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Food Handling Practices of Turkish Women Living in Ankara

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Abstract: In this research, safe food handling practices of 500 married Turkish women living in Ankara,Turkey was searched. 81.4% of women stated that washing hands before food handling was very important. 54.8% of women used drying towel. 31.2% of women used the same cutting board for raw and cooked food. 85.8% of women cleaned kitchen counters each time after they used. 86.8% washed fruit and vegetables and 98.1% washed chicken before cooking. 53.4% of women knew that the temperature of refrigerator should be between 1-5°C. 89.2% of women cooled food in room temperature. 54.6% of women kept leftovers in a few small cups in refrigerator. 48.4% of women thawed frozen meat on the counter in the room temperature.

Key words: Women, food safety, practices, knowledge, fruit, vegetables

INTRODUCTION

Food, which is vitally important for life, health and happiness, may cause some foodborne diseases and even death when kept in bad conditions (Koksal, 2001). The food chain, which starts in the field, garden and barn, goes through the stages of processing, transportation, storage, sales, preparation, cooking and service and ends at the table (Anonymous, 2006). Food safety requires correct handling from production through consumption. The contamination food leads to many foodborne diseases (Gurman, 1993). Mishandling, poor hygiene practices and bacterial pathogens that reproduce in food cause foodborne diseases (Jay *et al*., 1999; Duyff, 2002). Illnesses resulting from foodborne diseases (defined as "a disease of an infectious or toxic nature caused by or thought to be caused by the consumption of food or water") have become one of the most widespread public health problems in the world today (Redmond and Griffith, 2003).

The annual incidence of foodborne illnesses mediated by pathogenic microorganisms or microbial toxins in industrialized countries has been estimated to affect 5-10% of population annually and in many developing countries, including Turkey, the incidence is probably considerably higher (WHO, 1997). The most important factors in the prevalence of foodborne illnesses are the lack of knowledge on the part of food handlers or consumers and negligence (despite knowledge) in safe food handling. Surveys of foodborne disease outbreaks worldwide have shown that most cases of foodborne diseases occur as a result of an error in handling food during preparation, whether in homes, in food service and catering establishments, in the canteens of hospitals, schools, or at banquets and parties (WHO, 2000). It is important to pay attention to the preparation and cooking processes of food, storage conditions, expiration dates and hygiene (Bulduk, 2003). With a minimum of time and effort, immediate improvement can be made in four areas: avoiding cross-contamination, washing hands at appropriate time during meal preparation, cooking to the appropriate temperatures and cooling leftovers properly (Daniels, 1998).

The objective of this study is to identify the food handling practices of women at home as they are thought to be responsible for the family nutrition.

MATERIALS AND METHODS

This research was conducted on a group of 500 married Turkish women living in Ankara. Randomly sampling method was used. A questionnaire form that has been based on the one prepared by Jay *et al.* (1999) was used during the interviews. The questionnaire was pilot tested on 25 participants, resulting in minor modificiations with the question wording. The revised questionnaire was divided into two sections:

- Demographic section
- Food handling practices

Additionally, face to face interviews with women were conducted.

Each questionnaire took about 15 min. to administer.

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Data was analysed by using the SPSS statistical package program and descriptive tables were generated.

RESULTS AND DISCUSSION

General information: Demografical features of women are shown in Table 1. Of the women participated in the study, 35.42% are 30-39 years old, 33.8% are 40-49, 18% are 20-29 and 2.8% are 50 and above. The average age of the women was 38.622±8.966 years. The respondents' educational levels were as follows: 36% of respondents were high school graduate, 35.2% were college graduate, 19.8% were primary school graduate and 9.0% did fit into other categories. The rate of unemployed women was appeared to be 53.8 and 46.2% of them were employed.

40.6% of women had four people in their families. 28.2% of women had three people in their families and the average number of individuals in families was 3.728±1.114 persons. 40.8% of women had two children, 31.0% of women had one child, 12.2% of them had three children and 5.6% of them had four or more children. The average number of children in families was 1.740±1.065.

Table 1: Some demographic characteristics of women (n = 500)

Age (Year)	n	(%)
20-29	90	18.0
30-39	177	35.4
40-49	169	33.8
50 ve üzeri	64	12.8
Educational Status		
Illiterate	5	1.0
Literate	4	0.8
Primary school	99	19.8
Middle school	36	7.2
High school	180	36.0
Higher school	176	35.2
Employment Status		
Employed	231	46.2
Unemployed	269	53.9
Number Of individuals in the family		
2	63	12.8
3	141	28.2
4	203	40.6
5	67	13.4
≥ 6	26	5.2
Number of children		
None	52	10.4
1	155	31.0
2	204	40.8
3	61	12.2
≥4	28	5.6

Table 2: Where women wash their hands before food preparation

	n	(%)
In the kitchen	217	43.4
In the bathroom	270	54.0
It depends	13	2.6
Total	500	100.0

Food handling practices: People carry many pathogenic microorganisms on their bodies, hair, hands, faces, stools and clothes. These pathogenic microorganisms can easily be transferred into the raw or cooked foods (Bas and Saglam, 1997; Montville *et al*., 2001). The most common way sources of disease are transmitted from a food handler to food is by the hands (Lutz and Przytulski, 2001). It is, therefore, very important to wash hands properly to prepare food safely (Jay *et al*., 1999).

The respondents were asked "How important do you think it is to wash your hands before and after preparing food?" Of all the respondents, 81.4% felt it was very important to wash their hands, 18.4% felt that it was fairly important and 0.2% did not think it was important.

A similar study resulted in similar findings; 81.6% of the respondents felt that it was very important to wash their hands before food preparation; whereas, 17.3% felt that it was fairly important (Jay *et al*., 1999). Another study it was showed that 66% of the respondents did not wash their hands before food preparation and more than half of the respondents did not wash their hands after handling raw ground meat and poultry (Worsfold, 1997).

In the present study, the respondents were also asked the question: "Where do you wash your hands before food preparation?" Their answers are shown Table 2.

54.0% of the women wash their hands in the bathroom before food preparation, 43.4% of them wash their hands in the kitchen and where 2.6% of them wash their hands is not definite; it can be either the kitchen or the bathroom. It is generally accepted that hands should be washed in the kitchen sink where food is nearby.

The next question was "Do you have hand soap in the kitchen?". 74.0% of the respondents replied that soap was available in their kitchen and 24.6% did not keep a bar of soap in their kitchen.

Another question was "Do you use a towel to dry the dishes?". 54.8% (n = 274) of the women used a drying towel and 45.2% (n = 226) did not use one. The women (n = 274) using a towel to dry the dishes were also asked whether they dried their hands with the same towel as they used to dry the dishes. 62.8% of them did not dry their hands with the same towel, 27.7% of them sometimes did so and 9.5% of them always dried their hands using the same towel. This practice is seen as a cross-contamination hazard as microorganisms from the hands may be transferred to the towel and then to the dishes and utensils. In a video study conducted to determine food preparation practices at home, it was observed that separate towels were not used for hands and the dishes (Jay *et al*., 1999).

While preparing food, raw and cooked food should be separated from each other and different cutting boards should be used for meat, chicken, fish and vegetables

Table 3: Whether women use different cutting boards for to be consumed raw food to be cooked or not

	n	(%)
Uses same cutting board	156	31.2
Uses different cutting boards	239	47.8
Somethimes uses different cutting boards	105	21.0
Total	500	100.0

Table 4. The frequency of women's cleaning their kitchen counter

	n	(%)
After each usage	429	85.8
After every meal	54	10.8
Once a day	12	2.4
2-3 times a week	3	0.6
It depends	2	0.4
Total	500	100.0

(Soner and Ozgen, 2002; Anomymous, 2003). Bacteria in meat may cause cross-contamination on cutting boards. Meat juices left on cutting boards may cause disease-causing agents to be transferred onto the food to be consumed raw (Ak *et al*., 1994). Whether the respondents use different cutting boards for food to be consumed raw and food to be cooked or not is shown Table 3.

47.8% of the women do not use the cutting board that they have used for raw food to cut cooked food; 31.2% do so; and 21.0% sometimes use it. In several studies, it was observed that one forth of the respondents did not wash cutting boards after cutting raw chicken and meat (Klontz *et al*., 1995; Andress, 1999). In the study by Bruhn and Schutz (1999), 20% of people used the same plate for raw meat and cooked meat (2% always, 8% sometimes and 10% rarely). Altekruse *et al.* (1996) found that only 67% of people washed the cutting board after cutting raw meat. Worlsford (1997) found that 60.0% of people used the same cutting board for all cutting practices. Bermudez-Millan *et al.* (2004) also established that 71.0% of the subjects used the same cutting board for both meat and vegetables.

The 261 women who stated that they use the same cutting board for raw and cooked food always or sometimes have been asked what processes they applied before using it. 3.8% use the same cutting board for both raw and cooked food without cleaning it and 13.4% clean their utensils only using a damp cloth. 77.4% of women wash the cutting board with detergent and hot water and 2.3% wash with detergent and cold water. 3.1% of them wash the cutting board with only hot or cold water. In the study conducted by Williamson *et al.* (1992), it was determined that 53.4% of the respondents used the cutting board to cut vegetables after washing them with soap and water after cutting fresh meat, 37% only rinsed them and 5% used them without washing.

When the kitchen utensils and counters are not sufficiently clean, foods may be re-contaminated with pathogens. For this reason, utensils and counters should be effectively cleaned to provide food hygiene (Cigerim and Beyhan, 1994). The participants were asked how frequently they cleaned their kitchen counters and the results are shown in Table 4.

It was revealed that 85.8% of respondents cleaned kitchen counter after each usage, 10.8% cleaned after each meal, 2.4% cleaned once per day and rate of those cleaning 2-3 times per weak and those saying "it depends" were appeared to be 0.6 and 0.4%, respectively.

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. Existence of antimicrobial elements in cleaning material can assist to reduce microbiological contamination (Jay *et al*., 1999). In the present study, the question,"how do you clean kitchen counter?" was asked to women and their answers to the question are shown in Table 5. The responses to this question reveal that most of the respondents (81.2%) clean their kitchen counter with lukewarm water, detergent and cloth. 8.2% use only lukewarm water and damp cloth, 5.0% use spray cleaners and 5.6% do the cleaning by using bleaching agent with the detergent. Soap and water are usually adequate for cleaning the kitchen (Anonymous, 2004). In a study in which 524 adult individuals and 515 families were involved, ýt was determined that 70.3% of the participants clean food preparing surfaces incorrectly (Mitatakis *et al*., 2004).

It has been determined that the majority of the women (86.8%) always wash the fruits and vegetables to be peeled; whereas, 9.0% sometimes wash them and 4.2% never do so. A vast majority (98.4%), on the other hand, wash poultry such as chicken before they cook it. (Table 6).

Some consumers think that they are removing bacteria from meat and making it safer by washing it. As a matter of fact, washing raw poultry, beef, lamb, veal or pork before cooking is not recommended since any bacteria present on the surface can be destroyed by thorough cooking only (FSIS, 2006a).

The annual incidence of foodborne illnesses mediated by pathogenic microorganisms or microbial toxins in industrialized countries has been estimated to affect 5-10% of population annually and in many developing countries, including Turkey, the incidence is probably considerably higher (WHO, 1997). Microorganisms documented to cause food poisoning, are effective at certain temperature. For this reason, it is possible to keep food without any changes in levels of microorganisms if stored in cold conditions. It is important to maintain the refrigerator temperature within 1-5°‹C.

Table 5: How women clean their kitchen counter

	n	(%)
Detergent, lukewarm water and cloth	406	81.2
Lukewarm water and cloth	30	6.0
Damp cloth	11	2.2
Spray cleaner	25	5.0
Bleaching agent and detergent	28	5.6
Total	500	100.0

Table 6: The state of women's washing food before cooking

	Fruits and vegetables		Poultry(chicken etc.)	
	n	(%)	n	(%)
Always washes	434	86.8	492	98.4
Never washes	21	4.2	4	0.8
Somethimes washes	45	9.0	4	0.8
Total	500	100.0	500	100.0

Table 7: Women's opinions about the refrigerator temperature

	n	(%)
Less than1°C	25	5.0
1-5°C	267	53.4
6-10°C	43	8.6
11-15°C	37	7.4
More than 20°C	12	2.4
Does not know	116	23.2
Total	500	100.0

This level of temperature will not stop the growth of bacteria but will keep the growth under control (Tayfur, 2002; Anonymous, 2003) In the present study, more than half of the respondents (53.4%) knew that the temperature of the refrigerator should be between 1-5°‹C; 23.8% gave wrong answers and 23.2% said that they did not know the answer (Table 7).

Similar to this piece of research, in a study of 426 respondents carried out in Nebraska, it was determined that 56.0% of the respondents knew that the temperature of the refrigerator should be maintained at or below 5°C (Alberecht, 1995). The camera view study it was concluded that 30.0% of the participants did not know what the refrigerator temperature should be and 12.0% answered it wrongly, stating that it should be more than 40°F (4.44°C) (Anderson *et al*., 2004).

The women involved in the research were asked at what stage of shopping they bought food such as meat (Table 8).

A little less than half of them (47.2%) said they do so at the end of their shopping, 15.8% at the beginning, 8.4% in the midst of shopping and 28.6% replied that they were not aware when they did so (Table 9). In the study conducted by Jay *et al.* (1999), it was revealed that those buying meat at the end of their shopping were at the highest rate (58.3%). Buying meat at the end of shopping may reduce the damage that can be caused by room temperature.

Keeping cooked food at room temperature for a few hours is accepted to be a factor that causes foodborne diseases (Bulduk, 2003; Bryan *et al*., 1997). Inadequate

Table 8: The time when food such as meat ýs bought

	n	(%)
At the beginning of shopping	79	15.8
In the midst of shopping	42	8.4
At the end of shopping	236	47.2
Not aware	143	28.6
Total	500	100.0

Table 9:The way women preserve cooked food

	n	(%)
Hot food waits at room temperature until it is cool	446	89.2
Hot food is cooled in a container full of water and thenkept in the fridge	52	10.4
Consumed immediately	1	0.2
Put in the fridge immediately	1	0.2
Total	500	100.0

cooling-either leaving foods at room or warm outside temperatures, or storing them in large containers while being refrigerated-was associated with most of the outbreaks (Bryan, 1988). The respondents were asked what they would do if the meals they cooked would not be immediately consumed. 89.2% of them stated that they would keep them at room temperature until the food gets cool and 10.4% would put it in the refrigerator after cooling the cooked meal in a container full of water. One respondent said that meals should be immediately consumed and one other said that she would place cooked meal in the refrigerator immediately (Table 9).

In a study to evaluate food safety behavior, it was determined that 58% of 108 consumers kept cooked food at room temperature for more than 90 min., 12.0% for 3 h and 7% for more than 6 h, (Worsfold and Grilfith, 1997). Bruhn and Schuts (1999) reported that almost half of the consumers thought that cooked food should be cooled to room temperature before placing them in the refrigerator. Meer and Misner (2000) determined that 60.0% of respondents would never keep food at room temperature for more than two hours; Cody and Houge (2003) also determined that 86.0% of participants would place food in the refrigerator within 2 h. In the study carried out in Trinidad, it was determined that 37.0% of 120 consumers place food cooked with fish, chicken and meat as ingredients in the fridge after cooling them to the room temperature upon serving them and 4.5% keep them at room temperature all night or longer (Badrie *et al*., 2006). Perishable food should always be refrigerated within 2 h (FSIS, 2006).

The answers to the question "When an excessive amount of meal is cooked, how do you keep it in the refrigerator?" are shown in Table 10.

In the present study, more than half of the women (54.6%) said that they kept cooked food in several small containers, which is the correct answer. It has been

Table 10: How cooked meals preserved ýn the refrigerator

	n	(%)
In the pot she has cooked the meal	79	15.8
In a few small containers	273	54.6
In a large container	58	11.6
Does not cook in excessive amounts	68	13.6
In a container that is large enough for the amount of left food	22	4.4
Total	500	100.0

Table 11: How frozen meat ýs thawed

	n	(%)
In the refrigerator	96	19.2
On the counter	292	48.4
In a bag of lukewarm water	65	13.0
Cooks in the frozen state	26	5.2
In the microwave oven	21	4.2
Does not freeze	13	2.6
Uses more than one method	37	7.4
Total	500	100.0

determined that the rate of those placing the food in the refrigerator in the cooking saucepan is 15.8%, the rate of those keeping the food in a big pot/large container is 11.6%, the rate of those keeping in a container with the right size for the amount of the left meal is 4.4% and the rate of those saying that they do not cook in large amounts is 13.6%.

In the study performed by Bruhn and Schutz (1999), similar results were obtained; 67% of consumers said that they kept overly cooked meals in several small pots, 15% in the cooking saucepan and 36% in a big pot. In the other study, it was determined that the highest rate (54%) was of those keeping the remaining foods in deep pots, 14% in the cooking saucepan and 32% in a swallow pot, which is again a correct practice (Williamous *et al*., 1992).

When frozen food is used, an important matter in food preparation is to thaw such food using suitable methods (Cigrim and Beyhan, 1994). In the method of keeping food by the method of freezing, bacteria cannot be removed completely, but their growth is inhibited. During the thawing process, bacteria start to reproduce. Gradually thawing frozen meat on the kitchen counter is a usual but risky practice. For safe thawing, lower tills of refrigerators may be used to protect other food against any drops, a microwave oven may be used, or the food may be thawed under flowing water with a protective cover on it, or else it can be cooked in its frozen state (Hernandez, 1998; Brown, 2000). When compared, thawing food in the refrigetor is safer than thawing it under cold water with a protective plastic cover on (Brown, 2000) . In Table 11, data on how participating women thaw frozen meat are given.

To this question, 48.4% of women replied by saying that they thaw meat, poultry and alike at room temperature, which is a wrong practice. While in the study performed by Jay *et al*. (1999) it was determined that the highest rate (40.1%) was that of those thawing meat at room temperature (Meer and Misner, 2000) determined that the rate of those using suitable methods (microwave, refrigerator or cold water) to thaw food was 60.0%. In Anderson *et al.* (2004)'s study which involved a camera recording, 45.0% of the subjects thawed frozen meat, poultry and sea food in the microwave oven and 36.0% in the fridge employing convenient methods. However, it was established in a research carried out in Melbourne, Australia that 76.3% of the participants used unsafe methods to thaw chicken (Mitatakis, *et al*., 2004).

Another question was whether they froze unused thawed meat again or not. 74.6% of the women said they did not, 12.4% froze it back and 13.4% sometimes did so (n = 487). Frozen food, especially meat, should not be frozen again after it is thawed.

To the question "What do you do with food if you suspect that it has perished?", almost all of the participants (99.6%) replied by stating that they dispose of it. One woman said that the perished portion would be disposed of and the rest could be eaten. Another one said that the food would be rehaeated and eaten.

Acute cases due to food infection with gastrointestinal symptoms are collected under the title "food poisoning". Food poisoning may occur depending on chemical materials in food except microorganisms and toxins. Heavy metal poisoning and mushroom poisoning are also included in this group (Uzun, 1998).

It was asked if there was any kind of food that the respondent would avoid to consume, based on the fear of poisoning; and 115 women (23.0%) said "no" while 385 women (77.0%) said "yes". It was asked if there was any kind of food that the respondent would avoid to consume, based on the fear of poisoning; and 115 women (23.0%) said "no" while 385 women (77.0%) said "yes". Some of those who said "yes" had more than one answer. Accordingly, canned food ranks first among the kinds of food avoided (50.4%;). Other kinds avoided are fish (31.9%), chicken (14.8%), fast food (11.2%), mussels and oysters (8.3%), mushrooms (6.23%) and appetizers (4.7%).

In Jay *et al.* (1999)'s study, it has also been determined that consumers avoid certain kinds of food with the fear that it may cause food-poisoning (39.5%). Although this rate is lower than the rate found in our study, the kinds of avoided food are similar, except for canned foods (delicatessen goods and processed meats (27%), seafood and shellfish (18%), chicken, including carry-out chicken (13%), fish (13%), fast food and prepared carry-out foods (9%).

REFERENCES

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.

Ak, N.O., D.O. Cliver and C.W Kaspar. 1994. Decontamination of plastic and wooden cutting boards for kitchen use. J.Food Prot., 57: 23-30.

Albrecht, L.A.,1995. Food safety knowledge and practices of consumers. J. Family and Consumer Sci. 19: 119- 134.

Altekruse, S.F., D.A. Street, S.B. Fein and A.S. Levy, 1996. Consumer knowledge of foodborn microbial hazards and food-handling practices. J. Food Prot., 59: 287-294.

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

Anonymous 2004.http:// foodsafetyçwsu.edu/ faq.asp?pid=3

Anonymous, 2003. Can your kitchen pass the food safety test? http://www.fda.gov.fdoc/features/895-kitchen.html.

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

Anonymous, 2006. Dietary guideliness for Turkey. Ankara.

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

Bap, M., ve F. Saðlam, 1997. Otel beslenme servis personelinin kiþisel ve çevre hijyen bilgisinin ölçülmesi. Beslenme ve Diyet Dergisi, 26: 28-32.

Bermudez-Millan, A., R. Perez-Escamilla, G. Damio, A. Gonzales and S. Segura-Perez, 2004. Food safety knowledge, attitutes and behaviors among Puerto Rican caretakers living in Hartford, Connecticut. J. Food Prot., 67: 512-516.

Brown, A., 2000. Understanding Food Principles and Preparation. Wadsworth, 615.s,USA.

Bruhn, C.M. and H.G. Schutz, 1999. Consumer food safety knowledge and practices. J. Food Safety 19: 73-87.

Bryan, F.L, M. Jermini, R. Schmitt, E.N. Chilufya, M. Michael, A. Matoba, E. Mfume and H.Chibiya, 1997. Hazards associated with holding and reheating foods at vending sites in a small town in Zambia. J. Food Prot., 60: 391-398.

Bryan, F.L., 1988. Risks of practices, procedures and processes that lead to outbreaks of foodborne diseases. J. Food Prot., 51: 663-673.

Bulduk, S., 2003. Gýda ve Personel Hijyeni. Detay Yayýnlarý:67, Sistem Ofset, 179 s., Ankara.

Ciðerim, N. and Y. ve Beyhan, 1994. Toplu Beslenme Sistemlerinde Hijyen. Kök Yayýncýlýk, 48 s, Ankara.

Cody, M.M. and M.A. Hogue, 2003. Results of the home safety.It's in your hands 2002 survey: Comparisons to the 1999 Bencmark survey and health people 2010 food safety behaviors objective. J. Am. Diet. Assoc., 103: 115-123.

Daniels, R.W., 1998. Home food safety. Food Tech., 52: 54-56.

Duyff, R.L., 2002. American Dietetic Association Complete Food and Nutrition Guide. (2nd Edn.), John Wiley and Sons Inc., New Jersey.

FSIS Fact Sheet 2006a. Safe food handling: Does washing food promote food safety. http:// www.fsis.usda.gov/ factsheets/Does -Washing Food PromoteFood Safety/in..

FSIS Fact Sheet, 2006. Safe food handling: Basics for handling food safely. http://www.fsis. usda.gov/fact sheets/Basics for handling Food Safely/index.asp.

Gürman, Ü., 1993. Mutfak ve Yemek Temel Bilgileri. Emel Matbaacýlýk, 290 s., Ankara.

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

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

Jay, L.S., D. Comar and L.D. Govenlock, 1999. A video study of Australian domestic food-handling practices. J. Food Prot., 62: 1285-1296.

Klontz, K.C., B. Timbo, S. Fein and A. Levy, 1995. Prevalance of selected food consumption and preparation behaviors associated with increased risks of food-borne disease. J. Food Prot., 58: 927-930.

Köksal, O., 2001. Gýda ve Beslenme. Erciyes Üniversitesi Yayýnlarý No:130, Erciyes Üniversitesi Matbaasý, 528 s, Kayseri.

Lutz, C.A. and K.R. Przytulski, 2001. Nutrition and Diet Theraphy. 3rd Edn., F.A.Davis Company, Philadelphia, pp: 668.

Meer, R.R. and S.L. Misner, 2000. Food safety knowledge and behavior of expanded food and nutrition education program participants in Arizona. J. Food Prot., 63: 1725-1731.

Mitatakis, T.Z., M.I. Sinclair, C.K. Fairley, P.K. Lýightbody and M.E. Hellard, 2004. Food safety in homes in Melbourne, Australia. J. Food Prot., 67: 818-822.

Montville, R., Y. Chen and D.W. Schaffner, 2001. Glove barriers to bacterial cross-contamination between hands to food. J. Food Prot., 64: 845-849.

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.

Soner, A., I. ve Özgen, 2002. Yiyecek-içecek iþletmelerinde uluslar arasý hijyen standartlarý. Turizmde Saðlýk ve Beslenme; Sorunlar ve Çözümler Sempozyumu Bildiriler Kitabý, Baþkent Üniversitesi Haberal Eðitim Vakfý Yayýný, s., Alanya, pp: 49-62.

Tayfur, M., 2002. Besin Gruplarý (satýn alma, saklama, hazýrlama, piþirme ilkeleri). Aile Saðlýðý (Ed. F.Akyürek), Anadolu Üniversitesi Yayýn No:1375, Açýk Öðretim Fakültesi Yayýn, Eskiþehir, 742:94-114

Uzun, Ö., 1998. Besin zehirlenmeleri. Hacettepe Týp Dergisi, 29: 26-32.

WHO, 1997. Food safety and foodborne diseases. World Health Statitics Quarterly, Vol 50.

WHO, 2000. Foodborne disease: A focus for health education, Geneva.

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

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

Worsfold, D., 1997. Food safety behavior in the home. Br. Food J., 99: 97.