Nutritional status of the street food consumers of a private university in Bangladesh

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Abstract

A cross-sectional study was conducted to assess the nutritional status of randomly selected 120 consumers of street foods of a private University at Dhaka. The data on socioeconomic information, nutritional status, street food preference, personal hygiene and occurrence of diseases was collected using a structured questionnaire. Nutritional status was determined by BMI. Statistical analysis was done by using the SPSS and Microsoft excel. As revealed in the study, 76.7% of the respondents were male, 58.3% belonged to middle income group and 76.7% respondent's educational expenses were borne by their parents. Street foods were preferred by 24.2% consumers because of their good taste and quick service. The most preferred street foods were Shingara, Samucha and Puri. Street foods were stated as unhealthy by 56.7% consumers. Among them 16.7% had under nutrition, 23.3% had over nutrition and 60% had normal nutrition status. There is a significant association between nutritional status and hygienic practices (p value = 0.046). But 38.3% with normal nutritional status suffered from various diseases. There is no significant relationship between the street food consumption and nutritional status. More frequent street food consumption might have unhealthy effect on nutritional status. Therefore, further studies are required to evaluate the effect of frequent street food consumption on nutritional status.

Key words: Street food, Nutritional status, Hygienic practice

Introduction

Street foods play a significant role in fulfilling the food and nutritional requirements of the city dwellers at affordable cost particularly among the lower and middle income groups[1-3]. Street foods are ready-to-eat foods and beverages prepared at home and sold by vendors and hawkers and consumed in streets and other similar public places without further preparation[4]. Almost eight million people or 55% of the population of Dhaka consume some street food every day[5]. Street foods are more attractive than the home-made foods due to their unique flavour, spicy taste and convenience. These foods are important in contributing to the nutritional requirement of the consumers. Street food vending is probably the second most important employment opportunity for urban poor in Bangladesh and particularly important for young and middle-aged men who have migrated to Dhaka in the past five to ten years[6]. Around 418,000 people or 2.9 percent of Dhaka's total population depend on the income generated by street food vendors[5]. Since street vendors are poor, uneducated, and sometimes they do not know safe food handling, sanitation and hygiene, hand washing, use of safe water as well as how to display foods and provide food services. Street foods are sometimes considered to be public health risks. Foodborne illnesses due to microbial contamination are major health problem associated with street food[7,8]. Besides, the food safety situation became more vulnerable in public health due to resistance of food-borne microorganisms in multi-drugs[9]. Approximately, 30 million people in Bangladesh are suffering from food borne illnesses each year[10]. Diarrhoeal diseases are very common food poisoning cases in Bangladesh and these can cause death in some cases. Street food vending is common in the premises of educational institutes and many students depend on street foods during the day like many other consumers. Street food plays an important role for the university students where university cafeteria is almost absent. This is why most of the university students and employees are consuming street foods. The number of pepole of Dhaka has almost been doubled during the last decade from 5.3 to 9.3 million[11], which leads to an increased demand for relatively expensive and ready-to-eat foods as these urban residents spent most of the day

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outside house and has little time and money to spend on food.

Street foods are rich sources of carbohydrate but have low nutrient density. Most of the street foods are good sources for calorie and nutrition, some are very good sources of proteins, and met about half of the caloric requirement and get one third of his thiamin, riboflavin, and niacin, and provides significant amounts of calcium and irons. However they are low in fiber, vitamin A and C, folic acid and some trace minerals[12].

Unhygienic preparation of foods can cause contamination. Food in contact with unwashed hands can be a source of diarrhoea pathogens[13-15]. Once foods are contaminated with pathogenic bacteria, the bacteria can rapidly multiply within the foods[16-17]. More than 250 different types of virus, bacteria, parasites, toxins, and metals are associated with food borne diseases in humans[18]. Viruses are more responsible for more than 50% of all food borne illness.

This study aimed to determine the socioeconomic status of the street food consumers; foods available on the street and reasons of food preference; consumer' snutritional status and their association with age, income, occurrence of diseases and hygienic practices; and measures of control.

Methods and materials

This cross-sectional study was carried out from July 2013 to June 2014. The location was within the Private University campus at Banani, Dhaka and 120 students of different departments of a sellected Private University, who consumes street foods, was selected randomly as sample. Literature searching was carried out by using internet/website, PopLine and MedLine to review information relevant to this study.

Preparation of the study instrument: The data was collected using a structured questionnaire. Initially the questionnaire was field tested in another University having similar socioeconomic conditions, and then the questionnaires were revised and finalized according to the recommendations of the field test and used for the collection of data. The survey tool contained questions on socioeconomic information, nutritional status, and preference of taking street foods, personal hygiene and occurrence of diseases.

Quantitative survey: The socioeconomic information included gender, religion, age, marital status, own personal computer, use of transport, education cost provider, monthly family income, and whether they live with or without family. The monthly income of the respondents was categorized into three economic groups: Low income (first quintile); Middle income (second to fourth quintile); and High income (fifth quintile).

The information on food behavior, choice of street foods, preferences of taking street food, and favorite street food of the respondents were also collected.

Nutritional status assessment: The nutritional status of the respondents was assessed using the standard procedures. The weight of the respondents was measured (to the nearest 0.1 kg) using standardized digital weight machine. The respondents were bare footed, with minimum clothing and empty bladder and stomach. Edema was checked before taking weight. The height of the respondents was measured (to the nearest 0.1 cm) using a locally made standardized height scale. Standardized techniques were followed like upright and straight, Frankfurt plane as horizontal and bare footed.

Body mass index was calculated by dividing weight in kilograms by height in meters squared. Based on World Health Organization (WHO) cut-offs, the respondents were divided into three nutritional categories based on body mass index (Kg/m^2); Undernutrition: < 18.5 kg/m^2; Normal nutrition: 18.5 to 24.9 kg/m^2; and Overweight: 25.0 kg/m^2 and above.

Hygienic practices and occurrence of diseases: The information was collected on hand washing before and after taking street foods, mode of hand washing before and after taking street foods, source of drinking water, respondent's experience of ever tasting contaminated or spoiled street foods. Information was also collected on the occurrence of diseases in last three months like suffering from any disease, name of the diseases, duration of sufferings, and types of treatment.

Data analysis: Data collected from the respondents were compiled, tabulated and analyzed in accordance with the objectives of the study. Data from the survey were statistically analyzed using the Statistical Package for the Social Scientist (SPSS) and Microsoft excel.

Results and discussions

Socio-economic features of the respondents: Table 1 shows, among the total samples, 76.7% respondents were male and 23.3% were female.

Ninety seven percent respondents were unmarried, and 92.5% respondents were Muslim. Use of own personal computer (PC) is a better social status symbol and when the respondents were asked whether they use their own PC, 85% answered that they have their own PC and they use those PC. However, while asked about their use of transport, 98.5% and 27.5% respondents stated that bus and rickshaw are their mode of transports respectively; and 20.8% respondents do not use any transport but walk.

The social status of the family also depends on the provider of educational expenses; it was found that 76.7% provider of educational expenses were parents, 10.8% providers were siblings, 7.5% providers were the respondent themselves and 5.0% received educational expenses from other providers.

Income of the family: The monthly family income of the respondents was collected and segregated into low (first quintile), middle (second to fourth quintile) and high (fifth quintile) income categories according to standard procedures. Among the total respondents 58.3% were from the middle-income group, followed by 22.5 percent from the high-income group and 19.2% from the low-income group.

Preferred street foods: Figure on shows most of the respondents preferred Shingara, Samucha, Puri, Noodles, Parata and Fuchka among the available street foods in and around the campus. Most preferred street food among the respondents was Shingara (75.8%), which was followed by Samucha (70.8%), both Puri and Noodles (59.2%), Parata (55.8%) and Fuchka (54.2%). However, Egg Chop was the less preferred street food (38.3%) among the respondents.

Table 1: Percentage distribution of the respondents by their sociodemographic features (n=120)

Parameters		Number, (%)
Sex	Male	92 (76.7)
	Female	28 (23.3)
Marital status	Married	3 (2.5)
	Unmarried	117 (97.5)
Religion	Islam	111 (92.5)
	Hindu	9 (7.5)
Own PC	Yes	102 (85.0)
	No	18 (15.0)
Transport use	Bus	115 (98.5)
	Rickshaw	33 (27.5)
	Motorcycle	3 (2.5)
	No transport	25 (20.8)
Education expenses provider	Parent	92 (76.7)
	Sibling	13 (10.8)
	Self	9 (7.5)
	Others	6 (5.0)

Table 2: Distribution of the respondents by monthly income level (n=120)

Income level		Number (%)
Low income	(Tk.15000-Tk.30250)	23 (19.2%)
Middle income	(Tk.30251-Tk.83000)	70 (58.3%)
High income	(Tk.83001-Tk.275000)	27 (22.5%)

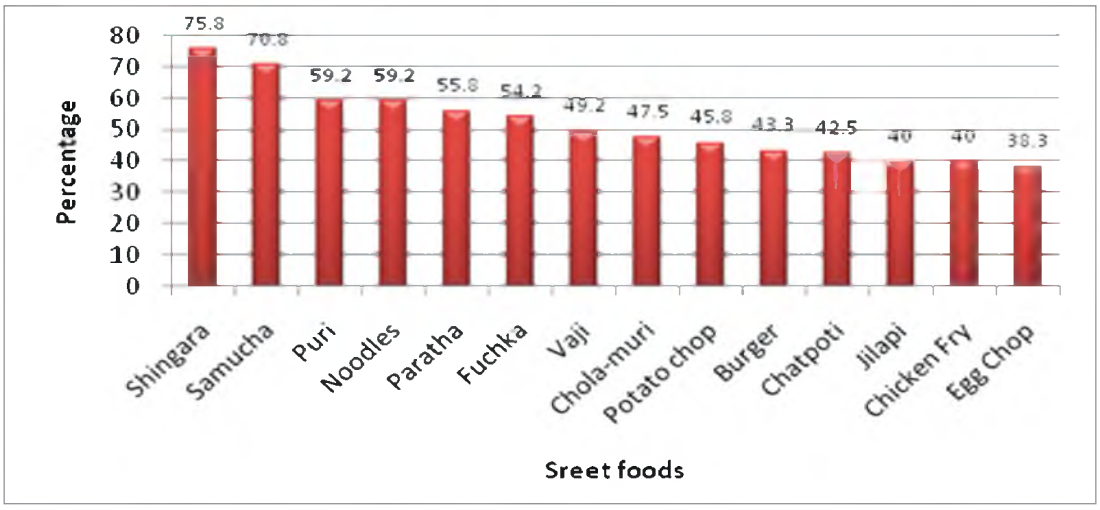

Figure 1: Most preferred street foods by the respondents (n=120).

Table 3: Opinion of the respondents on why they prefer street food

Sl. No.	Statement	Number (%)
1.	Very tasty, easily available and fast service	29 (24.2%)
2.	Attractive presentation of the street foods	16 (13.3%)
3.	Different taste than home-made foods	10 (8.3%)
4.	Working family has no time to prepare food and facility to carry foods from home	15 (12.5%)
5.	Low cost and easy to afford	21 (17.5%)
6.	Didn't like street food	29 (24.2%)

Reasons to prefer street foods: More than 75% respondents preferred street food on various reasons including good taste, availability and service; low cost and easy to afford; attractive presentation; no time to prepare food and facility to carry from home; and different taste than home-made food. One-fourth of the study samples (24.2%) opined that they prefer street food as these are very tasty, easily available and their fast service; while 17.5% respondents stated that they prefer street food because they are of low cost and are easy to afford. On the other hand, about one-fourth of the respondents stated that they do not like street foods (Table 3).

Perception on food value and hygienic condition of street foods: The consumer's perception about food value and hygienic condition of the street food are shown in Table 4. Majority of the consumers (56.7%) stated that street foods are prepared in unhealthy environment that causes contamination while 54.2% opined that hygienic practices and food quality need improvement. On the other hand, 47.5% consumers stated that street foods are tasty and give energy, and 40.8% opined that street foods may lead to gastrointestinal disease and food borne illness.

Table 4: Perception on food value and hygienic condition of street food

Sl. No	Statement	Number, (%)
1.	Street foods are tasty and give energy	57(47.5%)
2.	Street foods prepared in unhealthy environment result in contamination	68 (56.7%)
3.	Most of the street foods are unhealthy	68 (56.7%)
4.	Hygienic practices and food quality need improvement	65 (54.2%)
5.	Street foods have low nutritional value	22 (18.3%)
6.	Street foods may lead to gastrointestinal disease and food borne illness	49 (40.8%)
7.	University Canteen could ensure hygiene	22 (18.3%)

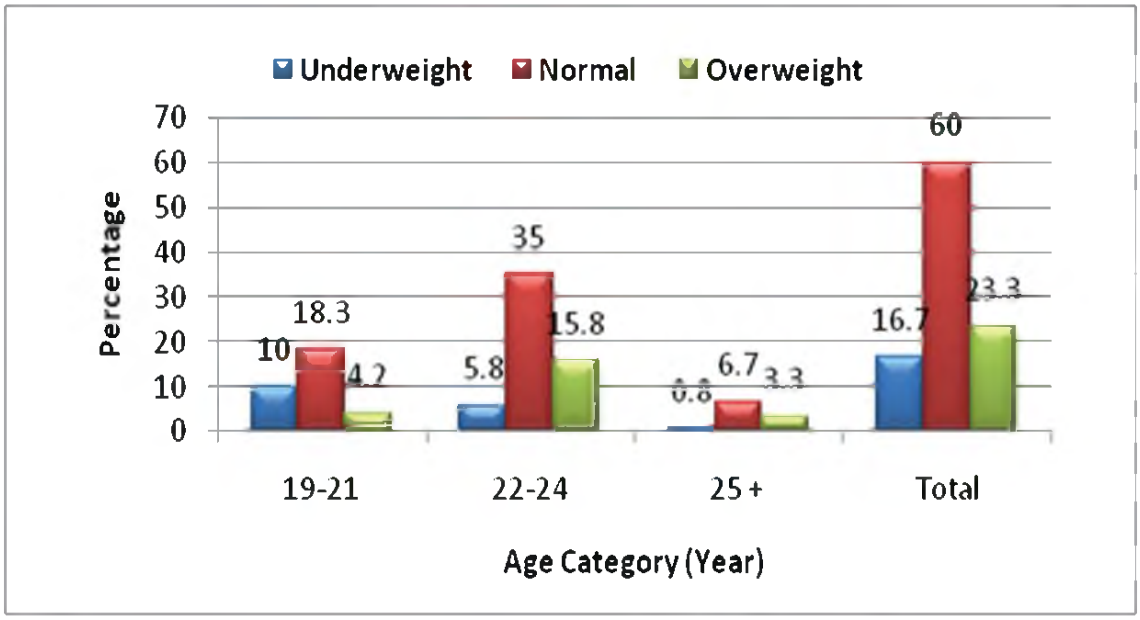

Figure 2: Nutritional status of the street food consumers by age category (n=120).

Nutritional status of the respondents by age: 16.7% respondents were undernutrition, 23.3% were overnutrition and 60% were normal nutritional status. Figure 2 shows that, among the respondents, the highest rate of normal nutrition (35%) was found in the age group of 22-24 years. The highest rate of underweight (10%) was found in the age group of 19-21 years. On the other hand, 15.8% respondents of the age group of 22-24 years were found over weight, which was higher than the other age groups. Thedifference between nutritional status and age category of the respondents is highly significant (p-value =0.006).

Nutritional status of the respondents by income level: The nutritional status of the street food consumers by income level was also assessed. Among the total respondents, normal nutritional status was found in 35% street food consumers of middle income group, which was followed by 14.2% and 10.8% consumers of low income and high-income groups respectively. Underweight was founding 9.2% street food consumers of middle-income group followed by 5% consumers from high income group and 2.5% consumers from low-income group (Table 5). It was also found that 15.0% consumers of middle income group and 6.7% consumers of high income group and 1.7% consumers of low income group are overweight. There is no significant difference between nutritional status and income level of the respondents (p-value= 0.548).

Table 5: Nutritional status of the street food consumers by income level (n=120)

Body mass index (BMI)	Low income group, n (%)	Middle income group, n (%)	High income group, n (%)	Total, n (%)	P- value
Underweight	3 (2.5%)	11 (9.2%)	6 (5.0%)	20 (16.7%)	
Normal	17 (14.2%)	42 (35.0%)	13 (10.8%)	72 (60.0%)	0.548
Overweight	2 (1.7%)	18 (15.0%)	8 (6.7%)	26 (23.3%)	
Total	22 (18.3%)	71 (59.2%)	27 (22.5%)	120(100.0%)	

Table 6: Nutritional status and hygienic practices of the street food consumers (n=120)

Parameters	Under weight, n (%)	Normal, n (%)	Overweight, n (%)	P –value
Hand washing before taking street food:				
- Yes	10 (8.3%)	26 (21.7%)	7 (5.8%)	
- No	10 (8.3%)	46 (38.3%)	20 (16.7%)	0.046
If no, why?				
- No need to wash	2 (2.6%)	16 (21.1%)	5 (6.6%)	
- No facility for hand washing	2 (2.6%)	18 (23.7%)	10 (13.2%)	0.633
-Lack of time	5 (6.6%)	12 (15.8%)	6 (7.9%)	
Source of drinking water:				
- Tube well	1 (0.8%)	0 (0.0%)	0 (0.0%)	0.326
- Filter water	16 (13.3%)	64 (53.3%)	25 (20.8%)	
-Mineral water	1 (0.8%)	2 (1.7%)	1 (0.8%)	
- Others	1 (0.8%)	5 (4.2%)	2 (1.7%)	
Mode of hand washing/ cleaning after eating:				
- Water	4 (3.3%)	15 (12.5%)	6 (5.0%)	0.462
-Tissue paper	10 (8.3%)	25 (20.8%)	8 (6.7%)	
- Newspaper	6 (5.0%)	30 (25.0%)	14 (11.7%)	
- Cloth	0 (.0%)	2 (1.7%)	0 (.0%)	
Have you ever eaten contaminated /Spoiled food:				
- Yes	9 (7.5%)	45 (37.5%)	20 (16.7%)	
- No	11 (9.2%)	27 (22.5%)	8 (6.7%)	0.071

Nutritional status and hygienic practices: Table 6 shows that 38.3% of the respondents having normal nutritional status didn't wash their hand before taking street foods. There is a significant relationship between the nutritional status and hand washing practice before taking street foods (p=0.05). Majority of the respondents having normal nutritional status (53.3%) used filter water as sources of drinking water. Newspapers and tissue papers are mostly used by the street food consumers of different nutritional status, while water was not so used, after taking street food. A total of 37.5% respondents having normal nutritional status suffered from disease due to contaminated food.

Nutritional status and occurrence of disease: Table 6 shows that 38.3% of respondents with

normal nutritional status, 17.5% of respondents having overweight, and 12.5% of underweight suffered from diseases though there is no significant relationship between the nutritional status and the occurrence of diseases. Surprisingly there is a positive correlation between the occurrence of the diarrhoea and the nutritional status of the respondents. Among the respondents, 35.9% of respondents with normal nutritional status suffered from diseases for less than 3days.

Income and occurrence of diseases: The table 7 depicts association between income and diseases frequency of the street food consumers. As revealed in the result 41.7% of middle income group were suffering from different diseases compared to 10.8% low income and 15.8% high income groups. Among the middle-income group, 24.2% was found to suffer from fever, 15.8% from abdominal pain, and 10.8% from abdominal burning sensation. Some 33.3% of respondents suffered from illness for <=3days. The statistical correlation test indicates that there is no significant relationship between income level and occurrences of disease.

Table 7: Association between nutritional status and occurrence of disease among the respondents (n=120)

Parameters	Underweight n (%)	Normal n (%)	Overweight n (%)	P value
Suffers from any disease				
- Yes	15 (12.5%)	46 (38.3%)	21(17.5%)	
- No	5 (4.2%)	26 (21.7%)	7 (5.8%)	0.869
Name of the diseases				
- Fever	8 (6.7%)	29 (24.2%)	13 (10.8%)	0.627
- Abdominal burning sensation	3 (2.5%)	12 (10.0%)	5 (4.2%)	0.797
- Dysentery	1 (0.8%)	3 (2.5%)	2 (1.7%)	0.692
- Typhoid	0 (0.0%)	1 (0.8%)	0 (0.0%)	0.916
- Abdominal pain	4 (3.3%)	18 (15.0%)	8 (6.7%)	0.507
- Vomiting	2 (1.7%)	3 (2.5%)	6 (5.0%)	0.102
- Diarrhoea	0 (0.0%)	4 (3.3%)	4 (3.3%)	0.044
- Others	9 (7.5%)	29 (24.2%)	8 (6.7%)	0.228

Table 8: Association between income and occurrenced of disease among the respondents (n=120)

Parameters	Low Income Group: n (%)	Middle Income Group: n (%)	High Income Group: n (%)	P value
Sufferings from any disease				
- No	13 (10.8%)	50 (41.7%)	19 (15.8%)	0.431
- Yes	9 (7.5%)	21 (17.5%)	8 (6.7%)	
Name of the diseases				
- Fever	8 (6.7%)	29 (24.2%)	13 (10.8%)	0.401
- Abdominal burning sensation	1 (0.8%)	13 (10.8%)	6 (5.0%)	0.111
- Dysentery	1 (0.8%)	3 (2.5%)	2 (1.7%)	0.626
- Typhoid	0 (0.0%)	1 (0.8%)	0 (0.0%)	0.948
- Abdominal pain	5 (4.2%)	19 (15.8%)	6 (5.0%)	0.935
- Vomiting	0 (0.0%)	9 (7.5%)	2 (1.7%)	0.449
- Diarrhoea	2 (1.7%)	4 (3.3%)	2 (1.7%)	0.850
- Others	8 (6.7%)	28 (23.3%)	10 (8.3%)	.981

Table 9: Comparison of nutritional status of the respondents who live with or away from family

Parameters	Under weight (n)%	Normal (n)%	Over weight (n)%	P value
Live with family				
Yes	9 (7.5%)	28 (23.3%)	15 (12.5%)	0.462
No	11 (9.2%)	44 (36.7%)	13 (10.8%)	

Nutritional status of the respondents who live with or away from family: Table 9 presents the relationship between nutritional status of the street food consumers and the facility to live with family and no facility to live with family. Among the students who live away from the family, about 36.7% were of normal nutritional status, 10.8% were overweight and 9.2% were underweight.

On the other hand, among the students who live with family, 23.3% were of normal nutritional status, 12.5% were overweight and 7.5% were underweight. The Pearson's R test with p-value indicates that there is no significant relationship between nutritional status of the consumers and their facility to live with family and no facility to live with family.

The present study reveals that 57% of the respondents were not living with their family. This information intensifies their dependency on street food. In the present study, Shingara (75.8%) was the most preferred food item, followed by Samucha (70.8%). Their liking also included both Puri and Noodles (59.2%), Parata (55.8%) and Fuchka (54.2%). More than one third of the respondents preferred street food because of good taste, easy availability, low cost and shortage of time to prepare food and carry from home. Similar findings were observed by the previous investigators[19].

The study investigated the occurrence of diseases and nutritional status. The occurrences of different diseases may be related to the consumption of street vended foods, although it is not known for sure that the occurrences of diseases are due to the consumption of street foods alone. The study revealed that 38.3% of respondents with normal nutritional status, 17.5% of overweight, and 12.5% of underweight respondents suffered from different diseases, though there was found no significant differences between the nutritional status as a factor for the occurrence of diseases. As expected there is a positive correlation between the occurrence of the diarrhoea and the nutritional status of the respondents.

Street food is sometimes associated with food borne diseases. Out of the incidents, it has been noticed that the vendors do not pay enough attention to food safety[20], and they probably lack education which influenced the lack of their sanitary knowledge[21]. However, the reality lies in the fact that street foods are generally very affordable. In practice the street food cannot be moved out from student's life. So, it is advisable to systematize street foods in hygienic environment.

Conclusions

In conclusion, it can be stated that street food consumption might have an effect on nutritional status. he findings of the present study could not identify a significant relationship between the street food consumption and nutritional status of the respondents. But hygiene practices might have influence on nutritional status. The results are not meant to be definitive in nature, but are exploratory, due to limitations in sample size.

Acknowledgements

The authors acknowledge the technical criticisms and suggestions made by the seminar participants on the study, particularly Professor Morshed Khandoker and Professor AJM Omar Faruque.

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