

Health Risks Associated with Consumption of Fast Foods: Perspectives of Traders in Kano, Nigeria

¹Usman Muhammad Ibrahim, ²Muhammad Lawan Umar, ²Auwal Umar Gajida, ²Rabiu Ibrahim Jalo, ³Odingboro Suleman Onimisi, ⁴Zahra'u Zubairu ⁵Fatelyn Okakah, ⁶Khadijah Nuhu Nasidi

¹Department of Community Medicine, Aminu Kano Teaching Hospital

²Department of Community Medicine, Bayero University and Aminu Kano Teaching Hospital, Kano State Nigeria.

³Faculty of Clinical Sciences, Bayero University, Kano State, Nigeria.

⁴Department of Nursing Services, Aminu Kano Teaching Hospital

⁵Department of Community Medicine, Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria

⁶Department of Nursing Sciences, Bayero University Kano

Corresponding author's email address: usmanmi2000@gmail.com

ABSTRACT

Background: Consumption of fast foods is increasing globally and may be linked to significant public health problems associated with both communicable and non-communicable diseases.

Objective: This study assessed knowledge and perception of potential health risk of fast food consumption among traders in Kano, and identified the commonly vended foods and drinks in Kano.

Method: A descriptive cross-sectional design was used to study 390 selected traders using a two staged sampling technique. Data was collected using interviewer administered semi-structured questionnaire and analyzed using IBM SPSS Statistics for Windows, Version 22.

Results: The mean \pm SD age of the traders was 39 ± 12.5 years with a range of 18-68 years. Most of the traders (88.6%) were greater than 24 years of age, majority were males (90.5%) with (97.6%) having formal education. About three-quarter (77.5%) had adequate knowledge of health risk, while (77.3%) had wrong perception. Commonly vended foods were fried chicken and red meat among others. Marital status {AOR=0.6, 95% CI= (0.2-1.5)} and duration in business {AOR=4.4, 95% CI= (2.3-8.4)} were independent predictors of knowledge, while tribe {AOR=2.4, 95% CI= (1.5-3.9)} was found to be an independent predictor of perception of health risk associated with fast food consumption among the traders.

Conclusion: Traders had adequate knowledge of health risk but wrong perception on the health implication of fast food consumption. Government should put in place policies and enforcements that will ensure sustained education of traders on the health risk of fast food consumption.

Keywords: Knowledge, perception, fast food, health risk

INTRODUCTION

Approximately 2.5 billion people around the world consume foods that are prepared or vended on the streets every day [1]. Preparing and selling food on the streets including fast food provide constant income for millions of uneducated people [1,2]. Food sold in the open

may not be produced and sold under appropriate conditions. Furthermore, the nature of jobs and business schedules like shop keeping may not allow stopping consumption of fast foods. However, the literature shows that increased consumption of fast foods can affect health

because of its high calories, saturated fat, sugar, and sodium content, in addition to less fiber, vitamins, or micronutrients [2]. Increased fast food consumption therefore leads to increased body cholesterol, which in turn leads to many of the significant health problems, such as obesity, diabetes, heart conditions, and stroke [2].

Street vended and fast foods are a source of culturally accepted, inexpensive, and convenient, often appealing foods for both urban and rural populations globally [1-3]. However, it faces higher risk of contamination by physical, chemical and biological agents from "farm to plate", and therefore poses concerns in terms of food safety and hygiene [3]. Studies have established relationship between consumption of street foods and diseases, either from lack of knowledge about hygiene and food safety practices of street food seller's, or detection of infective bacteria in street food samples [1]. Limited food safety knowledge, poor personal hygiene, improper food handling, inadequate raw materials and cooking, cross-contamination, and unsuitable storage and thawing conditions are among the main reasons cited for food borne illnesses associated with street vended and fast food [1-4]. Prevention of food borne diseases therefore requires the cooperation of all those who are involved in the food chain and educating consumers on food safety issues is very critical [4]. Although studies have shown that consumers are knowledgeable of, and concerned about food safety and hygiene, there is still need for the continued education of consumers about food safety issues to prevent food borne diseases [3]. Furthermore, consumers' underestimation of the frequency and seriousness of food borne illnesses (perception of risk) from food handling practices is a significant impediment to improving food safety behavior [4,5]. Understanding consumer's knowledge and perception of various food safety issues is therefore crucial to developing and implementing effective food safety policies and risk communication [5]. That is, the behavior of consumers in relation to food safety issues can only be properly predicted if there is systematic understanding of the way in which consumers perceive risks, and benefits,

associated with different food safety issues [7]. This study therefore determined traders' knowledge and perception of health risk associated with fast food consumption. It also identified the commonly vended foods and drinks in Kano metropolis. By nature of their work, traders stay all day away from their homes and constitute significant proportion of consumers of street vended food. Findings from this study may be useful in designing policies and cost-effective interventions targeted at consumers, to reduce the burden of food borne illnesses associated with consumption of street vended and fast food. In addition, the findings may be used for further research related to safety and hygiene of street vended foods.

Material and Methods

Study area/Setting

The study was conducted in 10 major markets within Kano metropolis. The state comprise of 8 Local Governments that lies within the city and consist of Kano municipal, Dala, Gwale, Fagge, Nassarawa, Tarauni, Ungogo and part of Kumbotso local government areas. They form the main center of trade and commerce. Based on the 2006 national census, the total population of Kano was 9,401,288. The total land area of Metropolitan Kano is 499 square kilometers with 2,163,225 people base on 2006 national population census living within the metropolis using a growth rate of 3.1% per annum. Kano state had a projected total population of 11,215,688 in 2012 and 13,065,294 in 2019 [7]. The state is referred to as the center of commerce in the country due to long flourished marketing activities. There are about 40 major markets of different varieties of commodities spread across the metropolis, with most of them operating daily between the hours of 9am to as late as 10.pm [8]. Within the markets, are various categories of traders selling variety of goods and involved in business activities with customers in form of retailers and consumers patronizing them from various states of Nigeria including neighboring African countries. The traders consume predominantly fast foods that are prepared at home and often street vended to give room for

them to attain to many customers as a form of business strategy.

Study design

Descriptive cross-sectional study design was used.

Study population

All traders within the major markets in Kano metropolis who have been in trading for at-least 6 months were included while visitors or traders temporarily away during data collection were excluded from the study.

Sample size determination

A sample of 385 was determined using formula for estimating minimum sample size for descriptive studies [7].

$$n = \frac{Z^2 pq}{d^2}$$

Substituting the values of standard normal deviate (z) 1.96 at 95% confidence interval and margin of error (d) 0.05 and prevalence (p) from previous study, point prevalence rate of consumers awareness of health implications of meat consumption of 68%=0.68 obtained from previous study [9] and a non-response rate of 15% were used to calculate the sample size.

Sampling technique

A two stage sampling technique was used to study eligible traders. In stage one, list of all the major markets within Kano metropolis was obtained from Kano state ministry for local government from which 10 out of the 40 major markets, representing 25% of major markets in Kano were randomly selected by balloting. This is to ensure adequate/good representation of traders within Kano markets.

In stage two, cluster sampling technique was used, each of the ten randomly selected major markets was considered as a cluster. Respondents were equally allocated to study 39 respondents in each of the selected markets. All the traders within the selected clusters that met the inclusion criteria were studied until the allocated sample

size was obtained.

Instrument description and method of data collection

Semi structured interviewer administered questionnaire adapted from past studies [2,11,12] was used for data collection. The questionnaire has four sections that elicited information on socio-demographic information, knowledge of health risk of fast food consumption, perception of traders on hygiene of fast foods consumed that are commonly street vended and prepared at home and section four asked questions on fast food and drinks that are commonly street vended.

Pre-testing of the questionnaire was conducted among 40 traders outside Kano metropolis. The questionnaires were administered by ten (10) trained Hausa and English-speaking research assistants with the interviews conducted in the two languages as required.

Data management and analysis

Data was analyzed using IBM SPSS Statistics for Windows, version 22. Quantitative variables were summarized using appropriate measures such as mean and standard deviation, or median and range, whereas categorical variables were presented as frequencies and percentages.

Knowledge domain:

Eleven questions were used to assess knowledge of health risk associated with fast food consumption. Any correct response to questions assessing knowledge of health risk associated with fast food consumption was awarded one mark while wrong response was given a zero point. Total score was summed up. Total score of <5.5 point was considered as inadequate knowledge while a score of >5.5 was considered as adequate knowledge [7,9].

Perception domain:

Twenty one questions were used to assess perception of health risk associated with fast food consumption among shop keepers. Questions were asked on a scale of 5 : (1=always,2=often,3=intermediate,4=rarely

and 5=never), any correct response to question assessing perception of traders on health risk of fast food consumption was awarded one point while wrong response was given a zero point. Total score was summed up. Total score of <16 point was considered as wrong perception while a score of ≥ 16 was considered as good perception [11].

The outcome variables were knowledge and perception of health risk associated with fast food consumption while the independent variables were the socio-demographic characteristics of the traders. Pearson's chi-square and Fisher's exact tests were used to test for significant association between categorical variables. Logistic regression was used to adjust for confounders and to determine predictors of knowledge and perception of traders on health risks of fast food consumption. A p value of 0.05 was considered significant. The criteria for inclusion of variables into the logistic regression model were priority variables, variables found to be significant at bivariate level, and a set of p value of 0.2 for variables that were found not significant at bivariate level [7,11].

Ethical considerations

Informed consent was obtained from eligible traders before questionnaire administration. The consent form was in local language (Hausa) and English language, and respondents who are literate indicated acceptance by signing the consent form and the non-literate ones affixed their thumbprints.

Permission to conduct the study was obtained from the respective LGAs selected, heads of the selected markets and Health Research Ethics Committee of Kano State Ministry of Health with approval number of MOH/OFF/797/T.I/1959, approved on 28th February, 2020 and data was collected from 1st-30th March, 2020. All the principles of research ethics were strictly adhered to throughout the conduct of the study.

RESULTS

Out of the 390 questionnaires distributed to the traders, 370 were retrieved and analyzed, giving

a response rate of 95.0%

The mean age of the traders was 39 ± 12.5 years with a range of 18 and 68 years. Most of the respondents (88.6%) were greater than 24 years of age. Majority of them were males (90.5%) with most of the respondents (97.6%) having formal education and more than one-half (59.2%) were Hausa speaking traders. More than one-fourth (36.5%) of the traders were selling raw food items as shown in table 1.

Parameters that were used to assess the trader's knowledge of health risk of fast food consumption are summarized in table 2. The mean knowledge score was 7.0 ± 2.7 . About three-quarter of the respondents (77.5%) had adequate knowledge of safety and hygiene of street vended and fast food with the remaining (22.2%) having inadequate knowledge. Most of the consumers (81.9%) correctly answered that using unclean hand by food vendors could lead to transmission of infections. In the same vain, up to (41.4%) knew that fast food consumption did not signify enjoyment. Similarly, more than one-half of the consumers (58.1%) and (59.5%) knew that fast food consumption could be attributed to obesity or weight gain and diabetes respectively as shown in table 2.

Parameters used to assess the trader's perception of health risk of fast food consumption are summarized in table 3. The median perception score was 11 with a range of 20. Majority of the traders (77.3%) had wrong perception related health risks of fast food consumption with only (22.7%) having good perception. Only about (9.2%) of the traders had good perception regarding nonuse of clothing after washing materials and utensils required by food vendors. More so, only (30.5%) of the traders felt that the use of apron during fast food preparation and serving is good in ensuring food safety and hygiene of fast food. Similarly, only (21.1%) and (30.0%) of the traders believed that the use of jewelries and not covering the hairs during fast food preparation may be associated with communicable diseases transmission as shown in table 3.

Table 1 Socio-demographic characteristics of traders

Variable(s)	Frequency n=370	Percentage %
Age (years)		
18-24	42	11.4
>24	328	88.6
Sex		
Male	335	90.5
Female	35	9.5
Educational status		
Formal	361	97.6
Informal	9	2.4
Tribe		
Hausa	219	59.2
Fulani	68	18.4
Igbo	79	21.4
Yoruba	4	1.1
Religion		
Islam	291	78.6
Christianity	79	21.4
Marital status		
Single	92	24.9
Married	278	75.1
Type of shop		
Cloth	50	13.5
Electrical appliances	37	10
Kitchen wares	20	5.4
Raw food items	135	36.5
Shoes	1	0.3
Bags	2	0.5
Insecticides	125	33.8
Hours of work/day		
<7 hours	340	91.9
≥7 hours	30	8.1
Days of work/week		
<6	14	3.8
≥6	356	96.2
Duration in business (years)		
≤3	47	12.7
>3	323	87.3
Coming with home prepared food		
Yes	6	1.6
No	364	98.4
Eat fast food		
Yes	365	98.6
No	5	1.4
Number of times of eating fast food/day		
<3	340	91.9
≥3	30	8.1

Table 2 Parameters used to assess knowledge of traders on health risk of fast food consumption with positive responses

Parameters	Frequency n=370	Percentage %
1. Fast food consumption is a measure of one's socio-economic status	199	53.8
2. Fast food consumption is a sign of enjoyment and sophistication	153	41.4
3. Food borne illness could be transmitted through consumption of (unclean) foods	303	81.9
4. Fast food contains large amounts of fats and oils cholesterol, sugar, and salt	258	69.7
5. Frequency of fast food consumption has no effect on the body	211	57.0
6. Frequency of fast food consumption should be reduced to avoid adverse effect on health	149	40.3
7. Fast food on its own cannot lead to non-communicable diseases	212	57.3
8. The following are the consequences of excessive fast food consumption		
(i) Obesity and weight gain	215	58.1
(ii) Heart disease	167	45.1
(iii) Cancer	147	39.7
(iv) Diabetes	220	59.5

Table 3 Parameters used to assess perception of traders on potential risk associated with fast food consumption with correct responses

Parameters	Frequency n=370	Percentage (%)
Apprehensiveness about the bacterial safety of ready to eat street vended food	209	56.5
Concerned about the fungal safety of ready-to-eat street-vended food	207	55.9
perturbed about the chemical safety of ready-to-eat street-vended food from lead, mercury and aluminum	112	30.3
Consider tidiness of environment	250	67.6
Consider hygiene of vendor	250	67.6
vendors should wear aprons	113	30.5
Food handlers should wear gloves	96	25.9
Food handlers should wear mask	88	23.8
Food handlers should wear hair covering	111	30.0
Food handlers should practice hand wash on regular intervals	230	62.2
Food handlers should not wear adornment or jewelry in course of food vending business	78	21.1
Money should be exclusively handled by the cashier	155	41.9
All waste collectors of the preparation area should be capped	243	65.7
There should be no vector or pest in the preparation area	247	66.8
Vendors should use soap and water in cleansing utensils	275	74.3
Rinsing with hot-warm water should be followed after cleansing utensils	103	27.8
Rubbing with clean clothes should be followed in the last step of cleaning	34	9.2
Vendors should discard the contaminated foods	291	78.6
There should be availability of clean water source	266	71.9
There should be access to clean toilet facilities	116	31.4
Temporary halt of vending for the exclusion of ill-food handlers when they suffer from cough and cold, diarrhea, stomach cramps, typhoid, hepatitis, food poisoning, helminthiasis and communicable diseases.	279	75.4

Table 4 Factors associated with trader's knowledge of fast food consumption

Variable(s)	Knowledge		χ^2	p-value	AOR(95% CI)	P-value				
	Adequate	Inadequate								
Age(years)										
18-24	24(57.1)	18(42.9)	11.8	0.001*	1.2(0.4-3.2)	0.7				
>24	264(80.5)	64(19.5)								
Sex										
Male	259(77.3)	76(22.7)	0.6	0.5						
Female	29(82.9)	6(17.1)								
Educational status										
Formal	5(55.6)	4(44.4)		0.1†	2.2(1.1-44.1)	0.6				
Informal	241(79.3)	63(20.7)								
Tribe										
Hausa	165(75.3)	54(24.7)	9.4	0.01*	0.6(0.2-1.5)	0.3				
Fulani	48(70.6)	20(29.4)								
Igbo	71(89.9)	8(10.1)								
Yoruba	3(75.0)	1(25.0)								
Religion										
Islam	217(74.6)	74(25.4)	8.4	0.004*	5(0.6-4.4)	0.1				
Christianity	71(89.9)	8(10.1)								
Marital status										
Single	58(63.0)	34(37.0)	15.5	<0.001*	4.1(1.1-15.0)	0.03*				
Married	230(82.7)	48(17.3)								
Type of shop										
Cloth	38(76.0)	12(24.0)								
Electrical appliances	25(67.6)	12(32.4)								
Kitchen wires	10(50.0)	10(50.0)								
Raw food items	113(83.7)	22(16.3)								
Shoes	0(0)	1(100.0)								
Bags	1(50.0)	1(50.0)								
Insecticides	101(80.8)	24(19.2)								
Hours of work/day										
<7 hours	5(83.3)	1(16.7)						0.7†		
≥7 hours	283(77.7)	81(22.3)								
Days of work/week										
<6	13(92.9)	1(7.1)		0.2†	0.3(0.3-2.0)	0.2				
≥6	275(77.2)	81(22.8)								
Duration in business (years)										
≤3	58(64.4)	32(35.6)	7	0.01*	4.4(2.3-8.4)	<0.0001*				
>3	26(89.7)	3(10.0)								
Coming with home prepared food										
Yes	5(83.3)	1(16.7)		0.7†						
No	283(77.7)	81(22.3)								
Eat fast food										
Yes	283(77.5)	82(22.5)		0.3†						
No	5(100)	0(0)								
Number of times of eating fast food/day										
<3	263(77.4)	77(22.6)	0.6	0.5						
≥3	25(83.3)	5(16.7)								

AOR=Adjusted odds ratio, †=Fishers exact, *=Statistically significant CI=Confidence interval

Age greater than 24 years was found to be significantly associated with adequate knowledge (80.5%) of health risks of fast food consumption.

Similarly, Igbo speaking shopkeepers (90%) and those who were married (83.0%) were found to have significantly higher levels knowledge of

health risk associated with fast food consumption. Marital status and duration in business were found to be independent predictors of knowledge

of health risk of fast food consumption among traders shown in table 4.

Table 5: Factors associated with trader's perception on health risk of fast food consumption

Variable(s)	Perception		χ^2	p-value	AOR (95% CI)	p-value
	Good	Wrong				
Age(years)						
18-24	9(21.4)	33(78.6)	0.04	0.8		
>24	75(22.9)	253(77.1)				
Sex						
Male	82(24.5)	253(75.5)	6.3	0.01*	0.3(0.1-1.3)	0.1
Female	2(5.7)	33(94.3)				
Educational status						
Formal	2(22.2)	7(77.8)		0.7†		
Informal	74(24.3)	230(75.7)				
Tribe						
Hausa	46(21.0)	173(79.0)	17	0.001*	2.4(1.5-3.9)	<0001*
Fulani	24(35.3)	44(64.7)				
Igbo	10(12.7)	69(87.3)				
Yoruba	3(75.0)	1(25.0)				
Religion						
Islam	74(25.4)	217(74.6)	5.8	0.02*	0.1(0.05-0.5)	0.001*
Christianity	10(12.7)	69(87.3)				
Marital status						
Single	24(26.1)	68(73.9)	0.8	0.4		
Married	60(21.6)	218(78.4)				
Type of shop						
Cloth	18(36.0)	32(64.0)				
Electrical appliances	16(43.2)	21(56.8)				
Kitchen wires	2(10.0)	18(90.0)				
Raw food items	17(12.6)	118(87.4)				
Shoes	0(0)	1(100)				
Bags	1(50.0)	1(50.0)				
Insecticides	30(24.0)	95(76.0)				
Hours of work/day						
<7 hours						
≥7 hours						
Days of work/week						
<6	4(28.6)	10(71.4)		0.6†		
≥6	80(22.5)	276(77.5)				
Duration in business (years)						
≤3	19(21.1)	71(78.9)	0.8	0.4		
>3	4(13.8)	25(86.2)				
Coming with home prepared food						
Yes	2(33.3)	4(66.7)	0.4	0.5		
No	82(22.5)	282(77.5)				
Eat street vended food						
Yes	83(22.7)	282(77.3)		0.9†		
No	1(20.0)	4(80.0)				
Number of times of eating vended food/day						
<3	77(22.6)	263(77.4)	0.01	1		
≥3	7(23.3)	23(76.7)				

Table 6: Street vended and fast foods and drinks available for traders

Vended food and drinks	Frequency	Percentage
	n=370	%
Burger	15	4.1
Pizza	13	3.5
Fried chicken	363	98.1
Fries	354	95.7
Gurasa bread	369	99.7
Red meat/Suyya	367	99.2
*Danwake	364	98.4
*Swallow/ tuwo	364	98.4
*Soya beans cake/awara	364	98.4
Fried yam	367	99.2
Beans cake/ Kose	363	98.1
Rice	369	99.7
Unflavored water	246	66.5
Flavored water	6	1.6
Fruit juice	10	2.7
Soft drink	108	29.2

*Danwake is a traditional food among hausa/fulani, prepared with beans or flour. It is served with pepper and oil (groundnut or palm oil).

*Awara is an emerging fast food among hausa/fulani, prepared with soya beans and fried with groundnut oil either at home or on the street. It is served with pepper and oil (groundnut or palm oil)

*Swallow/ tuwols a traditional food in hausa/fulani communities prepared with different grains (maize, millet e.t.c) and served with variety of local soups (kuka, okroe.t.c).

Majority of the traders(98.1%) and (99.2%) mentioned that chicken is readily available and vended and fried red meat respectively. Also, about two-thirds (66.5%) reported the availability of unflavored water as shown in table

Discussion

A review of literature on consumer knowledge and perceptions in relation to food safety behavior reveals some inconsistencies in the findings [4], with studies reporting suboptimal parameters, while others presenting relatively good knowledge and perception among consumers, in both situations, remarkable improvement were recommended to ensure

safety and reduce health risks associated with food consumed outside home especially in developing countries.

Literature related to consumers knowledge and perception on safety and hygiene of street vended and fast food are lacking globally especially in developing countries, with most studies targeted at students at various levels, while most studies are on street food vendors or restaurant food handlers. This study, found that about three-quarter (77.5%) of the traders studied had adequate knowledge of health risks related to fast food consumption, perhaps because most of them have formal education (97.6%), and are

exposed to written sources of information on the role of health risks associated with fast food consumption and their linkage with both communicable and non-communicable diseases, this is in addition to the possibility of having access to other sources of information. This is in keeping with a study that reported that consumers were knowledgeable of, and concerned about food safety, but emphasized the need for continued education of consumers about food safety issues [4]. Therefore, assessment of knowledge and appropriate public health intervention measures are necessary due to the ongoing trend of epidemiologic and nutritional transition that are associated with many non-communicable diseases coupled with growing number of fast food trade across markets and other public places. More than half of the traders interviewed were aware of the role of fast food as a potential risk factor for diabetes mellitus (59.5%), obesity and overweight (58.1%) highlighting the need for sustained health education intervention among consumers to ensure compliance with dietary planning principles using food pyramid to prevent the risk of non-communicable diseases as recommended by various studies [3, 4].

The commonly reported fast foods by the traders were street vended and prepared by street food vendors or their parents at home with no prior idea of modes of preparation by the shop keepers. This might explained the finding of this study that found majority of the traders (77.3%) studied to have wrong perception related to the health risk associated with fast food consumption, in contrast with a study conducted in United States of America that reported two-thirds of the participants to have better perception of health consequences of fast food consumption [12], this may be explained by the fact that, most fast food are not street vended in developed countries and are better accessed in a standard restaurant that were licensed to prepare and sale fast food, more so, the menu of the restaurants are often advertised using media. Moreover, licensed food joints are likely to be supervised and to prepare food under strict guideline and are maybe

directed to give detail information of basic ingredients used in food preparation, failure of which may lead to sanction by the supervising ministry/agency. This is lacking in most developing countries including Nigeria.

Majority of the traders (91.9%) reported consumption of fast food less than 3 times a day, this was higher than what was reported among students in Zimbabwe with 28.6% reported consumption of fast food two to three times a week [13], probably due to period of weekends for students to be away from school and the possibility of ampoule time by students to prepare food before coming to school, meanwhile, the traders studied have to be at shops as early as possible to attain to costumers from across Nigeria including other customers from neighboring African countries. This means that an alternative method of ensuring compliance with dietary practice principles is needed to ensure that occupational related nutrition transition that may lead to various non communicable diseases and communicable diseases associated with poor sanitary conditions in fast food preparation is adequately taken care of.

Conclusion:

Traders were found to have adequate knowledge of health risk associated with fast food consumption but wrong perception, especially regarding safety measures in preparation to prevent the risk of communicable diseases. Similarly, commonly sold fast foods are street vended and posed additional risk of foodborne illness among consumers. Government should therefore ensure various policies towards public health interventions targeted at ensuring improved knowledge of health risks associated with fast foods and conformance with dietary practice principles by busy traders.

References

1. CeyhunSezgin, A., &Şanlıer, N. Street food consumption in terms of the food safety and health. *Journal of Human Sciences*. 2016; 13(3):4072-4083. doi:10.14687/jhs.v13i3.3925

2. Abraham S, Martinez M, Salas G, Smith J. College student's perception of risk factors related to fast food consumption and their eating habits. *J Nutr Hum Health*. 2018 Volume 2 Issue 1 pp 18-21
3. Nonato IL, Minussi LOA, Pascoal GB, et al. Nutritional Issues Concerning Street Foods. *J Clin Nutr Diet*. 2016, 2:7. doi: 10.4172/2472-1921.100014
4. Zorba NF, Kaptan A. Consumer Food Safety Perceptions and Practices in a Turkish Community. *Journal of Food Protection*. Vol. 74, No. 11, 2011, Pages 1922–1929. doi:10.4315/0362-028X.JFP-11-126
5. Roseman M, Kurzynske J. Food Safety Perceptions and Behaviors of Kentucky Consumers. *Journal of Food Protection*. 2006, Vol. 69, No. 6 pp 1412–1421
6. Lynn Frewer L, Janneke D and Ellen K. Consumer Perceptions of Food Safety. 2008. *Medical sciences - Vol. II* pp 1-21
7. Gajida AU, Ibrahim UM, Jalo RI, Tukur J, Takai IU, Jaafar SJ et al. Predictors of knowledge and management practice of Rhesus negative pregnant women among primary health care workers in Kano, Nigeria. *Pyramid Journal of Medicine* 2019; volume 2:39. pp 60-4
8. Ibrahim AM. Evolutionary trend, spatial distribution of, and issues associated with markets in Kano metropolis. *Int J Phys Hum Geogr*. 2015;3(2):9–24.
9. Ajayi OA, Salaudeen T. Consumer Food Safety Awareness and Knowledge in Nigeria. *Internet J Food Saf*. 2014;16:17–24.
10. Ulusoy BH, Çolakoğlu N. What do they know about food safety? A questionnaire survey on food safety knowledge of kitchen employees in Istanbul. 2018. *Food and Health*, 4(4), 283-292. DOI: 10.3153/FH18028
11. Lawan UM, Gajida AU, Ibrahim UM, Gora MM. Occupational hazard perception and safety practices among workers of small-scale industries in Kano, Nigeria. *KJMS*. 2016;(10)1: 36-44
12. Min J, Jahns L, Xue H, Kandiah J, and Wang Y. Americans' Perceptions about Fast Food and How They Associate with its Consumption and Obesity Risk. *Adv Nutr* 2018; 9 : 590 – 601 ; doi:https://doi.org/10.1093/advances/nmy032.
13. Chopera P. Examining Fast Food Consumption Habits and Perceptions of University of Zimbabwe Students. *International Journal of Science and Healthcare Research*. 2018; Vol.3; Issue: 1 pp 1-5