

ASSOCIATION BETWEEN KNOWLEDGE, ATTITUDE, PRACTICE (KAP) AND HYGIENE STATUS OF FOOD HANDLERS AND PREMISES IN CAFETERIAS OF A PUBLIC UNIVERSITY IN MALAYSIA

Muhammad Hafiz Azim Abd Halim¹, Litya Nagaretnam¹, Shafiqah Amirah Noor Azman¹, Suhainizam Muhamad Saliluddin^{2}, Aidalina Mahmud²*

¹ Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

² Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia

**Corresponding author: Suhainizam Muhamad Saliluddin,
Email: suhainizam@upm.edu.my*

Abstract

Introduction: More people have become dependent on the availability of take-out food as one of their main sources of food consumed. Food remains as the main source of microbes that can lead to illnesses such as food poisoning. Food operators need to adhere to strict hygiene practices to ensure well-being of their consumers. The main purpose of this study was to describe the association between the level of knowledge, attitude and practices among food handlers with the overall hygiene status of food handlers and premises at food outlets in the campus of a public university in Malaysia.

Methodology: A cross-sectional study design was employed involving ninety one food handlers from thirty one cafeterias and canteens within the public university. The data were collected from the food handlers via questionnaire. Hygiene status of food handlers and premise were assessed using a standardised format.

Results: The respondents' KAP score was good with median point of 54.00. On the contrary, the hygiene status of food handlers and food premises was poor. Respondents showed positive attitudes towards the aspect of food safety and hygiene. Majority of the respondents have good practices in all parts of the questions. Analysis tests showed significant difference ($p < 0.05$) between the relationship of hygiene status of food premises and food handlers with their working experiences ($p = 0.004$), KAP score with training attended ($p = 0.041$) and vaccination received ($p = 0.035$). There was no significant association between KAP score and overall hygiene status of food handlers and food premises ($p = 0.925$).

Conclusion: The cafeterias in this survey need to increase the hygiene level of their food handlers' and environment of the premises.

Key Words: attitudes; food handlers; food safety; knowledge; practice; hygiene status

1.0 Introduction:

With the booming street food industry in the developing world there is an urgent need to ensure food operators adhere to hygienic practices to protect public health. Sharifa Ezat W.P., Netty D. & Sangaran G. (2013), reported that the incidence of food and water borne disease in Malaysia in 2010 ranged between 1.56 to 0.14 cases per 100,000 populations. Without emphasis on food hygiene practice, the fact remains that food is the source for microorganisms that can cause illness such as food poisoning.

2.0 Methodology

2.1 Subjects

Using the formula for a two-sided test for prevalence of good KAP from previous studies, a minimum sample size of 75 subjects was obtained. However for this study, a total of 91 food handlers employed within the period between 17th until 20th June 2014 from 31 out of 40 cafeterias in the public university were randomly selected by simple random sampling method to be included in this cross-sectional study.

2.2 Instruments and Scoring

Pre-tested and standardized questionnaire and evaluation form on hygiene status of food handler and food premise were used in this study where the score ranged from 0-60 and 0-73 respectively. The KAP questionnaire was modified from previous studies (Tan, Bakar, Abdul Karim, Lee & Mahyudin, 2013) and (Abdullah Sani & Siow, 2014). Pre-testing for the modified questionnaire used in this study was done on 30 subjects who are food handlers employed at food premises in an area adjacent to the public university. The Cronbach alpha value obtained from the pre-testing was 0.721- denoting fair to good agreement. Both of the previous studies used the mean as their cut off point. Since the population in this study was not normally distributed, the median was used as our cut off point. Median score of 54.00 was used as cutoff point for the questionnaire to group food handlers into having good or poor KAP score. The evaluation form for hygiene rating of food premise and food handler was modified from the guideline by Ministry of Urban Wellbeing, Housing and Local Government, Malaysia (2014). Total score from the evaluation were converted into percentage and grouped to star-ratings where premises that obtained 3 or more stars were considered as good and those with less than 3 were considered having poor hygiene status.

2.3 Statistical analysis

Statistical analysis was performed using IBM SPSS version 21.0. Kolmogorov-Smirnov test were used to test the data normality and their median were used to describe the data. Chi-square test was used to analyze the data. The results were considered statistically significant when $p\text{-value} < 0.05$.

3.0 Results

Table 1: Socio-demographic factors and working background of food handlers (N=91)

Variables	Characteristics	n (%)
Gender	Male	39 (42.9)
	Female	52 (57.1)
Nationality	Malaysia	51 (56.0)
	Non-citizen	40 (44.0)
Education level	No formal education	6 (6.6)
	Primary	17 (18.7)
	Secondary	54 (59.3)
	others	14 (15.4)
Job description	Dishwasher	11 (12.1)
	Chef	26 (28.6)
	Cutter	16 (17.6)
	Server	20 (22.0)
	Others	18 (19.8)
Working experience in food industry	< 1 year	19 (20.9)
	1-5	47 (51.6)
	6-10	18 (19.8)
	11-20	4 (4.4)
	>20	3 (3.3)
Food Handler training course	Yes	76 (83.5)
	No	15 (16.5)
Valid Vaccination (<i>Typhim Vi</i>)	Yes	82 (90.1)
	No	9 (9.9)

The socio-demographic factors and working background of food handlers in Universiti Putra Malaysia are shown in Table 1. The majority of the respondents were females (57.1%), Malaysians (56.0%) and chefs (28.6%). This reflected the current workforce in most food premises. More than half of the respondents (53%) have completed their secondary school and most of them (51.6%) have worked for 1-5 years. Majority of the food handler have attended food training courses before being hired and 90% of the respondents have gotten their *Typhim Vi* vaccination which is mandatory for all food handlers in Malaysia.

Table 2 shows the association between socio-demographic factors, working background, training course and vaccination status with KAP score of food handlers. There were no significant association between the variables except for the association between training course and vaccination with overall KAP score where those who had undergone training and vaccination had higher percentage of having good overall KAP score.

Table 2: The association between socio-demographic factors, working background, training course and vaccination status with KAP score of food handlers (N=91)

Variables	Overall KAP score		n (%)	Significance		
	Poor (n%)	Good n (%)		χ^2	df	P value
Gender						
Male	17 (43.6)	22 (56.4)	39 (42.9)	0.015	1	0.903
Female	22 (42.3)	30 (57.7)	52 (57.1)			
Nationality						
Malaysia	24 (47.1)	27 (52.9)	51 (56.0)	0.836	1	0.360
Non-citizen	15 (37.5)	25 (62.5)	40 (44.0)			
Education level						
No formal education	1 (16.7)	5 (83.3)	6 (6.6)	1.757	3	0.683
Primary	8 (47.1)	9 (52.9)	17 (18.7)			
Secondary	24 (44.4)	30 (55.6)	54 (59.3)			
Others	6 (42.9)	8 (57.1)	14 (15.4)			
Job description						
Dishwasher	4 (36.4)	7 (63.6)	11 (12.1)	2.295	4	0.682
Chef	11 (42.3)	15 (57.7)	26 (28.6)			
Cutter	5 (31.3)	11 (68.8)	16 (17.6)			
Server	11 (55.0)	9 (45.0)	20 (22.0)			
Others	8 (44.4)	10 (55.6)	18 (19.8)			
Working experience						
< 1 year	11 (57.9)	8 (42.1)	19 (20.9)	3.719	4	0.459
1-5	19 (40.4)	28 (59.6)	47 (51.6)			
6-10	6 (33.3)	12 (66.7)	18 (19.8)			
11-20	1 (25.0)	3 (75.0)	4 (4.4)			
>20	2 (66.7)	1 (33.3)	3 (3.3)			
Training course						
Yes	29 (38.2)	47 (61.8)	76 (83.5)	4.158	1	0.041*
No	10 (66.7)	5 (33.3)	15 (16.5)			
Vaccination (<i>Typhim Vi</i>)						
Yes	32 (39.0)	50 (61.0)	82 (90.1)	4.973	1	0.035*
No	7 (77.8)	2 (22.2)	9 (9.9)			

*Statistically significant ($p < 0.05$)

Table 3: The association between internal factors, training course, vaccination status and KAP score with hygiene status of food operators and food premises (N=91)

Variables	Overall hygiene status		n (%)	Significance		
	Poor (n%)	Good n (%)		χ^2	df	P value
Gender (N=91)						
Male	20 (51.3)	19 (48.7)	39 (42.9)	0.628	1	0.428
Female	31 (59.6)	21 (40.4)	52 (57.1)			
Nationality (N=91)						
Malaysia	27 (52.9)	24 (47.1)	51 (56.0)	0.453	1	0.501
Non-citizen	24 (60.0)	16 (40.0)	40 (44.0)			
Education level (N=91)						
No formal education	5 (83.3)	1 (16.7)	6 (6.6)	4.033	3	0.265
Primary	10 (58.8)	7 (41.2)	17 (18.7)			
Secondary	31 (57.4)	23 (42.6)	54 (59.3)			
Others	5 (35.7)	9 (64.3)	14 (15.4)			
Job description (N=91)						
Dishwasher	6 (54.5)	5 (45.5)	11 (12.1)	2.869	4	0.580
Chef	15 (57.7)	11 (42.3)	26 (28.6)			
Cutter	7 (43.8)	9 (56.3)	16 (17.6)			
Server	14 (70.0)	6 (30.0)	20 (22.0)			
Others	9 (50.0)	9 (50.0)	18 (19.8)			
Working experience (N=91)						
< 1 year	16 (84.2)	3 (15.8)	19 (20.9)	13.807	4	0.004*
1-5	20 (42.6)	27 (57.4)	47 (51.6)			
6-10	13 (72.2)	5 (27.8)	18 (19.8)			
11-20	1 (25.0)	3 (75.0)	4 (4.4)			
>20	1 (33.3)	2 (66.7)	3 (3.3)			
Training course (N=91)						
Yes	34 (44.7)	42 (55.3)	76 (83.5)	0.114	1	0.736
No	6 (40.0)	9 (60.0)	15 (16.5)			
Vaccination (Typhim Vi) (N=91)						
Yes	37 (45.1)	45 (54.9)	82 (90.1)	0.458	1	0.726
No	3 (33.3)	6 (66.7)	9 (9.9)			
KAP grade (N=31)						
Good	7 (41.2)	10 (58.8)	17 (54.8)	0.009	1	0.925
Poor	6 (42.9)	8 (57.1)	14 (45.2)			

*Statistically significant ($p < 0.05$)

Table 3 shows that the only significant association was between working experience with hygiene status of food operators and food premises where those with working experience of 11 to 20 years had highest percentage (75%) of having good hygiene status compared those with less than 1 year experience (15.8%) who scored the lowest.

4.0 Discussion

4.1 Descriptive analysis

The majority of the respondents were females (57.1%), Malaysians (56.0%) and chefs (28.6%). This reflected the current workforce in most food premises. Moreover, we recruited respondents from almost all cafeterias in the public university. More than half of the respondents (53%) have completed their secondary school and most of them (51.6%) have worked for 1-5 years. Majority of the food handler have attended food training courses before being hired and 90% of the respondents have gotten their *Typhim Vi* vaccination which is mandatory for all food handlers in Malaysia.

4.2 Analytical analysis

4.2.1 The association between socio-demographic factors, working background, training course and vaccination status with KAP score of food handlers

Our findings suggest that individual factors had no statistically significant effect on KAP score of food operators on food safety. These tallies with Lin et al. (2005), who found that gender, did not affect food safety knowledge, attitude and practice. Ch'ng K.S & Siti Khadijah A. (n.d.) showed that significant association exists between nationality and KAP score of food handlers and stated that more Malaysian food handlers scored higher compared to non-citizens. However, our data showed that percentage of non-citizen that obtained good KAP score was higher (62.5%) compared to citizens (52.9%) but our association was not significant. In education level, those with no formal education obtained the highest percentage of good KAP score (83.3%) compared to the rest. However, the association is still not significant. Similar findings were reported by Byrd-Bredbenner et al. (2007). In Bangladesh, most of the food vendors are illiterate, doing their business haphazardly. They had poor knowledge and practice in food safety (Faruque, Haque, Shekhar, Begum & IMS, 2010). Rheinländer et al. (2008) concluded that neither the gender of vendors nor vendors' knowledge about health and hygiene is closely related to safe food practices. With regard job description, it had no significant effect on KAP score of food handler. Our data analysis showed that cutters (68.8%) obtained the highest percentage of good KAP score. This result correlates with the previous study by Abdullah Sani & Siow (2014) that showed no association between KAP score and responsibility. Regarding working experience, there was insignificant difference between the KAP score and the duration of working experiences. It was observed that as duration of working experience increases, percentage of KAP score obtained increases as well except for working experience for more than 20 years. This was due to every food handler that worked for >20 years was non-citizen and did not understand the questionnaire well. A study done by Abdullah Sani & Siow (2014) showed significant association between working experience and knowledge on food safety of food handler. This was not reflected by the results of this study. According to this study, there was statistically significant association between the food safety training and the KAP score of food operators ($p= 0.041$). This result was in line with another study conducted in Northern Kuching (Rahman, Arif, Bakar & bt Tambi, n.d.) According to the study, training helps to improve overall food operators' practice on food safety. Training is critical to any system of food hygiene as training, instruction and proper supervision increase the potential of the food operators. Also, 90% of the respondents received valid *Typhim Vi* vaccination prior to their

employment in food premises. Again, there was statistically significant association between the vaccination received and the KAP score of the food handlers ($p=0.035$). Vaccination of *Typhim Vi* is usually included in the training course. This probably causes it to have a significant relationship with KAP score of food operator.

4.2.2 Association between socio-demographic factors, working background, training course, vaccination status and KAP score with hygiene status of food operators and food premises

Association between gender and hygiene status of food operators and premises was not significant ($p>0.05$). On the contrary, study by George Amponsah & Ekua Anamoaba (2011) stated that there was significant association between gender and hygiene status of food premises. However, our result correlates with a study done by Monney, Agyei & Owusu (2013) that showed no significant association between gender and hygiene status of food operator and premises. Based on our study, hygiene status of food premise was not significantly affected by nationality of food handler. Our result showed that Malaysian food handlers (47.1%) obtained higher percentage of good hygiene status compared to non-citizens (40.0%). Ch'ng K.S & Siti Khadijah A. (n.d.) stated that Malaysian food handlers had better understanding on food safety and hygiene compared to non-citizens where majority of them are not highly educated. This study reveals that education level was directly proportional to hygiene status. Other education level (64.3%) which consists of diploma, degree, master and philosophy doctorate obtained the highest percentage of good hygiene status. The higher the education level, the better the hygiene status. However, this association is also not significant ($p\text{-value}>0.05$). Small sample size may influence this result. Job description again showed insignificant association with hygiene status of food premises ($p>0.05$). The job that obtained highest percentage of good hygiene status was the cutter (56.3%) while the server obtained the highest percentage for poor hygiene status. National Restaurant Association (2014) also stated that server was the frontline for creating healthy dining environment. Servers touch almost everything especially when clearing table, wiping down furniture and menu and serving food. So, they got the highest percentage of poor hygiene status. Working experience was the only individual factors that showed significant association with hygiene status of food premise in our study. The highest percentage of good hygiene status was working experience for 11-20 years (75.0%). Respondents with less working experience result in have low hygiene status. Abdullah Sani & Siow (2014) also showed significant association between working experience and food hygiene. Thus, our result correlates with a previous study by Abdullah Sani & Siow (2014).

There was no association between vaccination and training received and the hygiene status of food operators and food premises. This contradicts with a study done by Kibret & Abera (2012) who found out that food safety training had shown to have a positive impact on practices of food handlers on food safety. Training and motivation provided to food handlers in food premises can help in maintaining the sanitation of food establishment. Although most of the food handlers had good knowledge on food safety but in reality they did not practice them and this has also been reported in other studies (Kibret & Abera, 2012) where food handlers did not translate their knowledge into practice which can lead to the poor hygiene status of the food establishments.

Based on the results obtained, there was no significant association between KAP score and hygiene status of food operators and premise ($p>0.05$). Percentage of good KAP score that obtained good hygiene status was less (41.2%) compared to poor hygiene status. Even though knowledge, attitude and practice score important in assessing hygiene status of food handler, but it did not give any difference if food handlers did not apply it on their food premise. Rheinländer et al. (2008) concluded that vendors' knowledge about health and hygiene was not closely related to safe food practices. Thus, there were no significant association between overall KAP score and hygiene status of food operator and food premise.

5.0 Conclusion and recommendation:

The study found that food handlers at food premises of the public university generally have good knowledge, attitude and practice on food safety. Vaccination and food safety training course received showed significant relationship with food safety knowledge, attitude, practice (KAP) of food operators. This emphasizes the importance of training among food operators to ensure perpetuation of best practices in food vending business thereby protecting public health. The study also revealed that there was no significant association between knowledge, attitude, practice (KAP) score of food handlers and the overall hygiene status off food handlers and food premises at the university.

Since the hygiene status of food premises in the public university was poor, the Environmental Health and Sanitation Department should also have more continuous training programs for food handlers emphasizing on the safe and hygiene food preparation to prevent foodborne illnesses. Other than that, each food premises must be supplied with adequate facilities such as wash basin, toilet room, and drainage facilities so that food handlers can translate their knowledge into practices.

Regarding our study, it is highly recommended that future surveys on this topic uses larger sample size in order to resemble the actual population. Furthermore, our study was restricted to food handlers in this particular public university only, therefore participation from other educational institutions is strongly encouraged for advance study to ensure adequate sample size and so that we can generalized our results to food handlers of educational institutions throughout Malaysia. Future studies also should focus on identifying the number of food handlers that had not received vaccination *Typhim Vi* and undergone food safety training. This data can be given to the health authority in the public university for further action in ensuring adherence to food hygiene practices among food operators in their premises.

Ethical

Jawatankuasa Etika Universiti Penyelidikan Melibatkan Manusia (JKEUPM) [ref:UPM/TNCPI/RMC/1.4.18.1(JKEUPM)/F2 dated 6th June 2014].

Declaration of conflict of interest

We authors of the article declare that there is no conflict of interest regarding publication of this article.

Acknowledgement

The authors would like to express their gratitude to UPM (supervisors, lecturers) and all participants (food handlers in the public university studied) for their willingness and cooperation to participate in this study.

References:

- Abdullah Sani, N., & Siow, O. (2014). Knowledge, attitudes and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control*, 37, 210--217.
- Byrd-Bredbenner, C., Maurer, J., Wheatley, V., Cottone, E., & Clancy, M. (2007). Food safety hazards lurk in the kitchens of young adults. *Journal Of Food Protection\Textregistered*, 70(4), 991--996.
- Ch'ng K.S & Siti Khadijah A. (n.d.). Association between hygienic status and its associated factors among food handlers in UPM food establishment in April and May 2006, 35-38.
- Faruque, Q., Haque, Q., Shekhar, H., Begum, S., & IMS, I. (2010). Institutionalization of Healthy Street Food System in Bangladesh: A Pilot Study with Three Wards of Dhaka City Corporation as a Model. National Food Policy Capacity Strengthening Programme. Final Report PR, 7(07).
- George Amponsah, A., & Ekua Anamoaba, B. (2011). Evaluation of Food Hygiene Knowledge Attitudes and Practices of Food Handlers in Food Businesses in Accra, Ghana. *Food And Nutrition Sciences*, 2011.
- Kibret, M., & Abera, B. (2012). The sanitary conditions of food service establishments and food safety knowledge and practices of food handlers in Bahir Dar town. *Ethiopian Journal Of Health Sciences*, 22(1), 27--35.
- Lin, C., Jensen, K., & Yen, S. (2005). Awareness of foodborne pathogens among US consumers. *Food Quality And Preference*, 16(5), 401—412.
- Monney, I., Agyei, D., & Owusu, W. (2013). Hygienic Practices among Food Vendors in Educational Institutions in Ghana: The Case of Konongo. *Foods*, 2(3), 282--294.
- National Restaurant Association,. (2014). Home. Retrieved 15 July 2014, from <http://www.restaurant.org/>
- Online Public Engagement Kementerian Kesejahteraan Bandar, Perumahan Dan Kerajaan Tempatan,. (2014). Garis Panduan Sistem Penggredan Ke Atas Premis Makanan di Kawasan Pihak Berkuasa Tempatan (PBT). Retrieved 15 April 2014, from <http://ope.kpkt.gov.my/ope/upload/topik/Garis%20Panduan%20Pemeriksaan%20&%20Penggredan%20premi>
- Rahman, M., Arif, M., Bakar, K., & bt Tambi, Z. (n.d.). Food Safety, Knowledge, Attitude and Hygiene Practices Among the Street Food Vendors in Northern Kuching City, Sarawak.
- Rheinländer, T., Olsen, M., Bakang, J., Takyi, H., Konradsen, F., & Samuelsen, H. (2008). Keeping up appearances: Perceptions of street food safety in urban Kumasi, Ghana. *Journal Of Urban Health*, 85(6), 952--964.
- Sharifa Ezat, W., Netty, D., & Sangaran, G. (2013). Paper Review of Factors, Surveillance and Burden of Food Borne Disease Outbreak in Malaysia. *Malaysian Journal Of Public Health Medicine* 2, 13(2), 98-105.