

Assessing the health conditions of fish shops in some municipalities of Greater Tripoli (Tripoli Center – Souq al-Jum'a – Tajoura) Exploratory field study

Altaher Abdulwahid Aljeheimi¹, Saleh Mohammed Bieki², Fatima Ramadan Al-kawan³

¹ Department of Life Sciences, Faculty of Arts and Sciences, University of Al-Merget Gasr Al-Akhyar, Libya

² Department of Food Sciences, Faculty of Agriculture, Bani Waleed University, Libya

³ Department of Life Sciences, Faculty of Arts and Sciences, Qasr Al-Akhyar, Al-Marqab University, Libya

*Email: taheraljhime@gmail.com

تقييم الأوضاع الصحية لمحلات بيع الأسماك في بعض بلديات طرابلس الكبرى (مركز طرابلس – سوق الجمعة – تاجوراء): دراسة ميدانية استكشافية

الظاهر عبد الواحد الجهيمي¹، صالح محمد بيكي²، فاطمة رمضان محمد الكاوان³

¹ قسم علوم الحياة، كلية الآداب والعلوم، جامعة المرقب – قصر الأخيار، ليبيا

² قسم علوم الأغذية، كلية الزراعة، جامعة بني وليد، ليبيا

³ قسم علوم الحياة، كلية الآداب والعلوم، قصر الأخيار، جامعة المرقب، ليبيا

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Abstract

This study aimed to assess the health conditions of fish shops in several municipalities of Tripoli (Tripoli Center, Souq al-Jum'a, and Tajoura). A field survey was conducted using a standardized health assessment form covering general hygiene, fish storage methods, availability of water and sanitary equipment, employee adherence to health regulations, and sales and cleaning practices. Data was collected from 30 shops (10 in each municipality) and then analyzed descriptively and comparatively. The results showed a clear disparity in the level of health compliance among the municipalities. Tripoli Center recorded the highest overall rating, followed by Tajoura, while Souq al-Jum'a had the lowest average compliance, particularly regarding employee personal hygiene and waste disposal. The study recommends strengthening health monitoring, intensifying training programs, and standardizing assessment criteria to improve fish safety and protect public health.

Keywords: Food safety, fish, health conditions, fish shops, Tripoli municipalities.

المخلص

هدفت هذه الدراسة إلى تقييم الأوضاع الصحية لمحلات بيع الأسماك في عدد من بلديات طرابلس (مركز طرابلس، سوق الجمعة، وتاجوراء). أجريت دراسة ميدانية باستخدام استمارة تقييم صحي موحدة شملت النظافة العامة، وطرق حفظ وتخزين الأسماك، وتوفير المياه والمعدات الصحية، ومدى التزام العاملين باللوائح الصحية، بالإضافة إلى ممارسات البيع والتنظيف. تم جمع البيانات من 30 محلاً (10 محلات في كل بلدية)، ثم تحليلها بصورة وصفية ومقارنة. أظهرت النتائج وجود تفاوت واضح في مستوى الالتزام الصحي بين البلديات. سجلت بلدية مركز طرابلس أعلى تقييم عام، تلتها تاجوراء، بينما سجلت سوق الجمعة أقل متوسط للالتزام، خاصة فيما يتعلق بالنظافة الشخصية للعاملين والتخلص من النفايات. توصي الدراسة بتعزيز الرقابة الصحية، وتكثيف البرامج التدريبية، وتوحيد معايير التقييم بهدف تحسين سلامة الأسماك وحماية الصحة العامة.

الكلمات المفتاحية: سلامة الغذاء، الأسماك، الأوضاع الصحية، محلات بيع الأسماك، بلديات طرابلس.

introduction:

Fish and fish products are among the most prominent and important food sources, possessing high nutritional and biological value due to their content of easily digestible proteins, essential unsaturated fatty acids, particularly omega-3 fatty acids, fat-soluble vitamins, and trace minerals necessary for human health. Numerous studies have confirmed that regular and healthy fish consumption can contribute to the prevention of cardiovascular diseases, improve nervous system function, and support mental development, especially in children. Furthermore, it plays a significant role in boosting immunity and overall health (FAO,2020).

Despite their nutritional importance, these fish are classified as highly perishable due to their high water content, enzymatic activity, and soft muscle tissue, making them a suitable environment for the growth of spoilage microorganisms and foodborne illnesses. It has been observed that the risk of microbial and chemical contamination of fish generally increases if good hygiene practices are not followed during the various stages of handling, from fishing or farming, through transportation and storage, to retail sale (Huss Et al, 2017).

Fish retail outlets are among the most sensitive links in the food supply chain, given their direct contact with both the fresh product and the end consumer. The World Health Organization indicates that a significant proportion of food poisoning cases in developing countries and elsewhere are linked to unsanitary practices during the final stages of food handling, particularly in traditional markets and open-air shops that often lack adequate hygiene infrastructure or regular monitoring (WHO, 2019).

Hygiene standards in fish shops encompass several interconnected elements, most notably the shop's general hygiene program, fish storage and refrigeration methods, the availability of potable water sources, the cleanliness of display and cleaning equipment, employees' adherence to personal hygiene practices, and proper waste disposal methods. (The Codex Alimentarius Commission) has emphasized these standards Any defect in any of these elements could lead to fish contamination and the transmission of pathogens to the consumer, posing a direct threat to public health (The Codex Alimentarius Commission 2011).

In major cities like Tripoli, fish shops vary considerably in size, organization, equipment, and staff experience. Compliance with health regulations also differs across municipalities, depending on the efficiency of regulatory bodies, the frequency of inspections, and the level of health awareness among shop owners and employees. This variation leads to significant differences in the quality and safety of the fish sold, necessitating regular field assessments to monitor health conditions and analyze the variations between different areas.

Regional and international studies have shown that poor personal hygiene practices among fishmongers, such as not washing hands regularly or not using personal protective equipment, are among the most important sources of microbial contamination of fresh fish (Al-Kholy et al, 2018) Poor management of organic waste within markets also leads to environmental degradation, attracts insects and rodents, and increases the likelihood of contaminants being transferred to the food on display(Mensah et al, 2018).

In this context, the Food and Agriculture Organization of the United Nations emphasizes that improving food safety in local markets depends not only on developing infrastructure, but also requires strengthening human capacities through continuous training, disseminating a culture of good hygiene practices, and standardizing assessment and control criteria across different regions (FAO,2020) The World Health Organization also stressed the importance of adopting a comprehensive preventive approach that combines official oversight with the individual responsibility of workers in the fresh food handling sector (WHO,2019).

At the local level, scientific studies assessing the health conditions of fish shops in Libya remain limited, particularly comparative studies between different municipalities within major cities. The lack of such studies hinders the development of effective regulatory policies based on reliable scientific data. Hence the importance of this study, which aims to assess the health status of fish shops in selected municipalities of Greater Tripoli (Tripoli Center, Souq al-Jum'a, and Tajoura) through an exploratory field study using a standardized health assessment form and a descriptive comparative analysis highlighting the strengths and weaknesses of health practices.

This study seeks to contribute to bridging the knowledge gap in this field, and to support regulatory bodies and decision-makers with accurate scientific information that helps improve the level of safety of fish offered, and reduce the health risks associated with its trade, which will positively impact the protection of public health and the promotion of local food security.

Study objectives:

1. Assessing the health conditions of fish shops in the municipalities of Tripoli Center, Souq al-Jum'a, and Tajoura.
2. Comparison of the level of compliance with health requirements among the municipalities under study
3. Identifying the most significant shortcomings in health practices within fish shops.
4. To provide practical and applicable recommendations for improving food safety.

Importance of the study:

The importance of this study lies in the fact that:

It provides a scientific database on the health status of fish shops in the city of Tripoli.

It contributes to supporting and developing health monitoring and inspection programs.

It helps raise health awareness among shop owners and employees.

It contributes to protecting the consumer from health risks associated with fish contamination.

Steps and method of operation:

The study adopted the descriptive-analytical approach and was carried out according to the following steps:

1. Conducting field visits to fish shops in the three municipalities.
2. Using a standardized health assessment form that included specific axes, with each axis given an assessment score.
3. (30) shops were randomly selected, with (10) shops for each municipality.
4. Data were entered into tables and analyzed descriptively, with comparisons made between municipalities.

Results:

The health assessment data were analyzed using descriptive statistics, where arithmetic means and percentages were calculated for each axis of the health assessment, and then a comparison was made between the three municipalities.

The results showed that the overall arithmetic mean for health assessment scores was 82% in Tripoli Central Municipality, compared to 68% in Souq al-Jum'a Municipality and 75% in Tajoura Municipality. This disparity indicates varying levels of adherence to health requirements among the municipalities.

The analysis also showed that the fish preservation and refrigeration axis achieved the highest overall average of (83%), while the personal hygiene of worker's axis recorded the lowest average of (58%), indicating that it is the most prominent weakness in the food safety system.

Table (1): Statistical comparison of the level of compliance with health practices in fish shops by municipality (%)

No	Axis	Tripoli %	Souq al-Juma %	Tajoura %	overall average
1	General cleanliness of the shop	85	70	80	78
2	Fish preservation and refrigeration	90	75	85	83
3	Display and cleaning tools	80	65	75	73
4	personal hygiene of employees	65	50	60	58
5	Waste disposal	75	60	70	68

Source: Prepared by the researcher based on data from the field study (2026).

This table illustrates the quantitative differences in health compliance levels among municipalities. Descriptive statistical comparisons revealed a clear advantage for Tripoli Central Municipality across most areas, with the highest average scores in all evaluation criteria. In contrast, Souq al-Jum'a Municipality ranked last, particularly in the personal hygiene and waste disposal area, which may reflect weak health monitoring or limited training.

Table (2): Distribution of fish shops according to the level of general health compliance

No	Level of commitment	Tripoli No/Percentage	Souq al-Juma No/Percentage	Tajoura No/Percentage
1	Good	6 (60%)	2 (20%)	4 (40%)
2	intermediate	3 (30%)	5 (50%)	4 (40%)
3	Weak	1 (10%)	3 (30%)	2 (20%)

Table (2) shows that the majority of shops in Tripoli municipality fall within the category of good compliance, while the percentage of weak compliance is higher in Souq al-Juma.

Table (3): Indicators of adherence to personal hygiene among employees

No	Index	Tripoli %	Souq al-Juma %	Tajoura %
1	Wear gloves	60	45	55
2	protective clothing	65	50	60
3	Regular handwashing	70	55	65

Table (3) shows that the personal hygiene axis is the weakest axis in all municipalities, which represents a direct health risk factor.

Table (4): Availability of sanitary infrastructure for a fish shop

No	Standard	Tripoli %	Souq al-Juma %	Tajoura %
1	Pure water source	85	70	80
2	refrigerators and ice	90	75	85
3	Specialized cleaning tools	80	65	75

The data in Table (4) indicates a clear disparity in the availability of health infrastructure, which is directly reflected in the level of safety of the fish on offer.

Discussion of results:

The results of the descriptive statistical analysis show that the level of compliance with health regulations in fish shops in the municipalities of Tripoli ranges from average to good, with clear descriptive differences between the municipalities studied. This variation reflects differences in the level of implementation of health requirements, the effectiveness of oversight, and the degree of individual compliance among employees in these shops.

Tripoli Central Municipality recorded the highest average scores across most health assessment criteria, particularly in fish storage and refrigeration, general store hygiene, and display and cleaning equipment. This superior performance can be attributed to the high level of regular health inspections, the availability of qualified inspection personnel, and the concentration of relevant administrative institutions within the municipality, all of which contribute to enhanced adherence to health regulations. These findings align with the FAO (2020) report indicating that the effectiveness of local control systems is a crucial factor in improving food safety in traditional markets.

In contrast, the Souq Al-Jumah municipality showed the lowest averages across all assessment criteria, particularly in the personal hygiene of workers and waste disposal, indicating a clear deficiency in the implementation of (Good Hygiene Practices). This deficiency is a major risk factor for fish safety, given the pivotal role of human activity as a direct source of contamination. This finding aligns with the results of the study by Al-Kholy et al. (2018), which confirmed that workers' failure to wear personal protective equipment is associated with higher microbial loads in fresh fish offered for sale.

The results also showed that the fish preservation and refrigeration component achieved the highest overall average compared to the other components, indicating that shop owners recognize the importance of temperature control as a fundamental means of maintaining fish quality. This finding aligns with the (Codex Alimentarius Commission's 2011), which affirmed that effective refrigeration is the first line of defense against the growth of pathogenic microorganisms in fish and fish products.

On the other hand, the poor adherence to proper waste disposal practices, particularly in the Souq al-Jum'a municipality, poses a dual health and environmental risk. Its negative impact extends beyond fish quality to the surrounding environment, increasing the likelihood of attracting insects and rodents. The World Health Organization (WHO, 2019) has confirmed that poor food waste management in traditional markets is a major factor contributing to the spread of foodborne illnesses.

Tajoura Municipality ranked in the middle between the two municipalities, demonstrating acceptable levels in most areas, particularly in fish preservation and refrigeration. However,

the relative decline in the personal hygiene of food handlers indicates a need to strengthen health awareness programs and provide ongoing training. A study by Clayton and Griffith (2016) demonstrated that regular training programs for food handlers significantly contribute to improving adherence to hygiene practices and reducing health risks associated with food safety.

In general, the results of this study align with the prevailing trend in scientific literature, which emphasizes that fish safety in traditional markets depends on the integration of three key elements: efficient health monitoring, adherence to personal hygiene practices by workers, and the proper application of handling and display practices. The differences observed between municipalities also reflect the need to standardize health monitoring mechanisms and evaluation criteria to ensure improved food safety and the protection of public health.

Conclusions:

There is a clear disparity in health indicators among the three municipalities studied.

Tripoli Central Municipality outperformed the other municipalities in most health assessment criteria.

A noticeable weakness was recorded in the personal hygiene of workers and the disposal of waste, especially in the municipality of Souq Al Jumaa.

Fish preservation and refrigeration is the most committed aspect among the evaluation axes, reflecting a relative awareness of its importance.

The results confirm that improving infrastructure alone is not enough to ensure fish safety without strengthening the human and training aspect.

Recommendations:

Intensify regular health inspections of fish shops in all municipalities.

Mandate the use of personal protective equipment and adherence to personal hygiene standards for all employees.

Implement specialized and ongoing training programs in food safety and good hygiene practices.

Standardize health assessment forms and inspection criteria across municipalities to ensure fair evaluation.

Improve waste management systems within markets to reduce health and environmental risks.

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Compliance with ethical standards*Disclosure of conflict of interest*

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