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Original Article

Women's Behaviors and Views on Home Food Safety in Tehran: A Qualitative Study

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ABSTRACT

Background and Objectives: The aim of this study was to explore the food safety knowledge and behavior of housewives in the city of Tehran, Iran in 2015.

Materials and Methods: In this qualitative study 12 Focus Group Discussions by directed content analysis method (n= 96), were conducted among the women who were responsible for food handling in their households in 10 health centers. Each session was held with 7-10 participants, and their voices were recorded. The final transcripts were read to obtain categories until developing themes by using constant comparison method.

Results: Three categories in nine themes were emerged as follows: 1*)* ***Personal hygiene and poisoning*** (Washing hands as priority in personal hygiene); *2)* ***Food safety, preparation and storage*** (Inadequate knowledge about proper time for boiling raw milk, Lack of awareness about temperature of refrigerator, Incorrect storage of food in the refrigerator, Storage of unwashed and unpacked eggs, fresh fruits and vegetables in the refrigerator, Thawing frozen raw meat and chicken at room temperature, Incorrect separation and sanitization of cutting boards for fresh vegetables, raw meat, chicken, and Inappropriate washing of fresh leafy vegetables); and *3)* ***Safety of cooked foods*** (Improper reheating of leftover foods).

Conclusions: The findings of this study illustrated that there was lack of knowledge about food safety. It was evident that the majority of the participants were not familiar with appropriate practices to prevent cross-contamination and food handling. Therefore, home food safety education should be conducted for housewives.

Keywords: Food safety, Women, Knowledge, Qualitative study, Focus group discussions, Iran

Introduction

Food safety is a global public health issue in all countries. Millions of people worldwide suffer from food-borne diseases resulting from the consumption of contaminated foods (1). Food-borne outbreaks were difficult to estimate due to under-reporting and indiscrimination. According to a report by the World Health Organization (WHO), the real prevalence of food-borne diseases was 300-350 times more than reported cases. Governments all over the world are intensifying their efforts to improve food safety in order to prevent fundamental problems (2).

In Iran, one of the major issues of national guidelines food-borne diseases care system is lack of knowledge in food handling and storage, as well as weak practice, which may lead to food-borne illnesses (3). Experts agree that home is the primary location where food-borne outbreaks may occur; however, many consumers do not consider home to be a risky place with regard to food-borne illnesses (4,5). Also the European Union of Food Safety report indicated that food-borne disease outbreak in 2008 was 40%, mainly caused by lack of hygiene in the home kitchens (6). Focus Group Discussions (FGDs) elicit data from a group of participants who can hear each

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other's responses and provide additional comments that they might not have made individually. Researchers who conduct FGs recognize that the participant interaction, which stimulates the identification and sharing of various perspectives on the same topic, is central to their success (7). Limited studies have been conducted regarding home food safety in Iran. Thus, this study is the first to explore home food safety knowledge, practice and integration of different perspectives, which provides richer and more credible data on approaches to food-borne disease prevention. This qualitative study was done in the framework of "determinants and predictive modeling of home food safety practice in the households of Tehran City, Iran".

Materials and Methods

In this qualitative study, 12 focus group discussions (FGDs) by directed content analysis method were convened in 10 health centers from five districts (North, East, West, South, and Center) of Tehran City. The districts were classified as high, moderate, and low socio-economic status based on a report by the Ministry of Economic and Financial Affairs (8). The use of qualitative techniques as FGD on food safety has some methodological advantages as they employ open-ended questions and probe a range of knowledge and practice, which can then be identified (9). FGDs were held until reaching saturation in each center (which means no new idea or comment) (10). A pilot FGD was conducted in one health center with 10 mothers, who were not included into the main study. The purpose was to match all team members' performance and to check the questions' intelligibility.

Participants: Study participants included women who were responsible for food handling and preparation in the households. They were invited by the health center's staff. They were contacted by phone, informed about the purpose of the study, and invited to participate in the study based on their willingness on a specific date. In a continuous procedure, 103 women were contacted; 96 of them accepted to cooperate, and 7 women were excluded as they were not available. Each FGD included 7-10 participants and lasted about 60 minutes. After each FGD session, food safety and nutrition education was provided for all subjects.

Focus Group Protocol: At the beginning of each session, the moderator introduced the survey team and explained the purpose of the study. Mothers were encouraged to state their opinions freely. They were then asked to introduce themselves as a means of getting the mothers acquainted with each other. The participants were seated in semi-circle (with the moderator in the center) to allow eye contact and free flow of discussion, and were informed that their voices would be recorded by a digital recorder. They were also assured that their names and wordings would not be revealed to anyone other than the research team. Moderator's guide was designed based on the research objectives (11-20), which consisted of a series of open-ended questions to allow the respondents to explain their own opinions and experiences (Table 1). Each team consisted of one moderator, one observer and two note-takers. The moderator was a flexible, open-minded, active listener, and able to establish a rapport with the participants and encouraging them to talk comfortably. The moderator also provided a short orientation as a discussion icebreaker. The note-takers were swift and accurate in writing. The observer watched what happened but had no active part in the discussions (21, 22).

Table 1. Focus group discussion moderator's guide

Questions
- What are the easiest and the most important ways to maintain personal hygiene?
- What do you think of when you hear the words "food poisoning"? And what are the symptoms?
- Have you got sick from homemade foods in the last six months?
- Do you consume canned foods? If yes, how?
- Do you consume raw milk? If yes, how?
- What are the most important factors in your view for selecting foods?
- What is the appropriate temperature for a refrigerator?
- How do you store raw and cooked foods in the refrigerator?
- How do you store eggs, fresh fruits and vegetables?
- How do you disinfect fresh vegetables?
- Do you use separate cutting boards for raw meat, chicken and vegetables?
- How do you defrost frozen raw meat?
- How many hours do you leave the leftovers at room temperature?
- How do you reheat the leftovers?

Triangulation has been viewed as a qualitative research strategy to test validity through the convergence of information from different sources. This method involves the use of multiple methods of data collection about the same phenomenon. Data source triangulation involves the collection of data from different types of people, including individuals, groups, families, and communities .In the present study, triangulation was done by the collection of data from women with different socio-economic statuses and residing in different districts to gain multiple perspectives and validation of data. In order to ensure data accuracy and consistent interpretations during the course of data analysis, the research team kept decision trails to document the decisions that were made over the course of the study. The obtained

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results were also checked with some of the participants who met the inclusion criteria of the study but did not participate in the research; all of them confirmed the fitness of the results as well. To confirm dependability, four faculty members conducted a second review. The results were further checked with some of the male key informants, who did not participate in the research; they also confirmed the fitness of the results. All research details including procedures, actions, and decisions were documented for audit purposes (23). During the discussions, views and perspectives changed and developed, which led to the generation of critical comments and potential solutions to the problems (24).

Data analysis: After each session, the notes were organized based on the focus group questions and probes, and expressions of emotion such as laughter sighs were noted. The record of each focus group was transcribed verbatim, and compared with the notes to fix potential discrepancies. The final transcripts were read repeatedly to achieve immersion and obtain a sense of the whole as one would read a novel.

All the data relevant to each category were identified and examined using constant comparison method (7), in which each item was checked or compared with the rest of data to establish analytical categories by hand, reading and re-reading the developing codes, themes and discussing transcripts at the team meetings. Then the data were read word by word by the team members independently to derive codes by highlighting the exact words from the text that appear to capture key thoughts or concepts. These often come directly from the phrases that frequently appear in the text and are then become the initial coding scheme. The codes were then sorted into categories based on how different codes were related and linked. The emerged categories were used to organize and group the codes into meaningful themes.

Ethics: This study was approved by the Ethical Committee of National Nutrition and Food Technology Research Institute (NNFTRI), Faculty of Nutrition Sciences and Food Technology, Shahid Beheshti University of Medical Sciences, Tehran, Iran (Grant No. 450.17). The subjects were informed that their participation in the study was voluntary, and they had the right to withdraw from the study at any time. Written informed consent was obtained from all participants. They did not receive monetary compensation for their participation. After each session, based on incorrect answers, home food safety consultation was provided for all subjects.

Results

The results showed that mean ±SD of the women's age was 37.6±11 years; 94% of the women were housewives and their educational level in most of them was middle to diploma. Also most of the households had 4-5 members. The demographic characteristics of the participants are summarized in Table 2.

Table 2. Demographic characteristics of the women participated in the discussions (n= 96)

Characteristics	n (%)
Women's educational level	
Illiterate /Primary	28 (29.2)
Middle to diploma	56 (57.8)
University degree	12 (12.5)
Women's job	
Housewife	90 (94)
Employed	6 (6)
Family size	
≤ 3	44 (45.5)
4-5	48 (50.8)
≥ 6	4 (2.4)

According to the FGD results, three categories and nine themes were explored based on the perspectives of the participants who were responsible for food handling in their households (Table 3).

Table 3. Key findings from the FGDs on food safety

Category	Theme
1. Personal hygiene and poisoning & food safety	1. Washing hands as priority in personal hygiene
2. Food safety, preparation and storage	2. Inadequate knowledge about proper time for boiling raw milk 3. Lack of awareness about the temperature of the refrigerator 4. Incorrect storage of food in the refrigerator 5. Storage of unwashed, unpacked eggs, fresh fruits and vegetables in the refrigerator 6. Thawing frozen raw meat and chicken at room temperature 7. Incorrect separation and sanitization of cutting boards for fresh vegetables, chicken, and raw meat 8. Inappropriate washing of fresh leafy vegetable
3. Safety of cooked food	9. Improper reheating of leftover foods

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Personal Hygiene and Poisoning: Almost all of the participants stated washing hands as the most important factor in personal hygiene while a few of them did not mention it as a priority:

"I wash my hands with soap and water before cooking every time."

Majority of the women were also aware of food poisoning and symptoms. They believed that their chance of getting food-borne illnesses from homemade foods was lower than eating out:

"It rarely happens but I think it was not from my cooked food."

"My family has not gotten sick from homemade foods."

During the last 6 months, only two mothers reported food poisoning from homemade foods:

"Once my friend brings us some cooked food, it makes us sick."

Majority of the mothers tended to mainly eat homemade foods, and a few of them consumed canned foods, without boiling them before consumption:

"My husband doesn't like canned foods."

"I do not boil the canned foods; I fry it in a pan."

A minority of the participants consumed raw milk, and had limited knowledge about the adequate time for boiling raw milk. Their recent concerns were the high price and the existence of palm oil in pasteurized milk. Although majority of the women had these concerns, but they still used to consume pasteurized milk:

"Recently, I prefer to consume raw milk because I have heard about the existence of palm oil in pasteurized milk."

The most important factors for selecting foods orderly were: freshness, price, expiration dates and packaging. Only one mother showed concerns with respect to food additives, hormones and pesticides:

"I choose based on freshness and then price; I cannot afford to buy foods with higher price."

"I buy foods with attractive packaging."

Food Safety, Preparation and Storage: A vast majority of the mothers did not know the appropriate temperature of their refrigerator:

"I do not know the correct temperature; my husband adjusts the temperature of the refrigerator."

Majority of the mothers reported incorrect distribution of raw and cooked foods. They kept unwashed, unprotected eggs, vegetables and fruits in the refrigerator. Only two out of 96 mothers washed fruits and vegetables before storing in the refrigerator:

"I put unwashed uncovered eggs, fruits and vegetables; when I want to consume, I wash as much as I need."

On the other hand, some of them washed eggs before storage:

"I wash everything before storing in the refrigerator."

Most of the mothers sanitized vegetables with tab water, vinegar or salt, while only a few of them used dishwashing liquid or disinfectors:

"I just use vinegar or salt."

"Tab water is enough; if I have time, I use salt for disinfection."

Most of the respondents declared using cutting boards and knifes for raw meat. A few women used separate cutting boards and knives for vegetables and raw meats:

"I only use cutting board for raw meat; I usually buy chopped vegetables."

A great number of mothers defrost frozen raw meat at room temperature, while a few of them follow safe practice regarding thawing meat in the refrigerator; one mother used microwave oven for defrosting:

"I thaw meat at room temperature or running water, I rarely defrost meat in the refrigerator."

Safety of Cooked Food: Most of the mothers did not have any leftover foods as they cooked only as much as needed. They also reported if they had any leftovers, they left foods at room temperature for at least 3hours.

"I cool down the leftovers at room temperature for more than 3 hours in the kitchen."

More than half of the mothers did not have the awareness of how to reheat leftovers:

"I reheat the cooked food until it gets warm."

Discussion

Personal Hygiene and Poisoning: Similar to our results, washing hands is a repeated or habitual behavior (25). The more often it is repeated, the less cognitive effort it becomes. Intervening to break this chain of events by introducing a new procedure (e.g., using soap) to wash hands instead of just rinsing them is challenging (26). In other qualitative studies (27-29), washing hands was an important factor in personal hygiene. Results of another focus group study uncovered that Indian women took a bath before cooking, which was a traditional cultural practice (30).

Other studies also showed that most of consumers did not believe that homemade foods could lead to food-borne illnesses (31,32). This optimistic bias is positively linked with risky behaviors and neglects

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taking precautionary measures, which increases the incidence of food-borne illnesses (33).

In contrast to our study, most of mothers in India (34,35) had experienced food-borne illnesses from homemade foods. Evidence shows that food-borne illnesses are often mild and of short duration, thus many consumers may not be aware of their sometimes devastating and deadly outcomes when they underestimate the value of safe food handling procedures (36). Similar to our study, the most important factors for choosing foods were: freshness, the expiry date, and safety assurance (28,30,37).

Food Safety, Preparation and Storage: In agreement with our findings, respondents of other studies (11,38,39) also stated incorrect temperature of the refrigerator. Temperature as key factor in the growth of microorganisms should be assessed in order to control the growth of psychotropic microorganisms (40) (recommended temperature is 4.4°C) (41). Refrigerated foods require constant temperature control not only to maintain the microbiological safety and quality of foods but also to minimize alterations in the food (42).

Surveys indicated that incorrect distribution of raw and cooked foods in refrigerators may lead to cross-contamination (39,43). Separate and appropriate storage of raw and cooked foods and covered containers has been recommended in order to prevent the transferring of pathogens into the refrigerator (44, 45). Uncovered vegetables and storing raw foods next to cooked foods may lead to the growth of *Listeria monocytogenes* (46).

In comparison with the current study, a few surveys (27,29,38) reported that mothers used the same cutting board for meat and vegetables. Furthermore, consumers used to defrost frozen raw meat at room temperature (11,27,29,38,47). A Brazilian study (48) showed lack of awareness regarding risky behaviors, handling and storage of foods in domestic kitchens.

Safety of Cooked Food: However, it is recommended to consume leftovers mostly within two days (20). To prevent further outbreaks, it is suggested that rice should be boiled in smaller quantities on several occasions during the day, thereby reducing the storage time. After boiling, the rice should either be kept hot (>63°C) or cooled down quickly and transferred to a refrigerator within 2 hrs. of cooking. Boiled or fried rice must not be stored under warm conditions, especially in the temperature range of 15–50°C. The heat treatment will cause spore germination, and in the absence of competing flora, **B. cereus** grows well. **B. cereus** can easily spread to many types of foods, and is also frequently isolated from meat, eggs and dairy products (49,50).

In line with the present research findings, the majorities of mothers in Slovenia cool down the leftovers at room temperature and then put them in the refrigerator (38). A few studies showed that mothers did not reheat the leftovers to boiling point (11,15,51). Because vegetative spores and cells of C. perfringenes can be present in many raw foods, their presence alone is not of major importance. However, temperature abuse of prepared foods is a major concern and is invariably involved in out breaks. Rapid chilling and proper reheating are important aspects of control. Hot foods should be held at the ALPHA recommended holding temperatures for hot foods (>60). Foods to be reheated should reach 71°C before consumption to kill vegetative cells (52). Among the predominant bacteria involved in food-borne diseases, *Staphylococcus aureus* is a leading cause of gastroenteritis resulting from the consumption of contaminated food (53). It would be helpful to receive storage and reheating instructions for leftovers or take outs. Despite the potential ease of printing information on take-out food containers, this type of information is rarely included (41). The obtained results can provide information to formulate essential messages for educational intervention programs that may be useful for implementing prevention programs and policy decisions to minimize food-borne diseases.

Conclusion

It was revealed in the present study that the majority of the participants were familiar with the practices that prevent cross-contamination but their food handling behaviors did not support this knowledge. It seems that women's behavior did not always translate into home food safety. Furthermore, it is crucial to increase the focus on the media in order to increase the level of knowledge at the community level. In addition, evaluation of public awareness in different communities with different socioeconomic and demographic characteristics is suggested. Some hygiene aspects are local issues in our country; they need to be emphasized, and unique strategies should be a priority for minimizing food-borne diseases. Therefore, food safety training should be conducted for households.

Limitation: In this study, rural households were not included.

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