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Microbial Analysis of Street Food in Demerara-Mahaica, Guyana

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Abstract

Street food is vital in global culture's economic, social, and nutritional aspects. However, as is typical among developing countries, various factors combine to compromise the safety of these foods, leaving residents susceptible to exceptionally high levels of microbial contamination. Chief among the numerous approaches and steps developed and employed to improve this situation is a clear understanding of the existing and potential extents of pathogens found in street foods. This is particularly true in jurisdictions like Guyana, where street food vending is unregulated. Therefore, this study investigated the microbiological safety of night street foods in the Demerara-Mahaica region of Guyana, focusing on contamination levels and demographic factors associated with street food contamination. Ninety food samples were collected and analyzed for Aerobic Plate Counts (APC), coliforms, and the presence of pathogens like Salmonella and Staphylococcus aureus. The study found a high prevalence of unacceptable APC levels and a relatively low prevalence of unacceptable coliform limits. No Salmonella was detected, and S. aureus was found at minimal levels in one of the food samples. These findings, while indicating significant public health risks related to lapses in food handling, also point to the need to improve food safety through comprehensive interventions that reduce contamination risks and safeguard public health. Recommendations include establishing the regulatory authority for food safety, making food safety standards mandatory, improving vendor training, enhancing infrastructure, and improving access to clean, potable water.

***Keywords**: Aerobic Plate Counts, Coliform Levels, Food Safety, Guyana, Microbial Contamination, Street Food.*

Introduction

Street food plays a vital role in residents' daily lives in Demerara-Mahaica, Guyana, providing convenient, affordable, and culturally significant nutrition. It also serves as an economic activity, providing a source of daily sustenance to many citizens at various stages of the food chain. However, the safety of these foods is frequently compromised due to inconsistent food handling practices, environmental contamination, and inadequate regulatory oversight. In regions like Guyana, where street foods are a staple, these safety concerns are exacerbated by informal vending conditions that promote the proliferation of harmful microorganisms, posing a severe public health risk in settings already burdened by foodborne diseases. It is crucial for all involved- public health officials, policymakers, researchers, and stakeholders- to take action to safeguard public health.

Globally, foodborne illnesses continue to present a significant public health challenge. According to the World Health Organization [1], nearly 600 million people – about one in ten – become ill each year from consuming unsafe foods, with around 420,000 deaths resulting from foodborne diseases. Children under the

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age of five are disproportionately affected, accounting for 40% of this burden. Diarrheal diseases are the most common form of foodborne illness caused by bacteria, viruses, parasites, or harmful chemicals in contaminated food [1, 2]. In Guyana, the coastal region of Demerara-Mahaica is especially vulnerable to food safety issues. It is the most densely populated part of the country, flood-prone due to its low elevation, and faces environmental and sanitation challenges. Seasonal flooding associated with high precipitation exacerbates these challenges, complicating efforts to maintain proper hygiene and increasing the risk of food contamination, particularly with informal food vending.

Despite street food's prominence in Guyana's culture and economy, the sector remains largely unregulated. Street food vendors frequently operate without proper food safety training, leading to inconsistent food storage, handling, and preparation practices that contribute to microbial contamination. While internationally recognized food safety standards, such as those outlined by Codex Alimentarius and the U.S. Food and Drug Administration (FDA), emphasize proper food handling and hygiene to prevent contamination, Guyana lacks robust alignment with these standards. However, to address this gap, Guyana has undertaken an assessment of its national food control system using the FAO/WHO Food Control System Assessment Tool. Beginning in January 2022, this nearly two-year assessment was conducted to evaluate the effectiveness of existing food safety systems and provide guidance for future improvements.

Efforts to regulate street food in Guyana began with the adoption of the Grenadian Standard, GDS 3 – Part 2: 1993, "Code of Practice for Street-Vended Foods," by the Guyana National Bureau of Standards (GNBS), and its approval by the National Standards Council in 2004. This voluntary standard was designed to assist regulatory agencies in monitoring street foods. Additionally, the Food Safety Act of 2019 was introduced to strengthen food safety regulations; however, its implementation has been delayed, as the Guyana Food Safety Authority (GFSA), the body responsible for enforcing the Act's provisions, has not yet been fully established. As a result, the enforcement of food safety laws remains fragmented and under-resourced, leaving food vendors without clear regulatory guidance. The absence of mandatory enforcement also leaves significant gaps in food safety, particularly in ensuring compliance with local and international standards.

Microbial analysis of street food is crucial for assessing the safety and quality of the foods vendors sell. Testing for harmful pathogens and evaluating overall microbial load provide insights into the effectiveness of current and potential food safety practices. Identifying key risk factors contributing to food contamination in Demerara-Mahaica can guide the development of targeted interventions to mitigate risks. Addressing the microbial contamination of street foods in Demerara-Mahaica is critical to improving public health outcomes. By aligning food safety practices with international standards and implementing effective monitoring and enforcement mechanisms, Guyana can safeguard its population, particularly its most vulnerable groups, from the risks posed by unsafe food.

While several interventions can address microbial contamination in street food, the most effective approach is a comprehensive one that combines vendor training, strengthened regulatory enforcement, and improved infrastructure. Food safety training and education interventions have been shown to significantly improve food handler knowledge, which can reduce microbial contamination risks [3]. Additionally, the enforcement of food safety regulations is essential, as evidenced by countries with strong regulatory frameworks. Moreover, improving infrastructure, such as ensuring access to clean water and refrigeration, can further mitigate contamination risks.

A notable gap in the literature is the lack of data on the safety of foods sold by street vendors at night in Guyana. Night street vending remains unregulated, and there is no available monitoring data for vendors operating during these hours. This study is the first to focus on microbial risks associated with night street foods in Demerara-Mahaica. The lack of regulatory oversight and microbial analysis in this context makes this research particularly important, as it aims to provide insights into a previously unstudied segment of the food market. By addressing this gap, the study offers novel findings that can inform public health interventions and contribute to improving food safety practices in Guyana.

Several studies have highlighted key factors contributing to contamination. Research shows that street food vendors often lack sufficient knowledge of food safety practices [3, 4], leading to unsanitary conditions that promote microbial contamination. In a study conducted in Silchar, India, it was found that the bacteriological quality of ready-to-eat street food was alarmingly poor, with bacterial loads ranging from 4.5 × 10^5 to 1.12 × 10^6 CFUs, posing a significant risk of foodborne illnesses [5]. Similarly, in Kathmandu, Nepal, coliform presence in street food indicated unsanitary conditions, underscoring the connection between poor hygiene and microbial contamination [6]. Another study in Kathmandu reinforced this, finding that many street food vendors lacked proper hygiene knowledge, increasing contamination risks during food preparation and handling [7]. This trend of inadequate hygiene practices among street food vendors was noted in multiple studies [8], suggesting a widespread issue across various regions.

Pathogens such as *Salmonella* and *Staphylococcus aureus* in street food have been documented in various contexts [9]. In Morelia, Mexico, poor hygienic practices among street food vendors were linked to the presence of foodborne pathogens in fresh-squeezed orange juice [10]. A study in Dhaka, Bangladesh, identified contamination of street food with *E. coli* and *Salmonella*, posing a significant public health threat [11]. Similarly, in Harare, Zimbabwe, dried fish samples were found to be contaminated with *Salmonella* and *E. coli* [12], highlighting the global nature of microbial contamination in street foods [13]. Notably, some studies reported the absence of *Salmonella* in food samples and this provided an opportunity to learn from such contexts with better contamination control [14].

The prevalence of *Staphylococcus aureus* in street food is particularly concerning due to its association with foodborne illnesses. An evaluation of fast-food establishments in Kaduna, Nigeria, revealed a high incidence of foodborne pathogens, including *Staphylococcus aureus* and *Salmonella*, which are known to disrupt normal cellular activities and lead to serious health complications [15]. Similarly, a study in Ethiopia highlighted the dominance of *Staphylococcus aureus* and *E. coli* in street foods, reinforcing the notion that these pathogens are prevalent across various street food contexts [16]. More so, the presence of antibiotic-resistant strains of these bacteria further exacerbates the public health risks. For example, antimicrobial resistance was detected in bacterial isolates from street foods in Hawassa, Ethiopia [17].

Regulatory frameworks for street food vending are often inadequate, leading to a lack of enforcement of food safety standards. For example, a study conducted in Mexico found that the policies governing street food were found to be poorly focused on domestic markets, putting residents at risk [18]. This is reflected globally in findings that point to the presence of coliforms and *E. coli* in street foods, indicative of faecal contamination, and highlighting the need for improved sanitation measures [19]. Socioeconomic factors also play a crucial role in shaping food safety practices.

Regular surveys are necessary to identify emerging food safety issues as socio-economic conditions significantly impact food safety practices among street food vendors [20]. Moreover, the role of consumer awareness in mitigating the risks associated with street food consumption cannot be overstated. Consumers often prioritize convenience over safety, which may contribute to the persistence of unsanitary practices among vendors [21]. Public health interventions aimed at educating both vendors and consumers about food safety practices are paramount. Such interventions could include training programs for vendors on proper food handling and hygiene, and public awareness campaigns to inform consumers about the risks associated with consuming contaminated street food.

The studies reviewed here indicate that street food contamination is a global issue, but it can be addressed through a combination of vendor training, improved infrastructure, stronger regulatory frameworks, and public health interventions. In Guyana, assessing the extent of microbial contamination in street foods is the first step toward developing effective, context-specific strategies for reducing contamination risks and improving food safety. This study focused on the microbial risks associated with night street foods in Demerara-Mahaica, Guyana, and aimed to provide a framework for improving food safety practices in the region, ensuring the community's well-being. By understanding the microbial risks associated with these foods, stakeholders can work towards implementing effective measures that align with international food safety standards. After all, "unsafe, unhealthy, unregulated, unmonitored food poses a high risk to anyone" [18].

Materials and Methods

This study employed a quantitative cross-sectional approach to investigate the prevalence of microbial contaminants in night street foods in Demerara-Mahaica, Guyana. On the one hand, this was accomplished through a survey that captured data regarding three questions: Where are night street foods being sold? What is sold as night street foods? Who are the vendors of night street foods? On the other hand, microbial analyses were carried out on food samples sold by night street food vendors to assess the extent of food contamination.

Study Area

Demerara-Mahaica is one of ten administrative regions in Guyana. Based on land area, it is among the smallest regions; however, it has the highest population density, and the capital city, Georgetown, is included. While no other cities exist in this region, many communities have active nightlife, including street food vending. These communities, together with the city, formed the study area.

Sampling and Survey Data

The unregulated nature of night street food vending in Demerara-Mahaica posed a significant challenge. With no existing vendor listings, we had to resort to convenience sampling. This method allowed us to select vendors operating during our data collection period from April 01 to June 30, 2024. 104 vendors were selected from 14 communities outside the city and 18 locations in the city. Considering that the vendors were actively involved in their trade, interviews were found to be less disruptive. The questions were based on observations and the demographics part of a questionnaire administered for a more extensive study. The survey captured vendors' gender, age, ethnicity, education, country of education, experience as food handlers, food safety training status, and location.

Monitoring and Food Samples

A team of 36 people collected the data. These included Environmental Health Officers, Environmental Health Assistants, Veterinary Public Health Inspectors, Inspectors from the Government Analyst Food and Drug Department (GA-FDD), and Meat and Food Inspectors. Their collaboration ensured the comprehensive and timely collection of samples for this survey. This paper forms part of a more extensive study for which ethical approval was obtained (See Appendix).

For that period, sample collection occurred on Thursday, Friday, Saturday, and Sunday evenings between 18:00h and 24:00h. All samples consisted of meat-based food items obtained in their original serving containers as they would be sold to customers. Food samples were collected from 104 participating vendors. Upon collection, the samples were immediately stored on ice/ice packs in insulated containers (coolers) and transported on the same evening to the Government Analyst–Food and Drug Department (GA-FDD) Laboratory in Turkeyen, Georgetown, Region 4 (Demerara – Mahaica). Samples were then placed in cold storage at the laboratory and analyzed within 24 to 48 hours to ensure the integrity of the microbiological results. This part of the survey gathered data on the type of meat used and the results of microbial analysis.

Microbial Analysis

The laboratory analyses were conducted by Analytical Scientific Officers and Analytical Technical Assistants attached to the GA-FDD Microbiology Laboratory, the regulatory authority in Guyana.

Aerobic Plate Count (APC)

For the enumeration of total aerobic bacteria, 50g of each sample was homogenized in 450mL of Phosphate Buffer. The mixture was plated on Plate Count Agar (PCA) (BD Difco) and incubated at 35°C for 48 hours.

Coliforms

Coliform quantification was performed using 3M Petrifilm plates. 25g of each sample was diluted in 225 mL Phosphate Buffer, and 1 mL of that mixture was then pipetted onto the plates, which were incubated at 35°C for 18-24 hours. *Klebsiella aerogenes* ATCC 13048 served as the positive control for the procedure.

Staphylococcus Aureus

To detect and quantify *Staphylococcus aureus*, 50 g of each sample was diluted in 450 mL of Phosphate Buffer. The mixture was plated on Baird Parker Agar (BD Difco) supplemented with 50mL Egg Yolk Tellurite Emulsion (BD Difco). The plates were incubated at 35-37°C for 48 hours. *Staphylococcus aureus* ATCC 25923 was used as the positive control.

Salmonella spp.

Detection of *Salmonella spp.* Involved in a two-step enrichment process.

1. Pre-enrichment: 25 g of the sample was added to 225mL of Lactose Broth (BD Difco) and incubated at 35°C for 24 hours.
2. Enrichment: 0.1 mL of the pre-enrichment was transferred to 10 mL of Rappaport Vassiliadis Broth (RV) Broth and incubated at 42°C for 24 hours. Simultaneously, 1mL of the pre-enrichment was added to 10mL of Tetrathionate Broth (TT) and incubated at 35°C for 24 hours. After incubation, RV and TT cultures were streaked onto selective agars, including Bismuth Sulfite (BS) Agar, Hektoen Enteric (HE) Agar, and Xylose Lysine Deoxycholate (XLD) Agar.
3. Differential Testing: Biochemical tests were performed on suspect colonies for further differentiation - incubation at 35°C for 24-48 hours. *Salmonella diarizonae* ATTC 12325 was used as a positive control.

Data Presentation and Analysis

Excel was used to encode and store the data, while SPSS v29 software was employed in processing and generating descriptive and inferential statistics. A p-value of 0.05 was applied throughout where appropriate. The sample of 104 vendors proved inadequate in satisfying critical assumptions of statistical analyses, including ANOVA, Chi-square test of association, and regression. On the one hand, and due mainly to small sample sizes, the multiple response variables, such as 'Age' or 'Type of Meat', did not satisfy the normality of samples assumption of ANOVA nor the Chi-square assumption of high (>5) expected cell counts. On the other hand, those items with two responses, including 'Gender' or 'Training', typically showed high p-values (>0.07).

Results

First, we present the results of the 'where' and the 'what' of the night street food vending. The study captured 104 night street food vendors (NSFVs) from Demerara-Mahaica, Guyana. Over half (65.4%) of the vendors were from the city, where NSFVs operating along Sheriff Street and the seawalls produced 41.1% of those in the city. Regarding outside the city, 21.2% of all NSFVs were sampled from the East Coast of the Demerara River (east of the city), while the other 13.5% stretched along the East Bank of the Demerara River (south of the city).

While all NSFVs in the sample population were interviewed, lab results were obtained for 90 food samples. In the case of the other 14, the most common circumstance was that the submitted sample was insufficient to allow for analysis of the required parameters. The study found various meat-based street foods sold in the sampled locations, ranging from traditional fast foods like barbeque chicken to traditional home-cooked foods like mixed meat cook-up rice. Table 1 lists the types of meat included in the sampled foods. The most popular kinds of meat sampled were chicken (36.7%), sausage (20.0%), and fish (12.2%). Meat combinations and other meats accounted for 24.4% of the sampled foods.

Table 1. Meats in Sampled Foods from NSFVs

Meat	Frequency	Per cent
Sausage	18	20.0
Beef	6	6.7
Chicken	33	36.7
Fish	11	12.2
Other/Combinations	22	24.4
Total	90	100

We now draw attention to the 'who' of the night street vending in Demerara-Mahaica, Guyana. Table 2 enumerates the demographic information of the sample. Females accounted for 61.5% of the vendors. The most common age ranges for NSFVs are 26-35 and 35-45, accounting for 66.3% of the vendors sampled. Only a few vendors (4.8%) were older than 55 years. Regarding ethnicity, about 50% of all NSFVs were Africans; Spanish migrants accounted for 12.5%; East Indians, 10.6%; and mixed ethnicities, 26.0%.

Table 2. Summary Statistics about the Demographics of the Vendors

Item	Responses	Frequencies	Percents
Gender	Male	40	38.5
	Female	64	61.5
Age	18-25	13	12.5
	26-35	36	34.6
	36-45	33	31.7
	46-55	17	16.3
	56-60	3	2.9

	>60	2	1.9
Ethnicity	Africans	51	49.0
	Mixed	27	26.0
	East Indians	11	10.6
	Chinese	1	1.0
	Amerindians	1	1.0
	Spanish	13	12.5
Education (103)	Nursery	1	1.0
	Primary	10	9.7
	Secondary	73	70.9
	University	17	16.5
	Postgraduate	2	1.9
Country of Education (103)	Guyana	84	81.6
	Overseas	19	18.4
Food Handling Experience	<1 year	22	21.2
	1 to <5 years	36	34.6
	5 to <10 years	22	21.2
	>10 years	24	23.1
Food Handling Training	Yes	43	41.3
	No	61	58.7

The distribution by education reflects that 18.4% of the NSFVs have a university education, 70.9% have secondary education, and 10.7% have, at most, primary education. Regarding where they obtained their education, 18.4% were educated outside Guyana, while 81.6% were educated in Guyana. Further examination of results showed that Spanish accounted for about 50% of those educated outside Guyana. A single participant did not provide details on their education.

More than 50% of the NSFVs have less than five years of food handling experience. Similarly, over 50% have received no formal training in food handling. Notwithstanding the similarities in percentages, years of experience were not found to be significantly associated with receiving training.

Thirdly, the lab results of the food samples are presented. *Salmonella* was not detected in any of the food samples. Similarly, except for one vendor, *Staphylococcus aureus* was not detected in the sampled foods. That food sample had an *S. aureus* count of 2.6×10^2, which is considered within acceptable range. Coliform and APC were prevalent in the study, so further analyses were performed on both parameters.

Table 3 shows the summary statistics for APC and coliform. Of the 90 sampled foods from the NSFVs, APC test results were conducted and returned for 86 vendors, where the minimum and maximum counts were $<$ 1.0×10CLU/g and 5.9×10^5CLU/g, respectively. Unsatisfactory ($\geq 10^5$) levels of APC were found in the foods sold by 25.6% of the NSFVs, and 33.7% were borderline (10^3 to $< 10^5$) cases and 40.7% were found to be satisfactory ($< 10^3$). In particular, the APC was less than 2.5×10^2 In foods produced by 27.9% of NSFVs.

Tests for coliform were carried out for all 90 food samples, where the colony-forming units (CFUs) were too numerous to count in 11 cases. Further analysis for the most probable number (MPN) was done for the other sampled foods of 79 vendors. The minimum MPN values were $<$ 1.0×10CFU/g and accounted for 59.5% of all samples. The maximum value was found to be $1.5 \times fourth\ CFU/g$ Unacceptably high counts (>1000) were found in foods of 7.6% of the NSFVs, acceptable counts (100 to 1000) for 24.1%, and foods from 68.4% of the vendors proved to be within the satisfactory range (<100).

Table 3. Summary Statistics for APC and Coliform Counts

	APC		**Coliform**	
	Count	**Per cent**	**Count**	**Per cent**
Satisfactory	35	40.7	54	68.4
Acceptable/borderline	29	33.7	19	24.1
Unsatisfactory	22	25.6	6	7.6
Total	86	100	79	100
Minimum value	$< 1.0 \times 10$ CLU/g		$< 1.0 \times 10$ CFU/g	
Maximum value	5.9×10^5 CLU/g		1.5×10^4 CFU/g.	

Fourthly, we examined differences in means and strengths of associations (Chi-square test) of the APC and coliform counts against the survey items. Using the ANOVA analysis, we found that the mean values of the APC and coliform did not differ due to the responses to any of the questions in the survey. Similarly, association tests suggest no significant association between the categories of APC or coliform counts and the responses to any survey variables. Finally, the results of the APC and coliform counts were matched against each other. The scatter plot in Figure 1 illustrates no linear relationship to allow for linear regression analysis and modelling.

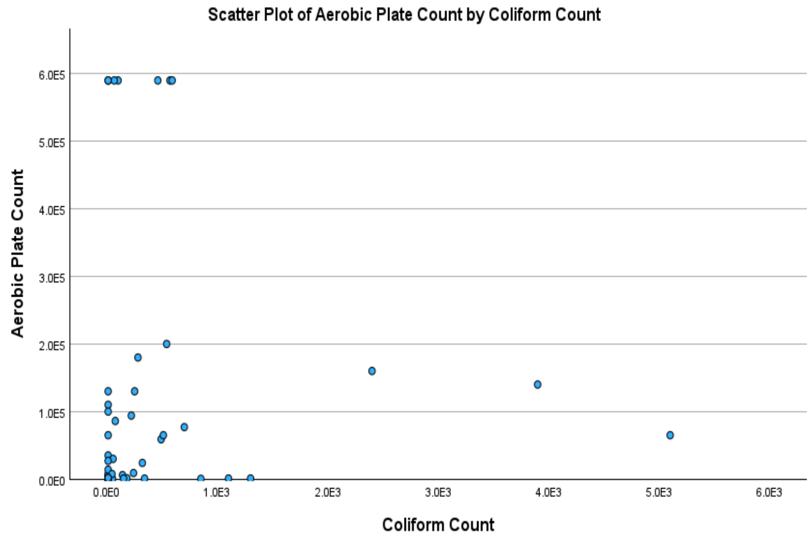

Figure 1. Scatter Plot of APC and Coliform Counts

Discussion

The study addressed the critical public health issue of microbial contamination in night street foods in Demerara-Mahaica, Guyana, focusing on its prevalence and identifying specific factors contributing to contamination. By analyzing 90 food samples and assessing vendor demographics, this research laid the groundwork for understanding the microbiological safety of street foods in the region.

The findings on aerobic plate counts (APC) highlight a pressing concern, as 25.6% of food samples had unacceptable APC levels. APC measures the overall bacterial load in food, which reflects the food's exposure to contamination and improper handling. Elevated APC counts suggest poor hygiene practices, inadequate temperature control, and prolonged exposure to environmental contaminants, making it a critical indicator of food safety. Guyana's APC rate, at 25.6%, represents a significant public health threat, especially when compared to countries with lower rates. This puts Guyana on the higher end of the spectrum, indicating serious deficiencies in street food handling and sanitation. The problem is not theoretical; contamination is present and indicates an urgent need for policy intervention.

The high APC rate suggests systemic issues in regulating and managing night street food vendors, including limited access to clean water and refrigeration, poor waste management, and lack of proper vendor training. To mitigate these issues, Guyana must implement stricter regulatory oversight, focusing on mandatory food safety training for vendors and regular health inspections. Infrastructure improvements, such as providing clean water and refrigeration facilities at vending sites, are essential for reducing microbial contamination. Without these interventions, the risk of foodborne illness will remain high.

In contrast, the coliform contamination rate was relatively lower, with 7.6% of samples exhibiting unacceptable levels. Coliform bacteria are indicators of faecal contamination and point to lapses in sanitation. While this rate is not as alarming as the APC findings, it still warrants attention. Compared to other developing regions, where coliform contamination rates are much higher [14, 22, 23]—Guyana's rate is relatively low. However, it remains above the threshold of 5%, which is considered low in some studies [23], indicating that while not a severe issue yet, it can worsen if night street food practices are not improved. However, it does not negate the urgent need for interventions to address this issue and prevent future contamination.

In summary, the 25.6% APC contamination rate calls for immediate policy intervention to address street food safety in Guyana. Vendor training, improved sanitation, access to clean water, and enhanced regulatory oversight are critical steps in preventing further contamination and protecting public health. Meanwhile, the current coliform levels require continuous monitoring and targeted interventions to prevent and actively reduce potential increases as the street food industry expands.

However, the absence of *Salmonella* in all samples and the minimal detection of *Staphylococcus aureus* in one sample diverges from findings in other regions where these pathogens are more prevalent [8, 9]. This suggests that these specific pathogens are not current threats in the night street food environment in Demerara-Mahaica. Such findings, however, warrant future research to investigate, for example, whether this is due to differences in food types, environmental conditions, or vendor knowledge, attitude, and practices.

A key finding was the lack of statistically significant associations between vendor training and contamination rates. Although more than half of the vendors lacked formal food handlers' training, no statistically significant relationship existed between training and microbial contamination. This is consistent with literature indicating that while training can improve food safety outcomes, it alone may not sufficiently reduce contamination if broader infrastructural issues, such as access to clean water and proper sanitation, are not addressed [24–26]. A more holistic approach is necessary, incorporating vendor education, regulatory oversight, and infrastructure improvements [4, 13, 24]. Implementing such comprehensive measures in

Guyana could similarly reduce contamination risks.

The lack of associations between contamination levels and vendor demographics (e.g., gender, age, and ethnicity) suggests contamination has no bounds among the vendors. Further research is required to ascertain whether other external factors, like environmental conditions and infrastructure, are more influential in determining contamination levels. The findings in other countries suggest that food contamination is shaped mainly by local environmental factors, including exposure to dust, pollution, insects, and inadequate temperature control [9, 27].

Further research is needed to address the lack of a significant linear relationship between APC and coliform counts, which complicates the interpretation of contamination patterns. This finding underscores the complexity of microbial contamination, as diverse environmental and behavioural factors may influence different types. Future studies should focus on developing comprehensive monitoring strategies that encompass multiple contamination indicators to better understand and mitigate these risks.

The regulatory framework in Guyana faces challenges like those seen in other developing nations, particularly in enforcing food safety standards. Regulatory authorities struggle to monitor many street vendors operating in urban areas like Demerara-Mahaica during the day, leading to inadequate oversight. This mirrors challenges faced in countries like Nigeria and Trinidad and Tobago, where insufficient regulatory enforcement has been linked to higher contamination rates [4, 22].

Guyana has a national standard adapted from the Grenadian Standard, GDS 3—Part 2: 1993, “Code of Practice for Street Vended Foods,” approved by the National Standards Council in 2004. However, the standard remains voluntary. It was created to assist regulatory agencies in monitoring street foods and to help vendors produce safe and wholesome products. However, its non-mandatory nature weakens its effectiveness. A technical committee is currently reviewing the standard, signalling progress, but significant regulatory gaps persist.

Moreover, the Food Safety Act of 2019, which aims to strengthen food safety regulations in Guyana, is yet to be fully implemented, primarily because the Guyana Food Safety Authority, the body responsible for enforcing the Act, has not been fully established. Food safety law enforcement remains fragmented without this crucial oversight body, and the existing regulatory framework is under-resourced and insufficient. To address these challenges, it is essential not only to implement the Food Safety Act but also to mandate the standards that govern street food. Once made mandatory, a more robust regulatory framework focused on enforcing the relevant standards would significantly enhance food safety in the street vending sector.

Further research should explore the impact of infrastructural improvements (e.g., better water access and refrigeration) on reducing microbial contamination. Longitudinal studies could also assess the effectiveness of targeted interventions like vendor training programs and stricter regulatory enforcement. Additionally, more investigation into environmental factors – such as air quality, exposure to contaminants near vending stalls, and the effectiveness of sanitation efforts – could yield more profound insights into the sources of contamination and offer strategies for reducing risks.

Conclusion

This study has provided a strong foundation for understanding the microbiological safety of street foods in Guyana. The results align with global research on food safety in developing nations highlighting that while vendor training and regulation are essential, both must be supplemented by broader improvements in enforcement to meaningfully reduce foodborne illness. In this study, no *Salmonella* was detected, and there was only one instance where *Staphylococcus aureus* was detected and enumerated at a minimal level. In contrast, higher counts of coliform bacteria and the Aerobic Plate Count (APC) point to notable microbial contamination, underscoring the need for targeted interventions to address these risks effectively.

Conflict of Interest

The authors have no conflict of interest.

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