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Women Food Safety Practices from Shopping to Eating in Ankara, Turkey

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Abstract: This study was conducted to determine the methods used for food storage and preparation in the Turkish household and to determine the domestic knowledge on food hygiene and food safety. A sample of 250 randomly selected, voluntary, married Turkish women participated in the survey. The research data were collected through a questionnaire and face-to-face interviews. The research findings revealed that the great majority of the women purchased meat at the end of shopping, thawed raw meat in the refrigerator, left hot food to cool in the room temperature and did not know the required refrigerator temperature for proper food storage. It was determined that 89.2% of the women deemed hand washing very important, but 43.2% of them did not wash their hands appropriately. Ninety point four percent of the women did not know the definition of cross contamination. The findings proved that some practices of the women changed according to their educational status. Considering the foodborne poisonings, the importance of education provided for women becomes evidently clear.

Key words: Food safety, nutrition, women

INTRODUCTION

Food safety is an essential public health issue for all countries. Foodborne diseases due to microbial pathogens, biotoxins and chemical contaminants in food represent serious threats to health of thousands of millions of people (FAO and WHO, 2008). In Turkey, 84,340 and 77,515 cases of foodborne diseases were identified in 1999 and 2000, respectively (WHO, 2004b). The proportion of cases arising from food preparation practices in the home may be especially under-represented in outbreak statistics, due to many factors (Day, 2001) because the opportunities for cross-contamination in the domestic kitchen are vast. It can be either direct (i.e., direct contact with potential sources, such as raw food, pets) or indirect (i.e., transfer of pathogens from a source via a vehicle to another food) (Jay *et al*., 1999a). Inappropriate temperature, such as inadequate refrigeration and inadequate cooking, reheating or hot holding, was involved in 44% of the outbreaks investigated. Inadequate handling was reported in 14% of the investigated outbreaks, mostly resulting from cross contamination, inadequate processing, insufficient hygiene and reusing leftovers (WHO, 2004a).

Food safety programmes are increasingly focusing on a farm-to-table approach as an effective means of reducing foodborne hazards (FAO and WHO, 2008). The food chain-from those who produce it to those who prepare it -has a significant role in the effort to reduce the risk associated with foodborne pathogens (Redmond and Griffith, 2003). Before public education and training programs can be planned and printed materials developed, food professionals must learn what consumers know about home food safety and home preparation practices (Williamson *et al*., 1992). The aim of this research was to identify the methods used for food storage and preparation in the Turkish household and to determine the domestic knowledge on food hygiene and food safety.

MATERIALS AND METHODS

The research region is the provincial center of Ankara (The capital city of Turkey). The sample of the research was composed of 250 married women who were registered in Public Education centers affiliated to the Ministry of Education in five of the fifteen central districts in the provincial center of Ankara. The research data were collected through a questionnaire and face to face interviews. The questionnaire form was prepared by making use of the previous studies conducted in this field (Jay *et al*., 1999a; Anderson *et al*., 2004; Badrie *et al*., 2006). In a pilot study, the questionnaire was administered to 30 consumers, resulting in minor modifications in the question wording. The revised questionnaire was divided into two sections: 1. The demographic section, 2. Items related to food safety practices.

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software. Frequencies, averages and standard deviations were calculated. In the statistical evaluation of the data, the Chi-square (X^2) test was used and in the cases when the Chi-square

test conditions were not met, the G statistics was applied.

RESULTS AND DISCUSSION

Sampling characteristics: Of the 250 women participating in the study, 44.8% were between 30-39 years old, 24.8% were 40-49, 19.6% were 20-29 and 10.8% were 50 and above. The respondents' educational levels were as follows: 33.2% of respondents were high school graduates, 29.2% were primary school graduates, 19.6% were university graduates and 18.0% were secondary school graduates. When the women responding to the survey were evaluated according to their occupational status, it was found that 80.4% of them were housewives, 12.8% of them were retired, 5.6% of them were state civil servants, 0.8% of them were working freelance and 0.4% of them were workers.

The behaviour of women regarding the food safety

Raw meat purchase, transportation and storage: Raw meat is a possible source of pathogenic bacteria that have a potential to cause a foodborne illness (Jay *et al*., 1999a). Table 1 shows information on at what stage of shopping women buy meat and the duration of their getting back home after the purchase.

The majority of the respondents, 43.6%, claimed to purchase meat at the end of shopping, while 23.6% purchased meat at the beginning of shopping. Jay *et al*. (1999a) found that 15% of respondents buy their meat at the start of their shopping trip, 18.6% in the middle and 58.3% at the end. In another study conducted by Ozcelik (2007), it was revealed that the rate of those buying meat at the end of the shopping were 47.2%. These findings have parallels with the findings of our research. People who buy raw meat at the start of the shopping expose meat to unrefrigerated conditions for the maximum possible time after purchase. The potential for temperature abuse would be reduced if they purchased meat at the end of the shopping (Jay *et al*., 1999a).

The question, How long is the duration between your purchase of meat and your getting back home? was answered as less than 30 min by 40.0% of the participants (Table 1). In this study by Jay *et al*. (1999a), the same question was answered at the following rates: 53.3%, less than 30 min; 30.3%, 30 min; 10.6%, 45 min and 5.8%, 1 h. These findings are similar to ours. In this study by Mahon *et al*. (2006), the majority of respondents (97%) generally returned home within 2 h of their food shopping and put groceries away immediately, hence reducing the risk of temperature increases in chilled/frozen products.

Seventy three point two percent of the women stated that they stored the meat they purchased in the freezer; 22.0% in the meat storage section of the refrigerator; and 4.8% in the top shelf of the refrigerator (Table 1). In this study by Mahon *et al*. (2006), half of the sample stored their meat in the fridge, 43% stored it in the freezer and the remaining respondents were not sure of their general practice. In this study by Jay *et al*. (1999a), 47.2% respondents stored meat in the meat compartment of their refrigerator and 21.4% stored in the top shelf.

Meat thawing practices: When food is stored by way of freezing, bacteria are not destroyed but their growth can be prevented. Although thawing frozen meat slowly on the kitchen counter is a usual practice, it is hazardous. For a safe thawing, to protect other foods from dripping, the bottom shelf of the fridge or a microwave oven can be used, the frozen meat can be thawn under running water after covering it with a protective cover, or cook it directly (Hernandez, 1998; Brown, 2000). Thirty nine point six percent of the women thaw meat on the kitchen counter, which is a wrong practice. The rate of those who do so is the lowest among the university graduates (28.6%).

It was determined by Jay *et al*. (1999a), Badrie *et al*. (2006) and Ozcelik (2007) that respectively 40.1%, 41.6% and 48.4% of the respondents thawed meat on the kitchen counter. These results are similar to our findings. Another question was whether they froze unused thawed meat again or not?. To this question, 91.6% of the women replied by saying they did not, which is a true practice. As per the educational status, it is seen that the university graduates never freeze the thawed meat again (Table 2).

Cooling and reheating leftovers: Leaving the cooked food at room temperature causes the growth of bacteria such as *Clostridium perfiringens* and *Staphylococcus aureus* (Leon and De Waal, 2004). Table 3 shows how women cool cooked food and store the leftovers.

Within the general sampling, it was found that the majority of the women (81.6%) left cooked food to cool in the room temperature. According to different studies, the rates of those who cooled cooked food at room temperature are as follows: in the study of Williamson *et al*. (1992) 29.0% of the respondents; in the study of Worsfold and Griffith (1997) 58.0% of the consumers; in the study of Jay *et al*. (1999a), 84.5% of the respondents; and according to Badrie *et al*. (2006) 58.0% of the respondents.

As these results also indicate, it is a common practice to store food in the fridge after cooling it in the room temperature. Our study also reveals that the majority of the participating women leave their food at the temperature range that provides a suitable environment for microorganisms to reproduce.

Although disposing of the leftovers is the appropriate thing to do with respect to avoiding food poisoning, considering economic losses, instead of disposing

Table 1: The time of women's purchasing meat, the duration of their getting back home and storage place (%)

	Education				
The time of purchasing meat	Primary	Secondary	High	University	Total
At the begining of shopping	37.0	22.2	20.5	10.2	23.6
In the midst of shopping	9.6	5.6	19.3	10.2	14.0
At the end of shopping	28.8	40.0	45.8	65.3	43.6
Not aware	24.6	22.2	14.4	14.3	18.8
	X^2 = 25.074		SD = 9	p<0.01	
The duration of their getting back home					
1 h	21.9	13.3	15.7	4.1	14.8
45 min	13.7	11.1	14.5	16.3	14.0
30 min	27.4	35.6	27.7	38.8	31.2
< 30 min	37.0	40.0	42.1	40.8	40.0
	X^2 = 8.993		SD = 9	p>0.05	
Storage place					
Freezer	63.0	73.3	75.9	83.7	73.2
Meat section of refrigerator	28.8	20.0	20.5	16.3	22.0
Top shelf of refrigerator	8.2	6.7	3.6	-	4.8
	X^2 = 8.957		SD = 6	p>0.05	

them, they can be stored in closed containers to be used within 24 h but they should never be added into newly cooked food (Bas and Saglam, 1997). In this study, 49.2% of the women stated that they kept the leftovers in smaller containers. The examination of the table as per educational status shows that the rate of those who kept the remaining food in the container in which the food was cooked is the highest among the university graduates (22.5%) and the rate of those who kept the remaining food in a few small containers is the highest among the middle school graduates (53.3%). The rate of those who also gave this answer is 54.6% in the study of Ozcelik (2007) conducted in Ankara and 87.1% in the study of Unusan (2007) conducted among housewives in Konya.

Refrigerator temperature: Microorganisms and enzymes are effective at a certain temperature. Thus, it is possible to keep food fresh by keeping it at cool temperatures. It is important that the temperature of the fridge is kept at 1-5°C. This temperature does not kill the bacteria but controls their production (Tayfur, 2002). Table 4 provides the opinions of the women about what the fridge temperature should be.

Nearly half of the women participating in the research (47.6%) stated that they did not know what the refrigerator temperature should be and 36.4% replied that it should be 1-5°C. The highest rate of those who replied this item correctly is among the university graduates with 55.1% (p<0.01). Jay *et al.* (1999a) determined that 26.3% of the respondents knew that the fridge temperature should be 1-5°C but 67.7% did not know the answer. Badrie *et al.* (2006) determined in their study that 65.3% of the participants did not know what the fridge temperature should be. These results indicate that in general the fridge temperature is not known.

Kitchen cleaning: Cleaning is the process of removing the visible dirt in the environment. As bacteria remain alive and reproduce fast in dirty environment, dirt is a critical danger for hygiene. When the kitchen utensils and tools and work surfaces are not clean, foods can be contaminated with pathogens. Therefore, to maintain food hygiene, kitchen utensils and tools as well as work surfaces should be effectively cleaned (Cigerim and Beyhan, 1994). The respondents were asked 2 questions on this topic. The first question was how many times a day they cleaned the kitchen counter. The majority (83.2%) replied that they cleaned it after every use. The highest rate for this answer is among the university graduates. Similar findings were obtained in the study of Ozcelik (2007) while Jay *et al.* (1999a) found that 30.4% of the respondents cleaned the kitchen counter once a day. The second question asked the respondents how they cleaned the counter and 73.6% replied that they used lukewarm water with detergent and a piece of cloth. The way women clean the kitchen counter differs by their educational status (p<0.01). A physical action such as wiping and a surface active element such as soap or detergent are needed to remove microbial contaminations completely from surfaces. The existence of antimicrobial elements in a cleaning material can assist to reduce microbial contamination (Jay *et al.*, 1999a). Although the rate is lower than our study, study of Jay *et al.* (1999a) also established that the majority of the participants (42.4%) clean the kitchen counter by using lukewarm water with detergent and cloth. The rate of those who use spray cleaners is 14.4%. Badrie *et al.* (2006) reported that the majority of the participants (43.7%) cleaned the kitchen counter using hot water + detergent and bleaching agent and 32.0% used hot water and detergent.

Hand washing for food preparation: Hands, which carry microorganisms to the foods, are the risk factor in food contamination (Bas and Saglam, 1997). Washing hands

Table 2: The method of thawing frozen meat and refreezing (%)

	Education				
The method of thawing frozen meat	Primary	Secondary	High	University	Total
On the counter	39.7	51.1	39.8	28.6	39.6
In the refrigerator	32.9	26.7	43.4	59.2	40.4
In a bag of lukewarm water	16.4	8.9	4.8	2.0	8.4
In the microwave oven	2.7	-	7.2	8.2	4.8
Cooks in the frozen state	8.3	13.3	4.8	2.0	6.8
	G = 31.848		SD = 12	p<0.01	
Refreezing meat					
Always	2.8	2.2	3.6	-	2.4
Never	89.0	88.9	90.4	100.0	91.6
Sometimes	8.2	8.9	6.0	-	6.0
	G = 10.263		SD = 6	p>0.05	

Table 3: How women cool cooked food and store the leftovers (%)

	Education				
The way of cooling foods	Primary	Secondary	High	University	Total
In a large and deep containers	9.6	15.6	12.1	6.1	10.8
In a few small and shallow containers	5.5	11.1	6.0	10.2	7.6
In the room temperature	84.9	73.3	81.9	83.7	81.6
	X^2 = 4.543		SD = 6	p>0.05	
The way of store the leftovers					
In the pot which meal was cooked	12.3	8.9	10.8	22.5	13.2
In a few small containers	50.7	53.3	50.6	40.8	49.2
In a large container	6.9	11.1	9.6	2.0	7.6
Does not cook in excessive amounts	17.8	8.9	13.3	12.2	13.6
Not aware	12.3	17.8	15.7	22.5	16.4
	X^2 = 12.022		SD = 12	p>0.05	

Table 4: The opinions of the women about the fridge temperature (%)

	Education				
Fridge temperature	Primary	Secondary	High	University	Total
<1°C	4.1	-	3.6	8.2	4.0
1-5°C	30.1	28.9	34.9	55.1	36.4
6-10°C	6.9	2.2	7.2	-	4.8
11-15°C	4.1	-	1.2	4.1	2.4
16-20°C	-	15.6	4.8	2.0	4.8
Don't know	54.8	53.3	48.3	30.6	47.6
	G = 41.110		SD = 15		p<0.01

effectively is the prerequisite of successful food preparation (Jay *et al*., 1999b). According to the Fight BAC! Recommendations, hands should be washed in hot soapy water before preparing food and after using bathroom, changing diapers, and handling pets. For best results, consumers should use warm water to moisten their hands and then apply soap and rub their hands together for 20 sec before rinsing thoroughly (Anderson *et al*., 2004). The participating women were asked the question: how important is it for you to wash the hands before and after preparing food?. Eighty-nine point two percent of the respondents replied that it was very important to wash their hands. When asked if the respondents washed their hands prior to preparing food, 98.8% claimed they did so, 1.2% said sometimes. Only 43.2% claimed that they used hot water and soap to wash their hands. In this study by Mahon *et al*. (2006), over three quarters claimed that they washed their hands with warm water and soap, 85% of the respondents washed their hands prior to preparing food, and 91% of them washed their hands after handling mince. In this study by Jay *et al*. (1999a), too, 81.6% of the respondents stated that washing hands is very important for them. The results of this study have parallels with our research findings.

Way of cleaning hands after touching raw meat, chicken and fish: Fresh meat is an ideal environment for the growth of bacteria. The nutrient elements that it contains (carbohydrates, proteins, etc.), its water activity and its pH degree are very suitable for the growth of bacteria. The gastro-intestinal systems and the skins of

Table 5: The frequency and method of cleaning the kitchen counter (%)

	Education				
The frequency of cleaning the kitchen counter	Primary	Secondary	High	University	Total
After each usage	75.3	86.6	84.3	89.8	83.2
After every meal	17.8	6.7	14.5	8.2	12.8
Once a day	6.9	6.7	1.2	2.0	4.0
	G = 9.580		SD = 6		p>0.05
The method of cleaning the kitchen counter					
Lukewarm water with detergent and cloth	72.6	82.2	75.9	63.3	73.6
Lukewarm water and cloth*	-	2.2	2.4	2.0	1.6
Spray cleaners*	1.4	4.4	2.4	16.3	5.2
Detergent and bleaching agent	26.0	11.2	19.3	18.4	19.6
	X^2 = 17.758		SD = 6		p<0.01

*Combined with the statistical operation

Table 6: The opinions of women about washing hands and how they wash their hands (%)

	Education				
Thoughts	Primary	Secondary	High	University	Total
Very important	89.0	80.0	90.4	95.9	89.2
Less important	4.1	13.3	2.4	-	4.4
Important	6.9	6.7	7.2	4.1	6.4
	G = 11.769		SD = 6		p<0.05
The state of hand washing					
Always	100.0	97.8	97.0	100.0	98.8
Sometimes	-	2.2	2.4	-	1.2
	G = 4.056		SD = 3		p>0.05
The way of hand washing					
Water+soap+ rubbing hands	67.1	57.8	51.8	49.0	56.8
Hot water+soap+rubbing hands up to wrists	32.9	42.2	48.2	51.0	43.2
	X^2 = 5.253		SD = 3		p>0.05

healthy animals include a great deal of microorganisms, the most frequent of which are bacteria such as *Escherichia coli, Salmonella spp*. and *Camphylobacter spp*. (Bas, 2004). To avoid the contamination of this bacteria existing on the surface of the meat to other foodstuff, hands should be thoroughly washed after touching raw food (Cigerim and Beyhan, 1994).

The question how do you clean your hands after touching raw meat, chicken and fish? was answered by stating that they did so using soap and hot water by 76.4% of the women in the research. The ratio of those who wash their hands in this way increase with education level and this is also statistically significant ($p<0.05$).

In the study of Jay *et al*. (1999a), it was determined that 55.8% of the participants washed their hands with hot water and soap after touching raw food; the ratio was 78.3% (Badrie *et al*., 2006). The results of these studies and ours are similar.

Covering hair when preparing meals: Falling hair itself and the dandruff may cause foodstuff to be contaminated. As the head skin often contain pathogenic bacteria such as *Staphylococcus aureus*, this is an area for which precautions should be taken to avoid contamination (Bas, 2004). Covering the hair or wearing a bonnet will be useful. The table lists the answers given to the question do you cover your hair and do you use gloves and an apron when preparing a meal?.

Thirty-eight percent of the women always cover their hair while preparing food, while 35.6% never do so. As the educational level increases, the rate of women covering their hair falls ($p<0.01$). The state of women's using gloves and aprons while preparing meals was investigated. The majority of the women did not use gloves (81.6%) and aprons were sometimes used (38.8%). Women's using gloves ($p<0.01$) and aprons ($p<0.01$) vary according to their educational status.

Knowledge of cross-contamination: Cross-contamination happens when bacteria in one food spread to another, often from a cutting board, knife, plate, spoon or hands. For example, drippings from raw meat, poultry and seafood left on a cutting board can transfer bacteria to vegetables which are to be sliced next (Duyff, 2002). The women in the research were asked whether they knew the meaning of cross contamination and 90.4% did not know the meaning. From an educational status perspective, any of the elementary school graduates, 97.8% of the middle school graduates, 88.0% of the high school graduates

Table 7: The way women clean their hands after touching raw meat, fish and chicken (%)

	Education				
The way of washing hands	Primary	Secondary	High	University	Total
With water	10.9	13.3	2.4	-	6.4
With soap and cold water	17.8	13.3	19.2	10.2	16.0
With soap and hot water	69.9	73.4	77.2	87.8	76.4
With glove*	1.4	-	1.2	2.0	1.2
	X^2 = 14.177		SD = 6		p<0.05

*It does not consider in the statistical analysis

Table 8: Covering the hair and using gloves and aprons while preparing meals (%)

	Education				
Covering hair	Primary	Secondary	High	University	Total
Always covers	67.1	33.3	27.7	16.3	38.0
Sometimes covers	12.3	37.8	32.5	26.5	26.4
Does not cover	20.6	28.9	39.8	57.2	35.6
	X^2 = 45.791		SD = 6		p<0.01
Using gloves					
Always	4.1	-	1.2	8.2	3.2
Never	87.7	100.0	78.3	61.2	81.6
Sometimes	8.2	-	20.5	30.6	15.2
	G = 35.710		SD = 6		p<0.01
Using an apron					
Always	45.2	31.1	35.0	30.6	36.4
Never	17.8	13.3	33.7	30.6	24.8
Sometimes	37.0	55.7	31.3	38.8	38.8
	X^2 = 14.078		SD = 6		p<0.01

and 73.5% of the university graduates did not have an idea on this topic. Regarding the knowledge on cross contamination, the difference between educational levels is significant (p<0.01).

Twenty-four of the women stated that they had knowledge about cross contamination and of these respondents, 25.0% defined it as contact of cooked food with raw food, 29.2% defined it as using the knife etc that has already been used for raw food for cooked food, and 45.8% defined it as contact of cooked food with raw food + using the knife etc that has already been used for raw food for cooked food + preparing food on contaminated surfaces.

When foodstuff is handled, raw and cooked food should be separated and separate cutting boards should be used for meat, chicken, fish and vegetables (Soner and Özgen 2002; Anonymous, 2003). Table 10 shows the state of participating women's using the knife and board they used for raw food for cooked food and data regarding the materials of the cutting tools they use.

As can be seen from the table, more than half of the women (53.6%) always and 24.4% sometimes use the same utensils and tools for raw and cooked food. The rate of those who always use the same utensils and tools is the highest among the elementary school graduates (65.8%). Whether the same materials are used for raw and cooked food as per educational status is found to be significant by the chi-square analysis (p<0.05). Worsfold and Griffith (1997) found that the rate of the research participants who use the same cutting board for all cutting processes is as high as 60.0% and this result is similar to our finding. In this study by Mahon *et al.* (2006), 74% of the respondents washed chopping board between the preparation of meat and vegetables. In this study by Altekruse *et al.* (1999), 19.0% of the respondents used the cutting board that was used for raw food for cooked food without washing it and 67.0% did so after washing it. In Andress (1999) study, it was also determined that one fourth of the participants did not wash the cutting board that they used for raw meat or chicken before they used it again. Shiferaw *et al.* (2000) found out that 93.0% of the respondents washed the cutting boards that came in touch with raw foodstuff. In the study carried out by Badrie *et al.* (2006), 6.0% stated that they wiped the cutting board used for raw food with a wet cloth and 2.0% stated that they just rinsed it under water. Study of Williamson *et al.* (1992) showed that only 54% of the respondents said they would wash the knife and cutting board with soap and water, then chopped the vegetables; whereas, 37% would only rinse the knife and cutting board and 5% would immediately chop the vegetables using the same unwashed knife and board. In the general sampling, it was determined that 36.0%, 33.6%, 22.8% and only 7.6% of the women used wooden, plastic, wooden-plastic and glass cutting boards.

Table 9: Women's knowledge about cross contamination (%)

	Education				
Cross contamination	Primary	Secondary	High	University	Total
Knows	-	2.2	12.0	26.5	9.6
Does not know	100.0	97.8	88.0	73.5	90.4
	G = 30.746		SD = 3		p<0.01

Table 10: The state of participating women's using the knife and board they used for raw food for cooked food and data regarding the materials of the cutting tools they use (%)

	Education				
The state of using cutting boards	Primary	Secondary	High	University	Total
Always	65.8	40.0	56.6	42.9	53.6
Never	15.8	20.0	24.1	30.6	22.0
Sometimes	19.2	40.0	19.3	26.5	24.4
	X^2 = 14.543		SD = 6		p<0.05
The materials of cutting boards					
Glass	2.7	2.2	4.8	24.5	7.6
Wooden	43.8	28.9	41.0	22.4	36.0
Plastic	37.0	42.2	26.5	32.7	33.6
Wooden-Plastic	16.5	26.7	27.7	20.4	22.8
	X^2 = 255		SD = 9		p<0.01

Conclusion: To conclude, it was determined that as the educational status of women increased, positive practices were also increased. This proves the importance of education.

REFERENCES

Altekruse, S.F., S. Yang, B.B. Timbo and F.J. Angulo, 1999. A multi-state survey of consumer food-handling and food consumption practices. Am. J. Prev. Med., 16: 216-221.

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. Diet. Assoc., 104: 186-191.

Andress, E.L., 1999. Safe food handling optimizel family nutrition. J. Family and Consumer Sci., 91: 40-43.

Anonymous, 2003. Safe food handling. Available at: http://www.co.st-louis.mo.us/dak/ancilary/cdc/safefood.html.

Badrie, N., A. Gobin, S. Dookeran and R. Duncan, 2006. Consumer awarenes and perception to food safety hazards in Trinidad, West Indies. Food Cont., 17: 370-377.

Bas, M., 2004. Besin hijyeni güvenligi ve HACCP. Sim Matbacilik Ltd. Şti., Ankara.

Bas, M. and F. Saglam, 1997. Otel beslenme servis personelinin kisisel ve cevre hijyen bilgisinin ölcülmesi. J. Nutr. and Diet, 26: 28-32.

Brown, A., 2000. Understanding food principles and food preparation. Wadsworth, USA.

Cigerim, N. and Y. Beyhan, 1994. Toplu beslenme sistemlerinde hijyen. Kök Yayincilik, Ankara.

Day, C., 2001. Gastrointestinal disease in the domestic setting: what can we deduce from survelliance data? J. Infection, 43: 30-35.

Duyff, R.L., 2002. American Dietetic Association complete food and nutrition guide. John Wiley and Sons Inc., New Jersey.

FAO and WHO, 2008. Assuring food safety and quality: Guidelines for strengthening national food control systems. Joint FAO/WHO publication. Available at: http://www.who.int/foodsafety/publications/fsmanagement/guidelinesfoodcontrol/en/index.html.

Hernandez, J., 1998. Food safety: Food preparation and cooking. Food Management, 33: 90-92.

Jay, L.S., D. Comar and L.D. Govenlock, 1999a. A video study of Australian domestic food-handling practices. J. Food Prot., 62: 1288-1296.

Jay, L.S., D. Comar and L.D. Govenlock, 1999b. A National Australian food safety telephone survey. J. Food Prot., 62: 921-928.

Leon, W. and C.S. De Waal, 2004. Yedigimiz gidalar güvenli mi? Insan ve cevre sagligini korumak icin tüketici rehberi. Prestij Yayinlari. Istanbul.

Mahon, D., C. Cowan, M. Henchion and M. Fanning, 2006. Food-handling practices of Irish beef consumers. J. Food Safety, 26: 72-81.

Ozcelik, A.O., 2007. Food handling practices of Turkish women living in Ankara. Pak. J. Soc. Sci.,4: 240-246.

Redmond, E.C. and C.J. Griffith, 2003. Consumer food handling in the home: a review of food safety studies. J. Food Prot., 66: 130-161.

Shiferaw, B., S. Yang, P. Cieslak, D. Vugia, R. Marcus, J. Koehler, V. Deneen, F. Angula and The Foodnet Working Group, 2000. Prevalence of high-risk food consumption and food-handling practices among adults: a multistate survey, 1996 to 1997. J. Food Prot., 63: 1538-1543.

Soner, A. and I. Özgen, 2002. Yiyecek-icecek isletmelerinde uluslar arasi hijyen standartlari, in Yiyecek icecek hizmetlerinde hijyen (Ed:Ali Halici)Turizmde Saglik ve Beslenme; Sorunlar ve Cözümler Sempozyum Bildiriler Kitabi, Alanya, 2002, Türkiye, pp: 49-62.

Tayfur, M., 2002. Besin gruplari (satin alma, saklama, hazirlama, pisirme ilkeleri) Aile Sagligi (Editör: F. Akyürek), Anadolu Üniversitesi Yayin No: 742, Eskisehir.

Unusan, N., 2007. Consumer food safety knowledge and practices in the home in Turkey. Food Cont., 18: 45-51.

WHO, 2004a. Food and health in Europe: a new basis for action. WHO regional publications European Series, No.96, Geneva.

WHO, 2004b. Surveillance programmed for control of food borne infections and toxications in Europe, 8th report 1999-2000, Country Report Turkey, Geneva.

Williamson, D.W., R.B. Gravani and H.T. Lawless, 1992. Correlating food safety knowledge with home food-preparation practices. Food Technol., 46: 94-100.

Worsfold, D. and C.J. Griffith, 1997. Assessment of the standard of consumer food safety behavior. J. Food Prot., 60: 399-406.