

Case Study

Factors influencing consumer choices and food safety awareness in street-vended foods: A case study of Meru town, Kenya

Johnson Kyalo Mwove* , Joy Deborah Orwa, Joyce Wangui Njoki, Francis Gichuho Irungu, Fredrick Gatobu Kiruki

Department of Food Technology, Chuka University, P. O. Box 109-60400, Chuka, Kenya

* Correspondence to: Johnson Kyalo Mwove, Email: jmwove@chuka.ac.ke

Abstract: The consumption of street-vended foods is common in many developed and developing countries, including Kenya. This study investigated the food safety knowledge of street food consumers (SFCs) and the factors influencing their choices of street-vended foods in Meru town, Kenya. A total of 456 respondents were randomly selected from different streets in Meru town to participate in this study. Data collection was carried out through in-person interviews using pretested structured questionnaires. The results of the survey revealed that a significant proportion, 79.2% of the participants were consumers of street vended foods. In addition, the study found a gender disparity that 58.8% of respondents were male and most of them had a primary or secondary education levels, while the majority of the female respondents reported that they had obtained college education. Furthermore, the majority of the respondents were self-employed (48.7%) and earned between KES 10,000 (USD 74) and KES 20,000 (USD 148) per month. The study also found that the average weekly expenditure on street-vended foods was estimated at KES 694.25 (USD 5.14). There was a highly significant association between the income range of the SFCs and their education level ($p < 0.001$), age category ($p < 0.001$) and employment category ($p < 0.001$). Education level ($p = 0.0274$) and age ($p = 0.0205$) of the SFCs were significant factors in predicting the personal hygiene knowledge scores of the SFCs. About 31.6% of consumers reported being sick once or twice a month after eating street foods. The study revealed that convenience, cost, quantity, hygiene and service were important factors considered by SFCs when purchasing street vended foods. The findings of this study offer valuable insights that can inform the development of appropriate strategies and policies aimed at promoting food safety awareness and ensuring the availability of safe and hygienic street-vended foods in Meru town, Kenya.

Keywords: Street food consumers, Food choice, Public health, Consumer attitudes, Food safety, Food-borne diseases

1. Introduction

The consumption of street-vended foods is common in many developing countries, including Kenya. However, the safety and hygiene of these foods have raised

significant public health concerns. Street food vendors often have inadequate food safety and hygiene knowledge and practices, which can pose hazards to consumers [1, 2]. Additionally, it has been reported that street food consumers (SFCs) have little knowledge about food safety, which further increases the risks associated with consuming

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street-vended foods [3]. Factors such as poor food handling and sanitation practices, inadequate food safety laws and weak regulatory systems have been identified to be the triggers for the problem of unsafe street-vended foods [4]. Furthermore, the presence of toxic heavy metals in street-vended foods has been potentially linked to the preparation and handling practices, as well as the raw materials used by street food vendors [5].

In addition to the concerns about food safety and hygiene, the prevalence of intestinal parasitic infections among SFCs has been reported to be high, indicating a possible link between unsafe food handling practices and the transmission of parasitic infections [6]. Inadequate food safety knowledge and practices of street food vendors have been associated with microbial contamination, leading to foodborne diseases and posing significant public health risks. Additionally, low hygienic standards in street food vending have been found to potentially contribute to the transmission of foodborne diseases [7]. The study by Alem [7] reported the presence of pathogenic microorganisms, including *Salmonella* (24.1%) and *Staphylococcus aureus* (22.4%) as well as *Escherichia coli* (53.5%), in street vended foods in Ethiopia. These pathogenic microorganisms were also reported in street vended foods in Kenya [8] as well as in the city of Dhaka in Bangladesh [9]. Thus, street foods are potential sources of foodborne disease outbreaks [10].

Although the safety issues associated with street-vended foods are obvious, these foods are a source of food for millions of consumers around the world who rely on these foods daily [11]. Therefore, it is essential to understand the factors that influence the consumers' choice of street-vended foods [12]. Factors such as the nutritional quality of street-vended foods, safety and hygiene considerations, as well as the environmental and economic aspects of street food consumption are critical to consumer preferences and their choice of street vended foods [13, 14]. However, there is limited information on the factors that influence consumers' choice of street vended foods in Kenya. In addition, despite the extensive knowledge available regarding the quality and safety of street foods as well as about the operations of street food vendors, there are few reports that specifically address food safety and hygiene knowledge, and attitudes of SFCs in Kenya.

As street foods play a significant role in the daily lives of many Kenyans, understanding consumers' knowledge of food safety and hygiene as well as their attitudes and the factors that influence their choices, can contribute to enhancing overall public health. This study explored the food safety knowledge of SFCs and identified the factors influencing their choice of street-vended foods in Meru Town, Kenya.

2. Materials and methods

2.1 Study design and location

A cross-sectional descriptive study was conducted in April 2022 on individuals in the streets of Meru town, Meru County, Kenya. The study locations included all the streets that encircle Meru town.

2.2 Sampling procedures for street food consumers

Since the total population of SFCs in the study site was unknown, the minimum sample size was determined using the formula described by Kothari [15], which yielded a minimum of 385 respondents. Consent was obtained before conducting the interviews with each respondent. The respondents were randomly selected from the people who were present in the different streets of Meru town. There was no prior notification to inform the individuals about the data collection. The respondents were the general public and therefore included both consumers and non-consumers of street vended foods. This was done to determine the estimated percentage of SFCs in Meru town.

2.3 Research questionnaire design and administration

A structured questionnaire (Appendix 1) was designed which included 5 questions on sociodemographic characteristics of respondents, 2 questions on consumption of street-vended foods, 2 questions on health issues related to street-vended foods, 19 questions on respondents' knowledge of food hygiene and safety (including hygiene practices, food preparation, service and disease transmission) and 28 questions on the factors influencing respondents' choice of street vended foods. The questionnaire was pretested on 15 respondents from Chuka town in Tharaka Nithi County, which borders Meru County and the questions were improved based on the feedback received. During the actual survey, the participants were informed of the objective of the study and that the information they provided would be treated confidential. Furthermore, they were also informed that the participation in the survey was completely voluntary and that they were free to opt out at any time during the interview. Those who consented to take part in this study were interviewed.

2.4 Limitations of the study

As this is a cross-sectional study, it may not fully capture the dynamic variations in the SFCs' knowledge, attitudes, and practices over time. Participants were not informed of the data collection in advance, which may have influenced their willingness to take part in the study. The study relied on self-reported data from respondents, which may be subject to recall bias or inaccuracies in reporting, particularly regarding their consumption of street-vended foods, hygiene practices and food safety knowledge.

2.5 Ethical approval

The permission to conduct this study was obtained from the National Commission for Science, Technology and Innovation (NACOSTI), (License No: NACOSTI/P/22/15200), Kenya. Ethical review and approval were undertaken by the Ethics Committee of Chuka University. (NACOSTI/NBC/AC-0812).

2.6 Statistical analysis

The data obtained from the questionnaires were analyzed using Statistical Package for Social Sciences (SPSS) software, version 25. Frequencies and percentages of responses were computed for the categorical data, while the numerical data were summarized as means \pm standard deviation. To examine the independence between categorical variables, a chi-square test was performed. To compare the means of two samples from unrelated groups, the T test for independent sample was conducted. One-way analysis of variance was used to determine statistically significant differences between the means of three or more independent groups.

The calculation of food hygiene and safety knowledge score was undertaken as follows: correct responses to personal hygiene (7 questions), food preparation (5 questions), and general knowledge (7 questions) were awarded a score of 1, and incorrect responses were scored as zero (0). The percentage scores for each SFC in the three question categories were calculated separately and categorized as follows: scores $\geq 80\%$ were assumed to be "good", while scores $< 80\%$ were categorized as "poor". Logistic regression was carried out to determine the relationship between the gender, age, education level, income and employment status of SFCs and the knowledge scores in each of the three categories using SAS software version 9.4M7. All statistical tests were conducted at a significance level of $p = 0.05$.

3. Results and discussion

3.1 Demographic characteristics of street food consumers in Meru town

Table 1 shows the demographic characteristics of 456 respondents from Meru town who participated in this study. Of the respondents, 79.2% were consumers of street vended foods. The gender distribution among the respondents indicated a higher percentage of males (58.8%) compared to females (41.2%) who participated. In regard to street food consumption, the majority of SFCs were male (61.2%). Recent studies have reported more male SFCs than females. For instance, a study by Sseguya, Matovu [16] conducted in the city of Kampala, Uganda, indicated that men derived more benefits from street foods than

women in terms of nutrient intake and inclusion of street food in meals. Similarly, Musaiger [17], Steyn, Labadarios [18] and Ma, Chen [19] reported a higher prevalence of male SFCs. The high prevalence of male respondents consuming street foods in this study, in contrast to female respondents, could be due to the perceived affordability, convenience and ready accessibility of such foods. This is particularly true for males in urban areas, including casual laborers, traders, hawkers, students and unemployed individuals, who may find it challenging to allocate time for self-prepared meals due to their varied commitments.

When examining the level of education, it was found that a substantial proportion of SFCs had completed secondary education (38.5%), while a much smaller percentage had no formal education (3.6%). Overall, there were more SFCs who had attained secondary and tertiary education. This was anticipated, given that these individuals were likely to have completed their education and were likely in pursuit of or engaged in active income-generating or rewarding endeavors. Due to their busy schedules, they were unable to prepare meals by themselves, and therefore preferred the economical, accessible and convenient street-vended foods. Similar findings were reported by Mamun, Alam [20], who found that 53.8% (133) of SFCs in Dhaka city had attained tertiary education.

In terms of age, 37.7% of SFCs were between 26 and 35 years old, with the smallest percentage being under 18 years old (0.3%). This was contrary to the findings of Mamun, Alam [20] who reported a higher percentage of SFCs in the age 18-25. However, in both studies, the majority of SFCs were under the age of 35. This difference could be attributed to various factors, including cultural and economic differences between street food consumers in the two study locations. Furthermore, our study focused on street food consumers in the streets of Meru town, with no particular focus on high-traffic areas. While the study by Mamun, Alam [20] targeted locations including schools, markets, parks, residential communities, and high-traffic streets in Dhaka city. These high-traffic areas may have been populated mainly by younger individuals under the age of 25, unlike the case in this study.

There was a significant ($p < 0.001$) association between age and both education and employment status. Consumers between the age of 18-35 were more likely to have attained tertiary education as compared to other age groups. Furthermore, this age group (18-35 years) consisted of a majority of the unemployed as well as those engaged in self-employment, casual employment or salaried positions. This was in contrast to the findings of Baidoe, Ananga [21] who reported that there was no significant relationship between education and age of SFCs in Hohoe, Volta Region, Ghana. However, this can be explained by the fact that this age group represents those who have either completed their secondary or tertiary education and are in the pursuit of income generating or rewarding endeavors [1]. Therefore, majority of these people may rely on street vended foods for daily meals.

Employment status showed that a significant proportion of SFCs were self-employed (48.2%), while the lowest percentage belonged to those who were employed on a salaried basis (15.8%). There was a highly significant ($p < 0.001$) association between the status of employment and the age of SFCs. About 60.0% of unemployed

SFCs were aged between 19-25. This is not surprising considering the high unemployment rate of persons under the age of 24 years in Kenya. According to KNBS [22], the unemployment rate in Kenya for individuals was 15.6% for persons between 20-24 years old and 10.9% for persons between 15-19 years old.

Table 1. Demographic characteristics of consumers and non-consumers of street vended foods in Meru town

Characteristic	Categories	All Respondents (%(N))	Street food consumers (%(N))
Gender	Male	58.8 (268)	61.2 (221)
	Female	41.2 (188)	38.8 (140)
Level of education	No formal education	3.3 (15)	3.6 (13)
	Primary education completed	20 (91)	21.3 (77)
	Secondary education completed	36 (164)	38.5 (139)
	College/ vocational training	27.6 (126)	25.5 (92)
	University education	13.2 (60)	11.1 (40)
Age	Under 18 years old	0.4 (2)	0.3 (1)
	19-25 years old	20.2 (92)	21.9 (79)
	26-35 years old	36.4 (166)	37.7 (136)
	36-45 years old	24.1 (110)	22.4 (81)
	46-55 years old	15.1 (69)	15.2 (55)
	Above 55 years old	3.7 (17)	2.5 (9)
Employment status	Unemployed	16 (73)	16.6 (60)
	Self-employed	48.7 (222)	48.2 (174)
	Casually-employed	17.8 (81)	19.4 (70)
	Employed-salaried	17.5 (80)	15.8 (57)
Income Range (KES) 1 USD = 135 KES, based on the exchange rate in April 2024	10,000 and below	37.3 (170)	40.7 (147)
	10,001 - 20,000	30.5 (139)	32.7 (118)
	20,001-30,000	18.9 (86)	16.9 (61)
	30,001 - 50,000	8.1 (37)	6.9 (25)
	Above 50,000	5.3 (24)	2.8 (10)

N – Number of persons

3.2 Street food consumption

Among all the respondents, it is noteworthy that a significant proportion, 79.2% (361 individuals), were consumers of street vended foods. This result indicated a substantial prevalence of street food consumption in Meru town. Leshi and Leshi [23] in their study of dietary diversity and nutritional status of SFCs in Oyo, Nigeria reported that more than 60% of the respondents consumed street vended foods daily. This underscored the importance of street vended foods in the fight against food and nutrition insecurity in Kenya.

3.3 Street food consumer's income

When considering income ranges, a notable percentage

of SFCs earned 10,000 and less (40.7%), while the smallest percentage reported an income of over 50,000 (2.8%), as shown in Table 1. A similar trend was reported by Ma, Chen [19], Baidoe, Ananga [21], Mamun, Alam [20], who found that the majority of SFCs were in the lower income categories, with the number of consumers decreasing as the income range increased.

There was a highly significant relationship between SFCs' income range and education level ($X=42.986$; $p < 0.001$), age category ($X=128.240$; $p < 0.001$) and employment category ($X=105.285$; $p < 0.001$). The majority of respondents who had no formal education (61.5%) and those who had attained primary education (58.4%) earned KES 10,000 and below. In addition, the majority of those who earned more than KES 30,000 had either attained college or vocational training or university

education. Thus, SFCs who had not pursued formal education or had only completed primary education may have limited access to skilled employment opportunities, which could contribute to their lower income levels.

The majority of the respondents (42.9%) who earned KES 10,000 and below were aged 19-25 years while the majority of those who earned more than KES 30,000 were aged 26 years and above. These results were contrary to what was reported by Ma, Chen [19] who found that although the educational level differed among SFCs, the younger consumers had relatively higher income as compared to older consumers.

The majority of the SFCs (37.4%) in the income category of KES 10,000 and below were unemployed, while the majority of the SFCs (58.5 -70.0%) who earned more than KES 10,000 were self-employed.

These findings revealed that street foods contribute significantly to the energy and protein intake of people of different income levels in Kenya. This underscores the importance of street foods to the food and nutrition security and hence the health [24] of SFCs, particularly in low-income countries like Kenya.

The majority (67.8%) of respondents had a monthly income of about KES 20,000. On average, SFCs spend KES 694.25±1080.31 per week on street-vended foods. That was about 13% of the income for the individual earning KES 20,000 and up to 27% of the income for the individuals earning KES 10,000 per month. This showed that street foods continues to be a major dietary source in urban settings [16]. Additionally, there is an evidence

that poor families that may have low incomes, spend a large proportion of their budget on street foods [23]. This highlights the significance of street foods as a source of affordable nutrients, especially for low-income people in developing countries like Kenya [1].

There were significant differences ($p=0.043$) in the amount of money spent on street foods between respondents of different age categories, as shown in Figure 1. The highest amount of money spent on street foods was recorded for the respondents who were 26-35 years old (KES 1,100.66 per week), although this was only significantly different from those aged 19-25 years (KES 599.37 per week). Street vended foods are appealing to the younger people as reported by Sanlier, Sezgin [25] in their research on consumption behaviors of young consumers of street foods. In their study, they found that about 40% of young people consumed street vended foods, 2-3 times a week, while about 23% consumed these foods daily. In addition, they might also appeal to older people who did not have plenty of time to prepare their own meals.

Regarding respondents' income categories, the highest significant ($p= 0.001$) amount of money spent on street foods was by consumers who earned between KES 10,000 and 50,000 as shown in Figure 2. This also represented the vast majority of people who were reported to be mostly self-employed and possibly lacking time to prepare their own meals.

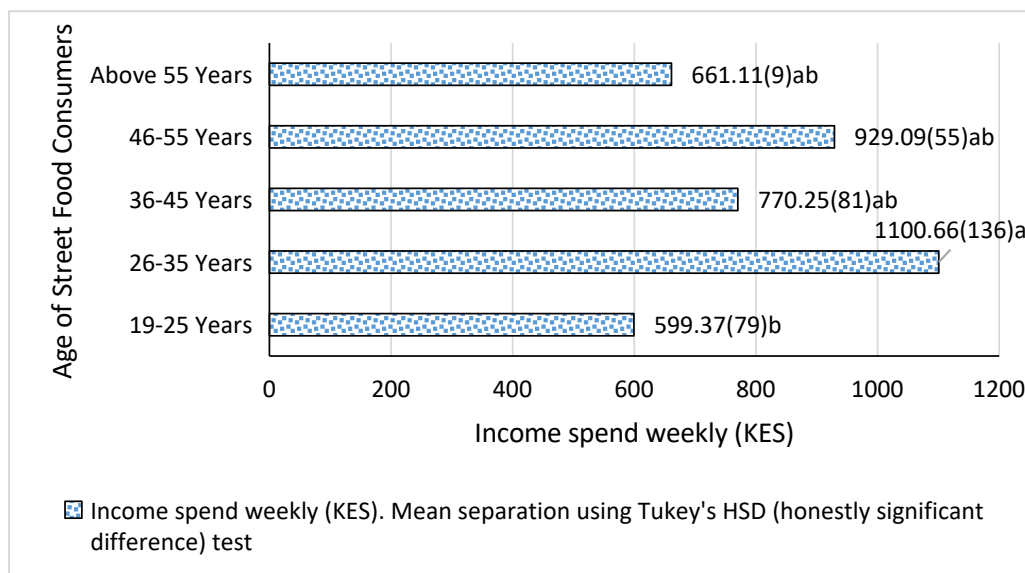


Figure 1. Income spent by street food consumers per week (KES) in different age categories

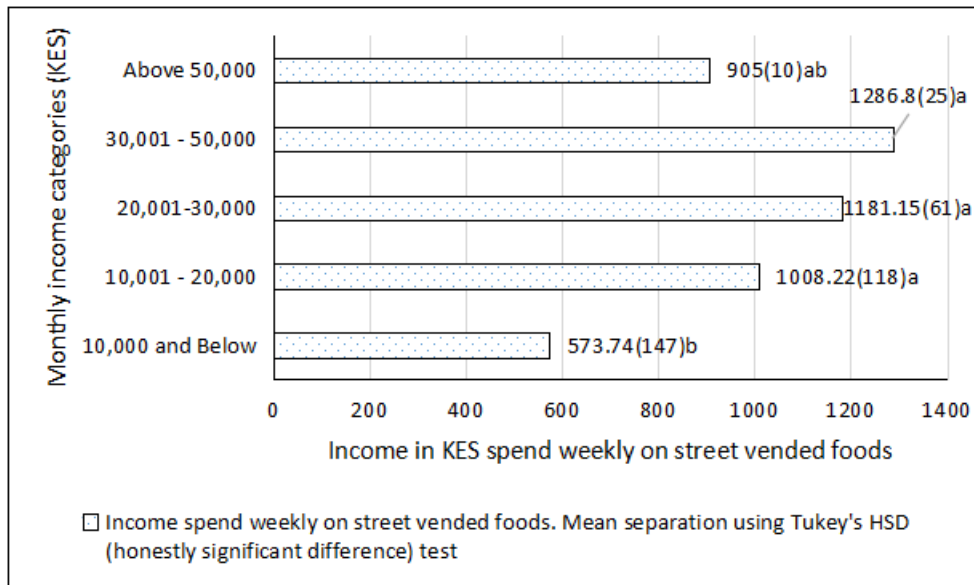


Figure 2. Income spent by street food consumers per week (KES) in different income categories

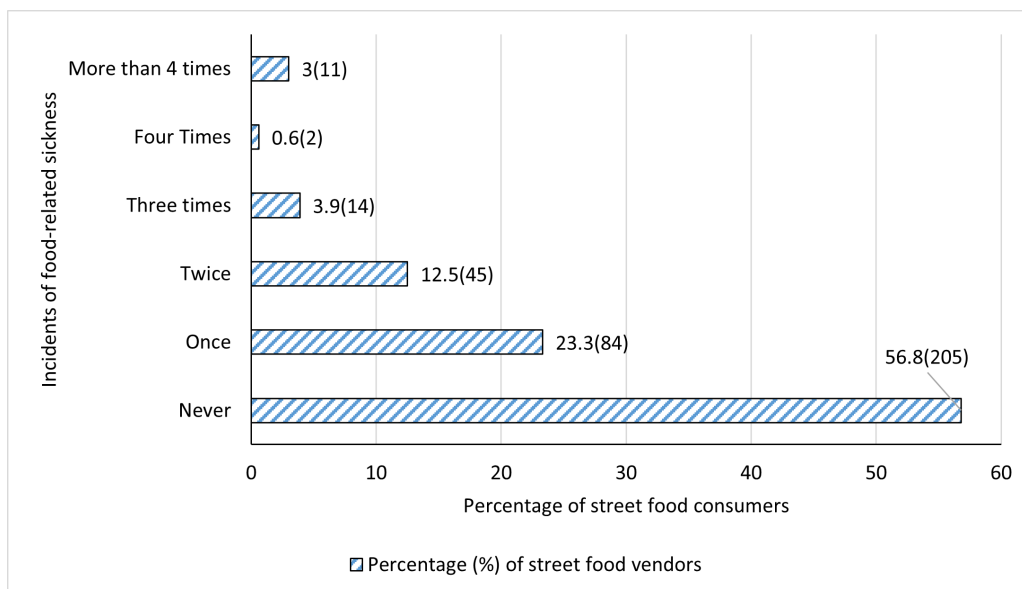


Figure 3. Percentage of street food consumers who reported being sick after consuming street foods

3.4 Health issues associated with street vended foods

Respondents were asked to report how often they had experienced health problems after eating street vended foods in the last one month (Figure 3). The majority of SFCs (56.8%) reported that they had not fallen sick after eating street vended food in the past month. Of those who had experienced health issues, 35.8% said they had fallen sick once or twice, while a smaller proportion (3.6%) indicated that they had felt unwell four or more times. Of the respondents who reported that they had health issues

after consuming street-vended foods, 52.3% were male. Of the 176 respondents who reported health issues, around 10.8% said that they had experienced headaches, while a significantly larger proportion, approximately 38.6%, indicated they had encountered episodes of diarrhea and vomiting. Stomach upsets were more prevalent, with approximately 66.5% of the respondents reporting this health issue. These findings highlighted the potential food safety concerns with street-vended foods. In Kenya, previous studies have reported the presence of pathogenic microorganisms including *Staphylococcus aureus* and *Salmonella* in foods [8]. Furthermore, toxic chemical

contaminants such as aflatoxins and fumonisins as well as heavy metals [5] have been reported in Kenya. Thus, there is a need to come up with strategies that can be implemented to enhance the safety of street vended foods so as to ensure public health. For instance, strategies to enforce the existing policies governing public health among the street food vendors. Such strategies may be successful if instead of enforcing restrictive policies on street food vendors, as is the case now [26], policies are crafted that facilitate safe operations. For instance, policies that recognize the contribution of street food vendors to the sociocultural and economic development and growth of society, recognize them as legal businesses, and offer guidelines that can be enforced to ensure compliance may greatly improve the safety of street-vended foods [27].

3.5 Food hygiene and safety knowledge

3.5.1 Hygiene practices

Although 70.8% of respondents recognized that washing utensils may not completely eliminate foodborne pathogens, only 12.9% believed that washing utensils with detergent does not make them free from contamination. Washing utensils with water alone is a risk factor, especially if the water used is not portable. Food stains provide a conducive environment for microbial growth on the surfaces of utensils. In a study conducted in China to assess food safety knowledge of SFCs, Ma, Chen [19] reported similar findings. About 87.5% of all consumers believed that proper cleaning and sanitizing reduces the risk of food contamination with pathogens. Thus, there is a better knowledge among consumers about hand washing with soap and water. This could help to reduce foodborne illnesses sprouting from street-vended foods.

The majority of the consumers (68.0%) were aware that eating and drinking while preparing and serving street-vended foods increased the risk of food contamination. These results are similar to those of another study in which 68% of consumers believed that eating while handling street food could be a source of contamination [28]. Similarly, according to Ma, Chen [19], 78% of consumers generally agreed that eating while preparing food was a food handling hazard. In the same study, a significantly lower percentage of vendors (57%) never agreed that the practice could be a source of food contamination. This is a great concern since the vendors should be more knowledgeable in food handling practices and hygiene [29]. However, the consumers also can be protected by their knowledge on the same.

Even though this may not always be the case, 59.9% of respondents reported that they thought that using gloves did not reduce the risk of food contamination. A study conducted in Kisumu, Kenya and Kampala in Uganda found that on average 57% of consumers believed that wet hands could be a source of contamination for food [30]. The use of gloves is therefore preferred to the use of wet

hands in food processing. According to Porusia, Sapavi [28], 97.2% of consumers believed that wearing gloves could protect food from contamination by wet hands and associated hazards.

Approximately 21.5% of respondents failed to acknowledge the crucial role of hand washing in reducing food contamination. Additionally, despite the importance of proper cleaning and sanitizing, only 34.9% of respondents believed that it decreased the risk of foodborne infections, so there is still room for improvement in awareness. Hands are always in direct contact with food and therefore, hand hygiene is important as it affects the hygiene and safety of food that comes into contact with. Several studies have scored significantly higher on consumer knowledge concerning hand washing before handling food [19, 28, 31, 32]. The use of water alone is never enough to eliminate a significant number of bacteria from surfaces.

3.5.2 Food preparation and service

The study found that 50.7% of respondents recognized the potential risk of food contamination when food was prepared without potable water. Potable water is important in any food processing operation, especially when it is used as an ingredient or to clean food contact surfaces. The lack of access to portable water for street food vendors was reported by consumers in Kenya and Uganda [30]. Low- and middle-income countries tend to struggle with issues such as access to clean water and sanitation, which is reflected in the level of hygiene as reported by consumers. Oloo and Wakhungu [30] also reported that street food vendors utilized temporary structures that are not connected to municipal treated tap water. Water is a source of several pathogenic microorganisms and should be treated before it is used for food preparation [33].

Most consumers (79.4%) acknowledged that handling money and serving food simultaneously could lead to contamination with pathogens. This is consistent with a study in Malaysia, which reported that the majority of consumers (94%) indicated that food could be contaminated from non-food sources including money [28]. Money still remains a source of food contamination if handled while preparing or serving food [34].

Although, 61.2% of respondents correctly believed that heating food could reduce the risk of food contamination, 67.5% of them recognized that reheating cooked foods could contribute to food contamination. Reheating food poses a major risk, especially if the food is handled improperly. At the same time, depending on the type of food and microorganisms there in, the amount of heat used could either kill microorganisms or accelerate their growth. According to Porusia, Sapavi [28], 72% of consumers believed that reheating food could be a source of contamination. This supported the findings of this study. Street food vendors should therefore reheat food thoroughly. In other studies, street food vendors believed

that precooked food should be reheated substantially before consumption [35-37].

The majority of respondents were aware that food preparation could potentially result in contamination with toxins or pathogens (71.3%) and that mixing leftovers from a previously prepared dish with freshly prepared food might contribute to food contamination (90.4%). The risk of contamination with pathogens and toxins is increased when left-over foods are mixed with freshly prepared food. Street food vendors had been reported to mix overnight foods with other fresh foods to avoid food waste [1], without realizing that this practice poses a risk to the health of consumers.

3.5.3 Disease transmission

A significant majority, 82.7% of respondents, recognized the potential transmission of diarrheal diseases through street-vended food. Similar results had been reported elsewhere, where 82% of consumers demonstrated knowledge regarding the transmission of diarrheal diseases through food [28]. In another study, fewer consumers (45%) reported knowledge of transmission of bloody diarrhea through street vended foods [19]. At the same time, only 58.6% of respondents acknowledged that illnesses in children could possibly be caused by street-vended foods. The perception that the risk of food poisoning is the same for all consumers, including children, healthy adults, pregnant women and the elderly, was held by 81.798% of respondents in this study. Vulnerable populations such as pregnant women, children and the elderly are at higher risk of foodborne illnesses [35, 36, 38, 39].

Additionally, the majority of respondents were aware that even seemingly healthy street food vendors could carry pathogenic microbes on their skin, in their nose and mouth (56.8%) and that street food vendors should refrain from selling their products if they are sick (66.3%). *Staphylococcus aureus* is a microorganism that is commonly found on people's hands, skin and nose and can be transmitted through food. Even a healthy person can transmit the pathogen to food. In other studies, consumers had reported the same knowledge as in this study [19, 28, 30, 32].

3.5.4 Factors influencing food hygiene and safety knowledge

The gender, age, education level, income and employment status of the SFCs were used to predict the level of knowledge about food hygiene and safety (personal hygiene score, food preparation score and general knowledge score). Only education level ($p=0.0274$) and age ($p=0.0205$) of SFCs were significant in predicting their personal hygiene scores. The odds of getting a good personal hygiene score were significantly lower ($p=0.0016$) for SFCs who had attained primary

education as compared to those who had a university education. In addition, SFCs aged over 55 years were five times more likely to achieve a good score than those who were younger than 26 years old as shown in Figure 4.

These findings align with existing literature on the relationship between education level and food safety knowledge. Previous research has demonstrated that higher education levels are associated with better food safety knowledge and practices [40, 41]. The finding of the current study that SFCs with a university-level education were more likely to achieve good personal hygiene scores further supports the notion that education plays a crucial role in food safety knowledge and practices. In addition, the association between age and personal hygiene among SFC workers is also consistent with research findings indicating that older individuals may exhibit better food safety practices due to their accumulated knowledge and experience [42].

3.6 Factors influencing the choice of street vended foods

As shown in Table 3, the majority of SFCs identified the following factors as important in choosing street vended foods: the products are easily available, the products do not require preparation, the products are cheap, the products are hygienically prepared, the products are served in sufficient quantity, the booths are clean and sanitized, the products are adequately covered or packaged, the food utensils are clean, and the vendors are kind and polite to the customers. This shows that, convenience, cost, quantity, hygiene and service are important aspects considered by consumers when purchasing street-vended foods. Other studies have identified similar factors that contribute to the choice of street food. According to Ali, Mahmud [43], price is the main facilitator of street-vended food chosen by consumers. Then they further affirmed that price can be used to steer the choice of street-vended foods towards more sustainable eco-sources which are less hazardous to the environment. According to Odeyemi [44] food consumers consider mannerisms of employees, premises and service as a priority. A study by Kim and Moon [45] recorded that food quality and ambiance are the main considerations by consumers in food selection. A clean serving environment attracts many consumers and has been reiterated by Geming [34], Ali, Mahmud [43] in their study. In other cases, socioeconomic background has been found to affect the decision of consumers when it comes to choice of street vended foods [29, 46].

Table 2. Food safety knowledge of respondents

Category	Questions	False (%)	True (%)
Hygiene practices	Washing utensils with detergent leaves them free of contamination.	12.939	87.061
	Washing utensils may not completely eliminate foodborne pathogens	29.167	70.833
	Eating and drinking while preparing and serving street-vended foods increase the risk of food contamination.	32.018	67.982
	Use of gloves by street food vendors while handling food reduces the risk of food contamination.	59.868	40.132
	Washing hands before work reduces the risk of food contamination.	21.491	78.509
	Proper cleaning and sanitizing of utensils decrease the risk of food-borne infections.	34.868	65.132
	Food preparation and service	Food prepared without potable water may be contaminated	49.342
Handling money and serving food at the same time may cause contamination with pathogens		20.614	79.386
Food preparation may cause contamination with toxins or pathogens		28.728	71.272
Heating food reduces the risk of food contamination.		38.816	61.184
Reheating cooked foods can contribute to food contamination.		67.544	32.456
Mixing leftovers from previously prepared dish with freshly prepared food may contribute to food contamination		9.649	90.351
Disease transmission		Diarrhea can be transmitted by street-vended food.	17.325
	Food-borne diseases in children could originate from street vended foods	41.447	58.553
	Street food vendors should not sell street vended foods when they are sick	33.772	66.228
	Healthy street food vendors can have pathogenic microbes on the skin, nose and mouth.	43.202	56.798
	AIDS can be transmitted by food.	96.93	3.07
	COVID 19 can be transmitted through food	61.404	38.596
	All consumers including children, healthy adults, pregnant women and older individuals are at equal risk of food poisoning.	18.202	81.798

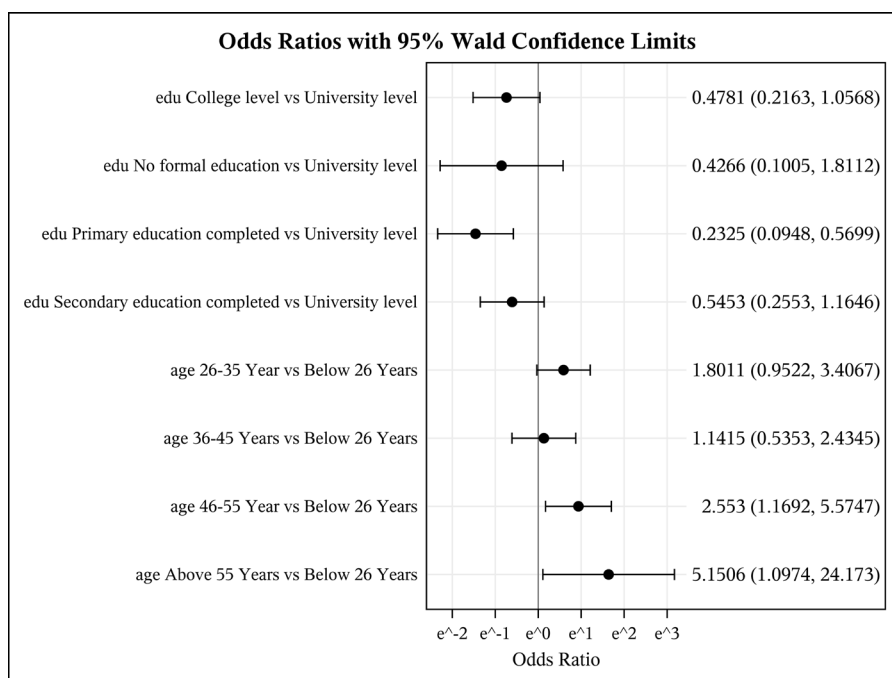


Figure 4. The odds ratio for personal hygiene scores for street food consumers

Table 3. Factors influencing the choice of street vended foods

Factors	Questions	Not important (%)	Very important (%)
Convenience	Products are easily available.	16.620	83.380
	Products do not require preparation.	45.429	54.571
Cost	The products are cheap.	34.903	65.097
Quality	The products are in high quality.	71.191	28.809
	Raw materials used are from a reliable source.	70.914	29.086
	The products are hygienically prepared.	38.227	61.773
Quantity	The products are served in sufficient quantity.	49.030	50.970
Safety	The products are good for consumer's health.	56.233	43.767
	Food will not cause illness.	60.665	39.335
	The food sold does not cause me harm.	55.402	44.598
Cleanliness	The booths are clean and sanitized.	46.814	53.186
	The location of the booths is clean.	62.327	37.673
	The vendor is wearing clean protective gear.	71.745	28.255
	The surroundings of booths are adequate for food trade.	59.280	40.720
Organization	The booths are well organized.	70.914	29.086
	The products sold in the booths are well arranged and presented.	68.975	31.025
	The products are adequately covered or packaged.	42.382	57.618
	The products sold in the booths are well advertised.	80.609	19.391
Service	The vendors are kind and polite to the customers.	47.368	52.632
	The vendors handle money and food separately.	57.618	42.382
	The vendors are clean and appropriately attired to sell food.	50.416	49.584
	Products are sufficiently/ properly cooked.	50.970	49.030
	The food utensils are clean.	45.706	54.294
	The food utensils are stored well to avoid contamination.	62.050	37.950
	Vendor does not eat while serving food.	70.083	29.917
	Vendor has short and clean nails.	65.374	34.626
	Vendor has a clean dustbin available.	70.360	29.640
The products are not mixed with raw materials or packaging materials.	60.388	39.612	

Conclusion

The findings of this study underscored the importance of addressing food safety concerns and understanding consumers' choices to enhance overall public health in the context of street food consumption. The study revealed that while a significant proportion of respondents had attained some level of education, there was a lack of awareness regarding safety of street-vended foods. This lack of awareness is concerning, particularly because street vended foods are a major source of food for many people in Meru town, Kenya. The reported health issues associated with food consumption further emphasize the need to improve food safety practices among street food vendors. The study also highlighted the key factors influencing consumer choices, including convenience, cost, quantity, hygiene and service. These findings provide valuable insights that can promote the development of appropriate strategies and policies aimed at promoting food safety awareness among street food consumers and ensuring the availability of safe and hygienic street-vended foods in Meru Town, Kenya.

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Conflicts of interest

We declare that there is no conflicts of interest related to this research.

Authors' contributions

All the authors were involved in data collection and the preparation of the manuscript. The corresponding author was involved in data analysis.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request. The structured questionnaire (Appendix 1) adopted for this research is available at <https://file.luminescence.cn/FNDS-257%20Appendix%201%20Questionnaire.pdf>.

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