



DENNIS OSADEBAY  
UNIVERSITY

# JOURNAL OF SCIENTOMETRICS & INNOVATIONS



August, 2023

VOLUME 1 (1)



Vol. 1 (1)

Dennis Osadebay University



**DENNIS OSADEBAY  
UNIVERSITY, ASABA**

# **JOURNAL OF SCIENTOMETRICS & INNOVATIONS**

August, 2023





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Journal of Scientometrics and Innovation

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# THE PUBLIC FOOD HANDLING PRACTICES, NUTRITIONAL RELEVANCE AND THEIR IMPLICATIONS

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## Abstract-

This article investigated the practices involved in the handling of publicly available food items, their nutritional relevance with a specific focus on their nutritional implications. By conducting a comprehensive review of pertinent literature, this study aimed to explore the potential consequences of food handling practices on the overall nutritional value and safety of food items that are accessible in public settings. Employing a systematic approach, various facets of food handling and their influence on public health were analyzed. The findings of this research provide valuable insights into the significance of adhering to appropriate food-handling practices to promote optimal nutrition and mitigate potential health hazards/concerns.

**Keywords:** Food handling, public foods, nutritional implications, hygiene, safety, foodborne illnesses, contamination.

## 1.1 Introduction

The proper management and handling procedures of food in public settings are of utmost importance in guaranteeing the safety and nutritional value of the food consumed by a diverse population. Public food establishments, including restaurants, street vendors, and food festivals, are crucial in nourishing a significant portion of the population (Fusté-Forné, 2021; Gupta et al., 2019). Nevertheless, inadequate methods of handling can result in foodborne diseases and undermine the nutritional integrity of said items (Doyle, 1994; Barjaktarović-Labović et al., 2018). The primary objective of this article is to examine the correlation between food handling practices in public settings and their potential influence on nutrition. This analysis is based on a comprehensive review of relevant scholarly literature. The management methods employed in food handling in public settings constitute a complex network that plays a central role in the contemporary food system. These practices significantly impact the nutritional value and safety of the food supply, which is accessible to a wide range of individuals. Public food settings, including restaurants, food stalls, and cultural gatherings, play a crucial role in nourishing and diverse gastronomic encounters for individuals from

various backgrounds (Kam et al., 2017). Nevertheless, the methods utilized in the processing, preservation, and dissemination of these food products possess a two-fold nature, as they can either protect the nutritional content or pose potential hazards to the well-being of the general population.

Public food handling practices ensure food safety, but there are possible microbial contaminants and cross-contaminating agents that need cautious consideration. Bacterial threats such as *Salmonella* and *Escherichia coli* are often linked with undercooked meats, with cross-contamination occurring through shared utensils and surfaces (Grant et al., 2016; Erickson et al., 2015). Viruses like *Norovirus* constitute a risk through contaminated water and food, emphasizing the need for proper hand hygiene. Parasites such as *Toxoplasma gondii* and *Cryptosporidium* may contaminate meats and fresh produce, necessitating thorough washing and proper cooking. Molds like *Aspergillus flavus* may produce aflatoxins on nuts and grains, requiring vigilant storage practices. Cross-contaminating agents include improper hand-washing and polluted surfaces, while chemical contaminants like pesticides and herbicides, as well as food additives, can also pose health risks (Anjum, 2020).

Furthermore, allergens must be managed to





especially for individuals with allergies. Awareness of these potential hazards and adherence to proper food handling practices are crucial to safeguard public health and prevent the implications of foodborne illnesses (Taniwaki et al., 2020; Simbine et al., 2019).

Food handling practices in public settings have gained significant importance in today's fast-paced society, where dietary choices are often influenced by convenience. The field of literature has shed light on the complex and interconnected relationship between these activities and the dietary health of individuals. Consuming food products that have compromised nutritional quality has adverse effects on individual health and presents significant societal challenges.

A rich tapestry of research endeavors has illuminated the exploration of this intricate relationship. Barjaktarović-Labović et al., (2018) and Faour-Klingbeil et al., (2021) drew attention to the startling prevalence of suboptimal hygiene practices within public food establishments, revealing a need for more adherence to proper hand-washing protocols. This study underscored how inadequate hand hygiene can pave the way for foodborne illnesses, compromising the nutritional intake of consumers while precipitating a cascade of health concerns. Al-Mohaithef et al., (2021) contributed to this discourse by unveiling the stark consequences of temperature mismanagement during food handling in public settings. Their work unveiled that improper temperature control not only imperils the structural and sensory attributes of foods but also acts as a catalyst for bacterial proliferation. These findings underscored the need to consider nutrient degradation and the potential hazards posed by bacterial contaminants.

The implications of handling practices extend beyond the confines of immediate nutrition. The investigation of Moretro et al., (2021) delved into cross-contamination, shedding light on how careless food preparation practices can engender the unintended transfer of allergens and pathogens. As elucidated by Ortiz et al., (2018) such oversight can have far-reaching consequences, exacerbating food allergies and intolerances, thereby significantly influencing the nutritional choices available to individuals with specific dietary needs. As this study embarks on a comprehensive analysis of the handling practices of public foods,

it is imperative to heed the lessons gleaned from these studies. The interconnectedness between food handling, nutrition, and public health underscores the necessity for a holistic understanding of this domain. Through rigorous exploration and meticulous examination, we endeavor to unravel the nuanced tapestry of handling practices and their profound nutritional implications.

The importance of adhering to appropriate food handling practices to preserve nutritional quality and ensure a thorough examination of the current body of literature underscores safety. The prevalence of inadequate food handling practices in public food establishments and the consequent risks of foodborne illnesses have been emphasized in studies conducted by Tan et al., (2014) and Papadopoulou et al., (2012). The practices above, namely insufficient hand hygiene and inadequate temperature regulation, can potentially result in bacterial contamination and degradation of nutrients.

Furthermore, a study by Ferreira et al., (2019) underscored the possible ramifications associated with cross-contamination in food preparation and service within public environments. The potential consequence of this phenomenon is the transmission of detrimental microorganisms, which can ultimately hurt the health and nutritional status of individuals who consume the affected products (Bouayad et al., (2015). Furthermore, the study by Ajala et al., (2010) sheds light on the significance of inadequate handling methods for food allergies and intolerances. This underscores the importance of exercising careful and precise food handling techniques to mitigate adverse reactions.

### 3.0 Materials and Methods

The study examined the nutritional outcomes of public food surveillance using a systematic approach following PRISMA guidelines. The study focused on research conducted in Nigeria to provide a comprehensive view of public food security practices in the last decade, spanning the period 2012 to 2022. Its relevant position in the literature was based in Delta State, Nigeria.

**Literature search and database selection:** Scholarly databases were thoroughly searched to





Identify relevant studies. Databases selected include PubMed, ScienceDirect, and Google Scholar. These databases were chosen because of their comprehensive coverage of the scientific literature, covering topics related to food handling, nutritional quality, and safety in public foods.

**Inclusion criteria:** Inclusion criteria aimed at selecting research articles examining food management practices in public spaces. Articles published within the specified timeframe (2012)–(2022), which focused on food consumption, nutrition, and safety in public food systems were included.

**Design and data extraction:** The study adhered to PRISMA guidelines by using its framework for systematic review. PRISMA guidelines were followed for study identification, analysis, eligibility, and inclusion. The framework helped ensure transparency and credibility in the review process.

**Author and citation analysis:** Highly qualified contributing authors were identified through thorough citation analysis. The authors were considered key contributors to the understanding of public food management and its nutritional consequences. Utilizing this systematic approach, the study aimed to provide a rigorous and comprehensive assessment of public food management practices and nutritional possibilities, based on studies published over the past decade.

A review of the selected literature revealed a range of findings on the different approaches to food delivery in public spaces. A study by Doyle (1994) found that food handlers exhibit inconsistent hand hygiene practices, which have been identified as prominent factors in foodborne illness. A study by Al-Mohaithef et al., (2021) highlighted the importance of following proper thermal management practices to prevent nutrient degradation and the spread of bacteria. The issue of cross-contamination has been evident in the public food environment, as highlighted by Ortiz et al., (2018), who highlighted potential risks associated with the transfer of allergenic pathogens during food preparation.

Neira et al., and her colleagues (2021) conducted a study focusing on adverse effects of cross-exposure in individuals with dietary restrictions. This study highlighted the importance of preventing unintended allergens.

#### 4.0 Results

The results of the investigation are presented in Tables below.

**Table 1: Types of Public Foods and Handling Practices**

Food Type	Common Handling Practices
Fresh Fruits	Washing, Peeling, Cutting
Cooked Meals	Cooking, Serving, Reheating
Bakery Products	Baking, Displaying, Packaging
Salad Bar Items	Assembling, Refrigeration, Hygiene Practices
Dairy Products	Refrigeration, Packaging, Handling Containers

The above table elucidated on the various food types and their handling practices. Fruits were handled by washing, peeling and cutting, while cooked meals were handled by cooking, serving and reheating. Furthermore, bakery products were handled by baking, displaying and packaging, while dairies were packaged in containers and refrigerated. The nutritional content and values of food depends on the process of handling.

**Table 2: Nutritional Content of Fresh Fruits**

Fruit	Calories (kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)
Apple	95	25	0.5	0.3	4
Banana	105	27	1.3	0.4	3.1
Orange	62	15	1.2	0.2	3.1
Grapes	69	18	0.6	0.2	0.9
Watermelon	30	7.6	0.6	0.2	0.4



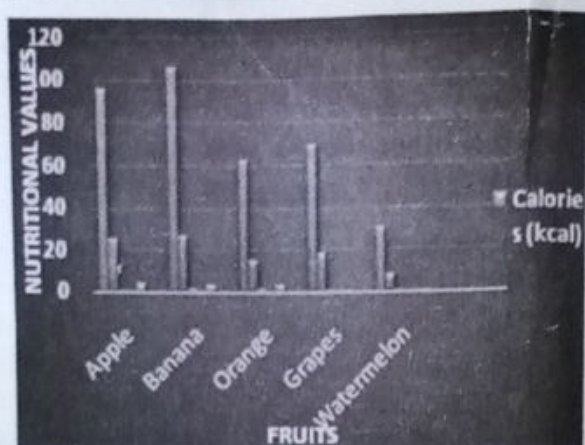


Fig.2.0 Nutritional Content of Fresh Fruits

Fig.2.0 shows the nutritional composition of various fresh fruits. Banana contained the highest amount of calories, carbohydrates, protein and fat content than the other fruits analyzed. Apple was next ranked in nutrient content while water melon recorded the least values. This presentation revealed the nutritional implications of consuming different fresh fruits, highlighting their varying contributions to daily dietary intake.

Table 3: Nutritional Content of Cooked Meals

Meal	Calories (kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)
Spaghetti Bolognese	320	45	15	8	3
Chicken Stir-Fry	250	20	30	10	5
Vegetable Curry	180	30	8	5	7
Beef Stew	300	25	20	15	6
Lentil Soup	150	25	8	2	9

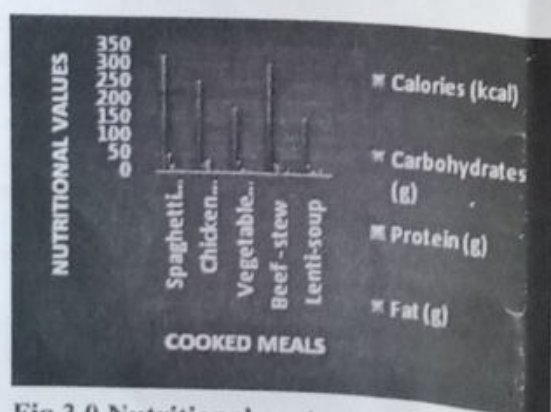


Fig 3.0 Nutritional content of cooked meals.

Fig.3.0 showcased the nutritional content of different cooked meals. Spaghetti bolognese recorded the highest amount of calories and carbohydrates in this category with 320k/cal and 45g respectively, followed by beef stew with 300 k/cal and carbohydrate 25g. Lentil soup recorded the least calorie content. The amount of protein, fat and fiber was variable among the cooked meals. By analyzing the distribution of nutrients in these meals, the graph presented insights into the nutritional implications of consuming different types of cooked dishes.

Table 4: Nutritional Content of Bakery Products

Product	Calories (kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)
Croissant	231	19.6	4.1	15.0	1.0
Baguette	240	49.0	8.0	1.0	2.0
Muffin	426	50.0	5.0	23.0	1.0
Danish Pastry	352	37.0	5.0	22.0	1.0
Croissant	231	19.6	4.1	15.0	1.0

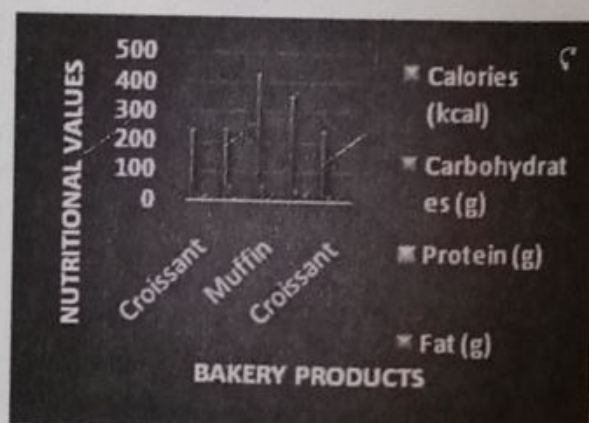


Figure 4: Nutritional Content of Bakery Products

Fig. 4 show bakery products and their nutritional content. The bakery products were generally high in calorie values. Muffin recorded the highest value (426 k/cal), followed by danidhpastery with 352 k/cal. Muffin was also high in carbohydrate and fat. The bakery products recorded comparatively low values of protein, fats and fiber. The utilization of grouped bars facilitated the convenient comparison of nutritional profiles among bakery items during that period.





Through an analysis of the nutrient distribution in the products above, the graph provided valuable insights into the nutritional consequences of consuming bakery foods.

**Table 5: Nutritional Content of Salad Bar Items**

Item	Calories (kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)
Lettuce Salad	15	2.0	1.0	0.2	1.0
Chicken Salad	220	15.0	20.0	8.0	3.0
Pasta Salad	180	30.0	5.0	3.0	2.0
Caesar Salad	150	7.0	5.0	12.0	3.0
Tuna Salad	250	10.0	25.0	15.0	2.0

The table above illustrates the nutritional composition of the items available at the salad bar. The table allowed for a convenient juxtaposition of nutritional profiles among items in the salad bar. Tuna salad and chicken salad were high in calories, carbohydrate, protein, fat and fiber. Lettuce salad was least in nutritional contents. Through the evaluation of the nutrient distribution in these food items, the table provided valuable insights into the nutritional consequences associated with decision-making at salad bars.

### 5.0 Discussion

The findings of the systematic review highlight the critical importance of applying appropriate food handling practices to maintain the nutritional quality and safety of public foods. Inadequate observance of hygienic procedures and inappropriate use of temperature controls destroy nutritional value of food and the issue of cross-contamination of contaminants, especially allergens with health is at greater risk for individuals who consume such substances. The implications of these findings have broader implications that extend beyond immediate health concerns. Regular visits to public food facilities put their food intake at risk and may lead to foodborne pathogens.

Additionally, social impacts include the economic burden from health costs associated with treating foodborne illnesses and the broader impact of impaired public health.

### Conclusion

In conclusion, this article highlights the important relationship between public food processing and nutritional outcomes. Evidence suggests that poor food handling practices can threaten the safety and nutritional value of food served in public places. Proper hygiene, temperature control, and strict adherence to diarrhea control are essential to reduce these risks and promote good nutrition. By recognizing the importance of preventive dietary practices and their impact on the importance of public health, we can create an environment that guarantees safe and beneficial access to nutritious foods for all.

### Recommendations

Flowing from the analysis of food types, handling practices, and nutritional content, it is recommended to adopt a well-balanced and varied approach to dietary choices. When handling fresh fruits, hygiene practices should be prioritized through thorough washing, peeling, and cutting, while being mindful of the nutritional variations among fruits, with bananas being a higher-calorie option. In the collection of cooked meals, handlers of public foods should diversify choices and be aware of their distinct nutritional profiles, especially noting the higher calorie and carbohydrate content in dishes like spaghetti bolognese and beef stew. Caution should be exercised with bakery products, bearing in mind their generally elevated calorie values, particularly in muffins and danish pastries. Salad bar items should be included in meal selections for their lower-calorie content. It is important to stress the importance of following healthy food handling practices to ensure safety and minimize potential health risks associated with the consumption of public foods.

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