KNOWLEDGE, ATTITUDE, AND PRACTICE ON FOOD SAFETY CULTURE AMONG KITCHEN EMPLOYEES OF MALAYSIAN GOVERNMENT HOSPITALS

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ABSTRACT

The objective of the present study was to use a questionnaire on knowledge, attitude, practice (KAP) to assess food safety culture in government hospital kitchens. Four different government hospitals kitchens with food safety management system (FSMS) in place located in Selangor and Federal Territory of Kuala Lumpur were evaluated. The questionnaires were used to assess the basic food hygiene knowledge, attitude and practice of the hospital food handlers and samples were collected from the selected critical sampling location (CSL). The results suggest that food hygiene and safety control is always considered as important and prioritized in most of the hospitals. Attention needs to be given to KAP on time and temperature control that are indicating a lower score to have a total positive prevailing FS-culture.

Keywords: knowledge, attitude, practice, food safety, government hospitals

INTRODUCTION

Hospital's food is an important source of nutrition to the inpatients (Yousif, Ashoush, Donia, & Hala Goma, 2013a). Shepherd (2011) stated more than 75% of the population depended on the catering menus during their hospital stays in the ward. Providing food that is safe to be eaten to the sick and vulnerable patients is a major responsibility especially for children, elderly and the immune-suppressed; cancer patients and diabetics as their conditions required meals served has undergone in a safest food safety activity (Valero et al., 2016; Lund & O"Brien, 2011). According to Legesse, Tilahun, Agedew, & Haftu (2017), food handlers are responsible to ensure food safety all the way from producing and manufacturing, storing, and preparation of food. Food is determined safe when it is free from bacteria, chemical and foreign objects which can be harmful when food processes are lacking in safe handling and processing (Lund & O'Brien, 2011). Therefore, to ensure safe and quality foods served to patients, implementing and applying the Food Safety Management System (FSMS) in hospital foodservice is required.

LITERATURE REVIEW AND HYPOTHESES

Food Safety Management System (FSMS)

FSMS is a system principle that includes programs, plans, policies, procedures, practices, processes, goals, objectives, methods, controls, roles, responsibilities, relationships, documents, records, and resources (Singh, 2015). Besides, FSMS determined as the linkage of organized features that combine to guarantee foods does not cause adverse human health effects (Dewanti-Hariyadi, 2013). To achieve its assured quality and to control the epidemics of foodborne diseases, regulations forced foodservice establishment management to design and implement FSMS (Jacxsens et al., 2009). FSMS practice in hospital foodservice is based on pre-requisite program (PRP) which consists of Standard Operating Procedures (SOP), Good Manufacturing Practices (GMP), and Hazard Analysis and Critical Control Point (HACCP). SOP and GMP are recognized as an operational condition, providing the foundation for HACCP for the program to be effective (Baş, Ersun, & Kivanç, 2006). SOP, which supports HACCP plan, includes food handler's good personal hygiene practice, having a good program on cleaning, sanitation, and cross-contamination specification control, good facility design and practices, proper maintenance of equipment program, and a good selection of supplier and (Baş et al., 2006). The GMP provides the operating and environmental conditions that are needed to protect food products during processing and storage (Agyei-Baffour, Sekyere, & Addy, 2013). HACCP program is developed to provide general guidance for the hospital management and their employee to ensure critical food safety-related aspects such as physical, chemical and biological hazard are addressed from harvest to consumption effectively (Grintzali & Babatsikou, 2010). Kafetzopoulos and Gotzamani (2014) mentioned that the successful implementation of HACCP might prevent foodborne disease and reduced the food safety risk to the acceptable level through its corrected implementation and application. Therefore, many government hospitals kitchen in Malaysia have been certified with GMP and HACCP to ensure food prepared according to FSMS and hence, food served to the patients are should be safe to be consumed (MOH, 2010). Government hospital's kitchen in Malaysia is managed by the Dietetic and Foodservice Department, where it provides a meal to all inpatients and their entitled staffs (Malaysian Hospital Accreditation Programme, 2013).

In Malaysia, Soon, Singh, and Baines (2011) stated that 50% of food poisoning episodes due to unsanitary handling procedures. Food handlers are responsible for ensuring food safety practices from food production to storage (Kibret & Abera, 2012). Improper handling and neglect of sanitary actions by the food handlers might allow the pathogen to survive, multiply in sufficient numbers and causes illness to the consumer (Lambrechts, Human, & Doughari, 2014). The chances of foods to be contaminated will be higher when it is handled by many individuals (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017). Therefore, knowledge on food hygiene practice is important for the food handlers to have the right attitude to carry out the practice and produced food that is safe for consumption, especially for the sick and vulnerable patients in the hospital or healthcare premises (Sylvia, RoseAnn, & John, 2015). Sousa (2008) commented that appropriate handling practices are essential to stop food contamination in the production and distribution.

Effective management of FSMS can be improved by applying the precautionary methods and providing adequate and frequent training to food handlers on food safety activities (Akabanda et al., 2017). Food safety culture has becoming importance approach to ensure good practice in a food institution is accepted and followed (Neal, Binkley, & Henroid, 2012). Food safety culture is where workers in an organization conduct food safety and the organization reflect

through it (Nyarugwe, Linnemann, Hofstede, Fogliano, & Luning, 2016; Griffith, Livesey, & Clayton, 2010). Also, the routine of food safety actions reveals where personnel possibly obtain the behaviors as they are part of the organization and thus their beliefs and behaviors will then emerge to fill the entire organization (Yiannas, 2009). The intention of food safety culture in place is to ensure employee compliance with the positive practices, which sequentially preventing the incidence of foodborne illnesses (Powell, Jacob, & Chapman, 2011).

Nonetheless, monitoring systems and audits are also an important component to ensure the system are in place successfully (Kotsanopoulos & Arvanitoyannis, 2017). The overall performance on the FSMS can be investigated through questionnaires as many kinds of research used this tool to enquire the knowledge, attitude and practices (KAP) of the food handlers towards the application and implementation of the system (Pacholewicz et al., 2016; Adel, Mostafa & Abdel-Rahman, 2014; Molina, 2012; Rohin, 2016). Food handlers' characteristics were evaluated and described as having good knowledge, attitude and practice if they managed to secure >80% of the total marks (Nyarugwe, Linnemann, Nyanga, Fogliano, & Luning, 2018; Pacholewicz et al., 2016).

Hospital Food Service

Hospital foodservice plays an essential role in providing patients care during healing processes (Busra, Dolah, Haslina, Ngah, & Samsudin, 2017). Providing food that is safe to be eaten by patients in a hospital is also a major responsibility since they are sick and vulnerable, especially for the group of patients; children, elderly and the immune-suppressed patients as their conditions required meals that have been prepared with high level of food safety activity (Valero et al., 2016; Lund & 'OBrien, 2011). Food determined safe is when it is free from bacteria, chemical and foreign objects which can be harmful when food processes are lacking in safe handling and processing (Lund & O'Brien, 2011). Besides, according to Legesse, Tilahun, Agedew, & Haftu, (2017) handlers are responsible for ensuring food safety from producing and manufacturing, storing, and preparation of food. The best practice to avoid food contamination and its significances are through good hygiene measures. Isara, Aigbokhaode, Onwusor, Onyeulo, & Orumwense, (2013) mentioned other than worsening patients‟ illnesses and the risk of death, it might also prolong hospitalization, increased financial load, and loss of family income and the health care system of the country will also be affected. Therefore, maintaining and observed food hygiene at all times during the processes of the patients and staff‟s food is a must in hospitals foodservice systems.

Food Poisoning

Food poisoning is a form of the foodborne disease; causes illness by the ingestion of food or water contaminated with either bacteria or their toxins, viruses, parasites, or chemicals (Addis & Sisay, 2015). Improper food preparation or cooking process and exposure of food to contaminants may lead to food poisoning (Rane, 2011). Foodborne disease outbreak can be classified when two or more persons experience a similar illness resulting from the ingestion of a common food (Callejón et al., 2015). Microbiological, chemical and physical hazards are the hazards known to cause foodborne illnesses. Food handlers, food equipment, cleaning supplies and suppliers may introduce hazards into hospital food service unit in many ways. The cases of foodborne illness may be under-reporting since the health care providers are more focused on the treatment of symptoms of the illness rather than confirming and reporting (Arendt et al., 2013). It may be due to the lack of food safety knowledge and the physician‟s lack of understanding of the seriousness of the foodborne illness (Mohammed & Osfor, 2017;

Wong et al., 2004). Food poisoning occurs within 48 hours after consumption of contaminated food or drink. The symptoms include nausea, vomiting, diarrhea and abdominal pain (Addis & Sisay, 2015). To prevent food poisoning and other foodborne illnesses it is suggested that through food hygiene practices and effectiveness (Rosmawati, Manan, Izani, & Nurain, 2014; Lazarevič, Stojanovič, Bogdanovič, & Dolišanin, 2013; Afifi & Abushelaibi, 2012). Epidemiology and surveillance data suggest that the causal of a sequence of foodborne illnesses are from defective practices in food handling and storing (Addis & Sisay, 2015; Ezat & Sangaran, 2013; Md Mizanur Rahman, Mohd. Taha Arif, Kamaluddin Bakar, 2012; Buccheri et al., 2007). Listeriosis caused large outbreaks in England, Spain, Australia, USA, China, Germany from the year 1972-2010. Inpatients who consumed food prepared by the hospital foodservice was infected (Silk, McCoy, Iwamoto, & Griffin, 2014). Listeriosis is a foodborne infection, and investigations in hospitals have demonstrated the consequences of serving unsafe food to highly vulnerable populations is the cause of the infections (Gaul et al., 2013; Shetty et al., 2009). Most food poisoning cases recorded happened in hospitals, cafeterias, nursing homes, prisons where the large quantity of meal cooked several hours before serving (Malik, Naeem, Nawal, & Chaudhri, 2015). Clostridium perfringens was found the main cause for the outbreak happened in Louisiana state psychiatric hospital in the year of 2010. Forty-two inpatients and 12 staff were infected, and within 24 hours, three patients had died. The chicken served was cooked a day before being served and was not cooled down according to hospital guidelines. The C. Perfingens is the third leading cause of food poisoning due to reheating of food, improper cooling of food (Sarah, Kelly & Hannah, 2013). In the year of July 1990, Salmonellosis affected 101 patients and eight workers of a mentally handicapped hospital in the U.K and caused foodborne illness. The investigation found beef rissoles cooked by deep-fat frying as the vehicle of infection (Evans, Hutchings, Ribeiro, & Westmoreland, 2013).

In Malaysia, there are various cases and issues reports regarding foodborne illness involving all aspects of institutional foodservice. The report on the outbreaks showed 62% of the episodes happened in schools, 8% accounted for community gatherings, and 17% in academic institutions (Soon et al., 2011). The foodborne disease may be triggered by insufficient training required by the food handlers, untreated water used for the non-drinking activity, and insufficient hygiene status (Lee et al., 2017). Many studies revealed food handlers themselves are the source of the contamination and caused the outbreaks in most cases other than ready-to-eat foods and water sources (Garden-Robinson, 2012; Campbell, 2011; Todd et al., 2007; Murat Bas, Azmi Safak Ersun, 2006). All food manufactured in Malaysia must abide by the basic food hygiene and the requirements of the Food Act 1983, Food Regulations 1985 and Food Hygiene Regulations 2009 to protect the public. Hence, hospital foodservice has the utmost responsibility to act against all food hazards besides to encourage and support the food safety activity in preparation of quality food.

Food Safety and Hygiene

Food can become contaminated along the supply chain (Sanjee & Karim, 2016; Bendekovič, Naletina, & Nola, 2015; Centers for Disease Control and Prevention, 2015). The food handlers need to practice good hygiene at all times to ensure the safety of food from production to consumption (Dudeja, Singh, Sahni, Kaur, & Goel, 2017; Mentziou, Delezos, Krikidis, Nestoridou, & Boskou, 2014; Stangarlin-fiori et al., 2016; Md Mizanur Rahman, Mohd. Taha Arif, Kamaluddin Bakar, 2012). A food handler is anyone who works in food premises; handle foods materials, surfaces, kitchen utensils and kitchen equipment that are likely to be in contact with (Onyeneho & Hedberg, 2013). The aspects of personal hygiene cover hygiene hands, attire, personal health and habit, and attitude (Tan et al. 2013). The causes of foodborne

illnesses may be due to poor personal hygiene, the inadequate practice of proper good hygiene or mishandling food preparation by food handlers. Mouth, skin, hands, cuts or sores, and hair among others can be the transport for microorganisms for contamination (Mashuba, 2016; Green et al., 2007). They also may carry a wide range of enteropathogens and participate in the transmission of many infections to the public in the community and patients in hospitals (Adams & Moss, 2008). Bacillus spp. (28.6%), E. coli (22%), Enterobacter spp. (14.6%), Klebsiella spp. (13.3%) and S. aureus (12.6%) are the most communal pathogenic bacteria isolated from the hands of food handlers (Shojaei, Shooshtaripoor, & Amiri, 2006). Therefore, food handlers need to maintain good food hygiene practices as it is critically important to prevent foodborne illness outbreak (Mama & Alemu, 2016).

It is mandatory according to the Malaysian Law, Food Act 1983, Food Regulations 1985 and Food Hygiene Regulations 2009, and all food handler must have a basic certificate of training on food handling processes and be vaccinated (Tan et al., 2013; Zain & Naing, 2002). These measures are taken as to overcome problems related to overall food safety through education and ensuring that customers‟ health will be protected (Sylvia, RoseAnn, & John, 2015; Agyei-Baffour, Sekyere, & Addy, 2013). Therefore, effective training able to opening up food handlers consciousness, providing knowledge and skills in food safety and cleanliness (Azniza Ishak et al., 2013). Local studies found, food handlers have adequate knowledge, positive attitudes, and good self-reported practices (Abdullah Sani & Siow, 2014; Hamid, See, & Ching, 2014; Abdul-Mutalib et al., 2012; Saad, See, Azam, & Adil, 2013). However, the number of cases of food poisoning in Malaysia is still low compared to other countries as the cases may go unreported (Soon et al., 2011).

Food handlers are not allowed to work in the kitchen if they are ill to avoid microbiological shifts on food (Todd et al., 2007; Angulo, Jones, & Angulo, 2006; King et al., 2000). The workers who have been infected with typhoid-like illnesses can be asymptomatic carriers and may cause disease or other illnesses to others or customers although not showing symptoms (Yousif, Ashoush, Donia, & Hala Goma, 2013; FDA, 2005). Hence, there is truly significant in the prevention of foodborne diseases played by food handlers in maintaining and improving the food handling practices and personal hygiene since they could be the mechanical agents which contaminate food (Yard Mc et al., 2015; Ezat & Sangaran 2013).

Foodborne outbreaks are common in a community setting but are seldom reported in a hospital setting (Luvira et al., 2012.). However, there are reported outbreaks cases in medical facilities due to poor food handling practices (Bennett, Jarvis, & Brachman, 2007). Listeriosis associated outbreak in a hospital located in Brazil affected adult patients with median age of 80 years who had immune suppressive conditions. It was reported the possible vehicle of Listeria probably originated in the hospital kitchen (Souto Martins et al., 2010). Listeria monocytogenes, the gram-positive bacterial agent of listeriosis, is ubiquitous and usually transmitted to humans in food (Donnelly, 2001). Two wards in the United Kingdom hospital affected by an epidemic of Clostridium Perfringens foodborne infection and was caused by contaminated pork not properly chilled (Regan, Syed, & Tunstall, 1995). A foodborne outbreak of Salmonella happened in a University hospital in Greece in 2005 due to faulty practices of the food handlers and absence of written standard guidelines for cleaning and disinfection of kitchen equipment (Gikas et al., 2007). The severity of illness may be higher in patients, especially immune-compromised patients. Luvira et al., (2012) mentioned food-borne outbreaks in the hospital are worth investigating to determine the source and guide prevention measure. Food handlers in hospital foodservice need to take additional precautions to prevent the transmission of foodborne illness (Arendt & Jinhyun, 2015). Stangarlin-fiori et al., (2016) mentioned offering

safe meals to individuals is important and can be achieved through the use of good hygiene practices as it involves a systematic approach to control the food contaminants. The maintenance of a high degree of hygiene in hospital settings is necessary as good hygiene practice is a preventive quality program through its implementation in any food establishments (Lazareviš et al., 2013). Therefore, hospital foodservice workers are encouraged to practice and applied positive behaviors to prevent the spreading of viruses and bacteria to food (Mohammed & Osfor, 2017; Sylvia et al., 2015).

Knowledge, Attitude and Practice of Food Handlers towards Food Safety and Hygiene Practices

Food handlers have great accountability in warranting food safety practices from food manufacturing and storing (Paiva De Sousa, 2008; Rane, 2011). Improper and neglecting the hygienic measures on the part of the food handlers may allow pathogenic bacteria to spread, stay alive and reproduce in abundant amounts to source illness towards human (Rane, 2011). Many studies identified improper cooking, temperature abuse during food storage, cross-contamination between cooked and uncooked foods, poor sanitation and hygiene, and using unsafe water and raw materials are the handling factors associated with food-borne disease outbreak and directly linked to food handlers (Mahmood, Fatima, Maria, & Wabasa, 2017; Ababio & Lovatt, 2015; Andy et al., 2015). Poor hygiene conditions of food premises, insufficient food hygiene practices during preparing and serving food, and personal hygiene of food handlers‟ are the most probable cause of foodborne illness (Angulo et al., 2006). In addition, numerous studies found lack of knowledge, attitude and practice of food handlers toward good food hygiene practice is also attributed to the foodborne diseases (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017; Mahmood et al., 2017; Grossi Machado, Tronco Monego & Raquel Hidalgo Campos, 2014; Hamid et al., 2014; Jianu & Chiș, 2012; Kibret & Abera, 2012). According to Rosmawati et al. (2015), insufficient knowledge and negligence during food preparation is a common cause of foodborne disease outbreaks.

According to Soon, Singh, and Baines (2011a) 50% of poisoning episodes in Malaysia are due to the unsanitary handling procedures. Zain and Naing (2002) reported poor knowledge levels among 430 food handlers in Kota Bharu, Kelantan in term of etiology (58.8%), symptoms (59.3%) and treatment (52.6%) of foodborne disease, awareness of personal hygiene (55.8%). According to (Malaysia National Health Accounts Unit, 2015) the diseases of the digestive system contributed 4.52% causes of hospitalization in public hospital; meanwhile, 9.14% reported in private hospital per 100,000 populations in Malaysia. A study in 7 military hospitals in Jordan found 200 food handlers expressed a high level of knowledge in food safety; in the categories of high-risk foods, foodborne diseases, food storage temperatures, and sources of food contamination. However, they have a lack of knowledge about the proper method of thawing frozen food, where 90% thought that the correct method for thawing frozen meat and broiler is to keep them overnight at room temperature (Sharif, Obaidat, & Al-Dalalah, 2013).

Knowledge of food hygiene practice is important for the food handlers to carry out a good food hygiene practice and produced food that is safe for consumption, especially for the sick and vulnerable patients in the hospital or healthcare premises (Sylvia et al., 2015; Murat Bas et al., 2006). Onyeneho & Hedberg, (2013) mentioned food handlers in hospitals and schools have better food safety knowledge and practices than workers in other restaurants, street vendors, and other small food service establishments due to adequate training on food safety. The higher level of education and training enhances the practice of food hygiene and safety (Isara et al. 2013). Effective training may improve in food safety understanding, practices and hygienic

attentiveness (Akabanda et al., 2017; Dudeja et al., 2017). Meaningful and focused training can contribute to expanding both the safety and quality of food (Akabanda et al., 2017; Dudeja et al., 2017). Food safety knowledge of the foodservice staff in a hospital at holy Makkah showed the percentage scores before and after the training concerning food safety practices on food processing showed improvement (Mohammed & Osfor, 2017). The knowledge taught through food safety training will lead to an improvement where it reflects a positive change in behaviour (Seaman & Eves, 2006). The significant association found between training and knowledge level compares to those without training (Adesokan, Akinseye, and Adesokan, 2015). The trained group would have more knowledge on food safety than the no-trained group (Park, Kwak, & Chang, 2010).

The attitude of food handlers in practicing good hygiene is really important to maintain food prepared and served to anyone is safe to be consumed and free from contamination (Akabanda, Hlortsi, and Owusu-Kwarteng, 2017; Hedberg et al. 2006). Besides, appropriate handling practices are essential to stop food contamination in the production and distribution (Paiva De Sousa, 2008). Foodborne illnesses would have less of an impact on society if the knowledge and attitude of food handlers concerning food cleanliness are adequate (Buccheri et al., 2007; Seaman and Eves 2006; Foods 2005; Zain and Naing 2002). Compliance with the procedures of food safety practices may be derived from a good knowledge, positive attitudes and behaviours of the employee (Mohd. Firdaus Siau, A., Son, R., Mohhiddin, O., Toh, P.S. and Chai, 2015). However, training may bring an increase of knowledge on food safety, but not always result in a positive change in food handling behaviour (Githiri, Kimiywe, & Okemo, 2013; Murat Bas et al., 2006). Attitude involves evaluative concepts associated with the way people think, feel and behave which comprises a cognitive, emotional and a behavioural component implying what you know, how you feel and what you do (Schwarz, 2001). It has similarly been recommended that attitudes may influence one‟s intention to perform a given behaviour or practice and thus correlated with behaviour (Fishbein, 1967). However, there are barriers to execute the good behaviour as it may come from other factors, including inhibitory attitudes of supervisors and colleagues, time pressures and or lack of staff, as well as structural factors, such as facilities and accessibility to supplies (Soares, Almeida, Cerqueira, Carvalho, & Nunes, 2012). Working environment may influence food handlers to attitude towards hygiene practices which as either a facilitator or barrier to safe practice (Clayton et al., 2015). The motivated ones will enjoy the work and motivated to adhere to health and hygiene requirements while laziness and the attitude of do not care about health falls for others (Arendt et al., 2014). Food handlers who attended training courses have a high and positive attitude toward safe food handling when handling foods as it is their responsibilities to produce safe food (Norhaslinda, Norhayati, & Mohd Adzim, 2016; Sharif et al., 2013). When the food handlers think that developing and handling food in the hygienic condition is important and necessary, they will likely intend to employ in that conduct (Norhaslinda, Norhayati, & Mohd Adzim, 2016). However, other studies highlighted training given to food handlers might not interpret to a positive attitude although training may increase knowledge and it is also noted that no differences between staff who attended the educational course with those who did not (Afifi & Abushelaibi, 2012). Monitoring practices are needed to ensure food handler maintain a high-level attitude toward food safety and hygiene by following the FSMS in place and thus prevent the possible causes of foodborne illness infection (Adesokan et al., 2015; Anandappa, 2013).

Majority of foodborne diseases cases caused by the poor and faulty food handling practices such as insufficient food preparation time, inadequate holding times and temperature exploitations, foods from unsafe sources by the food handlers and the lack of adequate facilities

and equipment to be used in the food facilities (Stangarlin-fiori et al., 2016; Tan et al., 2013; Abdul-Mutalib et al., 2012; Ismail et al., 2016; Kibret and Abera 2012; Paiva De Sousa 2008; Buccheri et al., 2007; Sharp, Collier, and Gilbert 1979). Even though food handlers may show knowledgeable on food safety, the performance may not always be constant with essential principles as they tend to neglect the basic requirement to execute the good practice of hygiene (Akabanda et al., 2017). Food handlers may have agreeable knowledge of food cleanliness; however, knowledge may not continually transform into practices (Annor and Baiden, 2011). Transferring of pathogens from food handlers to consumers can be minimized by practicing good personal hygiene and proper food handling practices (Abdul-Mutalib et al., 2012). Education, work activity, proper training, monitoring and verifying the job done specifically adherence to food hygiene standard operating procedure were significantly associated with adequate practice (Mentziou et al., 2014; Soares et al., 2012). These factors can be achieved by the commitment of top management to provides the training, encouraging setting to nurture cooperation both inside and across organizational for the workers to progress (Manghani, 2011). Food hygiene sets specifically on the condition of individual cleanliness and tendencies for the staff working on the establishment and helps to prevent outbreaks of foodborne infections in hospitals (Chigozie O Ifeadike et al., 2014.; Lazareviš et al., 2013). Besides, to prevent future outbreaks of food poisoning at the hospital, there's a need to improve the physical condition of the catering facilities and to improve food handling procedures (Al-Abri et al., 2011). Strong attitudes influenced the food handlers towards the execution of food safety strategies may decrease in the incidence of foodborne illnesses. (P. A. Luning et al., 2011). It is significant to the food handlers working in the hospital to have consistent education and adopted good practices specifically on the hand hygiene practice, temperature control for cooking, holding and keeping food accordingly in managing food in the hospital (Nyamari Jackim, 2013).

RESEARCH METHODOLOGY

Participants and procedures

A cross-sectional study was conducted in four primary government hospitals located in the state of Selangor and the Federal Territory of Kuala Lumpur. The study was conducted from 1st August until 31st October 2017. The following code was given to the hospitals as follows: Hospital 1 (H1) is located in Federal Territory of Kuala Lumpur and three hospitals; Hospital 2 (H2), Hospital 3 (H3) and Hospital 4(H4) are located in the state of Selangor. The respondents of this study consisted of individual employees from government hospitals. Data were collected by self-administered questionnaires to 140 respondents, and all questionnaires were found useful and were retained for further analysis.All of the selected hospitals are representing small and large-sized hospital, and they are characterised in Table 1.

Table 1: Characteristics of Hospitals

Hospital Location	No of Beds	No of Staff Handling Foods Directly	Status of FSMS Certification
H1	2229	89	GMP and HACCP
H2	306	24	GMP
H3	224	16	GMP and HACCP
H4	1154	52	GMP and HACCP

Measurements

Pilot Test of the questionnaire was done by ten foodservice hospital workers and was not be included in this project. They were asked to complete the questionnaire and to identify concerns and suggestions. All suggestions were considered and used to revise the questionnaires before data collection. The questionnaires also translated in Bahasa Malaysia version in the same form. Four sections of the questionnaires were developed to characterize food handlers who are working in government hospital‟s kitchen, and it included the demographic status and on food hygiene knowledge, attitudes, practices. Section A was considered to obtain information on the demographic, employment, level of education, training, and validity of typhoid injection status. Section B was intended to obtain food safety and hygiene knowledge, and it consisted of 24 questions. Section C has 18 questions to obtain information on the attitude of the food handlers. A 5-point Likert-type rating scale, ranging from one (1) "strongly disagree" to five (5) "strongly agree," was used. For the Section D, it consisted of 16 questions to obtain information on the practices of the food handlers, and it was also a 5-point Likert-type rating scale, ranging from one (1) "never" to five (5) "always," was used. Overall, all the questions tested for knowledge, attitude, and practice on food safety and hygiene such as hand and personal practices, cross-contamination, as well as time and temperature control. These questionnaires also included negative statements, providing incorrect information without using the negative word.

Data analyses

Scores were given to all the answered questions. For the knowledge scores, an arbitrary scale to interpret the overall scores according to Pacholewicz et al., (2016) was followed. All question has options with one correct answer; a score of "2" was given for correct answer and a score of "0" was given for the wrong and the not sure answer. If >80% of the questions were correctly answered, score 3 (good) was given, between 51 and 79% score 2 (moderate) was given and <50%, score 1 (poor) was given. In the attitude and practice sections, a scale was used as follows: 5 for "strongly agree" or "always", 4 for "agree" or "frequently", 3 for "uncertain" or "sometimes", 2 for "disagree" or "rarely" and "strongly disagree" or "never". For a negative statement, the points were given in reverse order.

RESULTS

Profile of samples

The samples are from the kitchen staff of government hospitals in Federal Territory Kuala Lumpur and Selangor. Out of the 140 food handlers who participated in this study, 114 (81.4.6%) were female, while 26 (18.6%) were males. The job designation of the target groups were 52 (37.1%) Assistant Foodservice Officer who is responsible for monitoring and controlling of food safety, and quality at kitchen level and 88 (62.9%) was the Assistant Foodservice who involved in all aspects of food production such as cooking, preparation, serving and cleaning. The highest number of food handlers came from age group ranged between 31–40 years; 56 (40.0%), followed by the group of 21-30 years which takes up 41 (29.3%) while only 14 (10%) food handlers aged more than 51 years. Concerning the level of education, most of the food handlers, 89 (63.1%) educated up to secondary school while 51 (36.8%) having a tertiary level of education. 50 (35.7%) of the food handlers had been working as food handlers for 5 to 10 years while 60 (42.9%) had over 11 years of experience in food handling and 30 (21.4%) had experience of fewer than five years. All the respondents (100%) have attended food handling courses, and their typhoid injection is still valid as it is the requirement of Malaysian law before they can work as food handlers.

Scores result on food safety and hygiene knowledge

Majority of the food handlers >90% believed that personal hygiene is important to protect their health. Most the food handlers were also knowledgeable about the critical role of handwashing practices after touching raw material, nose, and ear as well as wearing gloves while serving food and their association with the risk of cross-contamination. The food handlers also agreed that sick staff is not allowed to work and prepare foods as well as they understand the symptoms of food poisoning; H1 (98.6%) and H2, H3, H4 (100%). Overall, the average percentage score for hand and personal hygiene aspects was H1 (89.2%), H2 (81.7%), H3 (91.7%) and H4 (93.9%). All food handlers recognized that food contamination might come from them as the percentage of correct answer recorded was more than 90%. The food handlers are familiar with the standard of not wearing accessories such as jewelry and watches during working. All of the food handlers understood that wearing a glove while serving food is an important aspect to prevent cross-contamination and foodborne illness. Nevertheless, moderate level of knowledge was found from H1 (79.2%), H2 (68.4%) and H4 (77.8%) as they may not be perceived that used aprons have a higher risk in foods contamination. The food handlers are knowledgeable that all food contact surfaces, cooking and serving utensils must be cleaned and sanitized after used to prevent cross-contamination. H3 obtained 100.0% of correct answers while others obtained as followed: H1 (91.8%), H2 (80.0%), H4 (94.3%). The average score on cross-contamination aspect: H1 (76.6%), H2 (76.0%), H3 (83.6%), H4 (83.3%). Food handlers have a good level in the time and temperature control aspect and agreed time and temperature abuse have its consequences on food safety. However, food handlers had poor knowledge on the temperature growth of bacteria: H1 (42.0%), H2 (63.2%) H3 (30.0%) and H4 (66.7%) and foodborne infection may occur when people consumed cold foods H1 (48.6%), H2 (50.0%) H3 (30.0%) and H4 (60.6%). The total average percentage given was H1 (86.8%), H2 (91.7%) H3 (85.2%) and H4 (94.4%).

Scores result on food safety and hygiene attitude

Majority of the food handlers have a moderate to a good level of attitudes towards food safety and hygiene in the aspect of the hand and personal hygiene as well as cross-contamination. Food handlers scored a good percentage on attitude towards washing hands and perceived good personal hygiene could prevent foodborne illness. Also, food handlers scored a good percentage of the needs to wear protective clothing before entering the production areas. However, a poor result obtained on the use of kitchen cloth to dry hands after washing: H1 (43.9%), H3 (42.9%), H4 (33.3%) and H2 (69.2%) respectively. Overall, the average percentage score for hand and personal hygiene aspects among hospitals was H1 (75.9%), H2 (93.6%), H3 (83.3%) and H4 (72.9%). Concerning cross-contamination, the food handler did not perceive the importance of sanitizing the knives and cutting board as these two kitchen equipment can be the source of cross-contamination on food. Lower scores were obtained on these components. Overall, the average percentage score for cross-contamination aspects was H1 (77.2%), H2 (87.9%), H3 (77.5%) and H4 (70.3%). With respect to the attitude of the food handlers towards time and temperature control, the food handlers were unable to believe that bacteria can spread while serving fruits onto plate, the lowest scored observed: H1 (21.4%), H2 (7.7%), H3 (0.0%), H4 (16.7%). Poor scores in term of attitudes were observed on the on defrosted and refrozen foods among food handlers. Refreezing food that has been completely thawed can pose a risk, as this process will cause bacteria to multiply and increase their growth. The percentage score was as follows: H1 (19.0%), H2 (23.1%), H3 (23.1%) and H4 (12.5%).

The poor result also observed from the attitude towards the right cooking temperature for chicken. Overall, the average percentage scores for the time and temperature aspects among hospitals was H1 (35.4%), H2 (43.1%), H3 (38.9%) and H4 (35.0%).

Scores result on food safety and hygiene practice

All hospitals observed moderate scores of practices from the aspects of hand and personal hygiene as well as on the aspects of cross-contamination except for H3 (34.8%). All of the food handlers unable to perceive the importance of practice towards time and temperature control. Poor scores observed from the component of time and temperature. The thawing practices out from chilling temperature percentage score was as follows: H1 (8.3%), H2 (35.0%), H3 (30.0%) and H4 (33.3%). Similarly, food handlers unable to realize the risk of preparing food in advance will increase food contamination, the lowest scored observed: H1 (40.8%), H3 (22.2%), H4 (36.1%). Overall, the average percentage scores for the time and temperature aspects among hospitals was H1 (57.7%), H2 (72.4%), H3 (42.8%) and H4 (63.1%).

DISCUSSION

This study evaluated the prevailing FS-culture level, which is proactive, active and reactive through food handlers KAP from four government hospital's kitchen certified with FSMS. Food handlers need to practice good personnel hygiene and proper handling of food as they can be the route for growth of microbes through hands, cuts, mouths, skins, and hairs (Ali, Hayat, Fatima, & Noman, 2016). Highly knowledgeable of food handlers is significant as many studies shown lacking knowledge on personal hygiene contributing to foodborne illness in countless foodservice establishment (Kibret & Abera, 2012; Lee et al., 2017). In this study, the majority of the food handlers have a moderate to a good level of knowledge on the importance of hand and personal hygiene. Food handlers acknowledged that washing hand after touching raw material, nose, and ear and wearing gloves while serving food associated with the risk of cross-contamination. The finding is consistent with (Stratev et al., 2016) who reported the food handlers showed knowledge on usage of gloves while handling food to reduce the risk of food contamination. Besides, this study found the majority of the food handlers acknowledge that only fit and healthy person is allowed to work in the food area as unwell personal can spread foodborne illness. Conflicting to this finding, only 5% of restaurant workers in the United States of America had worked while sick with vomiting or diarrhea (L. Green et al., 2005). Poor knowledge derived from the majority of the food handlers as they did not perceive that contaminated food may have some changes in colour, odour, and taste.

Similarly these findings are consistent with Idris Ali & Immanuel, (2017) who found all the respondent answered do not know in the study. This study also found the majority of the food handlers from all of the hospital had poor knowledge on the right temperature for bacteria growth and their effect on the food as food contaminants. Knowledge on time and temperature control is important because the possibility of microbial growth or increased through time and temperature abuse. The findings are consistent with many studies which found that respondents had insufficient knowledge on time-temperature controls may have effect on food safety as temperature is also the critical control point in food production (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017; Mohd. Firdaus Siau, A., Son, R., Mohhiddin, O., Toh, P.S. and Chai, 2015). This study established that the majority of the food handler has a poor attitude towards food safety and hygiene. Most of the food handlers had a poor attitude towards sanitation processes as sanitizing of kitchen equipment, and utensils is a practical mechanism in reducing microorganism and controlling food contamination. The findings are consistent with Idris Ali

& Immanuel, (2017) who found that 100% of the respondents did not know that knives and cutting boards should be properly sanitised to prevent cross-contamination of foods. Most KAP studies obtained positive answers, but the food handlers might not practice it when it comes to handling foods (Siau et al., 2015).

This study also found that moderate level of practice by the food handlers towards food safety and hygiene. Poor practices towards food safety and hygiene will create food hazard and lead to foodborne illness (Paiva De Sousa, 2008). Food handlers did not have a good practice on time and temperature control especially on the matter of thawing procedure. The findings are consistent with Adel Hakim, Mostafa & Abdel-Rahman (2014) who found that <50% of participants gave correct answers to questions related to correct method of thawing food and right places for vegetables and meat in the refrigerator. The prevailing FS-culture showed that all hospitals scored either 2 or 3, demonstrating an active to proactive prevailing FS-culture. This suggests that food hygiene and safety control is always considered as important and prioritised in most of the hospitals. However, much more need to be done in H2 by both the management and the food handlers to ensure the food that is prepared in the safest way to avoid foodborne illness. According to Pacholewicz et al., (2016), consistent food safety and hygiene compliance behaviour will reflect in a better product safety performance. Therefore, food handlers need to be motivated, guided and continuous education need to be given for prevailing FS-culture being adopted and practice towards food safety and hygiene. Our findings are consistent with De Boeck, Jacxsens, Bollaerts, Uyttendaele, & Vlerick, 2016; Jacxsens et al., 2015 who found that the prevailing FS-culture scored higher for the larger organization.

CONCLUSION AND RECOMMENDATIONS

The objective of the present study was to use both questionnaires on KAP to assess food safety culture in government hospital‟s kitchen. Food handlers good characteristics and their commitment are highly needed to ensure food served to patients reflects the FSMS context through KAP output. Thus, in this study, it was found that the overall score of food safety output for H1, H3, H4 was moderate to a good level (overall score 2-3) except for H2 which was a moderate risk (overall score 2). It was also found that the prevailing FS-culture of all hospitals scored either 2 or 3, demonstrating an active to proactive prevailing FS-culture. This suggests that food hygiene and safety control is always considered as important and prioritised in most of the hospitals. Therefore, there is evidence that there is lower risks of food-borne disease(s) will be exposed to patients in these establishments. Although both pro-active and active prevailing FS-culture were found in this study, attention needs to be given to KAP on time and temperature control that are indicating a lower score to have a total positive prevailing FS-culture. It is suggested that a similar study can be done and extended to all government hospital‟s in Malaysia.

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