

## Original Article

### Factors Affecting Street Food Vendors' Safety Procedures and Their Awareness of the Health Risks to Customers

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#### Abstract:

**Background:** Food and beverages that are prepared and sold by sellers on places like the streets. Street food selling has become a booming business in developing countries like Bangladesh. This study aimed to find out the food safety practices of street food vendors and their knowledge regarding the health hazards of the consumers in selected areas in Dhaka city. **Method:** This was a cross-sectional study to assess the level of food safety practices among the street food vendors and their knowledge regarding health hazards of the consumers in selected areas in Dhaka city. **Result:** The mean age of the respondents was 30.85 years. Almost 94% of the respondents were male. Among all the respondents 37.2% completed secondary educational level. 73.7% of respondents were working for more than 20 years. Almost 78.9% of respondents had a monthly income between 10001 to 30000 BDT. Almost respondents 65.4% were married. Almost 50.7% half of respondents had the habit of taking paan (Betel Leaf), bidi (a type of cheap cigarette made of unprocessed tobacco wrapped in leaves)/cigarette, gul (remains of tobacco cake after it has been smoked). 96% of respondents had average safety practices. 72.0% of respondents had good knowledge about health hazards. The association between educational qualification, income, personal habits and knowledge regarding health hazards is significant. The association between knowledge regarding health hazards and food safety practices of the consumers is found significant. **Conclusion:** It is "easy to enter" businesses in developing nations like Bangladesh, where the unemployment rate is relatively high. This study of street food sellers in a few different parts of Dhaka city revealed that the vendors have an average safety practice and good knowledge about potential health risks. The result of the study sets the stage for further investigations into food safety and knowledge about potential health risks.

**Keywords:** Food Safety Practices, Knowledge regarding Health Hazards of the Consumers, Street Food Vendors.

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#### Introduction:

Food is considered a fundamental entitlement of all individuals.<sup>1</sup> Food contains over 40 different types of nutrients, which can be categorized into seven major groups: carbohydrates, proteins, fats, vitamins, minerals, dietary fiber, and water.

The origins of street food (SF) can be found in the ancient Greek marketplace, where tiny fried fish were offered for sale.<sup>2</sup> The increase in the number of marginalized enterprises, such as street food sellers, was brought on by the growth in urban population.<sup>3</sup> Street food (SF) and

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beverages are ready-to-eating food items prepared and sold by vendors in different public places especially in streets and crowded bus or train stations in Bangladesh as well as other countries around the world.<sup>4</sup> SF is an age-old practice and earning source of income in several countries.<sup>5</sup> Worldwide increases in unemployment and poverty are the key factors behind people who tend to run street food businesses because they require minimal experience and capital to set up.<sup>6,7</sup>

Street food safety is a critical public health issue in the third world and developing countries, including Bangladesh.<sup>8-10</sup> The changes in people's lifestyles have led to a transformation in the habit of eating outside. Due to lack of time for cooking at home, societal consumption patterns, cultural interactions, fast-paced living, and women's increased participation in the workforce are all influencing and altering the way people eat in busy cities.<sup>11,12</sup>

The rise in food-borne infections is linked to improper storage (50%), reheating-storing under insanitary circumstances (45%), and cross-contamination (39%).<sup>13</sup> From 1983-1992, street meals were responsible for 691 food poisoning incidents and 49 fatalities in China.<sup>14</sup> It was discovered that 300 persons in Hong Kong were unwell after eating street food and that 14 deaths in Malaysia were caused by food sources.<sup>15</sup> Cholera was spread to people who ate tainted street food harboring disease germs.<sup>16</sup> Many of the foods sold on the streets are unprotected against flies and other live animals that can transmit viruses. Time and temperature are two additional critical parameters in pathogen bacterium proliferation. Inadequate cooking and food storage can lead to cross-contamination between raw and processed foods, which can cause foodborne illnesses. Maintaining cleanliness among food sellers and using appropriate food handling practices can help reduce the spread of harmful germs that cause these infections.

In addition to hands, other body parts such as feces, face, and skin can also transmit microbes. Bacteria like *E. coli*, *Salmonella*, *Shigella*, *Campylobacter*, and *S. aureus* are particularly important to consumers as they can create foodborne hazards. Risk factors are situations or actions that raise the possibility of harm or a negative outcome: farming methods, the origins and caliber of raw materials and meals, preparing, handling, and selling food environments for vending, hygiene standards, Street food vendors' awareness of and attitudes toward food safety procedures.

Approximately 130 street food items are available, and these are consumed by 2.5 million people daily.<sup>18</sup> The inadequate awareness and vulnerability of existing food laws contribute to the unfavorable food safety situation in Bangladesh.<sup>19</sup> The Food and Agriculture Organization of the United Nations recommends the implementation of HACCP principles or the presence of competent food safety authorities to ensure food safety in crowded areas.<sup>20</sup> Foodborne diseases are a major worldwide

problem, particularly prevalent in Africa and Southeast Asia where they have the highest rates of occurrence and mortality. According to the World Health Organization, there are approximately 600 million cases and 420,000 deaths each year due to these diseases. Despite the potential hazards, individuals persist in consuming street food, particularly students who perceive it as lacking in nutritional value and detrimental to their health. Examples of street food include bagels, pastries, grilled sheep's intestines, meatballs in bread, kebabs, lamb, pancakes, chickpea-rice dishes, mussels, corn, chestnuts, schlep, licorice, pastes, cotton candy, wafers, sugar-coated apples, and ice cream. The street food vendors demonstrated a lack of knowledge and understanding of food safety practices. The majority of vendors were not familiar with the proper guidelines for maintaining hygiene during food preparation, processing, serving, and storage. To address this issue, it is necessary to implement educational initiatives for street vendors, improve the conditions for food preparation and storage, enforce adequate hygiene measures, and enhance waste disposal infrastructure. Effective education on food hygiene is essential for preventing foodborne illnesses on a global scale, as it provides valuable information on proper food hygiene practices. It is crucial to establish comprehensive food hygiene laws and a robust food safety system specifically for street food vendors.<sup>21</sup>

## Material and Methods

### Study design and settings

It was a cross-sectional study to assess the level of safety practices of street food vendors and to find out their knowledge regarding health hazards of consumers at selected areas in Dhaka city from January 1, 2023, to December 31, 2023.

### Sample selection

Four hundred twenty-two respondents aged 18 years and above 18 years both male and female. Willing to participate and give informed written consent at selected areas in Dhaka City.

### Data collection procedure

The study did on street food vendors were interviewed by a pretested semi-structured questionnaire through the face-to-face interview. The questionnaire consists of questions on socio-demographic characteristics and questions related to food safety practices and knowledge regarding health hazards of the consumers.

### Statistical analysis

The data were analyzed in IBM SPSS version 27. Descriptive statistics such as mean, standard deviation and percent were computed for continuous variables of the participants. The level of safety practices variable was created and scoring was done and categorized into three groups ranging from (less than 50= poor, 50-75=

average, and more than 75= good).<sup>22</sup> Street vendors' level of knowledge regarding health hazards of the consumers was classified into 3 categories (less than 50= low, 50-75=satisfactory, and more than 75= good).<sup>23</sup> Chi-square was used to assess the significance association between two variables and a p-value of <0.05 at a 95% confidence interval was taken as significance. The results were presented in tables and charts.

**Result:**

**Table 1: Distribution of the respondents according to socio-demographic variable and their association with food safety practices and knowledge regarding health hazards**

Socio-demographic Variables	Food safety practices				Knowledge regarding health hazard			
	Average	Good	χ <sup>2</sup> value	Low	Satisfactory	Good	χ <sup>2</sup> value	
<b>Frequency (%)</b>								
<b>Age Groups (Years)</b>								
± 20	56 (13.3)	2 (0.5)	53 (12.6)	1 (0.2)		13 (3.1)	1 (0.2)	42 (10)
21 to 40	306 (72.5)	4 (0.9)	296 (70.1)	6 (1.4)	F = 9.063	57 (13.5)	29 (6.9)	220 (52.1)
41 to 60	56 (13.3)	4 (0.9)	52 (12.3)	0 (0)	P = 0.151	16 (3.8)	1 (0.2)	39 (9.2)
> 60	04 (0.9)	0 (0)	4 (0.9)	0 (0)		1 (0.2)	0 (0)	3 (0.7)
Mean ± SD	30.85 ± 9.90							
Minimum	18							
Maximum	60							
<b>Gender</b>								
Male	398 (94)	10 (2.4)	381 (90.3)	7 (1.7)	F = -0.001	78 (18.5)	31 (7.3)	289 (68.5)
Female	24 (5.7)	0 (0)	24 (5.7)	0 (0)	P = 1	9 (2.1)	0 (0)	15 (3.6)
<b>Educational Qualification</b>								
No formal education	71 (16.8)	0 (0)	71 (16.8)	0 (0)		20 (4.7)	6 (1.4)	45 (10.7)
Primary	92 (21.8)	3 (0.7)	87 (20.6)	2 (0.5)	F = 5.865	26 (6.2)	10 (2.4)	56 (13.3)
Secondary	157 (37.2)	6 (1.4)	147 (34.8)	4 (0.9)	P = 0.390	33 (7.8)	11 (2.6)	113 (26.8)
Higher	102 (24.1)	1 (0.2)	100 (23.7)	1 (0.2)		8 (1.9)	4 (0.9)	90 (21.3)
<b>Duration of work as street food vendor (in years)</b>								
Less or equal 1	15 (3.6)	0 (0)	15 (3.6)	0 (0)		1 (0.2)	0 (0)	14 (3.3)
1 to 10	46 (10.9)	0 (0)	46 (10.9)	0 (0)	F = 1.598	8 (1.9)	2 (0.5)	36 (8.5)
11 to 20	50 (11.8)	1 (0.2)	48 (11.4)	1 (0.2)	P = 0.950	6 (1.4)	1 (0.2)	43 (10.2)
More than 20	311 (73.7)	9 (2.1)	296 (70.1)	6 (1.4)		72 (17.1)	28 (6.6)	211 (50)
<b>Monthly Income in BDT</b>								
Less or equal 10,000	41 (9.7)	2 (0.5)	38 (9)	1 (0.2)	F = 2.884	10 (2.4)	10 (2.4)	21 (5)
10,001 - 30,000	333 (78.9)	8 (1.9)	319 (75.6)	6 (1.4)	P = 0.439	70 (16.6)	19 (4.5)	244 (57.8)
More than 30,000	48 (11.4)	0 (0)	48 (11.4)	0 (0)		7 (1.7)	2 (0.5)	39 (9.2)
<b>Marital status</b>								
Single	146 (34.6)	3 (0.7)	141 (33.4)	2 (0.5)	F = 3.188	27 (6.4)	9 (2.1)	110 (26.1)
Married	276 (65.4)	7 (1.7)	264 (62.6)	5 (1.2)	P = 1	60 (14.2)	22 (5.2)	194 (46)
<b>Personal Habit</b>								
Yes	214 (50.7)	8 (1.9)	201 (47.6)	5 (1.2)	F = 4.650	56 (13.3)	27 (6.4)	131 (31)
No	208 (49.3)	2 (0.5)	204 (48.3)	2 (0.5)	P = 0.097	31 (7.3)	4 (0.9)	173 (41)

**\*Means significant**

According to Table 1, the majority of the respondents belonged to the age range of 21 to 40 years old, with a mean age of 30.85 ± 9.90 years. Approximately 94% of the population was male, 37.2% had completed secondary education, 73.7% had been employed for

**Ethical approval**

Informed written consent was obtained from each participant. Ethical approval was obtained from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Dhaka 1212, Bangladesh (NIPSOM/IRB/2023/03)

more than 20 years, 78.9% earned between 10,001 and 30,000 BDT per month, and 50.7% regularly smoked bidi (a cheap cigarette made of unprocessed tobacco wrapped in leaves), gul (the leftovers of a tobacco cake after it has been smoked), and paan (betel leaf).

The distribution of respondents among sociodemographic factors and safety practices was also displayed in this table. There is no meaningful correlation found between safety procedures and sociodemographic characteristics. Additionally, displayed here was the respondents’ distribution across sociodemographic characteristics and their level of awareness of the health risks faced by customers. Sociodemographic factors (income, habit, and level of education) and their awareness of the health risks faced by consumers are significantly correlated.

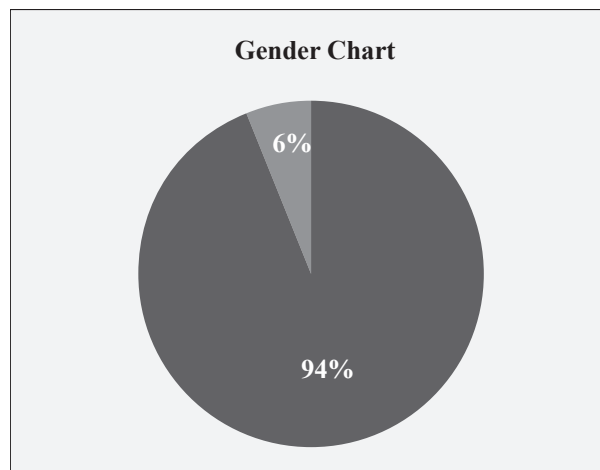
**Table 2: Distribution between safety practices of respondent & their knowledge regarding health hazards**

Safety Practice of street food vendors	Knowledge regarding health hazards of the consumers			χ <sup>2</sup> value
	Low	Satisfactory	Good	
	Frequency (%)			F=9.774
Poor	4 (0.9)	0 (0.0)	6 (1.4)	P=0.024
Average	80 (19.0)	29 (6.9)	296 (70.1)	*
Good	3 (0.7)	2 (0.5)	2 (0.5)	

\*Means significant

Table 2 indicated the distribution of participants based on food safety practices and consumer health risk

information. The data shows that a large majority of people with poor comprehension practiced average food safety standards. This also referred to acquiring adequate and proficient knowledge. The link between consumers’ comprehension of health concerns and their adherence to food safety standards is considered significant. This suggests a high link between the two variables.



**Figure 1: Distribution of the respondents by gender**

Figure 1 depicts the distribution of respondents by gender. Of the 422 responders, 94% were men and 6% were women

**Table 3: Distribution of the respondents by safety practices**

Safety practices	YES Frequency (%)	NO Frequency (%)
Washing hands before food processing	420 (99.5)	2(0.5)
Washing hands before and after touching wrapped and unwrapped raw foods	419 (99.3)	3(0.7)
Washing hands after touching prepared foods	420 (99.5)	2(0.5)
Washing hands after coming back from the toilet	422 (100.0)	
Washing and sanitize the clothes you use in the workplace	420 (99.5)	2(0.5)
Washing and sanitizing knife after chopping raw chicken or meat or other raw food	418 (99.1)	4(0.9)
Using detergent to clean utensils	416 (98.6)	6(1.4)
Cleaning the work area before starting work	420 (99.5)	2(0.5)
Using soaps/detergents to wash hands	413 (97.9)	9(2.1)
Keeping your nails short before starting activities	391 (92.7)	31(7.3)
Using jewelry and a wristwatch while working	86 (20.4)	336(79.6)
Using a tissue/cloth when coughing or sneezing	306 (72.5)	116(27.5)
Rubbing your hands on your face, hair, etc. while working	68 (16.1)	354(83.9)
Using an apron, mask, cap, and gloves at daily work	97 (23.0)	325(77.0)
Smoking in the workplace	100 (23.7)	322(76.3)
Reusing oil while preparing food	98 (23.2)	324(76.8)
Handling foods at work unhygienically while having diarrhea	9 (2.1)	413(97.9)

Table 3 revealed that all of the respondents gave positive answers when asked to wash their hands before processing food, after handling prepared food, before and after handling wrapped and unwrapped raw foods, after using the restroom, washing and sanitizing work clothes, using a knife to chop raw chicken, meat, or other raw food, cleaning utensils with detergent, using soaps or detergents to wash their hands, using a tissue or cloth when coughing or sneezing, cleaning the workspace

before beginning work, and trimming their nails short before beginning activities. On the other hand, the negative responses were 79.6%, 77%, 83.9%, 76.3%, 76.8%, and 97.9% for using jewelry and a watch while working, wearing an apron, mask, cap, and gloves at regular work, rubbing your hands on your face, hair, etc. while working, smoking in the workplace, reusing oil while preparing food, and handling foods at work unhygienically while experiencing diarrhea.

**Table 4: Distribution of the respondents according to their safety practices**

Food safety practices	Frequency (%)
Poor	10(2.4)
Average	405(96.0)
Good	7(1.7)
Total	422(100.0)

Table 4's results indicated that all respondents' safety practices were ranked as good, average, or poor, with 96% of them falling into the average category.

**Table 5: Distribution of the respondents by their knowledge regarding health hazards of the consumers**

Knowledge regarding health hazards	YES Frequency (%)	NO Frequency (%)
Bloody diarrhea can be caused by contaminated foods	348(82.5)	74(17.5)
Hepatitis A (jaundice) can be caused by contaminated foods	336(79.6)	86(20.4)
Salmonella (typhoid, paratyphoid) can be caused by contaminated foods	317(75.1)	105(24.9)
Abortion in pregnant women can be induced by contaminated foods	127(30.1)	295(69.9)
Influenza (influenza) can be caused by contaminated foods	313(74.2)	109(25.8)
Contaminated leftover chicken eaten cold causes foodborne diseases	343(81.3)	79(18.7)
Reheating cooked contaminated foods can cause abdominal discomfort	338(80.1)	84(19.9)
Raw or undercooked contaminated foods cause foodborne diseases	351(83.2)	71(16.8)
Food that is exposed without cover gets contaminated and causes foodborne diseases	361(85.5)	61(14.5)
Rice left overnight in the kitchen gets contaminated and causes foodborne diseases	338(80.1)	84(19.9)

Table 5 presented the distribution of respondents based on their awareness of the health risks posed by consumers. Of all the responders, 82.5% are aware that tainted food might result in bloody diarrhea. Four-fifth (79.6%) of

the respondents were aware that eating tainted food might result in Hepatitis A (jaundice), 75.1% are aware that contaminated foods can cause salmonella, which can cause typhoid and paratyphoid fever. Contaminated foods have the potential to cause abortions in expectant mothers; 69.9% were not aware. Three fourth (74.2%) of people were aware that tainted food can cause influenza, 81.3% were aware that eating cold, contaminated leftover chicken can lead to foodborne illnesses. Eighty-one percent of people are aware that reheating tainted food might upset your stomach. 83.2% are aware that contaminated raw or undercooked food can result in foodborne illnesses. 85.5% of people are aware that food that is left out in the open becomes contaminated and can lead to foodborne illnesses. 80.1% are aware that rice left in the kitchen overnight can become contaminated and lead to foodborne illnesses.

**Table 6: Distribution of the respondents according to their knowledge regarding health hazards of the consumers**

Knowledge of health hazards	Frequency (%)
Low	87(20.6)
Satisfactory	31(7.3)
Good	304(72.0)
Total	422(100.0)

Table 6 demonstrated that, of all respondents, there were three categories for their level of knowledge of health hazards: poor, satisfactory, and good, with 72% falling into the good category.

### Discussion:

The majority of respondents in this study were between the ages of 25 and 50, which is consistent with a prior study by Hossain et al. that indicated that a sizable number of the respondents in that study were between the ages of 20 and 40.<sup>22</sup> This study demonstrates a higher prevalence of males, however, a separate study conducted by Alamo-Tonelada, MBA et. al., reveals a higher prevalence of females, which contradicts the findings of this study.<sup>24</sup> In contrast to a prior survey by Fewja and Hassan, where 42.6% of the respondents had completed primary school, the study found that 37.2% of the respondents had completed secondary education.<sup>25</sup> Two-thirds (73.7%) of the respondents in this poll reported having worked for a company for more than 20 years. The results of this study were in conflict with another study by Fewja and Hassan, which shows that most respondents had less than five years of job experience.<sup>25</sup> According to the report, 78.9% of the respondents, or a sizable majority, made between 10001 and 30000 BDT per month. Significantly more than half of the participants (43%) in a different study by Hossain et al. reported having a monthly income between 5000 and 10,000 BDT.<sup>22</sup> This result, however, has no direct bearing on the current investigation. According to this study's findings, a significant percentage of participants

are married, which is consistent with Addo-Tham et al.'s earlier research showing that most responders are married.<sup>6</sup> Most of the study participants said they regularly consume gul, paan, and bidi/cigarettes. This result is consistent with another study by Hossain et al. that found that a significant proportion of the individuals consumed gul, paan, and bidi/cigarettes.<sup>22</sup>

According to the survey, 96.0% of the participants had safety practices that were within the typical range. Contrary to the results of this study, the majority of participants in another study by Hossain et al. demonstrated insufficient safety practices.<sup>22</sup>

The study's conclusions show that 72.0% of the participants knew a good amount about the health concerns connected to consumer behavior. In comparison, the majority of respondents in a different survey by Ma et al. indicated that they knew insufficiently.<sup>23</sup>

This study presents the participant distribution based on food safety practices as well as consumer health danger information. The table shows that a sizable percentage of people with less knowledge demonstrated mediocre food safety procedures. This also held for learning enough to be proficient. There is a strong association between consumers' awareness of health issues and their compliance with food safety regulations. This suggests that these two variables have a substantial association.

### Conclusion:

"Easy-to-enter" enterprises must be permitted to support individuals in developing countries such as Bangladesh, where a large number of people lack formal education and the population still lives in third-world circumstances. The results of this cross-sectional study of street food vendors in several areas of Dhaka city showed that the vendors follow average safety procedures and are well-informed about any possible health hazards. The lion's share of them needed any defense against the tidy within the zone. In any case, specialists must get instruction on themes like not wearing bangles or gems, utilizing tissues when hacking, utilizing veils, headgear, and gloves, and prohibiting the reuse of oil. Indeed, even though their capacity was insufficient, most of the sellers fizzled to supply new nourishment for the deal. The result of the think about sets the arrange for assist examinations on nourishment security and information approximately potential wellbeing dangers.

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