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## PUBLIC HEALTH RESEARCH

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### Perception of Foreign Students on Food Safety and Hygiene Practices among Food Handlers in Malaysian Restaurants: Public Health Perspective

*Olumide Adedokun Odeyemi*

*School of Biosciences and Biotechnology, Faculty of Science and Technology, National University of Malaysia, UKM Bangi 43600 Bangi, Selangor Darul Eshan, Malaysia.*

*\*For reprint and all corresponding: Olumide Adedokun Odeyemi, School of Biosciences and Biotechnology, Faculty of Science and Technology, National University of Malaysia, UKM Bangi 43600 Bangi, Selangor Darul Eshan, Malaysia.*

*E mail: oluodeyemi@gmail.com*

#### ABSTRACT

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<b>Accepted</b>	19 December 2012
<b>Introduction</b>	Influx of foreign students in Malaysia calls for a study on safety of food in Malaysia restaurants as perceived by them.
<b>Objective</b>	This study aims to investigate perception of foreign students regarding food safety and personal hygiene practice of food handlers in Malaysia restaurants.
<b>Methods</b>	A six sections Likert scale questionnaire was used. A total of 350 questionnaires were distributed during this study between March 2011 and March 2012 to the international students from 26 countries of the world in various public and private institutions of higher learning in Klang Valley, Malaysia.
<b>Results</b>	Among the distributed questionnaires, only 155 were correctly filled, retrieved and analyzed. Ninety-one respondents (59%) were male while 63 (41%) were females. A total of 107 (69%) were undergraduates and 29 (19%) were postgraduate students. One hundred and thirty-nine (90%) respondents were local or foreign restaurants. Eleven respondents (7%) did not patronize any of the restaurants. Among factors influencing choice of restaurants are closeness to residence, price of food and quality of food were the most important factors 62 (38%). Twenty-seven (28%) eat in restaurants because of the similarity of the food to that of their home country. Of the most preferred food, Nasi ayam, 89 (57%) top the list, next was Nasi goreng ayam, 14 (14%) and African food, 23 (15%). Nasi lemak was the least food preferred 3 (2%). A total of 104 (67%) respondents were of the opinion that handlers kept short nails, 91 (59%) do not pick nose, 108 (55%) stated that food handlers cough or sneeze while handling food. Ninety-eight respondents (64%) also stated that serving of food with unprotected hands were observed.
<b>Conclusions</b>	The result of this study showed that although food handlers are aware of the need for personal hygiene, more awareness needs to be created.
<b>Keywords</b>	Food safety - food borne diseases - foreign students

## INTRODUCTION

Malaysia, a south eastern Asian country with over 27 million populations envisions becoming a global education hub coupled with overall aim of becoming a developed country by the year 2020. Higher education serve as one of the tools required to achieve this goal. Hence, due to this, the government through 9<sup>th</sup> Malaysia plan aims at having 200,000 foreign students learning in various institutions of higher learning in the country. As in June, 2011, there are over 90,000 international students in Malaysia studying in both private and public institutions. Foreign students have been said to contribute over 3 billion Malaysia ringgit in terms of tuition fees only. A foreign student is defined as any person or individual that resides in another country aside the country of origin with the sole aim acquiring educational knowledge at certificate, diploma, undergraduate and postgraduate levels respectively <sup>1</sup>. Among factors contributing to high influx of these students include lower cost of education in Malaysia compared with other countries especially Western world. Other factors are hospitality of the citizens, technological advancement, political stability, socio economic development and low cost of living. Cultural diversity, stress and academic workload are factors identified alongside language barrier, discrimination, loneliness and financial constrains capable of affecting students in new environment <sup>2</sup>. Malaysia has been known for unique hospitality with varieties of foods and tourist attraction sites. There are more than 200,000 restaurants in the country as in the year 2010. Type of food, method of preparation, safety of prepared or sold food and personal hygiene practice of food handlers in these restaurants become important issues since they contribute to the adjustment of foreign students to their new country of residence. Food safety can be defined as necessary steps and precautions required in food production processes, storage, preparation and distribution to make sure such food or products are safe and suitable for human consumption. Food preparation, handling process, method of storage and personal hygiene of food handlers are vital factors in safety of food. Food handlers as defined by Isara and Isah (2009) are persons involved at either point of preparation, processing or distribution of food. Handlers play important role in safety of food for consumers. Personal hygiene, health status, knowledge, attitude and practice of appropriate food hygiene determine disease outbreaks as a result of consumption of contaminated food <sup>3</sup>. Recently, developed and developing countries have been experiencing an increase in food borne disease outbreaks <sup>4</sup>. More than 75 million outbreaks occurred in United States yearly with 320,000 hospitalizations, and over 4,500 deaths. In Malaysia, food safety-related issues are not unfamiliar due to its public

discussion. In January 2008, over 256 food poisoning cases were reported in Malaysia compared with 34 similar cases in 2007 as stated by the Ministry of Health, Malaysia (2008). This study therefore aims to investigate the perception of foreign students regarding food safety and personal hygiene practice of food handlers in Malaysia restaurants.

## RESEARCH QUESTIONS

This study was guided with the following research questions. Do foreign students patronize Malaysian restaurants? What are the factors influencing their choice of restaurants? Do food handlers in these restaurants comply with personal hygiene and food safety practices? Do foreign students have knowledge on food safety and food borne diseases?

## PROBLEM STATEMENT

Till date, no recent data or research is available on perception of foreign students on food safety and personal hygiene of food handlers in Malaysia. Increasing number of foreign students in the nation enable these students to be potential consumers of indigenous or foreign food sold in restaurants. This current study hence serve as an eye opener as untreated and infected students who travelled back to their countries can serve as potential distributors of food borne pathogens in their environment. It is therefore of necessity to survey their perception as this can help improve food safety and personal hygiene of food handlers' policy in the country.

## MATERIALS AND METHOD

This research was carried out using a six sections Likert scale questionnaire developed in 2011 with focus on stated research questions. The questionnaire was administered to international students from various public and private institutions of higher learning in Klang Valley, Malaysia. Socio demographic information (section A) was accessed with 5 questions on age, gender, marital status and duration of stay in Malaysia. The second section consists of 6 Likert scale questions relating to restaurants patronage among the respondents. Information on hygiene state of the restaurants environment was the third section of the questionnaire. It consists of 5 questions. Section D consists of 9 questions on food handlers' personal hygiene and practices. In addition, questions on knowledge of food borne diseases and safety awareness among foreign students was the fifth section while the last section (Section F) was on awareness and practice of food safety and hygiene among the respondents. The questionnaire was pilot tested among 30 students and corrected for clarity before distribution. A total of 350 questionnaires were distributed during the study between March 2011 and March 2012. A total of

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155 correctly filled and retrieved questionnaire were analyzed statistically.

### QUESTIONNAIRE VALIDATION

A pilot study was initially conducted among 30 foreign students to establish the validity, reliability and clarity of the questions. However, 24 questionnaires were successfully retrieved.

### RESULTS

#### *Sampling*

Of the 350 questionnaires distributed among the foreign students from 26 countries around the world, only 155 were correctly filled, retrieved and analyzed. Ninety-one (59%) were male while 63 (41%) were females. A total of 107 (69%) were undergraduates and 29 (19%) were postgraduate students. The remaining 19 (12%) students were having diploma and below. The average age of respondents was 26-30. Eighty-one (52%) respondents have lived in Malaysia for between 3 to 4 years. Only 4 (3%) spent 0-6 months in the country as at the time of this study (Table 1).

**Table 1** Socio demographic information (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Age (year)</b>	16 – 20	23	15
	21 – 25	77	50
	26 – 30	29	19
	31 – 36	16	10
	37 and above	10	6
<b>Academic level</b>	Certificate	1	1
	Foundation	2	1
	Diploma	16	10
	Undergraduate	107	69
	Postgraduate	29	19
<b>Marital status</b>	Single	115	74
	Married	30	19
	Engaged	7	5
	Divorced	2	1
<b>Gender</b>	Male	91	59
	Female	63	41
<b>Duration of stay in Malaysia</b>	0 – 6 months	4	3
	7 – 11 months	3	2
	1 – 2 years	46	30
	3 – 4 years	81	52
	5 years and above	19	12

#### *Restaurants patronage*

A total of 139 (90%) of all the respondents patronized Chinese, Malay, Indian or foreign restaurants (Table 2). However, 11 (7%) did not patronize any of the restaurants. Foreign restaurants patronage 74 (43%) was high among respondents. India restaurants were the least patronized. Eighteen (12%) foreign students patronized Malay and Chinese 15 (10%) restaurants respectively. On the frequency of patronage, 55 (35%) eat in restaurants on weekly basis while 49 (32%) eat everyday in the restaurants. Thirty (19%) eat once in two days. Among factors influencing choice of restaurants, closeness to residence, price of food

and quality of food, 62 (38%), were the most important factors. Twenty-seven (28%) eat in restaurants because of the similarity of the food to that of their home country. Of the most preferred food, Nasi ayam, 89 (57%) top the list, next was Nasi goreng ayam, 14 (14%) and African food, 23 (15%). Nasi lemak was the least food preferred 3 (2%). The reasons for preferred food were asked among the respondents. Safer and hygienic food 59 (38%) was the most important factor. Forty-three (28%) preferred food prepared only when demanded only while 25 (16%) preferred ready to eat (RTE) food.

**Table 2** Patronage of restaurants (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Eats in restaurant</b>	Yes	139	90
	No	11	7
<b>Preferred restaurant</b>	Chinese	15	10
	Malay	18	12
	Indian	14	9
	Foreign	74	43
	All of the above	32	21
<b>How often do you eat in restaurants?</b>	Every day	49	32
	Once in 2 days	30	19
	Weekly	55	35
	Not at all	15	10
	Fortnightly	4	3
<b>Factors influencing the choice of restaurant</b>	Closeness to my residence	23	13
	Price of food	18	6
	Quality and safety of food	21	13
	Similarity with home country food	27	28
	Combination of closeness to residence, price, quality and safety of food	62	38
	<b>Preferred food</b>	Nasi ayam	89
Nasi goreng ayam	14	14	
African food	23	15	
Fried rice	8	5	
Arab foods	7	5	
Western food	11	7	
Nasi lemak	3	2	
<b>Reasons for preferred food</b>	More safer and hygienic	59	38
	Prepared only when demanded	43	28
	Ready to eat (RTE)	25	16
	Take away	16	10
	Others	9	6

*Hygiene state of the restaurant environment*

Five questions were used to access response on the hygiene state of restaurants environment. Sixty-five (42%) strongly disagreed and 28 (18%) disagreed that the restaurants were close to refuse dump (Table 3). Sixty-eight (44%) agreed and 47 (30%) strongly agreed that hand washing facilities were provided while less than half 63 (41%) of the

respondents observed the presence of rodents, cats, and insects around the restaurants. Likewise, 39 (25%) strongly agreed and 74 (48%) agreed that waste bins are provided. Restaurants restroom were kept neat as indicated by 107 (69%) of the respondents.

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**Table 3** Information on the hygiene state of the restaurants environment (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Closeness to rubbish/refuse dump</b>	Strongly agree	24	15
	Agree	35	23
	Strongly disagree	65	42
	Disagree	28	18
<b>Provision of hand washing facilities</b>	Strongly agree	47	30
	Agree	68	44
	Strongly disagree	25	16
	Disagree	12	8
<b>Presence of rodents, cats and insects in the restaurant environment</b>	Strongly agree	25	16
	Agree	38	25
	Strongly disagree	22	14
	Disagree	17	11
<b>Waste bin provided</b>	Strongly agree	39	25
	Agree	74	48
	Strongly disagree	22	14
	Disagree	17	11
<b>Neatly kept toilets(s) available</b>	Strongly agree	50	32
	Agree	57	37
	Strongly disagree	27	17
	Disagree	16	10

### *Food handlers' personal hygiene and practice*

Keeping short finger nails, picking nose, coughing or sneezing when handling food, using unprotected hands to serve and dish food, smoking, use of apron, spitting around restaurants environment, wearing rings and bracelets and physical appearance were questions used to access personal hygiene and practice of food handlers. A total of 104 (67%) respondents were of the opinion that handlers kept short nails, 91 (59%) do not pick nose, and 108 (55%) stated that food handlers

cough or sneeze while handling food (Table 4). Ninety-eight (64%) also stated that serving food with unprotected hands were observed. However, regarding the use of apron, 88 (58%) was of the opinion that they have once seen handlers with aprons. Ninety-one (58%) also stated that there is spitting around food premises by food handlers. A total of 113 (74%) agreed that handlers always appear neat.

**Table 4** Food handlers' personel hygiene and practice (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Kept short nails</b>	Strongly agree	45	29
	Agree	59	38
	Strongly disagree	32	21
	Disagree	13	8
<b>Pick nose</b>	Strongly agree	23	15
	Agree	35	23
	Strongly disagree	70	45
	Disagree	21	14
<b>Coughing and sneezing when handling food</b>	Strongly agree	19	12

	Agree	33	21
	Strongly disagree	71	46
	Disagree	29	19
<b>Dishing, serving and tasting food with unprotected hands</b>	Strongly agree	17	11
	Agree	35	23
	Strongly disagree	74	48
	Disagree	24	15
<b>Smoking</b>	Strongly agree	21	14
	Agree	38	25
	Strongly disagree	62	40
	Disagree	29	19
<b>Use of apron</b>	Strongly agree	36	23
	Agree	52	34
	Strongly disagree	45	29
	Disagree	18	12
<b>Spitting around restaurant premises</b>	Strongly agree	22	14
	Agree	36	23
	Strongly disagree	55	35
	Disagree	36	23
<b>Wearing of accessories like rings, bracelets etc</b>	Strongly agree	28	18
	Agree	60	39
	Strongly disagree	45	26
	Disagree	18	15
<b>Food handlers always appear neat</b>	Strongly agree	43	28
	Agree	70	45
	Strongly disagree	25	16
	Disagree	13	8

#### *Awareness about food-borne disease among foreign students*

In this section of the questionnaire, four questions were used to access knowledge and awareness of students on food borne diseases. A total of 119 (77%) respondents were aware that food-borne diseases as illness acquired as a result of consuming food contaminated with microbes or

toxins (Table 5). A total of 104 (80%) respondents believed the diseases can be prevented while 133 (85%) perceived that poor hygiene of food handlers, unsafe raw food and inadequate cooking of food can cause outbreaks of food borne diseases and illnesses.

**Table 5** Awareness about Food borne diseases among foreign students (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Food-borne disease is illness acquired from the consumption of food contaminated by either microorganisms or toxins</b>	Strongly agree	56	36
	Agree	63	41
	Strongly disagree	26	17
	Disagree	5	3
<b>Foods-borne disease is preventable</b>	Strongly agree	64	41
	Agree	60	39
	Strongly disagree	23	16
	Disagree	3	2

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### Poor food handlers hygiene practices, unsafe raw food and inadequate cooking can cause outbreak of food borne disease

Strongly agree	61	39
Agree	72	46
Strongly disagree	14	9
Disagree	5	3

### Awareness, practice on food safety and hygiene among foreign students

A total of 136 (87%) of the respondents have knowledge on food safety and hygiene (Table 6). A total of 142 (91%) respondents washed hands before and after eating. A total of 141 (91%)

respondents washed hands before and after cooking while 129 (90%) washed hands with soap and water after going to toilet. Eighty (52%) respondents usually do not pick nose and wipe face with unwashed hands.

**Table 6** Awareness, practice of food safety and hygiene among foreign students (n=155)

Variables	Response	Frequency (n)	Percentage (%)
<b>Have knowledge on food safety and hygiene</b>	Strongly agree	72	46
	Agree	64	41
	Strongly disagree	12	8
	Disagree	3	2
<b>Wash hands before and after eating</b>	Strongly agree	78	50
	Agree	63	41
	Strongly disagree	5	3
	Disagree	2	1
<b>Wash hands before and after cooking</b>	Strongly agree	80	52
	Agree	61	39
	Strongly disagree	11	7
<b>Wash hands with soap and water after going to toilet</b>	Strongly agree	83	54
	Agree	36	36
	Strongly disagree	10	6
	Disagree	2	1
<b>Pick nose and wipe face with unwashed hands</b>	Strongly agree	40	26
	Agree	40	26
	Strongly disagree	49	32
	Disagree	22	14
<b>Aware of the World Health Organization (WHO)'s five keys to safer food</b>	Strongly agree	54	35
	Agree	58	37
	Strongly disagree	25	16
	Disagree	15	10

## DISCUSSION

Malaysia as a nation has been making concerted effort in internationalizing her higher education globally by attracting foreign students to take one form of study or the other at both undergraduate and postgraduate levels in various institutions of higher learning in the country. Adjustment to culture and custom of host country constitute one

of the major challenges of foreign students worldwide. Adapting to different types of food, methods of food preparation serve as factors in considering eating food in restaurants or self - prepare. While some students can still cook themselves despite busy academic schedule, some preferred eating in restaurants. Handlers of food in restaurants have been described as the most crucial

factor during food production, preparation, processing and storage<sup>5, 6</sup>. Recently, food borne related cases has been commonly reported in Malaysia<sup>7</sup>. These cases have been attributed to poor hygiene state of restaurants, poor food hygiene, inadequate cleanliness while preparing and serving food and food handlers' personal hygiene. Health authorities and other concerned governmental agencies have to issue "warning letters" to some restaurant operators due to poor environmental sanitation<sup>7</sup>. Siow and Norakiah<sup>8</sup>, stated that food is a perishable product although rich in micronutrients required for growth by humans, animals and microorganisms. Food can easily be contaminated via water (polluted), air (airborne microbes), processing equipment, rodents, insects and food handlers. It could be observed in this study that majority of the respondents eat in restaurants. Eating contaminated food can thereby result in food borne diseases. In a recent study in 2011 on the assessment of food safety knowledge, attitude and practice among food handlers in the National University of Malaysia residential hostels restaurants, respondents (food handlers) only showed positive attitudes towards food handling and not to both their personal hygiene and food handling. In a similar research, personal hygiene, practice and health status of food handlers in a food establishment around Wardha teaching hospital in India was found to play a significant role in food contamination<sup>4</sup>. A food handler as defined by Anant and Anjali (2011)<sup>9</sup> is someone who regardless of either he or she prepares, serve food or not but handles food. Personal hygiene of food handlers is very important because contact of food with any exposed part of their body such as unprotected hands, skin, clothing or body accessories can contaminate the food being handled. High level of personal hygiene and practice observed among food handlers will help prevent outbreak and spread of infectious food borne diseases. Various researchers have stated that maintenance of personal hygiene among handlers of food coupled with clean environment where food and related products are being produced and sold are important players in prevention of food borne diseases outbreak. Inappropriate handling of food by food handlers serve as breeding ground for pathogens to grow and increase to disease causing numbers if consumed contaminated<sup>10-12</sup>. Hand washing is simplest of all personal hygiene measures to ensure safe food among handlers<sup>13-16</sup>. It was reported that hand washing is one of the most efficient and effective ways of reducing spread of food borne pathogens due to its ability to reduce gastrointestinal disease by 12 – 40 % and also 20 % of other infections especially when combined with soap hence hand washing constitute the most important factor in food safety among both food producers, handlers and consumers<sup>17,18</sup>.

## CONCLUSIONS

The result of this study showed that although food handlers are aware of the need for personal hygiene, more awareness needs to be created. More so, food premises need to be kept neat always, refuse or waste should be disposed as soon as possible while rodents, cats and insects are prevented from getting into the dining area in the restaurants or where food is being prepared so as not to contaminate raw food materials. Continuous on the job training on personal hygiene is recommended for food handlers. In addition, foreign students in various institutions of higher learning should be given more awareness on food safety and hygiene to prevent outbreak and spread of food -borne diseases not only in Malaysia but also in the students' country of nativity in case if the students travelled home. Educational leaflet on the practice of food safety and hygiene should be provided to foreign students during orientation of new students in their host institutions.

## REFERENCES

1. Paige M. International Students Cross-Cultural Psychological Perspectives. In: R. Brislin (eds.). Applied Cross-Cultural Psychology. Newbury Park, California: Sage; 1990.
2. Yusliza MY & Shankar C. Adjustment in International Students in Malaysian Public University. International Journal of Innovation, Management and Technology. 2010; 1(3): 275 -278.
3. Isara AR & Isah EC. Knowledge and practice of food hygiene and safety among food handlers in fast food restaurants in Benin City, Edo state, Nigeria. Postgraduate Medical Journal. 2009; 16(3): 207-12.
4. Abhay BM, Naveeta K, Gargi AM, Ramchandra CG, Ajay KD & Vasant VW. Health Status and Personal Hygiene among Food Handlers Working at Food Establishment around a Rural Teaching Hospital in Wardha District of Maharashtra, India Global Journal of Health Science. 2010; 2(2): 198 -206.
5. Okojie OH, Wagbatsoma VA & Ighoroghe AD. An assessment of food hygiene among food handlers in a Nigerian university campus. Nigeria Postgraduate Medical Journal. 2005; 12 (2): 93-6.
6. Chukwuocha UM, Dozie IN, Amadi AN, Nwankwo BO, Ukaga CN, Aguwa OC, Abanobi OC & Nwoke EA. The knowledge, attitude and practices of food handlers in food sanitation in a metropolis in south eastern Nigeria. East Africa Journal Public Health. 2009; 6 (3): 240-3.



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7. Hazrina G, Mohhidin O, Nasyira MN & Roslan NA. Food hygiene Knowledge, attitudes and practices among food handlers in restaurant in Selayang area. In UMT 11<sup>th</sup> International Annual Symposium on Sustainability Science and Management 9<sup>th</sup> – 11<sup>th</sup> July 2012, Terengganu, Malaysia; 2012.
8. Siow ON & Norrakiah AS. Assessment of Knowledge, Attitudes and Practices (KAP) Among Food Handlers at Residential Colleges and Canteen Regarding Food Safety. *Sains Malaysiana*. 2011; 40 (4): 403–410.
9. Anant AT & Anjali PK. Assessment of personal hygiene of canteen workers of government medical college and hospital. *National Journal of Community Medicine*. 2011; 2 (3): 448-451.
10. Mulugeta K & Bayeh A. The sanitary conditions of food service establishments and food safety knowledge and practices of food handlers in Bahir Dar town. *Ethiopian Journal Health Science*. 2012; 22 (1): 27 - 35.
11. Zain MM & Naing NN. 2002. Socio demographic characteristics of food handlers and their knowledge, attitude and practice towards food sanitation: A preliminary report. *Southeast Asian Journal of Tropical Medicine and Public Health*. 2002; 33(2): 410-7.
12. FAO. Training manual for environmental health officers on safe handling practices for street foods. 2001. Available from <http://kharahais.gov.za/files/health/03.doc>.
13. Askarian M, Kabir G, Aminbaig M, Ziad A, Memish ZA & Jafari P. Knowledge, attitudes, and practices of food service staff regarding food hygiene in Shiraz, Iran. *Infections Control and Hosp Epidemiology*. 2004; 25(1): 16-20.
14. Roberts L, Smith W, Jorm L, Patel M, Douglas RM, & McGilchrist, C. Effect of infection control measures on the frequency of upper respiratory infection in child care: a randomized, controlled trial. *Pediatrics*. 2012; 105: 738-42.
15. Niffenegger JP. 1997. Proper hand washing promotes wellness in child care. *Journal of Pediatric Health Care*. 1997; 11: 26-31.
16. Master D, Hess Longe SH & Dickson H. Scheduled hand washing in an elementary school population. *Family Medicine*. 1997; 29: Page 336-9.
17. Ryan MA, Christian RS & Wohlrabe J. Handwashing and respiratory illness among young adults in military training. *American Journal of Preventive Medicine*. 2011; 21:79-83.
18. Curtis V & Cairncross S 2003. Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *Lancet Infectious Disease*. 2003; 3: 275-81.