http://foodbulletin.net

FOOD BULLETIN
e-ISSN: 2979-9848

https://prensip.gen.tr

RESEARCH ARTICLE

Identification of Food Safety Intervention Points by Application of Social Practice Theory: Case Study of Pushcart Foods

Bernard Onyekweli Ejechi[1]✉ • Eucharia Onyema Ejechi[2]

[1]Delta State University, Department of Microbiology, Abraka/Nigeria
[2]Delta State University, Department of Sociology, Abraka/Nigeria

ARTICLE INFO

Article History
Received: 21.09.2024
Accepted: 25.12.2024
First Published: 30.12.2024

Keywords
Aerosols
Coliform bacteria
Food safety
Pushcart street food
Salmonella
Social practice theory

ABSTRACT

The applicability of the sociological theory of social practice (SPT) for locating safety intervention points in street food practices was investigated. A randomly selected 100 pushcart street foods/vendors were used for the study. The practice elements enunciated in the social practice theory (materials, competence, social meaning) were identified in pushcart practices by non-participant observation and structured questionnaire. Warmer/containers, plates, dishing spoons, wash-water and food were identified as practice materials. The observed practices bothering on competence were: washing and re-use of plates, opening and closing of food containers, exposure of dishing spoons, use of non-potable wash water and environment of sales points. In order to confirm intervention points indicated by these practices, the presence of coliforms and *Salmonella* on the elements and sales points (Motor Parks, markets, workshops, construction sites) aerosols were investigated. Coliforms and *Salmonella* were isolated from the material elements in 16-64% of the pushcarts barely 4 hours after commencement of sales. The choice of sales points was influenced by satisfactory income (meaning element) despite their poor sanitary conditions. The high levels of aerosolised coliforms (2.29-3.38 log cfu/m^3) in these sales points indicated environment as an intervention point. This was corroborated by the association between coliform levels on the material elements and the environment (X^2=6.32-19.46; P=0.000-0.042). In conclusion, competence and sales environment were indicated as intervention points for pushcart food safety as supported by microbiological analyses. Thus, intervention by encouraging sales of packaged foods in pushcarts can eliminate incompetent handling, vulnerable practice materials and exposure in unsanitary environment.

Please cite this paper as follows:
Ejechi, B. O., & Ejechi, E. O. (2024). Identification of food safety intervention points by application of social practice theory: Case study of pushcart foods. *Food Bulletin*, *3*(2), 24-33. https://doi.org/10.61326/foodb.v3i2.289

1. Introduction

Street foods are common in urban areas of Nigeria as well as in many developing countries. Hawkers or vendors and food stalls constitute the street food system. The foods are sold on the streets or public places like Motor Parks, markets, construction sites and mechanic/furniture workshops. They are mostly inexpensive hence they attract a lot of patronage. However, several reports have raised concerns on the issue of safety due to food-borne diseases associated with street foods (e.g., Desye et al., 2023; Lawal et al., 2014; Ma et al., 2019; Mazi et al., 2023; Nkosi & Tabit, 2021; Okojie & Isah, 2014; Ossai, 2012). The concerns bothered on poor hygiene and sanitation, handling, exposure of food on the streets and lack of basic training on food safety measures.

The concern for the safety of street foods due to its association with high prevalence of food-borne diseases (Tuglo et al., 2021) has led to attempts at setting hygiene rules for street foods (Bamu, 2019). These rules have always been difficult to enforce. A forcible ejection from the streets (López-García,

✉ Correspondence
E-mail address: benejechi@delsu.edu.ng

2017) is most likely to always fail because the vendors are mobile and would always return. Besides, street food vendors constitute part of the informal economic sector that should not be eliminated. Thus, the difficulties associated with changing the behaviour of the street food vendors necessitated the need to consider other options for limiting the health risks associated with street foods. The social practice theory (SPT) may provide an alternative approach because it focuses on the "action" of the individual and not the individual.

Practice has been described as a multitude or line-up of human activities performed on routine or daily basis (e.g. household works, smoking, drinking, and income generating activities) that may be mutually dependent and commonly undertaken in the society (Holtz, 2014; Schatzki, 1996). These routine practices have been put together to form SPT by several workers beginning with Bourdieu (1977) and Giddens (1984). Succinctly, Reckwitz (2002), Shove et al. (2012), Holtz (2014), and Maller (2015) described social practice as an entity composed of three interconnected elements; competence or know-how, social meaning and materials. Social meaning involves motivation and the aim of the practice, know-how or competence implies practical knowledge of the protocol or procedure to carry out the practice while materials are the tools and equipment involved in the practice (Heidenstrøm, 2022). Studies of social practice are based on these elements as it occurs and interwoven in the specific practice or actions of the individuals and not on the individual (actors). The task before researchers would therefore be to identify the elements in the practices that are vulnerable to hazards for the purpose of intervention.

SPT researchers have mainly focused on public health especially health risk behaviour such as smoking, alcohol use, diet, physical activity, sexual behaviours, physician visits, medication adherence, screening and vaccination (Conner & Norman, 2017). Meier et al. (2018) posited: "in contrast to the heavily resourced science investigating individual behaviour, practice theory offers an alternative framing that recognizes the importance of fellow human beings, material objects, the affordances of equipment, infrastructural settings, spatial layouts of contexts or the temporal sequences which steer performances of practice". Thus it provides the framework for interventions by targeting the elements for changes, re-arrangement and modification or disruption of the connections between elements. The take home from this brief overview of SPT is that targeting the elements and their interplays for intervention can ultimately and potentially lead to health and safety benefits. Although SPT has been applied in some investigations on food safety, (Ejechi & Ejechi, 2020; Ejechi et al., 2023) it is yet to be fully extended to other food services like pushcart street foods.

Pushcart foods are usually prepared at home and sold at stoppage points along streets or pushed to markets, Motor Parks, workshops, construction sites and schools. The "journey direction" of the pushcarts is usually influenced by patronage hence some of the final sales-points may be located in poor sanitary environment where customers are plentiful. The material elements of the pushcart practices may therefore be exposed to contamination; and this may be worsened if the interconnecting competence and meaning elements do not forestall the exposure of the material elements to contaminants. It is therefore necessary to use SPT to identify practices that expose pushcart foods to contamination and how they are interconnected. The vulnerable practices(s) would be subsequently tested for microbial contamination for confirmation as potential intervention points. The study was therefore designed to ascertain the potential of the "material, competence and meaning practice elements" enunciated by SPT, to locate intervention points for ensuring the safety of pushcart street foods.

2. Materials and Methods

2.1. Selection of Pushcart Food Vendors

Although pushcarts move along the streets in neighbourhoods, it is easier to find them in four major locations (motor parks, markets, workshops and construction sites). Thus 5 pushcarts from each of the 4 major sales points were randomly selected from 5 major towns (Asaba, Agbor, Ughelli, Warri and Sapele) in Delta State, Nigeria. This brought the total numbers of pushcart that were studied to 100. Background characteristics of the pushcart vendors such as age, gender and education were obtained via one-on-one interview by trained research assistants after obtaining their verbal informed consents.

2.2. Identification of Practice Elements in Pushcart Services

The surveillance method of non-participation observation was adopted for identifying the material elements and competence in pushcart food service practices. Competence elements included hygienic handling of food and sales materials (plates, dishing spoons, wash water, warmer/food containers, and cutleries) and the sanitary condition of their major sales points. They were assessed by visual observation. The assessment of sanitary environment was based on: presence of waste dumpsites; blocked drainages; and dusty environment within 50m radius of the sale points. Hygienic handling competence was confirmed by the counts of total coliform bacteria and the presence of *Salmonella*. in food and on material elements. The assessment of the meaning element was based on the frequency of patronage by customers (sometimes/most of the time) and pushcart vendors' income generation (satisfactory/not satisfactory).

2.3. Determination of Total Coliform Bacteria and Presence of *Salmonella*

For the purpose of indicating the presence and source(s) of contaminants, laboratory tests for coliform bacteria in food, plates, spoons, drinking water and wash-water were conducted. Preliminary observation had showed that rice was sold by all pushcarts, which indicated its popularity hence it was used to test vulnerability of pushcart food to contamination. The rice meal was purchased after preparation or before sales commenced and later after 2 and 4 hours of sales and subsequently tested for coliform counts. The swab/rinse method with MacConkey agar (MA) was used to enumerate coliforms on the surfaces of plates, dishing spoons and cutleries following oral permissions granted by the vendors. Unused plates and plates washed for re-use were swabbed. The above procedure was repeated with respect to the detection of *Salmonella* using Bismuth Sulphite agar medium. Airborne coliform bacteria in the sales locations were enumerated by the settling plate technique where MA plates were exposed on a table at 1m above the ground for one hour. The Millipore membrane (0.20 µm pore) filter method on MA was used for the enumeration of coliforms in the wash water. All plates were incubated for 24-48 hours at room temperature (30±2°C) before the colonies that appeared were counted (coliforms) while *Salmonella* was recorded as either present or absent.

2.4. Data Analyses

The relationship between coliform counts in pushcarts rice meal, wash-water or plates and the sanitary condition of the sales points (within vicinity of dumpsites, drainages and dusty environment) was analysed with chi square statistics (SPSS version 21). Standard total coliform counts' permissible limits ($\leq$10 cfu/g/cm^2/100ml) was used to analyse the safety status of the food and material elements based on a dichotomy of below/above permissible limits. The Omeliansky formula (Awad & Mawla, 2012) was used to compute the population of the airborne coliforms ($N = 5a \times 10^4 (bt)^{-1}$ where: N = cfu/m^3; a = number of colonies/plate; b = dish square cm; t = exposure time in minutes).

3. Results

The pushcart vendors were entirely females and were mainly 31-50 years in age (Table 1). None of them had tertiary education while less than 15% had no education (Table 1). Vendors with primary education were slightly more than those who attended secondary schools (Table 1). The materials associated with the pushcart food services and food types are presented in Table 2.

Table 1. Socio-demographic characteristics of pushcart street food vendors.

Variables		***N*=100**	**%**
Gender	Male	0	0.0
	Female	100	100
Age	20-30	17	17
	31-40	42	42
	41-50	31	31
	>50	10	10
Education	None	12	12
	Primary	48	48
	Secondary	40	40
	Tertiary	0	0.0

Table 2. Identified material elements used by pushcart vendors based on non-participatory observation.

Food service activities	**No of Pushcarts involved (*N*=100)**		
		n	**%**
Drinking water source	From pushcart	66	66
	Nearby shops	34	34
Types of drinking water	Sachets	96	96
	Bottles	4	4
Water for washing plates and cutleries	None	23	23
	Carried in pushcart	43	43
Type of service	From nearby taps at sales point	34	34
	Take-away packs	17	17
Types of food sold	Pushcart plates/cutleries	83	83
	Customers' plates/cutleries	25	25
	Rice	100	100
	Beans	85	85
	Moimoin (bean pudding),	70	70
	Fried plantain,	67	67
	Yam	58	58
Keeping food warm with:	Warmer containers	82	76
	Stove (gas, kerosene, coal)	08	08
	None	10	16

Majority of the pushcarts carried drinking water which was mainly from sachets (Table 2). Water for washing plates and cutleries were either carried in the pushcarts or were obtained from nearby bore holes (Table 2). The table further showed that most of the pushcart vendors serve food with their own plates while a markedly lower number of customers came to purchase food with their own plates. Sales with take-away packs were minimal (Table 2). Maintaining food warmth with warmers was markedly more frequent than using portable stoves while a negligible number of pushcarts had no means of keeping food warm (Table2). Although the food types sold varied, all the pushcarts sold rice (Table 2).

The indication of competence in food services is presented in Table 3, which shows that the prevalence of poor hygienic handling of plates, dishing spoons and manner of dishing food was above 70%. In addition, the use of hand gloves was minimal while borehole water was mostly used for washing plates (Table 3). The pushcart food business was meaningful to the vendors because patronage was markedly more of "most of the time" and most of them reported satisfactory income generation (Table 3). As shown in Table 4, more than half of the pushcarts in the markets and Motor Parks were in the vicinity of waste dumpsites while those in workshops and construction sites were mainly in dusty environments; only few of them were close to blocked drainage channels.

Figure 1 presents the variations of the coliform counts in rice meals tested after 2 and 4 hours sales period by sales environment. The coliform counts at 2 hours were generally low irrespective of the sales environment of the pushcarts. However, no coliform bacteria were found in the rice meals of more than half of the pushcarts at 2 hours (Figure 1). All the pushcart rice meals in the Motor Park environment were contaminated by coliforms after 4 hours of sales while 80-96% (20-24/25) of the pushcarts in the other sales environments had contaminations at varying levels (Figure 1).

Table 3. Indicators of meaning and competence elements based on respondents' responses and pushcart vendors' habits.

Practice indicators	Response options	*N*	Prevalence	
			n	%
Meaning elements		140*		
Patronage of pushcart food	Sometimes		51	36.4
	Most of the time		89	63.6
*Vendor income generation	Satisfactory		67	57.1
	Not satisfactory		33	42.9
Competence elements	NA	100**		
Washing/re-use of plates/cutleries	NA		86	86
Opening and closing of food containers	NA		83	83
Exposure of dishing spoons	NA		74	74
Use of tap/borehole water for washings	NA		78	78
Use of hand gloves	NA		11	11

*Respondents; **Pushcarts; NA, not applicable.

Table 4. Sanitary condition of the major sales points within 50m radius of pushcarts.

Sales points	No of pushcarts [n(%)] within:		
	Dusty environment	Dumpsites vicinity	Blocked drainage area
Markets (*N*=25)	9(36.0)	13(52.0)	3(12.0)
Workshops (*N*=25)	15(60.0)	6(25.0)	4(16.0)
Construction sites (*N*=25)	18(72.0)	5(20.0)	2(8.0)
Motor Park (*N*=25)	6(25.0)	14(56.0)	5(20.0)

A further analysis of the varying levels of coliform counts in the rice meals is presented in Table 5. Coliform counts below the permissible limit were encountered in almost all pushcart rice meals sold 2 hours after cooking while 16-64% of the pushcarts had counts above the limit after 4 hours (Table 5). Motor Parks had the highest number of pushcarts having rice meals with non-permissible coliform counts (Table 5).

Non-permissible coliform counts were found more in washed and re-used plates than in unused plates and it tended to be greater in Motor Park environment (Table 5). Wash-water followed the same trend with the highest in Motor Park-based pushcarts. The drinking sachet water were generally free of coliform bacteria hence it was not included in the table. *Salmonella* was detected only in rice meals sold after 4 hours and in 12.0-48.0% of the pushcarts (Table 5).

Salmonella was also detected in washed and re-used plates and wash water, but not in unused plates (Table 5). The analysis in Table 6 shows that the presence of coliform bacteria in rice meal, wash-water and washed plates except unused plates, were significantly associated with the sales environment. High

airborne coliform bacteria counts with greater population in Motor Parks and markets were encountered in the sales environments (Figure 2).

Table 5. Prevalence of pushcarts with material elements containing coliform bacteria counts below or above permissible levels and the presence of *Salmonella* as indicators of hygienic practices.

Pushcart services		**No of pushcarts involved**		
Location of pushcarts (*N*=25/location)	**Material elements**	**Coliform limit***		***Salmonella***
		Above	**Below**	
		***n*(%)**	***n*(%)**	***n*(%)**
Market	Rice[a]	0(0.0)	25(100)	0(0.0)
	Rice[b]	10(40.0)	15(60.0)	7(28)
	Plates[c]	5(20.0)	15(60.0)	0(0.0)
	Plates[d]	10(40.0)	20(80.0)	10(40.0)
	Wash water	5(20.0)	25(100)	3(12.0)
Motor Park	Rice[a]	0(0.0)	25(100)	0(0.0)
	Rice[b]	16(64.0)	9(36.0)	12(48.0)
	Plates[c]	6(24.0)	19(76.0)	0(0.0)
	Plates[d]	14(56.0)	11(44.0)	11(44.0)
	Wash water	18(72.0)	7(28.0)	7(28.0)
Workshops	Rice[a]	0(0.0)	25(100)	0(0.0)
	Rice[b]	9(36.0)	16(64.0)	3(12.0)
	Plates[c]	2(8.0)	23(92.0)	0(0.0)
	Plates[d]	11(44.0)	14(56.0)	4(16.0)
	Wash water	10(40.0)	15(60.0)	5(20.0)
Construction site	Rice[a]	0(0.0)	25(100)	0(0.0)
	Rice[b]	4(16.0)	21(84.0)	3(12.0)
	Plates[c]	6(24.0)	19(76.0)	0(0.0)
	Plates[d]	10(40.0)	15(60.0)	6(24.0)
	Wash water	8(32.0)	17(68.0)	9(36.0)

[a]2 hours, [b]4 hours after cooking; [c]unused plates, [d]washed and re-used. *Total coliform permissible limit=10 cfu/g/cm^2/100ml.

Table 6. Chi square analysis of the association between coliform bacteria counts in pushcart rice meal, wash water or plates and the sales environment.

Occurrence of Total coliforms		**Pushcarts (*N*=100) in sales environment**				
Source	**Permissible limit**	***vicinity of dumpsites (*n*=48)**	***vicinity of drainage (*n*=38)**	**dusty area (*n*=14)**	**X^2**	***P***
Rice meal	Above	30	15	10	6.319	0.042
	Below	18	23	04		
Wash water	Above	24	10	12	15.126	0.001
	Below	24	28	02		
Unused plates	Above	20	12	04	0.951	0.622
	Below	28	26	06		
Washed plates	Above	31	10	12	19.463	0.000
	Below	17	28	02		

*50m radius.

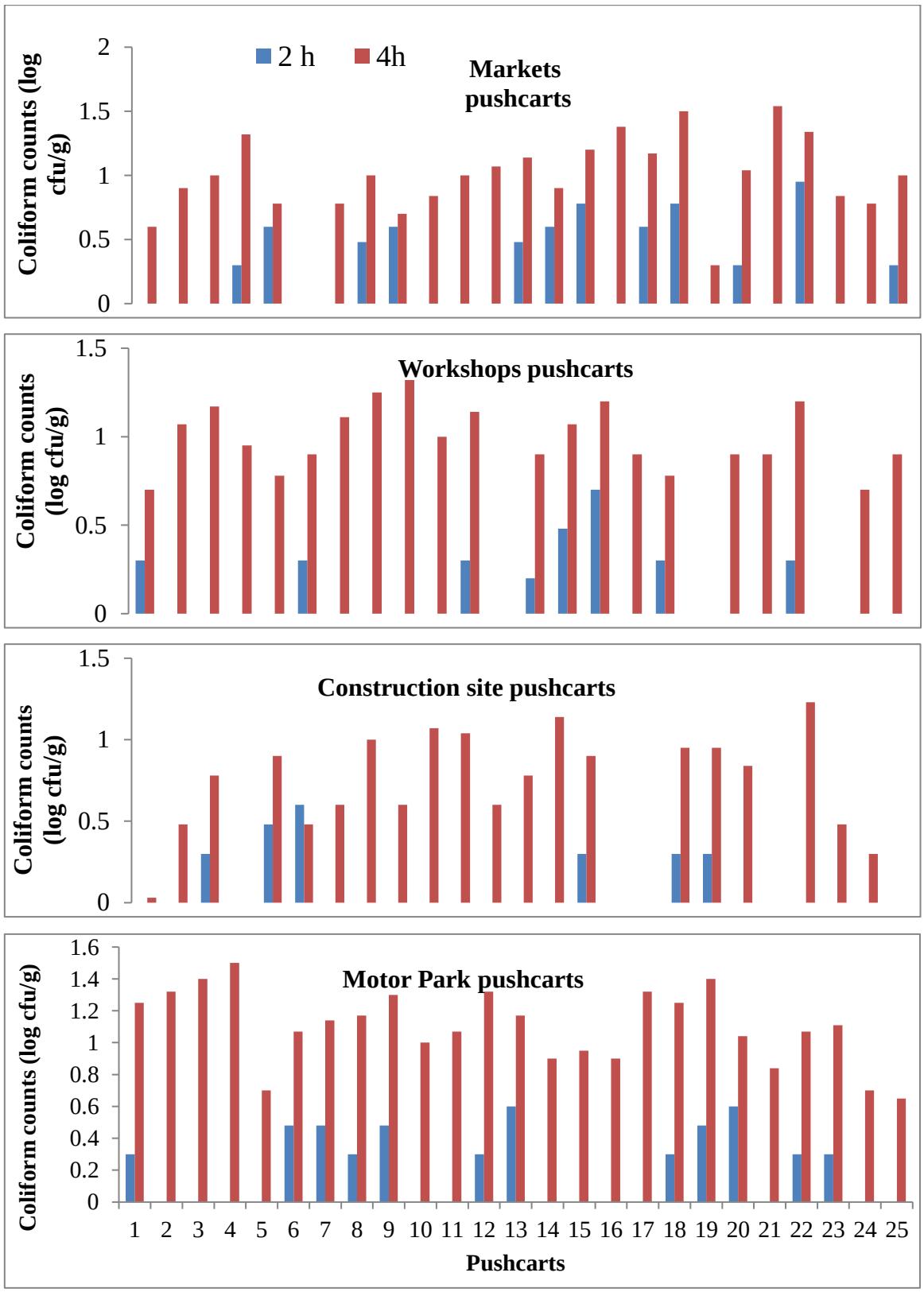

Figure 1. Trends in coliform bacterial population found in pushcarts' rice meals sold 2 and 4 hours after cooking.

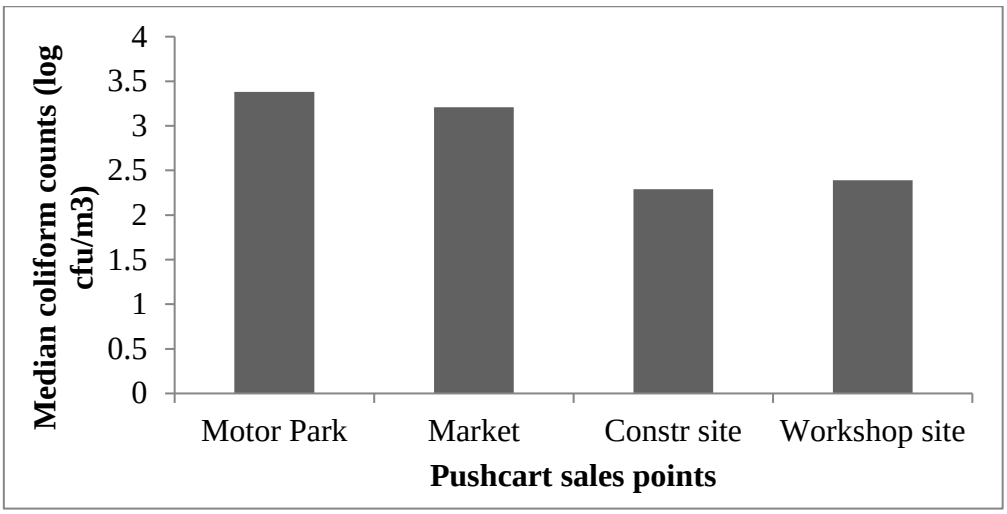

Figure 2. The population of coliform bacteria found in the air at pushcarts major sales points.

4. Discussion

The results revealed that the pushcart food practices involve material elements that are exposed to contamination as confirmed by the presence of coliform bacteria and *Salmonella.* While the presence of non-permissible levels of coliform bacteria is a danger signal, the detection of *Salmonella*, a causative agent of typhoid fever, indicates potential transmission of food-borne diseases. It is known that unhygienic practices are common with street food vendors (Desye et al., 2023). The pushcart vendors were no exceptions hence their habits of exposing food via intermittent opening and closing of warmers, use of exposed plates and dishing spoons, and the use of non-potable wash-water were not surprising. These incompetent actions therefore become potential areas for intervention as envisioned by SPT. The case for intervention at the competence level is further promoted by the dominance of women with low education in the pushcart food business. Their understanding of health-related issues is limited (Feinstein et al., 2006; Mamady, 2016) and this will make it difficult to change their handling habits especially when patronage and income are substantial. In addition, the personal hygiene of pushcart vendors cannot be easily targeted for intervention because of the low level education. There is also evidence that food handlers tend to report adherence to hygienic rules whereas they do not most of the time (Mazengia et al., 2015). Thus the available options are either to remove the implicated material elements, modify or substitute them in accordance with the vision of SPT (Meier et al., 2018).

The sanitary conditions of the sales points were generally poor as the results showed. Human traffic and wind can aerosolise microorganisms from the soil and dumpsites and the microorganisms can ultimately reach or settle on the material elements. This inference is substantiated by the high counts of airborne coliforms encountered in the sales environment. This deduction is also supported by the finding that the levels of coliform bacteria counts on the material elements were significantly associated with the sales environment. Further evidence of the involvement of airborne bacteria in the contamination of the pushcart materials comes from the finding that either few or no coliforms were present in rice meal samples until 4 hours into sales. Thus, the interconnection between the material elements and competence extends to the sales environment.

From the totality of the findings and the foregoing discussion, it is obvious that the points for intervention lie mainly in the use and handling of plates, dishing spoons and wash-water (material and competence elements) and sales environment (social meaning elements). This deduction is consistent with the expectations of SPT framework. SPT focuses on the actions of the individual and by this the pushcart vendors' practice interconnecting sequences become targets for intervention. This is also in line with SPT objectives as enunciated by Meier et al. (2018) and Heidenstrøm (2022). Intervention points may therefore be by eliminating some material elements that can disrupt the interconnecting pushcart vendors' habits that render food vulnerable to contamination. For example, sales with pre-packaged take-away food packs will remove the need for plates, dishing spoons and wash water during sales and eliminate the handling process that exposed food in the environment. The commonly sold foods as shown in Table 2 can all be easily packaged and sealed in disposable plastic containers.

The use of disposable plastic containers to package food is a common practice during celebrations (e.g. birthdays, marriages, funerals) in Nigeria. It can also be extended to pushcart street foods. Intervention in the context of the meaning elements would be to reduce patronage in sales environment where the pushcart food is vulnerable to contamination. The income reduction that will follow can compel the pushcart food vendors to move to other locations without the need for forceful ejection. This can be achieved by promoting building of

restaurants in Parks and market areas or any other crowded environment in order to divert attention from pushcart foods. However, the option of take-away pre-packaged food should be more attractive because the informal economic sector which provides income opportunities for many families need to be sustained.

It can be inferred from the outcome of this study that the potential of using SPT for pushcart food protection and possibly other street foods exists. It has always been difficult to convince people to change behaviour (Conner & Norman, 2017), especially when it involves income generation activities. Compliance with hygienic rules and food protection code of conduct would be seen as an encumbrance to income generation by street food vendors. This is further worsened by the finding that the pushcart food business is dominated by poorly educated women. Mass media enlightenment programmes or seminars on food safety are not likely to induce behavioural changes. The outcome of this study if implemented can limit cases of food-borne diseases associated with street foods and save cost. As we say in Nigeria, "prevention is better than cure",

Non-Governmental Organisations (NGO) that deal with food protection are not common in Nigeria hence the responsibility of ensuring food safety falls squarely on the shoulders of local Government or municipal Public Health Agencies. These agencies can promote patronage of pre-packaged street foods and seek subsidies for packaging materials to make them affordable to street food vendors. The public health agencies should also consider encouraging the emergence of NGOs that can promote food protection in the face of limited resources.

The outcome of this study should be applicable to other urban areas in Nigeria such as Lagos the Nigerian commercial capital located in South West region and Kano the largest commercial centre in Northern Nigeria. Pushcart street foods are numerous in Lagos and Kano where workers leave their homes for work as early as 4 am without breakfast in order to beat traffic jams. The outcome can also apply to stationary street food outlets in stalls, under large canopy trees or large umbrellas because the major difference with pushcarts is mobility. The sales environment and handling habits tend to be identical. However, investigations are still necessary for authentication.

4.1. Study Limitations

Permissions to observe kitchen cooking practices and the transfer of food to warmers or pots were generally denied. Attempts at following the pushcarts vendors to their final sales destinations were viewed with suspicion and rebuffed. Thus, pre-sales information bothering on hygienic practice in the kitchens could not be ascertained. While it is important to identify potential sources of microbial contaminants in the kitchens, the absence of such information does not really affect the reliability of the conclusions. The reason is that the absence of coliform bacteria as indicators of potential contamination in the tested rice meals at the point of commencement of sales suggests that either the cooking process eliminated microbial hazards or their entry was prevented. Thus, the data collected from the sales points was sufficient to test the applicability of SPT for pushcart food safety assurance. However, it is possible to overcome the reluctance of pushcart vendors in granting access if Public Health Agencies are empowered by law to undertake routine inspections of kitchens that serve the public. Access to kitchens by researchers may subsequently be facilitated by the Public Health Agency.

4.2. Future Research Directions

Pre-sales information is necessary in order to completely rule out any iota of doubt concerning the applicability of SPT. In order to fully assess the potential of SPT beyond pushcart foods, future studies concerning hawkers and stationary street food outlets' operators are important. It will also be interesting to extend investigations to other regions in Nigeria for the purpose of ascertaining the influence of cultural and ethnic differences in the Nigerian setting.

5. Conclusion

The SPT-based analysis revealed that pushcart vendors' practices associated with the material elements (plates, dishing spoons, wash-water and food) and handling (competence) compromised food safety. The handling practices exposed the materials to the environment, which was confirmed by the presence of coliform and *Salmonella* bacteria on the materials. The sanitary conditions of the pushcart major sale points (Motor Park, markets, workshops and construction sites) were generally poor and characterised by airborne coliform bacteria. The significant association between the occurrence of coliforms on the materials and the environment showed interconnections between materials, competence and the environment; and indicated that an intervention aimed at disrupting the interconnections can promote food safety as envisioned by SPT. Thus, the vulnerable material elements, handling and sales environment can be considered points for a disruptive intervention. This can be achieved by promoting sales of only pre-packaged food thereby limiting exposure of food and eliminating the usage/need for the vulnerable materials (plates, dishing spoons and wash water).

Acknowledgment

The authors gratefully acknowledge the fieldwork assistance of the 2018 and 2019 final year students of the Department of Microbiology, Delta State University, Abraka Nigeria.

Conflict of Interest

The authors declare no conflict of interest.

References

Awad, A. H., & Mawla, H. A. (2012). Sedimentation with Omeliansky Formula as an accepted technique for quantifying airborne fungi. *Polish Journal of Environmental Studie*, *21*(6), 1539-1541.

Bamu, P. H. (2019). *Street vendors and legal advocacy: Reflections from Ghana, India, Peru, South Africa and Thailand*. Retrieved Mar 5, 2022, from https://www.wiego.org/wp-content/uploads/2019/10/Bamhu-WIEGO-Resource_Document-14-Street-Vendors-Law-Five-Countries-2019.pdf

Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge University Press. https://doi.org/10.1017/CBO9780511812507

Conner, M., & Norman, P. (2017). Health behaviour: Current issues and challenges. *Psychology & Health*, *32*(8), 895-906. https://doi.org/10.1080/08870446.2017.1336240

Desye, B., Tesfaye, A. H., Daba, C., & Berihun, G. (2023). Food safety knowledge, attitude, and practice of street food vendors and associated factors in low-and middle-income countries: A systematic review and meta-analysis. *PLoS One*, *18*(7), e0287996. https://doi.org/10.1371/journal.pone.0287996

Ejechi, B. O., Akpomie, O. O., & Ejechi, E. O. (2023). Assessment of makeshift eateries' outdoor environment for food safety and location of potential intervention points guided by social practice theory. *International Journal of Environment and Health*, *11*(1), 1-20. https://doi.org/10.1504/IJENVH.2023.135443

Ejechi, E. O., & Ejechi, B. O. (2020). Applying social practice theory for intervention targets in health risk behavior: Case study of drinking from orifice of canned drinks. *International Journal of Health Sciences*, *8*(1), 7-14. https://doi.org/10.15640/ijhs.v8n1a3

Feinstein, L., Sabates, R., Anderson, T. M., Sorhaindo, A., & Hammond, C. (2006). What are the effects of education on health? In R. Desjardins, T. Schuller, L. Feinstein, R. Sabates & D. Campbell (Eds.), *Measuring the effects of education on health and civic engagement: Proceedings from the Copenhagen symposium* (pp. 171-172). Organisation for Economic Co-operation and Development (OECD).

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. University of California Press.

Heidenstrøm, N. (2022). The utility of social practice theory in risk research. *Journal of Risk Research*, *25*(2), 236-251. https://doi.org/10.1080/13669877.2021.1936608

Holtz, G. (2014). Generating social practices. *Journal of Artificial Societies and Social Simulation*, *17*(1),17. https://doi.org/10.18564/jasss.2333

López-García, R. (2017). Food law in Mexico: Regulatory framework and public policy strategies to address the obesity crisis in Latin America. In G. Steer & K. K. Patel (Eds.), *International food law and policy* (pp. 793-822). Springer. https://www.doi.org/10.1007/978-3-319-07542-6_33

Lawal, A., Dalhatu, G., & Ahmedu, A. (2014). A study of cleanliness and sanitary practices of street food vendors in Northern Nigeria. *Advances in Food Science and Technology*, *2*(5), 209-215.

Ma, L., Chen, H., Yan, H., Wu, L., & Zhang, W. (2019). Food safety knowledge, attitudes, and behavior of street food vendors and consumers in Handan, a third tier city in China. *BMC Public Health*, *19*, 1128. https://doi.org/10.1186/s12889-019-7475-9

Maller, C. J. (2015). Understanding health through social practices: Performance and materiality in everyday life. *Sociology of Health & Illness*, *37*(1), 52-66. https://doi.org/10.1111/1467-9566.12178

Mamady, K. (2016). Factors influencing attitude, safety behavior, and knowledge regarding household waste management in Guinea: A cross-sectional study**.** *Journal of Environmental and Public Health*, *2016*(1), 9305768. https://doi.org/10.1155/2016/9305768

Mazengia, E., Fisk, C., Liao, G., Huang, H., & Meschke, J. (2015). Direct observational study of the risk of cross-contamination during raw poultry handling: Practices in private homes. *Food Protection Trends*, *35*(1), 8-23.

Mazi, M. I., Onyeaka, H., Akegbe, H., Njoagwuani, E. I., Ochulor, C. E., Oladunjoye, I. O., Omotosho, A. D., Nwaiwu, O., Tamasiga, P., & Odeyemi, O. A. (2023). Street vended foods in Nigeria: An analysis of the current state of affairs and the way forward. *Cogent Food & Agriculture*, *9*(2), 2266194. https://doi.org/10.1080/23311932.2023.2266194

Meier, P. S., Holmes, J., & Warde, A. (2018) Social practice theory and the study of how we drink. *Addiction*, *113*(2), 217-219. https://doi.org/10.1111/add.14120

Nkosi, N. V., & Tabit, F. T. (2021). The food safety knowledge of street food vendors and the sanitary conditions of their street food vending environment in the Zululand District, South Africa. *Heliyon*, *7*(7), e07640. https://doi.org/10.1016/j.heliyon.2021.e07640

Okojie, P. W., & Isah, E. C. (2014). Sanitary conditions of food vending sites and food handling practices of street food vendors in Benin City, Nigeria: Implication for food hygiene and safety. *Journal of Environmen and Public Health*, *2014*(1), 701316. https://doi.org/10.1155/2014/701316

Ossai, S. O. (2012). Bacteriological quality and safety of street vended foods in Delta State, Nigeria. *Journal of Biology, Agriculture and Health Care*, *2*(5), 114-118.

Reckwitz, A. (2002). Toward a theory of social practices. *European Journal of Sociology*, *5*(2), 243-263. https://doi.org/10.1177/13684310222225432

Schatzki, T. R. (1996). *Social practices: A Wittgensteinian approach to human activity and the social*. Cambridge University Press. https://doi.org/10.1017/CBO9780511527470

Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice*. SAGE Publishing.

Tuglo, L. S., Agordoh, P. D., Tekpor, D., Pan, Z., Agbanyo, G., & Chu, M. (2021). Food safety knowledge, attitude, and hygiene practices of street-cooked food handlers in North Dayi District, Ghana. *Environmental Health and Preventive Medicine*, *26*, 54. https://doi.org/10.1186/s12199-021-00975-9