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Vendors and Consumers Status and Microbial Analysis of Open Restaurant Foods in Patuakhali District University

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Keywords: *open restaurant; vendor; microbial analysis; salmonella; E. coli.*

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Vendors and Consumers Status and Microbial Analysis of Open Restaurant Foods in Patuakhali District

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Keywords: open restaurant; vendor; microbial analysis; salmonella; E. coli.

I. Introduction

Open restaurant food vending and consuming is a popular type of informal self-employment in the Patuakhali district, providing the vendors with a means to sustain their livelihoods. Vendors sell a great variety of products from different kinds of vending units. A study in Uganda (Ayalew, M. S., 2008) showed that most vendors earned more than the minimum civil service wage and many earned more than the minimum wage. In developing countries, drinks, meals, and snacks sold by street food vendors widely consumed by millions of people (FAO, 1988). In Bangladesh, the quality and quantity of food supplies by vendor systems are not so inadequate but unhygienic for health. The street foods provide an affordable source of nutrients to many sectors of the population (Ohiokpehai, 2003). Within this context, street foods as informal food supply system, opportunities for resource- poor groups in urban and peri-urban environments, not only as a means of employment but also as an effective way of providing low-cost nutrition to the people (Codjia, 2000).

The present study also showed a daily income of vendors to be up to TK. 1746.50 with a net profit up to TK. 283.00./day. Though this figure is not that encouraging, however, when the credibility in terms of safety of street foods will increase, it will contribute to better earnings of the vendors. They tied to retailers, cooking units, and other food system actors. Specific consumer groups with street food eating habits found to exist. Among various types of informal sector activities, food vending is distinctive in the sense that it provides a need for the urban inhabitants and involves issues of hygiene and food safety. A large number of dwellers from different spheres of life such as students, tourists, rickshaw drivers, cart pullers, and other such workers rely on open restaurant food vendors for their daily meals. Urban food vending provides employment and income for many people. However, street foods are frequently associated with many food and water born disease like, diarrhea, hepatitis, typhoid, etc diseases due to their handlings and use of dirty water. The open restaurant foods vendors are not aware of all about health hygienic and microbial aspects of food and drinking water. Especially the coastal belt of Bangladesh is naturally rich in soil and water-borne pathogens.

II. Materials and Methodology

a) Sample selection and sample size

90 open restaurants and 90 consumers included in the present survey were therefore, a purposive sample chosen primarily to represent some of the key characteristics associated with them.

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b) Interview schedule design

The interview schedule developed for collecting socioeconomic information, health aspects of food, and environmental aspects of food after developing the Interview schedule it was pre-tested among five sellers, and five consumers and necessary correction done for the final Interview schedules. Those Interview schedule field tested, modified, and standardized.

c) Equipment and general procedure for microbial examination

i. All glass equipment, e.g., Petri dish, Pipette, Test tube, Beaker & other glass wares were washed, rinsed, dried, and treated a hot air oven for sterilization. Sterilization is done by dry heat at 170˚c for 1 hour.

ii. All the media prepared for microbial growth sterilized by steam pressure using l2t at l5 lb/ square inch pressure for 5 minute.

d) Preparations of food samples

Homogenate food samples prepared by taking 10gm of both superficial & inner layers of samples and weighed on a sterile weighing paper using sterile scalpels or forceps, and washing with alcohol before & each batch of samples and between samples washed with hot water and sterilized with alcohol. These meshed samples inserted aseptically into sterile cotton plugged conical flask containing 0.9% sterile sodium chloride solution by using sterile forceps.

e) Bacteriological analysis

Three different types of media were recommended for the growth of Salmonella and E. coli. The colonies developed on the plates and counted after incubation for 24-48 hours at 37˚c and pH of the media adjusted to 7.2 prior to sterilization. Inoculated plates incubated at 37˚c for 24 -48 hours to facilitate viable bacterial growth.

f) Total aerobic plate count

Duplicate pour plates of four successive decimal dilutions prepared. The plates incubated at 37°C for 24-48 hours, and duplicate plates counted and calculated. Average counts expressed as colony-forming units per gram or ml of sample.

g) Coliform count

The coliform count of the food and water samples determined using membrane filter technique. The plates incubated at 35°C for 24 hours.

h) Data management and analysis

The quality of the data entry process commenced as the questionnaires collected from the surveyed areas after the process of cleaning the mistakes. Data entry process managed to apply double-data entry errors. All questionnaires edited and the data were cleaned, and entered into a computer. The data were analyzed by SPSS 20.0 package. Results expressed as frequencies and percentages.

III. Results

a) Results of open restaurant food vendor

i. *Socio-economic and demographic profile of open restaurant food vendors*

Most of the vendors were male (97.78%). About 68% of them were age between 21-40 years (mean about 31 years) while, 23.33% were age between 41-60 years. About 73.33% of vendors were married, 43.33% of them had a family size of 5 or less, and the rest 56.67% had a family size higher than 5. About 54% of vendors who had primary education followed by nearly 10%, 5.56%, and 5.56% vendors had SSC, HSC, and Degree education respectively, and 24.44% of vendors were illiterate. Only 3.33% of vendors in Patuakhali had Degree education while, 20% of them were illiterate in Dumki comprising the lowest percentage among the three survey areas.

ii. *Ownership and reason for doing food vending business*

The survey, it was revealed that 74.45% vendors owned and half of the vendors (51.11%) had the opinion that due to the low investment, and skill required they had come into the open restaurant food vending business (Figures 1).

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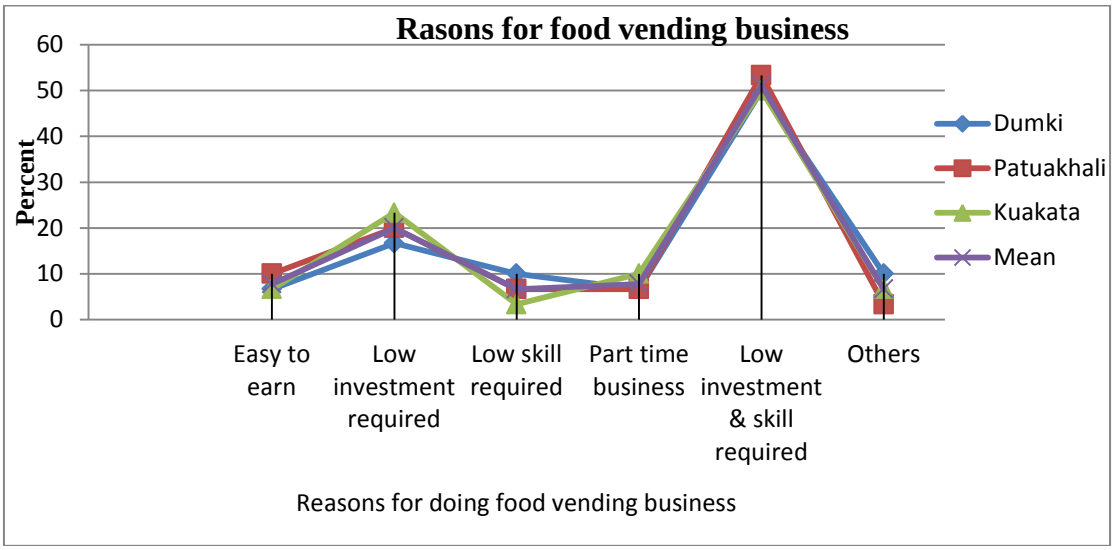


Figure 1: Reasons for food vending business of the open restaurant food vendor

iii. *Nature of shop and the vending business*

An open restaurant business requires medium investment. Most of the vendors own the business and reportedly work for 13-18 hours, running their open restaurant food vending as the principal business. Some members are engaged in open restaurant food vending business as their principal business though they have other income sources. Some vendors are solely engaged in open restaurant food vending as they do not have any other business. A small number of vendors engaged in part- time food vending. Nearly 82.22% of the food vendors reported it was their principal business while only 17.78% of them accepted open restaurant food vending as a part-time.

iv. *Length and period of business of street food vending*

The majority of the open restaurant food vendors had been doing business from 4 to 10 years in respective of the areas surveyed with the mean is 38.887%. In Kuakata, no open restaurant food vendors had been starting business up to one year.

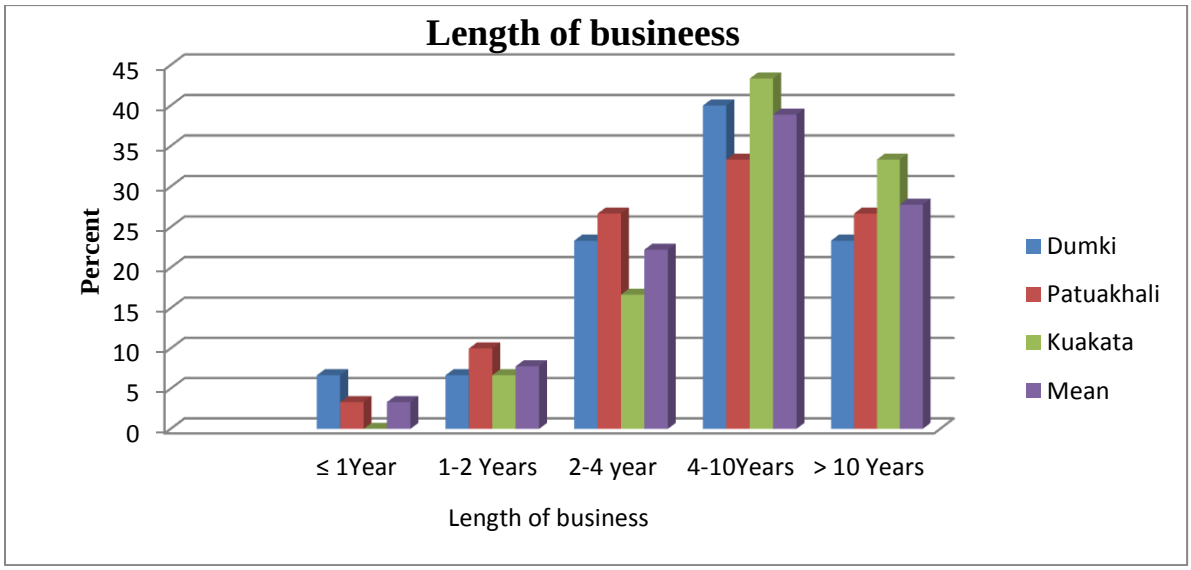


Figure 2: Length of business of the open restaurant food vendor

v. *Location and proximity of vending shops*

During the survey, it was revealed that 43.33 of the vending shops located on the sidewalk and 33% on the footpath in three survey areas and the rest in all other possible areas (near aisles of the bazaar, school, restaurant and office vicinity. 46.67 % of food vending shops in Dumki and 40% in the Patuakhali area and nearly 30% vending business in the Kuakata area

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located near the side of drain, sewerage, toilet and dustbins.

vi. *Nature of business and daily capital/net profit*

The vendors were unsatisfied about their investment, daily income, and net profit of the food vending business. Forty-one percent of vendors invested up to TK. 100000 in their business. Nearly 40% of vendors' daily sales range between TK. 1001-2000 and 81% make a net profit of more than TK. 500 daily. It observed that the average investment was higher in the Kuakata area amount in TK 97383 and less in Dumki amount in TK 78000. Patuakhali area placed in between the other two with TK 97333. However, more than 50% of vendors reported that net profit met 100% of their family expenditure.

Table 1: Daily capital/sale profile of the open restaurant food vendor

Upazila Name	Minimum (TK)	Maximum (TK)	Mean (TK)	Standard Deviation
Investment of the open restaurant food vendors				
Dumki	20000	300000	78000	± 39315.57
Patuakhali	20000	250000	97333	± 49320.274
Kuakata	1500	320000	97383	± 57894.95
Daily income of the open restaurant food vendors				
Dumki	1000	6000	3780	± 1954.023
Patuakhali	1000	7000	4,395	± 2064.84
Kuakata	1500	8000	5400	± 1975.15
Daily net income of the open restaurant food vendors				
Dumki	400	2400	1,357	± 485.43
Patuakhali	450	2500	1140	± 560.54
Kuakata	500	3000	1,653	± 691.34
Shop rent of the open restaurant food vendors				
Dumki	1200	3000	2005.556	± 485.64
Patuakhali	1000	3500	2278.261	± 674.17
Kuakata	1200	5000	2133.33	± 866.79

vii. *Working schedule of the vendors*

During the survey, it was revealed that (86.667%) worked all time. Food vending in residential areas was comparatively higher (90%). Seventy-five percent of the vendors worked for 13-18 hours in a day. The maximum sale was at noon and lowest was at morning. Winter was the season of maximum sale and while minimum during the summer. It was difficult to maintain the vending during the summer and rainy season, and consumers did not go outside. Winter season was more comfortable for both vendors and consumers. The majority (57.22%) of the vendors continued their business from morning to midnight. 77.23% of vendors washed their hand before preparing foods. However, 60% food handlers did not clear their hands before serving food which support the report of' Bangkok where over 60% of street food vendors washed preparation equipments and eating utensils once it day (FAO, 1994).

viii. *Licenses/permits*

About 67% of the vendors replied when they asked whether they had to pay shop rent for doing their vending businesses. The rest 33% of vendors had own shop. All vendors agreed that they did not pay money to the Police, market committee, and others. Over 100% of the street food vendors felt they should have a license for their business but, 74.44% had. The few, who said they had the licenses, had a business permit or food-selling permit. The food vendors told whether they had any training on food safety and food serving or not. Cent percent of the vendors had no training either on food safety or on food serving irrespective of the survey areas.

ix. *Food safety profile*

In street food vending, the raw material source was important as their contamination from this point could persist through preparation, processing, and cooking. Quality of the raw materials were important to the safety of vended food because of the biological, chemical and physical hazards that might be introduced to the vending operations and which may persist through preparation and processing.

a. *Water, environment, sanitation and personal hygiene*

Cent percent reported that the source of drinking water for consumers was stored water that was collected from the nearby tube well. The water always stored in plastic drums without lids, thus making it more susceptible to contamination. Most of the male labor brings water, and 67.777% bring 3 or less.

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Table 2: Water management of the open restaurant food vendors in percentage (n=90)

Characteristics	Dumki	Patuakhali	Kuakata	Mean
water bringing person				
Male labor	93.33	90	93.33	92.22
Female labor	6.67	10	6.67	7.78
Water bringing times				
<= 3	66.67	73.33	63.33	67.78
> 3	33.33	26.67	36.67	32.22
Have own tube well				
Yes	6.67	10	66.67	27.78
No	93.33	90	33.33	72.22
Water disposal place				
Drain	10	13.33	6.67	10
Dustbin	6.67	6.67	3.33	5.56
Roadside	26.67	40	43.33	36.67
Others (Pond,River etc)	56.67	40	46.67	47.78

b. *Safe water using practices*

One of the striking findings found in the survey was that 100% of vendors did not take any measures for purification of drinking water, which implies a definite possibility of contamination. Drinking water did not boil irrespective of the location.

x. *Mode of display of food by open restaurant vendor*

The majority of the vendors displayed their foods in baskets/trays, bowl, and shelves in survey area while vendors used showcase in Patuakhali and Kuakata areas. The utensils they used made up of many different materials such as melamine, aluminum, stainless steel, and ceramics. Some vendors used only paper instead of a plate. Tissue paper used 68.89% of vendors.

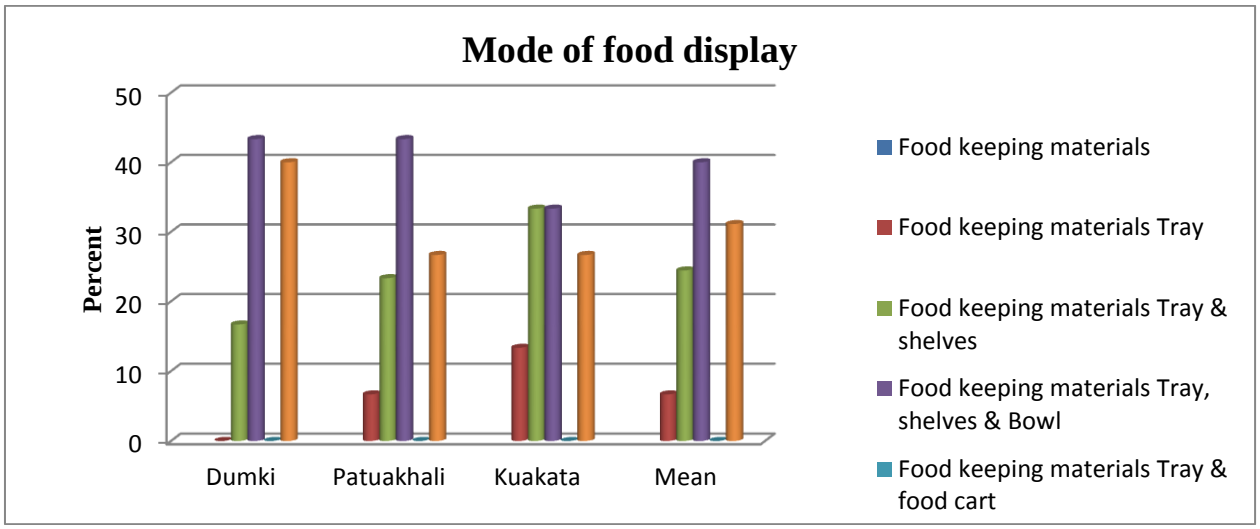


Figure 3: Mode of food display by the open restaurant food vendor

Table 3: Utensil of serving food of the open restaurant food vendors

Characteristics	Dumki	Patuakhali	Kuakata	Mean
Utensil During Serving food (%)				
Paper	0	0	0	0
plate	16.67	23.33	33.33	24.443
Cup & Glass	0	0	0	0
Plate & Polythene	83.33	76.67	66.67	75.557
Cup, Glass & Spoon	0	0	0	0

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xi. *Protective display of food*

About 64% of the vendors did not cover their food during selling. 56.67% cleaned the utensils in their shop but 13% on the roadside. Two thirds of food vendors used stored water for cleaning the utensil. The time between food making, and food selling more than 5 hours was 61.11%, and 38.89% was 5 or less. Ninety percent of open restaurant vendors used soybean oil and frequency of using oil was one used by 70% of the vendors.

xii. *Food servicing system of open restaurant food vendor*

Eighty-three percent of the vendors served food to the consumers with plate and polythene in Dumki area as against 66.67% vendors who used plate in Kuakata area. About 28.89% of the vendors disposed of their garbage in the pond, and (27.78%) threw them in the drain and roadside. Pond and river was the place of best choice (about 47.78%) and 36.667% on the roadside for disposal of used water. The use of public toilets or open places outside was the highest among the vendors. Some of the vendors used their own house as the second option. In all areas surveyed, almost all vendors washed their hands using soap water after toilet.

Table 4: Percent water and sanitation profile of the open restaurant food vendors (n=90)

Characteristics	Dumki	Patuakhali	Kuakata	Mean
Place of utensils clean				
Shop	60	53.33	56.67	56.67
Own house	16.67	6.67	6.67	10
Roadside	10	13.33	16.67	13.33
Others(Pond, River etc)	13.33	26.67	20	20
Type of water used to clean utensils				
Stored water	63.33	60	83.33	68.89
Tap water	0	3.33	0	0.11
River water	23.33	26.67	0	16.67
Others	13.33	10	16.67	13.33
Garbage disposal				
Dustbin	10	3.33	16.67	10
Drain	6.67	10	0	5.56
Road side	16.67	26.67	40	27.78
Pond	40	30	16.67	28.89
River	16.67	23.33	0	13.33
Others	10	6.67	26.67	14.45
Toilet uses				
Public toilet	53.33	53.33	33.33	46.67
Shop toilet	30	40	60	43.33
Own house	16.67	6.67	6.67	10
Neighbor house	0	0	0	0
Roadside	0	0	0	0
Others	0	0	0	0
Washing hands after using the toilet				
Yes	100	100	100	100
No	0	0	0	0
Sometimes	0	0	0	0
Washing hand before food preparation				
Always	76.67	80	70	75.56
Sometimes	16.67	20	30	22.22
Very few times	6.67	0	0	2.22
Never	0	0	0	0
Washing hands before food serving				
Always	43.33	53.33	40	45.55
Sometimes	56.67	46.67	60	54.45
Once a day	0	0	0	0
Never	0	0	0	0
Cleaning time of dirty plate				
Morning	6.67	10	3.33	6.67
Noon	0	0	0	0
After noon	0	0	0	0

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Night	6.67	16.67	20	14.44
Throughout the day	86.67	73.33	76.67	78.89
Morning to Mid night	0	0	0	0

xiii. *Source of food sold by the vendors*

A majority of the vendors prepared their food at home and brought to the streets for marketing. A single vendor was engaged in selling more than one food item. Almost 55.557%t of food vendor cooked/prepared foods in advance in their hotel kitchen while 28.89% vendors bought their foods for vending from open front place etc. 11.11% of vendors brought cooked food from home, 5.556% of vendors prepared food from other places remain for ready to eat.

Table 5: Food selling time of open restaurant vendors

Characteristics	Dumki	Patuakhali	Kuakata	Mean
Food selling time (%)				
Only Morning	0	0	0	0
Only Noon	0	0	0	0
Only After noon	0	0	0	0
Only Night	0	0	0	0
Throughout the day	6.67	13.33	13.33	11.110
Morning to Mid night	93.33	86.67	86.67	88.890

xiv. *Personal hygiene of the open restaurant vendors*

All of them usually did not cover their head during vending, 47.78% used dirty towels. But nearly 80% of the vendors' cut their nails properly, and 61.11% wore neat and clean attire. None was found to use hand gloves. Ninety percent of open- restaurant vendors did not cover their heads during vending.

xv. *Supervision and monitoring of the open restaurant food vendors*

About 88.89% of open restaurant vendors said that shops supervised regularly, and 87.65% were mobile court. Supervision occurred yearly and fined several times

xvi. Open restaurant food ingredient

Most of the vendors (93.33%) said that street food ingredients were bought from Kacha markets and 34.443% store in the shop and kept the prepared food in open showcase told 33.333% of vendors.

xvii. *Knowledge regarding food nutrition of the consumer*

Knowledge regarding food nutrition was not satisfactory. Only 4.44% of consumers had well knowledge about nutrition and 8.89% in hygiene. Food safety, food serving and other was very dull. Food preparation and hotel management knew moderately 66.67%, and 55.557% of vendors. The food serving practice was very poor. Fifteen percent vendors did not know about food safety. Fifty-one percent moderately knew consumers perception.

Table 6: Percent knowledge regarding food nutrition of the open restaurant food vendors (n=90)

Characteristics	Location	Well	Not so well	Moderate	Bad	Very bad	None
Nutritional	Dumki	3.33	6.67	20	23.33	40	6.67
	Patuakhali	3.33	10	26.67	26.67	23.33	10
	Kuakata	6.67	10	26.67	20	26.67	10
	Mean	4.44	8.89	24.45	23.33	30	8.89
Hygiene	Dumki	0	20	30	36.67	13.33	0
	Patuakhali	0	10	36.67	30	23.33	0
	Kuakata	3.33	13.33	33.33	26.67	20	3.33
	Mean	1.11	14.44	33.33	31.11	18.89	1.11
Food preparation	Dumki	0	0	83.33	10	6.67	0
	Patuakhali	0	0	76.67	13.33	10	0
	Kuakata	0	3.33	66.67	16.67	13.33	0
	Mean	0	1.11	75.56	13.33	10	0
Food safety	Dumki	0	0	10	40	33.33	16.67
	Patuakhali	0	0	13.33	43.33	26.67	16.67
	Kuakata	3.33	6.67	20	33.33	23.33	13.33
	Mean	1.11	2.22	14.44	38.89	27.78	15.56

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Food serving	Dumki	0	16.67	33.33	33.33	16.67	0
	Patuakhali	0	13.33	40	30	16.67	0
	Kuakata	0	16.67	43.33	26.67	13.33	0
	Mean	0	15.56	38.89	30	15.56	0

xviii. *Consumer aspect of the open restaurant food vendors*

In the survey, it was observed that 100% vendor told tourists was the regular customer, and no student ate there. On the other hand in Dumki and Patuakhali Upazila there were no tourists. Most of the vendors said that Labor, Rickshaw puller and Driver was the regular customer. Seventy percent vendor's opinion was consumers ate these foods for easy access and safe time. Open restaurant food supply proper nutrient told 58.887% of vendors.

Table 7: Consumer aspect of the open restaurant food vendors

Regular Customer (%)						
Location	Student	Labor	Rickshaw puller	Driver	General people	Tourist
Dumki	50	93.33	76.67	73.33	53.33	0
Patuakhali	56.67	90	80	76.67	56.67	0
Kuakata	0	83.33	66.67	70	53.33	100
Mean	35.35	88.887	74.447	73.333	54.443	33.33
Why consumers buy these foods? (%)						
Location	Taste	Cheaper	Safe time	Easy access	Nutrient supply	Others
Dumki	33.33	16.67	83.33	86.67	60	0
Patuakhali	46.67	23.33	73.33	80	63.33	10
Kuakata	53.33	26.67	60	50	53.33	13.33
Mean	44.443	22.223	72.220	72.223	58.887	7.777

xix. *Types of vended food*

Most of the vendors sold food item such as rice, fish, meat, brainy, vegetables ect.

Table 8: Types of vended food of the open restaurant food vendors

Types of vended food								
Location	Rice	Fish	Egg curry	Chicken	Beef	Bread	Khichuri	Brainy
Dumki	100	96.67	100	66.67	50	53.33	56.67	40
Patuakhali	100	100	93.33	70	46.67	43.33	33.33	46.67
Kuakata	100	100	56.67	90	56.67	83.33	16.67	80
Mean	100.00	98.8	83.333	75.557	51.11	59.99	35.55	55.55

b) Results of consumers of Open Restaurant food

i. *Socio-demographic characteristics of the consumers*

Among the interviewed consumers maximum were male (83.33%) and age ranged between 10-60 years. It found that majority of them were married (55.577%), and 1.11% of divorced. A majority consumer had S.S.C/ H.S.C. education (34.66%) followed by Illiterate (10%), and higher educated (30%). Consumers were from different occupations. The majority of them were students (38.89%) followed by the business (32.223%), and employer (14.4%). Maximum (31.113%) consumer was with no income.

ii. *Nature of consuming area of the consumer*

Most of the consuming areas (57.78%) were station; middle classes were 36.667%, and slum 5.557%. In Dumki 70% of consumers consumed food in the station.

iii. *Personal hygiene of the consumers*

The survey report of the consumers observed that almost 68.89% found to use a clean dress. But 72% of the consumers cut their nails properly. None found to use hand gloves during survey conducted. Vaccinated consumers were 52.223% of the total consumers.

iv. Personal hygiene

The source of drinking water collected from the nearby tube well and stored in plastic drums without lids. Before food eating, 44.447% of consumers washed hand, and never washed hand at 21.11%. The majority percent (75.557%) of consumers said that vendors cleaned their dirty plates throughout the day; Most of the consumer (61.113%) told foods did not clean and 52.223% told foods were not cover properly. Cleaning table and food serving done the same person. Used water disposed at the roadside.

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v. *Mode of display of street food*

The majority of the vendors displayed their foods in baskets/trays, bowl, and shelves, while vendors used showcase. About 38.89% of consumers had no idea of food preservation and 46.667% told vendors preserved food normally. A majority of consumers consumed always in road side. Major portion of consumer's ate roadside foods as it was safe time and easy access, although only 61.11% of them received it as unhygienic food. The same report found in Peru where the sanitary conditions utensils and tables judged to be substandard in 76 to 89 % of the inspection (FAO, 1990).

vi. *Knowledge regarding food nutrition of the consumer*

Knowledge regarding foods nutrition of the consumers was not satisfactory. Only 22.223% of consumers had knowledge about nutrition and 18.89% in hygiene. Through media and school campaign, people could learn more told 34.447% and 58.887% said that media and the internet were the best way to learn more. Seventy- three percent consumers had idea about food borne pathogen and 74.443% told this pathogen sometimes caused diseases.

vii. *Food safety perception and behavior of the consumer*

It observed that 60% of the consumers suffered from diseases like diarrhea, stomach upset etc. To avoiding disease 62.223% consumers opinion ate less food.

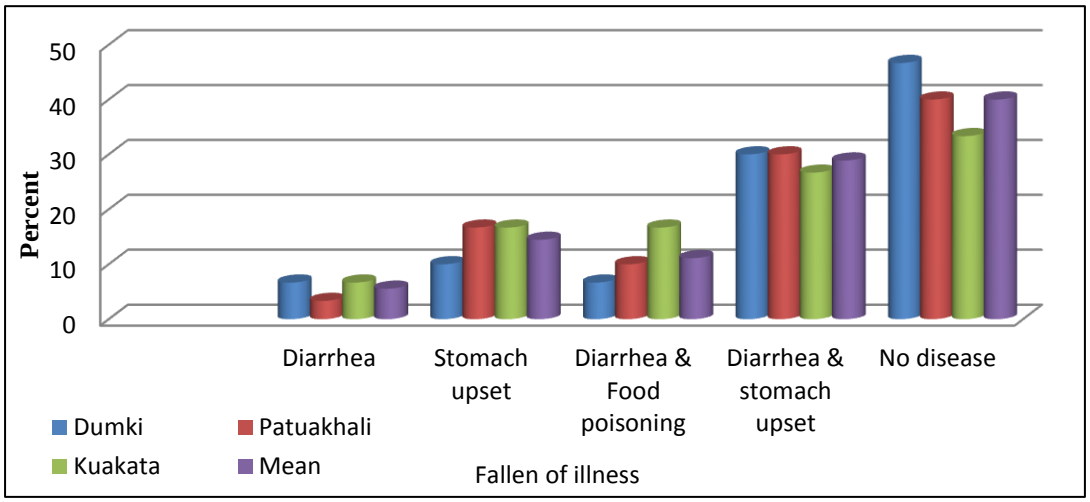


Figure 4: Types of disease afffect the consumer

viii. *Criteria for choosing vendor of the consumer*

Nearly 50% of consumers ate street food where the place was clean, and 83.333% shift where they found better option. Preferences of choosing a place 98.89% of consumers select cleanliness, 67.777% for freshness, 47.777% for time, and 30% for low price.

c) *Results of Microbial analysis*

E. coli. and salmonella count in open restaurant foods About all food items contained E. coli. and salmonella. Water and salad fully contaminated by this microorganism.

Table 9: E. coli. Test of open restaurant food (N=5)

E. coli. test of open restaurant food									
Charact eristics	Dumki	Patuak hali	Kua kata	Mean	Character istics	Dumki	Patuak hali	Kua kata	Mean
Food item: Rice (%)					Food item: Khichuri (%)				
-(ve)	60	60	40	53.33	- (ve)	80	80	80	80
No	40	40	60	46.67	No	20	20	20	20
Food item: Fish (%)					Food item: Biriani (%)				
-(ve)	80	60	80	73.33	- (ve)	40	40	60	46.67
No	20	40	20	26.67	No	60	60	40	53.33
Food item: Egg curry (%)					Food item: Vegetables (%)				

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- ve)	0	40	0	13.33
No	100	60	100	86.67
Food item: Meat (%)				
- ve)	60	60	60	60
No	40	40	40	40
Food item: Washing water (%)				
- ve)	100	100	80	93.33
No	0	0	20	6.67
Food item: Bread (%)				
- ve)	60	60	80	66.67
No	40	40	20	33.33

- (ve)	80	60	60	66.67
No	20	20	40	33.33
Food item: Drinking Water (%)				
- (ve)	60	40	60	53.33
No	40	60	40	46.67
Food item: Dal Charchori (%)				
- (ve)	100	100	100	100
No	0	0	0	0
Food item: Potato varta (%)				
- (ve)	80	80	80	80
No	20	20	20	20

Maximum (83%) of the sample bears gram-negative bacteria and Salmonella.

Table 10: Study of a positive sample of Salmonella

Name of food	Sample size	*E.coli.*(- ve)	Percent (%)	*Salmonella* (+ ve)	Percent (%)
Open Restaurant food sample	180	32	17.78	25	13.89

IV. Discussion

Maximum vendors (31%) were between 21-40 years of age, which supports the data of the Bangkok where the average age is 36 years (FAO, 1994). Maximum food vendors 95% were male. But it is extremely opposite to other countries and cities like Bangkok where the female is 69.3% and Honduras, Indonesia, and Nigeria where percentage increases to 90% and above (FAO, 1990).

In Bangladesh, about 25% of the men received help from their wives and 12% employed female helpers (Bhat & Waghray, 2000). In contrast, other countries (e.g. Nigeria, Ghana, Uganda, and the Kenya) including Botswana, the majority of vendors are women who balance the income-generating opportunities of street vending with traditional household and child care duties (Mwangi, 2002).

In Mexico City (Muòoz de Chavez et al, 2000) found that men and women divided their tasks and responsibilities. Women cooked the food to be sold later in the day, while the men were responsible for buying all that was necessary for preparation of the food. Women worked an early shift in the stall, until about noon, when the men took over and stayed late. Men were responsible for cleaning the stalls, while women washed the utensils and dishes at home.

About 72.22% food vendors aged between 21-40 years with a mean age of years. Bhat and Waghray (2000) reported that the average age of the vendors in Asian countries were 20-45 years. Studies conducted in most Latin American Countries showed a similar trend compared to the one in Asian countries. In Jamaica however the age of vendors ranged from 14 to 78 years, with a mean age of 35.5years and female vendors being older compared to their male counterparts (Bhat and Waghray, 2000)

A majority of the vendors displayed their foods in baskets/trays, bowl and shelves in survey area while vendors used showcase for display their food in Patuakhali and Kuakata areas.

The storage conditions were poor. The majority of the cases food stored at room temperature in plastic containers. The uncooked food products are left at ambient temperature for long periods.

Majority of the handler used stored water for cleaning utensils (68.89%) followed by followed by pond and river water (15%). Majority of handler used plate (27.78%) followed by paper & polythene (49.45%) as a serving media. Tube well water used 100% as drinking water. It found that many vendors simply re-used the water, especially for cleaning utensils equipments and dishes due to difficulties in obtaining clean portable water (FAO and PAHO, l985).

Hygiene during handling and cooking of street foods observed. It found that vendors did not wash fresh foods properly. Vendors did not wash their hands and utensils only once because they had not enough water. None of the cases, the vendors and the assistants did practice good personal hygiene; uniforms and aprons were not in use. Hanashiro et. al. (2005) examined microbiological quality of selected street foods from a restricted area of Sao Paulo city, Brazil and observed that personal hygiene of vendors during handling and cooking is very important as it causes serious health hazards to the consumers.

There was also hardly any inspection of the shops from the municipal or other appropriate

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authorities. This is similar to most developing countries which have no specific legislation or control systems for street food vending (Jayasuriya, 1994).

The most important finding of this study was the correlation between the socio- economic results regarding the hygiene practices of street vendors and the findings of the microbiological survey. The results of 5 other studies done among street food vendors in South Africa had similar conclusions (Mosupye FM et.al.2000).

This was a qualitative study of bacterial contamination for E. coli and Salmonella. Almost half (52.33%) of the samples contaminated where 17.67% positive for E. coli. and, 15% for salmonella in Open restaurant food. The positive case for Open restaurant food sample was 30 out of 180 sample (16.67%). The positive for Open restaurant foods sample was 35 out of 180 samples (19.44%) for salmonella.

V. Conclusion

Open restaurant foods have become a big part of the present-day urban scenario in many countries. The hygienic practices in question included food preparation, handling of utensils; a place for food preparation, personal hygiene, and methods of storing cooked food. Due to a lack of proper knowledge and guidance on food vending, vendors prepared it in explicitly unhygienic and unsanitary conditions. Improving the safety of food in any developing country is a great challenge. One of the major driving forces towards efforts to improve food vending is the contribution. As food vendors are doing their business without having a license, therefore, vendors are given clear legal status, so they can claim their entitlements to pursue their livelihoods. The vending foods contaminated with E. coli and Salmonella that causes a major health problem.

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