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Food Handling Practices of Food Stalls in Olongapo City as Perceived by Vendors

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Abstract: *This research study examined food handling practices among food stall vendors in Olongapo City, focusing on personal hygiene, food storage, utensils and equipment, and overall food handling practices. The goal of the study is to benefit the community by raising food safety awareness for food stalls. The majority of vendors were young individuals with limited food safety training. While food stalls generally adhered to proper food handling practices, significant differences were found based on sex and participation in food safety training. Recommendations were made to improve food safety practices. The City Hall of Olongapo City is advised to implement enhancement training programs and seminars for food stall vendors, targeting personal hygiene, food storage, and proper use of utensils and equipment. The enhancement program will educate vendors on proper food handling, leading to a safer and healthier environment for customers. Additionally, a certification process should be established, ensuring vendors meet specific criteria and comply with food safety regulations. This certification would assure consumers and motivate vendors to maintain high standards. The implications of this study highlight the importance of raising awareness, establishing food safety standards, and improving practices among food stall vendors. The findings contribute to the broader goal of enhancing public health and safety.*

Keywords: food handling practices, food stall vendors, food safety; training program, certification process

1. INTRODUCTION

The occurrence of incidents related to improper food handling practices has emerged as a pressing concern in recent years. These incidents encompass situations where food safety is compromised during various stages of food handling, from preparation and storage to serving and distribution. The consequences of such incidents can have severe implications for public health, leading to outbreaks of foodborne illnesses, contamination with harmful pathogens or chemicals, and other risks to consumer well-being (Brown and Johnson, 2018; Chen et al., 2019). As the number of reported cases continues to rise, it becomes imperative to comprehensivelyunderstand the underlying causes and contributing factors of these incidents. Identifying the root causes of improper food handling practices is essential to develop effective prevention and intervention strategies. Additionally, examining the responses and actions taken by food businesses and regulatory agencies is vital in addressing these incidents promptly and implementing necessary improvements (Lee and Park, 2021).

The popularity of street food in developing countries including the Philippines presents a significant public health risk due to the prevalence of

foodborne diseases (Jahan et al., 2018; Jores et al., 2018). These diseases are caused by the ingestion of food contaminated with harmful bacteria. Contaminated food can serve as a vector for transmitting bacterial pathogens, which can proliferate and survive in various food types, including raw or undercooked meat, poultry, seafood, eggs, dairy products, fresh produce, and even processed foods. (Amare et al., 2019; Shiningeni et al., 2019; Zurita et al., 2020). Street food consumption is on the rise worldwide due to its ability to offer a unique cultural experience, affordability, convenience, culinary innovation, social interaction, authenticity, and its alignment with the growing trends of culinary tourism and social media-driven food exploration, making it a popular choice for people seeking diverse and flavorful dining experiences (Abrahale et al., 2019; Tran et al., 2018). It is estimated that around 2.5 billion people consume street food daily (Morano et al., 2018). Both local residents and tourists are drawn to street food due to its appealing taste, affordability, accessibility, and convenience. Additionally, street food sales significantly contribute to local economies and serve as a crucial source of employment, particularly in developing nations (Malhotra, 2017).

This growing trend highlights the need to ensure the safety and quality of street food, considering its widespread consumption and economic significance. Implementing effective regulations, promoting hygienic practices, and enhancing food safety measures are essential to safeguard public health while supporting the economic benefits derived from street food vending.

Contamination can occur due to various factors, including inadequate hygiene practices and improper food handling. To address this issue, it is crucial to implement food safety program to enhance awareness and education among street food vendors and consumers, and improve overall sanitation and hygiene practices in street food environments. These actions can help minimize the risk of foodborne diseases and protect public health. This growing trend highlights the need to ensure the safety and quality of street food, considering its widespread consumption and economic significance. Implementing effective regulations, promoting hygienic practices, and enhancing food safety measures are essential to safeguard public health while supporting the economic benefits derived from street food vending.

Numerous studies have emphasized the potential public health hazards associated with consuming street food, primarily due to vendors' inadequate compliance with environmental hygiene requirements and substandard food handling practices, often compounded by their limited knowledge of food safety (Khaleefah et al., 2020; Ngoc et al., 2020; Oduro-Yeboah et al., 2020). These factors contribute to an increased risk of foodborne illnesses among consumers. The lack of proper infrastructure, hygiene facilities, and training programs for street food vendors further exacerbate the situation. To mitigate these risks, it is crucial to prioritize education and training initiatives for vendors, enforce stricter regulations and inspections, and improve the overall infrastructure and hygiene conditions of street food establishments. By addressing these challenges, public health can be safeguarded, and the reputation and safety of street food can be enhanced, leading to a more enjoyable and secure street food experience for consumers.

Food handlers can control foodborne diseases and outbreaks, but this control will only occur if they possess high levels of food safety knowledge, a positive attitude towards food hygiene, and proper food preparation and storage practices (Yusof et al., 2018). Everyone involved in the food sector has a duty to maintain order and cleanliness. Effective cleaning of utensils and equipment lowers the possibility of food contamination throughout preparation, storage, and serving, in accordance with the Code Sanitation of the Philippines (Presidential Decree No. 856). In addition, even when food handlers follow the correct procedures for food preparation, mistakes can still occur, which is why some food poisoning occurrences occur. Therefore, it is important to pay close attention to how food handlers behave and to assess the hygienic conditions in food stalls.

The researchers chose this study because food safety is very important because it helps protect consumers from the risk of foodborne disease. We aim to know the handling practices of food stalls in Olongapo City so we can assess how safe it is to eat at the different food stalls around the area. We are also looking at the big picture of how food safety affects businesses, and at the same time, we are hoping that this study will help educate people about the importance of food safety practices.

This study aims to determine the food handling practices of food stalls in Olongapo City as perceived by vendors. Specifically, the study aims to answer the following questions:

1. What is the profile of the respondents in terms of:

    1.1 age;
    1.2 sex;
    1.3 level of education;

1.4 food safety training; and
1.5 1.5 years of service?

2. How may the level of food handling practices of food stalls as perceived by the vendors be described in terms of:
   2.1 food handling;
   2.2 personal hygiene;
   2.3 food storage; and 2.4 utensils and equipment?

3. Is there a significant difference on the levels of food handling practices of food stalls as perceived by the respondents when grouped according to demographic profile?

4. What program will be proposed based on the result of the study?

Conceptual Framework

The conceptual framework maps the entire process of the researcher's study. This study aims to determine the food handling practices of food stalls in Olongapo City as perceived by vendors.

Figure 1 shows the Input-Process-Outcome Model. The model graphically represents all the variables in the study. The input includes the respondents' profiles, specifically age, sex, level of education, food safety training, and years of service. Furthermore, it includes food handling, personal hygiene, food storage, utensils, and equipment.

Second is the process, which includes the data collection, data entry, and analysis of data, specifically respondents' profiles and criteria for evaluating food handling practices. Moreover, it includes frequency and percentage distribution, a test of normality, and a test of difference.

Lastly, the output of this study is the enhancement program for food and health education on the adherence to food handling practices of food stalls.

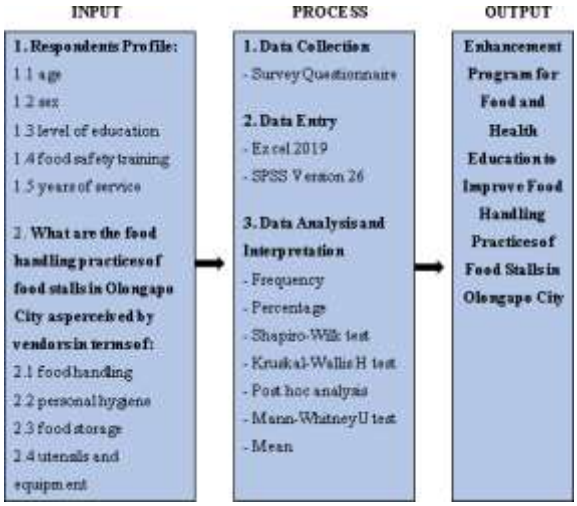

Figure 1. Research Paradigm of the Study

2. METHODOLOGY

This study made use of the quantitative method, which emphasizes objective measurements and the statistical, mathematical, or numerical analysis of data collected through questionnaires and surveys or by manipulating pre-existing statistical data using computational techniques.

McCombes (2022) provided a definition of descriptive research, stating that it is a systematic and precise approach to depict and characterize a population, situation, or phenomenon. Descriptive research seeks to answer questions related to "what," "where," "when," and "how" by employing diverse research methods to investigate one or more variables. However, it does not aim to uncover the underlying reasons or causes, as it primarily focuses on objectively observing and reporting the features, patterns, and behaviors within the research scope.

The study was conducted in Olongapo City, as this place was selected for its convenience and reliability as a source of information that would be useful for the study. Different food stalls could be found in different areas of Olongapo City, and handling practices were prioritized for the safety of all consumers. The study aimed to identify food handling practices at food stalls in Olongapo City as perceived by vendors.

Figure 2: Map Showing the Location of the Research Locale

The target respondents of this study were the food stall vendors in Olongapo City, with a total of 100 samples selected using purposeful sampling. G Power was utilized as the statistical tool to determine the required number of respondents.

Purposive sampling allows researchers to intentionally select participants that possess specific characteristics deemed relevant to the study, enabling a focused approach to gathering valuable information aligned with the research objectives (Nikolopoulou, 2022).

The researchers' criteria for choosing respondents are that they must be residents of Olongapo City, willing to share food handling practices as food stall vendors, and have been in business for at least one year already.

The instrument used was a researcher-made questionnaire purposely prepared to obtain data and facilitate observation of potential information. The researchers used structured questionnaire methods and 4-point Likert questions, which were categorized into:

The first part elicits the demographic profile of the respondents, which includes age, sex, level of education, food safety training, and years of service. The second part is the criteria for evaluating the handling practices of food stalls, which include food handling, personal hygiene, food storage, utensils, and equipment.

The following were used in the questionnaire: 4 = always, 3 = often, 2 = sometimes, and 1 = never. This instrument will be given to different vendors of food stalls to determine the level of food handling practices.

The formulated questionnaires were evaluated for their effectiveness and validity to ensure that they could measure what they were intended to measure consistently. The research adviser and three committees of experts reviewed the instrument and provided feedback and suggestions for revisions, which were carefully considered and implemented. The goal of this process was to improve the quality of the questionnaires and increase their accuracy in measuring the variables of interest in the research study. Cronbach's alpha was used to test the reliability of an instrument consisting of 20 items measuring various variables. The overall measure of all variables had an excellent internal consistency with a Cronbach's alpha value of .923.

The researchers prepared a questionnaire for the study "Food handling practices of food stalls in Olongapo City as perceived by vendors." The researchers went to the site of the study to distribute and gather respondents to answer the questionnaire. The researchers approached the respondents and explained the purpose of the study as well as how to complete the questionnaire. Finally, the researchers checked, summarized, analyzed, and tallied all of the respondent's responses with the help of statistical treatment of data in order to conclude the study's data

3. RESULTS AND DISCUSSION

Profile of the respondents

1.1 Age

Age	Frequency	Percent
15-24	30	30.0
25-34	24	24.0
35-44	28	28.0
45-54	13	13.0
55-64	5	5.0
Total	100	100.0

Table 1. Distribution on Respondent's Profile According to Age

Table 1 shows the frequency and percentage distribution of the respondents according to age. It indicates that most of the respondents are aged 15 to 24 years old (30 percent), while those aged 55 to 64 have the lowest number of respondents (5 percent). This implies that the majority of the respondents are aged 15 to 24 years old.

1.2 Sex

Sex	Frequency	Percent
Male	46	46.0
Female	54	54.0
Total	100	100.0

Table 2. Distribution on Respondent's Profile According to Sex

Table 2 shows the frequency and percentage distribution of the respondents according to sex. It reveals that most of the respondents are females (54 percent), while males have the least number of respondents (46 percent).

1.3 Level of Education

Level	Frequency	Percent
Primary	10	10.0
Secondary	46	46.0
Vocational	28	28.0
Tertiary	16	16.0
Total	100	100.0

Table 3. Distribution on Respondent's Profile According to Level of Education

Table 3 shows the frequency and percentage distribution of the respondents according to their level of education. It illustrates that most of the educational attainment of respondents is at the secondary level (46 percent), while the primary level has the lowest number of respondents (10 percent).

1.4 Food Safety Training

Training	Frequency	Percent
Yes	29	29.0
No	71	71.0
Total	100	100.0

Table 4. Distribution on Respondent's Profile According to Food Safety Training

Table 4 shows the frequency and percentage distribution of the respondents according to food safety training. It shows that most of the respondents did not attend food safety training (71 percent), while respondents who did attend food safety training had the lowest number of respondents (29 percent).

1.5 Years of Service

Years	Frequency	Percent
10 and below	89	89.0
11-20	8	8.0
21 and above	3	3.0
Total	100	100.0

Table 5. Distribution on Respondent's Profile According to Years of Service

Table 5 shows the frequency and percentage distribution of the respondents according to years of service. It indicates that most of the respondent's years of service are 10 and below (89 percent), while years 21 and above have the lowest number of respondents (3 percent).

Level of food handling practices of food stalls as perceived by the vendors be describes in terms of:

2.1 Food Handling

Table 6. Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in terms of Food Handling

Table 6 shows the mean and descriptive interpretations of the respondents in terms of food handling. "Cook food carefully, particularly meat, poultry, eggs, and seafood" (M = 3.89) has a descriptive interpretation of strictly adhering in terms of food handling. Following proper cooking practices is essential for regulatory compliance and maintaining food safety standards. Adhering to guidelines and regulations regarding food preparation and cooking helps to protect public health and maintain the reputation of the food vendor, ensuring customer satisfaction and loyalty. Proper cooking practices also help prevent cross-contamination (U.S. Department of Agriculture, 2021). While "discard the parts of food that have freezer burn", (M = 2.83) with a descriptive interpretation that often adheres in terms of food handling. The texture, flavor, nutritional value, and overall acceptability of the food can all change as a result of freezer burn. Due to the fact that freezer burn can affect the food's quality and safety, it is advised that customers and food handlers throw away any affected food (Lopes et

	Indicators	Mean	Descriptive Interpretation
1.	Rinse fresh fruits and vegetables under running water.	3.76	Strictly Adheres
2.	Discard the parts of food that have freezer burn.	2.83	Often Adheres
3.	Check dried goods for insects and pests, especially weevils which can quickly cause a widespread infestation.	3.51	Strictly Adheres
4.	Cook food carefully, particularly meat, poultry, eggs, and seafood.	3.89	Strictly Adheres
5.	Following the food' cooking instructions.	3.42	Strictly Adheres
Average		**3.48**	Strictly Adheres

al., 2021)

It reveals that the food stalls strictly adhere in terms of food handling, with an average of 3.48, which means that the food stalls comply with proper food handling. The strict adherence to food handling practices of food stalls is driven by the prevention of foodborne illnesses and the sustainability of the business. Food vendors play a crucial role in safeguarding public health by being knowledgeable about the potential risks associated with foodborne illnesses and implementing proper food handling techniques. It is essential for vendors to understand the factors that contribute to the spread of diseases, such as cross-contamination, improper storage temperatures, inadequate hygiene practices, and insufficient cooking or reheating procedures. They should receive training and education on food safety principles (Jong and Jensen, 2018).

2.2 Personal Hygiene

	Indicators	Mean	Descriptive Interpretation
1.	Wash and dry hands thoroughly before handling food, and wash and dry them again frequently during work.	3.82	Strictly Adheres
2.	Have clean outer garments and wear effective hair restraints.	3.34	Strictly Adheres
3.	Never sneeze or cough near food, or where it is being prepared or stored.	3.59	Strictly Adheres
4.	Keep the fingernails clean, trimmed, and short. Avoid using nail polish since it might contaminate the meals.	3.53	Strictly Adheres
5.	Never chew gum, smoke, spit, or eat in a space where food is handled or stored.	3.49	Strictly Adheres
Average		**3.55**	Strictly Adheres

Table 7. Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in terms of Personal Hygiene

Table 7 shows the mean and descriptive interpretation of the respondents in terms of personal hygiene. "Wash and dry hands thoroughly before handling food, and wash and dry them again frequently during work" (M = 3.82) has a descriptive interpretation of strictly adhering in terms of personal hygiene. Hand washing is a critical step in preventing the spread of pathogens and reducing the risk of food contamination. Street food vendors come into contact with various surfaces, ingredients, and money, which can harbor harmful bacteria and other contaminants. Regular and thorough hand washing with soap and clean water helps to remove dirt, bacteria, and viruses from hands, reducing the likelihood of cross-contamination and foodborne illnesses. The importance of hand washing and food handling

It reveals that the food stalls strictly adhere in terms of personal hygiene, with an average of 3.55, which means that the food stalls comply with proper personal hygiene. Vendors understand the importance of personal hygiene and properly practice good hygiene procedures. Vendor hygiene is quite important considering the germs that might spread foodborne diseases can be located in the skin, nose, and mouth (Pascual et al., 2019). Therefore, it is recommended that food handlers have the knowledge and abilities needed for hygienic food handling. In order to assure the safety of food, it is also important to establish food safety standards for vendors.

2.3 Food Storage

Table 8. Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in terms of Food Storage

Table 8 shows the mean and descriptive interpretations of the respondents in terms of food storage. “Separate wet and dry ingredients” (M = 3.59) has a descriptive interpretation of strictly adhering in terms of food storage. Separating wet and dry ingredients aids in maintaining the desired texture and quality of the food. Certain ingredients, such as flour or baking powder, are commonly used in dry form to achieve the desired consistency in baked goods. If these dry ingredients come into contact with moisture from wet ingredients, it can lead to clumping, affecting the texture and overall quality of the final product. Separating wet and dry ingredients is an important practice in cooking, primarily to achieve optimal results in terms of texture, consistency, and overall quality of the final product (Wiedmann, 2019). While “label food accurately and in detail” (M = 2.73) with descriptive interpretation often adheres in terms of food storage, by adhering to accurate and detailed food labeling practices, food vendors prioritize consumer safety, promote transparency, cater to specific dietary needs, and comply with regulatory requirements. The proper and accurate labeling of food ingredients can give consumers the knowledge necessary to make informed choices and can help consumers hold food producers responsible for the goods they create (Kumar and Venkatesh, 2019).

It reveals that the food stalls strictly adhere in terms of food storage, with an average of 3.38, which means that the food stalls comply with proper food storage. To maintain the safety and quality of food, food stalls and other food businesses need to ensure proper food storage. Proper food storage reduces food waste and spoilage, extends the shelf life of food, and promotes sustainability (Wilson et al., 2017).

2.4 Utensils and Equipment

	Indicators	Mean	Descriptive Interpretation
1.	Use different cutting boards for cooked and raw meats, and thoroughly wash cutting boards between uses.	3	Often Adheres
2.	All equipment used for preparing and serving food is carefully cleaned, dried, and put back where	3.75	Strictly Adheres

Table 9. Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in terms of Utensils and Equipment

Table 9 shows the mean and descriptive interpretations of the respondents in terms of utensils and equipment. "Maintain proper equipment operation" (M = 3.88) has a descriptive interpretation of strictly adhering in terms of utensils and equipment. Ensuring the proper operation and maintenance of equipment is crucial for food vendors as it guarantees safety, efficiency, and durability. In food processing, maintaining a sanitary processing facility is essential to prevent contamination and ensure the production of safe food products. Selecting the appropriate tools and equipment for each task and employing them correctly is vital for achieving the desired outcomes. Regular care, cleaning, and maintenance of the equipment are necessary to maximize its performance and longevity. By adhering to these practices, food vendors can ensure the smooth operation of their equipment, minimize the risk of foodborne illnesses, optimize productivity, and uphold food safety standards (Remco, 2017).

While the "use different cutting boards for cooked and raw meats and thoroughly wash cutting boards between uses" (M = 3) with descriptive interpretation often adheres in terms of utensils and equipment, Food vendors often adhere to the practice of using different cutting boards for cooked and raw meats and thoroughly washing cutting boards between uses because using separate cutting boards for raw and cooked meats helps prevent cross-contamination, reducing the risk of transferring harmful bacteria from raw meats to cooked foods that will not undergo further heat treatment. This practice is crucial to ensuring food safety and preventing foodborne illnesses (De Boer et al., 2017).

It reveals that the food stalls strictly adhere in terms of utensils and equipment, with an average of 3.60, which means that the food stalls comply with the proper usage of utensils and equipment. Adherence to appropriate utensil and equipment usage is crucial for food stalls to uphold hygiene standards and ensure the safety of their customers. Food handlers have direct contact with unwrapped food items, the equipment involved in their preparation, and the areas where these unpackaged products are stored or displayed, making them potential sources of contamination. Negligent handling practices at this stage pose a significant risk for foodborne outbreaks (Ahmed et al., 2020)

Difference on the levels of food handling practices of food stalls as perceived by respondents when grouped according to demographic profile

3.1 Age

Variables	Age	N	Median	H	df	Asymp. Sig	Conclusion
Food Handling	15-24	30	3.70	3.533	4	.473	Not Significant
	25-34	24	3.50				
	35-44	28	3.60				
	45-54	13	3.60				
	55-64	5	4.00				
Personal Hygiene	15-24	30	3.60	6.294	4	.178	Not Significant
	25-34	24	3.40				
	35-44	28	3.80				
	45-54	13	3.60				
	55-64	5	3.40				
Food Storage	15-24	30	3.50	6.312	4	.177	Not Significant
	25-34	24	3.20				
	35-44	28	3.40				
	45-54	13	4.00				
	55-64	5	2.80				
Utensils and Equipment	15-24	30	3.70	1.190	4	.880	Not Significant
	25-34	24	3.50				
	35-44	28	3.60				
	45-54	13	3.80				
	55-64	5	3.80				

Table 10. Difference on the Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in Terms of Age

The Kruskal-Wallis H test was used to analyze the level of food handling practices as perceived by the vendors, as can be seen in Table 10's analysis of the differences across five age groups. The test revealed no statistically significant differences in how the groups handled food [H(4) = 3.533, p =.473], with a median value of 3.70 for those aged 15–24, 3.50 for those aged 25–34, 3.60 for those aged 35–44, 3.60 for those aged 45–54, and 4.00 for those aged 55–64. A study by Labadan et al. (2019), conducted in the Philippines, provides support for the idea that age is not significant in food handling. The study revealed that there were no significant differences in knowledge, attitudes, or practices among various age groups of food handlers. Another study conducted by Pangan et al. (2018) shows evidence to support the idea that age is not an important factor in how people handle food in the Philippines. The findings of the study, which investigated the behaviors and understanding of street vendors in Metro Manila related to food safety, showed that there were generally no significant differences between different age groups of vendors in these areas. The study suggested that this would be because vendors of all ages are subjected to the same regulations regarding food safety and educational programs.

Since the p-value was higher than the significance level of .05., the test for personal hygiene revealed no significant difference between age groups [H(4) = 6.294, p

=.178], with a median value of 3.60 for those aged 15–24, 3.40 for those aged 25–34, 3.80 for those aged 35–44, 3.60 for those aged 45–54, and
3.40 for those aged 55–64. This is supported by the study conducted by Abayan et al. (2019), which investigated personal hygiene practices among street food vendors. The study found no significant difference in personal hygiene practices between the various age groups of vendors. It was believed that this might be due to the impact of government initiatives and regulations that encourage all vendors to adopt excellent hygiene.

The test for food storage revealed no significant age differences [H(4) = 6.312, p =.177], with a median value of 3.50 for those aged 15–24, 3.20 for those aged 25–34, 3.40 for those aged 35–44, 4.00 for those aged 45–54, and 2.80 for those aged 55–64. This result was due to the fact that the p-value was higher than the significance level of .05. According to Morillo et al. (2017), there was no significant difference in food storage practices based on age, but food handlers who received formal food safety training had better food storage practices compared to those who did not receive any training.

The test found no significant difference across age groups for utilizing utensils and equipment [H(4) = 1.190, p =.880], with a median value of 3.70 for those aged 15–24, 3.50 for those aged 25–34, 3.60 for those
aged 35–44, 3.80 for those aged 45–54, and 3.80 for those aged 55–64. The use of utensils and equipment across different age groups of food vendors did not vary significantly from one another. The majority of food vendors employed common equipment like knives, bowls, and spoons, and there was no significant difference in the way they used this equipment across age groups. Based on the study, age should not be a major consideration in food safety measures focused on the use of tools and equipment (Akabanda et al., 2018). In addition, the level of food safety knowledge, attitudes, and practices among food handlers across age groups was not significantly different. Particularly, the study discovered that there was no significan

difference in the frequency of use and that all age groups used tools and equipment equally. This implies that age is not a significant factor in how food handlers handle and use utensils and equipment (Al-Shabib et al., 2019).

3.2 Sex

Variables	Sex	n	Median	U	z	Asymp. Sig	Conclusion
Food Handling	Male	46	3.60	1149.500	-.649	.516	Not Significant
	Female	54	3.60				
Personal Hygiene	Male	46	3.60	934.000	-2.165	.030	Significant
	Female	54	3.80				
Food Storage	Male	46	3.40	886.500	-2.505	.012	Significant
	Female	54	3.70				
Utensils and Equipment	Male	46	3.60	963.000	-1.970	.049	Significant
	Female	54	3.80				

Table 11. Difference on the Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in Terms of Sex

Table 11 shows a Mann-Whitney U test that indicated no significant difference in the level of food handling practices perceived by vendors between male (Mdn = 3.60) and female (Mdn = 3.60), with U = 1149.500, z = -.649, and p =.516, which is more than the significance level of .05. Male and female vendors have similar practices regarding food handling. Both of them had similar food handling practices due to a variety of reasons, including the same workplace conditions, education, training, experience, and cultural norms (Okeke and Onuzulike, 2017).

The test showed a statistically significant difference in the level of food handling practices perceived by vendors between male (Mdn = 3.60) and female (Mdn = 3.80), U = 934.000, z = -2.165, and p =.030 for personal hygiene. Since the p-value is less than the .05 significance level. This finding could be attributed to various factors such as cultural norms, societal expectations, personal grooming habits, or awareness of hygiene practices. It implies that there may be a need to target specific hygiene education or awareness campaigns towards males to improve their personal hygiene habits. According to Esan and Fagbemi (2017), compared to male vendors, female street food vendors show better practices and understanding regarding personal hygiene. More specifically, female vendors were more likely to use

Considering that the p-value is below the .05 significance level in terms of food storage practices, the test found a statistically significant difference between males (Mdn = 3.40) and females (Mdn = 3.70) with U = 886.500, z = -2.505, and p =.012 in the level of food handling practices perceived by the vendors. The significant result suggests that there is a disparity between males and females concerning food storage practices. This discrepancy may be attributed to differences in knowledge about food safety, organizational skills, or attention to detail. It implies that

there is an opportunity to educate males on proper food storage techniques to ensure food safety, prevent spoilage, and reduce the risk of foodborne illnesses. According to Johannesson et al. (2018), sex differences in food storage practices, such as the tendency for females to engage in more secure food storage compared to males, can indeed be influenced by various socialization processes, cultural norms, and domestic responsibilities. Females often play a significant role in food preparation and household management, which can lead to differences in food storage behaviors.

For the handling utensils and equipment, the test showed a statistically significant difference in the level of food handling practices perceived by vendors between male (Mdn = 3.60) and female (Mdn = 3.80), U = 963.000, z = -1.970, and p =.049. The significant result in terms of utensils and equipment suggests that females generally have better practices when it comes to handling utensils and equipment. This discrepancy could be attributed to factors such as familiarity with kitchen tools, cooking experience, or attention to cleanliness. The result implies that there may be a need to provide guidance or training to males regarding proper handling, cleaning, and maintenance of utensils and equipment in order to improve their practices in this area. According to Fikreyesus (2018), females were more likely to use the appropriate utensils and equipment and clean them properly than males. Female food handlers prove to have significantly greater knowledge levels about using utensils and equipment.

In addition, female food vendors were more knowledgeable and maintained greater food safety than male vendors. This included better cleaning practices for utensils and equipment. This is because women tend to be more active in handling and preparing food in many societies, which has led to an increased understanding and expertise in preparing food (Akabanda et al., 2019).

3.3 Level of Education

Variables	Level	n	Median	H	df	Asymp. Sig	Conclusion
Food Handling	Primary	10	3.60	3.705	3	.295	Not Significant
	Secondary	46	3.60				
	Vocational	28	3.60				
	Tertiary	16	3.80				
Personal Hygiene	Primary	10	3.40	2.792	3	.425	Not Significant
	Secondary	46	3.60				
	Vocational	28	3.60				
	Tertiary	16	3.70				
Food Storage	Primary	10	3.40	1.272	3	.736	Not Significant
	Secondary	46	3.60				
	Vocational	28	3.40				
	Tertiary	16	3.50				
Utensils and Equipment	Primary	10	3.50	2.033	3	.566	Not Significant
	Secondary	46	3.70				
	Vocational	28	3.80				
	Tertiary	16	3.60				

Table 12. Difference on the Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in Terms of Level of Education

Table 12 displays the evaluation of the differences across four educational level groups for the level of food handling practices perceived by vendors as tested using the Kruskal-Wallis H Test. For the food handling practices, the test revealed a statistically no significant difference across educational level groups [H(3) = 3.705, p =.295], with a median value of 3.60 for primary, 3.60 for secondary, 3.60 for vocational, and 3.80 for tertiary level, since the p-value is greater than the significance level of.05. Based on the study of Zhou et al. (2018), food handlers in different food service businesses have no significant differences in their food safety knowledge and handling practices among people with different levels of education. This might be due to their experience and food safety training, which result in a level of knowledge and behavior that is similar across groups. The study of

Villar et al. (2021) found that food vendors have no significant differences in their practices or understanding of food handling across vendors with various levels of education. The fact that vendors may acquire knowledge and skills through different means, such as experience or training offered by health authorities, and that food handling is not always linked to formal education

For the personal hygiene practices, the test resulted in a statistically no significant difference across educational level groups [H(3) = 2.792, p =.425], with a median value of 3.40 for primary, 3.60 for

secondary, 3.60 for vocational, and 3.70 for tertiary level. According to Winter (2017), food vendors with varying levels of education exhibited similar personal hygiene practices, particularly in terms of handwashing. This suggests that education alone may not be the sole determinant of personal hygiene practices among food vendors. The findings suggest that cultural norms and other factors, such as resource accessibility, also influence individual hygiene practices. Therefore, the study recommended that efforts to improve personal hygiene practices among food vendors should focus not only on education but also on enhancing resource availability and raising awareness about the importance of good hygiene practices.

The test found no statistically significant differences in food storage practices among the groups of educational levels [H(3) = 1.272, p =.736], with a median value of 3.40 for primary education, 3.60 for secondary education, 3.40 for vocational education, and 3.50 for tertiary education. The study found that food vendors, regardless of their educational background, employed similar methods for storing food. The findings indicate that education level did not have a significant impact on these specific food storage practices among the vendors. Therefore, factors other than education, such as cultural norms or practical experience, may influence food storage practices. The study recommends that interventions aimed at improving food storage practices should consider these additional factors rather than solely focusing on educational interventions (Dhang et al., 2018).

For the utensils and equipment, the test resulted in a statistically no significant difference across educational level groups [H(3) = 2.033, p =.566], with a median value of 3.50 for primary, 3.70 for secondary, 3.80 for vocational, and 3.60 for tertiary level. According to the study conducted by Ababio et al. (2018), there is no significant difference between vendors with different levels of education when i

comes to how they sanitize and use their utensils and equipment. However, the study found that vendors with greater levels of education were more likely to have a better awareness of food safety practices. Additionally, Mensah et al. (2018) stated that the quality of the utensils and equipment utilized by food vendors at different levels of education is not significantly different. This might be because high- quality utensils and equipment are not prioritized enough in food safety training programs, and many food vendors have no convenient access to them

3.4 Food Safety Training

Variables	Training	n	Median	U	z	Asymp. Sig	Conclusion
Food Handling	Yes	29	3.80	699.500	-2.545	.011	Significant
	No	71	3.40				
Personal Hygiene	Yes	29	3.80	720.000	-2.390	.017	Significant
	No	71	3.60				
Food Storage	Yes	29	3.40	839.000	-1.474	.140	Not Significant
	No	71	3.40				
Utensils and Equipment	Yes	29	3.60	922.000	-.834	.404	Not Significant
	No	71	3.80				

Table 13. Difference on the Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in Terms of Food Safety Training

Table 13 depicts a Mann-Whitney U test for food handling that found a statistically significant difference in the level of food handling practices perceived by vendors between those with training (yes) [Mdn = 3.80] and those without training (no) [Mdn = 3.40], with U = 699.500, z = -2.545, and p =.011,
which is less than the significance level of five percent (0.5). The significant result suggests that there is a difference between individuals who practice food handling and those who do not. It indicates that individuals who engage in food handling tend to have better food handling practices. This finding implies that practicing proper food handling techniques, such as safe food preparation, storage, and hygiene, leads to improved overall food handling practices. It underscores the importance of education and awareness regarding food safety measures for individuals who do not currently engage in food handling practices, as it can help reduce the risk of foodborne illnesses and promote safer food consumption. According to Azanaw et al. (2019), food handlers who received safety training had higher odds of good food safety practice, which may be because

trained food handlers gain good awareness through training.

For the personal hygiene practices, the test revealed a significant difference in the level of food handling practices perceived by vendors between those with training [Mdn = 3.80] and those without training [Mdn = 3.60], with U = 720.000, z = -2.390, and p =.017. The significant result in this category suggests a difference between individuals who practice personal hygiene and those who do not. It indicates that individuals who prioritize personal hygiene tend to have better personal hygiene practices. This finding highlights the importance of practicing good personal hygiene habits, such as regular handwashing, maintaining cleanliness, and grooming. It implies that individuals who do not currently practice

personal hygiene may benefit from education and awareness campaigns to promote the adoption of hygienic habits, which can contribute to overall health and well-being. Food vendors who had received formal training exhibited higher levels of knowledge regarding food hygiene and were more inclined to implement excellent hygiene practices. Trained vendors were more likely to possess knowledge about preventing foodborne illnesses, including the importance of using safe water, appropriate food storage temperatures, and avoiding cross-contamination. Training in food safety procedures plays a significant role in improving personal hygiene practices and overall food safety measures among food vendors (Mashala, 2019).

The evaluation identified no significant difference in the level of food handling practices perceived by vendors between those with training [Mdn = 3.40] and those without training [Mdn = 3.40], with U = 839.000, z = -1.474, and p =.140 for the food storage practices. The study revealed that there was no significant difference in food storage practices between food vendors who received training and those who did not. This suggests that training alone may not be sufficient to improve food storage practices. Instead, the study suggests that implementing food safety management would be a more effective strategy to enhance food storage practices (Davis et al., 2020).

Table 13 also shows no significant difference in the evaluation of the level of food handling practices as perceived by the vendors between those who have received training [Mdn = 3.60] and those who have not [Mdn = 3.80], with U = 922.000, z = -.834, and p =.404
for the utensil and equipment handling practices under a significance level of.05. Although food vendors' knowledge and awareness of food safety practices improved following the training, there was no notable

difference in the utilization of food utensils and equipment before and after the training. Specifically, there was no significant variation in the cleaning and sanitizing of food utensils and equipment both before and after the training program. In essence, the training had a limited impact on the actual implementation of proper cleaning and sanitization practices for food utensils and equipment among the vendors (Dagnew, 2019).

3.5 Years of Service

Variables	Years	n	Median	H	df	Asymp. Sig	Conclusion
Food Handling	10 and below	89	3.60	.948	2	.623	Not Significant
	11-20	8	3.70				
	21 and above	3	3.60				
Personal Hygiene	10 and below	89	3.60	.234	2	.890	Not Significant
	11-20	8	3.80				
	21 and above	3	3.60				
Food Storage	10 and below	89	3.40	.620	2	.733	Not Significant
	11-20	8	3.60				
	21 and above	3	3.80				
Utensils and Equipment	10 and below	89	3.60	2.714	2	.257	Not Significant
	11-20	8	3.50				
	21 and above	3	3.80				

Table 14. Difference on the Level of Food Handling Practices of Food Stalls as Perceived by the Vendors in Terms of Years of Service

Table 14 displays the evaluation of the differences across four years of service groups for the level of food handling practices perceived by vendors as tested using the Kruskal-Wallis H Test. For the food handling practices, the test revealed a statistically no significant difference across years of service groups [H(2) =.948, p =.623], with a median value of 3.60 for 10 and below, 3.70 for 11–20, and 3.60 for 21 and above years of service, since the p-value is greater than the significance level of.05. Food handling practices may vary among vendors, regardless of their years of service. It was supported by a study conducted by Azam et al. (2017), which found that there was no significant difference in food safety knowledge and food handling practices among food vendors based on

their years of service. Regardless of how long they have been in business, the study suggested that all food vendors should undergo training in food safety to make sure they have the knowledge and skills to handle food properly.

The test resulted in a statistically no significant difference for the personal hygiene practices across groups [H(2) =.234, p =.890], with a median value of 3.60 for 10 and below, 3.80 for 11– 20, and 3.60 for 21 and above years of service, since the p-value is greater than the.05 significant level. This is supported by the study conducted by Adewoyin and Okeke (2018), in which they assessed the food hygiene practices of street food vendors with different years of service. The study's findings revealed

that there was no significant difference in personal hygiene practices among vendors with varying years of experience. Another study conducted by Kothari and Kothari (2017) also found no significant difference in personal hygiene practices between vendors with different years of experience. Food vendors, regardless of their level of experience, needed regular training and supervision of their personal hygiene practices.

Since the p-value was higher than the.05 significant level, the test found no statistically significant difference between the groups for food storage practices [H(2) =.620, p =.733], with a median value of 3.40 for vendors with 10 and below years of service, 3.60 for those with 11–20 years of service, and
3.80 for those with 21 and above years of service. Years of service are not an ideal indicator of food storage practice. Instead, it emphasizes the necessity of regular training and education programs to make sure that all food vendors, regardless of their level of service, have the knowledge and skills needed to maintain safe food storage and food handling practices (Bello, 2020).

For the utensils and equipment, the test resulted in a statistically no significant difference across groups [H(2) = 2.714, p =.257], with a median value of 3.60 for 10 and below, 3.50 for 11–20, and
3.80 for 21 and above years of service. The study found no significant differences in the cleanliness of food handling equipment based on the length of service provided by the vendors in the business. This suggests that the duration of a vendor's operation may not necessarily correlate with the cleanliness of their utensils and equipment. Continuous assessment and supervision are necessary to maintain high levels of hygiene and safety in food handling practices (Rothenberg, 2018).

4. CONCLUSIONS

Conclusions were made based from the aforementioned on the findings obtained in the study.

1. The researchers found out that the vendors are aged 15 to 24 years old. Most of the vendors are female with a secondary level of educational attainment. In addition, the majority of the vendors did not attend food safety training, and most of the respondent's years of service are 10 and below.

2. The researchers found out that the food stalls strictly adhered in terms of food handling, personal hygiene, food storage, utensils, and equipment.

3. There is a significant difference in personal hygiene, food storage, utensils, and equipment according to sex. Additionally, there is also a significant difference in food handling and personal hygiene according to food safety training.

4. The researchers proposed enhancement program for food and health education regarding the food handling practices of food stalls. This program intended to promote adherence to the standards in Presidential Decree No. 856 to ensure the safety and sanitation of food handling practices in the Philippines.

5. RECOMMENDATIONS

In view of findings and conclusions, the research offers the following recommendation.

1. The researchers recommend that City Hall provide training and seminars to food stall vendors to ensure compliance with the standards outlined in P.D. No. 856.

2. The researchers recommend implementing a certification process for vendors to obtain permission to sell. This certification would help ensure adherence to regulations and promote food safety and hygiene practices in the local area.

3. This study is recommended for other researchers as a reference when conducting similar studies on food handling practices. The results may be validated or refuted in larger groups of participants, or more variables may be added to future studies. This study may also serve as a reference for future researchers in the field to aid them in designing new studies on food handling practices.

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