

Hygienic Practices Among Food Handlers in Dubai

Al Suwaidi A. H. E.¹, Hussein H.^{2, *}, Al Faisal W.², El Sawaf E.³, Wasfy A.³

¹Preventive Medicine Department, Ministry of Health, Dubai, UAE

²School and Educational Institutions Health Unit, Health Affairs Department, Primary Health Care Services Sector, Dubai Health Authority, Dubai, UAE

³Staff Development, Health Centers Department, Primary Health Care Services Sector, Dubai Health Authority, Dubai, UAE

Abstract

Background: Hygiene practices among food handlers has gained considerable importance in each step of the food chain from production to preparation and serving of the food since nutritional habits have changed and out of house food consumption has increased due to the living and working conditions of today's world. **Objectives:** To study hygiene practices and their associated factors among food handlers in Dubai. **Methodology:** A cross-sectional study was carried out among 425 respondents who were selected by a systematic random sampling method and face-to-face interviewed using questionnaire structured by the researcher. Stool specimens were collected and examined for parasitic infection. **Results:** Overall hygienic practices score had a mean \pm SD value of 81.74 ± 5.29 with lowest score for personal hygiene (71.45 ± 7.43) and highest for cooking (90.05 ± 7.38). Eighty two percent of food handlers received adequate training in personal or general hygiene. Hygiene practices elaborated significant differences observed by sex, education, occupation, monthly income and by training. In stepwise logistic regression analysis those working in restaurants or housemaid and not trained were more likely to have fair to bad hygienic score. The prevalence of parasitic infection among food handlers was 2%. Stepwise logistic regression analysis revealed that the most significant predictors of parasitic infection were male sex (OR = 2.57, 95% CI = 1.47-4.50, p = 0.001), income of 1500-<2000 AED monthly (OR = 2.47, 95% CI = 1.27-4.82, p = 0.008) and one toilet at home (OR = 1.92, 95% CI = 1.17-3.15, p = 0.009). **Conclusion and recommendations:** This study showed good cooking practices of food hygiene among food handlers in Dubai, but with a need for improvement of personal and general hygienic practices through training and retraining of food handlers by the management of the food facilities and the local governmental authorities.

Keywords

Hygienic Practice, Food Handles, Dubai

Received: May 11, 2015 / Accepted: May 22, 2015 / Published online: June 28, 2015

© 2015 The Authors. Published by American Institute of Science. This Open Access article is under the CC BY-NC license.

<http://creativecommons.org/licenses/by-nc/4.0/>

1. Introduction

Hygiene practices among food handlers has gained considerable importance in each step of the food chain from production to preparation and serving of the food since nutritional habits have changed and out of house food consumption has increased due to the living and working conditions of today's world. In recent years, due to changing lifestyle, breakdown of joint family system and increase in

number of working women has led to consumption of ready to eat foods. The individuals may be able to satisfy their taste and nutrition needs, but pays little attention to hygiene and food safety.⁽¹⁾ The term food safety is increasingly being used in place of food hygiene and encompasses a whole range of issues that must be addressed for ensuring the safety of prepared food. Food hygiene probably put too much emphasis on cleanliness but food safety requires much more than a clean premises (Food Hygiene Safety). The high incidence of food borne illnesses has led to an increase in

* Corresponding author

E-mail address: hyhussain@dha.gov.ae (H. Hussain)

global concern about food safety.⁽²⁾

Several food-borne disease outbreaks have been reported to be associated with poor personal hygiene of people handling foodstuffs. Each year, 9.4 million people suffer from food-borne diseases throughout the world. Every day, cases related to food borne diseases are recorded in all countries from the most to the least developed ones. As most of these cases are not reported, actual scale of the problem is not known clearly. Illness from food borne pathogens is a significant global health concern.^(3,4) Population level incidence estimates, however, are uncertain due to underreporting and difficulty in attributing illness to food consumption. In the U.S. the Centers for Disease Control estimate that contaminated food borne pathogens cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths among a population of 273 million each year. Approximately 3 (52%) of these were attributed to food service establishments.⁽⁵⁾ The World Health Organization believes incidence rates in Organization for Economic Co-operation and Development (OECD) countries are similar.⁽³⁾ In developing countries, where it is more difficult to separate water and food borne illness, approximately 2.2 million people die from these causes.^(3,4) Such a level of illness and mortality drains productivity, imposing an in-kind of tax on human energy.⁽⁶⁾

It was revealed that growing urbanization and lifestyle changes have been found to be heralded with eminent changes in people habits of eating. A lot of people tend to get some meals outside home that might be prepared under unhygienic conditions. Unfortunately this performs an outstanding public health hazard. Faecal contamination of utensils used in food processing or presentation can easily transmit intestinal parasites directly or indirectly. Also, faeco-oral human-to-human transmission can occur via contamination of foods, water, nails, and fingers. So food handlers are expected to be an extra important source of transmitting parasitic infections to other.⁽⁷⁾

Food handlers have a major role in the prevention of food poisoning during food production and distribution phases. Food handlers are defined as employees who are employed directly in the production and preparation of foodstuffs, including those in the manufacturing, catering and retail industries as well as those who are undertaking maintenance or repairing of equipment in food handling areas, whether permanent staff, workers on contract or visitors to food handling areas. Food handling involves all aspects of treating and storing food from receipt of raw materials to the delivery of the final prepared product.⁽⁸⁾

Food handlers may cause food borne diseases by cross-contaminating the raw and processed foodstuffs as well as cooking and storing food under inappropriate conditions and

using contaminated equipment. They can be asymptomatic carriers of food poisoning organisms.⁽⁹⁾ Therefore, food safety is a major concern of the food industry and a key public health issue at international, national and local levels.⁽¹⁰⁾ The WHO has identified five factors that contribute to these illnesses: improper cooking procedures, temperature abuse during storage, lack of hygiene and sanitation by food handlers, cross-contamination between raw and fresh ready-to-eat foods, and acquiring food from unsafe sources.⁽¹¹⁾ Four of five of these practices are related directly to food service food handler behavior (acquiring foods from unsafe sources is the exception).

2. Objectives

To determine hygiene practices among workers dealing with food in Dubai.

To identify some of the factors that might be associated with hygiene practices among food handlers (personal, general and cooking hygiene).

3. Methodology

A cross sectional study was carried out. The study was conducted in Dubai city, the second largest city in U.A.E. The study was carried out in Dubai Municipality clinic which is the only authorized place for issuing medical fitness card for food handlers in Dubai. The study included food handlers attending Dubai municipality clinic for issuing medical fitness card. An appropriate sample size was calculated according to the sample equation obtained by using computer program Epi Info Version 6.04. The minimum sample size required was 420 food handlers. The study sample was 425 food handlers with 100% response rate. A systematic random sample procedure was carried out. Considering that filling the questionnaire was taking about 20-30 minutes, every 10th person was involved to select nearly 10 food handlers a day until accomplishment of the required sample size. The data was collected through face-to-face interviews, as well as laboratory stool test were carried out for all study sample.

4. Results

The Study reflected that the mean age of the study sample is 29.68 + 7.13 years, about more than two thirds were males. Almost half of the workers were from Indian subcontinent (India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka, Afghanistan and the island Maldives).

About one third of the workers had university or higher education. The data showed that more than half of the workers were enrolled in catering service at restaurants. And

almost one third of the workers had a work experience for 5 1025.22 AED years or more and the mean monthly income was 1638.81 +

Table 1. Personal hygienic practices of food handlers (Dubai).

Practices		Score	No.	%
Frequency of hand washing at work	Never	0	-	0.0
	Immediately, prior to the commencement of each shift	1	419	98.6
	At the beginning of the day's work or after a rest period	1	424	99.8
	After every visit to a laterine or urinal	1	423	99.5
	Evry time of nose flow, touch hair, nose or mouth	1	421	99.1
	After handling handkerchief, money, refuse container\refuse	1	420	98.8
	After handling raw food/ before handling ready-to-use food	1	399	93.9
	After smoking or on return to the food premises	1	81	19.1
Tools of hand washing	Never	0	-	0.0
	Only wipe with cloth	1	3	0.7
	Only cold water	2	2	0.5
	Only hot water	3	3	0.7
	Cold water, soap and nail brush	4	109	25.6
	Hot water, soap and nail brush	5	308	72.5
Available tools to dry hands	Nothing	0	-	0.0
	Air dryer	1	344	80.9
	Towel/ cloth	1	362	85.2
	Disposable hand drying material	1	353	83.1
	Apron/ clothes	1	225	52.9
Used tools to dry hands	Nothing	0	-	0.0
	Air dryer	1	82	19.3
	Towel/ cloth	1	98	23.1
	Disposable hand drying material	1	286	67.3
	Apron/ clothes	1	4	0.9
Protective clothing	Nothing	0	3	0.7
	Plastic Apron	1	338	79.5
	Overall	1	370	87.1
	Hairnet/hat	1	374	88.0
	Gloves	1	392	92.2
	Gum boots	1	57	13.4
	No protective clothing	0	-	0.0
Washing Protective clothing	Never	0	14	3.3
	Sometimes	1	24	5.6
	Each day	2	384	90.4
	Never\ no apron	0	-	0.0
Frequency of replacing apron\day	Once	1	185	54.7
	Twice	2	50	14.8
	3-5 times	3	30	8.9
	>5 times	4	73	21.6
Time of wearing gloves	Not using gloves	0	-	0.0
	During serving ready-to-consume foods to consumers	1	63	16.1
	When handling cold meat	1	49	12.5
	During serving and handling rady-to-consume food	1	296	75.5
Time of removing gloves	Never\ not using gloves	0	-	0.0
	Sometimes	1	79	20.2
	Each time after serving ready-to-consume foods	2	128	32.7
	During serving and handling ready-to-consume foods	3	185	47.2
Fate of gloves	Never\ not using gloves	0	-	0.0
	Put them away safely	1	3	0.8
	Leave them on the counter untill you need them again	0	5	1.3
	Lend them to another staff member	0	3	0.8
	Throw them away	2	381	97.2
Frequency of gloves replacement\ day	Never\ not using gloves	0	-	0.0
	Once	1	11	2.8
	Twice	2	23	5.9

Practices		Score	No.	%
Behaviours during food preparation	3-5 times	3	53	13.0
	>5 times	4	307	78.3
	Nil	1	405	95.3
	Chew gum	0	3	0.7
	Eat	0	4	0.9
	Touch mouth, tongue, nose, eyes, etc.	0	3	0.7
	Wear jewellery (rings, watches, bracelets)	0	11	2.6
	Keep fingernails tall	0	6	1.4
	Spit in an area where food is handled	0	4	0.9
	Smoke or use tobacco in an area where food is handled	0	2	0.5
practices during food preparation	Lick fingers when handling food	0	2	0.5
	Wash hands with soap and water at the beginning of the day's work or after a rest period	1	334	78.6
	Cough or sneeze over food	0	2	0.5
	Inflate bags or other wrappings by mouth	0	2	0.5
Nail biting	Use a hands wash basin for the cleaning of hands and simultaneously for the cleaning of equipment	1	134	31.5
	Yes	0	15	3.5
	No	1	410	96.5
Report illness to management	Always	2	389	91.5
	Sometimes	1	29	6.8
	Never	0	7	1.6
Action taken by management	Not reporting	0	-	0.0
	No action	0	5	1.2
	Medical examination	1	347	83.0
	Get sick leave	1	49	11.7
	Medical examination and get sick leave	2	17	4.1
Action in case of cut wound	Cntinue with open wound	0	2	0.5
	Report to management and use moisture-proof dressing	1	423	99.5
Adequate supervision to ensure personal hygiene	Yes	1	395	92.9
	No	0	30	7.1

Table 1 presents items constituting personal hygienic habits of food handlers. A small percentage reported washing hands after handling handkerchief, money, refuse container or refuse (16.2%), and also 19.1% only reported washing hands after smoking or on return to the food premises. The highest percentage (72.5%) are washing hands by hot water, soap and a nail brush and the available tools to dry hand are air dryers (80.9%), towel/cloth (85.2%), disposable hand-drying material (83.1%) or apron/clothes (52.9%). However, the used tools to dry hand are mainly disposable hand-drying material (67.3%), towel/cloth (23.1%), or air-dryer (19.3%). Protective clothing included gloves (92.2%), hair net/hat (88.0%), overall (87.1%), or plastic apron (79.5%) with minority reporting gum boots (13.4%). About 90% of workers reported washing protective clothing every day and 54.7% replace apron once per day. About three quarters wear gloves during serving and handling of ready to consume food, 47.2% remove it during serving and handling of ready to consume food and 97.2% of handlers throw them away after removal. Those who replace gloves >5 times per day

constitute 78.3% of workers.

Considering bad behaviors during food preparation, they were almost nil with few percentage reporting chewing gum, eating, touching face, wearing jeweler or keeping fingernails long (6.3 %). Though the majority of workers (78.6%) considered washing hands with soap and water at the beginning of the day's work or after a rest period to be a good practice during food preparation, a considerable percentage (31.5%) considered the use of a hand washbasin for the cleaning of hands and simultaneously for the cleaning of equipment to be a good practice. Those who reported nail biting constituted 3.5% of food handlers. About 92% always report illness to management, the action taken in most cases is medical examination (87.1%) and/or getting sick leave (15.8%) while in 1.2% of cases no action is taken. In case of cut wound almost always there is reporting to management and use of moisture-proof dressing with 2 cases reporting continuation with open wound. Almost 93% of workers mentioned the presence of adequate supervision to ensure personal hygiene.

Table 2. General hygienic practices of food handlers (Dubai).

Practices	Score	No.	%	
Frequency of cleaning work surfaces	Never	0	0.0	
	Daily before commencing with work	1	73	17.2
	Daily after work is finished	1	135	31.8
	Between shifts	1	34	8.0
	During and\ or immediately after food handling	1	178	41.9
	Before and after work	2	4	0.9
Method of cleaning work surfaces	Before, after work, and between shifts	3	1	0.2
	Never	0	-	0.0
	Cold water	1	2	0.5
	Cold water and detergent	2	120	28.2
	Hot water	2	5	1.2
	Hot water and detergent	3	298	70.1
Adherence to formal cleaning schedule	Yes	1	407	95.8
	No	0	18	4.2
Rats and mice	Daily	0	1	0.2
	Weekly	1	-	0.0
	Monthly	2	-	0.0
	Seasonal	3	5	1.2
	Annually	4	8	1.9
	never	5	411	96.7
Flies	Daily	0	3	0.7
	Weekly	1	3	0.7
	Monthly	2	3	0.7
	Seasonal	3	22	5.2
	Annually	4	6	1.4
	never	5	388	91.3
Coack-roaches	Daily	0	2	0.5
	Weekly	1	2	0.5
	Monthly	2	2	0.5
	Seasonal	3	8	1.9
	Annually	4	7	1.6
	never	5	404	95.1
Available in toilets\ rest rooms	Nothing	0	-	0.0
	Hand washing facility and cold or hot water	1	422	99.3
	Soap	1	418	98.4
	Plastic nail brushes	1	229	53.9
	Disposable hand-drying material	1	340	80.0
	Air dryer	1	318	74.8
Action when food falls on floor	Pick up and continue	0	6	1.4
	Notify management	1	7	1.6
	Pick up and wash off with clean water	1	9	2.1
	Leave on the floor	2	1	0.2
	Pick up and dispose of	3	402	94.6

Table 2 illustrates general hygiene practices among food handlers. Cleaning work surfaces is done before and after work in only 1.1% while the highest percentage (41.9%) clean surfaces during and/or immediately after food handling followed by those who clean surfaces daily after work is finished (31.8%). The method of cleaning is mainly hot water and detergent (70.1%) with 28.2% cleaning with cold water and detergent. The majority of workers (95.8%) adhere to formal cleaning schedule. Rats are present in work places in 3.3% of cases, flies in 7.7% of cases, and cockroaches in 5% of cases. Hand washing facilities water and soap are present in more than 98% of cases, disposable hand drying material in 80% of cases, air dryer in 74.8% of cases while plastic nail brushes are present in 53.9% of cases. When food falls on the floor, the majority pick up and dispose (94.6%) and 6 workers said that they can pick up and continue

Table 3 shows cooking practices among food handlers, where 90.1% always wash their hands before and during food preparation, 91.3% always clean surfaces and equipment used for food preparation before re-using and 87.5% were always using separate utensils and cuttingboard when preparing food. About 85% of workers always separate raw and cooked food during storage and 81.2% said that they always check that meats are cooked thoroughly. Reheating cooked food until it is piping hot throughout was always done by 30.1% of handlers while 78.6% were always thawing frozen food in the refrigerator or other cool places. About 59% always store left over in a cool place within two hours after cooking whereas 88.2% check and throw food beyond its expiry date. Washing fruits before eating was always done by 91.1% of handlers

Table 3. Cooking hygienic practices of food handlers (Dubai).

Practices		Score	No.	%
Wash hands before and during food preparation	Always	4	383	90.1
	Most times	3	38	8.9
	Sometimes	2	4	0.9
	Not often	1	-	0.0
	Never	0	-	0.0
Cleaning surfaces and equipment used for food preparation before re-using	Always	4	388	91.3
	Most times	3	33	7.8
	Sometimes	2	4	0.9
	Not often	1	-	0.0
	Never	0	-	0.0
Using separate utensils and cutting-boards when preparing food	Always	4	372	87.5
	Most times	3	51	12.0
	Sometimes	2	2	0.5
	Not often	1	-	0.0
	Never	0	-	0.0
Separating raw and cooked food during storage	Always	4	360	84.7
	Most times	3	53	12.5
	Sometimes	2	12	2.8
	Not often	1	-	0.0
	Never	0	-	0.0
Checking that meats are cooked thoroughly	Always	4	345	81.2
	Most times	3	55	12.9
	Sometimes	2	15	3.5
	Not often	1	10	2.4
	Never	0	-	0.0
Reheating cooked food until it is piping hot thoroughly	Always	4	128	30.1
	Most times	3	54	12.7
	Sometimes	2	104	24.5
	Not often	1	27	6.4
	Never	0	112	26.4
Thawing frozen food in the refrigerator or other cool place	Always	4	334	78.6
	Most times	3	71	16.7
	Sometimes	2	11	2.6
	Not often	1	5	1.2
	Never	0	4	0.9
Storing any left-over in a cool place within two hours after cooking a meal	Always	4	251	59.1
	Most times	3	93	21.9
	Sometimes	2	43	10.1
	Not often	1	1	0.2
	Never	0	37	8.7
Checking and throwing away food beyond its expiry date	Always	4	375	88.2
	Most times	3	38	8.9
	Sometimes	2	10	2.4
	Not often	1	-	0.0
	Never	0	2	0.5
Washing fruits and vegetables with safe water before eating	Always	4	387	91.1
	Most times	3	29	6.8
	Sometimes	2	9	2.1
	Not often	1	-	0.0
	Never	0	-	0.0

Table 4 shows that about 82% of food handlers have received adequate training in personal or general Hygiene.

Table 4. Training of food handlers in Dubai.

Training		No.	%
Adequate training in personal hygiene	Yes	348	81.9
	No	77	18.1
Adequate training in general hygiene	Yes	347	81.6
	No	78	18.4
Adequate training in personal and\ or general hygiene	Yes	350	82.4
	No	75	17.6

5. Discussion

As Dubai is one of the most speedy growing city in the Middle East in terms of business, economy and tourism, this town managed to attract enormous number of people to work and live in as well as developing the high life quality and services standards including food industry. Based on that, this study aimed to address one of the vital concerns in Dubai and a cornerstone in the attraction of this city. This study is one of the very few or may be the unique study in Dubai to tackle hygienic practices among food handlers.

Food handling industry in Dubai is well developed, structured and attracting rich diversity of employees in terms of education, nationality, experience and other variables. As noted in the data above a significant number of the food handlers have good or even high education , this can be explained by the fact that Dubai is highly competitive city in attracting good standards employees (educated) as an international city . This figure is in similar with other study done in Malaysia (2011) (122) (KAP) Among Food Handlers at Residential Colleges and Canteen Regarding Food Safety).In this study more than half of the respondents (66.2%) were high school educated, 50.8% of the respondents had a work experience for about five years, 29.3% for six to 20 years and 1.5% with more than 20 years of experiences. While another study carried out in Ethiopia (2010) (116) where most food handlers working in the kitchens were very young adults including children. The majority had inexperience with low educational levels.

In concern with personal hygienic practices among food handlers, the current study revealed that only a small percentage (16.2%), reported hands washing after handling handkerchief, money, refuse containers and about 19.1% of the participants reported hands washing after smoking or on return to the food premises. These figures suggest that the workers either do not know when to wash their hands or sometimes be carless about washing hands. The data in this study show a consistency with different literatures which support that there is a lack of compliance, and subsequent violations, with hand hygiene procedures.^(62,123,124,125) Michaels et al., (2004)⁽⁷⁷⁾ suggest that ‘previous studies of hand washing compliance indicate that it generally ranges from 5% to 50% among food handlers in food service facilities. On the contrary a study done in South Africa (2007)⁽²⁾ found that 94% washed their hands under all circumstances.

In regards to washing hands by hot water, soap, and disposable hand-drying material, resent study has revealed that almost more than two thirds of the respondents follow the instructions. This result comes in agreement with other study done in South Africa⁽²⁾ which revealed that 84 % of the

study sample used hot and cold water, soap and disposable hand-drying material. In other study in (2009)⁽¹²⁶⁾, assessing food handlers in Oregon showed 91% using warm water, soap and a common cloth towel. More to this a study carried out around a rural teaching hospital in Wardha District of Maharashtra, India (2010)⁽¹²⁷⁾ reported that less than half of the food-handlers were washing hands with soap and water after using the toilet.

It has been reflected by this study that more than two thirds of the workers used protective clothing included gloves, hair net/hat, overall or apron and about 97.2% of the workers used to throw their gloves away after removal. This can simply explained by the good level of education and appropriate training about safe food-handling practices among the study workers. In contrast, another study carried out in Malaysia⁽¹²²⁾ showed that 52.3% of the participants always use gloves during practice. Only 10.1% of the food businesses routinely use gloves as shown by a study conducted in 2006, about implementation of HACCP and prerequisite programs in food businesses in Turkey.⁽¹²⁸⁾ Another study done about knowledge, attitudes, and practices of food service staff regarding food hygiene in Shiraz, Iran,⁽¹²⁹⁾ revealed that 79.8% of the respondents use protective clothing when they touch or distribute unwrapped foods. All 100% of respondents discarded their gloves after removing them in a study done in South Africa.⁽²⁾

Concerning bad food hygienic practices among food handlers, the results of this study revealed that a few percentages (almost 6%) reported chewing gum, eating, touching face, wearing jeweler or keeping fingernails long which reflects high awareness among food handlers about the risky behaviors. More than three quarters of the study sample showed positive and healthy attitude towards washing hands with soap and water at the beginning of the day's work or after a rest period which is good practice during food preparation. About 31.5% of the participants recognize hand washing and simultaneously for cleaning of equipment to be a good and hygienic practice. Compared to our results, a study done personal and general hygiene practices of food in South Africa,⁽²⁾ reported only 6 % kept their fingernails long, and 12% wore jewelry when at work while other study done about examination of hygiene knowledge of personnel employed in hotel catering establishments proved that the respondents who understand that personal hygiene of the catering staff means clean hair, clean hands, and short nails with no nail varnish on, wash body and clean protective clothing were 92.5% of correct answers.⁽¹³⁰⁾ In Slovenia,⁽¹³¹⁾ 38.4% of food handlers were violating hygiene principles by wearing jeweler when handling foodstuffs.

This study reflects that about 91% of the study sample reported illness with the need for management, and about

98.8% were referred to medical examination. This means that there is good application of follow up, supervision and monitoring system applied so far. In cut wound incidences' about 99.5% of the cases were reported to the management with use of moisture roof dressing. A study done in 2009,⁽¹²⁶⁾ about 93% of the food handlers call in sick and stay home if they had a fever, an upset stomach, or diarrhea, 55% wash an infected cut or burn on finger or hand well with soap and water; cover it with an impermeable cover and a single use glove. Current study reflects adherence to formal cleaning schedule among almost 96% of the study sample with nearly one third are regularly cleaning food preparation surfaces. Hot water and detergents are adequately saved. These figures were similar to another study done in India about health status and personal hygiene among food handlers in Wardha District of Maharashtra,⁽¹²⁷⁾ where the kitchen surfaces were found to be clean in 73.13% of the food establishments and were being cleaned by soap & detergents (61.87%). While another study done in South Africa,⁽²⁾ found no formal cleaning schedule in place in all the outlets, but more than two thirds reported that surfaces were cleaned under all the circumstances and more than three quarters of workers used hot water and detergent. In two different studies, development of cleaning and disinfection procedures was found among 12.8% and 54.8% respectively among Turkish and Iranian food handlers.^(128,129)

Concerning cooking practices among food handlers, the study showed that more than three quarters of the participants wash their hands before and during food preparation and clean surfaces and equipment used for food preparation before re-using, while about three quarters were always using separate utensils and cutting-board when preparing food. Rules abreast with high level of awareness among food handlers are behind these high figures. The figures revealed by the current study elaborated same mistakes among food handlers concerning reheating cooked foods, thawing frozen foods, storing left over foods.

6. Conclusions

Food Handlers in Dubai are special in terms of level of Education, Food handling training, food handling standardizations. Personal hygienic practices among food handlers in Dubai reflects certain weakness in regarding to hands washing, lack of compliance, and subsequent violations with hand hygiene procedures. Regulations regarding protective clothing included gloves, hair net/hat overall or apron are efficiently applied. Food handlers follow up system, supervision and monitoring is well developed and functioning in terms of food born disease identification, referral and management. Cleaning procedures and practice

at food providing facilities are almost always saved in almost all food businesses.

Recommendations

Awareness strengthening and training program concerning food handlers should be regularly held in Dubai to better achievements and outcomes. – Re-certification, to keep up with new food technology and safe food-handling practices, and to ensure the safety of foods for consumers. It is also important to monitor food handling practices and to develop science-based food-safety inspection guidelines. – Identify and address language barriers, literacy issues and individual testing needs prior to course delivery. – Provide train-the-trainer sessions to promote interactive adult teaching strategies such as group discussions, role playing, demonstrations (proper use of cooking thermometers) and practice sessions, (e.g. proper hand washing).

References

- [1] Santos MJ, Nogueira JR, Patarata L and Mayan O. Knowledge levels of food handlers in Portuguese school canteens and their self-reported behaviour towards food safety. *Int J Environ Health Res* 2008; 18(6):387-401.
- [2] Tonder I, Lues JFR and Theron MM. The Personal and General Hygiene Practices of Food Handlers in the Delicatessen Sections of Retail Outlets in South Africa. *J Environ Health* 2007; 70(4):33-39.
- [3] Rocourt J, Moy G, Vierk KA, Schlundt J and Tiffin R. Foodborne disease in OECD countries: present state and economic costs. : Publications de l'OCDE; 2003.
- [4] Chopra M, Galbraith S and Darnton-Hill I. A global response to a global problem: the epidemic of overnutrition. *Bulletin-World Health Organization* 2002; 80(12):952-958.
- [5] Centers for Disease Control and Prevention. United States foodborne disease outbreaks. Centers for Disease Control and Prevention (Atlanta), Accessed [February 15, 2010]. Available from: http://www.cdc.gov/foodborneoutbreaks/outbreak_data.htm.
- [6] UN Food and Agriculture Organization (FAO)/World Health Organization (WHO), the Role of Food Safety in Health and Development. Accessed [February 15, 2010]. Available from: <http://www.who.int/foodsafety/en/>.
- [7] Andargie G, Kassu A, Moges F, Tiruneh M and Huruy K. Prevalence of bacteria and intestinal parasites among food-handlers in Gondar town, northwest Ethiopia. *J Health Popul Nutr* 2008; 26(4):451.
- [8] Rocha Carvalho ML, Beninga Morais T, Ferraz Amaral D and Sigulem DM. Hazard analysis and critical control point system approach in the evaluation of environmental and procedural sources of contamination of enteral feedings in three hospitals. *J Parenter Enteral Nutr* 2000; 24(5):296.
- [9] Sanlier N. The knowledge and practice of food safety by young and adult consumers. *Food Control* 2009; 20(6):538-542.
- [10] Tahkapaa, S., M. Kallioniemi, H. Korkeala and R. Maijala. Food control officers perception of the challenges in implementing new food control requirements in Finland. *Food Control* 2009; 20(6): 664-670.
- [11] World Health Organization. 2006. Five keys to safer food manual. Accessed [August 10, 2010]. Available from: www.who.int/entity/foodsafety/publications/consumer/manual_keys.pdf.
- [12] Green LR, Selman CA, Radke V, Ripley D, Mack JC, Reimann DW, Stigger T, Motsinger M, and Bushnell L. Food worker hand washing practices: an observation study. *Journal of Food Protection* 2006; 69(10):2417-2423.
- [13] Blanch, Susan. *Food hygiene*. London: Hodder & Stoughton 2003; 6:115.
- [14] Green LR, Radke V, Mason R, Bushnell L, Reimann DW, Mack JC, Motsinger MD, Stigger T and Selman CA. Factors related to food worker hand hygiene practices. *Journal of Food Protection* 2007; 70(3):661-666.
- [15] Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V and Perneger TV. Hand hygiene among physicians: performance, beliefs, and perceptions. *Ann Intern Med* 2004; 141(1):1-8.
- [16] Michaels B, Keller C, Blevins M, Paoli G, Ruthman T, and Todd E. Prevention of food worker transmission of foodborne pathogens: risk assessment and evaluation of effective hygiene intervention strategies. *Food Service Technology* 2004; 4(1):31-49.
- [17] DeBess EE, Pippert E, Angulo FJ and Cieslak PR. Food handler assessment in Oregon. *Foodborne Pathogens and Disease* 2009; 6(3):329-335.
- [18] Mudey AB, Kesharwani N, Mudey GA, Goyal RC, Dawale AK and Wagh VV. Health Status and Personal Hygiene among Food Handlers Working at Food Establishment around a Rural Teaching Hospital in Wardha District of Maharashtra, India. *Global Journal of Health Science* 2010; 2(2):198-206.
- [19] Nee SOI and Sani NA. Assessment of Knowledge, Attitudes and Practices (KAP) Among Food Handlers at Residential Colleges and Canteen Regarding Food Safety. *Sains Malaysiana* 2011; 40(4):403-410.
- [20] Bas M, Ersun AS and Kivanc G. Implementation of HACCP and prerequisite programs in food businesses in Turkey. *Food control* 2006; 17(2):118-126.
- [21] Askarian M, Kabir G, Aminbaig M, Memish ZA and Jafari P. Knowledge, attitudes, and practices of food service staff regarding food hygiene in Shiraz, Iran. *Infection control and hospital epidemiology* 2004; 25(1):16-20.
- [22] Skubina EC and Skwierczyński S. Examination of hygiene Knowledge of personnel employed in hotel catering establishments. *Pol. J. Food Nutr. Sci* 2007; 57(4): 95-99.
- [23] Jevsnik M, Hlebec V and Raspor P. Food safety knowledge and practices among food handlers in Slovenia. *Food Control* 2008; 19(12):1107-1118.