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Cultural and Behavioral Factors Related with Non-compliance to Hygienic Rules by Food Vendors in Primary and Secondary School in the Benoue Division - Cameroon

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Abstract

Background: Unhealthy foods containing harmful bacteria, viruses, parasites, or chemicals cause illnesses ranging from diarrhea to cancer. The objective of this study was to investigate the behavioral and cultural practices responsible for non-compliance with hygiene rules by commercial food vendors in primary and secondary schools in the Benoue division of Cameroon. Based on the results obtained, we recommend to decision-makers the need to ensure a quality diet served in schools, respect for hygiene rules and the practice of regular physical activity which both contribute to the good - cognitive and mental being of children.

Method: We conducted a descriptive cross-sectional analysis in the Benoue division of Cameroon. Quantitative and qualitative methods were used for data collection. Prospective data were collected from 172 food vendors within this locality. A well-structured questionnaire and an observation guide were used for data collection. Ethical approval was provided by the IRB of the Catholic University of Central Africa.

Results: The results show that 57% of participants were not aware of neither practiced optimal hygiene rules. More than 78.1% of the respondents did not wash their hands before serving food. Other cultural and behavioral determinants such as cleanliness, wearing of aprons, and owning a dust bin influenced vendors' respect of hygienic rules with a significance of 05% ($p < 0.05$).

Conclusion: Our findings show that cultural and behavioral determinants factors influence the practice of hygienic rules in schools. Training these minor business owners on adequate hygienic practice will optimize respect for aseptic rules

Keywords: Determinants, Food vendors, Hygiene rules, cultural and behavioral factors, Benoue Division

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1 | INTRODUCTION

The observance of food hygiene and safety by food vendors is one of the most important factors in the prevention of foodborne diseases (1). However, the inadequate knowledge of actors in the food sale industry on safe practices, storage, and manipulations of these foods exposes customers to epidemics of food poisoning (2). Healthy and quality food served in schools and regular physical activity are cited among some main basic requirements for optimum health (3). A school is a place where children spend most of their time during childhood, and exposure to unhealthy practices increases their risk of negative outcomes such as diseases, poor academic performance, and reason for school absenteeism from school (3). It is not only a space to disseminate intellectual skills, but also a place to learn healthy living habits and practices aimed to improve their qualitative output and reduce disease burden (4). Indeed, when we adopt a healthy lifestyle at a tender age, we reduce the risk of short-term and long-term pathologies with an optimized chance of increased mental development and academic performance (5). This practice reduces the child's odds of developing various health problems such as diarrheal diseases, obesity, and certain types of cancers that occur as frequent pathologies in this locality. However, hygiene and food safety remain a public health challenge (6). Children under 5 years of age carry 40% of the foodborne disease burden, with 125 000 deaths every year. Diarrheal diseases are the most common illnesses resulting from the consumption of contaminated food, causing 550 million people to fall ill and 230 000 deaths every year (7). According to the World Health Organization (WHO), approximately

1.7 billion children under the age of five years suffer from diarrhea each year accounting for more than 3 million deaths. 1/3 of this burden is related to foodborne illnesses and Africa bears the biggest burden (8). Inadequate respect for standards and hygienic procedures increase the risk of certain pathologies (9). The adoption of good quality of life in terms of hygiene optimizes the academic performance of pupil and students (10). Healthy eating requires good food hygiene, which in turn requires

compliance with and the application of hygienic guides and standards. Various epidemiological studies suggest a high prevalence of intestinal parasites in developing countries related with food quality (11). Their distribution is mainly associated with poor personal hygiene, environmental sanitation, and lack access to clean water (11). These rules must be known and respected by food vendors (formal and informal) to guarantee the best health outcomes for consumers. Through this knowledge, we still realize gaps in the respect of these measures, hence we seek to identify the cultural and behavioral determinants of non-compliance of hygiene rules by food vendors in primary and secondary schools in the Bénoué division (North Cameroon).

2 | MATERIALS AND METHODS

Informants' characteristics

The study was conducted amongst 172 participants. We had 91% of women and 9% men. Age range from 18 – 70 years. From our distribution, we have an average age of 34. Socio-demographic, cultural, and behavioral data on study informants are presented in Table 1.

2.1. Study design

We conducted a cross-sectional study in the Bénoué division of Cameroon from March to November 2016. We proceeded by a mixed-method approach (A quantitative component which comprised analyzing cultural and behavioral determinants of non-compliance by commercial food vendors and a qualitative component by using direct observation to enable us to triangulate the related practice and behavior observed). All commercial food vendors in primary and secondary schools in the Bénoué

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CULTURAL AND BEHAVIORAL FACTORS RELATED WITH NON-COMPLIANCE TO HYGIENIC RULES BY FOOD VENDORS IN PRIMARY AND SECONDARY SCHOOL IN THE BENOUE DIVISION - CAMEROON

TABLE 1: Summary of cultural and behavioral data

Variables		Frequency	Percentage (%)	Respect of hygienic rules		P-valeur
				No	Yes	
Sex	Male	15	8,72	93,3	6,7	0,008*
	Female	157	91,28	58,6	41,4	
Age	18-25	41	23,8	80,4	4,6	0,003*
	25-35	54	31,3	70	30	
	35-45	40	23,2	55	45	
	45 and more	37	21,5	46	54	
Educational level	No formal education	18	10,47	16,6	83,3	0*
	Primary	83	48,26	21,7	78,3	
	Secondary	66	38,37	63,6	36,4	
	University	5	2,91	60	40	
What's your religion ?	Christian	101	58,7	54,5	45,5	0,021*
	Muslim	71	41,3	71,8	28,2	
	No religion	0	0	,0	,0	
What's your ethnic group ?	Northerner	143	83,1	65,7	34,3	0,014*
	Southerner	29	16,9	41,4	58,6	
Do you know the energy values of the foods you sell?	Yes	80	46,5	46,3	53,8	0*
	No	92	53,5	75,0	25,0	
Have you been trained on food hygiene?	Yes	74	43,0	33,8	66,2	0*
	No	98	57,0	82,7	17,3	
Are you nails clean?	Yes	130	75,6	50,0	50,0	0*
	No	42	24,4	97,6	2,4	
Are your clothes clean?	Yes	151	87,8	56,3	43,7	0*
	No	21	12,2	100,0	,0	
Do you wear aprons?	Yes	62	36,0	32,3	67,7	0*
	No	110	64,0	78,2	21,8	
If yes, Are they clean?	Yes	57	33,1	28,1	71,9	0,017*
	No	5	2,9	80,0	20,0	
Do you cover their heads?	Yes	152	88,4	57,9	42,1	0,006*
	No	20	11,6	90,0	10,0	
Do you clean your table upon arrival?	Yes	83	48,3	37,3	62,7	0*
	No	89	51,7	84,3	15,7	
Do you use table cloths?	Yes	84	48,8	41,7	58,3	0*
	No	88	51,2	80,7	19,3	
If yes, Are they clean?	Yes	69	40,1	37,7	62,3	0,112
	No	15	8,7	60,0	40,0	
Do they have a trash can?	Yes	90	52,3	36,7	63,3	0*
	No	82	47,7	89,0	11,0	
Do they wash your hands before serving food?	Yes	48	27,9	31,3	68,8	0*
	No	124	78,1	73,4	26,6	
	Yes	44	25,6	27,3	72,7	0*
Do they wash your hands after serving their food?	No	128	74,4	73,4	26,6	
Is there water clean?	Yes	124	72,1	49,2	50,8	0*
	No	48	27,9	93,8	6,3	
Is the workplace clean?	Yes	115	66,9	47,8	52,2	0*
	No	57	33,1	89,5	10,5	
Are the dishes/cups clean?	Yes	79	45,9	27,8	72,2	0*
	No	93	54,1	90,3	9,7	
Is the container clean?	Yes	112	65,1	48,2	51,8	0*
	No	60	34,9	86,7	13,3	

* statistically significant variables

division aged over 18 who freely and voluntarily gave their consent were enrolled in the study.

2.2. Population

All persons who selling food in the primary and secondary schools were source population of the study

2.3. Eligibility Criteria All food vendors of

2.4. Sample Size Determination and Sample Procedures

The Bénoué division was stratified by district (12 districts). We randomly sampled 3 districts for our investigation. First, the exhaustive list of schools (primary and secondary) in these 3 districts (Garoua 1, Garoua 2, and Garoua 3) was drawn up as well as the number of food vendors (on average 4 per schools). Secondly, we proceeded by a 1 in 3 survey steps to enroll in the schools under investigation. This is illustrated as follows:

1. Enrollments of primary schools in the division (district of Garoua 1, 2 and 3): 84
2. Number of secondary schools (Garoua district 1, 2 and 3): 38

We proceeded using stratified sampling of schools within these three councils were all schools (127) were listed and enrolled for investigation. We further wrote the school's names and balloted randomly to obtain the first school. We later surveyed each school after a pitch of 3, the average of 43 schools to be surveyed was established, which gives a total of 172 food vendors (116 in primary schools and 56 in secondary schools).

Data collection instrument

We used a structured questionnaire for quantitative data and direct observation for qualitative assessment.

Qualitative variables considered

- Wear clean, decent clothes;
- Wash your hands with soap and clean water before and after any food handling, after going to the toilet, after handling dirty objects, after touching raw food, after handling toxic or dangerous objects, and whenever necessary;

- Keep your hands always short and clean;
- Have clean and combed hair and hold it by a cap, cap, or fishnet during operations;
- Refrain from any practice contrary to hygiene, whether it is spitting or scratching your nose, ears or other body openings;

1. Do not sneeze or cough on food (12) .

Data analysis and processing

The quantitative data were entered into the software CSPro later transferred to SPSS for analysis. A Chi-square test was performed to determine statistically significant variables. We ran a binary logistics analysis to observe the level of association between the variables of interest n and the independent variables.

Ethical considerations

We obtained ethical clearance (No 2016/0344/CEIRSH/ESS/MSP/ of 22/07/16) from the IRB of the school of Health Science Catholic University of Central Africa. An information sheet was provided to participants explaining in-depth the objectives, benefits, and risks of participation. Participation was free and voluntary. A signed written informed consent form was provided by each respondent before the commencement of the study.

3 | RESULTS

The results show that Christians are more likely to comply with food hygiene rules in contrast to Muslims ($p < 0.021$). 43% of participants were aware of good hygienic rules for food sales. Of those, 17.3% respected these hygiene rules, while 82.7% did not ($p < 0.000$).

Knowing the different compositions of the food sold can have an impact on this respect of hygienic rules. Indeed, food vendors who knew the value of what they sold, demonstrated better respect of hygiene rules ($p < 0.000$). Of the 172 food vendors surveyed, vendors with dirty nails were likely not to comply with hygiene rules (97.6%) unlike those with clean nails ($p < 0.000$). 52.3% of food vendors owned a

trashcan. Some schools in the study area had placed trash cans at various spots in their school premises. This study shows that schools with such cans in their environment practiced better hygienic rules ($P = 0.000$).

The clothes of vendors were not generally clean. Food vendors wearing dirty clothes (100%) did not respect basic food hygiene rules ($p < 0.000$), they did not bother to wash their clothes and besides, they continue to wipe their hands on these dirty dresses every time they finish serving food. We also observed that wearing an apron has an impact on compliance with food hygiene rules. Indeed, food vendors with aprons showed better respect of hygiene rules ($p < 0.000$) in contrast to those without.

4 | DISCUSSION

The main focus of this study was to identify and analyze the cultural and behavioral determinants of non-compliance of hygiene rules by food vendors in primary and secondary schools in the Bénoué division (North Cameroon). Therefore, the discussion of our results is linked to the literature and empirical data notably, knowledge about the value of food sold; nails hygiene, and regular handwashing; availability and use of a trash can; physical appearance and dressing attire; and wearing of aprons.

In comparison with existing literature, a similar observation was found by *Musa et al* where only 72 (39%) had received formal training in food hygiene before starting exerting food sales (13). While *Al Mamum et al* also found that more than two-thirds (68%) of food vendors did not portray adequate level in knowledge and awareness of food hygiene and security (14). In contrast to these findings, *Monney et al.* study revealed 77% of vendors had adequate knowledge about food safety and hygiene. This was explained by the fact that in their study, the majority of food vendors had a secondary or higher level of education that was not the case with our findings where more than half of participants had a primary level of education. The majority of food vendors had not received any formal training and knowledge in food hygiene and safety before this activity, this partly explains their poor practice (13), (15).

Knowing the different compositions of the food sold can have an impact on this respect of hygienic rules. Indeed, the theory of reasoned action makes it clear that knowledge acquired can influence behavior. People with an idea of the benefits of a product are more likely to use it better than those without. Through this theory, and after deduction, knowing the energy values of the food sold has an impact on compliance with hygiene rules.

Of the 172 food vendors surveyed, vendors with dirty nails were likely not to comply with hygiene rules (97.6%) unlike those with clean nails ($p < 0.000$). This can be explained by the fact that these food vendors do not know the basic rules regarding hand hygiene and the consequences of not washing hands and the risk of disease transmission. This result correlates with those of Charles et al. Likewise, 2/3 of the respondents did not practice hand washing before serving food (78.1%) and among them, 73.4% did not respect basic food hygiene rules. This can be explained by a lack of awareness of the importance and principles of handwashing by these food vendors. However, the guide to good hygiene and food safety practices recommends that people who are in contact with food wash their hands and forearms before serving food.

From our analysis, 52.3% of food vendors owned a trash can. Some schools in the study area had placed trash cans at various spots in their school premises. This study shows that schools with such cans in their environment practiced better hygienic rules ($P = 0.000$). In contrast with *Charles et al.* findings in Benin, revealed 31% of food vendors had no waste disposal site and 17% deposited waste on piles of garbage (16).

The clothes of vendors were not generally clean. Food vendors wearing dirty clothes (100%) did not respect basic food hygiene rules ($p < 0.000$), they did not bother to wash their clothes and besides, they continue to wipe their hands on these dirty dresses every time they finish serving food.

We observed that wearing an apron has an impact on compliance with food hygiene rules. Indeed, food vendors with aprons showed better respect of hygiene rules ($p < 0.000$) in contrast to those without. The literature review shows the importance to dis-

tinguish between work clothes and private clothes to limit the proliferation of germs.

Despite the relevance of the results obtained one of the key limitations of this study is that we were not able to conduct a nutritional analysis on the quality of the food items sold.

Nevertheless, as far as public health issues are concerned, for the first time in Cameroon, this study attempted to provide statistical evidence on hygienic practices by food vendors in schools.

5 | CONCLUSIONS

This study on characterizing factors related with non-compliance to hygienic rules by commercial food vendors in primary and secondary suggests the necessity to organize awareness campaigns on food hygiene rules; establish a certain number of guarding principles (wearing of aprons, frequent hand washing, owning a trash can, and getting basic training in quality food hygiene practices) to food vendors before they engage into this activity; recommend hand washing washbasins with water and soap to food vendors where they can wash their hands. Otherwise, they must have a disinfectant gel. Besides, we also suggested installing trash cans in the sale point and the school must ensure that these cans are completely emptied by the end of each day. Similarly, vendors are recommended to locate further from school sports complexes, and toilets.

What is already known on this topic: includes a maximum of 03 bullet points on what is already known on this topic

- School feeding is a very important element in the education and success of the child
- Compliance with hygiene measures reduces the frequency of diseases linked to poor food conservation and consumption.

What this study adds: include a maximum of 03 bullet points on what your study adds

- For the first time in Cameroon, this study provides statistical evidence on hygienic practices of food vendors in schools.

- The study gives an overview of the epidemiological profile of diseases linked to the consumption of poorly handled in the school milieu.
- The study makes available baseline data for future researchers on cultural and behavioral factors that influence compliance with poor food hygienic practices.

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Competing interest

All authors declared no competing interest and we received no funding to realize this study.

Authors contribution

UD, AS, designed the study, UD, AS, MN analyzed the data and produced the first draft of the study. All authors extracted the manuscript and approved the final draft.

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