this study show that food safety practices among respondents are good, with most respondents demonstrating a high commitment to basic hygiene practices in food handling. The highest average score was obtained for the practice of washing hands before handling food, reflecting a strong awareness of the importance of hand hygiene in preventing cross-contamination and protecting consumers from foodborne illnesses. This practice aligns with food safety guidelines that emphasize handwashing as a primary preventive measure against food contamination (Tamiru et al., 2022). The practice of cleaning the workspace before handling food also received a high score, indicating that respondents understand the importance of maintaining workspace cleanliness to prevent contamination. This is crucial in ensuring that the food prepared is safe to consume and free from harmful pathogens (Chen & Chen, 2023). However, the practice of refreezing defrosted food recorded the lowest average score, indicating confusion or a lack of awareness among respondents about the risks associated with this practice. This practice can increase the risk of bacterial growth in food, which can lead to food poisoning if not properly addressed (Bolek, 2020). Additionally, the practices of using the same towel to clean multiple workspaces and using an apron to dry hands also require attention. Using the same towel in various locations can cause

cross-contamination, while using an apron to dry hands is not recommended as it can transfer pathogens from clothing to food (WHO, 2024).

Conclusion

In conclusion, this study shows that the level of knowledge, attitudes, and food safety practices among respondents is good, with high awareness of several critical aspects such as handwashing and maintaining workspace cleanliness. However, there are deficiencies in certain knowledge and practices, such as understanding the risks of refreezing defrosted food and the use of inappropriate hygiene equipment, which can increase the risk of food poisoning.

This study suggests that while the knowledge and attitudes toward food safety are positive, there is still room for improvement, particularly in certain practical aspects. Deficiencies in knowledge and practices have the potential to pose health risks to consumers, and therefore, greater efforts are needed to ensure that all aspects of food safety are understood and correctly practiced by all individuals involved in food preparation. These implications are highly relevant for policymakers, educators, and health authorities responsible for improving food safety levels in society.

For future research, it is recommended that studies be conducted with a broader scope, involving a larger and more diverse population to validate these findings across various demographics and locations. Additionally, further studies could focus on the development and testing of educational interventions aimed at enhancing food safety knowledge and practices, particularly in less understood aspects such as the risks related to refreezing defrosted food. Studies could also evaluate the effectiveness of food safety awareness and training programs in changing risky attitudes and behaviors in food handling.

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