

## Effect of nursing intervention on constipation among elderly in Zagazig city Sharkia governorate-Egypt

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### ABSTRACT:

Constipation is one of the most common gastrointestinal complaints among elderly people. **Aim:** The aim of this study was to evaluate the effect of nursing intervention on constipation among elderly. **Design:** The study was carried out using a quasi- experimental design to evaluate the effect of the intervention on constipation among elderly. **Setting:** It was conducted in the Geriatric Social Club at Zagazig city. **Sample:** A purposive sample consisted of 100 elderly randomly divided into two equal groups (50 a study group and 50 a control group). **Tool for data collection:** A structured interview questionnaire covering demographic characteristics, past medical history, dietary habits, elimination habits, knowledge and practice about constipation. A health education intervention program developed based on literature and identified needs was implemented and its effect was evaluated through a posttest. **Results:** The study findings revealed statistically significant improvements of the knowledge of elderly in the study group, with decreases in intake of anti-allergics, sedatives and hypnotics, and laxatives. They also had significant improvements in sleep, psychological problems, and exercise practice. They had significant increases in eating regular meals and brown bread, and improvements in elimination habits, and associated complaints. **Conclusion:** The study concluded that the health education intervention led to improvements in elderly's knowledge and practices regarding the constipation problem, with subsequent improvements in their complaints and complications. **Recommendation:** the study recommended that implementation of the developed health education program in similar settings, with future research to assess its long-term effects. [Eman Shokry Abd Allah, Heba Ali Allah Ibrahim and Howaida Henry Fahmy. **Effect of Nursing Intervention On Constipation Among Elderly In Zagazig City-Sharkia Governate-Egypt. *J Am Sci* 2013;9(3s):32-43]. (ISSN:1545-1003). <http://www.jofamericanscience.org>. 5**

**Key words:** Constipation; elderly; and nursing intervention.

### 1.INTRODUCTION

Advances made in technology, medical care and nutrition have increased the average life expectancy of older persons today, making them physically stronger, more active and improving their all-round health (Tyagi, 2006). With these increasing trends in population aging comes a higher prevalence of chronic diseases, of which the gastrointestinal diseases are of particular importance (Clarke and Pearson, 2007). Constipation is one of the most common gastrointestinal complaints in elderly people (Wald et al., 2008).

Constipation is a symptom and not a disease. It occurs when the colon absorbs too much water or if the colon's muscle contractions are slow or sluggish, causing the stool to move through the colon too slowly (Lembo, 2010). Contributory factors include reduced mobility, a low-fiber diet, not drinking enough fluids, and lack of exercise, along with the overuse of laxative agents, various medications as diuretics, and iron supplements (National Institute on Aging, 2009; Ford and Suares, 2011). It can result in complications as hemorrhoids (Chong and Bartolo, 2008), and fecal impaction (Singh et al., 2007), and psychological impact on the quality of life (Jeffrey et al., 2009). Prevention has a major role in constipation. Preventive strategies are aimed at improving the overall hydration level prior to

increasing dietary fiber intake, and at establishing a consistent toileting schedule that supports the defecation reflex (Koh et al., 2008).

Massage treatment on the abdomen and back is used in constipation to help stimulate peristalsis waves in the colon to start the stagnant fecal matter moving again (McClurg et al., 2011). When applied to the abdominal area, it may help relax the muscles that support the bladder and intestines and help promote bowel activity. It also reduces discomfort and pain, induces relaxation, and improves quality of life (Hass, 2010). Additionally, it encourages the toxins to flush out through the lymphatic system (McClurg and Lowe-Strong, 2011). Many cultures have designed massage techniques specifically for the abdomen such as the *Swedish Peristalsis Massage* (Calver, 2006), the *Thai Hara massage* (Verhoef, 2007), the *Chinese Chi Nei Tsang Massage* (Chia, and Mantak, 2005), and the *Mayan Latin American massage* (Preece, 2006). Another massage modality is the acupressure, which uses gentle to firm pressure and integrates bodywork therapies and massage therapy techniques (Wang et al., 2009). The point has to be hold until the excess energy is released (Klaiman et al., 2008).

Acupressure technique for constipation involves applying pressure on certain areas of the body to stimulate the bowels (Jung et al., 2008).

In Egypt, population in the age group 65 years and over represents 4.2% of the total population, expected to increase to reach 5.2% by 2017 (*Central Agency for Public Mobilization and Statistics [CAMPAS], 2010*). This means more aging problems and demands. Despite the increasing awareness of functional bowel disease as the irritable bowel syndrome, there is no accurate information on its epidemiology in Egypt. However, the irritable bowel syndrome is believed to be very common, reaching 34.2% in the elderly attending primary health care centers in Suez governorate, of which 37.5% presented with constipation (*Abdulmajeed et al., 2011*).

The community health nurses may play a vital role in organizing and delivering educational sessions that help in the prevention of constipation and enhance the quality of life for the clients by using structured, systematic planning process, and ongoing support for implementation. A core education session must take into account local circumstances and should be disseminated through an active educational and training program. These must be monitored to evaluate their impact on the prevention of constipation (*Registered Nurses' Association of Ontario, 2005*).

#### **Significance of study**

Constipation is one of the most common gastrointestinal (GI) complaints of the older person and is related to a range of factors associated with ageing. It can cause physical discomfort, embarrassment and lead to concerns about an individual's capacity to live independently. Several factors can predispose an elderly individual to constipation such as physical, neurological and psychological disorders; insufficient dietary fiber; changes in fluid and electrolyte regulation; as a side effect of certain medication; changes in the social environment and neglecting the urge to defecate (*Page and Brownie, 2005*).

#### **Aim of study:**

The aim of this study was to evaluate the effect of nursing intervention on constipation among elderly.

#### **Study Hypothesis**

Achieving and maintaining a pattern of normal bowel elimination through an educational program will prevent constipation, decrease the use of laxatives, and improve the quality of life for elder adults

## **2. SUBJECTS AND METHODS:**

### **2.1.Subjects:**

A purposive sample consisted of 100 elderly fulfilled these criteria in the setting, a study group to attend the intervention program and a control group for comparison. Any elderly in the study setting was eligible for inclusion in the study sample if 60-80 years and suffering from constipation defined as difficult or decreased

bowel movements (less than three times a week). Those who were bed ridden or dependent in daily life activities were excluded.

### **2.2.Methods:**

#### **2.2.1. Technical Design:**

The technical design for the study will include research design, setting, subjects of the study, and tools for data collection.

#### **2.2.2. Research design:**

A quasi-experimental design was used in the intervention phase of the study to evaluate the effect of nursing intervention on constipation among elderly.

#### **Setting:**

Two geriatric clubs were found at Zagazig city. However the researcher decided to apply the study in the geriatric social club beside Governorate because it's a wide building and the numbers of elderly were fair enough.

#### **2.2.3. Tool of data collection:**

*A- structured interview questionnaire* was developed by the researcher to collect the necessary data for achieving the study objectives. It was composed of five parts:

- **Part 1:** demographic characteristics of the studied subjects (as age, sex, educational level, marital status, income and income source, etc)
- **Part 2:** Entailed questions about elderly knowledge of constipation such as definition of constipation, its symptoms, causes and medications causing it, complications, and preventive measures.  
*Scoring:* For each knowledge item, a correct response was scored 1 and the incorrect zero. For each area of knowledge, the scores of the items were summed-up and the total scoring was 37 degree divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%
- **Part 3:** practice of exercise defined as a minimum of walking 30 minutes/ day, for four days or more/week, and the dietary habits such as eating regular meals, number of meals/day, eating between meals, good mastication, etc.

*Scoring:* The dietary habits were classified as positive or negative; these were scored as +1 and -1 respectively. The numbers of negative habits were summed-up and means and standard deviations were computed.

- **Part 4:** elimination habits such as regular elimination, use WC only when feeling need, frequency of defecation, change in excretion habit, duration of defecation, etc.

- **Part 5:** self-management practices as taking food rich in fibers, paraffin oil, using enema, etc. For the study group, this part included additional items related to the practice of abdominal massage and acupressure.

**Scoring:** For each practice items, a correct response was scored 1 and the incorrect zero. For each area of practice, the scores of the items were summed-up and the total scoring was 26 degree divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. Practice was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%

## **B- Operational Design:-**

### **1- Pilot study:**

A pilot study was done to assess the applicability and clarity and replicated of the interview questionnaire form. It was conducted on 10% of elderly person. These subjects were included from the study sample.

### **2- Validity:-**

The study tool will be developed by the researcher based on review of relevant and current literature, and then reviewed by five experts from the Faculty of Nursing (Community Health Nursing Department) and Faculty of Medicine (Public Health Department). These experts assessed the tool for clarity, relevance, application, comprehensiveness, and understanding. This constituted the face and content validation of the tool. All recommended modifications in the tool were done.

### **3- Ethical consideration:**

The study protocol was approved by the pertinent committee of the Faculty of Nursing Zagazig University. An agreement for participation of the subjects was taken verbally before inclusion and after the aim of the study explained to them. They also were assured that any information taken from them would be confidential and used for the research purpose only.

**4- Fieldwork:** This was implemented through four successive phases, namely assessment, planning, implementation, and evaluation.

**\*\*Assessment phase:** The needs in knowledge and practice were identified through collection and analysis of the baseline data from the filled tools to design the educational program.

**\*\*Planning phase:** In planning the program, the researcher identified the important needs and health services for target group, set priorities, and defined goals and objectives upon which the content of the program was developed. It involved in seven sessions covering definitions, risk factors, complications, and prevention of constipation; examples of preventive nutrition,

exercise, abdominal massage and acupressure to prevent constipation. The teaching methods included brain storming, group discussions, and demonstrations. Audiovisual media, pictures, and handouts were used in addition to a guide handbook prepared by the researcher.

**\*\*Implementation phase:** The program included a theoretical component and a practical one for abdominal massage and acupressure. The educational program was divided into 7 sessions lasting 20-35 minutes each. The total duration of this phase of the study was 8-10 weeks. The researcher encouraged the participants to bring their relatives with them to know how to support and help them in their care.

**\*\*Evaluation phase:** A post-test was administrated after implementation of the program to assess the changes in participants' knowledge and practices. The same tools used in the pretest were re-used. The fieldwork was started in June 2010 and ended in December 2010.

**\*\*Administrative Design:** Permission for data collection and implementation of the educational program in the Geriatric Social Club at Zagzig city was obtained from pertinent authorities.

**2.2.4. Statistical analysis:** Data entry and statistical analysis were done using SPSS 16.0 statistical software package. Quantitative continuous data were compared using Student t-test in case of comparisons between two groups. When normal distribution of the data could not be assumed, the non-parametric Mann-Whitney test was used instead. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. In order to identify the independent predictors of the knowledge and practice scores, multiple linear regression analysis was used after testing for normality, and homoscedasticity, and analysis of variance for the full regression models were done. Statistical significance was considered at p-value <0.05.

## **3.RESULTS:**

### **3.1. Demographic characteristics of the study and control groups**

Table 1 Their mean age is about 66 years. The majority of the study (84%) and control (76%) groups are women. Only about one fourth of the study (26%) and control (20%) groups are illiterate or just read and write, while more than half have basic education. About half of the elderly in both groups are married, and the other half are widows. For almost all of them the main source of income is the retirement pension, and this income is insufficient. More than half of the study (56%) and control (66%) groups have a

crowding index of one or more. More elders in the study group live alone (18%) and in rural areas (56%) compared to 2% and 78% in the control group, respectively. These are the only differences of statistical significance between

the two groups ( $p=0.008$  and  $p=0.02$ , respectively).

**Table 1. Demographic characteristics of the elderly in the study and control groups.**

Items	Group				X <sup>2</sup> Test	p-value
	Study (n=50)		Control (n=50)			
	No.	%	No.	%		
<b>Age (years)</b>						
60-70	36	72.0	37	74.0		
71-80	14	28.0	13	26.0		
Range	60.0-81.0		60.0-81.0			
Mean±SD	66.0±4.9		65.9±4.1		0.01	0.91
<b>Sex:</b>						
Male	8	16.0	12	24.0		
Female	42	84.0	38	76.0	1.00	0.32
<b>Education:</b>						
Illiterate (Read/write)	13	26.0	10	20.0		
Basic	29	58.0	34	68.0	1.07	0.58
Secondary	8	16.0	6	12.0		
<b>Marital status:</b>						
Married	22	44.0	26	52.0	1.51	0.47
Widow	28	56.0	24	48.0		
<b>Income source:</b>						
Retirement pension	48	96.0	49	98.0		
Pension + assists	2	4.0	1	2.0	Fisher	1.00
<b>Income:</b>						
Insufficient	50	100.0	48	96.0		
Sufficient	0	0.0	2	4.0	Fisher	0.49
<b>Crowding index:</b>						
1	22	44.0	17	34.0		
1-3	28	56.0	33	66.0	1.05	0.31
<b>Live alone</b>	9	18.0	1	2.0	7.11	0.008*
<b>Residence:</b>						
Rural	28	56.0	39	78.0		
Urban	22	44.0	11	22.0	5.47	0.02*

(\*) Statistically significant at  $p<0.05$

Table (2) indicates low percentages of satisfactory knowledge among the elderly in the study and control groups before the intervention. The highest knowledge areas in both groups are related to the definition (36% and 36%), symptoms (46% and 30%), and complications (34% and 52%). Meanwhile, more elderly in the control group have satisfactory knowledge about preventive measures (42%) compared to the study group (20%). At the post-intervention phase, the

elderly in the study group have statistically significant improvement in their knowledge in all areas. The percentages of satisfactory knowledge range between 94% and 98%. No such improvement is noticed among the elderly in the control group. Moreover, none of them have total satisfactory knowledge whether before or after the intervention

**Table 2. Distribution of the elderly of the study and control groups regarding their correct knowledge about constipation problem in Pre-post intervention**

Knowledge	Pre (n=50)		Post (n=50)		X <sup>2</sup> Test	p-value
	No.	%	No.	%		
<b>STUDY GROUP:</b>						
Constipation definition	18	36.0	47	94.0	36.97	<0.001*
Symptoms of constipation	23	46.0	48	96.0	30.35	<0.001*
Causes of constipation	9	18.0	47	94.0	58.60	<0.001*
Medications causing constipation	5	10.0	47	94.0	70.67	<0.001*
Complications of constipation	17	34.0	49	98.0	45.63	<0.001*
Preventive measures	10	20.0	47	94.0	55.85	<0.001*
<b>CONTROL GROUP:</b>						
Constipation definition	18	36.0	20	40.0	0.17	0.68
Symptoms of constipation	15	30.0	15	30.0	0.00	1.00
Causes of constipation	5	10.0	5	10.0	0.00	1.00
Medications causing constipation	2	4.0	2	4.0	Fisher	1.00
Complications of constipation	26	52.0	23	46.0	0.36	0.55
Preventive measures	21	42.0	19	38.0	0.17	0.68
Total score of knowledge:						
Unsatisfactory	50	100.0	50	100.0	0.00	1.00

(\*) Statistically significant at  $p < 0.05$ 

Not mutually exclusive

Figure 1 indicates that only (6%) of the elderly in the study group have satisfactory total score of knowledge about constipation problem at pre-intervention phase. After the intervention, almost all of them (94%) have total satisfactory knowledge. This difference is of statistical significance ( $p < 0.001$ ).

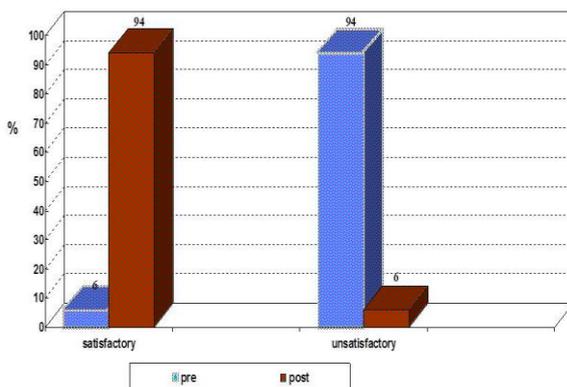


Figure 1: Total score of knowledge about constipation among elderly in the study group throughout intervention

### 3.2. Exercise and dietary habits, :

It can be Regarded in Table 3 which demonstrates that only about one fourth of the elderly in the study (28%) and control (22%) groups are practicing exercise before the intervention. At the post-intervention phase, almost all of those in the study group reported practicing exercise (96%), and the difference is statistically significant ( $P < 0.001$ ). no such

improvement is noticed among elderly in the control group.

As for the dietary habits, the same table indicates high frequencies of faulty habits before the intervention in both groups. The most common are eating 1-2 meals daily (62% and 54%), eating excess rice/ macaroni (44 and 56%), and drinking strong tea (38% and 42%). At the post- intervention, the elderly in the study group demonstrate statistically significant increases in the positive habits such as eating regular meals ( $P < 0.001$ ) and eating brown bread ( $P < 0.001$ ), along with significant decreases in all the bad habits. The only exception is related to good mastication, which has not improved. Over all, the mean total number of negative dietary habits decreased from  $4.1 \pm 1.5$  to  $2.8 \pm 0.6$  after the intervention among them ( $P < 0.001$ ). On the other hand, the control group data point to no statistically significant changes in their dietary habits after the intervention. The mean total numbers of negative dietary habits have not changed from the pre  $4.7 \pm 1.8$  to the post  $5.1 \pm 1.7$  intervention phases.

### 3.3. The pre-post intervention changes:

Table 4 describes these changes in the elimination habits among elderly in the study and control groups. Before the intervention, there are high frequencies of bad elimination habits in both groups. Examples are the use of WC only when feeling the need (80 and 50%), defecating every three days (72 and 74%), and staying for ten or more minutes. All the bad elimination habits showed statistically

significant improvements at the post-intervention phase but only in the study group ( $p < 0.001$ ). On the other hand, none of these bad

habits showed any significant change among the elderly in the control group

**Table 3. Distribution of the elderly of the study and control groups regarding their practice exercise and dietary habits in pre-post intervention.**

Items	Pre (n=50)		Post (n=50)		X <sup>2</sup> Test %	p-value
	No.	%	No.	%		
<b>STUDY GROUP</b>						
Practice exercise (walking)	14	28.0	48	96.0	49.07	<0.001*
<b>Dietary habits</b>						
Regular meals	21	42.0	48	96.0	34.08	<0.001*
1-2 meals/day	31	62.0	10	20.0	3.93	0.047*
Eat between meals	13	26.0	1	2.0	11.96	<0.001*
Eat fast	6	12.0	0	0.0	Fisher	0.03*
Good mastication	7	14.0	6	12.0	0.09	0.77
Eat excess canned food	13	26.0	1	2.0	11.96	<0.001*
Use excess of spices	8	16.0	0	0.0	Fisher	0.006*
Eat excess rice/macaroni	22	44.0	2	4.0	21.93	<0.001*
Drink strong tea	19	38.0	0	0.0	23.46	<0.001*
Eat brown bread	22	44.0	48	96.0	32.19	<0.001*
<b>No. of negative feeding habits:</b>						
Range	1.0-8.0		1.0-4.0			
Mean±SD	4.1±1.5		2.8±0.6		U=29.29	<0.001*
<b>CONTROL GROUP</b>						
Practice exercise (walking)	11	22.0	10	20.0	0.06	0.88
<b>Dietary habits:</b>						
Regular meals	21	42.0	19	38.0	0.17	0.68
1-2 meals/day	27	54.0	25	50.0	0.16	0.69
Eat between meals	24	48.0	31	62.0	1.98	0.16
Eat fast	11	22.0	20	40.0	3.79	0.051
Good mastication	9	18.0	8	16.0	0.07	0.79
Eat excess canned food	15	30.0	16	32.0	0.05	0.83
Use excess of spices	13	26.0	12	24.0	0.05	0.83
Eat excess rice/macaroni	28	56.0	30	60.0	0.16	0.69
Drink strong tea	21	42.0	22	44.0	0.04	0.84
Eat brown bread	24	48.0	24	48.0	0.00	1.00
<b>No. of negative feeding habits:</b>						
Range	1.0-8.0		1.0-9.0			
Mean±SD	4.7±1.8		5.1±1.7		U=1.20	0.27

U) Mann Whitney test

(\*) Statistically significant at  $p < 0.05$

On the contrary, the duration of the use of the toilet for defecation increased among them ( $p = 0.009$ ). Overall, the percentage of complaining of constipation fell to 72% among the elderly in the study group ( $p < 0.001$ ), while it remained

100% in the control group.

#### 3.4. The self-management of constipation:

Table 5 shows that about half of the elderly in the study (54%) and control (46%) groups reported taking laxatives to solve their problem at the pre-intervention phase. Other less common means include exercise (walking) and the use of enema. None in either group have satisfactory knowledge about abdominal

massage and acupressure as preventive measure for constipation. At the post-intervention phase, almost all of the study group elderly switched to proper means such as intake of fiber-rich food, increasing fluid intake, exercising (walking), and practice abdominal massage and acupressure as preventive measure for constipation, while all of them stopped the inappropriate means as the use of laxatives, paraffin oil, and enema. All these changes are statistically significant ( $p < 0.001$ ), except for the use of paraffin oil and enema. The table indicates no changes in self management practices among the elderly in the control group.

**3.5. Multivariate analysis:**

The study intervention turned to be the only statistically significant independent predictor of the knowledge score, (table 6), it explains 56% of the improvement in the knowledge score after the program.

None of the demographic characteristics have any significant influence on the knowledge

score. As far the dietary practice score, the same table shows that the knowledge score is the most important positive predictor, along with being married. On the contrary, female, gender, education, and income are negative predictors. The model explains 46% of the variation in the dietary practice score.

**Table 4. Distribution of the elderly of the study and control groups regarding their elimination habits in pre-post intervention**

Groups	Pre (n=50)		Post (n=50)		X <sup>2</sup> Test	p-value
	No.	%	No.	%		
<b>Elimination habits</b>						
<b>STUDY GROUP:</b>						
Regular elimination	2	4.0	47	94.0	81.03	<0.001*
Use WC only when feeling need	40	80.0	3	6.0	55.85	<0.001*
<b>Frequency of defecation:</b>						
- Daily	0	0.0	14	28.0	45.89	<0.001*
- Every other day	14	28.0	33	66.0		
- Every 3 days	36	72.0	3	6.0		
<b>Change in excretion habit:</b>						
- Increase	5	10.0	49	98.0	78.19	<0.001*
- No change	11	22.0	1	2.0		
- Decrease	34	68.0	0	0.0		
<b>Duration (min):</b>						
- 5	9	18.0	45	90.0	52.20	<0.001*
- 10	27	54.0	3	6.0		
- 15	14	28.0	2	4.0		
<b>Consistency:</b>						
- Normal	0	0.0	46	92.0	85.19	<0.001*
- Hard	50	100.0	4	8.0		
<b>Complain of constipation</b>	50	100.0	36	72.0	16.28	<0.001*
<b>CONTROL GROUP:</b>						
Regular elimination	3	6.0	2	4.0	Fisher	1.00
Use WC only when feeling need	25	50.0	25	50.0	0.00	1.00
<b>Frequency of defecation:</b>						
Every other day	13	26.0	11	22.0	0.22	0.64
Every 3 days	37	74.0	39	78.0		
<b>Change in excretion habit:</b>						
Increase	1	2.0	0	0.0	1.55	0.46
No change	18	36.0	22	44.0		
Decrease	31	62.0	28	56.0		
<b>Duration (min):</b>						
- 5	2	4.0	0	0.0	9.47	0.009*
- 10	22	44.0	10	20.0		
- 15	26	52.0	40	80.0		
<b>Consistency:</b>						
- Hard	50	100.0	50	100.0	0.00	1.00
<b>Complain of constipation</b>	50	100.0	50	100.0	0.00	1.00

(\*) Statistically significant at  $p < 0.05$

**Table 5. Distribution of the elderly of the study and control groups regarding Self-management of constipation problem in Pre-post intervention.**

Self-management	Pre (n=50)		Post (n=50)		X2 Test	p-value
	No.	%	No.	%		
<b>STUDY GROUP</b>						
Take food rich in fibers	9	18.0	47	94.0	58.60	<0.001*
Take laxatives	27	54.0	0	0.0	36.99	<0.001*
Use paraffin oil	5	10.0	0	0.0	Fisher	0.06
Increase fluid intake	19	38.0	49	98.0	41.36	<0.001*
Practice exercise(walking)	4	8.0	47	94.0	73.99	<0.001*
Use enema	4	8.0	1	2.0	Fisher	0.36
<b>Abdominal massage for prevention</b>	0	0.0	47	94.0	88.68	<0.001*
<i>Steps (n=47)</i>	0	0.0	47	100.0	97.00	<0.001*
<b>Management of constipation by acupressure</b>	0	0.0	47	94.0	88.68	<0.001*
<i>Steps (n=47)</i>	0	0.0	47	100.0	97.00	<0.001*
<i>Benefits (n=47)</i>	0	0.0	47	100.0	97.00	<0.001*
<i>Pressure points (n=47)</i>	0	0.0	47	100.0	97.00	<0.001*
<b>CONTROL GROUP</b>						
Take food rich in fibers	5	10.0	5	10.0	0.00	1.00
Take laxatives	23	46.0	23	46.0	0.00	1.00
Use paraffin oil	9	18.0	10	20.0	0.06	0.80
Increase fluid intake	24	48.0	21	42.0	0.36	0.55
Practice exercise(walking)	1	2.0	1	2.0	Fisher	1.00
Use enema	4	8.0	5	10.0	Fisher	1.00
<b>Abdominal massage for prevention</b>	0	0.0	0	0.0	0.00	0.00
<b>Management of constipation by acupressure</b>	0	0.0	0	0.0	0.00	0.00

(\*) Statistically significant at  $p < 0.05$ **Table 6. Best fitting multiple linear regression model for pre and post total scores of elderly knowledge, and dietary practice**

Pre-post changes in scores of:	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std.Error			
<b>Knowledge:</b>					
Constant	-73.46	52.79		-1.391	.166
Group (reference: control)	41.44	4.13	.512	10.038	<0.001
Intervention (reference: pre)	41.05	3.80	.507	10.796	<0.001
R Square = 0.56 Model ANOVA: F=86.26, p<0.001 Variables excluded by model: age, sex, marital status, education, income, residence, crowding index					
<b>Dietary practices:</b>					
Constant	35.50	4.89		7.254	<0.001
Sex (reference: male)	-1.99	.96	-.119	2.086	.038
Education (reference: illiterate)	-2.83	1.04	-.146	2.713	.007
Income (reference: insufficient)	-6.22	2.53	-.130	2.458	.015
Marital status (reference: unmarried)	.69	.25	.154	2.778	.006
Knowledge score	.11	.01	.633	12.021	<0.001
R Square = 0.46 Model ANOVA: F=34.18, p<0.001 Variables excluded by model: age, residence, crowding index, group, intervention					

#### 4.DISCUSSION

The present study hypothesized that the knowledge and practices related to constipation will be significantly improved among the elderly

exposed to the health education intervention, compared to control ones, with subsequent improvement of this problem. The study results indicate that these improvements occurred in fact

among the study group elderly, while no such improvements could be revealed among the control group subjects. The findings lead to acceptance of the research hypothesis, and indicate the effectiveness of the educational intervention

The study and control groups had to be similar, especially in characteristics related to constipation. The two groups had similar age, since age is a known correlate of constipation as indicated by *Massarrat et al. (2010)* in a study in Iran. The gender distribution was also almost equal in the two groups, with more females reflecting a higher prevalence of the problem among them. In line with this, *Alame and Bahna (2012)* showed female sex as an independent risk factor of constipation.

The two groups had also similar socio-economic factors such as education and income. These variables are important in the etiology of constipation as pointed out by *Müller-Lissner et al. (2005)* in a study in the United States of America. Nonetheless, more elderly in the study group of the current study were residing in rural areas. This difference could lead to bias, but such bias would be against the study group members since rural residence has been associated with a higher risk of constipation (*Higgins and Johanson, 2006*). Table (1)

The study findings demonstrated generally low levels of satisfactory knowledge in both groups at the pre-intervention phase. This finding was most evident regarding the causes of constipation and the medications that may lead to it. Such lack of knowledge, if not corrected, would lead to perpetuation of the problem among them. Similar low level of knowledge among elderly, as revealed among the present study participants, has been previously demonstrated. Thus, *Leung et al. (2011)* noticed that even the word "constipation" has varied meanings for different individuals. Hence, even defining constipation is not easy, and there are many ways to describe the problem and no one way is perfect (*Alame and Bahna, 2012*). Figure (1)

However, significant improvement in the knowledge of the elderly in the study group was shown at the post-intervention phase in all the areas under study. Meanwhile, no significant changes could be demonstrated in the control group. This indicates the success of the program in achieving this objective, and acceptance of its hypothesis. The finding was further confirmed by multivariate analysis, which identified the study intervention as the only significant independent predictor of the knowledge score, explaining more than half of this improvement in elderly knowledge score. These results are in agreement with *Grainger et al. (2007)* whose study in England showed a positive effect of an educational program on the knowledge of elderly about the prevention and management of constipation. Table (2)

The present study revealed a high prevalence of lack of physical exercise with only about one-fourth of the elderly in both groups practicing exercise before the intervention. This result was expected since the lack of physical activity is a known risk factor for constipation. In agreement with this, *Wald et al. (2008)* emphasized that physical activity is closely related to constipation, and limited mobility is considered part of the risk assessment for constipation. Implementation of the program led to significant improvement in the practice of physical exercise in the study group, but not in the control group. This indicates another success of the intervention in changing an important aspect of the lifestyle that is related to constipation. Similar findings were reported by *Simmons and Schnelle (2006)* in a study conducted in USA where the participants demonstrated improvement in regular exercise, mostly walking. On the contrary, *Harrington and Haskvitz (2006)* viewed that the intensity of aerobic and strengthening exercises required to have beneficial effects on colonic transit time may be beyond the capacity of the elderly. Table (3)

Another important lifestyle factor related to constipation is the dietary habits. The present study demonstrated that most elderly in both groups had incorrect dietary habits before the intervention such as eating infrequent meals daily, with excess rice or macaroni, and drinking strong tea. On average, each elderly reported around 4-5 negative feeding habits. This high prevalence of faulty habits can explain the presence of chronic constipation problem among them. In this respect, *Rao et al. (2009a)* mentioned that constipation in the elderly is generally related to poor dietary habits such as not eating regular meals, and insufficient chewing. After implementation of the intervention, the study group had significant improvements in correct habits like eating regular meals and eating brown bread, and their average of faulty habits decreased significantly. However, good mastication of food did not improve, and this might be related to poor dental state that cannot be changed through educational interventions. Therefore, the educational program succeeded in the amendment of the dietary habits of the elderly who were exposed to the intervention since those in the control group had no similar positive changes. The improvement of dietary habits has also contributed to the management of the main problem of these elderly, which is constipation. Table (3)

Similar improvements in the problem of constipation among the elderly have been reported in previous studies. Thus, *Ramkumar and Rao (2006)* in a study in North American found that frequent and regular feeding that keeps intestines contracting and moving stool along, regular eating of fresh fruit, raw salads, vegetables, and brown

bread was very useful in solving the constipation problem.

Multivariate analysis identified the knowledge score as the most important positive predictor of improvement of the dietary practice score. Thus, the lack of knowledge was the most important factor hindering proper the practice of dietary habits. Therefore, once they got the correct information, this was translated into sound dietary practices. The finding goes in line with the claim of undisputed need to provide patients with high quality, accurate information (*Duman, 2003*). In this same respect, *Williams and Ogden (2004)* highlighted that in the study looking at the Stepped Treatment of Older adults On Laxatives (STOOL), a lack of written patient literature relating to constipation for patients and healthcare professionals in primary care was revealed. The only materials available were produced by pharmaceutical companies and linked to laxative products. Table (6)

Another important predictor of the improvement of the dietary practices is the marital status. Being married was associated with higher scores. This might be explained by logistic and psychological factors. Logistically, married, especially men have somebody who can help in food preparation, and can thus apply what has been taught in the program, compared to the unmarried who may not be able to do it by him/herself. The psychological reasons relate to the feelings of loneliness, especially among widows who lost their beloved ones (*Choung et al., 2007*). Table (6)

In addition to knowledge and lifestyle changes, the present study intervention has attempted to improve the elimination habits. This has been planned based on the scientific background providing evidence that a bowel movement may be, in part, a conditioned reflex (*Hsieh, 2005*), and thus, a first-line lifestyle intervention for constipation is patient education regarding the designation of a time for daily defecation. Optimally, defecation should be attempted shortly after waking and after meals, when colonic activity is strongest (*Bleser, 2006*). Table (4)

The results of the current study showed significant post-intervention reductions in faulty elimination habits among the elderly in the study group, but not in the control group. Thus, the frequency of regular defecation increased, and a tendency to have normal consistency. Consequently, the percentage of elderly still suffering from constipation significantly decreased in the study group. However, this improvement cannot only be attributed to the changes in bowel habits as this overlooks the other elements of the program. In congruence with this, *Van Tilburg et al. (2008)* mentioned that since toileting activities are usually studied in combination with other

interventions, their independent role to bowel function generally cannot be determined. Table (4)

Self-management is an important approach in dealing with constipation. The present study program gave some emphasis to this aspect in the training of the elderly. The results showed a high prevalence of faulty self-management habits at the pre-intervention phase in both groups. This is in agreement with *Murakami (2007)* who mentioned that older Japanese patients who are constipated tend toward self-management of the problem, relying primarily on laxatives for treatment. Meanwhile, significant improvements of the faulty self-management habits were noticed among in the study group after the intervention such as taking non-prescribed medications, and using paraffin oil or enema. Mineral oils such as paraffin are not recommended on account of the risk of aspiration, and because they bind lipo-soluble vitamins, reducing their absorption (*Spinzi, 2007*).

On the other hand and as previously shown, the healthy habits related to intake of fiber-rich food, increasing fluid intake, and exercising increased among the elderly of the present study group after the intervention. These improvements in self-management would guarantee the perpetuation of these approaches and a long-term solution to the constipation problem. In congruence with this, *Zuckerman (2006)* mentioned that increasing fiber intake through diet or supplementation is often the first advice given to patients with constipation. However, soluble fibers must be differentiated from insoluble ones. It seems that soluble but not insoluble fibers might be effective but are problematic (*Speed et al., 2010*).

A main component of the present study intervention program was the use of massage and acupressure in the prevention and management of constipation. The elderly in the study group had theoretical knowledge and hands-on practical training in these aspects. None of them knew about before the program. Implementation of the program led to significant improvements in their knowledge about these approaches in prevention and management of constipation. This may have also contributed to improvement in their constipation problem. This simple and easily applicable maneuver seems to be effective in solving the problem. However, its effectiveness cannot be segregated from other program components such as the lifestyle and dietary changes, as well as the elimination habits.

In agreement with the foregoing present study finding, *Lamas et al. (2009)* studied the use of abdominal massage in 60 older people who were constipated or dependent on laxatives. The results showed a significant decrease in constipation and abdominal pain in the treatment group, compared with the control group. However, there was no

reduction in laxative use in either group. In a further report *Lämås et al (2010)* found that abdominal massage can be cost-effective in the long term, and it is appropriate to consider it when managing constipation. On the same line, *McClurg and Lowe-Strong (2011)* confirmed that abdominal massage can relieve constipation of various physiological causes by stimulating peristalsis, and increasing the frequency of bowel movements. The main drawback is the amount of time required to perform the massage, and its repeated nature. Table (5)

#### CONCLUSION

The study results concluded that the knowledge of the elderly regarding the constipation problem as well as their related practices are generally deficient. Implementation of a health education intervention led to improvements in both their knowledge and practices regarding diet, elimination habits, and self-management. The end-results are significant improvements in the constipation problem. The improvement in knowledge is essential to improve practice.

#### RECOMMENDATIONS

In view of the study findings, it is recommended to implement the developed health education program and its booklet in similar settings, with more efforts from nurses to improve the awareness of the elderly regarding the importance of self-management, and the avoidance of risk factors, in addition to the use of abdominal massage and acupressure. Elderly should be trained in these maneuvers. Additional research is needed to assess the long-term effects of such educational programs.

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