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ISSN: 2617-0817 E-ISSN: 2789-5912

Original Article

Association of Vendor's Demographic Characteristics with Their Level of Knowledge on Food Safety and Hygiene - A Cross-sectional Survey in Dhaka City

DOI: dx.doi.org

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Received: 24 Jan 2024
Accepted: 26 Jan 2024
Published: 28 Feb 2024

Published by:
Sher-E-Bangla Medical College, Barishal, Bangladesh

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ABSTRACT

Background: *Street-vended food is a vital source of affordable nutrition in urban Bangladesh, especially for low-income populations. However, limited education, poor hygiene practices, and unsafe environments raise serious food safety concerns. Understanding how vendors' demographic factors influence their knowledge of hygiene and safety is essential for designing effective public health interventions.* ***Objective:*** *To assess the association between demographic characteristics of street food vendors and their knowledge of food safety and hygiene in selected areas of Dhaka city.* ***Methods & Materials:*** *A descriptive cross-sectional study was conducted from June to October 2023 among 243 male street food vendors in Dhanmondi, Mohammadpur, and Mirpur. Vendors were selected using purposive sampling. Data were collected using a semi-structured questionnaire and checklist. Knowledge was scored and categorized into low, satisfactory, and good levels. Statistical analysis included descriptive statistics and chi-square tests, with significance set at $p < 0.05$.* ***Results:*** *Of the 243 respondents, 33.7% had low knowledge, 39.5% satisfactory, and only 26.7% good knowledge. Knowledge levels were significantly associated with monthly income and vending site environment ($p < 0.05$). Residence and smoking status also showed significant relationships with knowledge, while age, education, marital status, and work experience did not. While most vendors recognized basic hygiene practices such as hand washing, importance of protective gear, safe packaging, etc. during food service.* ***Conclusion:*** *A substantial knowledge gap exists among street food vendors in Dhaka. Socioeconomic and environmental factors significantly influence awareness and practices. Targeted training, better infrastructure, and policy support are urgently needed to improve food safety in the informal food sector.*

Keywords: *Street food vendors, food safety, hygiene knowledge, Dhaka, demographic factors, public health, informal sector.*

(The Planet 2024; 8(1): 201-206)

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INTRODUCTION

Food is a fundamental human necessity, and achieving the Sustainable Development Goal of Zero Hunger requires not only food availability but also assurance of food safety.[1] The FAO defines food safety as the assurance that food, when consumed as intended, will not pose harm to health by being free of chemical, physical, and microbiological hazards.[2] Two core concepts underlie food safety: toxicity, the inherent ability of a substance to cause harm, and hazard, the potential risk posed by contaminants if not controlled.[3] Among food sources, street-vended foods present significant safety concerns due to unregulated practices and poor hygiene standards.[4] Street-vended foods, ready-to-eat items sold in public spaces are especially popular in developing countries for their affordability and accessibility.[5] Vendors typically operate in informal settings such as bus stations, schools, and roadside areas, often lacking proper sanitation and infrastructure.[6] Many street food vendors have little formal education or training, resulting in limited awareness of personal hygiene and food safety practices.[7] To address this,

ISSN: 2617-0817 E-ISSN: 2789-5912

WHO introduced the "Five Keys to Safer Food" to promote better handling practices: keeping clean, separating raw and cooked food, cooking thoroughly, storing food at safe temperatures, and using safe water and raw materials.[8] Despite these guidelines, many vendors continue to prepare food under unhygienic conditions. Contaminated water sources, proximity to waste, and lack of hand washing facilities significantly elevate health risks.[9] In countries like Bangladesh, street food serves as both a livelihood for thousands and a dietary staple for low-income populations.[10] Chattogram, the second-largest city in Bangladesh, faces compounded challenges due to urban crowding, water scarcity, and climatic factors that affect microbial growth and food safety.[11] The unregulated growth of this sector also contributes up to 40% of the daily diet for urban consumers in developing nations, making foodborne illness a serious public health concern. Common diseases linked to street food include typhoid, hepatitis A, shigellosis, and diarrhea. These are especially dangerous for children and immunocompromised individuals.[12] Therefore, evaluating the association of vendor's demographic characteristics with their level of knowledge on food safety and hygiene is critical to designing effective interventions, improving consumer safety, and supporting public health efforts.

METHODS & MATERIALS

This descriptive cross-sectional survey was conducted among street food vendors in Dhaka city, specifically in the areas of Dhanmondi, Mohammadpur, and Mirpur, from June to mid-October 2023. The study population included adult male street food vendors (aged ≥18 years) who had been working for at least six months in the selected areas, sold fully or partially homemade ready-to-eat foods, and were permanent staff. Vendors who were under 18, declined participation, or were serving customers during data collection were excluded. Using the standard sample size formula for a single population proportion with an expected prevalence of 72.5%, a calculated sample size of 306 was derived; however, due to time and resource limitations, 243 complete responses were analyzed. A purposive non-probability sampling technique was applied to select active vending locations near institutions and transport hubs within the three areas. Data were collected using a pre-tested semi-structured questionnaire and a checklist. The questionnaire captured socio-demographic data and assessed knowledge on food safety and personal hygiene, scored out of 100, with performance categorized into low (<50), satisfactory (50–75), and good (>75). Observational data on hygiene practices and site conditions were gathered through a checklist. Verbal informed consent was obtained, and data collection was conducted via face-to-face interviews. The collected data were analyzed using Statistical Package for Social Sciences (SPSS), version-26.0. Descriptive statistics were performed to determine frequency and percentage. Chi-square tests, independent sample t test and one way ANNOVA were performed to assess the association between socio-demographic characteristics of the food vendors and their level of knowledge on food safety and hygiene where ($p < 0.05$)considered as the level of significance with 95% CI> Ethical approval was obtained from the Bangladesh Medical College Ethical Review Committee, and participants' privacy and confidentiality were strictly maintained.

RESULTS

A total of 243 male respondents irrespective of age, were employed in this study. The largest group fell within the age range of 36-45 years, making up 31.3% of the total respondents. The next most prominent groups were those aged 26-35 years, accounting for 25.5%, and 18-25 years, representing 24.3% of the respondents. Smaller portions of the respondents fell into the age categories of 45-55 years (15.6%) and above 55 years (3.3%). Among the respondents, the highest percentage, 40.3%, had completed primary education (Class 1-5), followed by 27.6% who had no formal education. A smaller proportion, 22.6%, had secondary education (Class 6-10), while 7% had completed higher secondary education. A very small percentage, 2.5%, had graduated from a higher education institution (Fig-1). The data also revealed that 22 respondents, or 9.1%, reported a monthly family income less than 5000 Taka. A larger portion, 74 respondents, representing 30.5%, fell into the income range of 5001 to 10000 Taka. Moreover, 84 respondents, constituting 34.6%, reported a monthly family income between 10001 and 15000 Taka. Lastly, 63 respondents, making up 25.9%, reported a monthly family income exceeding 15000 Taka. This study found that 52.3% (127 respondents) had clean vending sites, while 47.7% (116 respondents) had dirty vending sites. Among the respondents, 47 individuals, which accounted for 19.3% of the total, resided in city houses. The majority, comprising 172 individuals or 70.8%, lived in urban slum areas. The remaining 24 respondents, making up 9.9% of the total, resided in rural areas (Fig-1). The distribution of respondents by their work experience, revealed several key insights. Four categories of experience were examined: "Less Than 5 Years," which accounted for 30.5% of the sample with 74 respondents; "5-9 Years," representing 37.4% with 91 respondents; "10-20 Years," encompassing 25.5% with 62 respondents; and finally, "More than 20 Years," making up 6.6% of the total with 16 respondents. According to the distribution of marital status, the majority, comprising 75.3%, with 183 individuals, were married, while 24.6%, with 60 individuals, were single. The most frequent 131(53.9%) respondent reported being smokers, while 112 respondents (46.1%) said they were non-smokers (Table-I). Table II presents the distribution of respondents based on their knowledge of personal hygiene and food safety (n=243). According to the distribution of respondents' awareness of various aspects related to personal hygiene and food safety, washing hands with soap and water before food handling was considered a part of personal hygiene, and 73.3% (178 respondents) were aware of this, while 26.7% (65 respondents) were not. Washing hands regularly after food handling as a part of personal hygiene was known to 69.5% (169 respondents), with 30.5% (74 respondents) not aware of it. Washing hands properly to reduce the risk of food contamination was acknowledged by 71.6% (174 respondents), while 28.4% (69 respondents)

ISSN: 2617-0817 E-ISSN: 2789-5912

were not aware. Using aprons, masks, gloves, and caps during food handling as a part of personal hygiene was recognized by 42.4% (103 respondents), with 57.6% (140 respondents) not recognizing this. Belief that wearing jewelry while handling food is unsafe was held by 30.5% (74 respondents), while 69.5% (169 respondents) did not share this belief. Handling money while serving food being considered dangerous or unsafe was acknowledged by 49% (119 respondents), and 51% (124 respondents) did not consider it unsafe. The importance of workers trimming their nails regularly was recognized by 75.3% (183 respondents), while 24.7% (60 respondents) did not recognize this importance. The use of gloves to reduce the risk of transmitting infection to consumers was known to 56% (136 respondents), and 44% (107 respondents) were not aware. Cleaning utensils with soap and water to reduce food contamination was acknowledged by 73.3% (178 respondents), while 26.7% (65 respondents) did not recognize this. The concept of separating dirty zones from clean zones to reduce food contamination was known to 75.3% (183 respondents), and 24.7% (60 respondents) did not know this. Repeated reuse of oil being harmful to health was recognized by 53.1% (129 respondents), and 46.9% (114 respondents) did not recognize this. Keeping raw food separated from cooked food was considered important by 66.3% (161 respondents), while 33.7% (82 respondents) did not consider it important. The belief that cooked food should be served hot was held by 68.3% (166 respondents), and 31.7% (77 respondents) did not share this belief. Using food covers to reduce foodborne diseases was recognized by 76.5% (186 respondents), while 23.5% (57 respondents) did not recognize this. The notion that using polythene packs for food packaging is unsafe was acknowledged by 46.5% (113 respondents), while 53.5% (130 respondents) did not acknowledge this. Handling food while sick or suffering from diseases like diarrhea, typhoid fever, jaundice, common cold was considered dangerous by 68.3% (166 respondents), and 31.7% (77 respondents) did not consider it dangerous (Table-II). As per knowledge scoring analysis, 82 (33.7%) respondents had low knowledge, 96 (39.5%) had satisfactory knowledge, and 65 (26.7%) had good knowledge (Table-III). The association of respondents' monthly income and surrounding environment with their level of knowledge was observed statistically significant (P<0.05)(Table-IV,Table-V) and the association between age, education level, marital status, experience, residence, smoking status and their knowledge of food safety was also observed statistically significant with only residence and smoking status(P<0.05)(Table-6).

Table – I: Distribution of the respondents by age groups (*n*=243)

Age Groups (Years)	Frequency (n)	Percentage (%)
18-25	59	24.3
26-35	62	25.5
36-45	76	31.3
45-55	38	15.6
>55	8	3.3
Total	243	100
Educational Level		
No Formal Education	67	27.6
Primary (Class 1-5)	98	40.3
Secondary (Class 6-10)	55	22.6
Higher Secondary	17	7
Graduation	6	2.5
Total	243	100
Monthly income (BDT)		
<5000	22	9.1
5001-10000	74	30.5
10001-15000	84	34.6
>15000	63	25.9
Total	243	100
Surrounding Environment of Venturing		
Clean	127	52.2
Dirty	116	47.7
Total	243	100
Residence		
City House	47	19.3
Urban Slum Ares	172	70.8
Rural Area	24	9.9
Total	243	100
Experience (years)		
< 5	74	30.5
5-9	91	37.4
10-20	62	25.5
>20	16	6.6
Total	243	100
Marital Status		
Married	183	76.3
Single	60	24.6
Total	243	100
Smoking Status		
Yes	131	53.9
No	112	46.1
Total	243	100

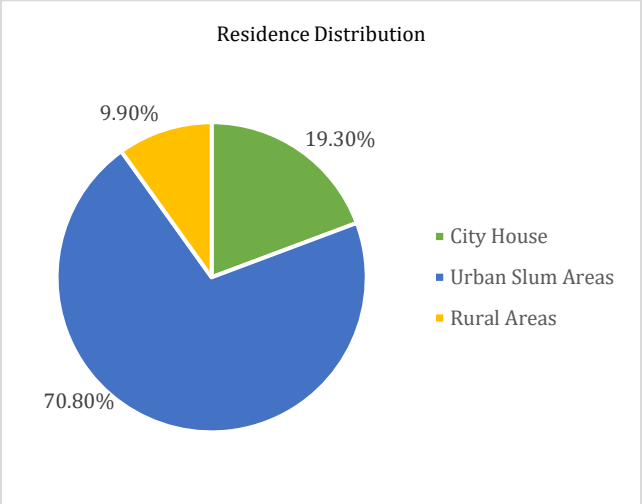

Figure - 1: Distribution of the respondents by residence (*n*=243)

ISSN: 2617-0817 E-ISSN: 2789-5912

Table – II: 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 – III: Distribution of the respondents by level of knowledge on food safety & hygiene (*n*=243)

Level of Knowledge	Frequency (n)	Percentage (%)
Low	82	33.7
Satisfactory	96	39.5
Good	65	26.7
Total	243	100

Table – IV: Association between level of knowledge with the monthly income of the respondents (*n*=243)

Monthly Family Income	Level of Knowledge			P-value
	Low	Satisfactory	Good	
Less Than 5000 Taka	10 (45.5%)	11 (50%)	1 (4.5%)	0.001
5001-10000 Taka	28 (37.8%)	32 (43.2%)	14 (18.9%)	
10001-15000 Taka	32 (38.1%)	32 (38.1%)	20 (23.8%)	
More Than 15000 Taka	12 (19%)	21 (33.3%)	30 (47.6%)	
Total	82 (33.7%)	96 (39.5%)	65 (26.7%)	

x2(df)=23.571(6); p=0.001

Table – V: Association between Level of knowledge and Surrounding environment of food vending sites (*n*=243)

Environment of food vending sites	Level of Knowledge			*P-value*
	Low	Satisfactory	Good	
Clean	24 (18.9%)	57 (44.9%)	46 (36.2%)	0.001
Dirty	58 (50%)	39 (33.6%)	19 (16.4%)	
Total	82 (33.7%)	96 (39.5%)	65 (26.7%)	

x2(df)= 28.248(2); p=0.000

Table – VI: Association of vendors' socio-demography with food safety knowledge (*n*=243)

	Knowledge Score		
Characteristics	Mean	SD	P-value
Age (years)[b]	63.77	22.408	0.13
18-25	67.14	25.152	
26-35	58.96	24.051	
36-45	61.18	26.122	
45-55	47.66	17.971	
>55	63.77	22.408	

ISSN: 2617-0817 E-ISSN: 2789-5912

Experience (years)[b]			
<5	63.51	22.188	0.064
9-May	57.14	25.964	
20-Oct	66.13	22.818	
>20	69.53	26.008	
Educational level[b]			
No Formal Education	59.51	23.596	0.523
Primary (Class 1-5)	60.91	25.515	
Secondary (Class 6-10)	65.57	23.536	
Higher Secondary	66.91	24.081	
Graduation	68.75	18.957	
Marital status[a]			
Single	63.69	24.177	0.592
Married	61.72	24.373	
Residence[b]			
City House	73.54	19.207	0.049
Urban Slum Area	61.56	24.145	
Rural Area	44.53	23.335	
Smoking Status[a]			
Yes	58.97	25.312	0.025
No	65.96	22.571	

Note: Bold values indicates statistically significant ($p < 0.05$).
aP-value was determined by independent sample t-test.
bP-value was determined by one-way ANOVA.

DISCUSSION

This study sheds light on a critical yet often overlooked segment of urban food systems, street food vendors whose knowledge and practices directly impact public health. The findings reveal a concerning gap in food safety awareness among vendors in Dhaka city, with only 26.7% demonstrating good knowledge and a significant 33.7% falling into the low knowledge category. This trend echoes similar observations from other urban centers in developing countries, where informal food sectors thrive amid limited regulation and education[13]. One of the most notable findings is the statistically significant relationship between residential background and food safety knowledge, with vendors from urban slums displaying considerably lower awareness compared to those from city housing areas. This may be attributed to poorer access to education, public health messaging, and sanitation infrastructure in slum areas, reinforcing social determinants of health as critical drivers of food safety behavior[14]. The surrounding environment of vending sites also emerged as a significant factor. Vendors operating in clean environments demonstrated markedly higher knowledge levels than those in unsanitary settings. This aligns with evidence suggesting that environmental cues and physical infrastructure can reinforce or undermine safe food handling behaviors[15]. For example, vendors with access to clean water and waste disposal facilities are more likely to wash hands and utensils properly, reducing cross-contamination risks[16]. Income also played a role, vendors from higher-income groups were more likely to demonstrate better food safety knowledge. This may be because higher income provides better access to resources like clean water, storage facilities, and possibly education, which influence both knowledge and practice[17]. However, formal education level, while showing some trend toward improved knowledge, was not statistically significant in this sample, suggesting that targeted training and awareness programs may be more effective than relying on formal education alone[18]. Another intriguing finding was the association between smoking status and food safety knowledge, non-smokers had significantly better scores. While the mechanism behind this is not fully clear, it could reflect broader health-conscious behaviors or a general difference in hygiene attitudes[19]. The study also revealed significant gaps in specific areas of knowledge, such as the use of protective gear, the risk of wearing jewelry during food preparation, and the dangers of handling money and food simultaneously. These results are consistent with earlier findings in Bangladesh and Kenya, where similar misconceptions and risky behaviors were reported among street vendors[20,21]. Given that nearly 75% of vendors live in slum areas and a substantial portion operates in unhygienic conditions, these knowledge gaps are not just individual shortcomings but systemic issues rooted in poverty, urban infrastructure deficiencies, and lack of regulatory oversight[22]. The implications of this study are clear: improving food safety among street vendors requires a multi-pronged approach, combining targeted educational campaigns, such as WHO's "Five Keys to Safer Food"[23], provision of basic infrastructure, and supportive policy frameworks that recognize and regulate street vending as a vital part of the urban food system. Training initiatives tailored to the specific needs and contexts of street vendors, perhaps delivered in collaboration with local NGOs or health departments, could help bridge the knowledge gap effectively. Ultimately, ensuring safe street food is not only about protecting consumers but also about empowering vendors with the knowledge and tools to operate responsibly. Doing so contributes to broader goals of urban health, food security, and economic inclusion.

ISSN: 2617-0817 E-ISSN: 2789-5912

Limitations of the Study

The study has a few limitations. It was conducted in only three areas of Dhaka and included only male vendors, which may limit the generalizability of the results. The use of self-reported data may have introduced bias, as respondents might have provided socially desirable answers. Additionally, the cross-sectional design prevents the establishment of causal relationships between variables.

Conclusion and Recommendations

This study reveals that while some street food vendors in Dhaka demonstrate a basic understanding of food safety and hygiene, a large proportion still lacks critical knowledge. Factors such as income, environment, residence, and smoking status were significantly associated with knowledge levels. Given the essential role of street food in both livelihoods and urban nutrition, these findings underscore the urgent need for targeted interventions to promote safer food handling practices. To improve food safety among street vendors, practical training programs tailored to their context should be implemented. Authorities should also work to provide better infrastructure such as clean water and waste disposal near vending areas. Policymakers should engage vendors in the development of food safety regulations, and community-level awareness campaigns can help reinforce key hygiene practices in accessible, relatable ways.

Conflict of interest: None declared

Funding: Self

REFERENCES

1. *World Health Organization (WHO). Food safety. Geneva: World Health Organization; 2022. P.1–12.*
2. *FAO/WHO. Codex Alimentarius: Food hygiene basic texts. Rome: Food and Agriculture Organization of the United Nations; 2009. P.40–45.*
3. *Rane S. Street vended food in developing world: hazard analyses. Indian Journal of Microbiology. 2011;51(1):100–6.*
4. *Muinde OK, Kuria E. Hygienic and sanitary practices of vendors of street foods in Nairobi, Kenya. African Journal of Food, Agriculture, Nutrition and Development. 2005; 5(1).*
5. *FAO/WHO. Street foods. Report of an FAO Expert Consultation. Jakarta: FAO Food and Nutrition Paper; 1997. P.20–23.*
6. *Rahman MM. Street food vending in Dhaka city: Socioeconomic profile and hygiene practices. Journal of Bangladesh Institute of Planners. 2013; 6:93–105.*
7. *Roever S. Informal Economy Monitoring Study Sector Report: Street Vendors. WIEGO; 2014. P.1–18.*
8. *WHO. Five Keys to Safer Food Manual. Geneva: World Health Organization; 2006. P.1–10.*
9. *Islam MA, Zaman M. Food safety in street food vending: A study in selected locations in Dhaka city. International Journal of Food Contamination. 2017;4(1):1–9.*
10. *FAO. Street foods: Report of an FAO Expert Consultation. Rome: Food and Agriculture Organization; 1989. P.20–30.*
11. *Khan MR, Afsana K. Street food in Dhaka city: Current scenario and policy implications. BRAC University Journal. 2012; 9(1–2):1–12.*
12. *Tambekar DH, Jaiswal VJ, Dhanorkar DV, Gulhane PB, Dudhane MN. Identification of microbiological hazards and safety of ready-to-eat food vended streets of Amravati City, India. Journal of Applied Biosciences. 2009; 14:782–7.*
13. *Rane S. Street vended food in developing world: hazard analyses. Indian Journal of Microbiology. 2011; 51(1):100–6.*
14. *Rahman MM. Street food vending in Dhaka city: Socioeconomic profile and hygiene practices. Journal of Bangladesh Institute of Planners. 2013; 6:93–105.*
15. *Roever S. Informal Economy Monitoring Study Sector Report: Street Vendors. WIEGO; 2014. P.1–18.*
16. *Islam MA, Zaman M. Food safety in street food vending: A study in selected locations in Dhaka city. International Journal of Food Contamination. 2017;4(1):1–9.*
17. *Tambekar DH, Jaiswal VJ, Dhanorkar DV, Gulhane PB, Dudhane MN. Identification of microbiological hazards and safety of ready-to-eat food vended streets of Amravati City, India. Journal of Applied Biosciences. 2009; 14:782–7.*
18. *FAO/WHO. Codex Alimentarius: Food hygiene basic texts. Rome: Food and Agriculture Organization of the United Nations; 2009. P.40–45.*
19. *Khan MR, Afsana K. Street food in Dhaka city: Current scenario and policy implications. BRAC University Journal. 2012;9(1–2):1–12.*
20. *Muinde OK, Kuria E. Hygienic and sanitary practices of vendors of street foods in Nairobi, Kenya. African Journal of Food, Agriculture, Nutrition and Development. 2005;5(1).*
21. *FAO/WHO. Street foods. Report of an FAO Expert Consultation. Jakarta: FAO Food and Nutrition Paper; 1997. P.20–23.*
22. *FAO. Street foods: Report of an FAO Expert Consultation. Rome: Food and Agriculture Organization; 1989. P.20–30.*
23. *WHO. Five Keys to Safer Food Manual. Geneva: World Health Organization; 2006. p. 1–10.*