

Knowledge, Attitude, and Practice on Food Poisoning among Pre-School Food Handlers in Kelantan, Malaysia

Nurul Ainun Hamzah², Nurul Hanani Hadi², Nurul Izzah Abdul Samad², Siti Marwanis Anua², Haliza Abdul Rahman^{1,3}

¹Laboratory of Youth and Community Wellbeing, Institute for Social Science Studies, Universiti Putra Malaysia, Putra Infoport, 43400 Serdang, Selangor, Malaysia,

²Environmental and Occupational Health Program, School of Health Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia, ³Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

Email: nurulainun@usm.my

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Abstract

A cross-sectional study was conducted to assess the Knowledge, Attitude, and Practice (KAP) on food poisoning among 191 food handlers in pre-schools in Kota Bharu, Kelantan, Malaysia using purposive sampling. The main instrument was a validated Malay self-administered questionnaire on food poisoning and data was analysed using univariate and multivariate analysis. The respondents had moderate knowledge (69.6 ± 9.59), a positive attitude (86.2 ± 9.38), and good practice (84.9 ± 7.34). A slightly significant correlation was found between the score of knowledge and attitude ($p=0.05$, $r=0.203$). Age, educational level, and year of employment did not influence the KAP score on food poisoning ($p>0.05$). Even though training and education are essential in supplying the knowledge, however, it does not automatically translate to safe food handling practices. Therefore, continuous education and training should be organized to strengthen food handlers' knowledge and attitude in areas that seem to be lacking.

Keywords: Food Poisoning, Foodborne, Food Handlers

Introduction

Foodborne diseases are common in Malaysia due to its climate, becoming a major public health concern. The hot and humid climate is suitable for foodborne bacteria growth and multiplication of microorganisms. The number of food poisoning cases increased by almost 24% in 2018 as compared to 2017. There were 213 food poisoning cases were recorded nationwide until May 2019. A total of 401 cases were recorded in 2017 while 469 cases were

recorded in 2018. There were 68 cases in schools under the Ministry of Education (MoE), private homes (55), other places (45), schools not under MoE (26), and institutions (19) (New Straits Times Online, 2019). Teachers and food handlers need to provide nutritious and safe food for students as the pre-schoolers have always been consuming meals from their respective schools. Most of the pre-schools do not have a well-developed food, nutrition, and physical activity program (Buttriss & Weichselbaum, 2011). Despite the rising numbers of food handlers receiving food hygiene training, unfortunately, the food poisoning outbreaks are still high due to unhygienic food handling practices. In Malaysia, the latter contributed to 50% of the reported cases (MOH, 2007).

Food poisoning is synonymous with food-borne diseases or foodborne illnesses, which are characterized by a short incubation period, acute illness, and clinical symptoms of mainly gastro-intestinal disturbances such as stomach pain and diarrhoea. The term food poisoning has always been used and understood in the mentioned context of food-borne diseases in the studied population. Therefore, the former would be used throughout this study. Three important factors playing a major role in the incidence of food poisoning regarding food handlers were Knowledge, Attitude, and Practice (KAP). These three factors were studied among food handlers in preschools as a model for studying these factors among other community sectors. The levels of these three factors among them were used as an indicator for the KAP score in the health education of the community. The information gained would be utilized for health promotion, adoption of legislation, and using appropriate tools to increase knowledge, changing wrong beliefs concerning food habits, and changing peoples' practices that increase the risk of foodborne diseases in general through health education.

Most of the previous studies conducted local and abroad assessed the KAP on food safety hygiene among food handlers in restaurants (Abdul Mutalib et al., 2012; Rahman et al., 2012; Rosnani, 2015), school canteens (Angeeta, 2012; Abushelaibi et al., 2016), institutional (Abdullah & Siow, 2014; Akabanda et al., 2017). However, information about food handlers in pre-school on KAP concerning food poisoning was still lacking. To the best of our knowledge, very few studies are available regarding food poisoning or food-borne illnesses among the community (Yelmizaitun, 2009), university students (Sharif & Al Maliki, 2010), and parents (Sa'ed et. al., 2019). Therefore, the objective of this study was to determine the correlation between knowledge, attitude, and practice on food poisoning as well as the associated factors to KAP score among food handlers in pre-schools.

Literature Review

Food poisoning is the result of foodborne diseases. Foodborne disease defines as any illness or disturbance around the gastrointestinal area after the consumption of foods (water) or beverages contaminated with one or more disease-producing agents such as bacteria, parasites, viruses, fungi, and their products as well as toxic substances not of microbial origin (World Health Organization, 2018). Foodborne illnesses are caused by food contamination either by bacteria, viruses, and parasites as well as harmful toxins and chemicals. (Center for Diseases Control and Prevention, 2017). The most common food-borne infections are caused by the bacteria *Campylobacter*, *Salmonella*, and *E. coli*. Some of the common "bugs," such as *E. coli* and *salmonella* which cause food poisoning can be avoided by storing, cleaning, preparing, and cooking foods properly (Illades, 2011). Serving and chopping utensils or other food contact surfaces play an important role in the institutional spread of viruses. It can

persist on surfaces in high numbers. The virus can be an important agent of epidemic acute nonbacterial gastroenteritis in school-aged children (Todd & Grieg, 2015).

A KAP survey is a quantitative type of method that provides access to quantitative and qualitative information. KAP stands for Knowledge, Attitude, and Practice. Knowledge is a set of understandings or the ability to do, tell describe, explain, show and or say. Thus, to know is to be able to do, tell describe, explain, show or say, attitude is a way of being, a position, and practice or behaviour is refers to applied skills, techniques, method or standard operating procedures (SOP) (Sybille, 2011). Knowledge is considered to be beneficial, however, it does not automatically mean that these behaviours will follow. In other words, there are gaps between what is known or said and what is done (Sybille, 2011).

Knowledge affects attitude while attitude reflects the reaction of the ability in practice (Chien-Yun et al., 2011). Attitude will directly give an impact on practice or behaviour or intentions, except for the case that the level of effect, which knowledge impacts practice through attitude is better than knowledge impacts directly on practice (Huang et al., 2018). Lastly, practice is more observable than attitude, and “numerous studies have shown low or sometimes no connection between attitude and practice” (Sybille, 2011; Dong, 2015)

Methodology

Study Area and Study Location

Kelantan is one of the 13 states in Malaysia and covers an area of about 15,024 km². It is located northeast of Peninsular Malaysia facing the South China Sea. This state is divided into 10 administrative districts, i.e. Kota Bharu, Tumpat, Bachok, Pasir Mas, Pasir Puteh, Kuala Krai, Machang, Tanah Merah, Jeli and Gua Musang (Malaysia Statistic Department, 2010). A cross-sectional study was conducted at a government-owned pre-school in Kota Bharu, Kelantan. Kelantan state is also divided into 12 parliaments consisting of Tumpat, Kota Bharu, Kubang Kerian, Pengkalan Chepa, Bachok, Pasir Mas, Pasir Putih, Machang, Jeli, Gua Musang, Rantau Panjang and Tanah Merah. Kota Bharu was a district and also parliamentary constituency located at the western of Kelantan in Malaysia. Kota Bharu was divided into four constituencies consists of Bandar Kota Bharu, Kubang Kerian, Ketereh, and Pengkalan Chepa (Kelantan State Government, 2018).

Sampling Method

This study used the purposive sampling method to select the districts. It is a non-probability sampling technique that focuses on the units that were investigated based on the judgment of the researcher. The researcher knows the specific characteristic that exists in a certain segment of the population. There were 230 food handlers in government-based pre-schools in Kota Bharu. Simple random sampling was used to recruit 191 participants by choosing the reference number of the questionnaire. Therefore, every food handler in pre-schools had an equal chance of being selected. Those who met the inclusive criteria namely, age 18 years old and above, have been working as a pre-assistant school for more than 1 year were included as sampling unit while those who are not able to read and write were excluded from this study. The total food handlers were selected from four constituencies: Kota Bharu (n=31), Kubang Kerian (n=59), Ketereh (n=59), and Pengkalan Chepa (n=51).

Research Tools

A self-administered questionnaire from Yelmizaitun (2009) was used for data collection. The questionnaire consists of 93 questions which were divided into four sections. Section one included 5 questions about the socio-demographic data. Section two included 10 questions about the knowledge on foodborne diseases and knowledge on food poisoning. The domain was divided into a general subdomain on general knowledge on food-borne diseases and selected diseases, knowledge on food poisoning, mode of transmission, sign, symptoms, and complications, and prevention and treatment of food poisoning. All questions about knowledge from question one to question eight were scored on a two-point scale (0, 1) with the option “wrong”, “do not know” and “correct”. Then, question nine to question ten was scored on two-score point scales (0 and 1) with the option “no” and “yes”. For question 11, it was scored by answering the correct answer which was 7. Section three included 5 questions about the attitude towards practising good hygiene. The question about attitude was scored on a five-point scale (0, 1, 2, 3, 4) with options of “strongly disagree”, “disagree”, “not sure”, “agree” or “strongly agree”. For negative attitude items above scoring were reversed. Section four included 5 questions about the practice of food poisoning which were subdivided into food hygiene and safety and choosing clean premises. The questions about the practice were scored on a five-point scale (0, 1, 2, 3, 4) with options of “seldom”, “never”, “sometimes”, “always” and “often”, except for the last question was scored on five-point scales (0, 1, 2, 3, 4) with options of “strongly disagree”, “disagree”, “not sure”, “agree” or “strongly agree”. The direction of the scale was (0 to 4) and reversed to (4 to 1) for some questions to check the validity of the responses.

Scoring System

The score range of knowledge, attitude, and practice were between 0 to 114, 0 to 28, and 0 to 88 respectively. which were converted to 100 points. Level of knowledge, attitude, and practice (KAP) were determined based on Bloom cut off points (Sobri & Rahman, 2016) The score was categorised into three levels where a score of 80 – 100% of correct responses meant good or positive, 50 – 80% moderate or neutral or satisfactory and 0-50% low or poor or negative. Therefore, the scores with their respective knowledge levels were (91-114) good knowledge, (68-90) moderate knowledge, and (0-67) low knowledge. The score for attitude levels was (22–28) positive attitude, (17-21) neutral attitude, and (0–16) negative attitude. Therefore, the score with their respective practice levels were (70-88) good practices, (53–69) satisfactory practices, and (0–52) poor practices.

Pre Test

The reliability of this KAP on the food poisoning questionnaire was determined by a pre-study on 21 food handlers in private pre-schools in Kota Bharu. It was accountable for 10.9% of the actual sample size (Connelly, 2008). These respondents were not included in the final survey. A convenience sample was used in the pilot while a more representative sample was planned for the larger study (Jairath et. al., 2000). The item in the KAP questionnaire was tested and the Cronbach’s Alpha values for total score knowledge, attitude, and practice were 0.76, 0.78, and 0.78 respectively. A reliability coefficient of 0.70 or higher was considered “acceptable’ (Griethuijsen et. al., 2014). The feedback of the pilot was positive with no comments to be considered. Therefore, the researchers confirmed that the questionnaire items were appropriate, clear, and understandable.

Statistical Analysis

The SPSS 22.0 statistical package was used for all analyses. Mean responses and percentages of responses in each category were calculated and presented in tabular form. The Pearson Correlation was used to determine the correlation between knowledge score with attitude and practice score. Multiple Linear Regression (MLR) was used to determine the associated factors to knowledge, attitude, and practice scores. The p-value below 0.05 was statistically significant.

Ethical Approval

This study was approved by the Human Research and Ethics Committee (JEPeM) of USM with reference number USM/ JEPeM/17100549. Each respondent's personal information is confidential, and study participation is voluntary. The study population was informed about the objectives and processes of the study where data gathered would be anonymous including for publication. Written consent was then obtained before questionnaires were distributed.

Results and Discussion*Sociodemographic Characteristic of the Respondents*

The sociodemographic characteristic includes age, marital status, years of employment, and level of education. The mean age of respondents was 40.1 ± 11.35 years old, and the mean duration of employment was 11.9 ± 8.73 years. Most of them completed secondary education (85.3%) and received a typhoid vaccine (99.5%). All of them attended food and safety hygiene training during their employment. The details of sociodemographic data are shown in Table 1. All respondents were female and the majority are married. The possible explanation could be attributed to the nature of the work which requires more patience apart from one owned interest.

Table 1

Sociodemographic Data of the Respondents

Demographic variables		Frequency (%)	Mean \pm S.D
Age (years)	20-29	36 (18.8)	40.14 \pm 11.35
	30-39	42 (22.0)	
	40-49	65 (34.0)	
	Above 50	48 (25.2)	
Marital Status	Single	26 (13.6)	N/A
	Married	157 (82.2)	
	Other	8 (4.2)	
Years of employment	< 10 years	111 (58.1)	11.93 \pm 8.73
	10 – 20 years	33 (17.3)	
	21-30 years	17 (8.9)	
	31 years and above	30 (15.7)	
Education	None	1 (0.5)	N/A
	Primary	7 (3.7)	
	Secondary	163 (85.3)	

Knowledge, Attitude and Practice on Food Poisoning

It has been reported that most of the respondents gave the correct statement that food poisoning (92.1%) is a disease caused by food contamination followed by cholera (85.3%) and dysentery (75.9%). Twenty-eight percent did not know about disease transmission and 42.4% never know about hepatitis A was a food-borne pathogen. They agreed that cholera, food poisoning, and dysentery were types of foodborne disease by their responses 85.3%, 92.1%, and 75.9% respectively. Similarly, Akabanda et al (2017) stated that 70.6% of the food handlers did not know that hepatitis A was a food-borne pathogen. However, 87.7% agreed that bloody diarrhoea could be transmitted by food.

All respondents responded that eating contaminated food was a factor in food poisoning. Other factors of food poisoning were buying food from dirty food handlers and premises (98.4%), using contaminated water while preparing food (97.4%), not washing hands with soap after using the toilet (96.9%), food that was already expired (96.4%), a preservative that is prohibited by the government (96.4%), and preparing food without washing hands before and after (94.8%). Nevertheless, many of them (> 95%) managed to answer correctly regarding the signs and symptoms of food poisoning like abdominal pain, diarrhoea, vomiting, and nausea. They also had a poor understanding of liver damage, kidney failure, brain damage as a complication or effect of food poisoning and coma, and dead as not a complication of food poisoning. Besides, a lack of knowledge on personal hygiene among food handlers could have resulted in food poisoning incidents.

Respondents knew the correct washing techniques and the source of their information from medical staff, reading material, mass media. Almost ninety percent applied the seven steps taken for the correct hands washing technique. However, some observational studies found that although the food handlers have good knowledge of food safety they do not always put the knowledge into practice (Oteri & Ekanem, 1989). Manning and Snider (1993) also reported that 81% of their respondents are aware of the importance of handwashing, but only 2% observe washing their hands thoroughly.

Attitude had the highest percentage score among the three components. This correlates with the correct answer given by most of the respondents regarding attitude and practice on food poisoning. More than half (51.8%) of the respondents get treatment if they had food poisoning and 63.4% agreed that the mortality rate can be reduced at the early prevention. It shows that respondents have positive beliefs or opinions of preventing food poisoning through treatment-seeking behaviour. They will be engaging the action of dealing with food poisoning illness which is a deviation from the state of good health, after perceiving themselves to have any symptoms of food poisoning. They have a high level of motivation to prevent food poisoning because they understand the positive benefits of treatment-seeking to nullify the perceived threat. Ninety-eight percent agreed that one way to prevent food poisoning is by practising good hygiene after knowing the correct technique and 84.3% agreed that cleanliness is important when buying food. It indicates that they have positive beliefs or opinions about good hygiene and food cleanliness and sanitation which prevents microbial or non-microbial contamination about food poisoning.

A larger percentage (> 95%) of the respondents practising good hygiene techniques during food preparation such as using clean water during preparation of food, washing hands using soap and clean water for both before and after preparing the food and going to the toilet. Ninety percent agreed that cleanliness is important when buying food from outside. They had continuous good traditions or habits of hand hygiene and preventing food contamination that can result in food poisoning. Their knowledge in the area of practicing good personal hygiene and attitude towards hand hygiene, as well as food cleanliness, have contributed to their good preventive practices. It has been advocated that proper handwashing is essential especially among food handlers to ensure a good standard of food safety and to avoid food poisoning (Food Standard Australia New Zealand, 2016; Marthur, 2011; Darko et al., 2015).

Most of them (85.9%) taught their kids hygiene care and already knew the seven steps for proper handwashing technique. Parents play an important role to create a healthy home environment thus serving as role models for their children (Ventura & Birch, 2008). Parents need to spend time with their children and show them the proper way of food hygiene practices as well as doing some activities together. Therefore, kids can learn food hygiene and follow their parents the correct way in their daily life. It is crucial to practice self-hygiene, especially hand hygiene because the hand is the major agent that transmits microorganisms and intestinal parasites to foods (Aarnisalo et al., 2006).

Respondents produced good personal hygiene practices such as wearing a clean dress, aprons, a cap, having a short nails with no skin problems, did not smoke during food handling, and clean the premises daily. According to Bas et al (2006), the staff employed in food and beverages services should have a clean, tidy and proper appearance, without any skin infections, good dental hygiene, have short fingers nails, and are not in the habit of biting nails, do not wear jewellery except wedding ring, wearing no make-up, work in clean shoes and uniform, and stick to good hygiene practices. In the aspects of food safety, the response provided by the respondents indicated that the level of their practices was good in which the overall percentage was more than 80%. Data for the risk factors showed that the majority of the food poisoning cases were due to improper food handling practices (Clayton et al., 2002). A study in the USA proposed that inappropriate food handling practices lead to 97.0% of foodborne diseases (Howes et al., 1996).

More than 70% of the respondents noted difficulty to find hygienic premises due to few numbers of food premises, food prices, and the location of hygienic premises at certain places. However, less than 30% of them responded towards no sign of hygienic premises and use of untreated well water. It indicates that they had a positive belief or opinions concerning hygiene and safe food premises putting them less at risk of food poisoning.

The Score of Knowledge, Attitude and Practice Score on Food Poisoning

The mean percentage scores for KAP for food poisoning were 69.6%, 86.2%, and 84.9%. According to the classification, the respondents had moderate knowledge and good in both attitude and practice on food poisoning (Table 2). These findings are comparable with the earlier discoveries by Sharif & Maliki (2010) who also reported scores of knowledge, attitude, practice with 74.95%, 67.26%, and 80.29% respectively. However, it is contrary to the findings by Aimi et al., (2018) who reported a score of knowledge, attitude, and practice towards food poisoning were 86.06%, 34.26%, and 19.91%.

Table 2

Percentage of Knowledge, Attitude and Practice Score on Food Poisoning

Domain	Mean ± S.D.	Min-Max	Category
Knowledge (K)	69.6 ± 9.58	45 -80	Moderate
Attitude (A)	86.2 ± 9.38	68 -100	Good
Practice (P)	84.9 ± 7.34	57- 97	Good

Tan et al (2013) reported that 85.4% of food handlers from the school canteen had a good knowledge of hand hygiene. Hassan & Dimassi (2014) also reported that 86.7% of university students used soap for handwashing. Hand cleanliness is the most critical part of food production. Apart from that, food premises inspection is compulsory to ensure the sanitary and cleanliness of the food premises all the time. Food poisoning cases occurred mainly in schools and institutions; therefore, priority must be given to school canteens and hostel kitchens (Maizun & Nyi, 2012).

Another study by Moy et al (2018) reported that youth had good food safety practices with a mean score of 81.5%, which was comparable with this study. In contrast, a similar study was conducted among adults found the knowledge, attitude and practice were insufficient (Byrd-Bredbenen et al., 2007; Sanlier & Konaklioglu, 2012). This study reflects that majority of the food handlers had a good attitude towards food-borne diseases even though they did not fully practice and comply with food and safety hygiene during their daily lives.

Correlation between Knowledge with Attitude and Practice

There was a slightly significant correlation was found between knowledge and attitude, but a weak correlation ($r= 0.203$, $p=0.05$). It showed that high scores in knowledge tend to have a positive attitude toward food poisoning parallel with a study in Iran (Anshari-Lari et al., 2010).

Table 3

Correlation of Knowledge, Attitude and Practice scores on Food Poisoning among Food Handlers in Pre Schools

Domain	r value	p-value
Knowledge & Attitude	0.203	0.005*
Knowledge & Practice	0.007	0.292
Attitude & Practice	-0.022	0.706

* Significant at $p < 0.05$

It has been mentioned that knowledge helps to improve attitude (Achikel, 2008). However, no significant association was found between knowledge and practice. This study revealed that having good knowledge and attitude does not lead to good practice. Previous studies reported no significant correlation between knowledge and food safety practices among food handlers in schools (Afifi & Abushelaibi, 2012), college students (Booth et al., 2013), and youths (Moy et al., 2018). Also, no association was found between knowledge, attitude, and practices (Soares et al., 2013). In contrast, Martins et al (2012); Aimi et al (2018) also found a significant correlation between knowledge and attitude. A negative correlation was observed between attitude and practice, but the correlation was not statistically significant. It revealed

that having a good attitude does not lead to good practice. The practice was more observable than attitude and numerous studies shown low or sometimes no connection between attitude and practice (Sybille, 2011). Based on Toh & Birchenough (2000), there was a strong correlation between knowledge and food handling practices. However good knowledge of food safety did not necessarily lead to good handling practices (Bas et al., 2006). Furthermore, a negative correlation was found between practice with knowledge and attitude (Suparmi et al., 2015).

Factor associated to Knowledge, Attitude and Practice Scores on Food Poisoning

The multivariable analysis showed none of the socio-demographic factors (age, year of education, year of employment, and training on FSH) were significantly associated with knowledge (K), attitude (A), and practice (P) score (Table 4). Therefore, it could be summarized that age, educational level, year of employment, and training did not influence the KAP score on food poisoning. Age was one of the most important factors influencing food safety behaviour (Al Sakkaf, 2015). Another study in Turkey found that adults significantly had better knowledge and practices on food safety as compared to youths (Sanlier, 2009). Similarly, Mathenge et al (2017); Aimi et al (2018) also found no significant association between KAP on food poisoning with age among food handlers.

The level of education was the key determinant of knowledge, as well as attitude and practices. The higher the educational level, the higher the level of KAP should be. Therefore, a better understanding of the importance of food safety hygiene and its applications would affect attitudes and subsequently food safety practices. Several studies on KAP in food safety emphasizes the knowledge score increased with the level of education among food handlers (Siow & Norakkiah, 2011, Martins et al., 2012, Checkol et al., 2019). In contrast, no association was found between the KAP score and years of education. Another study by Sharif et al. (2013) also found that the educational level of respondents did not influence the respondents' knowledge and practice. Only 10.5% of the respondents who received tertiary education had a moderate level of knowledge (score 60%) which reflected the insignificant findings on the influence of years of education towards overall KAP on food poisoning.

The year of employment also did not influence the KAP of food poisoning. It was found that those who had 1 to 30 years of experience in the food segment presented a similar level of knowledge. This might be due to the advanced training tools that food handlers were equipped with which could facilitate them to have better food safety knowledge irrespective of their experience in the area. These results were similar to other studies which found that although the food services had a good knowledge of food safety, they rarely applied this knowledge during food handling (Rowell et al., 2013).

Generally, training had a significant effect on knowledge, attitude, and practice. Studies have shown that the completion of a course or training program could help improve even more the food handlers' food safety knowledge (Oliveira et al., 2020). It was stated that more training on food safety helped in improving the overall food handlers practice (Rahman et al., 2012). Moreover, it also could assist them in the application of new attitudes in food handling, consequently reducing the susceptibility of food contamination (Ovca et al., 2018; Serafim et al., 2018). Therefore, training on food safety and hygiene were important for food handlers, since the knowledge acquired could be implemented in daily practices and consequently

reduce the outbreak and cases of Foodborne Diseases (FBD). Currently, FBD becomes a public health concern due to its repetitive occurrence. Even though all respondents had completed appropriate training related to food safety and hygiene, however, it did not influence the KAP score among them. These individuals were the ones who presented a greater knowledge of food safety. Additionally, practices could lead to the improvement of hygiene procedures over the years, thus generating more learning (Martins et al. 2012). Hence, training, motivation, and initiative should be provided to encourage food handlers to practice appropriate attitudes and procedures when working in food areas (Huda, 2008).

Limitation

An obvious limitation to the current study was the cross-sectional study itself. Data used in the analysis was self-reported and was collected within a short period. This might indeed impact the causal relationships between the variables of the study. Moreover, this study has only been carried out in the city of Kota Bharu, and it may not reflect the knowledge on food poisoning for the whole population of food handlers in pre-schools from other cities or regions of the country.

Table 4

Predictors of Knowledge, Attitude, and Practice Score on Food Poisoning

	SLR ^a		MLR ^b		t-statistic	p value
	p-value	p value	Adj β (94% CI)			
Knowledge (R² = 0.012)						
Constant			76.51	(63.95,		
Age	0.027	(-0.049,	0.481	89.05)	0.477	0.634
Education	0.104)		0.407	-0.022	(-0.070,	0.405
(years)	0.914	(-3.082,	0.512	0.114)	0.317	0.752
Year of	1.254)		0.347	-0.921	(- 0.976	0.330
Employment	0.025	(-0.049,		3.101,1.256)		
Training on	0.099)			0.014	(-	
FSH	6.254	(5.720 ,		0.075,0.103)		
	17.698)			6.084	(5.963,	
				18.011)		
Attitude (R² = 0.049)						
Constant			80.11			
Age	0.120		0.045*	(60.31,99.90)	0.997	0.330
Education	(0.003,0.237)		0.049*	0.069	1.971	0.050
(years)	3.352		0.040*	9(0.071,0.209)	1.224	0.222
Year of	(0.020,6.684)		0.742	3.331	(- 0.626	0.626
Employment	0.119	(0.006,		0.003,6.624)		
Training on	0.232)			0.084	(-	
FSH	3.102	(2.170,		0.051,0.220)		
	15.493)			3.035	(2.285,	
				13.788)		
Practice (R² = 0.031)						

Constant				78.31	(62.13,		
Age	0.147	(-0.026,	0.026*	94.48)		0.722	0.482
Education	0.171)		0.228	0.045	(0.105,	0.576	0.228
(years)	2.133	(1.551,	0.276	0.162)		0.771	0.487
Year	of 3.969)		0.545	2.126	(1.552,	0.801	0.478
Employment	0.072	(0.149,		3.940)			
Training	on 0.166)			0.049	(0.063,		
FSH	4.411	(3.945,		0.162)			
	16.60),			4.560	(4.124,		
				15.90)			

^a Simple Linear Regression, ^b Multiple Linear Regression

* Significant at $p < 0.05$

Conclusion

This study indicated that the knowledge was moderate, positive attitude, and good practice. Most of the respondents reported that they did not always comply with all the food safety practices even though they were requested to do so. Even though training and education were essential in the dissemination of knowledge, they did not automatically translate towards safe food handling practices. No correlation was found between knowledge with attitude and practice on food poisoning. Knowledge was essential in behaviour changes; however, knowledge was not turned into safe practices as well even though among those who had attended formal training in food safety. It might be due to the desire for seeking procedural knowledge that enhances behavioural practice. Nevertheless, certain improvements and recommendations could be implemented to maintain or enhance better performance in the future. Therefore, continuous food safety education, awareness, and campaign for food handlers should be implemented. People should start and continue to be trained to improve their knowledge, attitude, and practice as well as learn about factors influencing foodborne illness.

Declaration

We declare that this manuscript is our original work and has never been published, submitted, or considered for publication elsewhere. The text, illustrations, or any other materials included in the manuscript contained no violation of any existing copyright and do not infringe any rights of third parties. All authors who participated in the work are prepared to take public responsibility for the work.

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