Kitchen Safety in Hospitals

Practices and Knowledge of Food Handlers in Istanbul, Turkey

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ABSTRACT

This study was designed to identify the practices and knowledge of food handlers about workplace safety in hospital kitchens (four on-premises and eight off-premises) in Istanbul. A kitchen safety knowledge questionnaire was administered and a kitchen safety checklist was completed by dietitians. The mean total scores of the on-premise and off-premise hospital kitchens were 32.7 ± 8.73 and 37.0 ± 9.87, respectively. The mean scores for the items about machinery tools, electricity, gas, and fire were lower in off-premise than on-premise hospital kitchen workers. The kitchen safety knowledge questionnaire had five subsections; 43.7% of the food handlers achieved a perfect score. Significant differences were found in the knowledge of food handlers working in both settings about preventing slips and falls ($p < .05$). Significant relationships were found between marital status, education level, and kitchen safety knowledge of the food handlers ($p < .05$). [*Workplace Health Saf* 2014;62(10):415-420.]

Researchers have been studying occupational safety since the 1930s, yet research on occupational health and safety remains insufficient. The International Labour Organization (ILO) estimates that approximately 2.3 million men and women die each year from occupational injuries and diseases, including close to 360,000 fatal injuries and an estimated 1.95 million fatal work-related diseases (Seoul Declaration on Safety and Health at Work, 2008). The consequences of occupational injuries can be appreciable: lost work time and income, health care expenses, compensation costs, long-term health problems or disability, and the burden of injured and ill workers on family and friends (Wilkins & Mackenzie, 2007). Workplace safety has many stakeholders: workers, organizational leaders, and policy makers (DeJoya, Della, Vandenberg, & Wilson, 2010; McGonagle & Kath, 2010). In recent years, occupational health and safety has become a significant measure of organizational performance, partly because of health and safety costs to workers and their families, employers, and governments (Egan et al., 2007; Luria, Zohar, & Erev, 2008; Morillas, Rubio-Romero, & Fuertes, 2013). Improvements in workplace safety are necessary for both economic and legal reasons (Marcoulaki, Papazoglu, & Konstandinidou, 2012).

Exposure to hazardous working conditions, the nature of work assignments, and lack of experience and training are factors associated with negative safety and health outcomes and increased injury risk among informal and temporary workers (Hintikka, 2011). Every year, millions of workers experience occupational injuries and diseases and many die as a result of industrial accidents and exposures (Luria, 2008; Parejo-Moscoso, Rubio-Romero, & Pérez-Canto, 2012). Workers employed predominantly in housekeeping and maintenance departments, laundry, and catering exhibit the highest number of workplace injuries; physicians experience the lowest number of accidents but the reverse is true with respect to injury severity (Vaz, McGrowder, Crawford, Alexander-Lindo, & Irving, 2010). In several studies, informal and temporary work was associated with occupational injuries and health (Hintikka, 2011; Laberge, MacEachen, & Calvet, 2014).

The social and economic costs resulting from workplace accidents and injuries are generally not traceable to a single factor. Instead, multiple interrelated factors including those related to the physical and psychosocial working environment, aspects of the job, and individual differences

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Applying Research to Practice

Implementing a safety program is necessary for the well-being of both employers and employees. The safety of food handlers is as important as the safety of other workers from other industries. There are few studies about work safety in Turkey. The results of this study showed that only 43.7% of the food handlers answered all of the kitchen safety knowledge questions correctly and the mean scores for kitchen safety practices were low in hospital kitchens. Therefore, worker education and proper implementing procedures for work safety are necessary in food services.

affect worker safety (Wilkins & Mackenzie, 2007). Men experience work accidents more frequently than women and their injuries are more severe. Male workers younger than 25 years are most prone to work accidents than the rest of the workforce (Safe Work Australia, 2013). Training can reduce the incidence of occupational accidents (Christian, Bradley, Wallace, & Burke, 2009; Jacobsson, Sales, & Mushtaq, 2010; Jensen et al., 2014; McGonagle & Kath, 2010).

As in many fields, kitchen work has physical and psychosocial effects that can lead to musculoskeletal injuries (Haukka et al., 2010; Pehkonen et al., 2007; Westgaard & Winkel, 2011). Many types of injuries occur in the kitchen, such as burns and scalds from hot surfaces, food and liquids, and caustic chemicals; fire dangers from grills and fryers; strains, sprains, and stresses from slips, trips, and falls on wet or greasy surfaces or from ladders or step stools in cluttered space; and cuts from machines or knives in commercial kitchens (Le, Bazger, Hill, & Wilcock, 2014; Nenonen, 2013). The aim of this study was to determine the knowledge and practices of food handlers regarding kitchen safety in Turkish hospital kitchens.

METHODS

Sampling of Participants

This survey research study included 327 volunteer food handlers from four on-premise and eight off-premise randomly selected hospital kitchens in Istanbul, Turkey. For this study, on-premise catering was defined as any function held on the physical premises of the hospital producing and serving foot at the event; off-premise catering was defined as the process of holding an event in a selected place with food provided by a chosen commercial catering company outside its premises. A kitchen safety knowledge questionnaire was administered by 35 dietitians during July 2012 via a face-to-face interview. A kitchen safety checklist was completed by these dietitians based on on-site observational inspections.

Questionnaire and Checklist Design

The two-part questionnaire focused on respondents' demographic characteristics, such as age, gender, marital status, and education levels, and their knowledge of kitchen safety. Thirty-seven questions divided into five subsections of the questionnaire focused on preventing slips and falls (10 items), preventing burns and scalds (4 items), preventing cuts (5 items), preventing musculoskeletal injuries (8 items), and electrical safety (10 items). Food handlers' kitchen safety knowledge was scored 1 point for agree and 0 points for disagree, and there were no opinion responses. The possible total score for the 37 questions was 37 points if all answers were agree.

The kitchen safety inspection was quantified using a checklist with seven parts: manual handling (17 items), work environment (9 items), machinery and tools (7 items), heat (5 items), electricity (9 items), gas (4 items), and fire (7 items) for a total of 58 items. One point was given for satisfying the item (yes) and 0 points for not satisfying the item (no), with a total possible score of 58 points.

Statistical Analysis

Results were analyzed using SPSS version 11.5 (SPSS, Inc., Chicago, IL) for Windows. Means, frequencies, and percentages were calculated. For the evaluation of food handlers' kitchen safety knowledge, the chi-square test was used. The *t* test was used to analyze the kitchen safety practice scores among the hospitals. Significance was set at a p value less than .05.

RESULTS

The demographic characteristics of food handlers are presented in **Table 1**. The mean age of the food handlers was 35.8 ± 9.78 years. Nearly 57% of the sample were men. More than 74% were married. More than 50% of the participants had completed elementary school but only 3.3% of the participants had completed university. The mean daily work hours of the food handlers were 9.3 ± 1.63 hours per day.

Table 2 displays the kitchen safety practices in hospital kitchens. The mean total scores of the on-premise and off-premise hospital kitchens were 32.7 ± 8.73 and 37.0 ± 9.87, respectively, based on a possible total score of 58. The mean scores from manual handling (9.5 ± 4.94 vs. 11.4 ± 3.06) and work environment (5.5 ± 1.0 vs. 6.9 ± 1.46) were lower in on-premise hospital kitchens than off-premise kitchens. The mean scores for machinery tools (4.6 ± 1.76 vs. 5.7 ± 0.57), electricity (6.7 ± 2.14 vs. 7.0 ± 1.41), gas (1.6 ± 1.61 vs. 3.0 ± 0.81), and fire (4.5 ± 1.77 vs. 5.0 ± 2.16) were lower in off-premise hospital kitchens than on-premises kitchens. The score from the heat subscale was the same in both hospital groups.

The kitchen safety knowledge scores of the food handlers are shown in **Table 3**. Nearly 44% of the food handlers answered all of the kitchen safety knowledge questions correctly (41.8% of food handlers from on-premise kitchens, 44.1% of food handlers from off-premise kitchens). Knowledge about preventing musculoskeletal injuries was lowest and knowledge about preventing burns and scalds was highest for both on-premise and off-premise kitchen workers. Significant differences were found in food handlers' knowledge of preventing slips and falls at both on-premise and off-premise kitchens ($p < .05$).

The relationship between food handlers' kitchen safety knowledge and demographic variables (i.e., gen-

der, age, marital status, education level, and work experience) are shown in **Table 4**. Significant relationships were found between marital status, education level, and the kitchen safety knowledge of food handlers ($p < .05$).

DISCUSSION

As in every field of work, technological developments occur in institutional kitchens and rapid improvements in production methods may increase productivity and quality but also create new occupational health and safety risks. Occupational accidents frequently occur among kitchen workers (Christian et al., 2009; Haukka et al., 2010). Occupational accidents in institutional kitchens result from lack of precautions in the production area and unsafe behaviors by unqualified staff; accidents not only affect productivity and quality but may result in worker disability or death. Therefore, necessary precautions should be taken to prevent accidents from occurring in institutional kitchens (Niu, 2010). It is widely recognized that safety management systems play a role in company safety, especially in high-risk industries (Jacobsson, Sales, & Mushtaq, 2010). The identification of hazards and corresponding control measures provide the foundation for safety programs and essentially determine the scope, content, and complexity of successful occupational health and safety management systems (Makin & Winder, 2008). Occupational health and safety management systems have become more common over the past 20 years. A variety of standards, guidelines, and audits based on occupational health and safety management systems have been developed within the public, private, and not-for-profit sectors and many have been adopted by workplaces (Robson et al., 2007). Most countries have legislation protecting workers from hazards at work, but no legislation to protect workers' safety has been adopted in Turkey.

In this study, mean scores for kitchen safety practices were low for both on-premise and off-premise hospital kitchens (e.g., mean score 35.6 of a possible total score of 58). Mean scores from kitchen safety practices with machinery tools, electricity, gas, and fire were lower for workers in off-premise hospital kitchens than in on-premise kitchens. The score for heat hazards was the same in both groups.

Food and beverage industry employees are subject to health and safety hazards, including hot cooking equipment, knives, mechanical slicers and grinders, heavy lifting tasks, and slippery floors (Le et al., 2014; Unsar & Sut, 2009). Food manufacturing has one of the highest injury and illness rates in all industries (Christian et al., 2009). Prevention of these injuries depends on a coordinated effort between managers and workers. Among prevention strategies, safety training can be used to teach safe behaviors, provide practice time, and motivate employees to work safely. In this study, 43.7% of food handlers answered all kitchen safety knowledge questions correctly (41.8% of food handlers from on-prem-

TABLE 1

Demographic Characteristics of Food Handlers ($n = 327$)

Variable	*n*	*%*
Age (years), mean ± SD	35.8 ± 9.78	
Gender		
Men	185	56.6
Women	142	43.4
Marital status		
Married	244	74.6
Single	83	25.4
Education level		
Elementary	171	52.3
Secondary	78	23.9
High school	67	20.5
University	11	3.4

SD = standard deviation

TABLE 2

Kitchen Safety Practices in Hospital Kitchens (Mean ± SD)

Kitchen Safety Checklist	*Highest Possible Scores*	*On-Premise (n = 4)*	*Off-Premise (n = 8)*	*Total (n = 12)*	*p*
Manual handling	17	9.5 ± 4.94	11.4 ± 3.06	11.0 ± 3.26	.500
Work environment	9	5.5 ± 1.00	6.9 ± 1.46	6.4 ± 1.43	.137
Machinery and tools	7	5.7 ± 0.57	4.6 ± 1.76	4.9 ± 1.57	.356
Heat	5	3.3 ± 2.06	3.3 ± 1.28	3.3 ± 1.48	[a]
Electricity	9	7.0 ± 1.41	6.7 ± 2.14	6.8 ±1.83	.818
Gas	4	3.0 ± 0.81	1.6 ± 1.61	2.1 ± 1.51	.139
Fire	7	5.0 ± 2.16	4.5 ± 1.77	4.7 ± 1.82	.676
Total	58	32.7 ± 8.73	37.0 ± 9.87	35.6 ± 9.33	.484

SD = standard deviation
[a]*Not computed.*

TABLE 3

Percentages of the Food Handlers Who Attained a Perfect Kitchen Safety Knowledge Score

Kitchen Safety Questionnaire Subsections	*Highest Possible Scores*	*On-Premise (n = 55)*	*Off-Premise (n = 272)*	*Total (n = 327)*	*Chi-square*	*p*
Preventing slips and falls	10	39 (70.9%)	239 (87.9%)	278 (85.0%)	10.328	.001[a]
Preventing burns and scalds	4	48 (87.3%)	236 (86.8%)	284 (86.9%)	0.010	.919
Preventing cuts	5	44 (80.0%)	234 (86.0%)	278 (85.0%)	1.306	.253
Preventing musculo-skeletal injuries	8	30 (54.5%)	158 (58.1%)	188 (57.5%)	0.235	.628
Electrical safety	10	48 (87.3%)	209 (76.8%)	257 (78.6%)	2.961	.085
Total	37	23 (41.8%)	120 (44.1%)	143 (43.7%)	0.098	.754

[a]p < .05.

TABLE 4

Relationships Between Kitchen Safety Knowledge and Gender, Age, Marital Status, Education Level, and Work Experience

	Kitchen Safety Knowledge Scores			
Variables	*< 37 (n = 184)*	*37 (n = 143)*	*Chi-square*	*p*
Gender				
Men	108 (58.4%)	77 (41.6%)	0.770	.380
Women	76 (53.5%)	66 (46.5%)		
Age (years)				
20 to 29	62 (63.9%)	35 (36.1%)		
30 to 39	58 (54.7%)	48 (45.3%)	4.634	.201
40 to 49	46 (48.9%)	48 (51.1%)		
50+	18 (60.0%)	12 (40.0%)		
Marital status				
Married	127 (52.0%)	117 (48.0%)	6.957	.008[a]
Single	57 (68.7%)	26 (31.3%)		
Education level				
Primary school	85 (49.7%)	86 (50.3%)		
Secondary school	48 (61.5%)	30 (38.5%)	14.065	.003[a]
High school	48 (71.6%)	19 (28.4%)		
University	3 (27.3%)	8 (72.8%)		
Work experience				
1 to 5	130 (54.4%)	109 (45.6%)		
6 to 10	35 (62.5%)	21 (37.5%)	1.880	.598
11 to 15	14 (56.0%)	11 (44.0%)		
16+	5 (71.4%)	2 (28.6%)		

[a]p < .05.

ise and 44.1% of food handlers from off-premise kitchens). The workers earned the lowest scores on preventing musculoskeletal injuries, but the highest scores on preventing burns and scalds. Significant differences were found in food handlers' knowledge of preventing slips and falls between those who worked in on-premise and off-premise kitchens ($p < .05$). These findings were paralleled by another study that showed that food service staff in hospitals had insufficient knowledge about the basics of food hygiene (Tokuc, Ekuklu, Berberoglu, Bilge, & Dedler, 2009).

A wide range of personal and occupational factors, such as age, gender, education, occupational status, and lifestyles, have been found to be related to the risk of fatal occupational injuries (Gyekye & Salminen, 2009; Villanueva & Garcia, 2011). In addition, many younger, older, and inexperienced workers are employed in the food service industry; high turnover is a hallmark of the industry. All of these factors contribute to occupational injuries, and injuries in this industry are frequent (Laberge et al., 2014).

Several studies have reported increased risk of fatal accidents by gender; gender is often related to hazard exposure and different mechanisms (e.g., falls, strikes, and cuts) of injury occurrence (Villanueva & Garcia, 2011). In this study, the researchers did not find any statistically significant differences in kitchen safety knowledge scores by gender, but the percentage of male workers with a score less than 37 was higher than the percentage of female workers with scores less than 37.

Previous researchers found that the risk of occupational injuries was related to age. Some studies found an increased risk of nonfatal occupational injuries for younger workers and a relationship between older workers and fatal occupational injuries (Villanueva & Garcia, 2011). The risk of fatal occupational injuries by age could be explained by exposures specific to particular age groups, decreasing capability of sense organs and speed of response, and less ability to survive trauma. Older workers have fewer opportunities to secure safe jobs with few occupational hazards.

The majority of 63 nonfatal studies reviewed showed that young workers had a higher injury rate than older workers. However, 29 of 45 studies on fatal occupational injuries reported that younger workers had a lower fatality rate than older workers. These results are clearer for men than for women; young men were an at-risk group for occupational injuries (Jensen et al., 2014; Lin, Chen, & Luo, 2008).

In the current study, the majority of food handlers with perfect scores on the kitchen safety knowledge questionnaire were between 40 and 49 years old. The 20- to 29-year-old workers had an average score lower than the mean score of 37, but the differences between age groups were not statistically significant. The relationship between kitchen safety knowledge scores and marital status was statistically significant ($p < .05$). More single workers earned kitchen safety knowledge scores lower than 37 than married workers.

Some studies showed an association between workers' education and safety perceptions. The more educated workers expressed more positive perceptions about workplace safety than their less educated counterparts. A dissection of this group revealed fascinating findings: workers with vocational or professional educational backgrounds were the most enthusiastic about safety programs, followed by workers with university educations. When compared to their more highly educated colleagues with university educations, workers with vocational or professional education and formal education in occupational health and safety expressed the highest perceptions of safety. Although much attention has been given to employee age and job experience, the impact of formal education on accident prevention is neither straightforward nor well documented. Research is also lacking regarding the relationship between workers' educational attainment and safety perception (Gyekye & Salminen, 2009; Lin et al., 2008). In the current study, university-educated workers were more likely to earn perfect scores on the kitchen safety scale than others; a significant relationship was found between kitchen safety scores and education ($p < .05$).

In addition, it has been reported that workers with less than 3 years' work experience were significantly more likely to have accidents in the workplace than other groups of employees (Christian et al., 2009). Recent studies have shown that more work experience is associated with job dissatisfaction in food industries and can lead to poor safety practices (Gyekye & Salminen, 2009). In the current study, no relationship was found between kitchen safety knowledge scores and work experience.

Limitations of the current study include the lack of data on work injury and the small sample size.

Few data-based studies about kitchen safety in Turkey have been published, so the results of this study are important. This study showed that workplace practices in hospital kitchens are not acceptable; no proper safety management systems exist in these kitchens. Also, food handlers need education on kitchen safety. Future studies should include larger samples.

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