Food Hygiene Practices and Environmental Exposure: Microbial Safety Assessment of Foodstuffs Sold at Ngwa Road Market, Aba, Nigeria

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Abstract
This study evaluates the food hygiene practices and environmental exposure contributing to microbial contamination of foodstuffs sold at Ngwa Road Market, Aba, Nigeria. A total of 50 food samples—including fresh produce and ready-to-eat items—were randomly collected and analyzed for total viable bacterial counts and presence of pathogenic microorganisms (Escherichia coli, Salmonella spp., and Staphylococcus aureus). Concurrently, vendor hygiene practices and environmental factors were assessed using structured questionnaires and observations. Results showed microbial loads exceeding recommended safety limits, with 40%, 22%, and 35% contamination rates for E. coli, Salmonella spp., and S. aureus respectively. Poor hygiene practices and environmental exposure, such as proximity to open drains and waste disposal sites, were significant contributors. The findings highlight critical gaps in food safety at Ngwa Road Market and the urgent need for regulatory enforcement and hygiene education to reduce public health risks.

Keywords: *Food hygiene, Microbial contamination, Environmental exposure, Food safety, Ngwa Road Market, Aba, Nigeria*

Introduction

Foodborne illnesses remain a significant public health concern worldwide, particularly in developing countries where food markets serve as primary sources of nutrition but often lack adequate sanitary standards. Microbial contamination of foodstuffs is a common cause of foodborne disease outbreaks. Ngwa Road Market in Aba, Nigeria, is a major commercial hub for fresh produce, grains, and ready-to-eat foods. However, poor hygiene practices and environmental factors such as open drainage, waste accumulation, and exposure to dust pose contamination risks.

Literature Review

Microbial contamination in urban markets is well-documented, often attributed to poor hygiene practices, lack of infrastructure, and environmental exposure. Nigerian studies report frequent contamination with pathogens like E. coli, Salmonella spp., and S. aureus. The WHO emphasizes hygiene training, better sanitation, and regular monitoring as preventive strategies.

Materials and Methods

The study employed a cross-sectional design involving both microbiological analysis and observational assessment. Sampling was carried out over a 4-week period in March 2025. A total

of 50 food samples—including leafy vegetables, tomatoes, maize, rice, and ready-to-eat items such as meat pies and akara—were randomly collected using sterile sampling techniques. Each sample was placed in sterile polyethylene bags and transported in an icebox to the microbiology laboratory at Abia State College of Health Science and Management Technology, Aba, for immediate processing.

For microbiological analysis, standard plate count techniques were employed to determine the total viable bacterial counts. Selective media including MacConkey agar, Salmonella-Shigella agar, and Mannitol Salt agar were used for isolation of Escherichia coli, Salmonella spp., and Staphylococcus aureus respectively. Biochemical tests including catalase, coagulase, TSI, and indole were used for confirmation of bacterial isolates.

Structured questionnaires were administered to 50 food vendors to assess their hygiene practices. Observational checklists were used to evaluate environmental conditions surrounding vending stalls—such as proximity to drainage, presence of waste, and pest infestation. Data were analyzed using SPSS version 25 and microbial counts were compared with WHO permissible limits.

Results

Microbial loads exceeded safe limits in many samples. 40% contained E. coli, 22% Salmonella spp., and 35% S. aureus. Ready-to-eat foods had the highest contamination. Only 40% of vendors practiced regular handwashing, while 70% operated near open drains. Waste accumulation and pest presence were also common.

Discussion

These results highlight significant food safety concerns. Contamination likely stems from inadequate hygiene practices and environmental exposure. Compared to similar Nigerian markets, findings are consistent. Interventions such as improved training and stricter hygiene enforcement are urgently needed.

Conclusion

Foodstuffs sold at Ngwa Road Market are significantly contaminated, posing health risks. Effective control measures, including hygiene training, infrastructure improvement, and regulatory oversight, are needed to ensure food safety.

Recommendations

- Implement hygiene education for food vendors
- Improve sanitation and waste disposal systems
- Introduce regular microbial monitoring
- Promote protective gear usage by vendors
- Increase government regulation and oversight

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Tables

Table 1: Microbial contamination levels of foodstuffs sampled at Ngwa Road Market (CFU/g)

Food Type	Total Viable Count (CFU/g)	E. coli (%)	Salmonella spp. (%)
Fresh vegetables	1.5 x 10^6	45%	20%
Fruits	2.3 x 10^5	25%	10%
Grains	5.8 x 10^5	30%	30%
Ready-to-eat items	8.7 x 10^7	55%	40%

Table 2: Vendor hygiene practices and environmental conditions at Ngwa Road Market

Practice/Condition	Percentage Observed (%)
Consistent handwashing	40%
Use of gloves/aprons	25%
Stalls near open drains	70%
Presence of flies/pests	65%
Waste accumulation near stalls	80%