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Evaluation of Food Safety and Knowledge of Finger Food Vendors Along with their Socio-economic Conditions in Mysore City, India

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Abstract: ***A survey was carried out in Mysore city to evaluate the food safety and knowledge of finger food vendors along with their socio-economic conditions and water quality. A total of 62 vendors from two study areas were selected for the survey. It was observed that majority of them were fast food and chat vendors. The average daily income of the finger food vendors were between Rs. 200 to Rs. 1000. It was also noted that there was high level of total coliforms (≥1100 MPN/100ml) and fecal coliforms (≥1100 MPN/100ml) in bottled and tap water supplied by the vendors. No vendors new about the Food Safety and Standard Act and also about licensing and registration process. Thus there is a need for regular quality check of the food and drinking water provided by the vendors and also need of proper training for finger food vendors.***

Keywords: Finger food, Finger food vendor, Mysore city, Microbiological quality of water

1. Introduction

Finger foods that are popularly known as street foods are defined as "ready-to-eat foods and beverages prepared and/or sold by vendors and handlers especially in streets and other similar places for immediate consumption or consumption at a later stage without further processing or preparation" by FAO/WHO Codex Alimentarius Commission [3]. Now days, finger food has become a large source of employment generator. Additionally, finger food is a treasure house of local cooking traditions and increasingly plays an important role as an enhancer of tourism sector all over the world. The finger food vending serves as a livelihood basis and major source of income for many people who do not fit into the formal economic sector.

Due to issues of affordability and availability of restaurants people go for finger food. Also, the convenience and low prices make finger food the most favoured choice of the migrant workers in the large cities. Hence, they have become popular among urban people.

Finger food vendors usually take their products to their customers and therefore operate from such places as bus terminals, industrial sites, schools, market places and other street corners where there are ready and numerous clienteles. Unfortunately, these locations usually do not meet all food safety requirements. Even they don't follow the minimum standard of hygiene aspects.

There is a general perception that finger food vended are unsafe, mainly because of the environment under which they are prepared and consumed, which exposes the food to numerous potential contaminants. Hence, food safety of finger food is becoming a major concern as these foods are generally prepared and sold under unhygienic conditions, with limited access to safe water, sanitary services, or garbage disposal facilities.

The microbiological contamination of street vended food is considered to be a significant contributor to foodborne diseases, and the consumers of certain street vended foods are somehow at risk of contracting foodborne diseases. From different studies it was observed that the food safety knowledge and practices are very poor among the street food vendors [4],[5],[8],[11],[12]. Many of them don't even follow the basic hygiene practices.

Like other cities in India and rest of the world, the finger food services are growing rapidly in the Mysore city for providing food services to the office workers, students, labourers, daily commuters, industrial workers and city dwellers; as they provide food at a reasonable price at convenient locations in a short duration of time and meet the nutritional needs of a significant portion of the population.

Therefore, it is very important to determine the facilities provided at the cart, daily routine, knowledge on FSSA, etc., and to know the status of the finger food vending in the city, so that proper planning can be undertaken to handle the situation of danger due to unsafe food consumption.

This study aims to obtain the prevalent socio-economic, environmental and hygienic practices among the finger food vendors in Vijayanagar II stage and Vontikoppal areas of Mysore city. Information gathered from the study could be used by the state Health Officer and Designated Officer for proper policy making regarding regulating safe finger food standards within the city.

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2. Materials and Methods

2.1. Study Area Selection

The survey to evaluate the food safety and knowledge of finger food vendors along with their socio-economic conditions, hygiene of food vending environment and water quality within Vijayanagar II stage and Vontikoppal areas of Mysore city, was carried out from November 2013 till March 2014.

In order to select the study area, Mysore city was divided into four parts and among those four parts, one part was selected. From that one part, two areas which were densely populated with finger food vendors were selected for the study. They were busy localities of schools, colleges, market places, etc. having high density of populations. Sixty two (62) (Vijayanagar II stage - 25 and Vontikoppal - 37 respectively) food vendors operating in these areas were selected for this study.

2.2. Questionnaires

A set of questionnaires were developed and divided into five sections, which were: (i) Information of the food vendor, (ii) Information about the unit, (iii) Information about the food stuffs vended, (iv) Information regarding the utensils used for the sale of food and (v) Information regarding the vendor's food safety knowledge (source and occurrence of food related illnesses, importance of hand washing and other healthy behaviors etc.) and FSSA. The respondents were asked to select from a given set of options.

3. Results and Discussion

Mysore is a city which is expanding rapidly in size and population. Majority of the population arrives for livelihood and belongs to the low-socio-economic background. Moreover, the city is growing by all the means, such as, road, rail, air, media, and also from the point of view of drainage and sanitation. Mysore city has a semi-arid climate.

Since the city is growing rapidly, it is important to make a regular survey on safety and hygiene of finger food being served in the city for early identification of emerging food safety issues in order to prevent them from developing into health risks. Such studies have been conducted in places outside India and reviews have been published about food hygiene [1],[2],[6],[7].

3.1. Socio-Economic and Business Profile of the Vendors

The Socio-economic and demographic data regarding ownership, gender, age, duration of the business, etc of the finger food vendors are presented in the **Table 1**. Majority of the vendors were male and localities and rest are migrated from other states. Moreover all the vendors surveyed were owners of their units. Most of the vendors belonged to the age group between 25-50 category as the cases observed in other countries like Nigeria [10] and West Indies [9]. As far as experience is concerned, finger food vendors in Vontikoppal area were slightly more experienced than vendors in Vijayanagar area.

Table 1: Socio-economic Information of the Finger Food Vendors

Sl. No.	*Category*	*Sub Category*	*Vijayanagar II Stage*	*Vontikoppal*
1.	No. of food vendors	Permanent Temporary	24 1	36 1
2.	Ownership	Owner Rental Employed	23 0 2	36 0 1
3.	Age of the owner	Below 25yrs 25-50yrs Above 50yrs	2 21 2	2 27 8
4.	Gender	Male Female	21 4	34 3
5.	Place to which you belong	Local Migrated	24 1	36 1
6.	Duration of engagement in this occupation	Below 10yrs 10-20yrs Above 20yrs	17 7 1	15 13 9
7.	Main occupation	Yes No	25 0	37 0
8.	Employees engaged in the unit	Nill 1-3 3-5 Above 5	7 10 2 6	16 17 4 0
9.	Average monthly income	<500Rs 500-5000Rs 5000-10,000Rs >10,000Rs	0 4 8 13	1 7 20 9

The survey clearly indicated that majority of them in Vijayanagar (36%) and Vontikoppal (41%) areas were fast food vendors; 18% and 32% in Vijayanagar and Vontikoppal areas respectively were the vendors of chat items; 25% and 8% in Vijayanagar and Vontikoppal areas respectively were tea, coffee and milk vendors. About 11% and 13% in Vijayanagar and Vontikoppal areas respectively were the vendors of non-vegetarian food items. Remaining percentages were the vendors of sugar cane juice, fruit salads and ice creams. The comparison of categories of finger food vendors, age, gender and year of service are shown in the figures (**Figs. 1-4**). No food vendors were found to be trained before in this job.

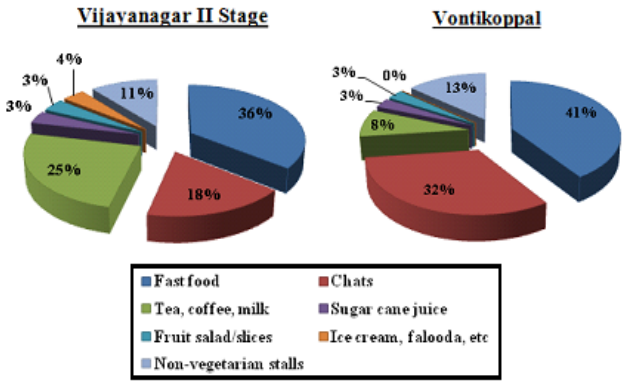


Figure 1: Percentage of Different Categories of Finger Food Vendors

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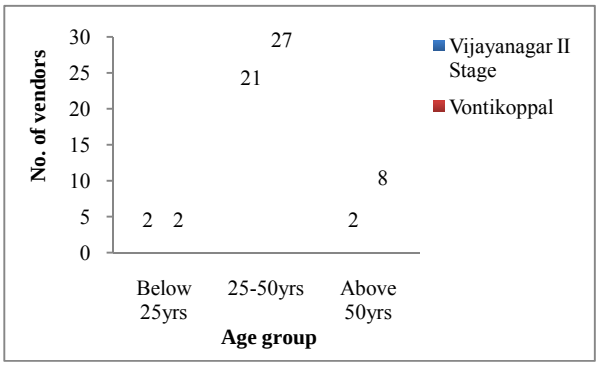


Figure 2: Age Profile of Finger Food Vendors

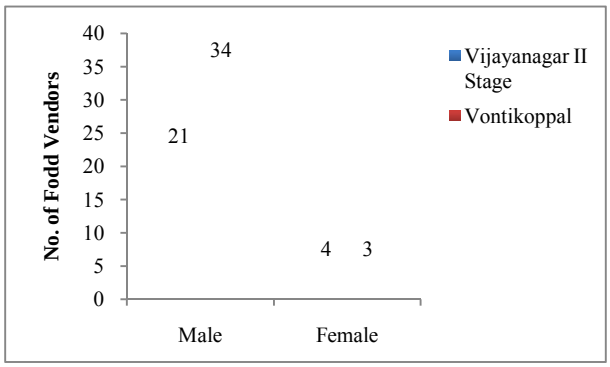


Figure 3: Gender Information

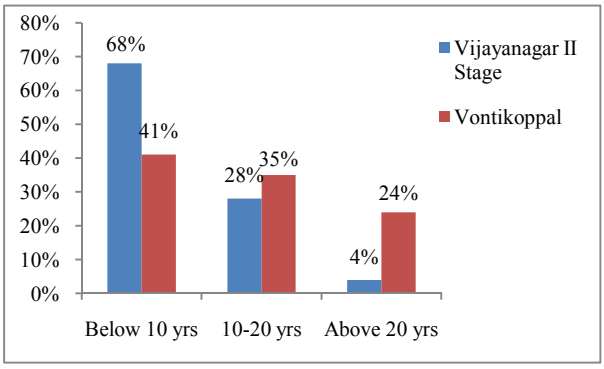


Figure 4: Percentage of Vendors Showing Their Years of Service

3.2. Information about the Unit

After analyzing the vendors, the study explored information on the units they had set up. Information on the finger food vending units is presented in the **Table 2**. From the survey it was found that only 20% and 24% of vendors in Vijayanagar and Vontikoppal areas respectively had license and 36% and 33% of vendors in Vijayanagar and Vontikoppal areas respectively had got registered under Mysore City Corporation.

Table 2: Information about the Unit

Sl. No.	*Category*	*Sub Category*	*Vijayanagar II Stage*	*Vontikoppal*
1.	Licensed unit	Yes No	5 20	9 28
2.	Registered unit	Yes No	9 11	12 16
3.	Age of the unit	Below 5 yrs 5-10 yrs 10-15 yrs Above 15 yrs	7 12 3 3	11 14 5 7
4.	Mode of lighting	Battery Candle/Gas Electricity No light	19 1 2 3	22 - - 15
5.	Covering of the unit	Partially covered Uncovered	22 3	35 2
6.	Source of water	Tap water Bore well water Bottled water	22 1 1	34 - 2
7.	Working hours	Below 8 hrs 8-12 hrs Above 12 hrs	13 2 10	27 7 3

About 48% and 38% mobile units in Vijayanagar and Vontikoppal areas respectively were 5-10 years of old. Majority of mobile units in Vijayanagar (76%) and Vontikoppal (59%) areas used charged battery for lighting facilities and also majority of them had to work up to 8hrs from morning till night. Most of the mobile units in Vijayanagar (88%) and Vontikoppal (95%) areas were partially covered. Comparison was made on the information regarding authorized and unauthorized food vendors and different sources of water as they were considered to be important factors with respect to health status of consumers. They are illustrated in **Fig. 5** and **Fig. 6**.

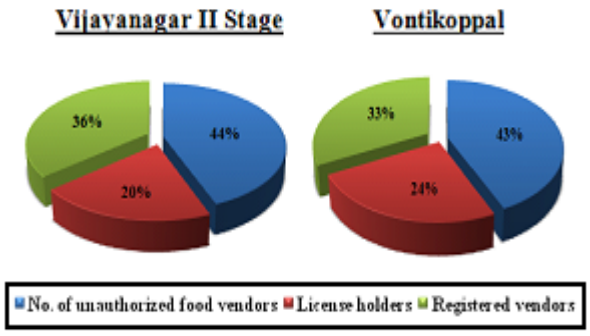


Figure 5: Percentages of Authorized and Unauthorized Food Vendors

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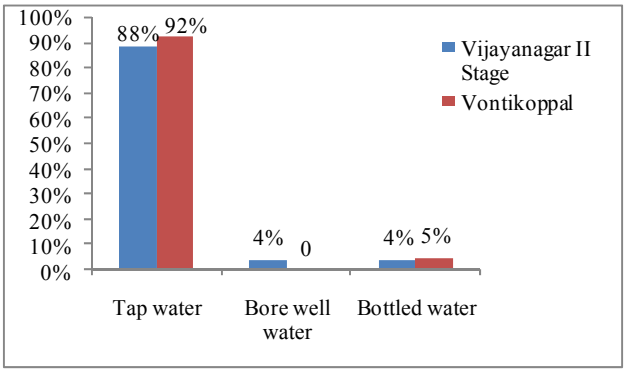


Figure 6: Percentage of Different Sources of Water

It was observed that, most of the finger food vendors were from low socio-economic status, they were unable to procure the minimum requirements for maintaining hygienic practices, such as standard food cart, with facilities of storage, cooking, hand and utensils washing facilities with detergents for the same and system for discarding the waste materials. And as majority of the vendors were unauthorized (52), a minimum of Rs 5,200/- will be lost for the Government every year from the two study areas.

3.3. Types of Food Stuffs Vended

From the survey it was observed that majority of the vendors in Vijayanagar (36%) and Vontikoppal (41%) areas vended Dosa, Idli, Poori, Roti, Chapati, Paratha, Rice, Curry, Gravy, etc. About 18% in Vijayanagar area and 28% in Vontikoppal area vended chat items such as Pani Puri, Gobi, Churmuri and so on. Again, 25% and 8% of mobile food vendors in Vijayanagar and Vontikoppal areas respectively vended Tea, Coffee and Milk along with Biscuits and Cake. Also about 11% in Vijayanagar and 13% in Vontikoppal areas vended non-vegetarian items such as Chicken, Mutton, Fish and Omelets. Rest of the mobile food vendors was found to vend cut fruits, sugar cane juice and ice creams.

3.4. Information Regarding the Utensils Used for the Sale of Food

The utensils used for sale of finger food were made of metal, plastic or paper. Majority of the Fast Food and Pani Puri vendors in Vijayanagar and Vontikoppal areas used metal or plastic plates for the sale of their food. Whereas, Gobi and Churmuri vendors used paper plates or polystyrene bowls; and majority of the Tea, Coffee and Milk sellers used paper or plastic cups for the sale. Thus all these materials are indirectly contributing to increase in the solid waste and they are not handled properly in both the study areas.

3.5. Information Regarding Food Safety Knowledge and FSSA

Regarding Food Safety Knowledge and Food Safety and Standard Act (FSSA), the vendors were asked few questions. Majority of the vendors had knowledge on food safety such as maintenance of hygienic conditions in and around their unit, giving filtered or bottled drinking water for customers, food adulteration and hand washing. But none of the vendors had knowledge on biological sources of contamination of food followed by knowledge on management of leftover food and also about FSSA in both the study areas; even though most of the vendors were educated up to primary and high school level.

3.6. Laboratory Analysis of Water Samples

Microbiologically contaminated food and drinking water are considered as important vehicles of foodborne disease transmission throughout the world; hence this study is mainly focused on the presence of microorganisms than other parameters. Since majority of the finger food vendors used bottled and tap water, same water samples were collected and used for the analysis work.

Water samples from certain finger food vendors of both the study areas were collected and tested for the presences of microorganisms and also for few other parameters. The water samples collected from the vendors were the representative samples of that particular study area. The findings of this analysis are presented in the **Table 3** and comparisons of these analyses are shown in **Fig. 7** and **Fig. 8**.

Table 3: Water Samples Analysis of Two Study Areas

Parameters	*Vontikoppal area*				*Vijayanagar area*			
	BW1	*BW2*	*TW1*	*TW2*	*BW3*	*BW4*	*TW3*	*TW4*
pH	7.9	6.3	7.8	7.7	7	7.2	7.4	7.5
Electrical Conductivity (µS)	62.8	42.3	824	365.5	74.9	58.9	399.8	472.6
TDS (mg/L)	40.8	27.5	535.6	237.6	48.7	38.3	259.9	307.2
Hardness (mg/L)	*BDL	BDL	308	308	BDL	BDL	332	330
Nitrate (mg/L)	BDL	BDL	0.1	0.1	BDL	BDL	0.6	0.4
Fluoride (mg/L)	BDL	BDL	0.3	0.3	BDL	BDL	0.5	0.5
Total Coliforms (per 100ml)	≥1100	≥1100	75	75	≥1100	≥1100	≥1100	≥1100
Fecal Coliforms (per 100ml)	≥1100	≥1100	240	240	≥1100	≥1100	≥1100	≥1100
Fecal Streptococci (per 100ml)	Nill	Nill	Nill	Nill	Nill	Nill	Nill	Nill

*BDL - Below Detection Level

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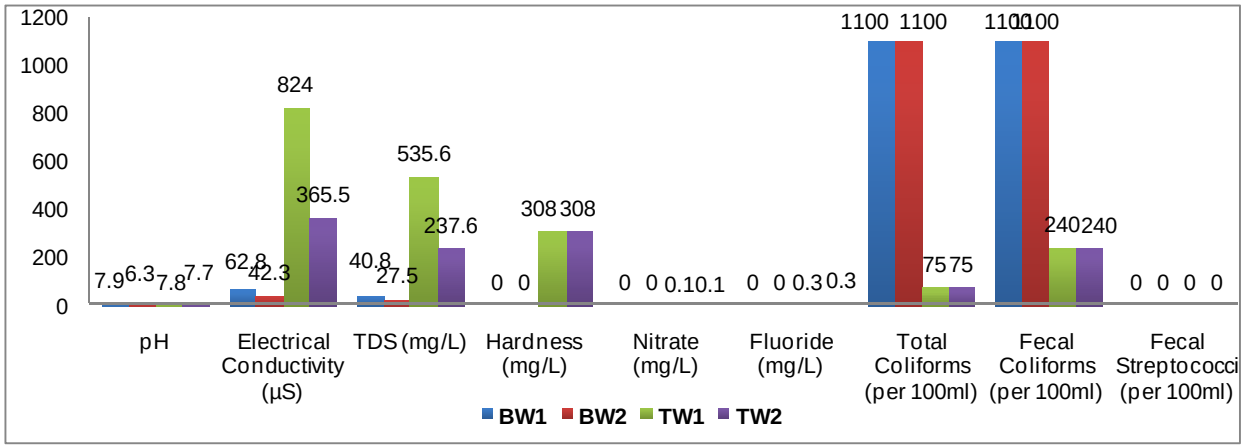


Figure 7: Water Samples Analysed at Vontikoppal Area

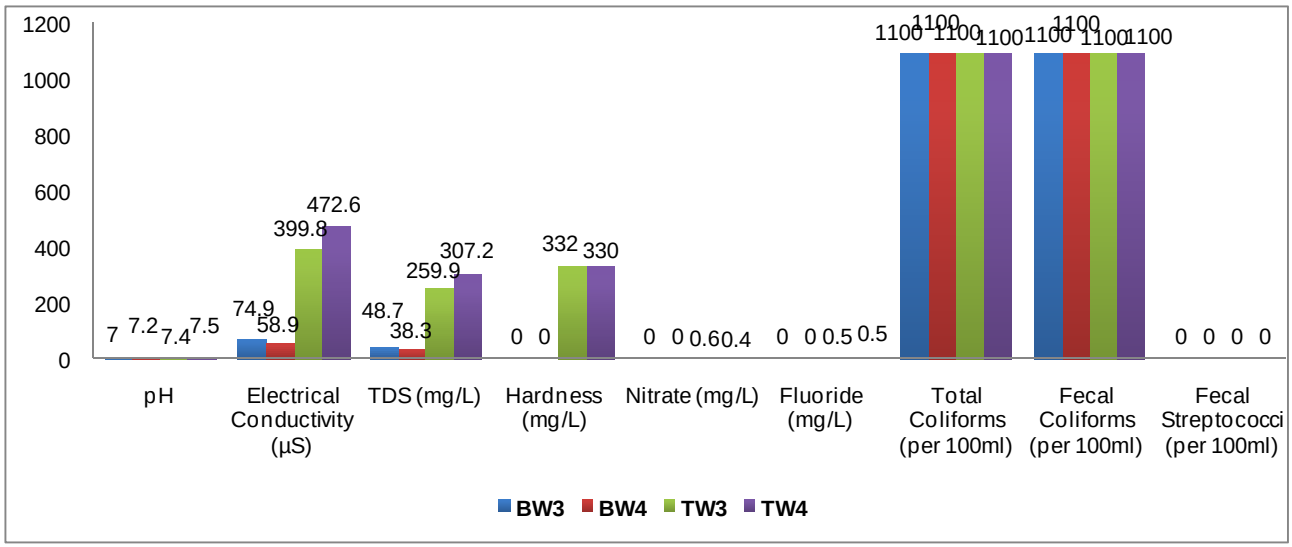


Figure 8: Water Samples Analysed at Vijayanagar II Stage Area

Analysis of water was done twice in order to compare the quality of water and samples were named as BW1, BW2, BW3, BW4, TW1, TW2, TW3 and TW4. For first, bottled water and tap water from particular food vendors were collected and analysed on the same day and again after one week, water samples from the same food vendors were collected and analysed on the same day for the same parameters. This procedure was followed for both the areas.

BW1 (Bottled water 1) and TW1 (tap water 1) were the water samples collected from Vontikoppal area and BW2 (bottled water 2) and TW2 (tap water 2) were the water samples collected from the same area after one week. Similarly, BW3 (bottled water 3) and TW3 (tap water 3) were the water samples collected from Vijayanagar area and BW4 (bottled water 4) and TW4 (tap water 4) were the water samples collected from the same area after one week.

The analysis clearly indicated that there was a presence of high level of total coliforms and fecal coliforms in samples BW1, BW2, BW3, BW4, TW3 and TW4. But comparatively less total coliforms and fecal coliforms were present in the TW1 and TW2. However, there were no signs of fecal streptococci in the water samples analysed. Other parameters such as pH, electrical conductivity, TDS, hardness, nitrate and fluoride were found to be within the limit.

Low demineralization of water which leads to re-growth of bacteria and level of hygiene control in the extraction and bottling process might have contributed to the presence of high level of total coliforms and fecal coliforms in bottled water; whereas, type of treatment system and present condition of water pipe lines might have contributed to high level of total and fecal coliforms in tap water.

4. Conclusions and Recommendations

We may conclude that, the foods sold in the two study area by the finger food vendors are not safe, as they cause microbial hazard to the consumer because of the presence of microorganism in the drinking water provided by the vendors. Also, there are tendency of finger food becoming contaminated with high level of toxic chemicals including pesticides, heavy metals, unapproved food additives, etc. and also contaminants may enter the food under the street conditions where dust and vehicular traffic level is high. As most of the finger food vendors are mishandling the solid waste generated in both the study area, they attract flies, rodents and street dogs, which transmits the disease in the entire community.

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Hence, the Government or Food Controlling Authority should make available of the basic infrastructures to the vendors which must include selection of proper sites away from drains, dustbins, etc., right method of supplying license to deserving food vendors, supply of good quality drinking water and regular monitoring of food in order to maintain the quality of vended food. Besides all these, proper training to finger food vendors must be given for improvement of knowledge on food safety and hygiene practices.

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