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WORKPLACE SANITATION AND INFRASTRUCTURE IN FOOD ESTABLISHMENTS: EVIDENCE FROM KHARTOUM LOCALITY

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ABSTRACT----------
Background: *The sanitary conditions and infrastructure of food establishments play a vital role in maintaining food safety and preventing contamination.*
Objective: *This study evaluated the sanitation practices and infrastructural adequacy of food preparation environments in Khartoum Locality, Sudan.*
Methods: *A cross-sectional observational study was conducted in (2020) among (34) food establishments, including restaurants, and cafeterias. Data were collected using structured checklists adapted from Codex Alimentarius guidelines, focusing on kitchen cleanliness, waste disposal, ventilation, water supply, and pest control.*
Results: *Only (26.5%) of establishments met basic sanitation standards. Potable water was available in (97%] of sites, while proper waste disposal facilities were present in (55.9%). Ventilation was adequate in (64.7%), and signs of pest infestation were observed in (85.3%) of establishments.*
Conclusion: *The study revealed substantial deficiencies in workplace sanitation and infrastructure in Khartoum Locality, which may contribute to food contamination and foodborne disease outbreaks.*
KEYWORDS: *Sanitation, Infrastructure, Food Safety, Food Establishments, Sudan----------*

1. INTRODUCTION

Workplace sanitation and infrastructure are critical determinants of food safety and quality. Globally, inadequate environmental hygiene in food preparation areas is linked to a significant proportion of foodborne disease outbreaks (World Health Organization [WHO], 2015). Proper design, maintenance, and cleanliness of facilities—including adequate ventilation, potable water, and pest control—reduce the risk of microbial contamination (FAO/WHO, 2009). In many low- and middle-income countries, including Sudan, food establishments often operate without compliance to sanitation regulations due to limited resources, lack of monitoring, and informal food vending practices (Barro et al., 2007). This creates environments where food can easily be contaminated by pathogens from water, surfaces, equipment, or pests (Mensah et al., 2002).

This study investigates the sanitation and infrastructural status of food preparation areas in [Khartoum Locality] to provide evidence for policy interventions aimed at improving public health outcomes.

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Global Evidence on Workplace Sanitation

Research from multiple regions has established the importance of infrastructure in preventing foodborne illnesses. Todd et al. (2007) reported that inadequate water supply, poor waste management, and pest infestations are recurrent factors in outbreaks. The Codex Alimentarius emphasizes that food preparation environments must be designed to facilitate proper cleaning, prevent cross-contamination, and minimize pest harborages (FAO/WHO, 2009).

Regional Context in Africa

In sub-Saharan Africa, studies have highlighted widespread deficiencies in food establishment infrastructure. In Burkina Faso, Barro et al. (2007) found that over 60% of food vending sites lacked access to clean water and had poor waste disposal systems. Similarly, Muyanja et al. (2011) in Uganda reported inadequate ventilation, poor drainage, and high pest prevalence in open-air food markets.

Local Evidence from Sudan

In Khartoum State, previous assessments revealed that many restaurants and street vendors lack adequate sanitation facilities, including water supply and pest control measures (Abdalla et al., 2012). The absence of structural regulations for small-scale food establishments contributes to unhygienic food environments.

MATERIALS AND METHODS

A cross-sectional observational study was conducted from [month, year] to [month, year] in [Khartoum Locality], Sudan. A total of [n] food establishments—comprising restaurants, cafeterias, and street vendors—were selected using stratified random sampling.

Data were collected using a **structured sanitation checklist** adapted from Codex Alimentarius food hygiene guidelines. Variables included:

- **Water supply** (potable vs. non-potable, availability)
- **Waste management** (presence of covered bins, frequency of disposal)
- **Ventilation** (natural/mechanical, adequacy)
- **Surface cleanliness** (walls, floors, equipment)
- **Pest control** (evidence of rodents, insects)

Observations were made during operating hours. Data were analyzed using SPSS version [X], with descriptive statistics to summarize sanitation indicators.

RESULTS

- **Water Supply:** (97%) of establishments had access to potable water.
- **Waste Disposal:** (44.1%) had covered bins; (67.7%) disposed of waste at least once daily.
- **Ventilation:** Adequate ventilation was present in (64.7%) of establishments.
- **Cleanliness:** (61.8%) had visibly clean preparation surfaces; (52.9%) had floors free of debris.
- **Pest Control:** Evidence of pest infestation was found in (85.3%) of sites, with rodents and cockroaches most commonly reported.

DISCUSSION

The results demonstrate significant sanitation and infrastructure deficiencies across food establishments in Khartoum Locality, consistent with findings from similar African contexts (Barro et al., 2007; Muyanja et al., 2011). The lack of potable water in a notable proportion of establishments compromises hygiene practices such as handwashing, utensil cleaning, and food rinsing.

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Poor waste management and inadequate ventilation not only increase the risk of contamination but also create favorable conditions for pests. The observed pest infestations highlight the urgent need for integrated pest management in food establishments.

Inadequate sanitation infrastructure poses a serious public health risk, particularly in urban areas with high population density and reliance on street foods. Policy measures should include enforcement of minimum sanitation standards, provision of water and waste facilities, and training for food handlers on maintaining hygienic environments.

CONCLUSION

Sanitation and infrastructure conditions in food establishments in [Khartoum Locality] are inadequate, with significant risks for food contamination. Strengthening regulatory oversight and investing in infrastructure improvements are essential steps toward ensuring safer food environments.

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