



RESEARCH ARTICLE.....

Identification of critical control points for street foods in Puducherry

S.B. Narayanan, V.J. Ajaykumar, Bhanu Rekha and Nithya Quintoil

ABSTRACT..... Street food is a major attraction for tourists and natives of Puducherry and its popularity can be attributed to its variety and affordability. This study was undertaken to assess the critical control points for the street food available in Puducherry. Information was collected by interview and observation. Thirty outlets were visited and information on demographic data on vendors and hygienic practices during the production and dispensing of food items was collected. Drinking water and hand wash samples of vendors were collected and subjected to microbial analysis. It was found that 26.7 per cent were not aware of licensing and only one respondent had FSSAI registration. Raw leafy vegetables were not washed by 56.7 per cent vendors. Most of vendors (93.3 %) were handling food and collecting cash at same time, 70 per cent without washing hands in between. Same person handled food and waste at 73.3 per cent of shops, half of them only washed hands in between. Presence of coliforms were detected in 40 per cent of the drinking water samples and 100 per cent of hand wash water samples, indicating gross contamination. Results of study indicated that, handling of cash and food without washing hands in between, handling food as well as waste by same person at a time, less availability of quality water and use of unwashed raw leafy vegetables as critical control points of street food hygiene in Puducherry. The results show the need for bringing street food vendors together at different points in city so that availability of quality water and proper waste disposal can be ensured to improve the quality of street food. Also training these vendors in hygienic food preparation and handling is a must to overcome the lacunae in their existing knowledge level. Strict implementation of licensing for street food in Puducherry is essential to ensure food safety in street foods.

KEY WORDS..... Street food hygiene, Critical control points

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INTRODUCTION.....

Puducherry is one of the major attractive tourist

locations in south India with around 16 lakhs of tourists
visiting annually. Food is one of the major attractions in

Puducherry for the travelers and natives. Most of the world cuisines are served in different restaurants of Puducherry. Street food is a major attraction for tourists and natives of Puducherry. As Puducherry is also an educational hub, street food is also popular among the students. As per FAO, street foods are defined as ready to eat food sold by vendors and hawkers especially in the street and or other similar places (FAO, 1989). Street food vendors caters in different locations of Puducherry with a wide variation of type of outlets from platform type, pulling cart and to modern food trucks. The street food is often considered to be an agent for food born illness. There are limitations for street food vendors in maintaining hygiene due to reasons like, insufficient supply of good quality water, lack of cleaning facilities, financial constraints etc. Understanding the lacunas in the hygienic practices is essential to improve the food safety. Hence, this study was conducted to assess the critical control points for the street food contamination in Puducherry.

RESEARCH METHODS.....

Street food vendors in Puducherry town and surrounding areas were included in this study. A total of 30 street food vendors were randomly approached and information was collected by a pre-structured questionnaire by interview and observation. The demographic data of vendors and hygienic practices during the cooking and dispensing of food items was collected. This included the personal details of vendors like sex, age, educational qualification and whether doing part time or fulltime business, the type of facility(push carts/platform type/others) was also noted. The information of hygienic practices followed like hand washing, handling of money, disposal of waste, use of soap and towel were collected. The details about the food served like, veg or non-veg, type of meat used, place of procurement, type of cooking, storage and handling of food, washing of dishes were also collected. The amount and source of water used by them were also assessed. Water samples (drinking water) were collected for microbiological examination. The hand wash samples of the vendors were collected during the process of cooking and serving of the food. These samples were collected in sterile containers and examined for coliforms following standard procedures. The data collected was analyzed as per the procedure by Snedecor and Cochran (1994).

RESEARCH FINDINGS AND ANALYSIS.....

Results of this study shows that majority of the street food vendors were males (63.3 %). However, the percentage of males were less compared to the earlier studies by Singh *et al.* (2018) who reported 85 per cent males, Qureshi *et al.* (2015) who reported 86.6 per cent males among street food vendors of Noida and Kashmir, respectively. This indicates the willingness of women in the UT of Puducherry to enter into street food business in comparison to other parts of India. As indicated in Table 1, most (56.7 %) of vendors were of the age group of 36-50 years. 26.7 per cent were above 50 years and 16.6 per cent were of age group of 20- 35 years. Similar studies conducted earlier have reported much younger average age for the street food vendors. Mukherjee *et al.* (2018) and Singh *et al.* (2018) reported that maximum number of vendors were of the age group of 20-40 years and 15-30, respectively. The higher age group of vendors in Puducherry may be due to the fact that a greater number of people are sticking on to the business for long time and a smaller number of youngsters entering into the business. Marital status of vendors revealed that most of them were married (76.7%). This was similar to the findings of Mukherjee *et al.* (2018) where most of the vendors (80.19%) were married. Finding was contradictory to the similar studies in Ethiopia 64 per cent were single in marital status (Adane *et al.*, 2018). Among the respondents, 43.3 per cent were drop outs from schools before tenth standard, 26.7 per cent had completed schooling and 20 per cent had not gone to school but were able to read. However, 10 per cent of them were graduates. The educational qualification in comparison to other parts of country is much higher as Joglekar and Bhoi (2013) reported out of 200 vendors 15 per cent were illiterate and only ten percentage attended the college. The vendors surveyed during this study had been running the business for a period ranging from one year to more than more than 50 years. The average years of experience for vendors is 7.9 years which is less than the finding of Mukherjee *et al.*, 2018 who reported the same as 13 years. In Puducherry the street food business is growing and new shops are coming up. The monthly income of street vendors in Puducherry ranged from around five thousand to two lakhs rupees. Half of the vendors had a monthly income ranging from 20,000 to 50,000 rupees which is much higher than the income of 5,000-10,000 rupees per month reported by Reang and

Bhattacharjya (2013). The higher income of the vendors shows the potential of this business in Puducherry and it also explains the reason why most of vendors stick to the same business

As shown in Fig. 1, most of the vendors (76.7%) were using pulling carts to do business and with very less change in business location. 13.3 per cent used motor vehicles that too in same location. Ten per cent of vendors were having platform/ non-mobile shops. In a similar study conducted in Noida by Singh *et al.* (2018) they also have noted that eighty-eight per cent of the vendors were selling their food stuff on mobile carts. Pulling carts has a great utility because of its mobile nature with a

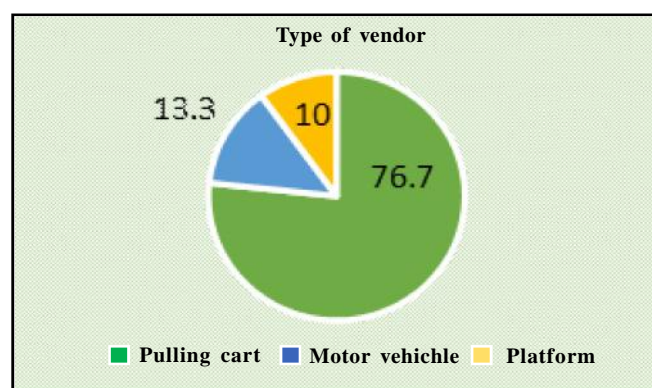


Fig. 1: Type of vendor

good carrying capacity with sole requirement of man power, less initial expenditure and hence, used by most vendors. The vendors in present study (43.3%) continued with the previous generation business or were working in different food industries like hotels prior starting their business. Similar results were found in Kashmir by Qureshi *et al.* (2015) where 39.04 per cent of vendors continued their dynastic profession. Results shows that the experience and art of street food business is hereditarily passed onto next generation. Majority (96.7%) of these shops were open only from the evening to late night. But few (13.3%) were also open from afternoon. In the evening time, workers, college students and travelers etc. will depend on street foods. There will be also so-called leisure eaters in crowded market places and beach etc.

As shown in Fig. 3, it was found that 26.7 per cent of vendors were not aware of licensing and only one respondent had FSSAI registration. The registration and licensing of all food outlets are mandatory as per Food Safety Standards Act 2006 to ensure the quality and hygiene of food. Vendors were not very serious about licensing since they believed their business is too small to have a license. Similar observation was made by Abraham *et al.* (2017). Study conducted in Raipur city by Joglekar and Bhoi (2013) noticed that none of the

Characteristics	Categories	Percentage (%)
Age	20- 35 years	16.6
	36-50 years	26.7
	Above 50 years	56.7
Marital status	Married	76.7
	Single	23.3
Education	Not gone to school but were able to read	20
	Drop outs from schools before tenth standard	43.3
	Had completed schooling	26.7
	Graduates	10
Washing of leafy vegetables	Not washing	56.7
	Washing	43.3
Handling of food	Bare hands	86.7
	Gloved hands	13.3
Storage of food	Open container	80
	Closed container	20
Drinking water source	Public water taps	76.7
	Packaged drinking water	23.3
Waste disposal	Dumping into public garbage bins near to their business location	86.7
	Drainage channels	10
	Burned the waste	3.3

vendors procured the license for street food business. Singh *et al.* (2018) found that in Noida only 5 per cent vendors had FSSAI registration certificate. The lack of licensing resulted in poor food handling systems and practices. The same trend was observed in Puducherry like other parts of country.

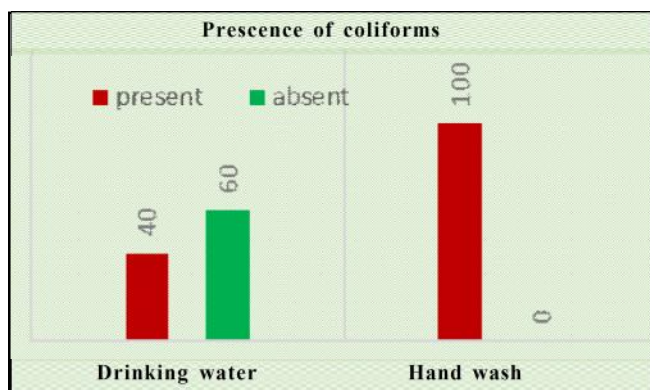


Fig. 2: Presence of coliforms

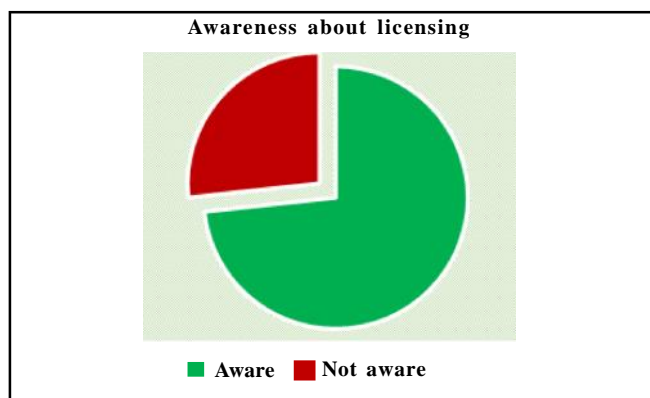


Fig. 3: Awareness about licensing

Out of 30 outlets visited 93.3 per cent were serving non vegetarian food and chicken was the major meat (80%) used. Meat products were having the maximum demand in Puducherry. Puducherry has a mixed culture and food habits. Majority prefer to have non-vegetarian food from outside since the meat is not cooked all the days at home. Along with chicken, fish (33.3%) also had a good demand as many prefer to taste sea food in this coastal town. Almost all (86.7%) food vendors were procuring raw materials from the Goubert market. Goubert market is the major and biggest market in Puducherry. Easy access and affordability in wholesale rates might be the attraction for vendors.

More than half (56.7%) of vendors were not washing the leafy vegetables before serving it as raw.

The availability of water was limited and vendors does not consider it is important to wash these. The earlier reports (Gadi *et al.*, 2018) have shown presence of feco-oral contaminants and other food borne pathogenic organisms in these leafy vegetables. The unwashed leafy vegetables were used as such for toppings, salads and for the decoration of dishes. From the observation it was noticed that customers did not bother about this even though they were aware about this and prefer to consume such food. Washing of vegetables was not done by 66.7 per cent of vendors and this was served uncooked which is a matter of great concern. The results were similar to observation made by Singh *et al.* (2018) who found that 62.0 per cent were not washing the food stuffs. Unavailability of running water, lack of time and labour involved during peak business hours could be the reason for this. Deep frying was the cooking method practiced by majority (86.7 %) followed by boiling (56.7 %). Ten per cent of the dishes were served uncooked and this was mostly in the vegetarian shops. Another 10 per cent grill the meat before serving. The cooking practice involved was based on the type of food they sold. Most of the street food vendors were selling fried items and customers preferred crispy items for evening snacks probably contributed higher percentage of vendors following deep frying.

Food and other food products were handled with bare hands by most (86.7 %) of vendors which was similar to the observation made by Joglekar and Bhoi (2013) in Raipur city where 93.3 per cent of vendors were not using gloves for cooking or serving food. But contradictory to this, Gadi *et al.* (2018) observed only 36.6 per cent of vendors handled food with bare hand in Allahabad city. Most of the vendors being poor and unaware of hygienic practices, also due to the ease of handling continue to follow the traditional way of handling food with bare hands similar to other parts of country except places where strict food safety measures and awareness or training on hygienic food handling practices is practiced. The cooked food, marinated meat and other raw vegetables were stored in open containers (80%) which were exposed to the dusty atmosphere near the traffic roads. Similar reports were noticed in Raipur city by Joglekar and Bhoi (2013) and Kolkata by Mukherjee *et al.* (2018) where 84.5 per cent and 73.59 per cent of vendors, respectively did not cover foods. The lack of facilities and negligence towards the importance of covering the food stored may be the reason for this.

Plates (63.3%) and plates with plastic cover or leaf (33.3%) were used by vendors for serving food. Newspaper was used by some (3.3%) vendors. Study conducted in Allahabad by Gadi *et al.* (2018) observed that 50 per cent of vendors served food in steel plate and 13.4 per cent used newspaper. Pondicherry which have a complex cultural background and being a tourist location, the food was served in a better manner. The serving plates were washed after single use by majority (93.3%) of the vendors but 100 per cent of vendors used bucket water for washing. Reang and Bhattacharjya (2013) observed that 97.4 per cent of vendors from Agartala washed dishes after serving food which was similar to the findings of this study. The findings were contradictory to the reports from Kashmir by Qureshi *et al.* (2015) who noted that only 59.04 per cent vendors washed plates by dipping in bucket of water. All vendors lack continuous source of water due to their mobile nature of business. The plates were dipped in the same bucket water which indicates a high risk of contamination. Added to this most of them (90%) were not using any towel to wipe the washed plates.

Public water taps were the source for drinking water for majority (76.7%) of shops. Few (23.3%) vendors used packaged drinking water. For all other needs like cooking, washing and cleaning purpose public water was used by all vendors. The findings were contradictory to the study in Agartala where vendors were depending on tube wells (36.3%), ponds (8.5%) and only 54.7 per cent were depending on public water supply (Reang and Bhattacharjya, 2013). Puducherry has a strong public water supply system with continuous supply which prompts vendors to use this water. Disposal of waste was done by dumping into public garbage bins near to their business location (86.7%), 10 per cent into drainage channels nearby and 3.3 per cent burned the waste. In contradictory to this 41 per cent left their wastes on road side in Vietnam (Angeli *et al.*, 2016). Good availability of garbage collection bins around the town of Puducherry and systematic collection of waste by the local administration encouraged the vendors to dispose the waste in to the garbage bins but without segregation.

In 93.3 per cent of shops same person was handling cash and food at same time. And 70 per cent of vendors didn't wash their hands after dealing with cash notes or coins. This finding was similar to that in Kashmir where 81.9 per cent of vendors was found handling money along with food (Qureshi *et al.*, 2015) and 79 per cent as

reported by Brady and Kelly (2002). In Kolkata 85.5 per cent of vendors didn't washed hands in between handling food and money (Mukherjee *et al.*, 2018). Currencies are always thought to be a great source of contamination. For saving the time, to cater maximum customers and less of number of workers cause handling all things at a time by same person which effects the quality of food served.

Seventy per cent of food handlers didn't follow the practice of hand washing before handling food. Similar findings were noted by Joglekar and Bhoi (2013) in Raipur city where 60 per cent of vendors did not consider to wash the hands prior handling food. Lack of running water facility at the point of business, lack of awareness about importance of hand washing and comparatively less consideration for the hygiene might be inhibiting the practice of hand washing. Only 26.7 per cent of food handlers used soap to wash their hands before handling food. Even though washing hands with soap was recommended vendors were not considering this as important during their busy business. Similarly, only 23.3 per cent of vendors were using towels to wipe their hands where 57.1 per cent of these towels were not washed daily. The unwashed towels were not clean and it may cause contamination. At 73.3 per cent of shops same person was handling food and cleaning waste. And only 50 per cent were washing hands before they again handle food. Majority of the shops were managed by a single person and the same person have to do all activities during the business. Due to lack of time and facilities, vendors didn't consider to separate the work which cause cross contamination in between handling food. Few of vendors (36.77%) were aware about the risk of fecal oral disease transmission. This was contradictory to the observation made by Adane *et al.* (2018) in Ethiopia where all food handlers were aware about fecal-oral disease transmission and 89 per cent of vendors mentioned at least one illness linked to consumption of contaminated food. Vendors in Puducherry were lacking awareness about hygienic food preparation and handling.

As shown in Fig.2, presence of coliforms were detected in 40 per cent of the drinking water samples and 100 per cent of hand wash water samples, indicating gross contamination. Even though most of vendors used public tap water which is chlorinated and purified. Practices followed by vendors like improper collection, storage and handling could be the reason for contamination of drinking water. Vendors were not

following proper hand washing practices, lack awareness and didn't follow hygienic practices of food handling which is indicated by the gross contamination of their hands during food handling.

Conclusion:

Results of this study indicated that, handling of cash and food without washing hands in between, handling food as well as waste by same person at a time, less availability of quality water for drinking and cleaning and use of unwashed raw leafy vegetables as critical control points of street food hygiene in Puducherry. The results show the need for bringing street food vendors together

at different points in city so that continuous availability of quality water and proper waste disposal can be ensured to improve the quality of street food. Also training these vendors in hygienic food preparation and handling is a must to overcome the lacunae in their existing knowledge level. Strict implementation of licensing for street food in Puducherry is essential to ensure food safety in street foods especially considering the tourist importance of Puducherry.

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