

# Hygienic Practices Among Fish Vendor in Panabo Public Market

Khing Yvan Basadre<sup>1</sup>; Kian Recto<sup>2</sup>; Angelyn Encinares<sup>3</sup>; Cherry Mae Jardinico<sup>4</sup>; Cristine Mae Mañacap<sup>5</sup>; Nolie, Jr. C. Guadalquiver<sup>6</sup>

<sup>1;2;3;4;5;6</sup>Institute of Teacher Education, Davao Del Norte State College, Davao Del Norte, Philippines

Publication Date: 2025/06/18

**Abstract:** Fish vending is a common practice in Panabo City Public Market, where fish vendors sell a variety of fresh and processed seafood products. However, the hygienic practices employed by these vendors are a concern, as poor sanitation and food handling can lead to the contamination of fish and pose health risks to consumers. The study aimed to determine the current status of compliance of fish vendor in terms of hygienic practices in Panabo Public Market. This study employed quantitative method and descriptive analysis. Simple random sampling technique was utilized in this study with the total of 128 fish vendors currently operating within the Panabo City Public Market. The data were analyzed using frequency. The findings revealed that while a majority of fish vendors maintained proper handling practices such as using separate containers to prevent cross-contamination and calibrating weighing scales, significant gaps were found in the use of potable water, cold storage maintenance, and personal hygiene. Specifically, all fish vendors failed to use potable water for washing inputs, none provided cold storage facilities with thermometers or maintained the required temperatures for fish products, and less than one-tenth wore clean aprons. These findings underscore the need for targeted interventions to improve water usage, cold storage, and personal hygiene practices among fish vendors to ensure food safety. Fish Vendors should be educated on the importance of using potable water for washing fish and other inputs to prevent contamination, and local authorities should ensure access to potable water sources in the market. Local authorities should also provide training to vendors on the proper use and maintenance of cold storage facilities, enforce strict personal hygiene standards, and ensure accessible hand washing stations are available. Additionally, conducting regular training sessions on food safety practices and strengthening inspection and enforcement of food safety regulations by local health authorities are crucial for improving overall food safety standards in the market.

**Keywords:** Hygienic Practices, Fish Vendors, Sanitary Interventions, Panabo City Public Market. Quantitative Method.

**How to Cite:** Khing Yvan Basadre; Kian Recto; Angelyn Encinares; Cherry Mae Jardinico; Cristine Mae Mañacap; Nolie, Jr. C. Guadalquiver (2025) Hygienic Practices Among Fish Vendor in Panabo Public Market.

*International Journal of Innovative Science and Research Technology*, 10(6), 963-970. <https://doi.org/10.38124/ijisrt/25jun602>

## I. INTRODUCTION

Food hygiene is an effort to control the factors of places, equipment, people, and foods that may cause health problems and food poisoning, including fish. Fish is a food that is widely consumed by the public, but on the other hand, fish experience the process of decay faster. Traditional product that is highly favored by the people because of its unique taste, so that hygiene and sanitation in its processing is needed to prevent the occurrence of fish poisoning. On the contrary, there are still many unexpected occurrences in the implementations, which are mainly related to the hygienic practices, drainage which is full of waste which leads to incompressible flow of water and bad smell; sanitation which does not meet the requirement which results in the product quality. Poor sanitation and hygienic practices as shown by the fact that the fish are placed on dirty places, or that the easily-rusty drums are still used to store the fish.

Additionally, non-conformance to required hygienic practices and limited food safety knowledge can contribute to food contamination and spread of foodborne diseases (Ma et al., 2019). The observation of hygienic practices highlighted critical control points where product contamination was possible such as the handling of money during preparation, storage of raw materials, handling of utensils, and sanitation of carts. Vendors and consumers food safety knowledge must be improved, including the hygienic practices (Duchaussee & Maharaj, 2024). Poor hygienic practices among handlers pose significant risks to public health due to the potential introduction of pathogenic microorganisms into the products. With minimal microbiological contamination, hygienic measures are the key to producing safe and high-quality goods for consumption (Terefe & Walelegne, 2024).

Consequently, Biswas et al. (2024) stated that unsatisfactory personal hygiene most importantly in effective hand washing has been identified as a significant risk factor

of food poisoning. However, the issue of sanitary quality is crucial whereby hygiene and food safety has increasingly become a concern due to the health risks and the number of people that die annually from foodborne illnesses. Thus, making food vendors a significant concern given their reputation of poor hygiene and safety.

Therefore, there is a need for proper hygiene practices, access to sanitary facilities (Khuluse & Deen, 2020). Traditional methods of preparation and distribution, inadequate storage temperatures and times, and improper personal hygiene of food handlers are possible sources of contamination, endangering street food safety. Low education levels of street food vendors have been associated with poor hygiene practices leading to food contamination during the preparation and sale of food preparation (Pilamala Rosales et al., 2023). Foods and ingredients may be subjected to cross-contamination from unwashed hands. Lack of good personal hygiene practices can predispose food to microbial contamination. Some previous studies reported that poor personal hygiene in the street or market and among food handlers poses a considerable risk to public health (Tong Thi et al., 2021).

Moreover, Kamboj et al. (2020) stated that hygiene practice training is therefore important in food safety and is an essential part of the hazard analysis critical control point (HACCP) concept. Considering the global Covid-19 pandemic, hygiene practice is essential. Hygiene and food safety research has proliferated over the years demonstrating that food vending is an important component to the socio-economy of developing countries and it will continue to grow due to its affordability and easy access. However, there is a paucity of studies that focus on the hygiene and food safety within parameters of tertiary environments and this research postulates that the informal nature of food vending give rise to unpleasant activities which could pose serious dangers to the health and safety of students, staff and the surrounding community (Khuluse & Deen, 2020). The microbiological quality of selected street foods observed that personal hygiene of vendors during handling and cooking is very important as lack of it caused serious health hazards to the consumers (Pilamala Rosales et al., 2023). Good hygiene and good practices are essential to prevent loss and waste and maintain quality. Therefore, proper hygiene must be promoted among marketers to provide safe and high-quality fish and fishery products. Personal hygiene is essential for handling fish. (Edirisinghe et al., 2022).

Furthermore, according to Gibson-Miller et al. (2020) UK citizens have experienced the most severe public health crisis in recent history due to inadequate hygiene practices that can lead to infections and the rapid transmission of diseases. Moreover, on the other hand, the Philippines must implement standardized hygienic practices due to the rapid transmission of infections and diseases (Molina et al., 2021). Macusi et al. (2022) stated that scarcity of safe drinking water and inadequate sanitation exacerbated by poor hygienic practices places fishing communities at an increased risk of diseases, and ultimately, impacts on fish vendors in Panabo City Public Market.

Therefore, this study aims to address the literature gaps by assessing the hygiene knowledge and food safety practice of fish vendors in Davao Region particularly in Panabo City Public Market hence, there's no study about hygienic practices among fish vendors in this area. These insights enable the identification of opportunities to improve food safety and hygiene practices of fish vendors in Panabo City. By filling this gap, the study aims to fill the needs for continuous training in good personal hygiene for fish vendor to ensure the high-quality products from fish markets.

## II. METHOD

### ➤ *Study Participants*

In this study, 128 individuals were selected for participation through a simple random sampling method. These participants were fish vendors currently operating within the Panabo City Public Market, located in Davao del Norte. The fish vendors sampled represented a broad cross-section of the market population, likely sharing common characteristics such as years of experience, sales volume, source of products, and familiarity with hygiene standards.

The participants were engaged through survey questionnaires adapted from the Bureau of Agriculture and Fisheries Product Standards (2020), which evaluated compliance with hygienic practices. The use of simple random sampling ensured that each vendor had an equal chance of selection, thereby promoting unbiased representation. Simple random sampling has benefits and drawbacks associated with it. It ensures unbiased, representative, and equal probability of the population (Noor, Tajik, Golzar 2022).

### ➤ *Materials and Instrument*

This study utilized a validated survey instrument adapted from the Bureau of Agriculture and Fisheries Product Standards (2020) entitled *Code of Hygienic Practice for the Sale of Fresh Agriculture and Fishery Products in Markets and Authorized Outlets*. The tool was designed to assess hygiene practices in fish markets and remains relevant to current regulatory and market needs.

The survey covered two main categories: Minimum Requirements (including handling practices, water storage, cold storage, and selling areas) and Hygienic Practices (covering facilities, personal hygiene, and sales stalls). This standardized instrument ensured consistency and reliability in evaluating vendors' compliance with hygienic standards.

### ➤ *Design and Procedure*

In this study, quantitative research design is used. Quantitative method allows the measurement of compliance with hygienic practices among fish vendors. Through survey, researchers objectively assess the extent to which vendors adhere to established hygiene standards (Bedane et al., 2022). From a market regulation perspective, quantitative research design can inform the development of hygiene codes and standards, ensuring consumer safety and promoting trust in the market. By adopting quantitative research design, the research aims to contribute insights that can drive evidence-

based practices, benefiting both public health and the market in Panabo.

Descriptive analysis will be used to achieve each research objective. Descriptive analysis allows researchers to systematically document and summarize the various hygienic measures practiced by fish vendors. Descriptive analysis enables comparisons across different groups of fish vendors, such as those selling different types of fish or operating in distinct areas within the market. This comparative analysis helps identify variations or disparities in hygienic practices among vendor subgroups, providing insights into factors that may influence compliance with hygienic standards (Grema et al., 2020).

The study used the inferential and descriptive methods of research with questionnaires as the main data-gathering tool. The subjects of this study were the fish vendors of Panabo Public Market located in the province of Davao Del Norte. Descriptive methods lay the groundwork by summarizing and describing data, providing the basis for further analysis. Inferential methods build upon these descriptions by allowing researchers to make broader statements or predictions about populations based on sample data. Both approaches are complementary and often used together in research to provide a comprehensive understanding of phenomena.

For instance, researchers used descriptive methods to conduct surveys and observations in Panabo City Public Market, documenting the current state of hygiene practices. They could then use inferential methods to test hypotheses about the effectiveness of sanitation training programs for vendors, or the impact of market management policies on overall cleanliness. By employing both descriptive and inferential methods, stakeholders and policymakers can gain a comprehensive understanding of the hygiene practices in Panabo City Public Market, identify areas for improvement, and make informed decisions to enhance public health and safety in the market environment.

### III. RESULTS AND DISCUSSION

This quantitative study presents key findings on the hygienic practices of fish vendors in Panabo City Public Market. Based on data gathered from 128 respondents, the results highlight both strengths and gaps in handling, sanitation, and food safety compliance. Through detailed analysis, this section aims to provide a clear understanding of the vendors’ current practices and areas needing improvement to ensure safer fish products for consumers.

#### ➤ Handling Practices

Personal hygiene is essential for handling fish. Good hygiene and good practices were important to prevent loss, waste and maintain quality (Edirisinghe et al., 2022). This study is similar from the study of Bureau of Agriculture and Fisheries Standards with the study entitled “Code of Hygienic Practice (COHP) for the Sale of Fresh Agriculture and Fishery Products in Markets and Authorized Outlets”. The 128 fish vendors serve as participants in this study.

Table 1 revealed that there were 128 or 100% of fish vendors had practiced the handling practices in terms of separating containers of blood and internal organs to prevent cross contamination vendors emphasized that this practice is important for preserving fish from any potential cross-contamination and the subsequent spread of illnesses. Altai et al. (2023) claimed that to reduce health risks to consumers, proper disposal management and separation of waste like blood and organs from fish were important to prevent from fecal contamination. Furthermore, there were 74 or 58.30% of fish vendors had practice while 53 or 41.70% of fish vendors had not practiced in terms of covering fish containers, keeping away from soap and disinfectant to prevent from contamination possibly because as observed by researchers’ vendors openly display their fish products to attract customers and rely on fly swatter to prevent flies from contaminating the fish. Containers, utensils, table surface, cutters, cutting knives are in good condition, properly maintained and cleaned were practiced by 97 or 76.40% of fish vendors while 30 or 23.60% fish vendors had not practice. This indicates that the majority of vendors carefully maintained and sanitized utensils and surfaces in the market to ensure the safety of the fish for consumption. Weighing scales to be used should be properly calibrated were practiced by 112 or 88.20% of fish vendors while 15 or 11.80% had not practiced. This shows that majority of fish vendors properly calibrated weighing scales to ensure that the weighing scales provide accurate measurements and contribute to product consistency. All of these frequency of handling practices, according to Wijaya et al. (2024) proper handling practices of fish or fishery products to consumers among fishermen, government agencies, and other stakeholders is important and necessary. Fish handling and storage play an important role in minimizing degradation. Therefore, maintaining and monitoring the safety and quality of fish is very important. Freshness is an important element of fish quality classification, and it is also a concern for the industry and consumers (Edirisinghe et al., 2022).

Table 1 Frequencies of Handling Practices

	Practiced		Not Practiced	
	N	%	N	%
Containers (including ice and water storage) are always covered and kept away from soap, disinfectants, and pesticides to prevent contamination.	74	58.30	53	41.70
Separate containers for blood and internal organs are used to prevent cross contamination.	128	100	0	0.00
Containers, utensils, table surface, cutters, cutting knives are in good condition, properly maintained and cleaned.	97	76.40	30	23.60

Weighing scales to be used should be properly calibrated.	112	88.20	15	11.80
---	-----	-------	----	-------

➤ *Water and Water Storage*

Table 2 revealed that there were 128 or 100% of fish vendors had not practiced the usage of potable water for washing fish produced because as the vendors shared their way of washing and cleaning fish, as what fish vendors said from researchers interviewed vendors only used water from water district which is not potable and as observed by the researchers that water district is unsafe to use as the water is not potable and it's not good to be used as washing inputs on fish products as it can contaminate the fish and affect the health safety of consumers. Moreover, there's an issue of using water in water district. This claim revealed by Visnuvinayagam et al. (2019) where stated that quality of the water used for fish processing should be of good quality in

order to avoid the transfer of pathogens from water to fish. Therefore, water districts should be used to clean the fish for the safety consumption of consumers. Ensure that waste water was properly disposed to prevent any hazards to the potable water and surrounding area were practiced by 102 or 80.30% fish vendors while 25 or 19.70% of fish vendors had not practiced. According to fish vendors wastewater can contain pollutants such as pathogens, chemicals, and organic matter. If not properly disposed, these pollutants can degrade water quality. Also, contaminated water pose significant health risks to humans and to market place. All of these frequencies of water and water storage parameters determined the level of how these fish vendors maintain their way of cleaning fish.

Table 2 Frequencies of Water and Water Storage

	Practiced		Not Practiced	
	N	%	N	%
Water to be used for washing inputs is potable.	0	0.00	128	100.00
Ensure that wastewater is properly disposed to prevent any hazards to the potable water and surrounding area.	102	80.30	25	19.70

➤ *Cold Storage (Fish Products)*

Table 3 shows that there were 128 or 100% fish vendors had not practiced in terms of providing cold storage freezers with thermometer cleaned, free from objectionable odor, and in good condition. In this regard, researchers observed that fish vendors were used ice box as their alternative for preserving fish and monitors the temperature inside the ice box instead of using cold storage freezers. Also, there were 128 or 100% of fish vendors had not practiced of chilling temperature for fish and fishery products at 0° C to 4° C while fresh-frozen fish and fishery products and meat were at -18° C or below possibly because the maximum chilling temperature

of icebox that fish vendors used was 22 °C. All of these frequencies of cold storage practices among fish vendors had not practiced. This claim was supported by Dasgupta et al. (2019) stated that not all fish vendors used chilling temperature for fish at 0° C to 4° C because majority of fish vendors particularly vending in public market areas commonly used a storage with an ice or icebox, fishermen use a thumb rule of 3:2 to 1:1 by volume of fish to ice in storage. The quantity of ice appears to be sufficient for 10 to 15 days for storage in melting ice as per sample calculation provided. In one case, fish surface temperature was measured as high as 22 °C on unloading, while ambient temperature was 25 °C.

Table 3 Frequencies of Cold Storage (Fish Products)

	Practiced		Not Practiced	
	N	%	N	%
Cold storage facilities/freezers are provided with thermometer are cleaned, free from objectionable odor, and in good condition.	0	0.00	128	100.00
Chilling temperature for fish and fishery products is at 0° C to 4° C while fresh-frozen fish and fishery products and meat are at -18° C or below.	0	0.00	128	100.00

➤ *Handling Requirements for Fishery Products*

Table 4 shows that there were 128 or 100% of fish vendors had practiced in avoiding formalin and other poisonous substances as preservatives and colorants of fish products. In this regard, fish vendors stated that they avoid of using poisonous substances such as formalin in fish products because can lead to acute poisoning and long-term health complications. Moreover, as their fish products to be look fresh and safe to consume they used ice, salt and seawater as their alternatives. Haque et al. (2020) stated that it is important to avoid the formalin in fruits and fish for the health of consumers in the market. Proper grading and classification of fishery products were practiced by 119 or 93.70% while there were 8 or 6.30% of fish vendors had not practiced. In

this regard, majority of fish vendors utilized proper grading and classification of fishery products it plays an important role in the entire fishery supply chain, from harvest to consumer, contributing to economic viability and environmental sustainability in the fish industry. Fishery products were packed separately according to varieties or species were practiced by 120 or 94.50% of fish vendors while 7 or 5.50% had not practiced. In this regard, researchers observed that packing fishery products separately according to varieties or species is essential for preserving quality, meeting consumer preferences, ensuring traceability, complying with regulations, and supporting sustainable practices in the fishing industry.

Table 4 Frequencies of Handling Requirements for Fishery Products

	Practiced		Not Practiced	
	N	%	N	%
Proper grading and classification of fishery products are observed.	119	93.70	8	6.30
Fishery products are packed separately according to varieties or species.	120	94.50	7	5.50
Do not use formalin and other poisonous substances as preservatives and colorants.	128	100.00	0	0.00

➤ *Fish and Fishery Products*

Table 5 revealed that there were 122 or 96.10% of fish vendors had practiced of packing properly of fish and shellfish in clean appropriate packaging materials, while 5 or 3.90% of fish vendors had not practice. In this regard, researchers observed that majority of fish vendors provides appropriate packaging materials that ensures food safety and prevent from transfer of pathogens. According to Tsironi & Taoukis (2018) packaging of fish products provides protection against chemical, biological, and physical

modifications during storage. Fish containers shall be elevated from the floor and provided with cover were practiced by 13 or 10.20% of fish vendors while 114 or 89.80% of fish vendors had not practice. In this regard, fish vendors explained that elevating fish containers off the floor would require both horizontal and vertical space, which they lacked due to restricted floor space. Therefore, they are unable to implement the practice of elevating fish containers from the floor, as it requires careful consideration and management.

Table 5 Frequencies of Fish and Fishery Products

	Practiced		Not Practiced	
	N	%	N	%
Fish and shellfish are packed properly in clean appropriate packaging materials.	122	96.10	5	3.90
Fish Containers shall be elevated from the floor and provided with cover.	13	10.20	114	89.80

➤ *Area or Place of Selling*

Table 6 revealed that there were 122 or 96.10% of fish vendors had practiced cleaning and sanitizing the area for the display of fishery products. In this regard, researchers observed that majority of fish vendors were practiced cleaning and sanitizing of the display area to reduce exposure of contaminants and contributes to a safe working environment. According to Sheng & Wang (2020), adequate sanitation and proper control strategies in fish processing

plants are vital to reduce the risk of contamination in fish and fish products. Signboards were placed in an area where it could not be a source of contamination had not practiced by 114 or 89.90% of fish vendors in the market possibly because majority of fish vendors did not have a basis where signboards might be placed as long as they were easily visible to the intended customer.

Table 6 Frequencies of Area or Place of Selling

	Practiced		Not Practiced	
	N	%	N	%
The Place or area for display for fishery products are cleaned and sanitized.	122	96.10	5	3.90
Signboards are placed in an area where it could not be a source of contamination.	13	10.20	114	89.80

➤ *Facilities*

Table 7 shows that there were 128 or 100% of fish vendors had not practiced in hand washing facilities, provided with potable water, liquid cleaning detergents and hand drying materials. In this phase, researchers observed that fish vendors only used water from water district not potable water to ensure that their fish sold to consumers were cleaned and free from contamination. This claim revealed by Visnuvinayagam et al. (2019) as stated that quality of the water used for fish processing should be of good quality in order to avoid the transfer of pathogens from water to fish.

Therefore, water districts should be used to clean the fish for the safety consumption of consumers. Toilets have separate rooms for male and female with clean toilet bowls in good working condition and have waste bins were practiced by 128 or 100% of fish vendors and reminders on hygienic practices should be appropriately posted in toilets were practiced by 128 or 100% of fish vendors possibly because fish vendors maintains hygienic practices and sanitation standards; promoting of reducing the health risk of cross-contamination between genders.

Table 7 Frequencies of Facilities

	Practiced		Not Practiced	
	N	%	N	%
Toilets Have Separate rooms for male and female with clean toilet bowls in good working condition and have waste bins.	128	100.00	0	0.00
Reminders on hygienic practices should be appropriately posted in toilets.	128	100.00	0	0.00
Hand washing facilities are provided with potable water, liquid cleaning detergents and hand drying materials.	0	0.00	127	100.00

➤ *Personal Hygiene*

Table 8 shows that there were 128 or 100% of fish vendors had not practiced in providing tongs or gloves to customers when they handle the products. These can be shown by their practices of using a glove while handling food which most of the participants not wearing glove due to the lack of comfortability. Majority of them don't use glove while handling products (AA et al., 2022). Wearing of clean apron during work were practiced by 11 or 8.70% of fish vendors while 116 or 91.30% of fish vendors had not practiced. In this regard, majority of fish vendors did not use apron while selling fish because according to the informants they are comfortable when they wear only shirts as it prevents from transferring of contaminants from the surfaces of apron to fish.

Keeping fingernails trimmed, clean, and without nail polish were practiced by 81 or 63.80% of fish vendors while 46 or 36.20% of fish vendors had not practiced. In this regard, fish vendors stated that clean nails is important as it shows cleanliness in sellers personality appeal while other 46 or 36.20% vendors had not practice because according to them they have no time of trimming which is also prevents contamination. No wearing of jewelries, and accessories were practiced by 46 or 36.20% of fish vendors while 81 or 63.80% of fish vendors had not practiced. In this regard, majority of vendors had not practiced because majority of them can't

afford jewelries and accessories and it presents a clean and focused appearance to customers, instilling confidence in the cleanliness and professionalism. Food handlers shall possess valid health certificates were practiced by 51 or 40.20% of fish vendors while 76 or 59.80% of fish vendors had not practiced. In this regard as researchers found that the majority of fish vendors did not practice health certifications due to a lack of money to acquire such health certificates, and they prioritize spending the money they make for their children's tuitions. While other fish vendors practiced it for maintaining compliance and avoiding regulatory issues.

Food handlers shall refrain from spitting, coughing, sneezing, smoking, or behavior/habits that can compromise food safety were practiced by 93 or 73.20% of fish vendors while 34 or 26.80% of fish vendors had not practiced. Food handlers shall not handle fresh produce, money, and receipts or tickets at same time were practiced by 2 or 1.60% of fish vendors while 125 or 98.40% of fish vendors had not practice. All of these frequencies of personal hygiene were supported by Oliveira et al. (2021) it stated that food handlers are required to maintain high standards of personal hygiene regarding protective clothing and equipment, handwashing procedures, and general behavior towards food hygiene and safety. Hand hygiene is an essential part of a personal hygiene program in food establishments.

Table 8 Frequencies of Personal Hygiene

	Practiced		Not Practiced	
	N	%	N	%
Wearing of clean apron during work.	11	8.70	116	91.30
Keeping fingernails trimmed, clean, and without nail polish	81	63.80	46	36.20
No wearing of jewelries, and accessories.	46	36.20	81	63.80
Food handlers shall possess valid health certificates.	51	40.20	76	59.80
Food handlers shall refrain from spitting, coughing, sneezing, smoking, or behavior/habits that can compromise food safety.	93	73.20	34	26.80
Food handlers shall not handle fresh produce, money, and receipts or tickets at same time.	2	1.60	125	98.40
Tongs or gloves shall be provided to customers when they handle the products.	0	0.00	127	100.00

➤ *Sales Stall*

Table 9 revealed that there were 81 or 63.80% of fish vendors had practiced of cleaning the stalls and free from personal belongings and other forms of contaminants while 46 or 36.20% of fish vendors had not practiced. In this regard, researchers observed that majority of fish vendors had practiced of cleaning the stalls and free from personal belongings and other forms of contaminants for as it reflects positively on the vendor, instilling confidence in customers about the freshness and hygiene of the goods being sold. While others had not practiced for several reasons, including the fact that they have valuable belongings that must always be considered. Business permit, stall number, names of food handlers and certificate should be displayed in conspicuous place within their respective stall were practiced by 74 or 58.30% of fish vendors while 53 or 41.70% of fish vendors had not practiced. In this regard, as fish vendors stated that displaying business permits, stall numbers, names of food handlers, and certificates in a prominent place within stalls ensures regulatory compliance, and maintaining transparency

in food business operations. It supports a positive business image and contributes to overall public health and safety in food markets and establishments. While other fish vendors had not practiced because some vendors operating on tight budgets may prioritize other operational expenses over displaying requirements or documents. The sales stall is built of solid, resistant, and impermeable material with sufficient elevation to be easily cleaned and sanitized were practiced by 115 or 90.60% of fish vendors while 12 or 9.40% of fish vendors had not. In this regard, majority of fish vendors were utilized sales stall was built of solid, resistant, and impermeable material with sufficient elevation to be easily cleaned and sanitized possibly because this ensures that the stall remains in good condition over time, reducing maintenance costs and ensuring operational continuity.

All of these frequencies of sales stall were supported by Husen (2019) where fish market provided with a stall is a place where the fishes and fish products of commercial importance is subjected to sale. Therefore, the facilities for

the fish market stalls development needed such as establishing improvement of existing fish market structure, improvement of sanitation, hygienic condition, and sufficient

auction places to ensure hygiene fish supply to the consumers.

Table 9 Frequencies of Sales Stall

	Practiced		Not Practiced	
	N	%	N	%
The sales stall shall be cleaned and free from personal belongings and other forms of contaminants.	81	63.80	46	36.20
Business permit, stall number, names of food handlers and certificate should be displayed in conspicuous place within their respective stall.	74	58.30	53	41.70
The sales stall is built of solid, resistant, and impermeable material with sufficient elevation to be easily cleaned and sanitized.	115	90.60	12	9.40

➤ *Concluding Remark*

For this quantitative research, the main objective that has been conducted were to answer the objectives in this study and to conclude the level of hygiene practices among fish vendors in Panabo Public Market and to identify and recommend interventions for fish vendors to improve food safety and handling practices. Besides, a theoretical model also has been developed from the hygienic practices that have been obtained.

Rotter’s Social Learning Theory which investigating a wide range of human behavior including personal experiences confirmed that Hygienic Practices among fish vendors provides behavioral change and having a different way of practices emphasized the perspective of evaluating fish vendors personal experiences. The hygienic practices among fish vendors were observed by the researchers to ensures that fish sold by consumers were safe for consumption and reduces the risk of foodborne illnesses. Good hygiene practices not only protect consumers but also contribute to the overall cleanliness and reputation of the vendor’s business. Fish vending industry has a good growth potential both in terms of market volume and market spread. The level of hygiene practices among fish vendors were examined and observed by the researchers.

The study revealed that the level of hygienic practices based on the preceding results of frequencies and percentages of participants interviewed by researchers had the different opinions whether those practices were practiced or not and typically involved several key aspects that require interventions. Study shows several unhygienic handling practices among fish vendors were observed and there is a need to anticipate interventions for the development of hygienic practices. According from the preceding result identifying sanitary intervention must effectively utilized because some indicators of the study had not practiced and in need to have an urgency interventions to address the gap.

According to Bedane et al. (2022) basic hygiene inadequacies in fish handling procedures can be fixed through interventions. Most likely intervention strategies were training fish vendors to develop cold storage of fish, providing tongs and glove to both vendors and consumers when handling fish products, wearing clean apron during work, avoid wearing jewelries and accessories when selling fish to prevent from potential contamination. Nordhagen et

al. (2022) added that vendors and consumers will likely be more responsive to interventions that focus on issues of the quality in fresh produced, both consumers and vendors tend to speak of quality and safety.

Taken all together, the study indicates that the identified unhygienic handling practices that could be due to less maintenance of food safety regulation practices in Panabo Public Market, these calls for an urgent timely intervention to establish and maintain effective national fish quality and safety plans to ensure public safety.

**REFERENCES**

- [1]. AA, S. N., MR, A. W., Ismail, F., & Wan Zainal Shukri, W. H. (2022). Food safety culture factors that influence attitude and practices of food handlers at orphanages in Terengganu. *Asian Journal of Medicine and Biomedicine*, 6(2), 188–198.
- [2]. Alttai, N. A., Al-Sanjary, R. A., & Sheet, O. H. (2023). Isolation and molecular identification of escherichia coli strain from fish available in farms and local markets in Nineveh Governorate, Iraq. *Iraqi Journal of Veterinary Sciences*, 37(2), 431–435.
- [3]. Bedane, T. D., Agga, G. E., & Gutema, F. D. (2022). Hygienic assessment of fish handling practices along production and supply chain and its public health implications in central Oromia, Ethiopia. *Scientific Reports*, 12(1).
- [4]. Biswas, Aloke & Dasgupta, Professor Aparajita & Bhattacharyya, Sayan & Banik, Amit & Roy, Soumit & Ghosh, Pritam & Raj, Atul. (2024). Microbial Contamination and Poor Hygienic Practices among Food Handlers in a Slum of Kolkata: A Matter of Concern. 5. 45-53.
- [5]. Dasgupta, M. S., Routroy, S., & Widell, K. N. (2019). A Strategy for improved temperature control in the supply and processing stages of Surimi cold chain in India. The 25th IIR International Congress of refrigerationAt: Montreal.
- [6]. Duchaussee, Tamara & Maharaj, Rohanie. (2024). Hygienic Practices of Snow Cone Vendors and Snow Cone Quality Evaluation in Central Trinidad. 46. 102-113. 10.47412/ZDSY6668.
- [7]. Edirisinghe, S. K., Wickramasinghe, I., Wansapala, M. A. J., & Warahena, A. S. K. (2022). Adoption of hygienic practices in selected fish markets along the

- fish supply chain, in Sri Lanka. *Food Research*, 6(2), 374–382.
- [8]. Gibson Miller, J., Hartman, T. K., Levita, L., Martinez, A. P., Mason, L., McBride, O., McKay, R., Murphy, J., Shevlin, M., Stocks, T. V. A., Bennett, K. M., & Bentall, R. P. (2020, May 16). Capability, opportunity, and motivation to enact hygienic practices in the early stages of the COVID-19 outbreak in the United Kingdom. *British Journal of Health Psychology*, 25(4), 856–864.
- [9]. Grema, H. A., Kwaga, J. K., Bello, M., & Umaru, O. H. (2020). Understanding fish production and marketing systems in north-western Nigeria and identification of potential food safety risks using value chain framework. *Preventive Veterinary Medicine*, 181, 105038.
- [10]. Husen, Md. A. (2019). Fish marketing system in Nepal: Present status and future prospects. *International Journal of Applied Sciences and Biotechnology*, 7(1), 1–5.
- [11]. Kamboj, S., Gupta, N., Bandral, J. D., Gandotra, G., & Anjum, N. (2020). Food Safety and Hygiene: A Review. *International Journal of Chemical Studies*, 8(2), 358–368.
- [12]. Khuluse, D.S. & Deen, A. (2020). Hygiene and Safety Practices of Food Vendors. *African Journal of Hospitality, Tourism and Leisure*, 9(4):597-611.
- [13]. Ma, L., Chen, H., Yan, H., Wu, L. and Zhang, W., (2019), “Food safety knowledge, attitudes, and behavior of street food vendors and consumers in Handan, a third tier, city in China”, *BMC Public Health*, Vol.19, No.1, 2019, pp.1128-1140
- [14]. Macusi, E. D., Morales, I. D. G., Macusi, E. S., Pancho, A., & Digal, L. N. (2022). Impact of closed fishing season on supply, catch, price and the fisheries market chain. *Marine Policy*, 138, 105008.
- [15]. Molina, V., Sison, O., Medina, J. R., Ayes, C. N., Joe, J. A., & Balizario, V. (2021, June 30). Water, Sanitation and Hygiene Practices in the Philippines: Meeting National and Global Targets at the Local Level. *Journal of Environmental Science and Management*, 24(1), 1–14.
- [16]. Noor, S., Tajik, O., & Golzar, J. (2022). Simple Random Sampling. *International Journal of Education & Language Studies*, 1(2), 78-82.
- [17]. Oliveira, R. S., Rodrigues, M. J., & Henriques, A. R. (2021). Specific hygiene procedures and practices assessment: A cross-sectional study in fresh fishery product retailers of Lisbon’s traditional food markets. *Foods*, 10(8), 1805.
- [18]. Pilamala Rosales, A., Linnemann, A. R., & Luning, P. A. (2023). Food Safety Knowledge, self-reported hygiene practices, and street food vendors’ perceptions of current hygiene facilities and services - an Ecuadorean case. *Food Control*, 144, 109377.
- [19]. Sheng, L., & Wang, L. (2020). The microbial safety of fish and fish products: Recent advances in understanding its significance, contamination sources, and Control Strategies. *Comprehensive Reviews in Food Science and Food Safety*, 20(1), 738–786.
- [20]. Terefe, G., & Walelegne, M. (2024). Effect of feeds and hygienic practices on milk production and its nutritional and microbiological quality. *CABI Reviews*.
- [21]. Tong Thi, A. N., Kittirath, P., Abiola, S. D., Doan Duy, L. N., & Cong Ha, N. (2021). Evaluation of street food safety and hygiene practices of food vendors in can tho city of Vietnam. *Current Research in Nutrition and Food Science Journal*, 9(1), 158–171.
- [22]. Tsironi, T. N., & Taoukis, P. S. (2018). Current practice and innovations in Fish .Packaging. *Journal of Aquatic Food Product Technology*, 27(10), 1024–1047.
- [23]. Visnuvinayagam, S., Murthy, L. N., Parvathy, U., Jeyakumari, A., Adiga, T. G., & Sivaraman, G. K. (2019). Detection of multi drug resistant bacteria in retail fish market water samples of Vashi, Navi Mumbai. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, 89(2), 559–564.
- [24]. Wijaya, H., Dien, H. A., Tumbol, R. A., & Mentang, F. (2024). Good fish handling techniques to maintain the quality of catch from ship to consumer. *Jurnal Ilmiah PLATAX*, 12(2), 13–21.