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Food Handling and Personal Hygiene Practices among *Momo* Vendors in Jaipur City, Rajasthan

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Abstract

Street food is ready to eat food, easily available, and offers a lot of varied choices, supporting different sections of society differently. Along with numerous benefits, street food poses a great threat to public health in which street food vendors are major culprits. Vendors are often less educated and do not follow proper hygiene and safety practices. The present study was conducted to assess the hygiene and food handling practices of 100 *momo* vendors from five street food vending hubs of Jaipur city and to create awareness regarding safe food handling practices. A pretested questionnaire was used to collect data from them. Almost all the vendors served food with bare hands and without wearing apron. Majority (65%) of vendors did not keep raw and cooked food separate and non-food items were stored along with food supplies. In 37% of vending sites, flies were seen harboring in the vicinity of the vending units. Presence of pests such as cockroaches, ants, and rats was observed around 18% vending outlets. Vendors often follow a low level of personal hygiene practices. There is a need to regulate these vendors with mandatory training and certification. Collective efforts of both vendors and official authorities are required to bring the changes.

Keywords: Food vendor, Handling, Hygiene, *Momo* vendors, Safety, Street food

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Introduction

Food and agriculture organization defines street food as "ready-to-eat foods and beverages prepared and/or sold by vendors or hawkers especially in the streets and other similar places."[1] The trend of commercially vended food is boosting day by day and among this street-food sector has seen noticeable growth especially in urban areas. The popularity of street food could be attributed to various transitions such as urbanization, rapid industrialization, technology advancement, long working hours, hasty lifestyle, and abundance of food outlets. It is estimated that around 2.5 billion people consume street food daily.[2] People are more inclined toward making easier choices that are less time consuming and street food provides a great option of ready to eat foods. Street food proves to be a better option because of its easier availability, convenience, inexpensive nature, and is often helpful in providing nutrition to many. It is also a source of livelihood to many as it provides a great option for job opportunities thus, acts as boon for low-income men and women.[3]

Despite providing numerous benefits to almost all sections of society, street food could also lead to many illnesses which may become fatal. As reported by the World Health Organization, "First ever estimates of the global burden of food-borne diseases show almost one in ten people fall ill every year from eating contaminated food".[4] Street food safety highly depends on the vendors, as they possess greater responsibility for maintaining it. Vendors are often illiterate and a majority of them do not follow basic hygiene practices and take safety measures during various operations which, in turn, leads to contamination of food and thus risk the health of consumers. Many a times, vendors even lack basic facilities such as proper infrastructure and water facilities. India is a rapidly growing country and faces a lot of rural-urban migration. This factor is also affecting the eating habits of the population. As street food does not require further processing; hence, it becomes a convenient choice to make. Thus, street food such as *poha, vada pav, dosa, and momos* are becoming an important part of cities especially metropolitan cities.[2] It is important to gain insight into various hygiene and safety practices followed by vendors. *Momos* are popular across the Indian subcontinent and the Himalayan regions of broader South Asia. The demand for *momos* is increasing day by day among consumers due to its non-oily nature, distinct taste, and demand among Indian consumers for steamed foods.[5] *Momos* have created a new entrepreneurship opportunity ranging from being street vended to being served in restaurants.

Significance of the Study

Personal hygiene is important aspect for food handlers. They possess greater responsibility to break the chain of transmission of various diseases from carrier to food and from food to consumers. In India, food vendors lack awareness regarding sanitation and hygiene practices to be followed. Therefore, for the sake of public health, it is important to gain insight on various approaches adopted by vendors during vending. The need of the hour is to increase consumer awareness by providing sufficient information

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on different hygiene practices followed by the street food vendors and thereby reducing public health risk associated with street food. This study could potentially contribute towards formulating various guidelines for the vendors and developing educational programs for them.

Objectives of the Study

The objectives of the study are as follows:

- To assess the food safety and hygiene practices followed by *momo* vendors of Jaipur city.
- To assess the common waste management systems practiced by the *momo* vendors.
- To create awareness among *momo* vendors about good hygiene practices.

Materials and Methods

This study was conducted on 100 *momo* vendors in Jaipur city of Rajasthan. After doing mapping of Jaipur city, few locations were identified where street vendors stand in clusters and out of these areas, five locations were selected for the study. Twenty *momo* vendors each from these five locations – Mansarovar, Vaishali Nagar, Gaurav Tower, Bagadia Bhawan, and Raja Park were selected purposively for assessing hygiene and safety practices. The inclusion criteria were:

1. Both mobile and stationary vendors
2. Only street *momo* vendors
3. Vendors vending only vegetarian *momos*

The exclusion criteria were:

1. Vendors serving in permanent establishment
2. Non-vegetarian *momos*
3. Street vendors other than *momo* vendors
4. Vending unit that had no food handler during data collection

A questionnaire was used as a tool to collect information on the food handling and hygiene practices, garbage disposal practices, and personal hygiene and health status of *momo* vendors. A pilot survey was also performed on ten vendors to remove ambiguities.

Demographic information included general information such as age, gender, education qualification, and experience in vending. The second section included questions which were asked from the vendors and certain observations made by the researcher at the point of data collection. The questions were related to storage practices followed by vendors, practices followed during the preparation of food, various cleaning measures adopted, and various waste management practices followed the health status and personal hygiene of vendors. Data were tabulated and analyzed, further the results were presented in terms of frequency and percentage.

Pamphlets were created to impart awareness regarding good food handling practices, waste management, and proper care and maintenance of food cart.

Results and Discussion

Demographic Profile of Vendors

Demographic profile included age, sex, level of education, and experience in vending and type of cart used and the results are presented in Table 1.

A vast majority (48%) of *momo* vendors belonged to 20–30 years of age group. Very few (10%) of them were below 20 years of age and above 40 years of age (7%). In a study conducted in Allahabad city, India, it was noticed that the majority (53%) of vendors were of 25–35 years of age.[6] It was observed that 95% were male vendors and 5% of vendors were female. Similar findings were also reported from other studies where vending was found to be male-dominated.[7]

Most of the vendors (37%) had education up to primary level and 30% up to senior secondary level. About 28% of the vendors were uneducated while 5% were graduates.

The experience in street food vending was found to be above ten years for 27% of the vendors and 33% had an experience of fewer than five years in this field, whereas the majority of vendors 40% were with 5–10 years of experience. The results are in acceptance with the study conducted by in Chennai.[8]

Details about various features such as the type of vending cart and condition of vending unit are given in Table 2. About 47% of the vending units were in a condition so as not to contaminate the food through physical hazards such as chipping surface, loose nails, or breakages. It was further observed that 47% of vending carts were located at adequate distance from other stalls to avoid contamination while others were not. About 64% of vending units had working surface located 60–70 cm above the ground. About 6% vendors had kept food containers 15.0 cm above the ground. In most (90%) of the vending units, dust was visible on the cart.

Table 1: Demographic profile of vendors

Variables	*Categories*	*Percentage (n=100)*
Age (years)	<20	10
	20–30	48
	30–40	35
	Above 40	07
Sex	Male	95
	Female	05
Level of education	Uneducated	28
	Primary level	37
	Up to senior secondary	30
	Graduate	05
Experience in vending (years)	<5	33
	5–10	40
	>10	27

Table 2: Features of vending cart

Variables	*Categories*	*Percentage (n=100)*
Type of vending cart used	Mobile	25
	Stationary	55
	No vending cart	20
Presence of physical hazards such as chipping surface, loose nails, or breakages at stall	Yes	53
	No	47
Adequate distance from other stalls to avoid cross-contamination	Yes	47
	No	53
Working surface located 60–70 cm above the ground surface	Yes	64
	No	36
Food containers kept 15.0 cm above the ground	Yes	67
	No	33
Presence of dust on cart	Yes	90
	No	10

Table 3: Practices related to preparation and service of food

Variables	*Category*	*Percentage (n=100)*
Type of water used for preparation	Filter water	18
	Tap water	72
	Purchased bottle	10
	Other sources	-
Treatment of water before using	Yes	-
	No	100
Preparation of *Momos*	At home	
	At vending site	67
	Purchase from somewhere	33
		-
Preparation of chutney	At home	55
	At vending site	45
	Purchase from somewhere	-
Washing of fruits, vegetables, and grains thoroughly before preparation	Yes	100
	No	-
Proper covering of food is done	Yes	22
	No	78
Presence of flies around the food	Yes	37
	No	63
Presence of pests around the establishment	Yes	18
	No	82

Table 4: Practices related to storage of food

Variables	*Categories*	*Percentage (n=100)*
Inspection of all food and other supplies for damage, spoilage or infestation on receipt.	Yes	100
	No	-
Refrigeration of perishable items	Yes	100
	No	-
Storage of leftovers in refrigerator	Yes	82-18
	No	
	Not applicable	
Usage of first in first out concept for food	Yes	97
	No	03
Checking manufacture/expiry date of food items	Yes	60
	No	40
Regular cleaning of refrigerator	Yes	80
	No	20
Time gap between preparation and service of *Momos*	1–4 h	14
	4–8 h	56
	8–12 h>12 h	23
		07
Time gap between preparation and service of chutney	1-4 h	0
	4-8 h	25
	8-12 h	27
	12-24 h	41
	>24 h	07
Proper care taken to keep raw and cooked food apart	Yes	35
	No	65
Non Food items stored separately from food supplies	Yes	30
	No	70

Practices Related to Preparation and Service of Food

Data related to practices followed during preparation and service of food have been presented in Table 3. About 72% of vendors used tap water for preparation of food and other activities whereas 18% said that they used filtered water for preparation. Similarly, it was reported that most of the urban street food vendors (78.5%) used the water available through municipal water supply for cooking.[9] Further it was noted that about 85% used the tap water for food preparation supplied by Noida Industrial Development Authority and only 15% of vendors used filtered/R.O water.[2]

None of the vendors in the present study did any treatment to water before using it. It was observed that 67% of vendors prepared *momo*s at home and 55% of vendors prepared chutney at home. All vendors said that they wash fruits, vegetables, and grains thoroughly before preparation. Hence, the results were in agreement with the study conducted in New Delhi, where 96% of the food vendors washed fruits and vegetables before cutting.[10] About 78% of vendors did not give due attention to cover their food items. In 37% of vending sites, flies were seen harboring the vicinity of the vending unit. Presence of pests such as cockroaches, ants, and rats was observed in the vicinity of 18% vending units.

Practices Related to Storage of Food

Proper storage conditions are very important for a food service unit. Improper storage of various ingredients and other food items often leads to the growth of microorganisms. The details of various practices adopted for management and storage of food by *momo* vendors are shown in Table 4.

All vendors responded that they inspect all food and other supplies for damage, spoilage, or infestation, on receiving and refrigerated the perishable items properly. The majority (82%) of vendors said that they store the leftovers in the refrigerator. Nearly all (9 %) of the vendors practiced first in and first out concept for different food ingredients and items. Only 60% of the *momo* vendors checked the manufacture and expiry date of food items. However, in the study conducted by Khan *et al*., around 8% of the street vendors stored the left overs under refrigeration and only 5.5% of the street vendors were following the practice of checking expiry date of the food ingredients.[7]

Most of the vendors (80%) said that they cleaned the refrigerator regularly. About 56% of the vendors had a time gap of 4–8 h between preparation and service of *Momo*s followed by 23% with a time gap of 8–12 h and only 14% served *Momo*s within 1–4 h of preparation. Majority (41%) of the vendors prepared the chutney before 12–24 h of service while only 7% prepared the chutney >24 h before service. None of the vendors prepared chutney between 1 and 4 h before service. In a cross-sectional study conducted in South Delhi, it was reported that 38.5% of the food vendors prepared food on the morning of sale only.[10] The majority (65%) of vendors did not take care of keeping raw and cooked food apart as well as most (70%) of them did not pay much attention to store non-food items separately from food supplies.

Cleaning and Handling Practices of Vendors

Various practices such as handing of cooked food and utensils of vendors during vending are detailed in the Table 5.

All vendors responded that they washed utensils every day. When asked about the frequency of washing the steamer used for *momo*s preparation, around 97% of the vendors responded that they washed it daily whereas only 3% of vendors admitted to washing it twice a day. Nearly, 10% of vendors washed clothes used for covering food every day, 38% after every two days and about 52% once a week. In contrary to this, a study reported that 77% of vendors washed clothes used for covering once a week and 20.5% after every 2 days.[2] In the present study, a majority (73%) of

Table 5: Practices related to cleanliness

Variable	*Category*	*Percentage (n=100)*
Cleaning of all utensils and cutlery everyday	Yes	100
	No	-
Frequency of washing the steamer	Once a day	97
	Twice a day	03
	Once a week	-
Frequency of washing clothes used for covering food	Every day	10
	After every two days	38
	Once a week	52
	Once a month	-
Hands used instead of tongs to pickup food item	Yes	66
	No	34
Food served with bare hands	Yes	95
	No	05
Type of utensils used for serving	Steel plates	03
	Plastic plates	05
	Paper plates	60
	Newspaper	-
	Thermocol	32
	Other	-
Unused pots and pans stored in clean and sanitary conditions	Yes	18
	No	82
Serving utensils handled and stored hygienically	Yes	33
	No	67
Clean and well-maintained preparation area	Yes	23
	No	77
proper storage of potable water	Yes	35
	No	65
Proper facility of cleaning, washing and sanitization of utensils and appliances	Yes	30
	No	70
Residue buildup in steamer, utensils etc.	Yes	60
	No	40

vendors were not familiar with the techniques used for sanitization of utensils whereas few (27%) of them knew about it.

One-third of the vendors used hands instead of tongs to handle food items. About 95% of vendors served food with bare hands. Bare hands cause food contamination as enteropathogens can survive on hands for three hours or longer. The serving utensils are equally important in the spread of contaminants and infection. It was found that 60% of the vendors used to sell their food in paper plates while thermocol plates were used by 32% of vendors to serve *momos*. A study reported the usage of paper plates by street food vendors as 22%.[7] More than 80% of vendors did not store unused pots and pans in clean and sanitary conditions. Similarly, a large percentage of vendors (67%) did not handle and store the serving utensils hygienically. It was observed that around 77% of vendors did not clean and maintain the preparation area well. Not even one-fourth of the vendors had a proper clean and well-maintained preparation area. The majority (65%) of vending units did not have proper storage of potable water. In about 70% of vending units, there was no proper area for cleaning, washing, and sanitization of utensils. Residue built up in steamers and utensils of 60% vendors was also observed.

Practices Related to Waste Management

The cleanliness of the vending unit and its surrounding is also very important. Various practices of management of garbage and waste were recorded and are given in Table 6.

Table 6: Practices related to waste management

Variables	*Categories*	*Percentage (n=100)*
Availability of dust bins near the vending site	Yes	80
	No	20
Proper facility available for liquid waste disposal	Yes	43
	No	57
Covered garbage boxes	Yes	23
	No	57
	NA	20
Garbage lying around in vicinity	Yes	73
	No	27
Washing of garbage containers regularly	Yes	55
	No	25
	NA	20

It was observed that 80% of vending units had dust bins present near the vending site. Nearly, similar observations were reported in the street food vendors of Chennai city.[8] Along with this, about 43% of vending units had a proper facility for disposal of liquid waste. About 56% of the vending units had uncovered garbage boxes. It was also observed that around 73% of vending units had garbage lying around them. It was also observed that 55% of the vendors washed the garbage containers regularly.

Health and Hygiene Status of Vendors

Details about health status of vendors are given in Table 7. When asked about the health status of vendors, only 3% of vendors responded that they were suffering from some kind of ailments of the respiratory system. About 15% of vendors said they either suffered from or just recovered from any contagious or food-borne disease. Doibale *et al*. also reported 4% of vendors as suffering from a respiratory problem in Aurangabad, Maharashtra.[11]

On the spot observation indicated that none of the vendors used headgear during the vending operation (Table 8). It was also observed that majority of vendors carried out vending operations without the use of apron (92%) and hand gloves (97%). Similar findings were reported in other studies.[9,10,12] In a study conducted in Delhi, it was observed that 98% of vendors practiced selling their food items without wearing gloves, 79% did not cover their head, and 76% did not wear an apron.[2]

In the present study, only 15% of the vendors practiced frequent cleaning of their hands. More than half (53%) of the vendors had clean hands which were free from cuts and cracks. Only 35% of vendors had clean, trimmed, and unvarnished nails. About 32% of vendors had short hair whereas the majority (68%) had long hair. Similar findings regarding the personal hygiene of street food vendors have been reported from other parts of the country.[10] None of the *momo* vendors from Jaipur city were observed smoking in the food preparation area; however, 5% of vendors were observed spitting on floor or in sinks. In contrary to this, it was observed 25% of vendors smoking/chewing gutka/pan while cooking or serving food operations.[9] Nearly, three-fourth (73%) of the vendors were wearing either jewelry or wristbands. Even Kumari *et al*. reported similar findings and stated that (82%) wore hand accessories.[12] It was further noted that only 30% of the vendors wore clean clothes.

Awareness Regarding Good Food Handling Practices

A series of pamphlets were developed in Hindi language related to the following topics:

Table 7: Health status of vendors

Variables	*Categories*	*Percentage (n=100)*
Suffering from ailments of respiratory tract	Yes	03
	No	97
Suffering from or just recovered from any contagious or food borne diseases.	Yes	15
	No	85

Table 8: Personal hygiene of vendors

Variable	*Categories*	*Percentage (n=100)*
Usage of headgear	Yes	-
	No	100
Usage of apron	Yes	08
	No	92
Usage of mouth cover	Yes	-
	No	100
Cleaning of hands whenever required	Yes	15
	No	85
Hands clean and free from cracks	Yes	53
	No	47
Fingernails clean, trimmed, and unvarnished	Yes	35
	No	65
Hair of vendor cut short	Yes	32
	No	68
Food handler observed smoking or eating in food preparation area	Yes	-
	No	100
Food handler been observed spitting on floor or in sinks	Yes	05
	No	95
Food handler use clean handkerchief or cloth to clean hand	Yes	28
	No	47
	Not observed	25
Food handler wearing any kind of jewellery or wristband	Yes	73
	No	27
Condition of cloths of handler	Clean	30
	Moderately clean	57
	Dirty	13

- Washing and sanitization
- Storage practices
- Preparation and service of food
- Personal hygiene of vendors
- Upkeep of cart
- Waste disposal management

The pamphlets included more illustration-based information to suit the requirement of all the vendors under the study. The pamphlets also aimed to impart information regarding guidelines issued by FSSAI under "Clean Street Food Hub Initiative," regarding the design and construction of *Momo* carts. Pamphlets were distributed for the future use.

Conclusion

In the present study, low level of compliance with hygiene practices and disregard of safety measures was found. Even the basic safety measures such as wearing apron, gloves, and headgear were not followed. Thus, risking the quality of food and health of consumers. There is a need to provide extensive and regular training to vendors to ensure proper hygiene practices. Street food vendors must be registered. Time to time inspection by local authorities should be done to keep a check on the vendors. Collective efforts are required by both vendors and official authorities to bring positive changes.

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References

1. Food and Agriculture Organization. Good Hygienic Practices in the Preparation and Sale of Street Food in Africa. Rome, Italy: Food and Agriculture Organization; 2010. Available from: http://www.fao.org/3/a-a0740e.pdf. [Last accessed on 2022 Jan 02].
2. Singh AK, Singh NP, Chaturvedani AK. Food safety and hygiene practices among street food vendors in Noida, Uttar Pradesh, India. Int J Curr Microbiol App Sci 2018;7:2340-7.
3. Gargi S, Mukta A, Kailash A. Physico-chemical and microbiological quality assessment of street foods sold in Jaipur city of Rajasthan. Food Sci Res J 2016;7:270-5.
4. World Health Organization. WHO Estimates of the Global Burden of Foodborne Diseases: Foodborne Disease Burden Epidemiology Reference Group 2007-2015. Geneva: World Health Organization; 2015.
5. Bepary R, Wadikar D, Patki P. Momo-a traditional food of Himalayan belt. Indian Food Industry Mag 2015;34:48-52.
6. Gawande HA, Mishra AA, Shukla RN, Jyoti J. Socioeconomic profile of street food vendors and quality evaluation of Samosa and Panipuri in Allahabad City, (UP) India. Int J Agric Food Sci Technol 2013;4:275-80.
7. Khan MS, Sayeed A, Akter A, Islam MA, Akter S. Food safety and hygiene practices of vendors during chain of street food production in Barisal city. Food Saf Health 2018;1:57-65.
8. Saravanan AV, Sibyl S, Bennadi D, Kshetrimayum N. Food safety among food vendors in chennai city-a cross sectional survey. Int J Pharma Res Health Sci 2016;4:1466-9.
9. Kotwal V, Satya S, Naik N. Food safety and hygiene practices among urban and rural street food vendors: A comparative study in and Around Delhi, India. Int J Curr Res 2018;10:65500-6.
10. Sharma P, Kumari S, Panesar S, Yadav G, Chandrawanshi L, Salodia U. Food hygiene perceptions and safety practices among street food vendors in South Delhi: A cross-sectional study. Int J Sci Res 2017;6:589-92.
11. Doibale MK, Mohite SD, Sawase GB, Pagadal PH. Study of socio-demographic profile and causes of street vending in urban area, Aurangabad, Maharashtra. Int J Community Med Public Health 2019;6:4005.
12. Kumari S, Sharma P, Yadav G, Salodia U, Chandrawanshi L, Kishore J. Assessment of hygiene status and environmental conditions among street food vendors in South-Delhi, India. Epidem Int 2017;2:4-9.