

Food Safety Knowledge, Attitudes, and Practices of School Canteen Food Handlers in the District of Maria, Siquijor, Philippines

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Abstract. Food safety is a vital public health concern impacting communities around the globe. It encompasses the management of various biological, chemical, and physical hazards that can compromise food safety and lead to adverse health outcomes. Undoubtedly, ensuring food safety in school canteens is crucial, as it directly influences the health and well-being of students. This study explored the knowledge, attitudes, and practices of the 43 school canteen food vendors regarding food safety in the District of Maria, Siquijor. The researcher used a descriptive-correlational research method and a validated questionnaire to collect data. The statistical tools used in the study were weighted mean, multiple regression analysis, and Spearman rank correlation Coefficient. This motivated the researcher to study the knowledge, attitudes, and practices of food handlers in school cafeterias, as they are essential in ensuring the preparation and serving of safe food to students, teachers, and other patrons. The results revealed that the school canteen vendors' knowledge and practices in food handling and safety in terms of food packaging, food preparation, and food service process is "very high." Furthermore, the data indicated that the school canteen vendors have a favorable attitude toward food packaging, food preparation, and food service norms. Additionally, the findings revealed a significant relationship between the vendors' knowledge and their attitudes regarding food packaging, preparation, and service processes. The study also found a significant relationship between the school canteen vendors' knowledge and their practices, as well as between attitudes and practices in food preparation. The findings further discovered that school canteen vendors' profiles and KAP on food handling and safety are unrelated. Although the study revealed high levels of reported knowledge, favorable attitudes, and substantial compliance with food safety practices, the actual behaviors of food handlers observed may not align with the DepEd guidelines. This discrepancy indicates that the respondents might have overestimated their adherence to the established policies, highlighting the need for continuous training and supervision by teachers responsible for school canteens.

Keywords: Food packaging; Food preparation; Food safety; Food service; School canteen vendors.

1.0 Introduction

Food safety is a critical public health issue affecting populations worldwide. Ensuring food safety for consumption requires a complex interaction of processes, regulations, and technologies designed to prevent food contamination and food poisoning. Food safety also includes the management of various biological, chemical, and physical

hazards that can contaminate the food and cause adverse health effects. In the Philippines, there is little information stating that canteen or food providers follow specific rules about the safety of food within school canteens, which is of prime importance since it directly affects the health and well-being of students. In this regard, DepEd Order No. 8, s. (2007), also called the “Revised Implementing Guidelines on the Operation and Management of School Canteens in Public Elementary and Secondary Schools,” has strictly implemented food safety standards that stringently require school canteens to have access to potable water, hygienic practices, hand washing facilities, clean and safe food storage, and a pest-free environment. Included in the guidelines are also detailed procedures for running and overseeing school canteens, with an emphasis on maintaining standards of cleanliness, responsibility, and food safety.

Additionally, it is a prime requirement that canteens secure several permits and clearances from municipal offices and health authorities in the area. These permits must be displayed as valid for the duration of the school year. Also, food safety standards are emphasized, including having access to drinkable water, keeping areas clean, and using hygienic procedures while handling food. Employees must follow hygiene regulations and strictly wear appropriate clothing and identification. By following these rules, school canteens will be held to high standards of operation, hygiene, and accountability, protecting the health and safety of staff and children.

Additionally, a healthy campus is highly dependent on the support and engagement of school administrators in implementing food safety policies and training for school canteen employees. Each school staff member must ensure that food is available in all cafeterias and that handlers know and know the importance of food safety. They must also practice proper food handling to prevent food poisoning caused by certain bacteria or other harmful foodborne pathogens. While previous research assessed knowledge, attitudes, and practices of food handlers in schools, such as those studies conducted by da Vitória et al. (2021), Ahmed et al. (2021), and Al-Kandar et al. (2019), these studies only investigated the relationship between knowledge, attitudes, and practices of food handlers. These investigations did not correlate school canteen vendors’ knowledge of food safety with a) their attitude towards food safety and b) their practices in food safety. They also failed to establish the connection between the vendors’ attitude and their practices and the level of their knowledge of food safety standards and their profile. There is a necessity for enhanced monitoring and surveillance systems in school cafeterias to guarantee adherence to food safety standards, as the existing measures are frequently inadequate. This prompted the researcher to study food handlers’ knowledge, attitudes, and practices in school cafeterias. They play a key role in preparing and serving safe food to students, teachers, and other customers. Schools are mandated by law to follow food safety regulations, guaranteeing food is prepared, stored, and served safely. Adhering to these regulations is crucial for ensuring accountability and protecting the health of both students and staff.

2.0 Methodology

2.1 Research Design

This is a descriptive-correlational method of research. The study is descriptive because it describes the food handlers’ knowledge, attitudes, and practices on food safety. It is also correlational because the food handlers’ profile was correlated to their understanding, attitude, and practices (KAP).

2.2 Research Locale

The study was conducted in six (6) public elementary schools in Maria District, one (1) public secondary school, and one (1) integrated school. The public elementary schools included in the study are the following: Bogo Elementary School, situated in Bogo, Maria, Siquijor; Candaping Elementary School in Candaping B, Maria, Siquijor; Cantaroc B Elementary School located in Barangay Cantaroc B, Maria, Siquijor; Logucan Elementary School in Barangay Logucan, Maria, Siquijor; Lico-an Elementary School in Barangay Lico-an, Maria, Siquijor; Pisong A Elementary School located in Barangay Pisong A, Maria, Siquijor; and Minalulan Elementary School in Barangay Minalulan, Maria Siquijor.

Two public secondary schools in the same municipality were also involved in the study: Maria Integrated School (formerly Maria Central School), an integrated school located in Poblacion Norte, Maria, Siquijor, and Candaping National High School, the only national high school located in Barangay Candaping B, Maria, Siquijor.

2.3 Research Participants

The respondents of this study were the 43 school canteen vendors of the selected schools in the Maria District of Siquijor. Non-teaching or teaching personnel are not part of this study. The respondents were selected using the systematic sampling technique, which involved reaching out to every school on the list, as well as all of the canteen vendors who were able to respond to the questionnaire. Out of the 48 total population, only 43 answered and returned the questionnaire.

2.4 Research Instrument

The questionnaire consists of four parts. The first part includes the disclosure statement, while the second, third, and fourth parts assess the respondents' knowledge, attitudes, and practices related to food safety. Three experts in the field inspected the questionnaire to ensure content validity and check if the items aligned with the study's specified problems. A dry run was also conducted to ensure the items' reliability and verify that the respondents understood the questions.

2.5 Data Gathering Procedure

The researcher ensured all recommendations and corrections from the panel members were incorporated into the study. After the design hearing, the researcher incorporated all the panel's suggestions and recommendations. Approval from the dean of the Foundation University Graduate School was then obtained. After that, a letter requesting permission to conduct the study was delivered to the Schools Division superintendent of the Division of Siquijor. The signed and approved request was given to the principals of the enumerated schools. The researcher explained to the respondents the goal and significance of the study during distribution. Following the respondents' completion of the questionnaires, the forms were collected. The results were tallied using MS Excel and Megastat software and then analyzed and interpreted.

2.6 Data Analysis Procedure

The researcher employed several data analysis tools, including percentages, to illustrate the relationship of a part to a whole. This was mainly utilized in presenting the school canteen food handlers' knowledge, attitudes, and practices (KAP). Throughout the analysis, the researcher used the results gathered from the respondents to describe the KAP of the school canteen food handlers.

2.7 Ethical Considerations

The researcher stringently followed the ethical protocols stipulated by the Ethics Committee of the Foundation University Research Office and obtained ethical approval from the committee prior to conducting the study. Throughout the study, the researcher observed all the necessary ethical considerations to ensure that the dignity and well-being of the school canteen vendors were protected at all times. The research data collected from the study was treated with the utmost confidentiality. The researcher also gave participants the option to remain anonymous or choose to be identified.

3.0 Results and Discussion

3.1 Knowledge of School Canteen Vendors about Food Handling Practices

In terms of Food Packaging

Table 1 presents that the level of school canteen vendors' knowledge of food handling practices regarding food packaging is "Very High," as evidenced by its composite mean of 4.81. The results implied that the vendors consider their customers' welfare by ensuring that the food served to their clients is adequately packaged and free from contaminants such as bacteria and other microorganisms. According to Putri et al. (2018), knowledge of food handling practices is crucial for ensuring food safety, preventing foodborne illnesses, and maintaining food quality on how one understands the food packaging process.

As reflected in the table, the vendors strongly agree that they possess "very high" knowledge of packaging food and use gloves to handle raw foods to reduce the risk of food contamination ($\bar{wx} = 4.86$). The study's findings are congruent with those obtained by Akabanda et al. (2017), which revealed that knowledge of food safety procedures, such as wearing gloves during food preparation, prevents the risk of foodborne diseases.

Table 1. *Level of Knowledge of School Canteen Vendors about Food Handling Practices in terms of Food Packaging (n = 43)*

<i>In packaging food...</i>	w$\bar{x}$	VD	LoK
1. I use gloves for raw foods to reduce the risk of food contamination.	4.86	SA	VH
2. I use clean, undamaged, food-safe packaging containers.	4.81	SA	VH
3. I properly sealed the food in airtight containers to keep the food free from contaminants.	4.81	SA	VH
4. I use paper cups and biodegradable boxes in packaging food	4.81	SA	VH
5. I consider using a food-safe inner liner if there's a risk of chemicals leaching into food.	4.77	SA	VH
Composite	4.81	SA	VH

Note: 4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

Furthermore, the data also show that the extent of the vendors' knowledge of food packaging is "very high" (VH), particularly in the following indicators: a) use of undamaged food containers (4.77); b) sealing food in airtight containers (4.81); c) use of paper cups and biodegradable boxes in packaging food (4.81); and d) use of inner liners in food packaging (4.81). These results are signified by the weighted means ranging from 4.77 to 4.81, which is "very high" since the vendors practiced and knew about proper food packaging in their respective schools.

Food handlers in schools play a crucial role in safeguarding students' and customers' safety by adhering to proper food packaging standards. Plastics, glass, and fiber should not be used to package food items for reasons of student safety, product quality, and environmental effects. Deng et al. (2022) stated that using plastics, glass, and fiber in packaging is crucial due to its negative environmental effects, impact on product quality, and consumer safety.

In terms of Food Preparation

Table 2 shows that the school canteen vendors' knowledge about food handling practices in terms of food preparation is "very high," as seen in its composite weighted mean of 4.86. It is evident from the data that the school canteen vendors exhibit very high knowledge of the following: a) making sure that raw and cooked food must not be directly in contact to avoid contamination; b) food must be cooked within the recommended internal temperature; c) all kitchen utensils must be cleaned; d) cooking food ingredients following the required cooking time; and e) serving the food hot. These indicators received weighted means ranging from 4.84 to 4.88. This finding suggests that food handlers can guarantee their food is safe and free from hazardous germs and pathogens that might cause foodborne diseases. It also means that the vendors adhere to the recommended internal cooking temperatures. Zairinayati (2022) emphasized that food handlers should promptly refrigerate or freeze perishable items and use insulated containers for hot food transportation to maintain safe temperatures.

Table 2. *Level of Knowledge of School Canteen Vendors about Food Handling Practices in terms of Food Preparation (n = 43)*

<i>In preparing the food...</i>	w$\bar{x}$	VD	LoK
1. I ensure that direct contact between raw and cooked food is avoided.	4.88	SA	VH
2. I cook the food to the recommended minimum internal temperature needed.	4.86	SA	VH
3. I follow the required time in cooking different ingredients.	4.84	SA	VH
4. I know it is not necessary to serve the food hot.	4.84	SA	VH
5. I see to it that all kitchen surfaces are meticulously cleaned.	4.86	SA	VH
Composite	4.86	SA	VH

The table also shows that the school canteen vendors' knowledge is "very high," especially in terms of following the required time for cooking different ingredients ($w\bar{x} = 4.86$). This finding implies that the vendors were instructed on food safety procedures, including how crucial it is to cook products for the right length to eradicate dangerous bacteria and pathogens. Furthermore, organizational rules stress the value of food safety in canteen operations or regulatory requirements to guarantee adherence to food safety regulations.

In terms of the Food Service Process

Table 3 shows that the school canteen vendors' knowledge of food handling regarding the food service process is "very high," with a composite weighted mean of 4.76. Food handlers have "very high" knowledge of the food service process, especially in considering safe containers for the students ($w\bar{x} = 4.81$). The results suggest that the school canteen vendors completely recognize that their customers' safety is their utmost priority. Thus, they have to observe proper food service processes.

Food handlers should be highly regarded for adhering to operating procedures for food handling and personal hygiene because both practices play a significant role in maintaining food safety. The result parallels the study of

Putri et al. (2018), which emphasized that school canteen vendors must prioritize following standard operating procedures for personal hygiene and for holding food, along with proper gloves usage when serving food.

Table 3. *Level of Knowledge of School Canteen Vendors about Food Handling Practices in terms of Food Service Process (n = 43)*

<i>In the food serving process...</i>	w$\bar{x}$	VD	LoK
1. I consider containers that are safe and can give health protection to the students.	4.81	SA	VH
2. I follow standard operating procedures for personal hygiene and food holding, as well as proper glove use when serving food.	4.79	SA	VH
3. I use clean, sanitized utensils and cutting boards when preparing food.	4.77	SA	VH
4. I wash, rinse, and sanitize can openers and tops of cans before opening.	4.74	SA	VH
5. I consider containers that are safe and can give health protection to the students.	4.72	SA	VH
6. I make sure that I wash my hands before and after serving the food to our customers.	4.70	SA	VH
Composite	4.76	SA	VH

3.2 Attitude of School Canteen Vendors concerning Food Handling Practices

In terms of Food Packaging

Table 4 shows that the school canteen vendors' attitude towards food handling regarding food packaging is "very positive" with a composite weighted mean of ($w\bar{x} = 4.69$). The results show that the school canteen vendors consider secure and tamper-proof containers to prevent food contamination and ensure that the packaging has good visual appeal, as evidenced by its composite weighted mean of 4.70. This finding implies that the vendors showed very positive attitudes toward these indicators. Likewise, Liu et al. (2021) asserted that tamper-evident packaging prevents food tampering, ensures the same condition as packed, and prevents contamination, thus lessening the chances of food spoilage.

Table 4. *Level of Attitude of School Canteen Vendors about Food Handling Practices in terms of Food Packaging (n = 43)*

<i>In packaging food...</i>	w$\bar{x}$	VD	LoA
1. I use secure and tamper-proof packaging to prevent contamination and ensure that the food reaches the students in the same condition as when it was packed.	4.70	SA	VP
2. I pay attention to the visual appeal of the packaging, making it inviting and appetizing for students.	4.70	SA	VP
3. To ensure safety, I protect the food against harmful bacteria and molds by using food-safe packaging materials.	4.67	SA	VP
4. I ensure that packaging helps retain the freshness of food items or keeps them warm to maintain the quality of the meals.	4.67	SA	VP
5. I consistently use gloves and tongs to handle nonpacked food.	4.65	SA	VP
Composite	4.69	SA	VP

Note: 4.21 – 5.00 (Very Positive, VP), 3.41 – 4.20 (Positive, P), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Negative, N), 1.00 – 1.80 (Very Negative, VN)

Additionally, the food handlers also display very positive attitudes towards the remaining indicators as they always make sure to use food-safe packaging materials to ensure food safety, maintain the quality of the meals by properly packaging them to warrant freshness of the food items, and consistently use gloves and tongs in handling nonpacked foods. Indeed, school canteen vendors must use gloves while handling unpackaged food to ensure food safety and cleanliness. Using gloves and tongs can safeguard students' health by preventing cross-contamination and the growth of bacteria and molds. As Sudarshan et al. (2018) emphasized, food handlers must use gloves and observe proper hand washing during food preparation to guarantee safe food packaging practices.

In terms of Food Preparation

Table 5 reflects that the level of school canteen vendors' attitude towards food handling in terms of food preparation is "very positive," with a composite weighted mean of 4.73. Mainly, food handlers have been "very positive" in prioritizing using fresh and high-quality ingredients so that students can consume highly nutritious food. They can guarantee that the meals they provide students are nourishing but also tasty and enticing by concentrating on using fresh ingredients. Forde and Graaf (2022) emphasized that school canteen vendors can improve the overall taste and appeal of their meals while also adding more nutritional value by using fresh and high-quality ingredients. They also posited that school canteen vendors may ensure that students eat a balanced and healthy diet while improving the overall taste and appeal of meals.

Table 5. *Level of Attitude of School Canteen Vendors about Food Handling Practices in terms of Food Preparation (n = 43)*

<i>In preparing the food...</i>	<i>w$\bar{x}$</i>	<i>VD</i>	<i>LoA</i>
1. I prioritize the use of fresh, high-quality ingredients, which contribute to the nutritional value of the meals and also enhance their overall taste and appeal.	4.74	SA	VP
2. I ensure that I use tongs, spatula, and tissue in handling food	4.74	SA	VP
3. I consider the food demands needed for the students to support nutritional balance.	4.72	SA	VP
4. I consider different dietary preferences and restrictions when planning the menu, which provides students with choices and helps ensure they receive the nutrients they need.	4.72	SA	VP
5. I use separate utensils, chopping boards, and other equipment for raw and ready-to-eat foods to avoid cross-contamination	4.70	SA	VP
Composite	4.73	SA	VP

The data further reveal that school canteen vendors hold “very positive” attitudes to the following indicators: a) they use tongs, spatula, and napkins when handling food; b) students’ nutritional balance in preparing food is taken into account; c) ensure that students can receive the required nutrients they need by considering different dietary preferences; and d) cross-contamination is prevented by using separate utensils for raw and ready-to-eat food. All these have weighted means ranging from 4.70 to 4.74. This finding signifies that school canteen vendors demonstrate very positive attitudes in terms of the way they prepare the food as they highly look into their customers’ well-being and consider their dietary needs and preferences when creating the menu.

Shukri et al. (2022) concluded that food handlers' attitudes impact food safety, food quality, and how they handle and prepare food. They added that the positive attitude of canteen food handlers guided them to strong adherence to cleanliness practices, appropriate food handling procedures, and attention to food safety protocols during the preparation phase. On the other hand, Hema et al. (2022) also emphasized that school canteen vendors should promote healthier eating habits among students and offer affordable, nutritious food options in school canteens. Therefore, the vendors need to be aware of the foods being prepared in school to ensure students’ safety and ensure they can eat healthy and nutritious foods.

In terms of the Food Service Process

Table 6 discloses that the school canteen vendors’ attitude towards food handling regarding the food service process is “very positive,” as reflected in its composite weighted mean of 4.78. Mainly, food handlers have a “very positive” attitude towards ensuring that the food in stock is good to serve from morning to afternoon and always wear aprons to prevent food contaminants from getting into the food, with a composite weighted mean of 4.79. The results indicate that the food vendors are optimistic about ensuring food is stored correctly to prevent spoilage and foodborne illnesses.

Table 6. *Level of Attitude of School Canteen Vendors about Food Handling Practices in terms of Food Service Process (n = 43)*

<i>In the food serving process...</i>	<i>w$\bar{x}$</i>	<i>VD</i>	<i>LoA</i>
1. I always ensure that the food in the canteen is good to serve from morning to afternoon.	4.79	SA	VP
2. I always use apron before serving food to help prevent contaminants from getting into the food.	4.79	SA	VP
3. I always consider updating the menu in real-time from Mondays to Fridays.	4.77	SA	VP
4. I always place cooked food in a clean dish for serving.	4.77	SA	VP
5. I always use separate, clean serving spoons for each kind of food.	4.74	SA	VP
Composite	4.78	SA	VP

Shukri et al. (2022) emphasize that food handlers' attitudes significantly influence food safety, affecting proper handling, preparation, storage, and refrigeration processes and requiring careful consideration in serving food in the canteen. Hussein (2016) also stressed that food handlers’ positive attitudes will lead to a sustainable, healthy food safety culture with responsible team members who will consider proper food service protocols.

3.3 Practices of School Canteen Vendors Concerning Food Handling Norms

In terms of Food Packaging

Table 7 elucidates that the extent of school canteen vendors’ practice of food handling norms in terms of food packaging is “very high,” as shown in the composite weighted mean of 4.93. Explicitly, school canteen vendors practice to a “very high” extent the following indicators: a) using approved packaging materials that seal the food package; b) sealing packages securely to prevent contamination; and c) ensuring that all the needed materials are set before the start of food packaging. These findings are signified by the weighted means ranging from 4.93 to

4.95. The results suggest that the school canteen vendors follow proper packaging procedures to maintain the food quality they serve.

Table 7. Extent of Practices of School Canteen Vendors about Food Handling Norms in terms of Food Packaging (n = 43)

<i>In packaging food...</i>	w$\bar{x}$	VD	EoP
1. I use approved packaging materials that will securely seal the food package	4.95	A	VH
2. I seal packages securely to prevent contamination and tampering.	4.95	A	VH
3. I ensure that all my needs are addressed before packing to avoid exposing the food to microbes.	4.93	A	VH
4. I ensure that handwashing is done using a detergent or disinfectant before handling food items.	4.91	A	VH
5. I clean all surfaces and utensils used for packaging are clean and sanitized.	4.88	A	VH
Composite	4.93	A	VH

Note: 4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

Indeed, Letuka et al. (2021) stated that food preparation and packaging are significant factors in preventing food from becoming contaminated and safeguarding consumers' safety. School canteen vendors should select packaging materials certified for food use to guarantee food safety and quality. As emphasized by Cheng et al. (2022), food packaging provides real-time information on product details, safety, and quality while guiding consumers to ensure safe and quality food. Food can be kept secured and fresh for consumption by properly sealing packaging, thus preventing contamination.

Moreover, the data further show that the school canteen vendors practice proper hand washing before handling food items and cleaning and sanitizing the surfaces and utensils used when packaging the food. This agrees with the findings of Suryani et al. (2019) that the school canteen vendors must regularly clean work surfaces and utensils before packing to prevent cross-contamination and ensure proper food packaging through frequent handwashing with soap and water. Maintaining food safety and stopping the spread of dangerous germs requires proper handwashing using a detergent or disinfectant before handling food. Ali et al. (2022) argued that keeping hands clean, washing food, and cleaning and rinsing kitchen equipment are all part of basic personal hygiene when handling food.

In terms of Food Preparation

Table 8 shows that the extent of school canteen vendors' practice in terms of food preparation is "very high," as displayed in its composite weighted mean of 4.87. It can be observed from the results that indicators 1, 2, and 3, which depict the school canteen vendors' practice of no smoking, sneezing, or nose-poking when preparing food, making sure that their aprons are washed, and always keeping an eye on any signs of food spoilage or contamination of perishable items, respectively, got the highest mean of 4.88.

Table 8. Extent of Practices of School Canteen Vendors concerning Food Handling Norms in terms of Food Preparation (n = 43)

<i>In preparing the food...</i>	w$\bar{x}$	VD	EoP
1. I do not smoke, sneeze, or poke my nose to avoid contaminating the food I am preparing.	4.88	A	VH
2. I always make sure that my apron is washed and clean.	4.88	A	VH
3. I checked for any signs of spoilage or contamination on perishable items.	4.88	A	VH
4. I washed my hands thoroughly with soap and water before handling food.	4.84	A	VH
5. To prevent cross-contamination, I regularly clean and sanitize cutting boards, knives, and other utensils.	4.84	A	VH
Composite	4.87	A	VH

During food preparation, food handlers are forbidden to smoke, sneeze, or poke their noses. Preventing contamination of food when it is being processed is crucial for ensuring food safety. Ncube et al. (2020) mentioned that if food vendors smoke, sneeze, and poke their noses, the health of the customers will be at stake since these actions can introduce dangerous germs and pollutants into the food. Food handlers must follow stringent hygiene measures to guarantee the safety and quality of the food served to consumers.

Meanwhile, food handlers should inspect perishable goods for any indications of contamination or spoiling to guarantee food safety and avoid foodborne illnesses. This practice includes detecting odd smells, colors, or textures and looking for any indications of pollutants like molds. The findings of Zairinayati (2022) indicate that perishable goods must be promptly frozen or refrigerated by food handlers to prevent food spoilage. Food

handlers can reduce the chance of cross-contamination and guarantee the safety of the food prepared in the kitchen by adhering to safe cleaning and sanitization procedures.

In terms of the Food Service Process

Table 9 shows that the extent of school canteen vendors' practice in the food service process is "very high," as shown in its composite weighted mean of 4.87. Explicitly, the school canteen vendors try to avoid touching their faces or other body parts when serving customers, as indicated in its weighted mean of 4.91. When handling food, the vendors should not have any contact with any other part of their bodies. They should wear an apron or use a napkin to wipe off their hands to practice good hygiene and stop the spread of pollutants. The same finding is found in the study of Husain et al. (2018) when they pointed out that school canteen vendors should avoid touching their faces and use napkins or aprons to maintain hygiene and prevent cross-contamination, thus ensuring student safety.

Table 9. *Extent of Practices of School Canteen Vendors concerning Food Handling Norms in terms of Food Service Process (n = 43)*

<i>In the food serving process...</i>	w$\bar{x}$	VD	EoP
1. I try to avoid touching my face or other body parts when serving food to customers	4.91	A	VH
2. I should not go too close to other customers, especially when serving food, to avoid microbial exposure to the food I am serving.	4.88	A	VH
3. I should wash my hands and other utensils not already used to avoid food contamination.	4.87	A	VH
4. I should use a serving spoon properly and wash it after.	4.86	A	VH
5. I should wear personal protective attire when selling the food in the canteen.	4.84	A	VH
Composite	4.87	A	VH

To prevent food contamination, food handlers should wash their hands and any utensils that are not in use. According to Deepika et al. (2023), food handlers should follow reasonable hygiene procedures and make sure that the area where the food is prepared is clean. Other kitchen utensils are also sanitized to avoid contamination and food-borne illnesses. On the other hand, wearing appropriate clothing keeps the food safe and clean during preparation and serving and shields it from possible pollutants.

3.4 Relationship between Variables

Table 10 presents the data for identifying the relationship between variables. Using Spearman Rank-Order Correlation, the data show a significant relationship between the canteen vendors' knowledge and their attitude regarding food packaging, food preparation, and food service process (all p values < $\alpha = 0.015$). This finding means that the canteen vendors with better knowledge of the food safety norms tend to display a positive attitude towards the same areas.

Table 10. *Relationship between Variables (n = 43)*

Variables	r_s	p-value	Decision	Remark
Knowledge and Attitude				
Food Packaging	0.393	0.009	Reject H ₀₁	Significant
Food Preparation	0.429	0.004	Reject H ₀₁	Significant
Food Service Process	0.370	0.015	Reject H ₀₁	Significant
Knowledge and Practices				
Food Packaging	0.285	0.064	Accept H ₀₁	Not significant
Food Preparation	0.552	<.001	Reject H ₀₁	Significant
Food Service Process	0.265	0.086	Accept H ₀₁	Not significant
Attitude and Practices				
Food Packaging	0.073	0.641	Accept H ₀₁	Not significant
Food Preparation	0.339	0.026	Reject H ₀₁	Significant
Food Service Process	0.011	0.946	Accept H ₀₁	Not significant

Note: Level of significance = 0.05

This implies that the vendors are more likely to adopt a more favorable attitude toward implementing these policies if they have a greater awareness of food safety concepts, such as appropriate food packaging, preparation, and service processes. Vendors who possess in-depth knowledge of food safety may feel more empowered and confident to follow best practices, which could result in a more positive outlook on food safety procedures. Their views regarding food safety may be further reinforced by compliments and good comments from patrons or oversight agencies, mainly if they are acknowledged or commended for adhering to correct food handling

procedures. In connection with this, Shukri et al. (2022) concluded that food handlers' attitudes impact food safety, food quality, and how they prepare and handle food.

The table also reflects that the canteen vendors' knowledge and practices in terms of food preparation are significantly related ($p < .001$). This signifies that the higher the level of expertise of the canteen vendors regarding food preparation, the better their practices in the same area. The results connote that the vendors are more likely to apply food preparation safety procedures scrupulously in their day-to-day operations if they have a solid comprehension of them. For example, a vendor can better prepare food safely and hygienically if they know the proper cooking temperatures, hygiene standards, and cross-contamination avoidance techniques. A thorough understanding of food preparation safety may inspire vendors to be accountable and dedicated to maintaining high food safety standards in their canteen operations. This practice may result in diligent attempts to follow procedures and norms, like cleaning hands frequently, sanitizing surfaces and utensils, and storing ingredients appropriately. Furthermore, suppliers that have a thorough awareness of the safety of food preparation might be more proactive in identifying and putting best practices into effect to guarantee the quality and safety of the food they offer. In connection with this, Letuka et al. (2021) stated that proper food preparation significantly prevents food contamination.

Moreover, the table shows that the canteen vendors' attitudes and practices regarding food preparation are significantly related ($p = 0.026$). This connotes that canteen vendors with a positive attitude toward food preparation tend to display a higher level of practice in the same area. This further denotes that vendors with a favorable outlook on food preparation safety are likelier to think it is essential to follow and prioritize the proper procedures. This optimistic outlook may result from knowledge, experience, or personal convictions about food safety being important in preserving public health. Vendors committed to upholding food safety regulations could be more inclined to adopt stringent hygiene protocols, like routine hand washing, equipment sanitization, and appropriate cooking methods. The school canteen vendors possess positive attitudes toward food preparations and put these attitudes into practice by consistently and thoroughly implementing safe practices to ensure food safety.

Meanwhile, other variables, such as the canteen vendors' knowledge and their practices in terms of food packaging ($p = 0.064$) and the food service process ($p = 0.086$), do not display a significant correlation. This explains that vendors are aware of food safety regulations about packaging and servicing procedures, but they might encounter difficulties or limitations when implementing these policies. For example, vendors might not have access to the right tools or supplies for packaging, making it more difficult to uphold food safety regulations. Furthermore, vendors could find it challenging to follow food service process rules because of inadequate training on correct practices. In addition, irregularities in applying food safety procedures regarding packing and service processes may also be due to insufficient supervision of school personnel.

Lastly, no relationship is also found between the canteen vendors' attitudes and their practices in terms of food packaging ($p = 0.641$) and the food service process ($p = 0.946$). This implies that the vendors' opinions toward food safety do not always coincide with activities or behaviors that they engage in daily. For instance, a vendor may have good intentions about food safety in theory, but they may encounter obstacles or limitations when putting these intentions into practice in their canteen operations. A lack of management support, time restraints, or resource limitations could cause these difficulties. Vendors may also consider different aspects of food safety depending on those they think are more important or urgent, which can cause a discrepancy between their beliefs and actions. Furthermore, regardless of their views regarding food safety, other factors, such as consumer demands, may also impact vendors' actions and methods in the food packaging and service processes. In connection with this, according to Soares et al. (2016), results indicate that there can be wide variations in the expertise and attitude of school canteen vendors regarding food management.

3.5 Relationship between Profile and Level of Knowledge, Attitude, and Practices

Table 11 presents the data for identifying the relationship between the profile of the canteen vendors and their level of knowledge, attitude, and practices. As reflected, all p-values are more significant than the significance level (0.05). This finding will not allow the rejection of the null hypothesis. In other words, the data are insufficient to conclude that a significant relationship exists between the variables. This may imply that the profile variables

cannot account for the level of the canteen vendors' knowledge, attitude, and practices on food safety norms. This shows that the canteen vendors' knowledge, attitudes, and actions regarding food safety standards are influenced by factors other than their profile, such as their educational background, age, marital status, and years in business. The result is in opposition to the findings of Hossen et al. (2020) that the vendors' profile, such as level of education and income, are correlated with their knowledge, attitude, and practice on food safety, except for vending experience, which shows a negative relationship in terms of the vendors' Knowledge, Attitude, and Practices (KAP).

Table 11. Relationship between the Profile of the Canteen Vendors and Their Level of Knowledge, Attitude, and Practices (n = 43)

Variables	r_s	p-value	Decision	Remark
Knowledge				
Age	0.040	0.796	Accept H_{o2}	Not significant
Educational Attainment	0.088	0.575	Accept H_{o2}	Not significant
Number of Years in Buss.	0.006	0.971	Accept H_{o2}	Not significant
Marital Status	$r_{pbi} = 0.067$	0.657	Accept H_{o2}	Not significant
Attitude				
Age	0.029	0.853	Accept H_{o2}	Not significant
Educational Attainment	0.179	0.250	Accept H_{o2}	Not significant
Number of Years in Buss.	0.186	0.232	Accept H_{o2}	Not significant
Marital Status	$r_{pbi} = 0.120$	0.443	Accept H_{o2}	Not significant
Practices				
Age	0.073	0.641	Accept H_{o2}	Not significant
Educational Attainment	0.124	0.427	Accept H_{o2}	Not significant
Number of Years in Buss.	0.097	0.537	Accept H_{o2}	Not significant
Marital Status	$r_{pbi} = 0.093$	0.554	Accept H_{o2}	Not significant

Spearman Rank-Order Correlation (r_s) and Point-Biserial Correlation at 0.05 level of significance

The vendors' KAP on food safety is negatively correlated with their vending experience, which means that the longer a vendor has been in operation, the less probable it is that he or she follows proper procedures for food safety. Therefore, considering a wider variety of characteristics and contextual circumstances beyond their profile alone is necessary to thoroughly understand food safety behaviors among canteen vendors (Nkosi & Tabit, 2021).

4.0 Conclusion

Prioritizing food safety in schools is essential for safeguarding student health and fostering a safe learning environment. Enhanced training for food handlers, strict adherence to regulations, and active engagement from school administrators are critical components in achieving effective food safety management in school canteens. In food safety, Knowledge, Attitude, and Practices (KAP) of school canteen food handlers are seen as essential contributory factors in minimizing the gaps in children's health and nutritional status; the issue of whether these are possibly put into practice remains dim. Despite high levels of reported knowledge, positive attitudes, and firm adherence to food safety practices based on the disclosed results in the study, the actual practices of food handlers observed might not be conscious of the DepEd guidelines. This difference suggests that the respondents might have overrated their adherence to the implemented guidelines, stressing the importance of ongoing training and monitoring by teachers in charge of the school canteens. It is worth emphasizing that food safety KAP encompasses food preparation, packaging, and service processing. The Department of Trade and Industry and the Department of Education play a significant role in ensuring that food safety standards are strictly observed and providing resources for better implementation of food safety practices in school canteens. This partnership can facilitate more effective training programs, regular inspections, and robust accountability measures to bridge the gap between knowledge and practice and between attitude and practice to ultimately enhance food safety standards.

5.0 Contributions of Authors

The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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