

A study about the young consumers' consumption behaviors of street foods

Um estudo sobre o comportamento de consumo dos jovens consumidores de alimentos de rua

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Abstract *As in almost every country in the world, street foods are frequently used in Turkey. To determine the preferences for these foods, a questionnaire was given to 847 individuals constituted by randomly selected high school and university students. Of the participants, 43.4% were male and 56.6% were female; the majority of them were between 19 and 22 years of age. It was found that 40.1% of the young people ate street food 2-3 times per week, whereas 23.3% were found to eat it every day. Turkish bagels, döner, boiled corn in a cup and toast are most preferred street foods. A statistically significant negative correlations were found between consumption preference scores and education, gender, and age. Although consumers know that street foods can cause contamination with microorganisms, that sellers do not pay attention to hygiene, and that these foods are raw or not cooked well, they prefer because of their cheapness, deliciousness, variety and fast service. Street foods are widely consumed in Turkish young students and because of preventing food poisoning, they should be educated about food hygiene and safety. Also, educating vendors in personal hygiene and good manufacturing practice can minimize contamination risk.*

Key words *Youth, Street food, Food preference*

Resumo *Alimentos de rua são frequentemente consumidos na Turquia como em quase todos os países do mundo. Foi aplicado um questionário para 847 indivíduos constituídos por estudantes de nível médio e superior que foram aleatoriamente selecionados. Dos participantes, 43,4% eram do sexo masculino e 56,6% do feminino; a maioria deles tinha entre 19 e 22 anos de idade. Foi constatado que 40,1% dos jovens comem alimentos de rua 2-3 vezes por semana, enquanto 23,3% todos os dias. Bagel turco döner, milho cozido em um copo e pão torrado são os alimentos de rua mais preferidos. A correlação negativa estatisticamente significativa foi encontrada entre as pontuações de preferências de consumo e educação, gênero e idade. Embora os consumidores saibam que os alimentos de rua podem causar contaminação com microrganismos, pois os vendedores não prestam atenção à higiene, e que estes alimentos são crus ou mal cozidos, eles preferem por causa de seus custos baratos, o seu gosto, a variedade e o serviço rápido. Alimentos de rua são amplamente consumidos por jovens e estudantes turcos e para prevenir a intoxicação alimentar, eles devem ser educados sobre higiene e segurança alimentar. Além disso, educar fornecedores sobre higiene pessoal e boas práticas de fabricação podem minimizar o risco de contaminação.*

Palavras-chave *Juventude, Alimentos de rua, Preferência alimentar*

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Introduction

Nowadays, as in many fields of life, globalisation has caused differences in people's food consumption habits. In developing countries out-of-home consumption of foods and beverages is rising and causing differences in consumption styles^{1,2}. Variable social profiles and the intensive participation of women in working life have caused observable changes in countries' economies and this has been reflected in food and beverage culture^{3,4}. Accordingly, in recent years people in developing countries have spent most of their disposable income on food consumption, which has turned street foods into alternative sources of nutrition^{2,5-7}. Street foods are foods and beverages that are sold in the street and other open public spaces and that are ready to consume, without the need for any processing or preparation⁸. Street foods are sold in places where sometimes people briefly gather (on street corners, at interchanges, subway station entrances/exits, crossroads etc.)⁹.

Studies have shown that 2.5 billion people consume street food around the world^{8,10}. This prevalent consumption raises the importance of food safety and its relation to health¹¹. There are many epidemiological studies about relation of street food and diseases, because of lack of knowledge about hygiene, and food safety of street food seller's and the overabundance of pathogenic bacteria in street food samples¹²⁻¹⁴. In many countries around the world, especially in Africa, Asia, and Latin America, it has been found that street foods carry harmful pathogens and cause serious foodborne diseases^{12,15-23}.

It is thought that the places where street food are prepared, sold, and consumed provide appropriate conditions for contamination¹³. The poor hygiene practices of food sellers and negative environmental conditions such as problems with the supply of clean drinking water and the disposal of waste increase food safety hazards, which is an important public health issue^{8,14,24,25}. Food safety is highly important for developed and developing countries. In today's world, millions of people catch diseases originated from food sources and thousands of deaths occur²⁶. Therefore, an increase in food poisoning due to the consumption of street food is seen as a risk²⁷. The contamination of foods with hazardous microorganisms such as *E. coli*, *Salmonella typhimurium*, *Pseudomonas sp.*, *Staphylococcus aureus*, and *Proteus* in the food preparation, storage, and service stages can cause detrimental health consequences²⁸⁻³¹. While diarrheal diseases

caused by microbial pathogens originating from food sources are frequently seen both in developed and developing countries, it is reported that approximately 1.9 million people die from this disease around the world every year³². Street foods were responsible for 691 food poisoning outbreaks and 49 deaths from 1983 to 1992 in China³³. Approximately 30 million people in Bangladesh have had a foodborne disease and these diseases result from flies and other organisms which can act as a source of pathogens for most food sold in the street²⁷. According to The Ministry of Health of Turkey (2006), 23,901 *Salmonella typhi* infection, 429 *Salmonella paratyphi* infection, 21,068 dysentery infection and 8824 Hepatitis A occurred in Turkey in 2004³⁴. It was found that from past till today, the number of instances notified regarding food intoxications originating from *E. coli* O157H7 kept on increasing. Increase in global trade, traveling, changes in consumption of modern food, influence of modern life styles, and changes in food consumption have all caused new pathogens to form²⁷. In many countries besides the fact that street food is not reliable, it is seen that they also carry diseases originating from food sources^{12,16,20,21,35}. Although street foods carry health risks, they are good food alternatives for students and also offer people with low incomes and those working in small businesses a chance to meet their nutritional needs^{36,37}.

Widespread urbanisation and population growth in some countries in recent years has in part driven the development of the illegal street food sector^{2,23}. Although the FAO and WHO determine international rules according to feasibility studies to ensure the safety of foods sold and consumed in the street³, in most countries the sale of street food is an unrecorded and illegal market^{7,38}. Studies have shown that in most countries' policies there is no legal arrangement for food safety or the sale of street food^{13,23}. The preparation and sale of food has become an area of self-employment for those that have little or no education, unemployed, and having financial difficulties in urban areas, as the number of people buying from this sector is considerable⁸.

The consumption of street food in Turkey is parallel to in many countries around the world. Some kind of street food can be seen almost everywhere in Turkey. Food and beverages such as *çiğ köfte* (steak tartare a la turca), *gözleme* (pancakes), Turkish bagels, pastries, *kokoreç* (grilled sheep intestine), meatball sandwiches, kebab, *döner*, pea meal pilav, mussels, boiled corn

in a cup, *boza*, chestnuts, sahep, liquorice, macun (gum-like candy) and cotton candy, wafers, candied apples, ice cream, etc. are sold in local businesses after being prepared and cooked in unsuitable conditions^{39,40}. Street food is preferred by young people because of its cheapness, availability, variety, etc. There are some studies conducted in Turkey. It was determined that students preferred meatballs in bread, bagel, pastry from food sold on the streets, pastry from traditional cuisine, and baklava from deserts^{41,42}. Ercan et al.⁴² found out that among 79 male and 11 female street food sellers the number of those thinking that food could be a source of disease was high. It was emphasized that there were differences among hygienic knowledge, attitude, and applications of street food sellers and that hygiene applications were not sufficient enough. However, there has not been a comprehensive study on this subject. Therefore, this study was planned and carried out in order to determine the street food preferences, the reasons for these preferences and effect of socio-demographic factors among young people.

Methods

Research design

The study was designed as a descriptive study. A sample consisted of 847 young volunteer consumers (male = 368, female = 479) who were either high school (15-19 years old) or university students (above 19 years old). At the beginning of the study participating of total 1100 students (550 high school, 550 university) was targeted, but 325 high school and 522 university students accepted to participate the study (response rate: 77%). The data of the study were collected with a self-administrable questionnaire developed by the researchers between February and April 2014 in Ankara, the capital of Turkey.

Participants were informed about the subject and purpose of the study. Each young person signed a voluntary participation form and filled in the questionnaire, which adhered to the principles of the Declaration of Helsinki (World Medical Association).

Instrumentation

The research data were collected through a questionnaire which was tested as a pilot study on 62 consumers and then suitable modifica-

tions were made. The consumers in the survey were especially reminded that truthful information was required for the success of the study and that the information would be kept confidential. Students aged below 15 years and not consume street foods were excluded.

The questionnaire was organised into two main sections;

- i) Demographic information;
- ii) Consumers' decisions regarding street food preferences and preference causes.

Demographic information

The first section of the questionnaire was four questions related to gender, age, income, and educational background as the demographic information.

Street food preferences

The participants were asked to indicate their favorite five ones from the list of 45 street foods mostly consumed in Turkey. And so on and so far for food safety knowledge; food purchase decisions; factors influencing food choices; concerns about food safety of street foods; attitudes towards food safety regarding street food. The factors influencing food choices were designed based on food choice questionnaires developed by other researchers⁴³⁻⁴⁶, including convenience, sensory appeal (appearance, taste, smell, texture, and sound), price, nutritional value, mood, familiarity, the appearance of street food, and safety. A five-point Likert scale, ranging from one (1) "strongly disagree" to five (5) "strongly agree" was also used to determine respondents' attitudes towards street food safety and the reasons for choosing street foods with 25 items. Each item score ranged between 1-5 and the total street food preference score obtained from this questions range between 25-125. Rising of the total score indicates that there are more causes for prefer street foods.

Questionnaires were modified and tested for suitability through Cronbach's alpha test with a reliability coefficient of 0.83. The questionnaire took approximately 15 minutes to complete.

Statistical analysis

The SPSS Version 15.0 (SPSS Inc., Chicago, IL, USA) statistical software package was used for all analyses. The results were expressed as mean \pm standard deviations (\pm SD), frequencies, and per-

centages. Descriptive statistics were used to summarise the variables of interest and determine relationships between them. An independent *t*-test was applied for binary variables to compare the scores regarding street food preference according to gender, education level; age, and the frequency of consumption of street food, while a one-way ANOVA (confidence interval 95%) was applied for more than two variables, and a post hoc LSD test was used to determine the group causing the difference. Statistical significance was identified at the 95% confidence interval ($p < 0.001$ and $p < 0.05$).

Results

Eight hundred and forty-seven questionnaire forms were filled in by young consumers. Of the young respondents, 43.4% were male and 56.6% were female. Among the young consumers, 38.4% were between 15 and 18 years of age, 40% were between 19 and 22 years of age, and 21.6 % were 23 years of age and over (Table 1).

The mean street food preference scores of males (86.3 ± 6.1) was found to be higher than females (80.3 ± 12.2) and the difference was statistically significant ($t = 8.63$, $p < 0.05$). University students (86.2 ± 7.5) preferred consuming street foods more than high school students (77.4 ± 12.1) ($t = 13.06$, $p < 0.05$). The mean street food preference score (87.5 ± 4.6) was higher for 19-22 years old than for other age groups ($F = 103.8$, $p < 0.05$). The differences between all age groups are also statistically significant ($p < 0.05$) (Table 1).

Street foods frequently that are consumed in Turkey are shown in Table 2. In this study it was found that Turkish bagel ($n = 511$, 60.33%), *döner* ($n = 371$, 43.80%), boiled corn in a cup ($n = 322$, 38.01%), and toast ($n = 319$, 37.66%) are the most preferred street foods among young people. *Çiğ köfte*, fried potatoes, pizza, and ice cream are frequently preferred foods.

The preference scores of participants who consume street foods 1-3 times a year were the lowest (65.5 ± 0.7) and those of participants who consume it daily (85.4 ± 9.07) were the highest. There was a statistically significant difference be-

Table 2. The most preferred street foods of young ($n = 847$).

Street Food	n	(%)
Turkish bagels (pastries, etc.)	511	60.33
<i>Döner</i>	371	43.80
Boiled corn in a cup	322	38.01
Toast	319	37.66
<i>Çiğ köfte</i>	290	34.23
Fried potatoes	256	30.22
Pizza	208	24.55
Ice cream	185	21.84
Meatball sandwich	154	18.18
<i>Kumpir</i> (baked potato)	153	18.06
<i>Gözleme</i> (pancake)	112	13.22
Fried fish sandwich	102	12.04
<i>Tantuni</i>	68	8.02
<i>Kokoreç</i> (grilled sheep intestine)	25	2.95

Table 1. Street food preference scores of young's according to gender, education level and age (mean, standard deviation and significance level).

Demographic characteristics	n	(%)	$\chi \pm SD$	t / F test	p value	Tukey test
Gender						
Male	368	(43.4)	86.3 ± 6.1	$t = 8.63$	0.000*	
Female	479	(56.6)	80.3 ± 12.2			
Education level						
High school student	325	(38.4)	77.4 ± 12.1	$t = 13.06$	0.000*	
University student	522	(61.6)	86.2 ± 7.5			
Age (years)						
15-18 years of age	325	(38.4)	77.4 ± 12.1	$F = 103.8$	0.000*	(1-2), (1-3), (3-2)
19-22 years of age	339	(40.0)	87.5 ± 4.6			
23+ years of age	183	(21.6)	84.0 ± 0.2			

* $p < 0.001$.

tween preference scores according to consumption frequency ($F = 6.96, p < 0.05$) (Table 3).

A statistically significant correlation was found between the street food consumption preference score and education level ($r = -0.169, p = 0.000$), gender ($r = -0.219, p = 0.000$), and age ($r = -0.138, p = 0.000$) ($p < 0.001$) (Table 4).

It was shown that although the young consumers knew that it is easier for street food to contaminate people with microorganisms ($M = 3.46 \pm 0.96, F = 3.15 \pm 1.08$), vendors paid no attention to hygiene ($M = 2.31 \pm 0.83, F = 2.60 \pm 1.02$), street foods are raw or not cooked well ($M = 2.44 \pm 0.49, F = 2.67 \pm 0.60$), and consumers preferred this food because of its cheapness ($M = 4.22 \pm 0.78, F = 3.61 \pm 1.13$), the satisfaction it gives ($M = 3.91 \pm 0.89, F = 3.32 \pm 1.20$), its taste ($M = 4.03 \pm 0.83, F = 3.89 \pm 0.96$), its variety ($M = 3.07 \pm 0.76, F = 3.54 \pm 0.85$), its fast service ($M = 4.41 \pm 0.73, F = 3.69 \pm 1.10$), and because it is consumed by most people ($M = 4.33 \pm 0.63, F = 3.99 \pm 1.08$). The difference in the mean scores between the genders is statistically significant ($p < 0.05$) (Table 5).

Discussion

Street foods are widely consumed and produced in almost all countries around the world, as a result of nutritional trends in urban areas⁴⁷. Street food is preferred by consumers, especially students, because of its delicious taste, accessibility, variety, and cheapness¹⁴.

Most studies have found that street food is adequate in terms of cleanliness, hygiene, and quality^{12,15-23}. Şanlıer⁴⁸ reported that the food safety knowledge scores and safe food preparation practice scores of young consumers were lower than adults. Sert and Kapusuz⁴⁹ found in their study that 75% of participants preferred street food occasionally and 18.9% usually. In the present study, while the street food consumption preference scores were low in participants who consumed street foods 1–3 times a year, they were high in participants who consumed it daily ($F = 6.96, p = 0.000$) (Table 3). In a study the most preferred foods were pastries, Turkish bagels, fried potatoes, toast, hamburgers, and *döner*⁵⁰. In the present study the most preferred foods were Turkish bagels ($n = 511, 60.33\%$), *döner* ($n = 371, 43.80\%$), boiled corn in a cup ($n = 322, 38.01\%$), and toast ($n = 319, 37.66\%$) (Table 2). The preferred street foods were simi-

Table 3. Young's preference scores according to consumption frequency of street foods.

Consumption frequency	n (%)	$\chi \pm SD$	F	P value
Daily	197 (23.3)	85.4 \pm 9.07	6.96	0.000*
2-3 times per week	340 (40.1)	83.6 \pm 10.06		
Weekly	190 (22.4)	81.2 \pm 11.3		
2 times per month	59 (7.0)	79.5 \pm 9.4		
Monthly	50 (5.9)	78.2 \pm 8.8		
1-3 times a year	11 (1.3)	65.5 \pm 0.7		

* $p < 0.001$.

Table 4. Correlation between gender, age, education level and preference scores of street foods (r).

	Consumption preference score (r)	p value
Gender	- 0.219*	0.000*
Age (year)	- 0.138*	0.000*
Education level	- 0.169*	0.000*

* $p < 0.001$.

lar in these two studies. In another study it was determined that people preferred hamburgers, pizza, fried potatoes, and meat products⁵¹. As a result, easy accessibility, cheapness, traditional, variety, fast service, practice and delicious specifications of street foods effect consumers' preferences. But it is also known that these foods threaten consumers' health because of poor hygiene conditions. Because of cross-contamination risk and lack of legal regulations for safety precautions for consumers has a negative effect on public health. So legal obligations on street foods and vendors and self-controlled practice and behaviours of vendors are effective in prevention of consumers' health.

In one study, students consumed street foods quite frequently because of their economic and fast service considerations, although they knew that these foods are unhealthy and have low nutritional value⁴⁹. Similarly, in the present study although street food was widely consumed, the scores of preference causes "clean and suitable for health" and "healthy" were low. The difference according to gender was statistically significant ($p = 0.000$) (Table 5). This may be due to living away from their families for education and having not enough time to preparing

Table 5. The street foods preference scores according to gender ($\bar{x} \pm \text{SD}$).

Preference causes of street foods	Male (n = 368)	Female (n = 479)	t-test	p-value
	$\bar{x} \pm \text{SD}$	$\bar{x} \pm \text{SD}$		
Cheap	4.22 ± 0.78	3.61 ± 1.13	8.92	0.000**
Tasty	4.03 ± 0.83	3.89 ± 0.96	2.18	0.029*
Healthy	1.90 ± 0.82	2.21 ± 0.91	5.00	0.000**
Fast consumption	4.13 ± 0.83	3.36 ± 1.17	10.75	0.000**
Clean and suitable for health	2.15 ± 0.63	2.39 ± 1.02	3.86	0.000**
More satisfying	3.91 ± 0.89	3.32 ± 1.20	7.86	0.000**
Fast service	4.41 ± 0.73	3.69 ± 1.10	10.77	0.000**
Consumed by most people	4.33 ± 0.63	3.99 ± 1.08	5.34	0.000**
Easily accessible	4.52 ± 0.61	4.12 ± 0.86	7.63	0.000**
Sold legally	4.32 ± 0.73	3.67 ± 1.12	9.63	0.000**
Familiar vendor	3.19 ± 0.84	2.38 ± 0.94	12.92	0.000**
Vendors pay attention to hygiene	2.31 ± 0.83	2.60 ± 1.02	4.41	0.000**
Vendors are helpful	3.28 ± 0.77	2.78 ± 0.97	8.06	0.000**
Vendors are full of sweetness and light	3.60 ± 0.81	2.73 ± 1.13	12.38	0.000**
Vendors show more interest	3.26 ± 0.67	2.92 ± 0.91	5.97	0.000**
Food preparation can be seen	3.75 ± 1.02	3.28 ± 1.13	6.21	0.000**
Foods appeal to the taste buds	3.50 ± 0.66	3.64 ± 0.99	2.29	0.02*
Low nutritional value	3.06 ± 0.84	2.92 ± 0.87	2.39	0.17
Satisfies hunger	4.18 ± 0.78	3.97 ± 0.94	3.43	0.001*
Reflects food culture	2.38 ± 0.73	2.87 ± 1.16	7.05	0.000**
Increases chances of Contamination with microorganisms	3.46 ± 0.96	3.15 ± 1.08	4.20	0.000**
Raw and not cooked well	2.44 ± 0.49	2.67 ± 0.60	5.77	0.000**
Variety	3.07 ± 0.76	3.54 ± 0.85	8.18	0.000**
Consume much more	4.10 ± 0.67	3.86 ± 0.89	4.33	0.000**
Easy to consume with family	2.64 ± 0.79	2.60 ± 1.04	0.65	0.51
Total score	86.27 ± 6.13	80.26 ± 12.21	8.64	0.000**

* $p < 0.05$; ** $p < 0.001$.

foods because of education system consists a lot of exams in Turkey.

In various studies street foods were frequently preferred because they offer delicious varieties of tastes, are cheap and satisfying, easily accessible, have an important role in the preservation of cultural and social inheritance, and are freshly prepared^{2,30,35,52}. Similarly, in this study the scores of preference causes “more satisfying”, “variety”, “easily accessible”, “food preparation can be seen”, and “reflects food culture” were high. The difference between the genders was significant ($p = 0.000$) (Table 5). This can arise from that males prefer eating outside more than females.

Silva et al.⁵² found that 22.6% of vendors stated that they do not disinfect their hands while they are working and 80.2% touch food and money at the same time. In another study,

only 30–37% of vendors were aware of the hygiene practices in food processing and 8–11% of vendors did not have any information about food contamination⁹. Rahman et al.⁵³ stated in their study that vendors had inadequate information about food safety attitudes and practices and that there are problematic practices. Liu et al.⁵⁴ showed that the ratio of foodborne diseases caused by *Vibrio parahaemolyticus* in street foods was high. In India, 70% of 60 samples taken from street vendors were contaminated with *E. coli* and *S. typhimurium* and the necessity of hygiene control and enhancing the microbial quality of the food was emphasised⁵⁵. Samapundo et al.⁴ determined that consumers and vendors have an intermediate level of food safety knowledge and attitudes. As street foods are consumed quite often, the necessity of educating both vendors and consumers about food hygiene must be

considered. Successful food hygiene education and knowledge about food hygiene practices due to this education are important in the prevention of foodborne diseases around the world. In a study conducted in India, it was determined that after educating 80 vendors about food safety and hygiene, the mean knowledge level was raised from 24.35% to 66.2% and that the adaptation of good hygiene practices was raised from 37.5% to 50.8%⁹, indicating that food hygiene education can affect consumers' and vendors' behaviour positively. In nutrition programmes in the USA, students are taught about food hygiene and safe food selection in addition to their nutritional behaviour being observed in order to provide them with healthy nutrition⁵⁶. Therefore, by educating high school and university students about the importance of food safety, the risk of foodborne diseases can be reduced.

There is a general perception that street foods are unsafe. Also vendors are generally unlicensed, and uneducated about food hygiene and sanitation practice and working in unhygienic conditions so these results with rising consumers' doubts. Educating vendors in personal hygiene and good manufacture practice can minimize pathogen contamination risk for consumers. In addition consumers determine the quality of food-related audits and inspections performed by the government to protect people. Consumers, through non-governmental organisations established by them, prompt the government to lay down rules that are aimed at protecting consumer rights and ensuring proper food safety. Although food safety is handled by the government, the food industry, and consumers, the government has the primary responsibility due to its power to enact food-oriented rules and directives⁵⁷.

The first step towards determining the measures that need to be taken and conducting a risk analysis of food safety should be to educate consumers on food safety. An effective food safety education programme should cover information concerning the temperature control of food, proper food preparation practices, the prevention of cross contamination, suitable cleaning and disposal procedures, causative agents of foodborne illnesses, high-risk groups, and other contributing factors to foodborne diseases and prevention strategies⁵⁸. However, means should be provided to help disseminate the messages that any food safety education programme would deliver to consumers. To raise consumers' food safety knowledge and awareness about street food, we suggest targeted media information and materials on good hygiene practices in the form of brochures and leaflets for all ages. Consumers could receive these materials after short education/training programmes and the materials could be enhanced by including statements from reliable sources.

Limitations

As the population of this study consisted of young consumers from central Turkey, the results cannot be generalised for all consumers or all ages. Performing the study on a large sample of consumers of all ages would be useful. Although the reliability coefficient found was high, interpretation of the results is limited due to responses being self-reported, which are prone to subject bias. Instrument validation for all ages of consumers through more testing and observational studies is needed.

Collaborations

N Sanlier was responsible for the conception and development of the study, data analysis and interpretation, writing of the manuscript and critical review of the content. AC Sezgin participated in the design of the study and helped to draft the manuscript. G Sahin participated in the design of the study, performed the statistical analysis and helped to draft the manuscript. E Yassibas participated in the design of the study, performed the statistical analysis and helped to draft the manuscript. All authors read and approved the final manuscript to be published.

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