

## Determination of Hygiene-Sanitation Knowledge Level of Food Handlers at Food Section of Discount Stores in Bursa

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**Abstract:** This study was carried out in order to determine knowledge level about hygiene-sanitation of food handlers working in food section of discount stores and supermarkets which can be qualified as big convenience stores in and around Bursa. A survey form composed of 10 questions was applied to 149 food handlers who were assigned unbiased with simple random sampling method and who participated in the study voluntarily. Gender of employee and their training about hygiene-sanitation were determined as independent variables. The correct answers given for the questions; “Soap kills bacteria while washing hands”, “Cheese can be packaged with bare hands”, “Store manager should be informed about diseases such as flu, cold, diarrhea” were respectively 4.7, 38.9 and 13.4%. It was determined that answers given for the question only above were meaningful statistically according to both gender and receiving training previously. As a result, it was determined that hygiene-sanitation level of food handlers were quite low.

**Key words:** Discount store, food handler, hygiene, sanitation, flu

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### INTRODUCTION

Discount stores are those which are preferred by low and middle income consumer groups where wide range of product is provided at low prices through restricted consumer service (Tenekecioglu *et al.*, 2003; Timur *et al.*, 2006). Supermarkets where consumer obtain their basic necessities are quite important in the sense of consumer health due to their potential in food industry (Ozturk, 2007). Delicatessen sections where food of animal origin are prepared, packaged and put up for sale are high-risk places due to cross contamination between surfaces contacting food and equipment (Lues and Van Tonder, 2007). Therefore, food handlers should know that there are hazards at every stage from preparation to consummation of food and they should obey health and hygiene rules. In various studies which have been carried out it was determined that great majority of food handlers do not wash their hands correctly, do not apply hygiene rules though they are aware of them, moreover they cause foodborne diseases with garbage, polluted water and contaminated equipment (Collins, 1997; Sagoo *et al.*, 2003; Aycicek *et al.*, 2004; Seaman, 2010).

It is known that *Listeria monocytogenes*, *Shigella*, *Vibrio parahaemolyticus* and *Escherichia coli* O 157 which are found commonly raw food are the most

important bacterial agents which cause foodborne diseases at super markets or open markets especially through cross-contamination (CDC, 2007; Minami *et al.*, 2010). Studies put forward that lack of personal hygiene of food handlers and false hand and surface hygiene have important roles in foodborne diseases (Collins, 1997; Fielding *et al.*, 2001; Cogan *et al.*, 2002; Sagoo *et al.*, 2003; Lues and Van Tonder, 2007). Even healthy people may infect bacteria causing food poisoning especially through nose and mouth to hands and from there to food. Therefore, food sections of supermarkets should be hygienic, every kind of food stuff should be healthy and reliable, food handlers should be chosen carefully and training should be given to them frequently (Atasever, 2000; Ozturk, 2007).

Risk factors in foodborne epidemics result from wrong food processing practices (Lues and Van Tonder, 2007; Clayton *et al.*, 2002; Seaman and Eves, 2006). While here false personal hygiene of food handlers are related with foodborne diseases and epidemics (Human and Lues, 2012; Van Tonder *et al.*, 2007), some researchers (Kirilmaz, 2008; Nieto-Montenegro *et al.*, 2008; Pilling *et al.*, 2008) stated that training of employees about food security plays important role in solving this problem.

It was determined in the studies in which the status of food handlers during practice are evaluated in Turkey

that their hygiene knowledge are quite insufficient and great majority of employers have not received any hygiene training (Aslan and Cakiroglu, 2004; Kayayurt, 2002). It was especially determined that big supermarkets which adopts food security as principle give continuous training to the staff and work with experts regularly while smaller supermarkets do not give in house training for the staff (Demirel, 2006). The most important reason of this is that Hygiene Education Regulation (Anonymous, 2013) has just been put into practice in Turkey when the study is completed.

This study was planned and carried out in order to determine information level about hygiene-sanitation of food handlers working in food section of discount stores and supermarkets which can be qualified as big convenience stores in and around Bursa.

**MATERIALS AND METHODS**

The study material is composed of 149 food handlers who were assigned unbiased with simple random sampling method among food handlers working at food section of discount stores in and around Bursa and who participated in the study voluntarily between September 2011 and April 2013. Food handlers were applied with a survey forms composed of 10 questions which measure their knowledge about hygiene-sanitation. The SPSS 17.0 Package Program was used in the analysis of data. Numerical and percentage values of demographic information of staff were given. Gender and training of the staff about hygiene-sanitation were determined as independent variables and evaluation were done by using Chi-square analysis.

**RESULTS AND DISCUSSION**

It was determined that 69.8% of the participants staff are male, 30.2% are female, 85.9% are secondary school graduates, 14.1% are high-school graduates, 33.6% have 0-2 years of experience, 48.3% have 2-5 years of experience, 18.1% have >5 years of experience at this sector, 13.4% have received hygiene training in different institutions before, the rest 86.6% have received no training (Table 1). Results obtained from study are presented in Table 2 and 3.

Since, delicatessen sections form an important step for consumers assessing secure food at supermarkets, food security studies should be handled as a whole, should be applied attentively in the sense of both the process of food and staff and equipment (Minami *et al.*, 2010; Mortimer and Clarke, 2011). Using hand or equipment which have contact with raw food in cooked food poses serious danger in the sense of cross-contamination and therefore it is important to use

soap and disinfectants consciously in hand cleaning (Lues and Van Tonder, 2007; Collins, 1997; Sagoo *et al.*, 2003). Soaps are detergent materials which are used in cleaning dirt, dust and many other organic materials from hands, they remove bacteria but does not kill them (Abaza *et al.*, 2010; Luby *et al.*, 2010; Todd *et al.*, 2010). However, in the study 95.3% of food handlers gave answers that soap kills bacteria at hands. Moreover, the rate of staff who answered this question correctly was around 15% in the group of food handlers which has received insufficient training on the subject. The results show that gender and status of previously received training are statistically significant in the sense of correct answers given for this question. While data obtained for this issue are similar with the results obtained at institutions which does not pay sufficient attention to training (Ozturk, 2007; Gundogan, 2008), it is different from the results obtained from institutions which give continuous training (Nieto-Montenegro *et al.*, 2008; Pilling *et al.*, 2008; Human and Lues, 2012).

There is no different between soap bar and liquid soap in the sense of aim of process. However, soap bar is known to be pollution source since it can be contaminated from the hands of users or from the environment (Demirel, 2006). In the study, male and female participants answered the question “it is dangerous for food handler to use bar soap” correctly in the rate of 46.2 and 40%, respectively the rate of correct answer was 36.4% for those who had not received training while the rate is 95% for those who had received training before. It was only determined that there is statistically significance relation in 5% significance level according to status of receiving training before. The rate of correct answer given for this question by the group which has not received training is low which may be due to the fact that they are living in rural section of the city and due to their socio-economic levels and cultural differences.

Table 1: Distribution of demographic information of personnel

Demographic information	N	%
<b>Gender</b>		
Female	45	30.2
Male	104	69.8
Total	149	100.0
<b>Working period</b>		
2 years	50	33.6
2-5 years	72	48.3
5 years and more	27	18.1
Total	149	100.0
<b>Educational status</b>		
Secondary	128	85.9
High-school	21	14.1
Total	149	100.0
<b>Receiving training</b>		
Yes	20	13.4
No	129	86.6
Total	149	100.0

**Table 2: Percentage distribution of correct answers for hygiene and sanitation survey questions**

Survey	Chi-square									
	Total (n = 149)		Males (n = 104)		Females (n = 45)		Received training (n = 20)		Not received training (n = 129)	
	N	%	N	%	N	%	N	%	N	%
Soap kills bacteria while washing hands	7	4.7	1	1.0	6	13.3	3	15	4	3.1
It is dangerous for food handler to use bar soap	66	44.3	48	46.2	18	40.0	19	95	47	36.4
The aim of disinfectants is only to remove away dirt from environment	9	6.0	4	3.8	5	11.1	4	20	5	3.9
Towel fabric should not be used after be used in washing hands	92	61.7	64	61.5	28	62.2	19	95	73	56.6
Hands should be washed hygienically after coughing or sneezing or smoking	44	29.5	28	26.9	16	35.6	11	55	33	25.6
Store manager should b informed about diseases such as flu, cold and diarrhea	20	13.4	9	8.7	11	24.4	9	45	11	8.5
Food handler should take a bath every day	79	53.0	51	49.0	28	62.2	15	75	64	49.6
Cheese can be packaged with bare hands	91	61.1	31	38.9	27	60.0	19	95	39	30.2
Equipment which is used for uncooked food can only be washed with soap and used for cooked food	2	1.3	1	1.0	1	2.2	0	0	2	1.6
Hot water should absolutely be used in equipment cleaning	43	28.9	26	25.0	17	37.8	13	65	30	23.3

**Table 3: Chi-square values of survey questions according to gender and status of receiving training before (n = 149, SD = 1)**

Survey	Gender		Receiving training	
	$\chi^2$ -value	p-value	$\chi^2$ -value	p-value
Soap kills bacteria while washing hands	10.738	0.001*	5.476	0.019*
It is dangerous for food handler to use bar soap	0.482	0.487	25.070	0.000*
The aim of disinfectants is only to remove away dirt from environment	2.921	0.087	7.932	0.005*
Towel fabric should not be used after washing hands	0.006	0.937	10.816	0.001*
Hands should be washed hygienically after coughing or sneezing or smoking	1.125	0.289	7.201	0.007*
Store manager should be informed about diseases such as flu, cold, diarrhea	6.739	0.009*	19.821	0.000*
Food handler should take a bath every day	0.121	0.139	4.480	0.034*
Cheese can be packaged with bare hands	12.044	0.001*	30.553	0.000*
Equipment which is used for uncooked food can only be washed with soap and used for cooked food	0.377	0.539	0.314	0.575
Hot water should absolutely be used in equipment cleaning	2.498	0.114	2.529	0.112

\*p<0.05

Since the wounds, boils and acnes at hand are direct source of contamination, disinfection treatment should absolutely be applied after mechanical cleaning with soap and water (Anar, 2000). Many studies put forward that although food handlers know the way of washing hands hygienically they do not put this into practice completely (Balci *et al.*, 2005; Rabbi and Dey, 2013). Kasimoglu *et al.* (2004) stated in their study that the hands of food handlers are contamination source and the number of bacteria has decreased significantly recently after hand disinfection training. Male and female participants give correct answers at the rate of 3.8 and 11.1%, respectively for the question, “The aim of disinfectants is to remove away dirt from environment”. The rate of correct answers was 3.9% for those who have not received training, yet only around 20% for those who have received training which shows that food handlers do not have sufficient knowledge about intended purpose of disinfectants.

It is suggested to use paper towels in food premises since towels which have contamination risk due to being damp or unchanged for a long time includes microorganisms causing food poisoning (Fidan and Agaoglu, 2004; Anonymous, 2006). In the survey carried

out in food premises, it was determined that great majority of food handlers use towels in order to dry their hands (Gundogan, 2008; Erbil, 2000). In the study 61.7% of food handlers stated that towel usage is inconvenient. The rate of correct answer is 56.6% for those who have not received training while it is 95% for those who have received training. It is thought that the effect of importance and attention of facility managers given to hand washing units and equipment in here upon correct application of food handlers.

Healthy people carry bacteria which would cause food poisoning in their body. These bacteria in mouth and nose are infected easily through coughing, sneezing or smoking cigarette (Fidan and Agaoglu, 2004; Gulbandilar, 2009; Erdogan and Arslan, 2011). This rate was reported to be between 10.2 and 23.1% in the studies in which *Staphylococcus aureus* vector status of personel working at food premises are evaluated (Durak *et al.*, 2010; Andargie *et al.*, 2008; Simsek *et al.*, 2009). Male and female participants give correct answers at the rate of 26.9 and 35.6%, respectively for the question; hands should be washed hygienically after coughing or sneezing or smoking, the rate of correct answers was 26.6% for

those who have not received training and 55% for those who have received training. The results make us think that food handlers do not know the difference between social hand washing and hygienic hand washing.

Although, it is inconvenient to make food handlers work in food sections in case of flu, cold, diarrhea, it was determined that great majority of employees do not inform managers about this situation (Demirel, 2006; Ozturk, 2007; Gundogan, 2008). In the study, it was determined that 8.7 and 24.4% of male and female participants inform managers in case of cold, flu and diarrhea and this rate is 8.5% for those who have received training and 45% for those who have not, it was meaningful statistically according to both gender and receiving training previously. It is thought that employees do not inform common illnesses to managers with the fear of being fired. People learn hygiene practices such as washing hands, having bath from their families in the childhood period and sustain these habits generally throughout their life. In their study in which the frequency of having bath among elementary school children with different socio-economic level. Cetinkaya *et al.* (2005) stated the frequency of having bath at least once a week as 98.2% and the frequency of having bath two or more times a week is higher among students attending schools with high socio-economic level. In the studies carried out in various sections of society, the rate of having bath 2-3 times a week was reported between 41.2 and 80.6% (Yagmur, 2007; Unsal, 2010; Ozdemir *et al.*, 2012). In the study while the rate of male and female food handlers who have bath everyday was reported as 49 and 62.2%, respectively this rate was 49.6% for those who received training and 75% for those who have not. There was statistically significant relation at 5% significance level according to status of receiving training previously. It is thought that different seasons and temperature during conducting the survey are effective in answers given for this question.

When food handlers do not use gloves or do not wash their hands hygienically during packaging foods which are consumed without heat-treatment and sold in delicatessen sections such as cheese, bacteria causing food poisoning infect these products (Collins, 1997; Cogan *et al.*, 2002; Lues and Van Tonder, 2007). In spite of this, it is stated in the studies carried out recently that using gloves is much more risky and should frequently be changed (Lynch *et al.*, 2005; Nielsen and Sorensen, 2012). In the study while 38.9% of males and 60% of females state that cheese should not be packaged with bare hands, this rate was 30.2% for those who have not received training and 95% who have received training. These results put forward that it was meaningful

statistically according to both gender and receiving training previously. As a result, it is clear that food handlers should follow general hygiene rules while using their bare hands or gloves in packaging food to be consumed uncooked.

Equipment such as knife, cutting board, etc. which is used at uncooked food should be washed and disinfected before using at cooked food (Atasever, 2000; Brewer and Rojas, 2008). It is that none of the food handlers in the trained group could give correct answer for the question "Equipment which is used for uncooked food can only be washed with soap and used for cooked food". The results researchers have obtained are similar with the results of researchers (Goulter *et al.*, 2008; Taormina and Dorsa, 2007) who stated that equipment sterilization is carried out shortly and ineffectively in food premises and researchers (Anderson *et al.*, 2004; Ravishankar *et al.*, 2010) who stated that people do not pay attention hygiene especially while using cutting boards.

It was emphasized that hot-warm water usage is important in cleaning surfaces and equipment during or after working due to dirt such as oil, protein and blood (Baskaya *et al.*, 2009; Eustace *et al.*, 2008; Goulter *et al.*, 2008; Leps *et al.*, 2013). The rate of males and females who answered that "Hot water should absolutely be used in equipment cleaning" is 25 and 37.8%, respectively this rate is 23.3% for those who have not received training and 65% for those who have received training. In his study, Clayton *et al.* (2002) stated that food handlers do not apply even the things they know due to insufficient number of employees and insufficient resource. The results are important for putting forward the fact that cleaning is carried out superficially and ineffectively by food handlers.

## CONCLUSION

It was determined that the knowledge level of food handlers working at food sections of discount stores in Bursa is quite low about hygiene-sanitation. The results show that the staff is especially lacking basic personal hygiene knowledge only a small part of them have received hygiene training but this training has not been sufficient or they have lack of knowledge in practicing of what they have learned as a result of hygiene training.

## REFERENCES

- Abaza, A.F., A.E. Amine and W.A. Hazzah, 2010. Comparative study on efficacy of different alcohol hand rubs and routine hand wash in a health-care setting, Alexandria, Egypt. *J. Egypt. Public Health Assoc.*, 85: 273-283.

- Anar, S., 2000. Determination of critical points at yoghurt production. *Food*, 1: 36-39.
- Andargie, G., A. Kassu, F. Moges, M. Tiruneh and K. Huruy, 2008. Prevalence of bacteria and intestinal parasites among food-handlers in Gondar town, Northwest Ethiopia. *J. Health Popul. Nutr.*, 26: 451-455.
- Anderson, J.B., T.A. Shuster, K.E. Hansen, A.S. Levy and A. Volk, 2004. A camera's view of consumer food-handling behaviors. *J. Am. Dietetic Assoc.*, 104: 186-191.
- Anonymous, 2006. Adolescent health and development. T.C. Ministry of Health General Directorate of ACSAP, UNICEF, Aydogdu Offset.
- Anonymous, 2013. Hygiene education regulations. July 5, 2013, Official Gazette of Publication: 28698.
- Aslan, S. and P. Cakiroglu, 2004. Knowledge of cooks about food security and analysis of the effect of training on this subject on their information level. *J. Occup. Educ.*, 6: 133-150.
- Atasever, M., 2000. Food at workplaces: Hygiene, preparation and protection of food. *Y.Y.U. Vet. Fak. Derg.*, 11: 117-122.
- Aycicek, H., H. Aydogan, A. Kucukkaraaslan, M. Baysallar and A.C. Basustaoglu, 2004. Assessment of the bacterial contamination on hands of hospital food handlers. *Food Control*, 15: 253-259.
- Balci, E., D. Horoz, I. Gun and Y. Ozturk, 2005. The evaluation of hygiene and health attitudes of cleaning workers. *Erciyes Med. J.*, 27: 158-166.
- Baskaya, R., A. Karagoz and Y. Keskin, 2009. Cleansing and disinfection in the food industry. *TAF Prev. Med. Bull.*, 8: 93-106.
- Brewer, M.S. and M. Rojas, 2008. Consumer attitudes toward issues in food safety. *J. Food Saf.*, 28: 1-22.
- CDC, 2007. Preliminary FoodNet data on the incidence of infection with pathogens transmitted commonly through food --- 10 States, 2006. *Morb. Mort. Wkly Rep.*, 56: 336-339.
- Cetinkaya, S., S. Arslan, N. Nur., O.F. Demir, L. Ozdemir and H. Sumer, 2005. Personal hygiene behaviors of the students attending in primary schools, in Sivas. *Surekli Tip Egitimi Dergisi*, 14: 229-236.
- Clayton, D.A., C.J. Griffith, P. Price and A.C. Peters, 2002. Food handlers' beliefs and self-reported practices. *Int. J. Environ. Health Res.*, 12: 25-39.
- Cogan, T.A., J. Slader, S.F. Bloomfield and T.J. Humphrey, 2002. Achieving hygiene in the domestic kitchen: The effectiveness of commonly used cleaning procedures. *J. Applied Microbiol.*, 92: 885-892.
- Collins, J.E., 1997. Impact of changing consumer lifestyles on the emergence/reemergence of foodborne pathogens. *Emerg. Infect. Dis.*, 3: 471-479.
- Demirel, O.D., 2006. The effect of education on knowledge level about hygiene and sanitation of delicatessen workers at big supermarkets in Kayseri and determination of ergonomic suitability of sections. Postgraduate Thesis, Educational Sciences Institute, Family Economy and Nutrition Department, Gazi University, Ankara, Turkey.
- Durak, Y., M.O. Aladag, A. Uysal and D. Akin, 2010. Prevalence of *Staphylococcus aureus* in throat and nasal cultures of food handlers in Konya surround. *Selcuk Tarim ve Gida Bilimleri Dergisi*, 24: 30-32.
- Erbil, S., 2000. Evaluation of sanitation and hygiene of food factories producing bulk nutrition in Istanbul. Postgraduate Thesis, Institute of Health Sciences, Istanbul University, Istanbul, Turkey.
- Erdogan, H. and H. Arslan, 2011. Analysis of *Staphylococcus aureus* vector in nose and throat culture of hotel staff and evaluation of risk factors. *Klimik J.*, 24: 90-93.
- Eustace, I., J. Midgley, A. Small, I. Jenson and J. Sumner, 2008. Knife sanitizing in abattoirs: The effectiveness of current and alternative practices. *Food Prot. Trends*, 28: 712-722.
- Fidan, F. and S. Agaoglu, 2004. The investigation of hygiene status of restaurants in agri region. *Y.Y.U. Vet. Fak. Derg.*, 15: 107-114.
- Fielding, J.E., A. Aguirre and E. Palaiologos, 2001. Effectiveness of altered incentives in a food safety inspection program. *Prev. Med.*, 32: 239-244.
- Goulter, R.M., G. Dykes and A. Small, 2008. Decontamination of knives used in the meat industry: Effect of different water temperature and treatment time combinations on the reduction of bacterial numbers on knife surfaces. *J. Food Prot.*, 71: 1338-1342.
- Gulbandilar, A., 2009. Investigation of *Staphylococcus aureus* carriage and antibiotic sensitivity in nose mucous membrane in Kutahya Province. *D.P.U. Fen Bil. Derg.*, 18: 1-5.
- Gundogan, N., 2008. The determination of the knowledge level in nutrition, hygiene and sanitation of the school canteen staff. Postgraduate Thesis, Faculty of Educational Sciences, Ankara University, Ankara, Turkey.
- Human, I.S. and R. Lues, 2012. Assessing relationships between microbiota and food Handler practices in delicatessen sections: An interdisciplinary approach. *J. Food Saf.*, 32: 122-128.

- Kasimoglu, A., U.T. Sireli and S. Akgun, 2004. Determination of contamination sources during the manufacturing of yoghurt. *Turk. J. Vet. Anim. Sci.*, 28: 17-22.
- Kayayurt, Y., 2002. Determining the food safety knowledge level of the kitchen staff working for 4 and 5 star hotel kitchens. Master Thesis, Institute of Educational Sciences, Gazi University, Ankara, Turkey.
- Kirilmaz, A.O., 2008. The assessment of the training package to be given to the staff working in the group the University of Ankara's nutrition services. Master Thesis, Institute of Health Sciences, Hacettepe University, Ankara, Turkey.
- Leps, J., K. Einschütz, N. Langkabel and R. Fries, 2013. Efficacy of knife disinfection techniques in meat processing. *Meat Sci.*, 95: 185-189.
- Luby, S.P., M.A. Kadir, M.A.Y. Sharker, F. Yeasmin, L. Unicomb and M.S. Islam, 2010. A community-randomised controlled trial promoting waterless hand sanitizer and handwashing with soap, Dhaka, Bangladesh. *Trop. Med. Int. Health*, 15: 1508-1516.
- Lues, J.F.R. and I. Van Tonder, 2007. The occurrence of indicator bacteria on hands and aprons of food handlers in the delicatessen sections of a retail group. *Food Control*, 18: 326-332.
- Lynch, R.A., M.L. Phillips, B.L. Elledge, S. Hanumanthaiah and D.T. Boatright, 2005. A preliminary evaluation of the effect of glove use by food handlers in fast food restaurants. *J. Food Prot.*, 68: 187-190.
- Minami, A., W. Chaicumpa, M. Chongsa-Nguan, S. Samosornsuk and S. Monden *et al.*, 2010. Prevalence of foodborne pathogens in open markets and supermarkets in Thailand. *Food Control*, 21: 221-226.
- Mortimer, G. and P. Clarke, 2011. Supermarket consumers and gender differences relating to their perceived importance levels of store characteristics. *J. Retailing Consum. Serv.*, 18: 575-585.
- Nielsen, J.B. and J.A. Sorensen, 2012. Glove material, reservoir formation and dose affect glove permeation and subsequent skin penetration. *Sci. Total Environ.*, 417-418: 87-91.
- Nieto-Montenegro, S., J.L. Brown and L.F. Laborde, 2008. Development and assessment of pilot food safety educational materials and training strategies for Hispanic workers in the mushroom industry using the health action model. *Food Control*, 19: 616-633.
- Ozdemir, S., T. Ortabag, B. Tosun, O. Ozdemir and H. Bebis, 2012. Evaluation of knowledge level and behaviors of nursing high-school students on genital hygiene. *Gulhane Med. J.*, 54: 120-128.
- Ozturk, M., 2007. Influence of hygiene application on some food retail markets in Istanbul and it's effects on some foodstuffs. Ph.D. Thesis, Institute of Health Sciences, Istanbul University, Istanbul, Turkey.
- Pilling, V.K., L.A. Brannon, C.W. Shanklin, K.R. Roberts, B.B. Barrett and A.D. Howells, 2008. Food safety training requirements and food handlers' knowledge and behaviors. *Food Prot. Trends*, 28: 192-200.
- Rabbi, S.E. and N.C. Dey, 2013. Exploring the gap between hand washing knowledge and practices in Bangladesh: A cross-sectional comparative study. *BMC Public Health*, Vol. 13. 10.1186/1471-2458-13-89.
- Ravishankar, S., L. Zhu and D. Jaroni, 2010. Assessing the cross contamination and transfer rates of *Salmonella enterica* from chicken to lettuce under different food-handling scenarios. *Food Microbiol.*, 27: 791-794.
- Sagoo, S.K., C.L. Little, C.J. Griffith and R.T. Mitchell, 2003. Study of cleaning standards and practices in food premises in the United Kingdom. *Commun. Dis. Public Health*, 6: 6-17.
- Seaman, P. and A. Eves, 2006. The management of food safety: The role of food hygiene training in the UK service sector. *Int. J. Hosp. Manage.*, 25: 278-296.
- Seaman, P., 2010. Food hygiene training: Introducing the food hygiene training model. *Food Control*, 21: 381-387.
- Simsek, Z., I. Koruk, A.C. Copur and G. Gurses, 2009. Prevalence of *Staphylococcus aureus* and intestinal parasites among food handlers in Sanliurfa, Southeastern Anatolia. *J. Public Health Manage. Pract.*, 15: 518-523.
- Taormina, P.J. and W.J. Dorsa, 2007. Evaluation of hot-water and sanitizer dip treatments of knives contaminated with bacteria and meat residue. *J. Food Prot.*, 70: 648-654.
- Tenekecioglu, B., T. Tokol, N. Calik, R. Karalar, S.A. Ozturk and N. Timur, 2003. Marketing Management. Anadolu University Publications, Eskisehir, Turkey.
- Timur, N., I. Varinli and M. Oyman, 2006. Introduction to Retailing. Anadolu University Publications, Eskisehir, Turkey.

- Todd, E.C., B.S. Michaels, J. Holah, D. Smith, J.D. Greig and C.A. Bartleson, 2010. Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 10. Alcohol-based antiseptics for hand disinfection and a comparison of their effectiveness with soaps. *J. Food Prot.*, 73: 2128-2140.
- Unsal, A., 2010. Genital hygiene behaviors of female students at university. *Firat Health Serv. J.*, 5: 79-93.
- Van Tonder, I., J.F. Lues and M.M. Theron, 2007. The personal and general hygiene practices of food handlers in the delicatessen sections of retail outlets in South Africa. *J. Environ. Health*, 70: 33-38.
- Yagmur, Y., 2007. The genital hygiene behaviors of the females aged 15-49 living at the Firat health clinic neighborhood in Malatya. *TSK Prev. Med. Bull.*, 6: 325-330.