Food Control 94 (2018) 78–84

Contents lists available at ScienceDirect

Food Control

journal homepage: www.elsevier.com/locate/foodcont

Food safety knowledge, attitudes and practices of food handlers in lebanese hospitals: A cross-sectional study

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ARTICLE INFO

Keywords:
Food safety
Knowledge
Attitudes
Practices
Food handlers
Lebanese hospitals

ABSTRACT

This study aims to assess the food safety knowledge, attitudes and practices among food handlers working in Lebanese hospitals and to explore the association between the obtained scores, handler socio-demographic and working characteristics.

An observational cross-sectional study was carried out, using a semi-administered, semi-structured questionnaire interviewing 254 food handlers working in 13 different hospitals located in Beirut (n = 7) and Mount Lebanon (n = 6).

The mean age of the 254 recruited food handlers was 37.6 ± 10.3 years, 63.8% were males, 60.1% had primary level education and the majority (90%) had previously received a course on food safety in hospitals. The most incorrect practice was thawing food at room temperature (72.8%). On average, food handlers scored 59.2%, 83.7% and 83.2% on the knowledge, attitudes and practices questions, respectively and 75.4% on the overall knowledge, attitude, practice (KAP) score. Knowledge scores were significantly higher among food handlers who attended a training course (60.8%, $p = 0.001$), working in government and hospitals not affiliated to university (71.3%, $p = 0.013$ and 60.5%, $p = 0.013$, respectively). Respondents who served for more than 21 years in university-affiliated hospitals were significantly ($p < 0.001$) more likely to have positive attitudes. The reported practices and overall KAP scores were significantly higher among those who had been working for more than 21 years, in government hospitals. Men scored better than women for practices scores (85.2%, 79.6%, $p = 0.001$).

Results strongly emphasize the need for continuous food safety interventions, training sessions and food hygiene regulations to enhance food handlers' knowledge and improve food safety in hospitals.

1. Introduction

Food safety remains a major concern around the globe. Each year, millions of people in the world are hospitalized and even die after consuming contaminated food (World Health Organization, 2015). Of those foodborne illnesses, 70% were associated with catering or food service establishments, with risk of death in outbreaks estimated to be three folds higher in hospitals as compared to other settings (Meakins, Adak, Lopman, & O'Brien, 2003).

Food hygiene requires special attention to necessary preventive measures in order to minimize the risk of contamination especially in hospitals, where patients are particularly highly susceptible to foodborne illness (Buccheri et al., 2007). Nutritious and adapted diets are essential for their treatment and recovery. Prepared foods must be safe, of good quality, wholesome and served at convenient times. In such a setting, it is also important to ensure a continuous supply of food to patients, visitors and staff (Lahou, Jacxsens, Verbunt, & Uyttendaele, 2015).

Food handlers play an important role in ensuring food safety and preventing food contamination throughout the chain of production, processing, storage and preparation (Lee, Hishamuddin, Thong, & Chai, 2017; Zain & Naing, 2002). Poor personal hygiene is a vehicle for the transfer of various pathogens including gastro-intestinal infectious diseases (Michaels et al., 2004). Mishandling food was associated with 97% of foodborne illnesses in catering outlets (Egan et al., 2007). On the other hand, good knowledge, positive attitude and proper food handling practices could help control foodborne outbreaks in such settings (Angelillo, Viggiani, Rizzo, & Bianco, 2000; Sharif & Al-Malki, 2010). Although knowledge is essential, there is a need to possess an understanding of its role on enhancing the practices, behavior, assess other socio-demographic and work-related factors that would lead to proper handling (Siow & Norrakiah, 2011).

Several studies were conducted to assess the knowledge, attitudes and practices of food handlers in hospitals in different countries around the world including; Sri Lanka (Adikari, Rizana, & Amarasekara, 2016),

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https://doi.org/10.1016/j.foodcont.2018.06.032
Received 4 April 2018; Accepted 26 June 2018
Available online 27 June 2018
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Malaysia (Norhaslinda, Norhayati, & Mohd Adzim Khalili, 2016), Kingdom of Saudi Arabia (KSA) (Hamadan & Almhaifer, 2015), India (Anuradha & Dandekar, 2014; Mukhopadhyay et al., 2012), Kenya (Githiri, Kimiywe, & Okemo, 2013), Jordan (Sharif, Obaidat, & Al-Dalalah, 2013), Italy (Buccheri et al., 2007) and Iran (Askarian, Kabir, Aminbaig, Memis, & Jafari, 2004). It was shown that the level of knowledge, attitude and practices were diverse in different countries. Associations were reported between the knowledge, attitudes and practices and the food handlers' socio-demographic characteristics including gender (Hamadan & Almhaifer, 2015), age (Norhaslinda et al., 2016), level of education (Hamadan & Almhaifer, 2015), occupation (Sharif et al., 2013), working experience (Askarian et al., 2004) and pre-placement training (Mukhopadhyay et al., 2012). The hospital characteristics including its size, number of beds and affiliations showed also significant effects on the scores (Askarian et al., 2004; Sharif et al., 2013). Moreover, positive correlations between knowledge and practices, knowledge and attitudes, attitudes and practices were reported (Norhaslinda et al., 2016).

Even though food safety in hospitals is of the greatest importance, there is a lack of published study on the knowledge, attitudes and practices of food handlers in Lebanese hospitals. The food safety knowledge attitude and practices were assessed among Lebanese university students in Beirut and Jbeil (Mount Lebanon) (Hassan & Dimassi, 2014), and food handlers in two different types of food business management in Beirut (Faour-Klingbeil, Kuri, & Todd, 2015). The results of both studies showed that food handlers had limited knowledge in crucial areas of food safety including temperature control, proper food preparation practices, prevention of cross contamination, suitable cleaning and hygiene procedures. It was also reported that their attitudes were not consistent with their behavior but guided by their misperception usually related to specific demographic or work settings. The current literature is limited in scope as the first study is restricted to an age group between 18 and 23 and the second one recruited a small sample size (n = 80), making generalization difficult. Moreover in Lebanon, like in many developing countries, the food safety regulatory framework through the food supply chain is not efficiently developed and the food safety system is still reluctant on the antiquated laws that still rely on end product inspections, overlapping responsibilities of governmental departments and agencies and it is not consistent with the modern approaches that adopts hazard-based and risk-based systems (Faour-Klingbeil et al., 2015).

Therefore, the objective of the current study is to assess the food safety knowledge, attitudes and practices of food handlers employed in Lebanese hospitals located in Beirut and Mount Lebanon. This study also aims at exploring the relationships between the knowledge, attitudes and practices scores and socio-demographic factors as well as hospital characteristics.

2. Materials and methods

2.1. Study design

A cross-sectional study recruiting food handlers working in Lebanese hospitals located in Mount Lebanon and Beirut, was conducted between January and May 2017. Furthermore, the selected employees were only the ones handling the food from kitchen to ward and not the nurses working in direct contact with the patients. This study had been revised and approved by the University Institutional Review Board (Protocol Ref #: IRBSP16-1-FNHS).

2.2. Questionnaire design/data collection

The survey was implemented by means of semi-structured questionnaire, adopted from Buccheri et al. (2010) and slightly modified to suit the food handlers in the Lebanese hospitals. It included 5 sections containing mainly multiple choice questions about: (a) socio-demographic characteristics, employment status and the type of hospital where they work; (b) knowledge about food hygiene, storage time and temperature conditions, pathogens and foodborne illnesses; (c) attitudes regarding prevention of foodborne diseases; (d) measures used to prevent foodborne diseases; (e) sources of information on food hygiene and their perceptions regarding any need to attain more information. Concerning knowledge of pathogens, respondents were asked to name at least one food item that can be associated with the transmission of the foodborne disease. Answers were classified as correct and incorrect. The questionnaire was written in English and translated to Arabic language, due to the multi-nationality of the food handlers, and it was back translated from Arabic to English language to verify the translation. It was piloted on 15 people, before starting the survey to confirm question clarity and to identify participants' opinions and time requirements.

After screening the list of the Lebanese hospitals located in Mount Lebanon and Beirut, the head of the kitchen or the dietary department in all these hospitals were contacted via phone calls and then by email. After taking the hospital's approval, an interview-based survey was conducted. Each participant read the informed consent and signed it, then responded to the questions individually (in case of ability) or was assisted by the investigator. The questionnaire was filled by face to face interview to ensure that the questions and responses were completed properly.

2.3. Data analysis

The data obtained was analyzed using IBM's Statistical Package for Social Sciences (SPSS) version 20 (IBM, Inc, Chicago, IL). The responses frequency and percentages in each category were calculated and tabulated. Independent sample t-test, ANOVA and correlation (confidence interval 95%) were used to compare selected test parameters such as age, gender, educational level and work experience (years working in the current ward) and education level with selected questions about knowledge, attitudes and practices. Age was reclassified into 3 different groups corresponding to the age groups defined by Buccheri et al. (2007). A one-point score was attributed to the correct answer on every question, and a null score was attributed to the incorrect answer as well as to the “I don't know”, “Uncertain”, “Often” answers. The KAP scores were categorized as poor (less than and equal to 50%), fair (51–79%) and good (80% and above) (Norhanslinda et al., 2016). In all analyses, differences were considered statistically significant at $p \leq 0.05$.

3. Results

Out of the 38 hospitals located in Beirut and Mount Lebanon only 13 agreed to participate (Table 1). Among the recruited ones, seven were located in Beirut and six in Mount Lebanon, 12 were private, 1 governmental and 2 were affiliated to universities.

Socio-demographic characteristics of food handlers in Lebanese hospitals are presented in Table 2. Among the recruited food handlers (n = 254) with a mean age equal to 37.6 years (10.3 SD), 63.8% were males, 97.2% were Lebanese, 71.7% were ever married, 46.6% had a monthly net income ranging between 601.00 and 900.00 US$, 60.1% had primary level of education and 90% had received a course on food safety in hospital. The majority of the participants (44.1%) had been working in the same job for less than 5 years.

3.1. Knowledge

The food handlers' knowledge is reported in Table 3. The results showed that 58.7% of the participants knew that the preparation of food in advance could contribute to food poisoning and 78.3% knew that reheating food is likely to contribute to food contamination. The majority of the respondents (91.7%) knew that incorrect application of cleaning and sanitization procedures on equipment can increase the risk

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