Effect of Nursing Intervention program on Gastrointestinal Tract Problems among Elderly Patients undergoing Chemotherapy

Moustafa Tag El-Melook Saad[1], Eman Baleagh Meawad[2], Amira Ahmed Hassanein[3]

[1]Assistant Lecturer of Gerontological Nursing, Faculty of Nursing, Mansoura University, Egypt
[2]Lecturer of Gerontological Nursing, Faculty of Nursing, Mansoura University, Egypt
[3]Professor of Medical Surgical Nursing, Faculty of Nursing, Mansoura University, Egypt

Abstract: **Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. Chemotherapy is a type of cancer treatment that use one or more anti-cancer drugs as part of a standardized chemotherapy regimen. Chemotherapy has a range of side-effects that depend on the type of medications used. The most common medications affect mainly the fast-dividing cells of the body, such as blood cells and the cells lining the mouth, stomach, and intestines. Nausea, vomiting, anorexia, diarrhea, abdominal cramps, and constipation are common side-effects of chemotherapeutic medications that kill fast-dividing cells. Aim: Assess the effect of nursing intervention program on gastrointestinal tract problems among elderly patients undergoing chemotherapy. Design: Quasi-experimental research design was used in this study. Setting: the outpatient clinics and inpatient wards at the oncology center affiliated to the main Mansoura University Hospital. Tools: Seven tools were used in this study; Patient's assessment questionnaire sheet, patient's knowledge on chemotherapy side effects, and patient actions toward chemotherapy side effects questionnaire, patient knowledge about oral care and progressive relaxation techniques questionnaire, nausea and vomiting assessment scale, WHO Oral Toxicity Scale, Constipation assessment scale and Diarrhea assessment scale. Results: the mean scores of all items of knowledge including chemotherapy, actions related to chemotherapy side effects, oral care and progressive relaxation technique differs significantly after applying the program, nausea level, vomiting level and stomatitis level differ significantly after application the program. Conclusion: The program had a positive effect on GIT problems related to chemotherapy. Recommendation: development of educational programs for all nurses and other health care providers in hospitals focusing on helping elderly cancer patients how to deal with chemotherapy side effects.**

Keywords: **Cancer, Chemotherapy, Elderly Patients, Gastrointestinal Tract.**

I. INTRODUCTION

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. It can caused by external factors, such as tobacco, infectious organisms, and an unhealthy diet, and internal factors, such as inherited genetic mutations, hormones, and immune conditions. These factors may act together or in sequence to cause cancer. Ten or more years often pass between exposure to external factors and detectable cancer (**American Cancer Society, 2016**).

According to the World Health Organization (WHO), liver cancer followed by bladder cancer then lung cancer constitutes the most three types of cancer in males, while breast cancer, liver cancer and non-Hodgkin lymphoma constitutes the most three types of cancer in females. There are 39.300 deaths from cancer in males and 33.300 deaths from cancer in females occur yearly in Egypt (**WHO, 2014**).

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Older people are more prone to develop cancer than younger individuals as a result of physiological changes associated with ageing, which in turn favor the development and growth of cancer. Cancer is the leading cause of death in women and men aged 60 to 79 years. More than 60% of all cancers and 80% of cancer-related deaths in the United States occur in patients who are 65 years or older. **(Ferlay et al., 2014)**.

There are many types of cancer treatment. The types of treatment will depend on the type of cancer. The most common types of cancer treatment are surgery, radiotherapy, chemotherapy, immunotherapy and hormone therapy. Chemotherapy is a type of cancer treatment that use one or more anti-cancer drugs (chemotherapeutic agents) as part of a standardized chemotherapy regimen. It may be given with a curative intent (which almost always involves combinations of drugs), or it may aim to prolong life or to reduce symptoms (palliative chemotherapy). It is one of the major categories of the medical discipline specifically devoted to pharmacotherapy for cancer, which is called medical oncology (**De Martel et al., 2016**).

Chemotherapy have a wide range of side-effects that depend on the type of medications used. The most common medications affect mainly the fast-dividing cells of the body, such as blood cells and the cells lining the mouth, stomach, and intestines. Chemotherapy-related toxicities can occur acutely after administration, within hours or days, or chronically, from weeks to years **(Rachel, 2012)**.

Nausea, vomiting, anorexia, diarrhea, abdominal cramps, and constipation are common side-effects of chemotherapeutic medications that kill fast-dividing cells. Malnutrition and dehydration can result when the patient does not eat or drink enough, or when the patient vomits frequently, because of gastrointestinal damage. This can result in rapid weight loss, or occasionally in weight gain, if the patient eats too much in an effort to allay nausea or heartburn. Weight gain can also be caused by some steroid medications. These side-effects can frequently be reduced or eliminated with antiemetic drugs. Self-care measures, such as eating frequent small meals and drinking clear liquids or ginger tea, are often recommended. In general, this is a temporary effect, and frequently resolves within a week of finishing treatment. However, a high index of suspicion is appropriate, since diarrhea and bloating are also symptoms of typhlitis, a very serious and potentially life-threatening medical emergency that requires immediate treatment **(Gibson & Keefe, 2009)**.

Nursing care of the patient receiving chemotherapy focuses on preparing the patient physically and psychologically for therapy. Pretreatment assessment includes knowledge of the treatment plan and goal of therapy, physical assessment, nutritional assessment, patient's and family understanding of the disease process and proposed treatment plan, the patient's knowledge of possible side effects. So the patients and their families must have a clear understanding of the treatment options and goals **(Yarbro, 2013)**.

II. AIM OF THE STUDY

The aim of this study was to assess the effect of nursing intervention program on gastrointestinal tract problems among elderly patients undergoing chemotherapy.

Research hypothesis:

Gastrointestinal tract problems among elderly patients undergoing chemotherapy will be decreased.

III. SUBJECTS AND METHOD

Research design:

A quasi- experimental research design was used in this study.

Setting:

The study was carried out in the outpatient clinic and inpatient wards at the oncology center affiliated to the main Mansoura University Hospital.

Subjects:

A purposive sample of 53 elderly patients diagnosed with cancer during a period of three months (from 1st of December 2017 till the end of February 2018) and the research sample included all elderly cancer patients of both sexes attending the above mentioned setting and fulfilling the following criteria:

- Aged 60 years and above.

- Undergoing chemotherapy.

- Ability to communicate and willing to participate in the study.

- Free from any debilitating diseases such as heart failure, renal failure, liver failure and amputation.

Tools: In order to collect the necessary data for the study seven tools were used:

Tool I: Patient's assessment questionnaire sheet:

It was developed by the researcher after reviewing the relevant literature to obtain information from the elderly patients and it included two parts:-

Part I: Socio-demographic characteristics of the patients such as age, sex, residence, marital status, level of education and income.

Part II: Medical history of the condition such as: diagnosis, medication used, side effects of treatment, presence of other medical diseases and complaints.

Tool II: Patient's knowledge on chemotherapy side effects, and patient actions toward chemotherapy side effects questionnaire, it divided into two parts: -

Part I: patient knowledge on chemotherapy and its side effects questionnaire:

This tool was developed by the researcher after reviewing the relevant literature. It was used to assess the knowledge of the studied elderly patients about chemotherapy and its side effects. It included questions about types of cancer treatment, meaning of chemotherapy, purpose, route of administration, medicinal visits before starting chemotherapy, precautions to be reported before starting it and its side effects on the digestive system. The total number of questions were seven (7); each question had a group of correct answers, each correct answer was given a score of one (1), while did not know or no answer was given a score of zero (0). The total score was depend on the numbers of grades the patient obtained regarding all questions. The total score is 36 and was classified as follow:

o Good Knowledge: more than or equal 75% (score ≥27).

o Fair Knowledge: 50% to less than 75% (score 18 to < 27).

o Poor Knowledge: less than 50% (score < 18).

Part II: patient knowledge about actions toward chemotherapy side effects on digestive system:-

This part was used to assess the knowledge of the studied elderly patients about patient actions with chemotherapy and its side effects on digestive system. It included questions about elderly cancer patients' actions with chemotherapy side effects on digestive system like nausea, vomiting, stomatitis, constipation and diarrhea. The total number of questions were four (4); each question had a group of correct answers, each correct answer was given a score of one (1), while did not know or no answer was given a score of zero (0). The total score was depend on the numbers of grades the patient obtained regarding all questions. The total score is 32 and was classified as follow:

o Good Knowledge: more than or equal 75% (score ≥24).

o Fair Knowledge: 50% to less than 75% (score 16 to < 24).

o Poor Knowledge: less than 50% (score < 16).

Tool (III): Patient knowledge about oral care and progressive relaxation techniques questionnaire:-

This tool was developed by the researcher after reviewing the relevant literature. It was used to assess the knowledge of the studied elderly patients about oral care and progressive relaxation techniques steps. The total number of questions were two (2); each question had a group of correct answers, each correct answer was given a score of one (1), while did not know or no answer was given a score of zero (0). The total score was depend on the numbers of grades the patient obtained regarding all questions. The total score is 12 and was classified as follow:

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o Good Knowledge: more than or equal 75% (score ≥9).

o Fair Knowledge: 50% to less than 75% (score 6 to < 9).

o Poor Knowledge: less than 50% (score < 6).

Tool (IV): Nausea and vomiting assessment scale:

This tool was developed by American Society of Clinical Oncology, (2003). Common Toxicity Criteria (CTC) for nausea. Scoring system in this scale ranged from zero to four: (zero) none, (1) loss of appetite without alteration in eating habits, (2) oral intake decreased without significant weight loss, dehydration, or malnutrition, (3) Inadequate oral caloric or fluid intake; IV fluids, tube feedings, or total parental nutrition (TPN) indicated, and (4) Life-threatening consequences.

Common Toxicity Criteria (CTC), for vomiting assessment, its scoring system ranged from zero to four. (Zero) none, grade (1) - one episode per 24 hours, grade (2) means 2 to 5 episode per 24 hours, grade (3) means ≥ 6 episodes per 24 hours; IV fluids, or TPN indicated, and grade (4) Life-threatening consequences.

This tool was translated into Arabic and tested for its reliability by Abo Baker, (2012). The reliability was assured by means of Cronbach's alpha (r) = 0.89.

Tool (V): WHO Oral Toxicity Scale:

This tool was developed by Shebl et al., (2014). It meets anatomical, symptomatic and functional components of stomatitis. Severity of oral stomatitis graded from (0) to (4). Listed as following grade (0) no side effects, (1) sore mouth no ulcers, (2) sore mouth with ulcers but able to eat normally, (3) able to eat liquids only and (4) unable to eat and drink. It was translated into Arabic and tested for its validity and reliability by Abo Baker, (2012) by using test retest reliability Spearman's correlation coefficient (r=0.861).

Tool (VI): Constipation Assessment Scale:

The Constipation assessment scale was developed by **McMillan and Williams, (1989)**. The scale includes eight items that focus on the symptoms of constipation. These items are abdominal distension or bloating, change in amount of gas passed rectally, less frequent bowel movement, oozing liquid stool, rectal fullness or pressure, rectal pain with bowel movements, smaller stool size, urge but inability to pass stool. The severity degree of constipation is measured and scored by using a three – point Likert scale, from zero(0) to two(2), where zero (0) indicates no problem, one (1) indicates some problem, while two (2) indicates severe problem. The total score of the scale ranged between 0 and 16. A score from 2 to 6 is assigned for those who have mild constipation; a score from 7 to 10 is assigned for those who have moderate constipation, while a score of 11 and above is assigned for those who have severe constipation. The scale was translated into Arabic and tested for its reliability by **Noshy, (2014)** using test-retest method. The reliability was assured by means of Cronbach's alpha (r) = 0.88.

Tool (VII): Diarrhea Assessment Scale:

Common Toxicity Criteria (CTC), assessment scale for diarrhea. This tool was developed by **American Society of Clinical Oncology, (2003)**. This scale scoring ranged from grade (one) to grade (5) as the following; grade (1) < 4 times pass stool per day over baseline, grade (2) > 4-6 stools per day over baseline; IV fluids indicated, grade (3) > 7 stools per day over baseline; incontinence; IV fluids, hospitalization, grade (4) Life-threatening consequences e.g. hemodynamic collapse, and grade (5)- Death. It was translated into Arabic and tested for its reliability by **Abo Baker, (2012)**. The reliability was assured by means of Cronbach's alpha (r) = 0.88.

Educational program:

The program was be developed by the researcher based on review of relevant literature and finding of assessment. The contents of the program included the following:

❖ Educational components that include brief information about:

✓ Definition of cancer

✓ Definition of chemotherapy

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✓ Types of chemotherapy

✓ Action of chemotherapy

✓ GIT Side effects of chemotherapy

✓ Management of GIT Side effects of chemotherapy

❖ Training components that include:

✓ Oral care protocol

✓ Progressive relaxation technique

Method:

1.   An official letter was issued from the Faculty of Nursing, Mansoura University and forwarded to the director of the Mansoura University Hospital in order to obtain the approval to carry out the study.

2.   The study tool I (Socio demographic and medical data structured interview schedule), tool II (patient knowledge on chemotherapy side effects, and patient actions toward chemotherapy side effects questionnaire), tool III (patient knowledge about oral care and progressive relaxation techniques questionnaire) were developed by the researcher and reviewed by the supervisors. The reliability of tool II, III were tested using test – retest method. These tools were applied to 10 elderly cancer patients selected from Mansoura Oncology Center and reapplied 2 weeks later. The reliability was assured by means of Cronbach's alpha (r) = 0.87 for tool II and (r) = 0.88 for tool III.

3.   Study tools were tested for content validity by a jury of 7 experts in the fields of Gerontological Nursing, Medical Surgical Nursing as a jury to test its content validity and feasibility and necessary modification were done.

4.   A pilot study was carried out on 5 elderly patients from outpatient clinics in Mansoura Oncology Center before starting the data collection to test the feasibility of the tools and to identify the approximate time needed for the interview. The data obtained from the pilot study was analyzed and according to the results, the recommended changes were done.

5.   Verbal consent from the subjects was obtained after explanation of the purpose of the study. Then, the necessary data were collected using the study tools. Patients' medical records were reviewed to complete the part of patient's health history and the rest of questions was completed by elderly patient.

6.   The developed training program for the elderly patients was conducted individually in inpatient wards and outpatients clinic of the Oncology Center at Mansoura University. The duration of each session took about 30-45 minutes for 5 days per week.

7.   During the training sessions, the researcher used brief, simple and clear wards. An illustrated booklet was used to clarify knowledge and practice for each patient. Other teaching methods used were; lecture, open discussion, power point presentation using lap top and videos. At the end of each session, a brief summary was given by the researcher emphasizing the important points. Before the start of the next sessions, the researcher used to ask questions related to topic discussed in the previous session; any missed or unclear points were reemphasized by the researcher.

Ethical consideration:

•   Ethical Approval was obtained from the research ethics committee of the Faculty of Nursing – Mansoura University.

•   A verbal consent from the study subjects to participate in the study was obtained after explaining the purpose of the study by the researcher.

•   Privacy of the subjects was assured and confidentiality of the collected data was maintained.

•   Study subject were informed about their right to withdraw from the study any time without penalty.

Statistical analysis:

The collected data were coded, computed and statistically analyzed using SPSS software program version 16.0. The qualitative data were presented as frequency and percentages and the statistical comparison was done using Chi square

test ($\square$2) and Fisher exact test (when any expected cell was less than 5). While, quantitative variables were presented as Mean ± SD, and the comparisons were done using Student t test for two groups, Paired t test for comparison of the same group at two different periods and one way Anova test (F test) for more than two group. Pearson correlation (r) was used to find out the correlation of two quantitative variables. The difference was considered significant at $P \leq 0.05$.

IV. RESULTS

Table (1) shows the distribution of the elderly cancer patients according to their socio - demographic characteristics. The age of the studied subjects ranged from 60 up to 83 years, with a mean age of 67.05 ± 6.41 years. More than three quarters of the patients (83.0%) were 65 to less than 75 years old, and (17.0%) of them were 75 to less than 85 years.

Females were more prevalent in the studied sample. They constituted (52.8%) of the patients. More than half of the studied sample (60.4%) were married and (18.9%) of them were divorced.

Regarding residence more than half of the studied sample live in rural areas (50.9%).

Concerning the educational level the table shows that (50.9%) of the studied sample were illiterate, (28.3%) of them were read and write; those with university education were represent (20.8%) of the sample.

As regard the monthly income, more than half of the studied sample was reported that the income is not enough (54.7%).

Regarding living condition, more than three quarters of the patients (79.2%) living with family.

Table (1): Distribution of the elderly cancer patients according to their socio-demographic characteristics

Items	(N= 53)	%
Age (in years)		
- 60<75	44	83.0
- 75<85	9	17.0
Mean (SD)	67.05 ± 6.41	
Sex		
- Male	25	47.2
- Female	28	52.8
Residence		
- Urban	26	49.1
- Rural	27	50.9
Marital status		
- Married	32	60.4
- Widow	11	20.8
- Divorced	10	18.9
Educational level		
- Illiterate	27	50.9
- Read and write	15	28.3
- University education	11	20.8
Monthly income		
- Enough	24	45.3
- Not enough	29	54.7
Living condition		
- With family	42	79.2
- With sons	11	20.8

Table (2) shows the distribution of the elderly cancer patients according to type of cancer. It shows that the highest percentage about a quarter of the studied sample (24.5%) were diagnosed with breast cancer where the lowest percentage was the uterine cancer (3.8%) in other types of cancer.

Table (2): Distribution of the elderly cancer patients according to type of cancer

Diagnosis	(N= 53)	%
- Breast cancer	13	24.5
- Liver cancer	8	15.2
- Lung cancer	7	13.1
- Colon cancer	5	9.4
- Brain cancer	5	9.4
- Ovarian cancer	4	7.5
- Prostate cancer	3	5.8
- Other types of cancer#	8	15.2

Other types of cancer include cancer of pancreas, thyroid cancer, skin cancer and uterine cancer.

Table (3) shows the distribution of the elderly cancer patients according to their medical history, medication taken and family history. It was observed from the table that 39.6 % of the studied elders had other diseases as hypertension (24.5%). Regarding other medication consumed by elders, more than half of the studied sample (60.4%) doesn't consume other medication with cancer treatments, however (26.4%) take anti-hypertensive drugs (24.5%). Regarding the family history with cancer, the majority of the studied sample (79.2%) had no family history with cancer.

Table (3): Distribution of the elderly cancer patients according to their medical history, medication taken and family history with cancer

Other medical diseases	(N= 53)	%
Other medical diseases		
- Yes	21	39.6
- No	32	60.4
Diseases#		
- Hypertension	13	24.5
- Diabetes mellitus	10	18.9
- Vision problems	4	7.5
- Orthopedic Diseases	3	5.7
Other Medication taken		
- No	32	60.4
- Yes	21	39.6
Prescribed medications#		
- Anti-hypertensive	14	26.4
- Diabetic agents	13	24.5
Family history with cancer		
- Yes		
- No	11	20.8
	42	79.2

More than one response

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Table (4) shows the distribution of the elderly cancer patients according to their side effects of chemotherapy. The table shows that nausea, vomiting and fatigue was the most common side effects that reported by all patients which represented (100%, 100% & 88.7%) respectively. While the smallest percent was bleeding and represented 1.9%.

Table (4): Distribution of the elderly cancer patients according to their side effects of chemotherapy

Side effects	(N= 53)	%
Side effects of treatment		
- Yes	53	100
Side effects#		
- vomiting	53	100
- Nausea	53	100
- Fatigue	47	88.7
- Anorexia	43	81.1
- Stomatitis	36	67.9
- Weight loss	36	67.9
- Hair loss	36	67.9
- Diarrhea	35	66
- Constipation	18	34
- Pain	15	28.3
- Dysphagia	14	26.4
- Dry mouth	12	22.6
- Loss of taste	8	15.1
- Hyperthermia	5	9.4
- Change skin color	5	9.4
- Skin redness	2	3.8
- Bleeding	1	1.9

#More than one response

Table (5) illustrates the elderly cancer patient knowledge about chemotherapy side effects, their actions toward chemotherapy side effects, and their knowledge about oral care and progressive relaxation techniques before and after the program. The table revealed that the mean scores of all items of knowledge including chemotherapy, actions related to chemotherapy side effects, oral care and progressive relaxation technique differs significantly after applying sessions and after 2 months follow up (p= .000).

Table (5): Elderly cancer patient knowledge about chemotherapy side effects, actions toward chemotherapy side effects, and knowledge about oral care and progressive relaxation techniques before and after the nursing intervention program

Items	(N = 53)			t-test			F
	Before the program	Immediately after the program	After 2 months	t 1	t 2	t 3	
	Mean ± SD	Mean ± SD	Mean ± SD				
Patient knowledge about chemotherapy	10.07±3.44	20.32 ±4.04	22.49 ± 4.15	16.01 (<.001)	15.06 (<.001)**	2.82 (<.001)**	153.615 (<.001)**
Patient actions related to chemotherapy and side effects	9.79±3.26	16.43 ±4.44	16.66±4.43	10.58	10.84	1.94	48.337 (<.001) **
Patient knowledge about oral care and progressive relaxation techniques	2.00±1.41	6.13 ± 1.54	6.01 ± 1.48	24.24	23.74	1.94	133.512 (<.001) **

t1= paired sample t test for score before the program and immediately after the program.

t2= paired sample t test for score before the program and after 2 months.

t3= paired sample t test for score immediately after the program and after 2 months.

F= test of variance between score before the program, immediately after the program and after 2 months.

P = significant at level of 5%.

Table (6) shows the frequencies of Nausea level before and after the nursing intervention program. The table clearly shows that all frequencies of nausea level (loss of appetite without alteration in eating habits, oral intake decreased without significant weight loss, dehydration, or malnutrition and inadequate oral caloric or fluid intake; IV fluids, tube feedings, or total parental nutrition (TPN) indicated) differ significantly after application the program (p = .002).

Table (6): Frequencies of Nausea level before and after the nursing intervention program

| | Frequencies of Nausea Level | | | | | | Test of Significance | |
| | Before the program | | Immediately after the program | | After 2 months | | X^2 | P |
	No	%	No	%	No	%		
Loss of appetite without alteration in eating habits	6	11.3	14	26.4	18	33.9	16.826	.002*
Oral intake decreased without significant weight loss, dehydration, or malnutrition	25	47.1	30	56.6	28	52.8		
Inadequate oral caloric or fluid intake; IV fluids, tube feedings, or total parental nutrition (TPN) indicated	22	41.6	9	17	7	13.3		

X^2 = Chi Square test

Significant at level of 5%.

Table (7) portrays the frequencies of vomiting level before and after the nursing intervention program. The table shows that all frequencies of vomiting level (one episode per 24 hours, to 5 episode per 24 hours, and more or equal 6 episodes per 24 hours; IV fluids, or TPN indicated) differ significantly after application the program (p = .004)

Table (7): Frequencies of Vomiting level before and after the nursing intervention program

| | Frequencies of Vomiting Level | | | | | | Test of Significance | |
| | Before the program | | Immediately after the program | | After 2 months | | X^2 | P |
	No	%	No	%	No	%		
One episode per 24 hours	6	11.3	13	24.5	15	28.4	8.810	.004*
To 5 episode per 24 hours	25	47.1	25	47.1	28	52.9		
More or equal 6 episodes per 24 hours; IV fluids, or TPN indicated	22	41.6	15	28.4	10	18.7		

X^2 = Chi Square test

Significant at level of 5%.

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Table (8) shows the frequencies of stomatitis level before and after the nursing intervention program. The table shows that all frequencies of stomatitis level (no side effects, sore mouth no ulcers, sore mouth with ulcers but able to eat normally, able to eat liquids only, and unable to eat and drink) differ significantly after application the program (p = .007).

Table (8): Frequencies of Stomatitis level before and after the nursing intervention program

	Frequencies of Stomatitis Level						Test of Significance	
	Before the program		Immediately after the program		After 2 months		X^2	P
	No	%	No	%	No	%		
No side effects	17	32.1	17	32.2	17	32.2	7.577	.007**
Sore mouth no ulcers	11	20.8	12	22.6	16	30.2		
Sore mouth with ulcers but able to eat normally	15	28.3	19	35.8	18	33.9		
Able to eat liquids only	8	15.1	4	7.5	2	3.7		
Unable to eat and drink	2	3.7	1	1.9	0	0		

X^2 = Chi Square test

Significant at level of 5%.

Table (9) shows the frequencies of constipation level before and after the nursing intervention program. The table reveals that the number of patients who have severe constipation decreased from 4 patients before starting the program to one patient after 6 weeks and there were no patients have severe constipation after 2 months from the program but there was no statistically significant differences regarding frequencies of constipation level before and after application program (p = .307)

Table (9): Frequencies of Constipation level before and after the nursing intervention program

	Frequencies of Constipation Level						Test of Significance	
	Before the program		Immediately after the program		After 2 months		X^2	P
	No	%	No	%	No	%		
No constipation	35	66.1	35	66.1	35	66.1	7.149	.307
Mild constipation	5	9.5	7	13.3	10	18.7		
Moderate constipation	9	16.9	10	18.7	8	15.2		
Severe constipation	4	7.5	1	1.9	0	0		

X^2 = Chi Square test

Significant at level of 5%.

Table (10) shows the frequencies of diarrhea level before and after the nursing intervention program. It appears from the table that the number of elderly patient who have more than 7 stools per day over baseline; incontinence; IV fluids, hospitalization were decreased from 15 patients before starting the program to 6 patients after 6 weeks and 2 patients after 2 months from the program but there was no statistically significant differences regarding frequencies of diarrhea level before and after application program (p = .476)

Table (10): Frequencies of Diarrhea level before and after the nursing intervention program

	Frequencies of Diarrhea Level						Test of Significance	
	Before the program		Immediately after the program		After 2 months		X^2	P
	No	%	No	%	No	%		
No diarrhea	18	33.9	18	33.9	18	33.9		
Less than 4 times pass stool per day over baseline	0	0	3	5.7	5	9.5		
More than 4-6 stools per day over baseline; IV fluids indicated	20	37.7	26	49.1	28	52.9	17.721	.476
More than 7 stools per day over baseline; incontinence; IV fluids, hospitalization	15	28.4	6	11.3	2	3.7		

X^2 = Chi Square test

Significant at level of 5%.

V. DISCUSSION

Chemotherapy is a corner stone of cancer treatment for many tumor entities; however it is associated with side effects, even when standard-dose regimens are applied **(Wedding et al, 2007)**. Age is considered a risk factor for increased toxicity and poor tolerance to chemotherapy **(Hurria et al, 2010)**. Two reasons for increased toxicity in elderly patients with cancer are an increased exposure to a drug and changes in pharmacodynamics caused by increased vulnerability of organs with age **(Wedding et al, 2007)**.

American Cancer Society (2010) pointed that toxic effects of chemotherapy of elderly cancer patients may include anorexia, nausea, vomiting, stomatitis, alopecia, diarrhea, constipation, leucopenia, anemia, thrombocytopenia, and increase risk for infection and bleeding. **Dupler (2009)** also added that toxic effect of chemotherapy may be more complicated for some patients and produce reversible or permanent damage to the liver, kidney, lungs, and also can affect testicular, and ovarian function, moreover it can produce cardiomyopathy and peripheral neuropathies.

Nursing care of the patient receiving chemotherapy focuses on preparing the patient physically and psychologically for therapy. Pretreatment assessment includes knowledge of the treatment plan and goal of therapy, physical assessment, nutritional assessment, patient's and family understanding of the disease process and proposed treatment plan, the patient's knowledge of possible side effects. So the patients and their families must have a clear understanding of the treatment options and goals **(connie et al., 2011)**.

The provision of information about presentation, prevalence, and duration of side effects of chemotherapy reduce the patient's anxiety level, enhances self-care and improve patient outcome **(Wengstrom et al., 2009)**. Therefore, the aim of the present study was to assess the effect of nursing intervention program on gastrointestinal tract problems and health status among elderly patients undergoing chemotherapy.

Socio-demographic characteristics and medical data of the studied patients:

In the present study the majority of the study subjects was in the young old category. This can be explained by the fact that elderly patients with cancer have a low probability of recovery and their ability to tolerate with chemotherapy side effects very low and therefore do not live much. The same finding was supported by a study done in Egypt by **Heba et al., (2012)**; in elderly patients with gastrointestinal cancer. Another study done in Greece by **Lavdaniti (2017)** found that the majority of the studied subjects was in the young old category in elderly cancer patients undergoing chemotherapy. On the other hand, this results disagreement with a study conducted in Denmark by **Esbensen (2006)** who reported that the majority of the study subjects was in the middle old category.

As for sex, females constituted more than one half of the study subjects. This may be attributed to the fact that females are more likely to be risk for cancer, mainly breast cancer than males. This is in the same line with the findings of other studies conducted in Palestine and Denmark respectively by **Thweib (2011)** and **Esbensen & Thomsen (2011)**; who reported that the female sex represented more than one half of the study subjects. These findings were in contrast with the findings of other studies done in Denmark, Taiwan and Italy by **Esbensen (2006), Oliva (2011), Fan (2013** who reported that elderly males reported risk for cancer than females.

Concerning the educational level, more than one half of the study subjects were illiterate. This may be explained by the fact that the elderly in past had fewer opportunities for education in the past. This results in the same line with a study done in Taiwan by **Fan (2013)** who reported that about one third of the study subjects in patients with hepatocellular carcinoma were elementary school. While this finding is in contrast with a study done in Palestine by **Thweib (2011)** who reported that the illiteracy only represent one fifth of the study subjects in Palestinian cancer patients.

In the current study, more than half of the elderly cancer patients were married. This is in agreement with other studies done in Palestine, Republic of Korea and Taiwan by **Thweib (2011), Kwon (2012) and Fan (2013)** respectively who reported that the majority of the study subjects were married.

There are more than 100 types of cancer. Types of cancer are usually named for the organs or tissues where the cancers form. Cancers also may be described by the type of cell that formed them, such as an epithelial cell or a squamous cell **(Harris, 2009)**. As regards cancer type, the present study found that the breast cancer, liver cancer, lung cancer, and colon cancer represent about two third of the studied sample and the most types of cancer of the elderly cancer patients. It can be explained by the fact that more than half of the studied sample were females and more likely to develop breast cancer, also the high percentage of liver diseases in Egypt which can cause complications including cancer. This result was in agreement with a study done in Palestine by **Thweib (2011)** who reported that breast cancer, colorectal cancer, and lung cancer were the most types of cancer of their study subjects. This finding were also noted by a study done in Republic of Korea by **Kwon (2012)** who reported that stomach cancer, colorectal cancer, and breast cancer were the most types of cancer of their study subjects.

Elderly cancer patients' knowledge:

Teaching of patient plays a major role in empowering elderly patients with cancer. Teaching patients about their disease, treatment, side effects management and health status to can enhance coping mechanisms, reduce decisional conflicts, reduce treatment side effects, promote patient autonomy and improve the experience for patients and families. Patients who understand their disease and treatment have greater compliance with therapy, which translates into better outcomes **(Cancer Care Nova Scotia, 2011).** Provide possible teaching prior to first treatment, help them to alleviate some of the conflicts associated with the treatment experience and may facilitate patient's teaching **(Shea et al., 2007)**.

The present study revealed that all of elderly patients had poor knowledge about chemotherapy side effects and actions toward this side effects. This may be explained by that the large number of patients at the Oncology Center does not give the medical team an opportunity to give them enough information about chemotherapy, also may because that more than half of the studied sample were illiterate. This is in agreement with a study done in Egypt by **Abd-Elaziz (2016)** who reported that the majority of elderly patients had an unsatisfactory level of knowledge about chemotherapy, side effects and prevention. While this finding is in contrast with a study done in Germany by **Jahn (2009)** who reported that the studied patients had moderate level of knowledge regarding chemotherapy and this can be explained by the difference of education and culture between the two studied samples in Egypt and Germany.

Furthermore, the present study revealed that there was a statistically significant difference in elderly knowledge regarding chemotherapy side effects, actions toward chemotherapy side effects after the program. It can explained by the fact that teaching patients about their disease, treatment, and side effects management can enhance coping mechanisms and improve patients' knowledge. This result is supported by a study done in Egypt by **Abd-Allah (2000)** who documented that the in-service training program has a beneficial effect in improving the knowledge and skills for the elderly. Also this is in harmony with the study done in Canada by **Caroline (2011)** who noted that knowledge scores were consistently increased for the nursing consultation group. Another study done in India by **Rani & Dahiya, (2018)** who reported that the planned teaching program was effective in increasing the knowledge of the patients regarding chemotherapy side effects and their management.

The present study revealed that all of elderly patients had poor knowledge about oral care and progressive relaxation techniques. This may be attributed to insufficient information related to oral care and progressive relaxation techniques, also this may be attributed to the lack of continuous education and in-service training programs. This results was in the same line with a study done in Taiwan by **Sun (2017)** who reported that the majority of studied sample had poor knowledge regarding relaxation techniques in breast cancer patients receiving chemotherapy. Another study done in USA by **Lalla (2008)** who reported that patients undergoing chemotherapy had poor knowledge on oral care protocol.

The result of the current study shows that there was a statistically significant difference in elderly knowledge regarding oral care and progressive relaxation techniques before, after and following the program. This can be explained by the fact that simplified educational programs that are important to the condition of the elderly have an important role in changing the knowledge and awareness of patients. This is in the same line with studies done in Egypt and South Korea by **Sobeh & Hafez (2016) and Yoo (2005)** respectively who reported improve patients' knowledge regarding oral care and muscle relaxation technique after intervention program.

Gastrointestinal problems of the studied patients:

Chemotherapy drugs kill cancer cells, but they can also damage healthy cells and causes many side effects. Different cells and tissues in the body cope differently with chemotherapy. Chemotherapy drugs affect the cells that are actively growing and dividing, such as blood cells in the bone marrow, cells lining the mouth and GIT and hair follicle cells **(American Cancer Society, 2017)**.

Management of chemotherapy related nausea and vomiting should incorporate both pharmacological and non-pharmacological approaches, whenever appropriate, with the overall goal of improving and/or maintaining the patient's quality of life **(American Society of Health-System Pharmacist, 2010)**.

In this study; the elderly patients had a significant reduction in the severity of nausea after program application. This results confirm the idea that the progressive muscle relaxation and patient teaching are considered the most effective non pharmacological intervention for nausea. This result is in agreement with the finding of studies done in Japan and USA by **Arakawa (2011) & Bayuk (2010)** respectively who reported that relaxation techniques including progressive muscle relaxation training, had been shown in several research studies to be helpful in alleviating nausea.

Concerning vomiting, the results of this study shows that the elderly patients had a significant reduction in the severity of vomiting. This can be explained by the fact that sometimes non-therapeutic intervention can improve the condition of patients, especially if attention is paid to the behaviors of eating, drinking, etc. This results was in the same line with a study done in Germany by **Jahn (2009)** who reported that teaching program about chemotherapy side effects have benefits for cancer patients regarding vomiting level. Also the results of this study was in the same line with a study done in USA by **Cotanch & Strom (2011)** who reported that progressive muscle relaxation was effective in decreasing the frequency of chemotherapy induced vomiting.

Stomatitis is a common debilitating complication of chemotherapy. The impact of oral stomatitis is far-reaching for patients, caregivers and the medical system. Stomatitis results in severe physical consequences for patients impacting their quality of life and resulting in life-threating complications. Ultimately, the development of stomatitis not only impacts long term outcomes, but also leads to a significant financial and emotional burden for the patients and the medical system **(Balducci, 2017)**.

The most unfortunate side effects of chemotherapy is the development of diarrhea and constipation **(American Cancer Society, 2012)**. It can be prevented by measures such as diet and nutrition **(Dest, 2011)**.

The present study revealed that there is no statistical differences between severity of diarrhea before and after the program. This can be explained by the fact that elderly patients need more information about how to deal with diarrhea. This result in accordance with a study done in Japan by **Bye et al., (2009)** who mentioned that there were no differences in the prevalence of diarrhea between study and control group after diet modification. This results were in contrast with study done in USA by **Ravasco et al., (2011)** who reported that individual dietary counseling can be successful in enabling patients at high risk of diarrhea to maintain good status of life which accompanied by a reduction in symptoms and improved health-related quality of life.

Furthermore, the present study revealed that there is no statistical differences between severity of constipation before and after the program. This can be explained by the fact that the elderly patient had no compliance with diet and nutrition education program as a part with Egyptian people culture with food. This results was supported by a study done in Egypt by **Mohammed et al., (2012)** who reported that there is no statistical differences between severity of constipation between study and control group.

The finding of the present study showed statistical significant differences in the severity of stomatitis before and after oral care. So this finding confirms the statement that mouth care reduces the incidence and severity of stomatitis. This is goes in line with **Wrthington (2010)** who mentioned that poor oral hygiene make cancer patients at risk for stomatitis. This result was justified by **Levi (2007)** who stated that food debris and plaque accumulate in the oral cavity create good media to microorganism growth and changes in oral PH. Therefore, frequent oral care make mouth fresh, free from food debris and prevent the dryness of the lips to reduce the risk for tissue injury of the oral cavity.

Therefore, Education, as an essential part in cancer patients' treatment, its importance has been demonstrated in many studies, performed for cancer patients aimed to control cancer therapy side effects. In this sense, effective cancer patient education requires training, knowledge, educational skills, communication and listening abilities, understanding and negotiation skills from the multi – professional team. Information, however, is a relatively cheap intervention that could and should be a part of standard care **(Mossman et al., 2009)**.

VI. CONCLUSION AND RECOMMENDATIONS

In this study implementation of the nursing intervention program proved to be effective in improving patients' knowledge about chemotherapy side effects, actions toward chemotherapy side effects, and knowledge about oral care and progressive relaxation techniques. Also, improving patients' gastrointestinal tract problems as nausea, vomiting and stomatitis. The mean scores of all items of knowledge including chemotherapy, actions related to chemotherapy side effects, oral care and progressive relaxation technique differs significantly after applying sessions and after 2 months follow up (p= .000). The frequencies of nausea, vomiting and stomatitis levels differ significantly after application the program (p = .002), (p = .004) and (p = .007) respectively.

Recommendations:

- The developed booklet to be distributed to elderly cancer patients in the Oncology center Mansoura University through the responsible personal to raise their knowledge.

- Providing elderly with educational materials as books, pamphlets and videos to increase their awareness about cancer and chemotherapy side effects' management.

REFERENCES

[1] **American Cancer Society. (2016)**. Cancer basics/what is cancer, http://www.cancer.org/cancer/cancerbasics/what-is-cancer. Accessed at 10 October, 2016.

[2] **World Health Organization**. **(2014)**. Media center/fact sheets, http://www.who.int/mediacentre/factsheets/fs297/en/. Accessed at 15 February, 2014.

[3] **Ferlay J, Shin HR, Bray F, Forman D, Mathers CD, Parkin D. GLOBOCAN (2008)**, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 10. Lyon, France: International Agency for Research on Cancer; Year. Available at: http://globocan.iarc.fr. 2010. Last accessed 8/17/2010.

[4] **De Martel C, Ferlay J, Franceschi S, et al. (2016)**. Global burden of cancers attributable to infections in 2008: a review and synthetic analysis. Lancet Oncol; 13:607-15

[5] **Rachel A (2012)**. Cancer chemotherapy. Wiley-Blackwell. ISBN 0-470-09254-8.

[6] **Gibson RJ, Keefe DM (2009)**. "Cancer chemotherapy-induced diarrhoea and constipation: mechanisms of damage and prevention strategies". Supportive Care in Cancer. 14 (9): 890–900.

[7] **Yarbro CH. (2013)**. The history of cancer nursing. In: McCorkle R, Grant M, Frank-Stromborg M, Baird SB, editors.Cancer nursing, 2nd ed. Philadelphia: WB Saunders; p. 12–24.

[8] **American Society of Clinical Oncology. (2003)**, Cancer in Older Adults. Retrived from http://www. kalispellregional.org/data/content/cancer_in_older_adults.pdf in 5 December, 2014.

[9] **Abo Baker H. (2012)**. Establishing and Implementing of Nursing Management Protocol to radiotherapy side effects for cancer patients. Published Master Thesis. Faculty of Nursing. Mansoura University.

[10] **Shebl, A.M, Ismaeel,W, and Hassanein A.(2014)**. Impact of oral care protocol on the incidence and severity of stomatitis induced by radiotherapy. IOSR Journal of Nursing and Health Science; 3(3): 35-44.

[11] **McMillan SC & Williams FA. (1989).** Validity and reliability of the Constipation Assessment Scale. Cancer Nursing 12, 183–188.

[12] **Noshy H. (2014)**. Effect of Lifestyle Modification Intervention to overcome Chronic Constipation among Community Dwelling Older Adults, Unpublished Master Thesis. Faculty of Nursing. Mansoura University.

[13] **Hurria A. K., Togawa S. G., Mohile C., Owusu H. D., Klepin C. , Gross S. M., Lichtman V., Katheria S., Klapper W. P.(2010)**. Predicting chemotherapy toxicity in older adults with cancer: A prospective 500 patient multicenter study. J Clin Oncol; 28 No15.

[14] **Wedding U., Honecker M., Bokemeyer C.,Pientka L.& Hoffken K. (2007)**. Tolerance to chemotherapy in elderly patients with cancer:Cancer control Journal;14(2):44-56.

[15] **American Cancer society (2010). Evaluating the older patients with cancer: understanding frailty and the geriatric assessment. CA Cancer J clin; 60:120-132.**

[16] **Dupler D (2009)**.Cancer treatment. Available at http://www.answers. Com/topic/cancer.

[17] **Connie Henke Yarbro, Debra Wujcik, and Barbara Holmes Gobel (2011)**. Cancer nursing: principles and practice. 7th ed. Jones & Bartlett publisher; p: 901-905.

[18] **Wengstrom Y, Forberg C, Noslund I, and Bergh J (2009)**. Quantitative assessment of skin erythema due to radiotherapy – evaluation of different measurements. Radiother Oncol; 72(1):91-197.

[19] **Heba Ahmed Mohammed, Khairia Abo Baker Elsawi1, Magdi Mohammed, Manal Mohammed Mostafa (2012)**. Impact of Proposed Nursing Rehabilitation Program on Self-management of Selected Side Effects of Chemotherapy for Elderly Patients with Gastrointestinal Cancer. Journal of American Science, 2012;8(1).

[20] **Lavdaniti M (2017).** Quality of Life in Elderly Cancer Patients Undergoing Chemotherapy. GeNeDis 2016. Springer International Publishing; 291—295.

[21] **Esbensen B, Østerlind K and Hallberg I. (2006)**. Quality of Life of Elderly Persons with Cancer: A 3-Month Follow-up, Cancer Nursing [TM]. 29(3).

[22] **Thweib N. (2011)**. Quality of Life of Palestinian Cancer Patients. J Pediatr Hematol Oncol, 33:S68–S69.

[23] **Esbensen B and Thomsen T. (2011)**. Quality of life and hope in elderly people with cancer. Open Journal of Nursing, 1, 26-32.

[24] **Oliva E, Nobile F, Alimena G, Ronco F, Specchia G, Impera S, Breccia M, Vincelli I, Carmosino I, Guglielmo P, Pastore D, Alati C, and Latagliata R. (2011)**. Quality of life in elderly patients with acute myeloid leukemia: patients may be more accurate than physicians. Haematologica; 96(5):696-702.

[25] **Fan S, Eiser C, Ho M and Lin C. (2013)**. Health-related quality of life in patients with hepatocellular carcinoma: the mediation effects of illness perceptions and coping. John Wiley & Sons, Ltd, Psycho-Oncology, 22: 1353–1360.

[26] **Kwon I, Ryu E, Noh G and Sung Y. (2012)**. Health-related quality of life in cancer patients between baseline and a three-year follow-up. *European Journal of Oncology Nursing*, 16: 131-136.

[27] **Harris CC. (2009)**. Molecular epidemiology of human cancer risk: gene–environment interactions and p53 mutation spectrum in human lung cancer. Journal of Pathology 187: 8–18.

[28] **Cancer Care Nova Scotia (2011)**. Education Standard for Adults Affected by Cancer.

[29] **Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, (2007)**. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC Med Res Method; 7(2):10.

[30] **Abd-Elaziz NM (2016)**. Effect of Teaching Program on Chemotherapy Outcomes for Cancer Elderly Patients at Assiut University Hospitals. Journal of Nursing a nd Health Science; 5(3): 62-69.

[31] **Jahn P, Renz P, Stukenkemper J, Book K. (2009)**. Reduction of chemotherapy-induced anorexia, nausea, and emesis through a structured nursing intervention: a cluster-randomized multicenter trial. Support Care Cancer. 17:1543–1552.

[32] **Abd-Alla, M., (2000)**. Assuring quality care through a managerial in-service training program for head nurses working in Assiut University Hospital, DNS thesis of nursing service administration, Assiut University.

[33] **Caroline Häggmark, Lena Bohman, Kate Ilmoni- Brandt, IngemarNäslund, Per-OlowSjödén, and Bo Nilsson (2011)**. Effects of information supply on satisfaction with information and quality of life in cancer patients receiving curative radiation therapy. Patient Education and Counseling; 45(3): 173-9.

[34] **Rani M, Dahiya M. (2018)**. Study to Assess the Effectiveness of Planned teaching Program on Knowledge Regarding Side Effects of Chemotherapy and Its Coping Strategies among the Patients Admitted in Cancer Unit of Pt.Bds Pgims, Rohtak. Journal of Nursing and Health Science. 7(1): 60-64.

[35] **Sun F, Hung C, Yao Y, Lu C, Chiang C. (2017)**. The Effects of Muscle Relaxation and Therapeutic Walking on Depression, Suicidal Ideation, and Quality of Life in Breast Cancer Patients Receiving Chemotherapy. Cancer Nursing; 40(6).

[36] **Lalla R, (2008)**. Management of Oral Mucositis in Patients Who Have Cancer. Elsevier Inc; 61–77.

[37] **Sobeh. D, Hafez. F. (2016)**. Effectiveness of Nursing Care Protocol on Preventing and Managing Radiotherapy Induced Oral and GIT Toxicity in Cancer Patients. Journal of Nursing and Health Science; 5(6): 96-103.

[38] **Yoo. H, Ahn. S, Kim. S, Kim. W, Han. O. (2005)**. Efficacy of progressive muscle relaxation training and guided imagery in reducing chemotherapy side effects in patients with breast cancer and in improving their quality of life. Support Care Cancer; 13: 826–833.

[39] **American Cancer Society. (2017)**. Chemotherapy Side Effects. Retrieved from: https://www.cancer.org/treatment/treatments-and-side-effects/treatment types/chemotherapy/chemotherapy-side-effects.html. [Accessed 17.12.2018].

[40] **American Society of Health-System Pharmacist (2010)**. ASHP therapeutic guidelines on the pharmacologic management of nausea and vomiting in adult and pediatric patients receiving chemotherapy, radiation therapy or undergoing surgery. 56:729-764.

[41] **Arakawa S (2011).** Relaxation to reduce nausea, vomiting and anxiety induced by chemotherapy in Japanese patients. Cancer Nurs; 20:342-349.

[42] **Bayuk L (2010)**. Relaxation Techniques: an adjunct therapy for cancer patients. Semin Oncol Nurs; 1:147-150.

[43] **Jahn P., Renz P., Stukenkemper J., Book K., Kuss O., Jordan K., Horn I., Thoke-Colberg A., Schmoll H. & Landenberger M.(2009)**. Reduction of chemotherapy-induced anorexia, nausea, and emesis through a structured nursing intervention: a cluster-randomized multicenter trial. Supportive care in cancer; 17(12): 1543-1552.

[44] **Cotanch. P, Strom. S. (2011)**. Progressive muscle relaxation as antiemetic therapy for cancer patients. Oncol Nurs Forum; 14:33-37.

[45] **Balducci L. (2017)**. National Comprehensive Cancer Network (NCCN) practice guidelines in oncology: senior adult oncology. (http://www.nccn.org/professionals/physician- gla/PDF/senior.) Accessed April 2017.

[46] **American Cancer Society (2012)**. Nausea and vomiting. Available at: http://www.cancer.org/docroot/SPC/content/SPC_1_Minority_Cancer_Unequal_Burden.asp.

[47] **Dest V (2011).** How to Manage Radiation-Induced Diarrhea. RN; 64(5):91.

[48] **Bye, Ose, and Kaasa (2009)**. The effect of low fat, low lactose diet on nutritional status during pelvic radiotherapy. Clinical Nutrition; 12(2): 89-95.

[49] **Ravasco R, Monterio-Grillo I, Vidal PM. (2011)**. Dietary counseling improves patient outcomes: a prospective, randomized, controlled trial in colorectal cancer patients undergoing radiotherapy. J Clin Oncolo; 23:1431-1438.

[50] **Mohammed H, Elsawi K, Saber M. (2012)**. Impact of Proposed Nursing Rehabilitation Program on Self-management of Selected Side Effects of Chemotherapy for Elderly Patients with Gastrointestinal Cancer. Journal of American Science; 8(1).

[51] **Wrthington HV. (2010)**. Interventions for treating oral mucositis for patients with cancer receiving treatment. Cochrane Database Syst Rev; 1: 23.

[52] **Levi F, Zidani R, and Missel JL. (2007)**. Randomized multicentre trial of chronotherapy with oxaliplatin, fluorouracil, and folinic acid in metastatic colorectal cancer. Lancet; 350: 681-6.

[53] **Mossman J, Boudioni M, and Slevin ML. (2009)**. Cancer information: a cost effective intervention. Eur J Cancer; 35(11):1587-1591.