

Food Safety Knowledge, Practices and Attitudes of Community Dwelling Older Adults in Marsa Matrouh City, Egypt

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Abstract: Food safety is a global health goal and foodborne diseases are a major health problem in both developed and developing countries. Segments of the population at risk for foodborne diseases or food poisoning are children and the elderly. For the elderly people, foodborne diseases can be very dangerous, elderly people over the age of 60-year-old are hospitalized and die because of foodborne illnesses at significantly higher rates than the rest of the population. **Aim:** The present study aimed to identify the knowledge, practices and attitudes of community dwelling older adults in Marsa-Matrouh city, Egypt towards food safety. **Design:** A descriptive research design was used. **Setting:** The study was carried out at “El wafaa and El Ataa” club for older adults. This club is the only social club for older adults in Matrouh governorate. **Subjects:** All the community dwelling older adults who attended “El wafaa and El Ataa” club on the day of high rate of attendance during the period of three months were recruited conveniently, they include 124 elders. **Tools:** Two tools were used for data collection; Tool I: Socio-demographic, Health and Food Profile Structured Interview Schedule, and Tool II: The food safety knowledge, practices and attitudes questionnaire. **Results:** The findings of the present study concluded that, the total food safety attitude portrayed higher mean percent score, followed by total food handling practices, total personal and kitchen hygiene knowledge and total food safety knowledge with mean percent scores 86.5 ± 9.7 , 72.0 ± 7.9 , 69.8 ± 17.6 and 60.3 ± 16.3 respectively. It obviously noted that, personal/kitchen hygiene knowledge, food handling practice and food safety attitude score and total score was found to be positively correlated with food safety knowledge score. Furthermore, food handling practice and food safety attitude score and total score was found to be positively correlated with personal/kitchen hygiene knowledge score. Food safety attitude score and total scores was found to be positively correlated with food handling practices score. Finally, total score was found to be positively correlated with the food safety attitude score. **Recommendations:** The main recommendation of current study was to raising public awareness regarding food safety and its effect.

Keywords: Food Safety, Awareness, Food Profile, Elderly.

I. INTRODUCTION

Food safety is a global health goal and foodborne diseases are a major health problem in both developed and developing countries. Foodborne disease, often called food poisoning, is any disease caused by the eaten food. The World Health Organization (WHO) reported that there are around 2 million cases of food poisoning occurring annually worldwide, especially in developing countries. In the United States, the Centers for Disease Control and Prevention (CDC) reported that approximately 76 million people develop a foodborne illness each year, resulting in 325,000 hospital admissions and 5,000 deaths. (Centers for Disease Control and Prevention, 2014) (World health organization, 2015)& (Fadaei A, 2015)

Segments of the population at risk for foodborne diseases or food poisoning are children and the elderly. For the elderly people, foodborne diseases can be very dangerous. The latest data indicates that although children over 4 years old have the highest incidence of foodborne diseases, elderly people over the age of 60-year-old are hospitalized and die because of foodborne illnesses at significantly higher rates than the rest of the population. (Gerba, 1996), (Buccheri C, 2010) (Anderson A, 2011)& (Martins R, 2014)

When get aged, there is a higher risk of food-borne infection or poisoning as the results of the accumulation of age-related changes including; decreased immune system function, decreased stomach acidity and slow peristaltic movements that increase the possibility of colonizing microorganisms and increasing its toxins production. In addition, the older adults' sense of taste or smell may not always a sound alert especially when the food is spoiled or sour. Also, with aging there is an increase in the numbers of comorbid diseases and other factors, such as; increasing use of over the counter medications (OCM), malnutrition and lack of activity that increase the susceptibility to foodborne infections among older adults. (Kendall P, 2006), (Food safety and inspection service, 2011), (Anderson A, 2011), (Kendall H, 2013)& (Martins R, 2014)

Foodborne illness, or food poisoning, is caused by eating foods contaminated with pathogenic bacteria, toxins, viruses, or parasites. This contamination can be linked to consumption of high-risk foods, cross-contamination from food contact surfaces or persons and adopting improper food safety practices such as; unsanitary food-handling, and improper preservation and storage of food. (Anderson A, 2011), (Fadaei A, 2015)& (Evans E, 2016), Compared with younger adults, elderly persons aged 60 years and more had a higher incidence of foodborne infections caused by *Listeria*, *Salmonella*, *Vibrio*, and *Yersinia* species and *Escherichia coli* and the same or lower incidence of infections caused by *Campylobacter*, *Cryptosporidium*, *Cyclospora*, and *Shigella* species. (Smith, 1998), (Centers for Disease Control and Prevention C. f., 2003), (Kendall P, 2006)& (Anderson A, 2011), (Martins R, 2014)

Food safety and foodborne illness in older adults is a growing concern for the specialty of Gerontological and Community health nursing. Staying healthy and independent into old age is important because; the number of older populations are increased all over the world, and more elderly people will remain in the community as a result of continuing improvements in medical and public health care. (Anderson A, 2011) & (Yap L, 2016).

Gerontological and Community health nurse can play a vital role in increasing the awareness of older population regarding food safety and preventing the wide spread of foodborne illness among older adults through developing successful preventive nursing programs. The accurate assessment for food safety knowledge attitudes, and practices of older adults is the first step for developing sound preventive nursing programs, especially with the limited available information about food safety in old age. (ACMSF, 2008), (Cates Sc, 2009),(Anderson A, 2011), (Kosa KM, 2011), (Martins R, 2014) So, the present study aimed to; "Identify the food safety knowledge, practices and attitudes of community dwelling older adults in Marsa- Matrouh city, Egypt".

II. AIM OF THE STUDY

The present study aimed to;

Identify the knowledge, practices and attitudes of community dwelling older adults in Marsa- Matrouh city, Egypt towards food safety.

III. RESEARCH QUESTION

What is the knowledge, practices and attitudes of community dwelling older adults in Marsa- Matrouh city, Egypt towards food safety?

IV. MATERIALS AND METHODS

Materials

Design:

This study followed a descriptive research design.

Setting:

The study was carried out at "El wafaa and El Ataa" club for older adults. This club is the only social club for older adults in Matrouh governorate. This Club is affiliated to the Marsa- Matrouh Social club and serve about 200 community

dwelling older adults from both sex in Marsa- Matrouh city (The capital of Matrouh governorate). This Club is under supervision of the Ministry of Social affairs. The working hours of “El wafaa and El Ataa” club are from 6 pm to 10 pm three days per week (Sunday, Tuesday and Thursday).

Subjects:

All the community dwelling older adults who attended “El wafaa and El Ataa ” club on Thursday (The day of high rate of attendance) during a period of three months were recruited conveniently based on the following inclusion criteria: - aged 60 years and above, able to communicate and accepted to participate in the study. The sample comprised one hundred and twenty-four (124) older adults.

Tools: -

Two tools were used for data collection: -

Tool I: Socio-demographic, Health and Food Profile Structured Interview Schedule: -

This tool was developed by the researchers after a thorough review of the relevant literatures, it consisted of three parts:

Part1: Socio-demographic characteristics of the older adults: This part consists of questions related to the patient's age, sex, marital status, level of education, income, living arrangement, and level of social support.

Part 2: Health profile of the older adults: This part consists of questions related to patient's medical history of chronic diseases, type of medication, exposure to food poisoning, current gastrointestinal, smell, taste, chewing and swallowing problems.

Part 3: Food profile of the older adults: This part consists of questions such as; the responsible persons for purchasing and cooking food for older adult, and sources of knowledge related to food safety.

Tool II: The food safety knowledge, practices and attitudes questionnaire: -

The food safety knowledge, practices and attitudes questionnaire was developed by Memis. E *et al* (2012). It is designed to assess the food safety knowledge, food safety practices and food safety attitudes. It was divided into four sections: food safety knowledge (ten questions), personal/ kitchen hygiene knowledge (six questions), food handling practice (fourteen questions) and food safety attitude (eight questions).

Responses to the questions related to food safety knowledge subscale (section one and two) were graded as the following; one point for the right answer and zero for the wrong answer. The subscale related to safe food preparation practices (section three), included a set of negative sentences (statements, 1, 2, 5, 8, 10, and 11) in addition to the positive ones. Responses to the positive sentences were graded as follows: never 1, sometimes 2, always 3, while the responses to the negative sentences were graded in reverse order. Responses to the questions related to the subscale of food safety attitude (section four) were graded as follows: never 1, sometimes 2, always 3. A higher score represents a higher level of food safety and personal/kitchen hygiene knowledge, food handling practice and attitude.

Method

- Permissions to carry out the study from the responsible authorities of the Faculty of Nursing Matrouh University and the Marsa- Matrouh Social club were obtained after explanation of the purpose of the study, date and time of data collection.
- Tool I (Socio-demographic, Health and food Profile Structured Interview Schedule) was developed by the researchers after a thorough review of relevant literature.
- Tool II (The food safety knowledge, practices and attitudes questionnaire) was translated into Arabic language by the researchers.
- The study tools; I and II were tested for content validity by five (5) experts in the field of the study namely; Gerontological Nursing, Community Health Nursing and Geriatric Medicine.

International Journal of Novel Research in Healthcare and Nursing

Vol. 7, Issue 2, pp: (366-383), Month: May - August 2020, Available at: www.noveltyjournals.com

- The study tool II was tested for reliability on ten (10) older adults using Cronbach's coefficient alpha reliability method. The reliability result of tool (II) was 0.84 which means that the tool is 84% reliable.
- A pilot study was conducted on a sample equal to 10 % of the total sample size (13 older adults) selected from the outpatient clinics of the Matrouh general hospital to determine the clarity and applicability of the study tools and didn't included in the study sample.
- Data was collected by the researchers who attended at "El wafaa and El Ataa" club from 6 pm to 10 pm each Thursday (the day of older adults' high attendance rate) for a period of three months to collect the data.
- Those who meet the inclusion criteria were included conveniently in the study.
- Each older adult was interviewed face-to-face at the waiting area for approximately 30 min to complete the questionnaire.
- Data collection started from the first of September till the end of November 2019.

Ethical considerations: -

An informed verbal consent was acquired from every older adult involved in the study after providing appropriate explanations about the purpose of the study and volunteer participation and the right to refuse to participate in the study and withdraw from the research at any time were emphasized to them. The privacy and anonymity of the participants and confidentiality of the collected data were maintained.

Statistical Analysis:

- The collected data were coded and analyzed using PC with the International Business Machine- Statistical Package for Social Sciences (IBM-SPSS version 25) and tabulated frequency and percentages were calculated.
- The level of significance selected for this study was p-value equal to or less than 0.05.

V. RESULTS

Table (1) Distribution of Studied Elders According To Their Sociodemographic Data

Sociodemographic data	No.	%
Age (Year)		
Young-old	107	86.3
Middle-old	17	13.7
Mean±SD	65.2±5.4	
Min-Max	60-80	
Sex		
Female	90	72.6
Male	34	27.4
Level of education		
Illiterate	33	26.6
Read and write	8	6.5
Basic	16	12.9
Secondary	41	33.1
High	26	21.0
Marital status		
Single	5	4.0
Married	76	61.3
Widow	43	34.7
Living arrangements		
Alone	16	12.9
Spouse	37	29.8
Children	28	22.6
Spouse and children	43	34.7

Sociodemographic data	No.	%
Income		
Not enough	71	57.3
Enough	53	42.7
Work before retirement		
Housewife	73	58.9
Professional work	15	12.1
Skilled work	36	29.0

Table (1) shows the distribution of studied elders according to their sociodemographic data. The majority (86.3%) of elders were young old (aged 60 to less than 75 years old), while the rest (13.7%) of them were middle-old (aged 75 to less than 85 years old) with a mean age of 65.2±5.4 years. Around three quarters (72.6%) of them were females. Slightly more than one quarter (26.6%) of them were illiterate, compared to slightly more than one fifth (21%) who were highly educated. More than sixty (61.3%) of them were married. Around one tenth (12.9%) of them were living alone. Regarding their income, it was not enough among 57.3% as they said. More than half (58.9%) of them were housewife.

Table (2) Distribution of Studied Elders According To Their Health History

Health history	No.	%
Presence of chronic illnesses		
No	30	24.2
Yes	94	75.8
Number of chronic diseases		
Didn't have health problems	30	24.2
Yes, One problem	50	40.3
Yes, Multiple health problems	44	35.5
#Types of health problems	n(94)	
DM	60	63.8
HTN	50	53.2
Arthritis	9	9.6
Heart Disease	5	5.3
Cataract	4	4.3
Liver Diseases	3	3.2
Cholecystitis	1	1.1
Neuro vascular diseases	1	1.1
Anemia	1	1.1
Renal diseases	1	1.1
Received Medication	n(124)	
No	30	24.2
Yes, one type	50	40.3
Yes, more than one type	44	35.5
#Type of medication received	n(94)	
Antidiabetic	60	63.8
Antihypertensive	49	52.1
Anti-inflammatory	6	6.4
Anticoagulant	3	3.2
Liver drugs	3	3.2
Corticosteroids	2	2.1
Neuro vascular medication	2	2.1
Eye drop	2	2.1
Nitrate	1	1.1
Renal medication	1	1.1
Vitamins	1	1.1
Iron	1	1.1
Current GIT problems	n(124)	
No	36	29.0

Health history	No.	%
Yes	88	71.0
#Types of GIT disorders	n(88)	
Constipation	53	60.2
Heartburn	26	29.5
Distension	19	21.6
Diarrhea	4	4.5
Indigestion	2	2.3
Gastritis	2	2.3
Smell or taste changes at last year	n(124)	
No	105	84.7
Yes	19	15.3
Chewing or swallowing problems		
No	86	69.4
Yes	38	30.6
Using denture		
No	95	76.6
Yes	29	23.4
History of food poisoning during last year		
No	120	96.8
Yes, it caused due to eating at restaurant	4	3.2
Who buy food		
Themselves	50	40.3
Husband	29	23.4
Wife	13	10.5
Son	17	13.7
Daughter	15	12.1
Who cook food		
Themselves	63	50.8
Wife	26	21.0
Daughter	35	28.2
Sources of knowledge related to food safety		
No source	32	25.8
TV	48	38.7
Customs and traditions	24	19.4
Others (reading, internet)	20	16.0

Table (2) presents the distribution of studied elders according to their health history. More than three quarters (75.8%) of the elders were suffering from chronic illnesses. Slightly more than one third (35.5%) of them suffer from multiple health problem. Around two thirds (63.8%) of them have diabetes mellitus, followed by hypertension that was reported among more than half (53.2%) of them. Less than one tenth (9.6%) of them complained of arthritis and the minorities of them suffered from other health problems. It was noted from the table that 24.2% among those who have chronic health problems did not received medications. It also noticed that, the majority (88%) of them have GIT problems. More than half (60.2%) of them were reported that they have constipation, followed by heartburn among 29.5%, distension among 21.6%, and the minorities of them complained of diarrhea, indigestion and gastritis (4.5%, 2.3%, and 2.3% respectively). Only 15.3% of them reported that they have smell or taste changes during the last year. Regarding chewing or swallowing problems, less than one third (30.6%) of them suffered of this problem during the last year. More than one fifth (23.4%) using denture. The minority (3.2%) of them have history of food poisoning during the last year and it was caused by eating at restaurants outside their homes. There are 40.3% of them reported that they buy their food, followed by 23.4% of those who reported that their husband who buy food. More than half (50.8%) of them cooked their food. Finally, Television was the main source of information regarding food safety, followed by their custom and tradition (38.7% and 19.4% respectively), and the rest of them reported that they received information from other sources as reading and internet as reported by (16%).

Table (3) Distribution of Studied Elders According to Their Food Safety Knowledge

Food Safety Knowledge	Responses			
	Incorrect		Correct	
	No.	%	No.	%
The taste, appearance and smell of foods that cause food poisoning are bad (False)	121	97.6	3	2.4
There is no objection to the use of cracked or broken eggs (False)	46	37.1	78	62.9
Eggs that are cooked well can be kept at room temperature for more than 2 days (False)	46	37.1	78	62.9
Freezing does not kill bacteria in foods, only stops their reproduction (True)	37	29.8	87	70.2
Canned foods can be stored on shelves in the original packaging (True)	19	15.3	105	84.7
Foods stored incorrectly do not constitute a health hazard (False)	28	22.6	96	77.4
The internal temperature of chicken and Turkey must be high for safe cooking (True)	27	21.8	97	78.2
Raw eggs or foods containing raw eggs are hazardous (True)	60	48.4	64	51.6
Meals suspected of being spoiled could be consumed again after boiling (False)	93	75.0	31	25.0
Fruit and vegetables that can be peeled should be washed (True)	15	12.1	109	87.9

Table (3) shows the distribution of studied elders according to their food safety knowledge. The majority of elders have correct knowledge regarding that “Fruit and vegetables that can be peeled should be washed” and “canned foods can be stored on shelves in the original packaging” (87.9% and 84.7% respectively). More than three quarters of them have correct knowledge regarding that “The internal temperature of chicken and Turkey must be high for safe cooking”, “Foods stored incorrectly do not constitute a health hazard”, and “Freezing does not kill bacteria in foods, only stops their reproduction” (78.2%, 77.4%, and 70.2% respectively). It was noticed that 62.9% of them have correct knowledge regarding “There is no objection to the use of cracked or broken eggs” and “Eggs that are cooked well can be kept at room temperature for more than 2 days” with the same percentage, and only 51.6% of them have correct knowledge regarding that “Raw eggs or foods containing raw eggs are hazardous”. Worthwhile, it noticed that the vast majority (97.6%) of them didn’t know that “the taste, appearance and smell of foods that cause food poisoning are bad” and three quarter (75%) of them also didn’t know that “meals suspected of being spoiled could be consumed again after boiling”.

Table (4) Distribution of Studied Elders According to Their Personal and Kitchen Hygiene Knowledge

Personal and Kitchen Hygiene Knowledge	Responses			
	Incorrect		Correct	
	No.	%	No.	%
Cigarette smoke blown into the air contaminates foods and the air with saliva (True)	31	25.0	93	75.0
Wiping the cutting board with a disposable towel after use prevents bacterial growth (False)	67	54.0	57	46.0
Bacteria passed by hands to foods will cause toxins (True)	20	16.1	104	83.9
Hands should be dried with disposable towels (True)	36	29.0	88	71.0
Surfaces should be cleaned before preparing foods (True)	5	4.0	119	96.0
Swabs can be used as cleaning equipment during the preparation of foods (True)	65	52.4	59	47.6

Table (4) shows the distribution of studied elders according to their personal and kitchen hygiene knowledge. It was noticed from the table that, the majority of the elders have correct knowledge regarding that “surfaces should be cleaned before preparing foods”, “Bacteria passed by hands to foods will cause toxins (96% and 83.9% respectively). Around three quarters of them correctly know that “Cigarette smoke blown into the air contaminates foods and the air with saliva” and “Hands should be dried with disposable towels” (75% and 71% respectively). Whereas, more than half of them didn’t know that “wiping the cutting board with a disposable towel after use prevents bacterial growth” and “Swabs can be used as cleaning equipment during the preparation of foods” (54% and 52.4% respectively).

Table (5) Distribution of Studied Elders According To Their Food Handling Practices

Food Handling Practices	Responses					
	Never		Sometimes		Always	
	No.	%	No.	%	No.	%
Keep cooked foods at room temperature until they are cooled (-)*	56	45.2	60	48.4	8	6.5
Use dirty eggs carefully without washing (-)*	17	13.7	29	23.4	78	62.9
Do not touch cooked foods after handling raw foods	30	24.2	59	47.6	35	28.2
Keep raw and cooked food separate	8	6.5	19	15.3	97	78.2
Test the safety of milk by tasting instead of checking the expiry date (-)*	42	33.9	40	32.3	42	33.9
Store pasteurized milk in the refrigerator up to 3 days	21	16.9	52	41.9	51	41.1
Do not allow raw chicken, fish and meat to touch each other	19	15.3	35	28.2	70	56.5
Taste the foods to see whether they are safe or not (-)*	57	46.0	42	33.9	25	20.2
Do not freeze foods again after thawing.	22	17.7	59	47.6	43	34.7
Use outdoor milk after boiling for half an hour (-)*	70	56.5	32	25.8	22	17.7
Thaw frozen meat on countertops/ radiators (-)*	34	27.4	41	33.1	49	39.5
Put leftover foods into the refrigerator within two hours	47	37.9	43	34.7	34	27.4
After purchasing foods that could go off in a short time put them into the refrigerator within two hours	24	19.4	43	34.7	57	46.0
Wash poultry like chicken, turkey, etc. before cooking	4	3.2	4	3.2	116	93.5

*Negative statements denote poor practices (reversed scoring)

Table (5) portrays the distribution of studied elders according to their food handling practices. It was observed that, the majority (93.5%) of elders always wash poultry like chicken, turkey, etc. before cooking, more than three quarters (78.2%) of them always keep raw and cooked food separate, around two thirds (62.9%) of them always use dirty eggs carefully without washing. More than half (56.5%) of them always do not allow raw chicken, fish and meat to touch each other, and around two fifths of them reported that after purchasing foods that could go off in a short time they always put them into the refrigerator within two hours, and they always thaw frozen meat on countertops/ radiators (46% and 39.5% respectively).

Furthermore, it is noticed from the table that, more than two fifths of the elders were sometimes keep cooked foods at room temperature until they are cooled, do not touch cooked foods after handling raw foods, do not freeze foods again after thawing, and store pasteurized milk in the refrigerator up to 3 days (48.4%, 47.6%, 47.6% and 41.9% respectively). Finally, around half of the elders never use outdoor milk after boiling for half an hour, taste the foods to see whether they

are safe or not (56.5% and 46% respectively). Additionally, around one third of them never put leftover foods into the refrigerator within two hours and test the safety of milk by tasting instead of checking the expiry date (37.9% and 33.9% respectively).

Table (6) Distribution of Studied Elders According To Their Food Safety Attitudes

Food Safety Attitude	Responses					
	Never / Not agree		Sometimes/ Somewhat agree		Always agree	
	No.	%	No.	%	No.	%
It is not important whether bought ready meals contain additives or not	70	56.5	26	21.0	28	22.6
Branded products should be purchased	13	10.5	42	33.9	69	55.6
A clean environment of places selling	6	4.8	9	7.3	109	87.9
Food products is important	0	0.0	15	12.1	109	87.9
The nutrient value should be considered rather than food taste	12	9.7	48	38.7	64	51.6
Food shopping should be done at supermarkets that are considered to offer better quality products	7	5.6	61	49.2	56	45.2
Sales promotions have an important impact on the decision to buy certain foods	3	2.4	69	55.6	52	41.9
Bloated cans should not be consumed	50	40.3	26	21.0	48	38.7
When purchasing products, one should read the information and instructions on packaging carefully	65	52.4	26	21.0	33	26.6

Table (6) shows the distribution of studied elders according to their food safety attitudes. It well noted from the table that 87.9% of the elders always have positive attitudes toward that “a clean environment of places selling” and “food products is important” with the same percentage, more than half of them also always have positive attitudes toward that “branded products should be purchased” and “the nutrient value should be considered rather than food taste” (55.6% and 51.6% respectively). Additionally, around half of the elders somewhat agreed that “sales promotions have an important impact on the decision to buy certain foods” and “food shopping should be done at supermarkets that are considered to offer better quality products” (55.6% and 49.2% respectively). Finally, more than half of them were never agreed that “it is not important whether bought ready meals contain additives or not” and “when purchasing products, one should read the information and instructions on packaging carefully” (56.5% and 52.4% respectively), and slightly more than two fifths (40.3%) never agreed that “bloated cans should not be consumed”.

Table (7) Distribution of Studied Elders According To Their Total Food Safety Knowledge, Personal/Kitchen Hygiene Knowledge, Food Handling Practice, Food safety attitudes and Total Mean and Mean Percent Scores

Scores according to various variables	Maximum allowed scores	Mean±SD	Mean%±SD	Min-Max
Total Food Safety Knowledge	10	6.0±1.6	60.3±16.3	2-9
Total Personal and Kitchen Hygiene Knowledge	6	4.1±1.0	69.8±17.6	1-6
Total Food handling practices	42	30.2±3.3	72.0±7.9	21-37
Total Food safety attitude	24	20.7±2.3	86.5±9.7	15-27
Total	82	61.2±5.9	74.6±7.2	43-73

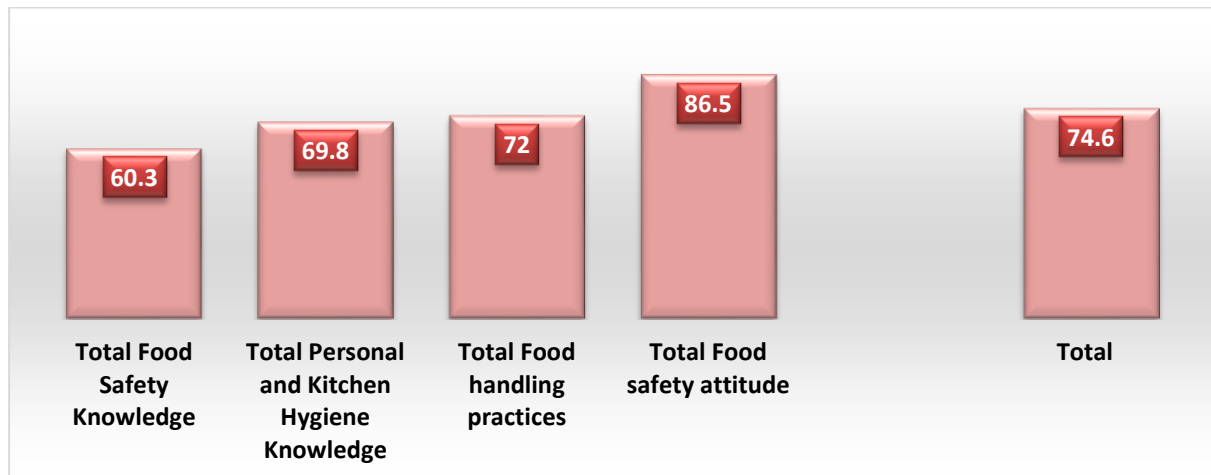


Figure (1) Total food safety knowledge, personal/kitchen hygiene knowledge, food handling practice, food safety attitudes and Total percent scores of Studied Elders

Table (7) and figure (1) shows the distribution of studied elders according to their total food safety knowledge, personal/kitchen hygiene knowledge, food handling practice, food safety attitudes and total mean and mean percent scores. The total food safety attitudes portrayed higher mean percent score, followed by total food handling practices, total personal and kitchen hygiene knowledge and total food safety knowledge with mean percent scores 86.5±9.7, 72.0±7.9, 69.8±17.6 and 60.3±16.3 respectively.

Table (8) The Association between Total Food Safety Knowledge, Personal/Kitchen Hygiene Knowledge, Food Handling Practice, Food safety attitudes and Total scores and Some Sociodemographic Data of Studied Elders

Variables	Total food safety knowledge		Total personal and kitchen hygiene		Total food handling practices		Total food safety attitudes		Total score	
	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)
Age (year)										
Young-old	5.9±1.6	.759	4.2±1.0	.101	30.3±3.5	1.206	20.7±2.4	.290	61.2±6.2	.142
Middle-old	6.3±1.1	(.385)	4.1±0.8	(.751)	29.4±1.7	(.274)	21.0±1.7	(.591)	60.7±3.3	(.707)
Sex										
Female	6.0±1.5	.000	4.2±1.0	.760	30.5±3.1	3.123	20.8±2.4	.137	61.6±5.8	1.976
Male	6.0±1.7	(.991)	4.0±1.1	(.385)	29.3±3.7	(.080)	20.6±2.0	(.712)	60.0±5.9	(.162)
Level of education										
Illiterate	5.5±1.8		3.9±1.1		29.2±3.3		19.5±1.7		58.3±5.7	
Read and write	4.8±1.1		3.3±1.0		29.6±3.0		19.8±3.6		57.7±7.6	
Basic	6.5±1.4	2.790	4.4±.9	3.086	30.6±2.5	2.036	20.5±2.0	5.478	62.1±3.7	5.733
Secondary	6.1±1.6	(.029)*	4.2±.9	(.019)*	30.1±3.9	(.094)	21.2±2.4	(<.001)**	61.7±6.4	(<.001)**
High	6.5±1.3		4.5±.9		31.6±2.3		22.0±1.5		64.5±3.4	
Marital status										
Single	7.4±1.3		4.8±.4		33.0±1.2	2.490	21.2±1.3	1.643	66.4±1.6	3.536
Married	6.1±1.6	3.067	4.1±1.1	.908	30.3±3.6	(.087)	21.0±2.5	(.198)	61.6±6.3	(.032)*
Widow	5.6±1.5	(.050)*	4.2±.9	(.406)	29.6±2.8		20.2±1.9		59.7±5.0	
Living arrangements										
Alone	6.3±1.6		4.5±1.0		29.6±3.2		20.7±1.8		61.2±6.2	
Spouse	6.3±1.4	1.633	4.1±1.2	.709	31.0±3.7	1.153	21.1±3.0	1.270	62.6±7.0	1.636
Children	5.5±1.5	(.185)	4.0±0.7	(.549)	29.7±2.6	(.331)	20.0±1.9	(.288)	59.4±4.6	(.185)
Spouse and children	5.9±1.7		4.2±1.0		30.0±3.4		20.8±1.9		61.0±5.3	
Income										
Not enough	5.7±1.7	7.035	4.0±1.0	5.789	29.3±3.3	12.341	20.3±2.3	6.005	59.4±5.4	17.479
Enough	6.4±1.3	(.009)**	4.4±1.0	(.018)*	31.4±2.9	(.001)**	21.3±2.2	(.016)*	63.6±5.6	(<.001)**
Work before retirement										
Housewife	5.8±1.6		4.1±.9		29.9±3.0		20.4±2.4		60.4±5.4	
Professional work	5.6±1.9	1.990	3.7±1.2	3.523	29.1±3.7	3.137	20.4±1.8	2.921	58.9±6.7	5.556
Skilled work	6.4±1.4	(.141)	4.5±1.0	(.033)*	31.3±3.6	(.047)*	21.5±2.1	(.058)*	63.7±5.6	(.005)**

F:ANOVA test

(Sig):Significance P value of ANOVA test

*significance at p value ≤0.05

**significance at p value ≤0.01

Table (8) The Association between total food safety knowledge, personal/kitchen hygiene knowledge, food handling practice, food **safety attitudes** and total scores and some sociodemographic data of studied elders. It noticed from the table that there is a significant association between the elders' level of education and their total food safety knowledge, total personal and kitchen hygiene, total food safety attitude and the overall total score (F:2.79 with P value 0.029, F:3.086 with P value 0.019, F: 5.478 with P value <0.001, and F: 5.733 with P value <0.001 respectively). There is a significant association between the elders' marital status and their total food safety knowledge and the overall total score (F:3.067 with P value 0.050 respectively). There is a significant association between the elders' income sufficiency and their total food safety knowledge, total personal and kitchen hygiene, total food handling practices, total food safety attitude and the overall total score (F:7.035 with P value 0.009, F:5.789 with P value 0.018, F: 12.341 with P value 0.001, F: 6.005 with P value 0.016 and F: 17.479 with P value <0.001 respectively). Moreover, there is a significant association between the elders' working before retirement and their total personal and kitchen hygiene, total food handling practices, total food safety attitudes and the overall total score (F:3.523 with P value 0.033, F:3.137 with P value 0.047, F: 2.921 with P value 0.058, and F: 5.556 with P value 0.005 respectively). Finally, there is no significant association observed between sex, age, and living arrangement and all of the total scores.

Table (9) The Association between Total Food Safety Knowledge, Personal/Kitchen Hygiene Knowledge, Food Handling Practice, Food safety attitudes and Total scores and Health History of Studied Elders.

Health history	Total food safety knowledge		Total personal and kitchen hygiene		Total food handling practices		Total food safety attitudes		Total score	
	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)	Mean ±SD	F (Sig)
Presence of chronic illnesses										
No	6.3±1.5	1.669	4.3±1.0	1.063	31.7±3.3	7.880	21.2±2.9	1.313	63.6±7.0	6.972
Yes	5.9±1.6	(.199)	4.1±1.0	(.305)	29.7±3.2	(.006)**	20.6±2.1	(.254)	60.4±5.2	(.009)**
Number of chronic diseases										
Didn't have health problems	6.3±1.5	1.603 (.205)	4.3±1.0	.597 (.552)	31.7±3.3	4.465 (.013)*	21.2±2.9	2.113 (.125)	63.6±7.0	4.618 (.012)*
One problem	6.1±1.7		4.1±1.0		30.1±2.9		21.0±2.2		61.2±5.0	
Multiple health problems	5.7±1.5		4.1±1.0		29.4±3.5		20.2±1.8		59.5±5.4	
Received Medication										
No	6.3±1.5	1.669	4.3±1.0	1.063	31.7±3.3	7.880	21.2±2.9	1.313	63.6±7.0	6.972
Yes	5.9±1.6	(.199)	4.1±1.0	(.305)	29.7±3.2	(.006)**	20.6±2.1	(.254)	60.4±5.2	(.009)**
Number of medications received										
Didn't received medication	6.3±1.5	1.603 (.205)	4.3±1.0	.597 (.552)	31.7±3.3	4.465 (.013)*	21.2±2.9	2.113 (.125)	63.6±7.0	4.618 (.012)*
Yes, one type	6.1±1.7		4.1±1.0		30.1±2.9		21.0±2.2		61.2±5.0	
Yes, More than one type	5.7±1.5		4.1±1.0		29.4±3.5		20.2±1.8		59.5±5.4	
Current GIT disorders										
No	5.9±1.6	.253	4.0±1.1	.550	30.1±4.0	.047	21.4±2.5	4.647	61.6±6.9	.232
Yes	6.0±1.6	(.616)	4.2±1.0	(.460)	30.2±3.0	(.828)	20.4±2.2	(.033)*	61.0±5.4	(.631)
History of food poisoning during last year										
No	6.0±1.6	.123	4.1±1.0	1.147	30.3±3.3	2.797	20.8±2.3	.450	61.3±5.8	1.220
Yes	5.7±1.5	(.727)	4.7±1.2	(.286)	27.5±1.7	(.097)	20.0±2.8	(.503)	58.0±6.6	(.272)
Who cook food										
Themselves	6.2±1.5	1.300 (.276)	4.3±1.1	1.421 (.246)	30.7±3.3	1.639 (.198)	21.4±2.5	6.004 (.003)**	62.7±6.2	4.688 (.011)*
Wife	6.0±1.8		4.0±1.2		29.4±3.8		20.4±2.0		59.7±5.6	
Daughter	5.6±1.5		4.0±0.7		29.9±2.9		19.8±1.7		59.5±4.8	

F:ANOVA test

(Sig):Significance P value of ANOVA test

*significance at p value ≤0.05

**significance at p value ≤0.01

Table (9) The association between total food safety knowledge, personal/kitchen hygiene knowledge, food handling practice, food **safety attitudes** and total scores and health history of studied elders. There is a significant association

between the presence of chronic illnesses among studied elders, numbers of chronic diseases, received medication, numbers of received medication and who cooked food and their total food handling practices and the overall total score ((F:7.880 with P value 0.006 and F:6.972 with P value 0.009), (F:4.465 with P value 0.013 and F:4.618 with P value 0.012), (F:7.880 with P value 0.006 and F:6.972 with P value 0.009), (F:4.465 with P value 0.013 and F:4.618 with P value 0.012), and (F:6.004 with P value 0.003 and F:4.688 with P value 0.011 respectively)). Additionally, there is a significant association between the current GIT and the elders’ total food safety attitudes (F:4.647 with P value 0.033). Finally, there is no significant association noted between the presence of chronic illnesses among the elders, number of chronic diseases, received medication, number of received medication, current GIT disorders, history of food poisoning and who cooked food and the elders’ total food safety knowledge and total personal and kitchen hygiene.

Table (10) Correlation of Food Safety Knowledge, Personal/Kitchen Hygiene Knowledge, Food Handling Practice, Food Safety Attitudes Score and The Total Scores (r) of Studied Elders

	Personal/kitchen Hygiene Knowledge		Food Handling practices		Food safety attitude		Total	
	R	P value	r	P value	r	P value	r	P value
Food Safety Knowledge	0.213	0.017*	0.443	<0.001**	0.236	0.008*	0.653	<0.001**
Personal/kitchen Hygiene Knowledge			0.204	0.023*	0.192	0.033*	0.431	<0.001**
Food Handling practices					0.310	<0.001**	0.848	<0.001**
Food safety attitudes							0.666	<0.001**

r: Pearson Correlation

P value: P value of Pearson Correlation

*significance at p value ≤0.05

**significance at p value ≤0.01

Table (10) portrays the correlation of food safety knowledge, personal/kitchen hygiene knowledge, food handling practice, food handling attitudes scores and the total scores (r) of Studied Elders. It obviously noted from the table that, personal/kitchen hygiene knowledge, food handling practice and food safety attitudes score and total score was found to be positively correlated with food safety knowledge score (r: 0.213 with P value 0.017, r:0.443 with P value <0.001, r:0.236 with P value 0.008 and r:0.653 with P value <0.001 respectively). Furthermore, food handling practice and food safety attitudes score and total score was found to be positively correlated with personal/kitchen hygiene knowledge score (r: 0.204 with P value 0.023, r:0.192 with P value 0.033, and r:0.431 with P value <0.001 respectively). Additionally, food safety attitudes score and total scores was found to be positively correlated with food handling practices score (r: 0.310 with P value <0.001 and r:848 with P value <0.001respectively). Finally, total score was found to be positively correlated with the food safety attitudes score (r: 0.666 with P value <0.001).

VI. DISCUSSION

Although anyone at any age can fall victim to food poisoning, the elderly people are more at risk for a number of reasons. Older adults’ immune systems are not as robust as they once were. This makes it harder to fight off bacteria, parasites, and other pathogens. Seniors also have less stomach acid, resulting in slower digestion and diminished resistance to foreign bacteria. They have more, weakened kidneys which are not as effective in filtering toxins out of the blood as healthy kidneys. This means once contracted, food poisoning can be difficult to recover from and may reoccur. Other factors that make the elderly more vulnerable to food poisoning include **poor** eyesight and sense of smell (Dispatch Health Group, 2020). This shed the light on the importance of conduct studies to understand the underline cause behind food poisoning among these age group and its factors and how to prevent such problem. So, the present study aimed to; “Identify the food safety knowledge, practices and attitudes of community dwelling older adults in Marsa- Matrouh city, Egypt”.

The findings of the current study noticed that, the majority of elders were young old (aged 60 to less than 75 years old), while the rest of them were middle-old (aged 75 to less than 85 years old) with a mean age of 65.2±5.4 years. More than three quarters of them were suffering from chronic illnesses. Slightly more than one third of them suffer from multiple health problems. Around two thirds of them have diabetes, followed by hypertension that was reported among more than half of them, and around a quarter among those who have chronic health problems did not received medications. The

minority of them have history of food poisoning during the last year and it was caused by eating at restaurants outside their homes.

Also, the majority of the studied elders have GIT problems. More than half of them were reported that they have constipation, followed by heartburn among less than one third, distension among slightly more than one fifth, and the minorities of them complained of diarrhea, indigestion and gastritis. And 15.3% of them reported that they have smell or taste changes during the last year that may (affect their) increase the risk to get food poisoning. These findings may be attributed to aging process and weak immune system. These findings highlight the importance of raising the older adults' awareness toward the food safety precautions to be followed in order to protect them.

One of the important factors affecting the risk associated with food poisoning is food source, so it is recommended to understand who buy food and the place selected to purchase food as well as the precautions followed when selecting food to buy and preparing it (Jevsnik et al, 2013). Additionally, Jevsnik et al, 2013 added that, the elderly is not sufficiently aware of how important their role in the food supply chain is. Their behavior is not always in accordance with good hygiene practice and may lead to food-borne diseases at home. In the current study, there are forty percent of the studied elders reported that they buy their food, followed by more than one fifth of those who reported that their husband who buy food. More than half of them cooked their food. They added that Television was the main source of information regarding food safety, followed by their custom and tradition, and other sources as reading and internet. These findings confirm Roy findings 2016 who use the online food safety education mini-modules and stated that it was well-received by participants and were effective in promoting awareness of recommended food safety practices for older adults.

Since the current study aimed to identify the knowledge, practices and attitudes of community dwelling older adults in Marsa- Matrouh city, Egypt towards food safety, the current study showed that the mean percent total score of food safety knowledge is 60.3%. The majority of elders have a correct knowledge regarding that "Fruit and vegetables that can be peeled should be washed" and "canned foods can be stored on shelves in the original packaging". More than three quarters of them have correct knowledge regarding that "The internal temperature of chicken and Turkey must be high for safe cooking", "Foods stored incorrectly do not constitute a health hazard", and "Freezing does not kill bacteria in foods, only stops their reproduction". It was noticed that around two thirds of them have correct knowledge regarding "There is no objection to the use of cracked or broken eggs" and "Eggs that are cooked well can be kept at room temperature for more than 2 days" with the same percentage, and only half of them have correct knowledge regarding that "Raw eggs or foods containing raw eggs are hazardous". Worthwhile, it noticed that the vast majority of them didn't know that "the taste, appearance and smell of foods that cause food poisoning are bad" and three quarter of them also didn't know that "meals suspected of being spoiled could be consumed again after boiling". In this regard, United States Department of Agriculture Food Safety and Inspection Service (FSSIS), 2013 declared that knowledge of safe food handling helps older adults stay healthy. Some older adults are homebound and must rely on delivered food. Others have minimal cooking experience. It's important to understand the effect of pathogens and other microorganisms on elderly bodies. Practicing the safeguards necessary to avoid foodborne illness is the best way to stay healthy. The findings of the present study indicate that around two fifths of the studied elders have poor knowledge regarding food safety that may be attributed to that 46 percent of them were illiterate or just read and write or only have basic education, sometimes the source of information regarding food safety wasn't enough or well prepared to supply them with the sufficient knowledge regarding food safety.

The Canadian Center for Occupational Health and safety (CCOHS) (2020), documented that, poor cleaning and personal hygiene habits/practices can cause food contamination, food poisoning, and spread of infection. This fact confirmed the current study findings regarding personal and kitchen hygiene knowledge, where, the majority of the elders have correct knowledge regarding that "surfaces should be cleaned before preparing foods", "Bacteria passed by hands to foods will cause toxins. Around three quarters of them correctly know that "Cigarette smoke blown into the air contaminates foods and the air with saliva" and "Hands should be dried with disposable towels". Whereas, more than half of them didn't know that "wiping the cutting board with a disposable towel after use prevents bacterial growth" and "Swabs can be used as cleaning equipment during the preparation of foods". These findings indicate the importance to orient them more regarding these weak points in food safety which can be handled correctly if they concerned.

Safe steps in food handling, cooking, and storage are essential to prevent foodborne illness. Since elder can't see, smell, or taste harmful bacteria that may cause illness. So it recommended in every step of food preparation, to follow the four steps of the Food Safe Families campaign to keep food safe which include Clean "Wash hands and surfaces often", Separate "Don't cross-contaminate", Cook "Cook to the right temperature" and Chill "Refrigerate promptly" (United States Department of Agriculture (USDA), Food Safety and Inspection Service, (2015). In this regard, this study shed the light on food handling practices, where, the majority of elders always wash poultry like chicken, turkey, etc. before cooking, more than three quarters of them always keep raw and cooked food separate, around two thirds of them always use dirty eggs carefully without washing. More than half of them always do not allow raw chicken, fish and meat to touch each other, and around two fifths of them reported that after purchasing foods that could go off in a short time they always put them into the refrigerator within two hours, and they always thaw frozen meat on countertops/ radiators. These findings similar to Murray et al, 2017 findings in their research entitled "Canadian Consumer Food Safety Practices and Knowledge: Food book Study". These findings may put them at risk to get infection easily, so it is important to alarm them about the bad consequences.

Furthermore, it is noticed that, more than two fifths of the elders were sometimes keep cooked foods at room temperature until they are cooled, do not touch cooked foods after handling raw foods, do not freeze foods again after thawing, and store pasteurized milk in the refrigerator up to 3 days. Finally, around half of the elders never use outdoor milk after boiling for half an hour, taste the foods to see whether they are safe or not. Additionally, around one third of them never put leftover foods into the refrigerator within two hours and test the safety of milk by tasting instead of checking the expiry date. These findings go in line with Yusof et al, 2018 and John Hopkins Medicine, 2020.

Additionally, Anderson et al, 2011 found that adults over sixty years of age were more likely to follow recommended food safety practices than those lesser than sixty years of age. Women, those with less education, and nonwhite individuals generally had better food safety practices and a greater awareness of food safety risk. Al-Sakkaf, 2015 also added that the research indicated the influence of demographic factors (age, gender, level of education, income, work hours, race, location, culture), as they play a potential role in determining domestic food safety behavior. These findings confirmed by the current study findings, where, there is a significant association between the elder's level of education and their total food safety knowledge, total personal and kitchen hygiene, total food safety attitude and the overall total score. In Egyptian society women mainly responsible to prepare food so it is important to orient them about such precautions. Men also must be included in order to help to protect themselves and their family.

Satisfactory Food Safety Attitude (FSA) is recommended to protect elders from getting food poisoning risks, since positive attitude mainly linked with good practices. Teffo and Tabit (2020) reported that, all the hospital food handlers possess at least a satisfactory FSA. One of the good findings in the current study indicate that food safety attitude of the studied elders revealed that the majority of the elders always have positive attitude toward that "a clean environment of places selling" and "food products is important" with the same percentage, more than half of them also always have positive attitude toward that "branded products should be purchased" and "the nutrient value should be considered rather than food taste". Additionally, around half of the elders somewhat agreed that "sales promotions have an important impact on the decision to buy certain foods" and "food shopping should be done at supermarkets that are considered to offer better quality products". Finally, more than half of them were never agreed that "it is not important whether bought ready meals contain additives or not" and "when purchasing products, one should read the information and instructions on packaging carefully", and slightly more than two fifths never agreed that "bloated cans should not be consumed". The same findings were reported by Anderson et al, 2011. Evans and Redmond, 2019 also found that older adults perceived themselves to have lower levels of risk than other individuals have, suggesting perceptions of optimistic bias and personal invulnerability regarding food safety.

It obviously noted that, personal/kitchen hygiene knowledge, food handling practice and food safety attitude score and total score was found to be positively correlated with food safety knowledge score. Furthermore, food handling practice and food safety attitude score and total score was found to be positively correlated with personal/kitchen hygiene knowledge score. Additionally, food safety attitude score and total scores was found to be positively correlated with food handling practices score. Finally, total score was found to be positively correlated with the food safety attitude score. These findings are confirmed by Teffo and Tabit (2020).

There is a significant association between the elder's marital status and their total food safety knowledge and the overall total score. There is a significant association between the elder's income sufficiency and their total food safety knowledge, total personal and kitchen hygiene, total food handling practices, total food safety attitude and the overall total score. Moreover, there is a significant association between the elder's working before retirement and their total personal and kitchen hygiene, total food handling practices, total food safety attitude and the overall total score. In this regard, Wright et al, 2011 confirmed that, food safety attitude and knowledge affecting elders' safe practices. These findings were expected since income affecting person practices in all aspect of their life in addition to working experiences may add value to their knowledge transmission specially when concerned with food and eating practices that take a part of worker's communication in our society.

Furthermore, the current study found that, there is a significant association between the presence of chronic illnesses among the elders, numbers of chronic diseases, received medication, number of received medication and who cooked food and their total food handling practices and the overall total score. Additionally, there is a significant association between the current GIT problems affecting older adults and the elder's total food safety attitude. These findings go in line with Langiano et al, 2012, and Mulkey (2014). These findings may be attributed to their aging process and changes in their immune system.

The eating history of each individual has a close relationship to their health-disease profile. Therefore, nutrition, as an integrating part of institutional and individual health practices, has an important role throughout life (Heitor et al, 2013). Tack et al (2020) documented that, to better protect the public and achieve forthcoming Healthy People 2030 foodborne disease reduction goals, more widespread implementation of programs to raise preventive measures awareness and new strategies that target particular pathogens and serotypes are needed. Gerontological and Community health nurse have a significant role to protect the older adults and makes them more oriented and ready to fight food poisoning and carry suitable precautions toward food safety (Behravesht et al., 2011).

VI. CONCLUSION

The findings of the present study concluded that, the total food safety attitudes portrayed higher mean percent score, followed by total food handling practices, total personal and kitchen hygiene knowledge and total food safety knowledge with mean percent scores 86.5 ± 9.7 , 72.0 ± 7.9 , 69.8 ± 17.6 and 60.3 ± 16.3 respectively. It obviously noted that, personal/kitchen hygiene knowledge, food handling practice and food safety attitudes score and total score was found to be positively correlated with food safety knowledge score. Furthermore, food handling practice and food safety attitudes score and total score was found to be positively correlated with personal/kitchen hygiene knowledge score. Food safety attitudes score and total scores was found to be positively correlated with food handling practices score. Finally, total score was found to be positively correlated with the food safety attitudes score.

VI. RECOMMENDATION

Based on the findings of the current study, the following recommendations are suggested:

- ❖ Nursing assessment of food safety knowledge, practices and attitudes of community dwelling older should be an integral part of the comprehensive assessment of them.
- ❖ Developing a simplified illustrated and comprehensive Arabic brochures or flayers including information related to safe food handling for older adults in order to raising the community awareness.
- ❖ Developing health education sessions for community dwelling older adults and gerontological and community health nurses about food safety and older adults.

Further research:

- ❖ Replication of the present study using a larger sample to confirm and further valid the findings of the current study.

ACKNOWLEDGEMENT

The authors would like to express their appreciation to the studied elders who devote their time to participate in this research.

Conflict of interest

The authors declared that they have no conflict of interest.

Author contribution

All three authors were part of the initial design of the research. They shared in collected and analyzed the data, wrote and edited the final version of the text of the manuscript and formatted it and submitted it for publication.

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International Journal of Novel Research in Healthcare and Nursing

 Vol. 7, Issue 2, pp: (366-383), Month: May - August 2020, Available at: www.noveltyjournals.com

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