

Food Safety among Working and Non-Working Women in Damanhour

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Abstract

Although the public is increasingly concerned about food-related risks, the rise in food poisoning cases suggests that people still make decisions about food safety that are less ideal from a health and safety perspective. **The aim:** To assess the food safety knowledge and practices among working and non-working women in Damanhour. **Subjects & Methods: Research design:** Cross-sectional descriptive study. **Sample:** of 200 rural women were recruited (working and not working) from 2 villages in Damanhour. **Tool:** Structured interview questionnaire was used to collect data from food prepared women to identify their food safety knowledge and practices. The study conducted from August 2014 to December 2014. **Results:** Nearly 60% of the sample had a university education, nearly 40% of them were above 30 and less than 40 years old. Moreover, the majority of them had unsatisfactory food safety knowledge. The mass media was one of the main sources of their information. **Conclusion:** Significant differences was observed between women (working and nonworking) and their food safety knowledge and practices. **Recommendation** Develop and implement effective food safety educational programs that result in safer food handling practices of women in relation to all aspect of food safety.

Keywords: *Food Safety, Food Handling & Food Safety Knowledge.*

Introduction

Safe food is a basic human right in modern society. Prevention of disease and improvement of human health is a paramount importance, not only for government and industries but also for consumers themselves. Many foods brought into the home are frequently contaminated with naturally occurring pathogens, which cannot be detected organoleptically (seen, smelled or tasted) but can cause disease varying in severity including even death. In recent years, headlines and news flashes on widespread outbreaks of foodborne disease caused by lapses in food safety or emerging pathogens have provided vivid reminders that food not only nourishes and sustains us but if handled unsafely, can be a major threat to health and well-being. (Redmond & Griffith 2008, Vitale, 2012)

Although foodborne illness is preventable, more than 56,000 people per year become ill in the U.S., creating high economic costs, loss of productivity and reduced quality of life for many. Moreover, in developing world, foodborne illness causes an estimated 2.2 million deaths each year, of which 1.9 million are children, and has more impact on health as creating a vicious cycle of diarrhea and malnutrition and on economy in developing countries but no reliable data are available (Vitale 2012, Biggers et al., 2013). The WHO estimates that foodborne illness has a global burden of 99,727 Daily's and that 90% of these are the result of illness in lower income and lower middle countries due to poor food safety practices among family members (Grace 2015 & WHO, 2015).

Although the public is increasingly concerned about food-related risks, the rise in food poisoning cases suggests that people still make decisions of food consumption, food storage and food preparation that are less ideal from a health and safety perspective. Experts agree that the home is the primary location where foodborne outbreaks occur; however, many consumers do not believe the home to be a risky place. People of all ages seem to think that they know how to handle food safely, but their self-reported food handling behavior does not support this self-belief. Studies have estimated that between 50 and 87% of reported foodborne disease outbreaks have been associated with the home. (Garwood & Fontannaz 2015, WHO, 2015)

Food safety is a scientific discipline describing handling, preparation, and storage of food in ways that prevent foodborne illness. This includes a number of routines that should be followed to avoid potentially severe health hazards. The safety of food at the moment of consumption is critical for human health and depends on many variables, that may include: criteria for checking the safety of food ingredients when choosing and purchasing food, transportation, the storage and preservation of food, it is preparation and cooking, the exposure of food to a dangerous temperature, the handling of leftovers, kitchen facilities and the use of kitchen appliances, and aspects of personal hygiene and the basic health care of food handlers. These are the key factors likely to contribute to foodborne illness occurrences in the

home. (Devia, 2011, Biggers et al., 2013, El-Ghany et al., 2014)

Food can transmit disease from person to person as well as serve as a growth medium for bacteria that can cause food poisoning. Food safety is an area of public health action to protect consumers from the risks of food poisoning and foodborne diseases, acute or chronic. Unsafe food can lead to a range of health problems: diarrheal disease, viral disease (the first Ebola cases were linked to contaminated bush meat; reproductive and developmental problems, cancers. Food safety is thus a prerequisite for food security (Devia, 2011, Biggers et al., 2013, Olinto et al., 2014).

Although proper food handling, preparation, storage, and feeding practices may prevent many foodborne diseases, each year millions of people become ill and thousands die from these diseases. (WHO 2015)

The primary food preparer, the family member especially mothers and grandmothers who prepares most of the meals in the household, and responsible for most of food hygiene practices of family members are important because both have the potential to influence family members and has a vital role in reducing the number of illness caused by foodborne pathogens for family member particularly children in low-income settings (Toure et al., 2013, Sanlier et al., 2012).

Significance of the study

Most cases of foodborne illness are preventable if food protection principles are followed from production to consumption. Given that it is currently impossible for food producers to ensure a pathogen-free food supply, the home food preparer is a critical link in the chain to prevent foodborne illness (Vatale 2012, Sperber & Mortimore 2011, Biran 2012). Epidemiological data from different parts of the globe have shown that a significant proportion of foodborne illnesses are attributable to improper food processing practices in consumers' homes. Food can be mishandled at many places during food preparation, handling, and storage. Poor food hygiene is a major cause of morbidity globally and it has been suggested that up to 70% of diarrhea episodes in developing countries may be foodborne. However, there is a shortage of evidence concerning its impact on morbidity and mortality in developing countries (Redmond 2008, Sanlier et al., 2012).

Few studies have considered the influences that can affect the food safety concepts. Furthermore, many factors can affect food prepared food safety behavior at home or their risk assumptions as work status or increase the working hours, working types of mother which is the consider the main food prepare inside the home. (McCarthy et al., 2007)

Various studies were conducted to the knowledge and practice regarding food safety in a rural setting as it was found that rural mothers had poor knowledge and practice regarding food hygiene. Consequently, they should be encouraged to prevent this foodborne illness throughout learning how to combat it by taking food hygiene precautions measures as possible to prevent contaminants from getting onto their food (Morgan 2009 & Takanashi 2009)

Health care professionals need to be aware of consumers' food safety behaviors in the home and deliver tailored food safety interventions that are theory-based. (Redmond, 2008) It is very important to investigate food prepare women s' knowledge, and practices related to food safety and the causes of lack of knowledge and poor practices. (Bloomfield, 2013) **The aim** of this study was to assess the food safety knowledge and practices among working and non-working women in Damanhour.

Research design

A descriptive cross-sectional design was followed to carry out this study.

Research questions

Are there differences between working and non-working women in relation to their total food knowledge and practices score regarding their general characteristics and their perceived food safety knowledge and overall health status?

Material & methods

Setting

The study was carried out in two selected village from 7 village follow Damanhour zone namely El Zawia and Hafes. From that village one family health center and one school from each village were chosen.

Subjects

- The study subjects were fulfilling the following criteria: either working and nonworking women responsible for food preparing at home. (Women having the responsibility of food preparation; mother, grandmother, mother in low, big daughter etc.) and agree to participate in the study.
- Using multistage sample technique: at **First**: 2 out from 7 (village)affiliated to Damanhour city were randomly selected.
- **Secondly**, One school from each village was selected using the computer-based random system as follow: 1 school out of 4 schools available in Hafes and one out of 3 schools from El Zawia and available family health center in the same village was included in the study.
- **Third** stage: A convenient sample of 50 women were taken from each school (fulfilling criteria of being working women). Total working women were 100 women were taken from both schools.

- **Fourth** stage: A convenient sample of 50 nonworking women were recruited from each previous family health centers. Total number of 100 of nonworking women were taken from both family health center and who were fulfilling inclusion criteria.

Tool

One tool was used in this study: A structured interview questionnaire.

The structured interview questionnaire was used to collect data from working and nonworking women selected from previously mentioned setting to identify their food safety-related knowledge and practices.

It consisted of four parts

Part I: Women personnel & some sociodemographic characteristics included the following items: Women age, marital status, the level of education & occupational status.

Part II: Women health related food safety data included: reported health status, their perceived level of food safety knowledge and their family previous history of food poisoning, and the most common causes of food poisoning.

Part III: Women food safety related knowledge:

The women knowledge level was evaluated through 47 questions. The scoring system was used to assess food safety knowledge of women.

The knowledge part was divided into 5 main categories (domains):

- Knowledge related to **causes of food poisoning** items (15) items, for example, microorganism can be destroyed by the freezer, microbial growth faster at room temperature than in refrigerators, summer than winter, microorganisms carrier on the human body, the source of food contamination etc.
- Knowledge related to **personnel and kitchen hygiene** (6 items) as food handling should be avoided in illness, skin should clean, covered, free from the wound, the nail should be cut etc.
- **Food purchasing and storage** related knowledge: (15 items) hot fluid or food should not store in the fridge, firstly purchased should be used first, buying cottage cheese from the street, buying from outside store (street) opened long life milk should be stored in the refrigerator, keeping leftover food etc.
- **Food preparation related knowledge** (6 items): thawing food at room temperature or in water, ways washing vegetables (soaking in water or add potassium permanganate etc.
- **Food cooking** (5) related knowledge: using a spoon while cooking for tasting more than one

time, prepared food should keep how many days, adequate reheating cooked food, etc.

• Scoring system was as follow:

- The answer for each item was either “yes”, “No”, or don’t know. A score “one” was given to correct answer and “zero” was given to negative answer, missing answer or don’t know.
- The max total score was 47.
- The answer of the respondent was scored and summed together
- The total score was categorized into 2 levels, these level as follow:
 - Satisfactory level of knowledge: score > 60% (more than 28)
 - Unsatisfactory level of knowledge: score < 60% (less than 28)

Part IV: Women food safety related practices:

The women food safety practices were evaluated in the fourth part through using 40 items (questions) was developed and used by the researcher to identify food safety related practices. **It was related to 4 domains:**

- **Personnel hygiene (15 items):** avoiding food preparation while ill, hand washing warm water and soap, rubbing fingertips between finger, hand washing before food preparation, using a spoon while cooking for tasting one time.
- **Food purchasing and storage: (7 items)** reading expiry date before purchasing, buy displayed food of animal origin outside the refrigerator, avoid storage of hot food before become cold, firstly purchased should be used first, buying cottage cheese from the street, buying from outside store (street) and keeping leftover food.
- **Food preparation (6 items):** thawing frozen food, Thaw food of animal origin at room temperature or in water, not refreeze of thawed frozen food again, washing vegetable under running water / soaking in water / soaking in water with potassium permanganate, and using separate or same cutting board for vegetable or meat.
- **Food cooking (12):** boiling milk for 5-10 minutes, checking the adequacy of food cooking by checking the change of color and examine texture by a fork, stored prepared food should be kept in food chiller, adequate reheating cooked food, cleaning food utensil and equipment using warm water and detergent, drying food utensil.
 - The response for each item was either “yes”, “No”, or don’t know. A score “one” was given to correct answer and “zero” was given to negative answer, missing answer or don’t know.
 - Some questions were scored as follow “yes always score for 2, some time for 1 or No, or not applicable for 0. (some items in personnel hygiene, preparation and cooking domains)

- The maximum total practice score was 40.
- The response of the women was scored and summed together. The total score was categorized into two level:
 - Satisfactory: for score > 60% (more than 24).
 - Unsatisfactory: for score < 60% (less than 24).

Methods

- An official approval to conduct the study was obtained from responsible authorities.
- The tool was developed by researchers after a thorough review of the recent relevant literature (**Bloomfield 2013, Farahat 2015& Fawzi, 2009**) and content validity was assured by submitting to jury in the field of the study. Any necessary modifications were carried out accordingly
- Cronbach Alpha Coefficient was used to ascertain the reliability of the tool ($r=0.86$)
- A pilot study was carried out on 30 women from another setting than selected ones to ascertain the clarity, relevance, and applicability of tool and necessary modification were done.
- Each interview took 15–20 minutes to be completed.
- The study work was carried out in a period of 4 months (from August to December 2014).

Ethical considerations

- All participants were informed about the purpose of the study and given a brief explanation. Consequently oral informed consent was obtained from each participant.
- Anonymity and confidentiality of the information were considered.

Statistical Analysis

- The collected data were coded and analyzed by using the Statistical Package for Social Sciences (SPSS) 20.0 IBM corp. released 2011 IBM statistic for window version 20 ARMWOK, NY: IBM.comp.
- Data was tabulated and presented using various of tests: calculation of the mean, standard deviation,
- Pearson chi-square, t-tests were used in the analysis, chi-square and Mont Carlo exact probability test was used to study the significance of the difference between proportions. The cutoff point for statistical significance was $P \leq 0.05$

Results

Table (1): Distribution of the studied subjects according to their personal characteristics (n= 200).

Characteristics	Women				Total		X ² (P)
	Working		Nonworking		No	%	
	No.	%	No.	%			
Age (years)							0.338 [^]
<20	1	1.0	6	6.0	7	3.5	
20-	29	29.0	33	33.0	62	31.0	
30-	43	43.0	36	36.0	79	39.5	
40-	23	23.0	21	21.0	44	22.0	
50+	4	4.0	4	4.0	8	4.0	
Educational level							19.8 (0.001)*
Primary	3	3.0	8	8.0	11	5.5	
Preparatory	3	3.0	12	12.0	15	7.5	
Secondary	21	21.0	37	37.0	58	29.0	
University	73	73.0	43	43.0	116	58.0	
Marital status							17.9 (0.001)*
Married	78	78.0	54	54.0	132	66.0	
Single	12	12.0	12	12.0	24	12.0	
Divorced	5	5.0	12	12.0	17	8.5	
Widow	5	5.0	22	22.0	27	13.5	

* P < 0.05 (significant)

Table (2): Distribution of the studied subjects according to their reported health-related data.(n=200).

Women health related data	Women				Total		MCP
	Working		Nonworking		No.	%	
	No.	%	No.	%			
Reported overall health status							0.270
Excellent	15	15.0	21	21.0	36	18.0	
Very good	35	35.0	37	37.0	72	36.0	
Good	45	45.0	32	32.0	77	38.5	
Intermediate	4	4.0	9	9.0	13	6.5	
Poor	1	1.0	1	1.0	2	1.0	
Women food safety knowledge as perceived							0.035 [^]
Excellent	12	12.0	14	14.0	26	13.0	
Very good	47	47.0	62	62.0	109	54.5	
Good	36	36.0	18	18.0	54	27.0	
Intermediate	5	5.0	4	4.0	9	4.5	
Poor	0	0.0	2	2.0	2	1.0	
Reported Previous attack of food poisoning							0.001*
▪ No	64	64.0	38	38.0	102	51.0	
▪ Yes	36	36.0	62	62.0	98	49.0	
If yes, mention **(36/62)							
Nausea	11	30.6	24	38.7	35	35.7	0.417
Vomiting	15	41.7	34	54.8	49	50.0	0.209
Fever	17	47.2	30	48.4	47	48.0	0.911
Diarrhea	15	41.7	46	74.2	61	62.2	0.001*
Fatigue	10	27.8	19	30.6	29	29.6	0.764
Colic's	17	47.2	36	58.1	53	54.1	0.299

Women health related data	Women				Total		MCP
	Working		Nonworking		No.	%	
	No.	%	No.	%			
Reported causes of food poisoning							
Eating out side home	11	30.6	32	51.6	43	43.9	0.043*!
Unhealthy practice	9	25.0	10	16.1	19	19.4	0.284
Low immunity	8	22.2	24	38.7	32	32.7	0.093

^MCP: Mont Carlo exact probability

! FEP: Fisher exact probability

* $P < 0.05$ (significant)

** multiple answer

Table (3): Distribution of women (working and nonworking) in relation to their total food safety knowledge mean score. (n=200).

Items	Women				Total		t (P)
	Working		Nonworking		Mean	SD	
	Mean	SD	Mean	SD			
Food safety knowledge domains							
Food poisoning items (15)	6.07	2.23	5.79	2.15	5.93	2.19	0.90 (0.367)
Personal hygiene (6)	4.03	1.55	3.24	1.52	3.64	1.58	3.6 (0.001)*
Purchasing and storage (15)	6.40	3.08	5.09	1.96	5.75	2.66	3.5 (0.001)*
Food preparation (6)	3.01	1.55	2.54	1.47	2.78	1.52	2.2 (0.029)*
Food cooking (5)	2.45	2.0	2.06	1.72	2.26	1.88	2.7 (0.007)*
Total Knowledge (47)	21.96	7.39	18.72	5.67	20.34	6.77	3.4 (0.001)*

t: Independent sample t-test

* $P < 0.05$ (significant)

Table (4) Distribution of women (working and nonworking) in relation to their total food safety practice mean score. (n=200).

Food safety practices domains	Women				Total		t (P)
	Working		Nonworking		Mean	SD	
	Mean	SD	Mean	SD			
Food safety practice domains							
Personal hygiene (15)	9.70	1.96	9.76	1.51	9.74	1.73	0.74 (0.402)
Purchasing and storage (7)	2.61	1.14	2.41	1.28	2.50	1.22	0.92 (0.382)
Food preparation (6)	3.28	1.12	3.21	1.17	3.24	1.15	0.77 (0.399)
Food cooking (12)	5.71	2.10	5.48	1.93	5.59	2.01	0.91 (0.364)
Total food safety practices (40)	21.1	4.4	20.7	3.6	20.9	4.0	0.85 (0.397)

t: Independent sample t-test

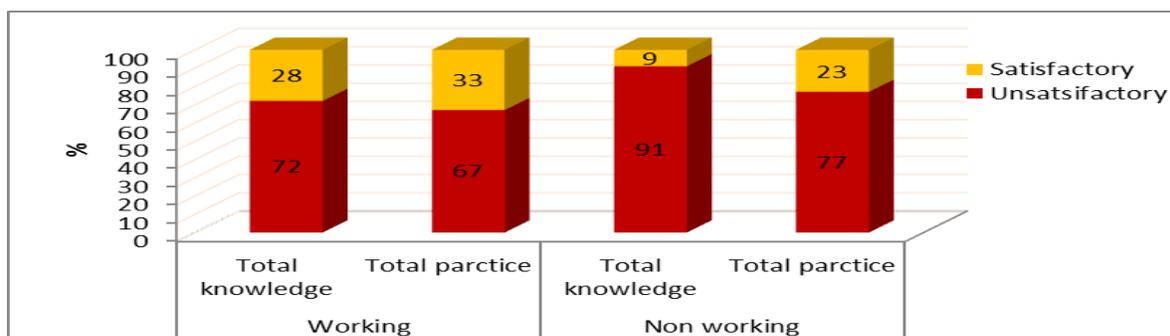
* $P < 0.05$ (significant)

Figure (1): The Differences Between Total Knowledge And Practices Score Among Working And Nonworking Women.

Table (5): Relation between working women total knowledge score regarding their general characteristic's and other variables. (n=100).

Characteristics of working women	Total knowledge				MCP
	Unsatisfactory		Satisfactory		
	No.	%	No.	%	
Age (years)					
<20	1	100.0	0	0.0	0.466
20-	23	79.3	6	20.7	
30-	28	65.1	15	34.9	
40-	18	78.3	5	21.7	
50+	2	50.0	2	50.0	
Educational level					
Primary	3	100.0	0	0.0	0.475
Preparatory	3	100.0	0	0.0	
Secondary	15	71.4	6	28.6	
University	51	69.9	22	30.1	
Marital status					
Married	52	66.7	26	33.3	0.138
Single	11	91.7	1	8.3	
Divorced	5	100.0	0	0.0	
Widow	4	80.0	1	20.0	
Women food safety knowledge as perceived.					
Excellent	9	75.0	3	25.0	0.017*
Very good	27	57.4	20	42.6	
Good	32	88.9	4	11.1	
Intermediate	4	80.0	1	20.0	
Poor	0	0.0	0	0.0	
Reported overall health status					
Excellent	14	93.3	1	6.7	0.097
Very good	21	60.0	14	40.0	
Good	32	71.1	13	28.9	
Intermediate	4	100.0	0	0.0	
Poor	1	100.0	0	0.0	

MCP: Mont Carlo exact probability

* $P < 0.05$ (significant)

Table (6) Relation between nonworking women totals knowledge score regarding their general characteristic's and other variables. (n=100).

Characteristics of nonworking women	Total knowledge				MCP
	Unsatisfactory		Satisfactory		
	No	%	No	%	
Age (years)					
<20	6	100.0	0	0.0	0.559
20-	28	84.8	5	15.2	
30-	33	91.7	3	8.3	
40-	20	95.2	1	4.8	
50+	4	100.0	0	0.0	
Educational level					
Primary	8	100	0	0.0	0.813
Preparatory	11	91.7	1	8.3	
Secondary	33	89.2	4	10.8	
University	39	90.7	4	9.3	
Marital status					
Married	49	90.7	5	9.3	0.704
Single	10	83.3	2	16.7	
Divorced	11	91.7	1	8.3	
Widow	21	95.5	1	4.5	
Women food safety knowledge as perceived.					
Excellent	11	78.6	3	21.4	0.212
Very good	59	95.2	3	4.8	
Good	15	83.3	3	16.7	
Intermediate	4	100.0	0	0.0	
Poor	2	100.0	0	0.0	
Reported over all health status					
Excellent	21	100.0	0	0.0	0.583
Very good	33	89.2	4	10.8	
Good	28	87.5	4	12.5	
Intermediate	8	88.9	1	11.1	
Poor	1	100.0	0	0.0	

MCP: Mont Carlo exact probability

Table (7): Relation between working women total practice score regarding their general characteristic's and other variables. (n=100).

Characteristics of working women	Total practice				MCP
	Unsatisfactory		Satisfactory		
	No.	%	No.	%	
Age (years)					
<20	1	100.0	0	0.0	0.050*
20-	17	58.6	12	41.4	
30-	34	79.1	9	20.9	
40-	14	60.9	9	39.1	
50+	1	25.0	3	75.0	
Educational level					
Primary	2	66.7	1	33.3	0.631
Preparatory	3	100.0	0	0.0	
Secondary	13	61.9	8	38.1	
University	49	67.1	24	32.9	

Characteristics of working women	Total practice				MCP
	Unsatisfactory		Satisfactory		
	No.	%	No.	%	
Marital status					
Married	52	66.7	26	33.3	0.919
Single	8	66.7	4	33.3	
Divorced	4	80.0	1	20.0	
Widow	3	60.0	2	40.0	
Women food safety knowledge as perceived.					
Excellent	8	66.7	4	33.3	0.239
Very good	27	57.4	20	42.6	
Good	28	77.8	8	22.2	
Intermediate	4	80.0	1	20.0	
Poor	0	0.0	0	0.0	
Reported overall health status					
Excellent	11	73.3	4	26.7	0.521
Very good	23	65.7	12	34.3	
Good	28	62.2	17	37.8	
Intermediate	4	100.0	0	0.0	
Poor	1	100.0	0	0.0	

MCP: Mont Carlo exact probability

* P < 0.05 (significant)

Table (8): Relation Between Nonworking Women Total Practice Score Regarding Their General Characteristic's and Other Variables. (n=100).

Characteristics of non-working women	Total practice				MCP
	Unsatisfactory		Satisfactory		
	No	%	No	%	
Age (years)					
<20	5	83.3	1	16.7	0.235
20-	22	66.7	11	33.3	
30-	27	75.0	9	25.0	
40-	19	90.5	2	9.5	
50+	4	100.0	0	0.0	
Educational level					
Primary	8	100.0	0	0.0	0.350
Preparatory	10	83.3	2	16.7	
Secondary	28	75.7	9	24.3	
University	31	72.1	12	27.9	
Marital status					
Married	41	75.9	13	24.1	0.599
Single	9	75.0	3	25.0	
Divorced	8	66.7	4	33.3	
Widow	19	86.4	3	13.6	
Women food safety knowledge as perceived.					
Excellent	9	64.3	5	35.7	0.033*
Very good	53	85.5	9	14.5	
Good	10	55.6	8	44.4	
Intermediate	4	100.0	0	0.0	
Poor	1	50.0	1	50.0	

Characteristics of non-working women	Total practice				MCP
	Unsatisfactory		Satisfactory		
	No	%	No	%	
Reported over all health status					
Excellent	20	95.2	1	4.8	0.004*
Very good	32	86.5	5	13.5	
Good	20	62.5	12	37.5	
Intermediate	5	55.6	4	44.4	
Poor	0	0.0	1	100.0	

MCP: Mont Carlo exact probability

Table (9): Relation Between Working Women Total Knowledge And Their Total Practices Score.

Total practice	Total knowledge				FEP
	Unsatisfactory (N= 72)		Satisfactory (N=28)		
	No.	%	No	%	
Unsatisfactory	57	79.2	10	35.7	0.001*
Satisfactory	15	20.8	18	64.3	

FEP: Fisher exact probability * $P < 0.05$ (significant)

Table (10): Relation between nonworking women's total knowledge and their total practices score.

Total practice	Total knowledge				FEP
	Unsatisfactory (N=91)		Satisfactory (N=9)		
	No	%	No	%	
Unsatisfactory	73	80.2	4	44.4	0.015*
Satisfactory	18	19.8	5	55.6	

FEP: Fisher exact probability * $P < 0.05$ (significant)

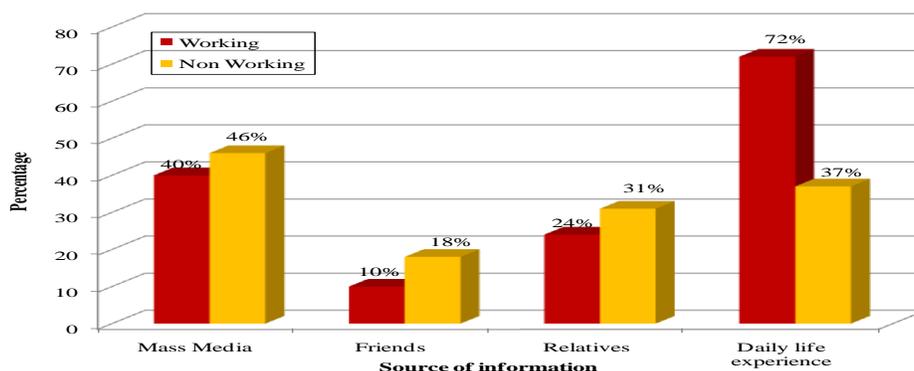


Figure (2): Distribution of the studied subjects (working and not –workingwomen) according to their source of information

Table (1): Illustrates the general characteristic's regarding studied subjects working and nonworking women. It reveals that nearly 60% of them (working and nonworking) had a university education. While, nearly 40% of them were above 30 and less than 40 years of age and 66% were married. Significant differences were observed between studied subject'

educational level and Marital status ($p = 0.001$ and 0.001 respectively).

Table (2): Reflects studied subjects reported health-related data. The table shows that 45.0% of working women perceived their health status as good while 37% of nonworking women stated that they are in very good health status. Moreover, it was observed that 47% of working and 62% of nonworking women

perceived their food safety knowledge as very good respectively. Also, the table reveals that 49% of studied sample or their family members had food poisoning attack. Moreover, 62%, 54.1% and 50% of them mentioned that diarrhea, colic's and vomiting respectively were considered some of the food poisoning signs during last 6 month. Finally, 43.9% of studied subjects mentioned that one of the main causes of food poisoning signs was eating outside the home. Significant differences were found with both group regarding reported level of food safety knowledge, family Previous attack of diarrhea as food poisoning signs and eating outside is the main cause of food poisoning. ($p= 0.035, 0.001, 0.001$ and 0.043 respectively).

Table (3): Shows the knowledge mean score of studied women. Regarding working women total knowledge score, it was higher in all domains of food safety knowledge 21.96 ± 7.39 compared to 20.34 ± 6.77 to those nonworking women. Also, the table shows that the higher total mean score was regarding food poisoning & purchasing and storage items (5.93 ± 2.19 and 5.75 ± 2.66 respectively). There were statistically significant differences regarding all domains of food hygiene knowledge mean score except food poisoning items (personal hygiene, purchasing and storage and food preparation) ($p=0.001, 0.001, 0.029, 0.007$ respectively). Also, Significant divergences were observed between two groups and their total knowledge score ($p= 0.001$)

Table (4): Shows the studied women food safety mean score practices. Regarding food safety practices mean score it was observed from the table that there were no significant differences between two groups. ($p= 0.85$) and their reported practices.

Figure (1): Shows the differences between the studied subjects and their food safety total knowledge and total practices scores. It was revealed from the figure that 72% and 67% of working women had unsatisfactory knowledge and practice score respectively compared to 91% and 77% of nonworking women had unsatisfactory food safety knowledge and practice score respectively.

Table (5): Demonstrates the relationship between total knowledge score and general characteristics of working women. No significant difference's were found between general characteristic's and reported overall health status regarding total knowledge score. Furthermore, 88.9% from those who perceived their food safety knowledge good actually had unsatisfactory knowledge. Significant differences were found between women perceived knowledge of food safety knowledge and their actual knowledge score ($p= 0.017$).

Table (6): Shows the relation between nonworking women total knowledge score and general

characteristics and other variables. No significant differences were found between nonworking women total knowledge score and general characteristic's, their reported perceived level of food safety knowledge and their stated overall health.

Table (7) Reveals the relation between the working women total practice score regarding their general characteristic's, their reported perceived food safety knowledge and their stated overall health. It was observed from the table that 79.1% of those who were above 30 to less than 40 years had unsatisfactory food safety practices. While 75.0% of those above 50 years had satisfactory total practice. Statistically significant relation was found between working women's age and their total practice score ($p= 0.050$).

Table (8): Shows the relation between the nonworking women food safety total practice score regarding their general characteristic's, the women food safety knowledge as perceived and their stated overall health. The table reveals that 85.5% of those perceived their knowledge about food safety were very good in contrast they had unsatisfactory practice score. Moreover, 95.2% and 86.5% from those who reported their overall health status either excellent or very good respectively their total practice was unsatisfactory. Significant differences were found between reported level of food safety and overall health and nonworking total practices score ($p= 0.033, 0.004$ respectively).

Table (9) Illustrates the relation between working women's total knowledge score regarding their total practice score. As observed from the table that 79.2% from those who had unsatisfactory food safety score had unsatisfactory food safety practice. The significant differences existed between the two variable $p= 0.001$

Concerning the relation between nonworking women total knowledge score regarding their total practice score. It was clear from the table (10) that 80.2% of those who had unsatisfactory knowledge had also unsatisfactory total practices. Statistically significant differences' between nonworking women's total food safety knowledge and practices. ($p=0.015$)

Concerning the sources of information of studied subjects regarding food safety, it was observed from the figure (2) that 72% and 40% of working women's stated that daily life experience and Mass media were some of their sources of information respectively. On the other hand, 37% and 46% of nonworking women mentioned the same sources of their knowledge and practices respectively.

Discussion

Even in societies with highly developed food safety systems such as the European “farm – to- fork “and the American “ farm- to- table “ there is a weak link which can cause significant morbidity and mortality from foodborne illness (**Farber, 2011**).

Previous researchers have revealed key factors that play a decisive role in the occurrence of food poisoning: knowledge and practice. Poor knowledge and practice among especially domestic food preparer can regularly negate much of the effort made in improving and maintaining food safety standards at the stage of the food chain (**Angelillo et al., 2001& Badrie et al., 2006**).

The result of the study gave ideas about the extent of satisfactory and unsatisfactory food safety knowledge and practices among women(working and nonworking) which could help in the future planning and implement a further educational program to domestic food prepare. And to elaborate the main sources of their information.

Women are considered the food handlers in the home; their role is to ensure food safety and hygiene for their infants and children. Women need to take many precautions to minimize pathogenic contamination of home-prepared foods because they are the final line of defense against foodborne illnesses. (**Kwon et al., 2008**).

Women who rule the kitchen are less likely to take protective steps when they place less importance on their own responsibility than that of others in the food safety chain or believe their risk of foodborne illness is controlled by fate or luck (**Biggers et al., 2013**). Several studies indicated that some women have a little responsibility because they believe most foodborne illnesses are caused earlier in the food safety chain or by retail food establishments. Moreover, many of them even those in high-risk groups do not perceive themselves or someone in their families to be susceptible to foodborne illness as they rank their risk of foodborne illness lower than that of others (**Kang et al., 2010 & FSA 2014**) Consequently the result of this study revealed that nearly less than one-quarters of both working and non-working women have stated that they have very good level of food safety knowledge and practices while in fact they have unsatisfactory knowledge and practice, this may be due misconception of what they already know about food safety. This is considered a risk for cross contamination, unsafe practices and consequently increase the liability of unsafe food practices and resistibility in learning further information.

The women needs for food safety is greatly increasing in recent days but the level of food safety

education remains still low. The current study revealed that the majority of studied women either working or not working has unsatisfactory food safety knowledge and practices which could be considered as risk factor for acquiring food poisoning which accordingly may hinder them from following the recommended food safety precautions and consequently jeopardize their family member to be more liable for food poisoning. In the agreement of the result, (**Mohamed et al., 2014**) indicated that the lack of food safety knowledge results in food safety-related health problems and home food preparer who are undereducated, or have low incomes have limited food safety knowledge and poor food handling practices. On the other hand, this result was contradicted with (**Pang et al., 2015**) that the majority of his study participants had an acceptable level of food safety knowledge and practices. These results can be explained to the unavailability of national food safety health campaigns, which can help in raising awareness regarding simple food safety and hygiene knowledge &practices.

Previous research indicates the influence of demographic factors in predicting food safety behavior, as these factors play a potential role in determining domestic food safety knowledge and practice (**Kwon et al., 2008 & Sudershan et al., 2008**). In this study, no significance differences were found between educational level and marital status regarding food safety knowledge and practices. This result was contradicted with (**Hussein et al., 2014**) who found that the higher level of education the higher level good food safety knowledge. This may be attributed to scarce of food safety basic knowledge in the undergraduate curriculum so they haven't any basic information. Also, may be due to the raising of self-confidence among university graduate regarding many things in life as they may be less worried about food hazards or safety in terms of their cooking skills or may be due to the inherited concepts about food safety from their mothers or family.

Moreover, it was found from the present study that three-quarters of those above 50 years had satisfactory total practices score while in contrast, nearly the majority of those who were above 30 to less than 40 years had unsatisfactory food safety practices. This result was congruent with (**Sakkaf, 2013**) this may be attributed to older people cook more safely because of their experience and may be because they were learning to cook in school as integrated curriculum in the past or because food preparation considers as habitual behavior, in comparison to young people.

Several studies have mentioned that foodborne most common sign is diarrhea and which attributed to poor hygiene as unclean water and food, unhygienic food

hygienic practices of caregivers. (Usfar & Iswarawanti, 2010) in accordance, the present study results reveal that less than two-thirds of women (working and nonworking) mentioned that one of their family members had food poisoning signs (diarrhea) during last 6 month. This result was in the line with (Fawzi & Shama 2009) (Meysenburg et al., 2014) who reported that nearly half of their studied sample has diarrhea as a sign of food poisoning. The lack of food preparer knowledge and practice about food safety increase the possible contribution to increasing high rate of food poisoning.

The present study revealed that less than half of the studied sample had reported that eating outside the house was the main cause of food poisoning only and the majority of women reported that they have either excellent and very good food safety knowledge. Concurrently, (Rima et al., 2008, Kang et al., 2010 & Farhat et al., 2015) mentioned that household preparer does not perceive food poisoning to be a high risk in relation to home-prepared food; and if they do encounter it, they expect it to have limited consequences. Also, mentioned that their participant was confident that they can manage the risk from food poisoning when preparing the food themselves because of their very good knowledge. This can be due to false awareness about what basic food safety knowledge and practices and mishandling of food in the home is direct threat to cause any food born disease in spite being reported of very good food safety-related knowledge and practices.

The findings drawn from the study reveals that there were considerable variations between working and nonworking women regarding many variables in relation to food safety main concepts as age, assumed food safety knowledge, reported overall health status, mean knowledge score in various domains of their knowledge and practices. In spite that working women had unsatisfactory knowledge and practices and overall responses not so far accepted but they consider to some extent better than nonworking women in all aspects. These results come on the line with (Sanlier 2010, Farhat et al., 2015 & McCarthy, et al., 2007.) that they mentioned that the highest mean knowledge and practices score were among women who were working than nonworking women. This result may be attributed to that working women are surrounded by a variety of chances and opportunities to change their wrong information and grasp new ideas, learn from others and update with daily life-related issues concerning food safety.

Finally, regarding the sources of food safety knowledge and practices, the present study shows that less than three-quarters of studied sample get

their food safety knowledge and practices from either Mass media or their daily life experiences. This result was in the line of (Sanlier, 2010, Parvathy, et al., 2012, Unusan, 2015 & Mostafa, 2008) that they mentioned that television and mass media was the common sources of food safety. Accordingly this can be attributed to lack of a suitable source of food safety information and also it is obvious from the other sources mentioned that there was no any governmental educational sources was available for both groups which illustrate the lack of required educational campaign. Also, this can explain one of the causes of unsatisfactory food safety knowledge and practices, especially of nonworking women.

Conclusions

Based on the findings of the current study it could be concluded that working women generally have food safety related knowledge more than nonworking women and in the same time, there were no significant differences found between them regarding food safety related practices. Women (working and non-working) who reported that they have very good level of food safety knowledge and practices, in fact, have unsatisfactory knowledge and practices. In the other hand, there were significant differences observed between women (working and nonworking) and their food safety-related knowledge and practices. The main sources of their food safety knowledge and practices were from mass media and their daily life experiences.

Recommendations

In the light of the findings the following recommendations are suggested:

- The need of more effective (i.e., behaviorally focused, theory-driven, tailored, and personalized) outreach food safety educational programs about safer food handling practices in relation to purchasing, transporting, storing, preparing and consuming food is essential to underpin food safety promotional activities for all women.
- Food safety subject should be introduced and integrated into curriculum from primary school level to college level to increase required knowledge and skills of the next generation of becoming a mother.
- A number of techniques can be employed to continually reinforce the early learning: public service announcements by radio, television or print media and campaign session especially to reach and through Primary Health Care Centers (family health center) about all concept of food safety.

- TV cookery show hosts could be educated to eliminate the poor practices which many currently use, and instead help to educate their viewers on the good practices needed in the kitchen.
- Supporting qualitative research would offer an additional method to gain in-depth insights into household food preparer behavior.
- Health authorities must develop and disseminate health and food safety information that is accurate and accessible in the workplace.

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