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Original Article

Knowledge on Food Safety and Hygiene Practices among Street Food Vendors of Dhaka City

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ABSTRACT

Introduction: *Food safety remains a consistent global health concern. Mishandling of food elevates the risk of contamination, posing potential health threats to consumers. The primary contributors to the spread of foodborne illnesses are often attributed to a lack of knowledge and improper hygiene practices among food handlers.* ***Objective:*** *This study aimed to assess knowledge on food safety & hygiene practices among the street food vendors of Dhaka city.* ***Methods & Materials:*** *This descriptive cross-sectional study was conducted across various areas within Dhaka city, including Dhanmondi, Mohammadpur, and Mirpur, from June to mid-October 2023. A total of 246 male street food vendors irrespective of age, were purposively employed in this study.* ***Results:*** *This study showed that as per overall knowledge scoring, the most frequent 96(39.5%) vendors had satisfactory knowledge on food safety and hygiene followed, 82(33.7%) low level of knowledge and 65(26.7%) good level of knowledge. The result revealed that majority of the respondents 76 (31.3%) was in the age group of 36 to 45 years and all were male, maximum was Muslim 237 (97.5 %), married 183 (75.3%) and from urban slum dwelling 172 (70.80%). Out of the total respondents, 98(40.3%) vendors had achieved primary level of education while 67 (27.6 %) had no formal education.* ***Conclusion:*** *This study suggests that awareness program, training programs, hygiene promotion campaigns, related to food safety &*

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hygiene need to be done targeting Street Food Vendors and related workforce to enhance their knowledge on food safety & hygiene.

Key words: *Street, Vendors, Food, Safety, Personal, Hygiene, Practice*

INTRODUCTION

Food is essential for life, and achieving "Zero Hunger" is a key sustainable development goal. However, simply ensuring food availability is not enough; the food must also be safe and free from pathogens to support growth and development effectively[1]. The FAO defines food safety as ensuring food is free from harmful chemical, physical, and microbiological hazards. Food safety is based on two key concepts: toxicity, which causes harm under any condition, and hazards, which are potential threats if not controlled. Street food safety depends largely on the vendors' knowledge and experience[2]. Food safety is an area of public health action to protect consumers from the risks of food poisoning and foodborne diseases, acute or chronic. Unsafe food can lead to a range of health problems: diarrheal disease, viral disease, reproductive and developmental problems, cancers[3]. The WHO and FAO define street-vended foods as ready-to-eat items sold by vendors in public places for immediate or later consumption, without the need for further processing[4]. Street food vendors operate from such places as bus terminals, industrial sites, market places, school compounds, or around the gates, road sides and other street corners where there are ready and numerous clienteles[5]. The food vendors are often poor, uneducated and untrained. They are often ignorant about basic personal hygiene, which are the principles necessary to maintain the safety of food[6]. World Health Organization (WHO) has developed five main keys to safer food, which include keeping clean, separating raw and cooked food, cooking thoroughly, keeping food at safe temperatures, and using safe water and raw materials[7]. The mishandling of food and the disregard of hygienic practices facilitate pathogens to come in contact with food and thereby cause illness in consumers. So good personal hygiene is emphasized to ensure proper handling of foods. Personal hygiene of the food handlers includes daily bathing, clean clothing, washing hands before meals and after toilet, care of nails, feet and teeth. Foods may acquire contamination at any stage of its production, processing, distribution, and preparation[8]. The unchecked growth of street-vended food strains city resources, disrupts urban planning through congestion and littering, and poses health risks. Unemployment and poverty drive many to enter the street food business, as it requires minimal experience and investment[9]. Rapid urbanization and modernization have led to more people working away from home, changing lifestyles. Over the past two decades, women increasingly joined the workforce to share financial responsibilities, driving a shift towards convenient street foods, which have become more popular among families[10].

Street-vended foods can lead to foodborne illnesses due to poor vendor hygiene and unsanitary conditions. The World Health Organization estimates that foodborne illnesses cause approximately 2.2 million deaths each year, with around 86% of these deaths occurring in children and street food are perceived to be a major public health risk[11]. But there are very few studies and limited data on this major public health issue in Bangladesh. Therefore, the researcher has designed this study. The aim of this paper was to explore the knowledge of food safety and hygienic practices among street food vendors of Dhaka city.

METHODS & MATERIALS

This descriptive cross-sectional study was conducted across various areas within Dhaka city, including Dhanmondi, Mohammadpur, and Mirpur, from June to mid-October 2023. The purpose of the study and its benefits were explained to the respondents, and verbal informed consent was obtained. The study population comprised male street food vendors who had been working in the selected areas for at least six months. A purposive sampling technique was used, and a total of 246 male street food vendors irrespective of age, were employed in this study. Data were collected using a semi-structured written questionnaire and checklist, both of which were pre-tested among 10 vendors outside the study area to ensure reliability. Additionally, questions assessing vendors' knowledge of food safety and hygiene practices, included seventeen category open-ended questions. Each “yes” response was scored 1 point, and a total score was calculated, categorizing knowledge levels as low (<50), satisfactory (50-75), or good (>75). The collected data were analyzed using IBM SPSS version 26.0. Descriptive statistical analysis was performed and the results were presented using in tables and charts as frequency and percentage. Ethical approval of this study was obtained from the Ethical Review Committee of Bangladesh Medical College, Dhaka, Bangladesh.

RESULTS

Table I shows distribution of demographic characteristics of the respondents. The most frequent age group among the participants was 36-45 years which includes76 (31.3%) of the participants, followed 26-35 years 62 (25.5%), 18-25 years59 (24.3%), 45-55 years38 (15.6%), and over 55 years8 (3.3%). The majority of the participants were Muslim 237(97.5%), followed Hindu5 (2.1%) and Christian 1(0.4%). The most frequent98 (40.3%) respondent had completed primary education, followed 67(27.6%) had no formal education, 55(22.6%) had secondary education, 17(7.0%) had higher secondary education, and 6(2.5%) had graduation degree. Most of the participants were married 183 (75.3%), followed single 58 (23.9%), widowed 1(0.4%) and divorced 1(0.4). The majority of the respondents lived in urban slum 172(70.8%). The majority of the respondents 53.9% were smokers, while 46.1% were non-smokers.

Table – I: Distribution of Demographic Characteristics of the Respondents (*n*=243)

Demographic Characteristics	Frequency *n*=243	Percentage
Age Groups (Years)		
18-25	59	24.3
26-35	62	25.5
36-45	76	31.3
45-55	38	15.6
>55	8	3.3
Religion		
Muslim	237	97.5
Hindu	5	2.1
Christian	1	0.4
Educational Level		
No formal Education	67	27.6
Primary	98	40.3
Secondary	55	22.6
Higher Secondary	17	7.0
Graduation	6	2.5
Marital status		
Married	183	75.3
Single	58	23.9
Widowed	1	0.4
Divorced	1	0.4
Residence		
Urban slum	172	70.8
City house	47	19.3
Rural area	24	9.9
Smoking status		
Smoker	131	53.9
Non-smoker	112	46.1

Table – II shows the distribution of the respondents by type of food sold at vending site. The most frequently sold food type was fried food 85(35%), followed by beverages 48(19.8%), grain and cereals 41(16.9%), other types of food 40(16.5%), and served fruits and vegetables 29(11.9%).

Table – II: Distribution of the respondents by type of food sold at vending site (*n*=243)

Type of Food Sold	Frequency	Percent
Served fruits and Vegetables	29	11.9
Fried Food	85	35
Grain & Cereals	41	16.9
Beverages	48	19.8
Others	40	16.5

Table III illustrates the distribution of the respondents by vending material use. The most frequently used material was wooden carts 159(65.4%), followed by container baskets 41(16.9%), other materials 25(10.3%), and canopies 18(7.4%).

Table – III: Distribution of the respondents by vending material used (*n*=243)

Material Used	Frequency	Percentage
Wooden Cart	159	65.4
Canopy	18	7.4
Container Basket	41	16.9

Others	25	10.3

Table IV shows the distribution of the respondents by place of preparation of food. The most common place of food preparation was at the stall 113(46.5%), followed by a combination of both home and stall 68(28%), at home 60(24.7%), and other locations 2(0.8%).

Table – IV: Distribution of the respondents by place of preparation of food (*n*=243)

Place of Preparation of Food	Frequency	Percentage
At Home	60	24.7
At Stall	113	46.5
Combine (both home and stall)	68	28
Others	2	0.8

Table V represents the distribution of the respondents by based on utensil washing practices. The most common method of utensil washing was in a bucket 157(64.6%), followed by washing by putting water on the plate 65(26.7%), and in a basin 21(8.6%).

Table – V: Distribution of the respondents by based on utensil washing practices (*n*=243)

Utensil Washing	Frequency	Percentage
In Bucket	157	64.6
In Basin	21	8.6
By putting water on plate	65	26.7

Table VI shows the distribution of respondents by based on the water source used for cooking. The most common source of water was tap water 178(73.3%), followed by filter water 33(13.6%), mineral water 16(6.6%), and tube-well water 16(6.6%).

Table – VI: Distribution of the respondents by based on the water source used for cooking (*n*=243)

Source of Water	Frequency	Percentage
Tap water	178	73.3
Mineral water	16	6.6
Filter water	33	13.6
Tube-well	16	6.6

Table VII shows the distribution of respondents based on their knowledge of personal hygiene and food safety practices. The majority of participants recognized the importance of personal hygiene and food safety practices: 178(73.3%) agreed that washing hands with soap before handling food is essential, while 169(69.5%) felt the same about washing hands after food handling. Most believed that proper hand washing reduces food contamination risk 174(71.6%), and that workers should trim their nails regularly 183(75.3%). However, only 103(42.4%) considered using aprons, masks, gloves,

and caps necessary. Opinions were mixed regarding wearing jewelry while handling food, with 169(69.5%) disagreeing about its safety. A split opinion was noted on handling money during food service, with 119(49%) agreeing it's unsafe. Cleaning utensils with soap was endorsed by 178(73.3%), and separating dirty from clean zones was supported by 183(75.3%). While 129(53.1%) thought repeated oil reuse is harmful, 161(66.3%) supported keeping raw and cooked foods separate. Serving cooked food hot was deemed important by 166(68.3%), and using food covers was favored by 186(76.5%). Finally, handling food while sick was considered dangerous by 166(68.3%).

Table – VII: Distribution of the respondents by based on their knowledge of personal hygiene and food safety (*n*=243)

Knowledge on Personal Hygiene and Food Safety	N (%)	
	Yes	No
Washing hand with soap & water before food handling is a part of personal hygiene	178 (73.3)	65 (26.7)
Washing hand regularly after food handling is a part of personal hygiene	169 (69.5)	74 (30.5)
Washing hand properly reduces risk of food contamination	174 (71.6)	69 (28.4)
Using an apron, mask, gloves and caps during food handling is a part of personal hygiene	103 (42.4)	140 (57.6)
Wearing jewelry while handling food is unsafe	74 (30.5)	169 (69.5)
Handling money while serving food is dangerous/unsafe	119 (49)	124 (51)
Workers should trim their nails regularly	183 (75.3)	60 (24.7)
Use of gloves reduces the risk of transmitting infection to consumers	136 (56)	107 (44)
Cleaning utensils with soap and water reduce food contamination	178 (73.3)	65 (26.7)
Separating dirty zone from clean zones can reduce food contamination	183 (75.3)	60 (24.7)
Repeated reuse of oil is harmful for health	129 (53.1)	114 (46.9)
Raw food should be kept separated from cooked food	161 (66.3)	82 (33.7)
Cooked food should be served hot	166 (68.3)	77 (31.7)
Using food covers is essential to reduce food borne disease	186 (76.5)	57 (23.5)
Using polythene pack for food packaging is unsafe	113 (46.5)	130 (53.5)
Handling food while sick or suffering from diseases like diarrhea, typhoid fever, jaundice, common cold is dangerous	166 (68.3)	77 (31.7)

Table VIII presents the overall level of knowledge assessment on food safety and hygiene of the respondents. The level of knowledge among participants was satisfactory 96(39.5%), followed by low knowledge 82(33.7%) and good knowledge 65(26.7%).

Table – VIII: Overall level of knowledge assessment on food safety and hygiene of the respondents (*n*=243)

Level of Knowledge	Frequency	Percentage
Low	82	33.7
Satisfactory	96	39.5
Good	65	26.7

DISCUSSION

This descriptive cross-sectional study aimed to assess knowledge on food safety and hygiene among the street food vendors of Dhaka city. This study's findings revealed that among 243 food vendors all the observed vendors were male and largest group among street food vendors, approximately one-third of them, falls within the age range of 36-45 years. Almost similar results were observed, with approximately 40% of vendors falling within the age bracket of 31 to 40 years[4,11]. Another study which found 34.21%.25 The next most prominent groups include those aged 26-35 years, accounting for about one-fourth of the respondents, and 18-25 years, representing nearly one-fourth as well. Smaller portions of the respondents belong to the age categories of 45-55 years (about 15.6%) and above 55 years (approximately 3.3%). In this study, the largest group, comprising the vast majority at 97.5%, consists of Muslims, with 237 individuals. Hindus make up a smaller fraction, accounting for 2.1% of the respondents, which is equivalent to five people. Christians are a minority in the sample, constituting just 0.4%, or one person. In this study, the highest proportion, representing 40.3% of street food vendors in Dhaka had completed primary education (Class 1-5). A smaller segment, constituting above one-fifth (22.6%), had received a secondary education (Class 6-10), while 7% had successfully completed higher secondary education. A very minor fraction, comprising only 2.5%, held a degree from a higher education institution. This study found study, the majority of respondents (75.3%) were married, followed by singles (23.9%). A small percentage of respondents were widowed (0.4%) and divorced (0.4%) and 53.9% were smokers, while 46.1% were non-smokers. Another study conducted in Barisal, Bangladesh found that 96.7% study subjects were male and3.3% were female, 50.5% study subjects were aged between 25-40 years, 37.4% can write only their name and 20,9% had completed only elementary school and among the vendors 86.8% were Muslim and 3.2% were Hindus[12]. These findings are in the lineage of our study to some extent and at the same time differs to our findings in some points This may be happened due to place and sample size variation of these two studies. In this study, it was revealed that 35.8% of the respondents' reported

interactions with fixed vendors, while the majority, comprising 64.2%, encountered mobile vendors. In contrast, a similar study conducted in Hubballi-Dharwad city, Karnataka, India, showed that 67% of the vendors used fixed carts, while 33% opted for mobile carts[13]. The findings of this study indicated that 35.0% of the respondents, totaling 85 individuals, were involved in selling fried food. In a similar study conducted in Bangladesh, it was observed that a higher percentage, specifically 76% of the vendors were engaged in selling fried food, surpassing the results of this study. Additionally, 29 respondents, or 11.9%, served fruits and vegetables. Furthermore, 41 respondents, representing 16.9%, sold grain and cereals, while 48 respondents, equivalent to 19.8%, offered beverages. The remaining 40 respondents, making up 16.5%, sold other types of food. In this study, it was observed that the majority of Street Food Vendors, specifically 65.4%, utilized wooden carts for their vending activities. Canopies were employed by a smaller percentage of respondents, accounting for 7.4%, while container baskets were used by 16.9%. A minor proportion, 10.3%, opted for other materials for their vending setups. Comparing these findings with other studies, a study on Street Food Vendors in Owerri, Nigeria, reported that 28.57% used wooden carts and another 28.57% used canopies[14]. In this study, it was found that 24.7% of the total sample preferred to prepare their meals at home. A larger group, consisting of 113 individuals (46.5% of the sample), favored food preparation at stalls. Another group of 68 respondents, equivalent to 28.0%, mentioned using both home and stall settings for food preparation. Meanwhile, a small fraction of just 2 respondents, constituting 0.8% of the total, noted different food preparation locations. Another study in India found that 20 % of the vending sites were near garbage and very few vending sites (7 %) were found to be vending nearby to any open drain. Only 2 % of the vending sites were operation with any open water source present close to the vending site[15]. However, as per knowledge scoring on food safety and hygiene practices among the street vendors of Dhaka city, this study investigated that the highest 96(39.5%) vendors had satisfactory knowledge, 82 (33.7%) had low knowledge and 65(26.7%) had good knowledge. These findings are almost in the lineage with some other studies[16-20].

Limitations of the Study

This study was conducted with a limited purposive sample size in Dhaka city over a short study period. Therefore, the results of this study may not reflect of the whole country.

Conclusion

The study uncovers notable insights into the awareness and practices of street food vendors concerning personal hygiene and food safety. The distribution of knowledge levels reveals a concerning proportion with low knowledge, emphasizing the imperative need for comprehensive training programs aimed at enhancing food safety awareness among food vendors. In conclusion, this

study's findings provide valuable insights into the observed and knowledge levels of food vendors regarding personal hygiene and food safety. The identified knowledge gaps, coupled with observed hygiene practices, draw attention to the necessity for targeted interventions, especially in areas such as: PPE utilization, utensil cleaning and food safety knowledge. These findings align with and reinforce the observations from previous literature studies, emphasizing the importance of continuous education and training programs to improve food safety practices among food vendors.

Recommendations

More awareness program related to food safety & hygiene need to be done targeting Street Food Vendors and related workforce to enhance their knowledge on food safety & hygiene.

Develop tailored food safety training programs for food vendors based on the type of food they sell. Different food types may require specific knowledge and practices to ensure safety.

Launch hygiene promotion campaigns targeting food vendors, emphasizing the importance of practices such as handwashing and glove usage and utilization of clean water for food preparation, cooking, and utensil cleaning

Establish regular monitoring and inspection mechanisms to ensure that food vendors comply with food safety and hygiene regulations

The study needs to be conducted on a large scale; more representative populations including woman are also needed to see the actual scenario.

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Conflict of Interest

The authors declare no conflict of interest.

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