Impact of Proposed Nursing Rehabilitation Program on Self management of Selected Side Effects of Chemotherapy for Elderly Patients with Gastrointestinal Cancer

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Abstract: Elderly cancer patients that are receiving chemotherapy may face many challenges as co morbidity, polypharmacy and chemotherapy toxicity that may affect their nutritional and functional status; so nursing rehabilitation program is crucial to overcome these complications and improve quality of life. Therefore, the aim of this study was to examine the impact of proposed nursing rehabilitation program on self management of selected side effects of chemotherapy for elderly patients with gastrointestinal cancer. To fulfill the aim of this study the following research hypotheses were tested: H1: The study group will have a decreased intensity of chemotherapy adverse effects as compared to control group. H2: The post test mean knowledge scores of the study group will be higher than that of a control group. H3: The post test mean self management scores of the study group will be higher than that of a control group. Quasi-experimental design was utilized in this study. A convenience sample of 60 elderly male and female patients. Patients were randomly divided into two equal and matched groups (study and control). Four tools were utilized for data collections; 1) Socio- demographic and medical profile data tool, 2) Chemotherapy induced toxicities tool, 3) Oral care assessment tool, 4) Pre- post knowledge assessment and self management tool. The study results revealed the followings: there was statistical significant difference between study and control group in relation to incidence of chemotherapy´s adverse effects as nausea and vomiting, mucositis and diarrhea after the last chemotherapeutic cycles. Post test mean knowledge scores related to chemotherapy, functions, adverse effects, elimination, mucositis, oral care and balanced diet and post test mean self management scores related to elimination, mucositis, nausea and vomiting, oral care practice were higher in the study group than control group. In conclusion nursing rehabilitation program seemed to have a positive impact on gastrointestinal elderly patient's outcomes.

1. Introduction

Our bodies are made up of billions of cells that grow, divide and then die in a predictable manner; cancer occurs when something goes wrong with this system, causing uncontrolled cell division and growth (American Cancer Society, 2010a). Cancer is primarily a disease of the elderly, sixty percent of newly diagnosed malignancies are found in people over the age of sixty five; overall, the elderly are 10 times more likely to get cancer, and 15 times more likely to die from cancer than young people according to (US National Cancer Institute, 2010). Three major hypotheses have been proposed to explain the association of cancer and age. The first hypothesis holds that this association is a consequence of the duration of carcinogenesis. In other words, the high prevalence of cancer in older individuals simply reflects a more prolonged exposure to carcinogens as pollution, radiation,

tobacco, alcohol, chemical substances (Anisimov, 2007).The same author added that the second hypothesis proposes that age- related progressive changes in the internal milieu of the organism may provide an increasingly favorable environment for the induction of new neoplasm and the growth of already existent but latent malignant cells; the third hypothesis practically joins these two hypotheses together.

Most cancers are named for the organ or type of cells in which they begin; for example, cancer that begins in the digestive system called gastrointestinal cancer. Gastrointestinal cancer refers to abnormal cell growth leading to the formation of tumors in the digestive track as esophagus, stomach, pancreas, liver, bile ducts, gallbladder, colon, rectum and anus (Wikipedia, 2011). In Egypt, The percentage of gastrointestinal cancer patients is about (24.7%) according to Egypt National Cancer Registry in

Minia Governorate, Egypt (2009). Colorectal cancer is the third most common cancer in men and women, with an estimated 105,000 colon cancer and 40,000 rectal cancer cases diagnosed in the United States in the past year (U.S. National Cancer Institute, 2009). In Egypt, Rates of Colorectal Cancer per 100,000 Population at El-Minia is about 3.3% according to Egypt National Cancer Registry in Minia Governorate (2009).

Older adults with gastrointestinal cancer may be at greater risk for the nutritional problems related to cancer and its treatment. These include nausea, vomiting, dehydration, taste alteration, anorexia, cachexia, mucositis and bowel alteration (Stavley, 2009). Cancer treatment can take many different forms, and it is always tailored to the patients. The decision on which type of treatment is most appropriate depends on type, location and stage of the cancer (how much it has spread), age, health status, and personal treatment preferences (Dupler, 2009).

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 (2010b) 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.

Repetto (2003) pointed that effective management of the toxicity associated with chemotherapy with appropriate supportive care is crucial, especially in the elderly patients to give them the best chance of cure, and survival or to provide palliation. Elderly patients with gastrointestinal cancer may present complex problems that need comprehensive physical and psychosocial support that can be established through rehabilitation approach (Debra, 2009). The aim of rehabilitation is to maximize person's roles fulfillment and independence in his or her environment, all within the limitations imposed by the underlying pathology and impairment and availability resources; this helps the patient to make the best adaptation possible to any difference between the roles achieved and the roles desired (Clay, et al, 2009).

According to Janie (2009) cancer rehabilitation helps those elderly patients to obtain the best physical, social, psychological, and work related functioning during and after cancer treatment. The rehabilitation team consists of the oncologist, surgeon, nurse, social worker, physical therapist, occupational therapist, nutritionist and others depending on the special needs of the individual (Broadwell, 2009). Oncology nurses are an important component of this team; they can educate and counsel patients and their families as well as administer chemotherapy, interpret and manage treatment related side effects, coordinate community and medical services, and provide palliative care; moreover they can also motivate the older patient toward self care to reduce chemotherapy toxicity (Baltimore, 2009).

Orem theory emphasizes the importance of how one's own self care is important for maintain life, health development and well being (Bruce et al, 2009). Self care is defined by Orem theory as the ability to perform activities and meet personal needs with the goal of maintain health and wellness of mind, body, spirit (Rosales, 2010). So nurses should be aware about their roles in an increasing self care capacity and minimizing self care limitations to promote a sense of well being and a higher quality of life (Clay, et al, 2009). The same authors added that nurses also can provide their elderly patients with evidence on which to make informed decision, teach them skills that may enhance their quality of life, maintain optimal functioning and prevent deterioration and moreover evaluate the success of the care provided from the patient's point of view.

2. Subjects and Methods:

The aim of this study is to examine impact of proposed nursing rehabilitation program on self management of selected side effects of chemotherapy for elderly patients with gastrointestinal cancer. To fulfill the aim of this study the following research hypotheses were tested:

H1: The study group will have a decreased intensity of chemotherapy adverse effect like mucositis, nausea and vomiting, diarrhea and constipation as compared to control group.

H2: The post test mean knowledge scores of the study group will be higher than that of a control group.

H3: The post test mean self management scores of

the study group will be higher than that of a control group.

A quasi-experimental design was utilized to accomplish this study. A convenience sample of 60 elderly male and female patients Subjects were randomly assigned to either study or control group (30 subjects each).

Matching was done according to age, education, gender, diagnosis and co morbidities. Both groups were admitted to the inpatient medical unit (free public sector) to receive cancer chemotherapy protocol. Subjects received chemotherapy cycle for three to four days and repeated every twenty one days. Control group subjects (untreated or unexposed group) were followed by the researcher for two phases of chemotherapeutic cycles, first phase was before the first chemotherapeutic cycle and the second phase was after the last six chemotherapeutic cycles while study group were followed for three phases of chemotherapeutic cycles, first phase was before the first chemotherapeutic cycle, the second was in between chemotherapeutic cycles(2nd and 4th chemotherapeutic cycles) while the third phase was after the last six chemotherapeutic cycles to assess effect of nursing program on the intensity of chemotherapy adverse effects.

Data collection phase was conducted over a period of one year starting on April, 2010 to April, 2011.The inclusion criteria were: subjects aged 60 years and above having gastrointestinal cancer. The exclusion criteria included patients who are less than 60 years of age, had another type of cancer, comatose, receiving another type of treatment besides chemotherapy or mentally disturbed. This study was conducted at the National Cancer Institute (NCI), Cairo University, in the inpatient medical unit (free public sector). Data pertinent to the study variables were collected by means of the following tools:

1-Socio- demographic and medical profile data tool

It is designed by the researcher and divided into two parts; the first part is related to the socio-demographic variables as the patient's age, gender, occupation, level of education, marital status, type of residence, history and duration of smoking. The second part is concerned with the medical profile that includes site of cancer, type of surgery and chemotherapy.

2-Chemotherapy induced toxicities tool

It designed by the researcher, it includes common adverse effects related to chemotherapy as mucositis, nausea, vomiting, constipation, diarrhea. The patient is asked about the presence of adverse effects and whether it occurs before or after taking chemotherapy(which cycle?) and the frequency of occurrence per day.

3-Oral care assessment tool

It includes Oral cavity assessment tool, Oral care procedure sheet and WHO mucositis toxicity scale.

3. a- Oral cavity assessment tool

It is an assessment of the oral cavity designed by (Goodman, et al, 1993). It includes assessment of voice, swallowing, lips, tongue, saliva, mucous membranes, gingiva and teeth or dentures of the oral cavity.

3. b- Oral care procedure sheet

It is designed by (Primary Care Clinical Manger- Centeral, 2006); it includes aim and objectives of oral care, equipment used, principles for practice of oral care and procedure steps for doing effective oral care to the elderly patients.

3. c- WHO mucositis toxicity scale

It is designed by (Sonis, 2004), WHO scale is used to assess degree of mucositis. It is based on subjective, objective and functional outcomes as follows:

Subjective: Oral soreness as described by the patient.
Objective: presence of oral erythema and /or ulceration
Functional: ability to eat solids and liquids

4-Pre- post knowledge and self management assessment tool

It developed by the researcher to cover patients and their significant other's knowledge and satisfaction with nursing care and education received as asking questions related to type of medications that are received, functions of chemotherapy, most common side effects of chemotherapy, how they can be defined, and managed, and information related to balanced diet.

Procedure

The procedure is divided into two phases for control group and three phases for study group. Data collection was started for control group then for study group.

For control group
Phase 1: Before the first chemotherapeutic cycle

Patients on admission who was admitted to inpatient setting to receive chemotherapeutic cycles

and agreed to participate in the study were interviewed by the researcher to fill out the socio-demographic and medical profile data tool, and assessment of the oral cavity and degree of mucositis if present and chemotherapy induced toxicities assessment tool was completed and pre- knowledge and self management assessment tool was performed.

Phase 2: After the last six chemotherapeutic cycles

Control group who received chemotherapeutic cycles and received routine hospital nursing management was interviewed by the researcher at the end of six chemotherapeutic cycles to fill out again assessment of the oral cavity and degree of mucositis if present and chemotherapy induced toxicities assessment tool was completed and pos- knowledge and self management assessment tool was performed to identify effect of chemotherapy drugs on their quality of life.

For study group

Phase 1: Before the first chemotherapeutic cycle

Patients on admission who were admitted to inpatient setting to receive chemotherapeutic cycles and agreed to participate in the study were interviewed by the researcher to fill out the socio-demographic and medical profile data tool and assessment of the oral cavity and degree of mucositis if present and chemotherapy induced toxicities assessment tool was completed and pre- knowledge and self management assessment tool was performed. On the second and third day of the first chemotherapeutic cycle (before chemotherapeutic session) the researcher provided brief information to the patients regarding assessment of oral cavity and definition and causes of mucositis, and how it can be prevented or its intensity can be reduced. The researcher also demonstrated oral care procedure for those. On the fourth day of first chemotherapeutic cycle, the researcher completed the information related to other chemotherapeutic adverse effects as nausea, vomiting, diarrhea and constipation that might have occurred, the researcher defined in a brief way the definitions and causes of those adverse effects and the way of preventing or reducing them. In addition the researcher offered written material to the patients with colored pictures to help them to follow this information at their homes and also asked them to re-demonstrate oral care procedure to be sure that they can perform it effectively at their homes.

Phase 2: In between chemotherapeutic cycles

The patients were followed up after ending the first cycle of chemotherapy at home for 5 days by phone in the afternoon at least 10 minutes in each day to be sure that they followed the effective health instructions related to the adverse effect of chemotherapy.

Phase 2 a: In the second and fourth chemotherapeutic cycle

Chemotherapy induced toxicities assessment tool were filled again by the researcher to identify adverse effects that might have affected the patients and also to assess their oral cavity and degree of mucositis if present. Moreover, the researcher asked the patients to re-demonstrate oral care procedure again and also asked them about the adverse effects that happened and how they managed it. The patients were followed up after ending the second and fourth cycle of chemotherapy at home for three days by phone in the afternoon at least 10 minutes in each day to be sure that they are following the effective health instructions related to the adverse effects of chemotherapy.

Phase 3: After the sixth chemotherapeutic cycle

Study group who received chemotherapeutic cycles were interviewed by the researcher after the sixth chemotherapeutic cycle to fill out again assessment of the oral cavity and degree of mucositis if present and chemotherapy induced toxicities assessment tool was completed and post- knowledge and self management assessment tool were performed to identify the effect of nursing program on self management of selected side effects of chemotherapy for elderly patients with gastrointestinal cancer.

Data Analysis:

Statistical analysis was utilized to test for differences between the study and control subjects, using the SPSS program. A probability level of 0.05 has been adopted as the level of significance.

3. Results

Section (1): Socio-demographic Characteristics and Medical Data

With reference to site of cancer, nearly or less than half of both study and control group subjects were having colon cancer (46.7% & 50% respectively).Regarding surgery, the same percentage of both study and control group subjects were done surgery related to site of cancer (76.7%). In relation to intravenous chemotherapy, more than two third of study group subjects (46.7%) received Leucovorin, Fluorouracil. While (40%) of control group subjects received (Leucovorin, Fluorouracil & Plantinol). There was no significant statistical difference between study and control group subjects related to socio-demographic characteristics and medical data.

Table (1):Socio-demographic characteristics of study and control group

Variables	Study group(n=30)		Control group(n=30)		χ^2	P- value
	n	%	n	%		
Age / Yrs:					.000	1.000
1. 60-65	8	26.7	8	26.7		NS
2. > 65	22	73.3	22	73.3		
Mean ± SD	67.4 ± 2.3		67.4 ± 2.3			
Gender:					0.71	0.79
1. Male	18	60.0	19	63.3		NS
2. Female	12	40.0	11	36.7		
Occupation:					0.091	0.955
1. House wife	12	40.0	11	36.7		NS
2. Farmer	8	26.7	8	26.7		
3. Private work	10	33.3	11	36.7		
Marital status:					0.098	0.754
1. Married	23	76.7	24	80.0		NS
2. Widowed	7	23.3	6	20.0		
Residence:					0.67	0.795
1. Urban	14	46.7	13	43.3		NS
2. Rural	16	53.3	17	56.7		
Level of education:					0.232	0.972
1. Illiterate	15	50.0	16	53.3		NS
2. Can read and write	11	36.7	11	36.7		
3. Primary&preparatory school	4	13.3	3	10.0		
History of Smoking:					0.655	0.721
1. Yes	17	56.7	14	46.7		NS
2. No	13	43.3	16	53.3		
Duration of Smoking:					0.655	0.721
1. < 30 years	8	26.7	6	20.0		NS
2. ≥ 30 years	9	30.0	8	26.7		

N.S=Not Significant

Table (1) (cont.): Medical Data of both study and control group.

Variables	Study group (n=30)		Control group (n=30)		χ^2	P- value
	n	%	n	%		
Site of cancer:					0.563	0.967
1. Nasopharynx	2	6.7	1	3.3		NS
2. Esophagus	1	3.3	1	3.3		
3. Stomach	10	33.3	9	30.0		
4. Colon	14	46.7	15	50.0		
5. Rectum	3	10.0	4	13.3		
Surgery:					0.000	1.000
1. Yes (radical)	23	76.7	23	76.7		NS
2. No	7	23.3	7	23.3		
Intravenous Chemotherapy:					0.288	0.866
1. Leucovorin, Fluorouracil	14	46.7	12	40.0		NS
2. Oxaliplatin, Fluorouracil	5	16.7	6	20.0		
3. Plantinol, Fluorouracil	11	36.7	12	40.0		

N.S=Not Significant

Section 2: Hypotheses testing
Hypotheses (1)

The study group will have a decreased incidence of chemotherapy´s adverse effects as compared to control group (Tables 2-6 are related to this hypothesis).

Table 3 shows that the adverse effects are less in the last chemotherapeutic cycle.

Table (2) Difference in incidence of chemotherapy´s adverse effects between study and control group before first

chemotherapeutic cycle.using chi- square

Variables	Study group(n=30)		Control group(n=30)		χ^2	P- value
	n	%	n	%		
Nausea- Vomiting:					0.417	0.519
No Nausea & Vomiting	25	83.8	23	76.7		NS
< 3 times / day.	5	16.2	7	23.3		
≥ 3 times / day.	0	0.0	0	0.0		
Mucositis:					0.000	1.000
1. Yes	0	0.0	0	0		NS
2. No	30	100	30	100		
Diarrhea:					0.341	0.559
No diarrhea	21	70.0	23	76.7		NS
≤ 3 times / day.	9	30.0	7	23.3		
> 3 times / day.	0	0.00	0	0.00		
Constipation:					0.659	0.417
No constipation	21	70.0	18	60.0		NS
1 time / 3 days.	9	30.0	12	40.0		
1time >3 days.	0	0.00	0	0.00		

N.S=Not Significant

Table (3) Incidence of chemotherapy´s adverse effects of the study group in the second, fourth and last chemotherapeutic cycles.

Variables	Study group(n=60)					
	2nd Cycle		4th Cycle		Last Cycle	
	n	%	n	%	n	%
Nausea- Vomiting:						
No Nausea & Vomiting	14	46.7	17	56.7	19	63.3
< 3 times / day.	11	36.7	8	26.7	8	26.7
≥ 3 times / day.	5	16.7	5	16.7	3	10.0
Mucositis:						
1. No	21	70.0	24	80.0	27	45.0
2. Yes	9	30.0	6	20.0	3	5.0
Diarrhea:						
No diarrhea	15	50.0	18	60.0	21	70.0
< 3 times / day.	9	30.0	6	20.0	5	16.7
≥ 3 times / day.	6	20.0	6	20.0	4	13.3
Constipation:						
No constipation	19	63.3	22	73.3	24	80.0
1 time / 2 days.	6	20	3	10.0	3	10.0
1 time / 3 days.	5	16.7	5	16.7	3	10.0

Table (4) Difference in incidence of chemotherapy´s adverse effects between study and control group after the last chemotherapeutic cycle using chi- square

Variables	Study group(n=30)		Control group(n=30)		χ^2	P- value
	n	%	n	%		
Nausea- Vomiting:					6.808*	0.033
No Nausea & Vomiting	19	63.3	9	30.0		
< 3 times / day.	8	26.7	14	46.7		
≥ 3 times / day.	3	10.0	7	23.3		
Mucositis:					4.812*	0.029
1. No	27	45.0	20	33.3		
2. Yes	3	5.0	10	16.7		
Diarrhea:					6.708*	0.035
No diarrhea	21	70.0	11	36.7		
< 3 times / day.	5	16.7	11	36.7		
≥ 3 times / day.	4	13.3	8	26.7		
Constipation:					2.081	0.353
No constipation	24	80.0	19	63.3		NS
1 time / 2 days.	3	10.0	6	20.0		
1 time / 3 days.	3	10.0	5	16.7		

*Significant at the ≤ 0.05 probability level   NS=Not Significant

Table 4 shows that the incidence of nausea and vomiting,mucositis and diarrhea were statistically significantly lower in study group compared to control group, while the incidence of constipation was insignificantly lower in study group.

Table (5)   Percentage distribution and chi- square of WHO grades of mucositis of the   study group in the second, fourth and last chemotherapeutic cycles (n= 60).

WHO grades of mucositis	Study group					
	2nd Cycle		4th Cycle		Last Cycle	
	n	%	n	%	n	%
Grade 0 (No mucositis)	21	70.0	24	80.0	27	90.0
Grade 1	6	20.0	3	10.0	2	6.7
Grade 2	3	10.0	3	10.0	1	3.3

Table (6) Percentage distribution and chi- square of WHO grades of mucositis of study and control group after the last chemotherapeutic cycle (n= 60).

WHO grades of mucositis	Study group(n=30)		Control group(n=30)		χ^2	P- value
	n	%	n	%		
Grade 0 (No mucositis)	27	90.0	20	66.7	4.820*	0.047
Grade 1	2	6.7	7	23.3		
Grade 2	1	3.3	3	10.0		

*Significant at the ≤ 0.05 probability level

Table 6 indicates that the incidence of mucositis is significantly lower in the study group compared to the control group.

All the results from the tables 2 to 6 support Hypothesis (1).

Hypotheses (2)

The post test mean knowledge scores of the study group will be higher than that of a control group (Table 7 is related to this hypothesis).

Table (7) shows no significant differences between study and control group subjects in relation to pre assessment tool results.

In relation to post assessment tool results, Study group showed a higher mean score of Knowledge related to chemotherapy functions, chemotherapy´s adverse effects, constipation, diarrhea, mucositis and oral care as compared to the control group subjects, with significant statistical differences between them. According to knowledge related to nausea and vomiting, study and control group   subjects showed an equal mean scores, with no significant statistical differences between them (**t** =450.000 at P=1.000). All the results from the table 7 support Hypothesis (2).

Table (7) Mean difference of knowledge scores in pre and post assessment tool between study and control group (n= 60).

Variables	Pre assessment tool results		t-test p value	Post assessment tool results		t-test p value
	Study group(n=30)	Control group(n=30)		Study group(n=30)	Control group(n=30)	
	X ± SD	X ± SD		X ± SD	X ± SD	
Knowledge related to chemotherapy functions	1.16 ± 0.37	1.13±0.34	435.0 0.72 NS	2.33± 0.47	1.33± 0.47	100.000* < 0.001
Knowledge related to chemotherapy´s adverse effects	1.43 ± 0.72	1.46±0.73	437.0 0.83 NS	2.63±1.15	1.83±0.59	276.000* .006
Knowledge related to constipation	1.00 ± 0.00	1.00± 0.00	450.0 1.00 NS	1.56 ± 0.50	1.00 ± 0.00	195.000* < 0.001
Knowledge related to diarrhea	1.03 ± 0.18	1.03 ± 0.18	450.0 1.00 NS	1.53 ± 0.50	1.03± 0.18	225.000* < 0.001
Knowledge related to mucositis	1.26 ± 0.44	1.26 ± 0.63	438.0 0.83 NS	2.03 ± 0.49	1.36± 0.49	188.000* < 0.001
Knowledge related to nausea and vomiting	2.00 ± 0.00	2.00 ± 0.00	450.0 1.00 NS	2.00 ± 0.00	2.00 ± 0.00	450.000 1.000
Knowledge related to oral care	1.00 ± 0.00	1.00 ± 0.00	450.0 1.00 NS	1.90 ± 0.71	1.00 ±0.00	135.000* < 0.001
Total	13.90 ± 0.84	13.90±1.44	437.5 0.84 NS	20.20 ± 3.77	14.56 ± 1.16	61.000* < 0.001

*Significant at the ≤ 0.05 probability level

Hypotheses (3)

The post test mean self management scores of the study group will be higher than that of a control group (Table 8 is related to this hypothesis).

Table (8) shows that there is no significant statistical differences between study and control group subjects in relation to pre assessment tool results. In relation to post assessment tool results, study group showed a higher mean score of self management of constipation, diarrhea, mucositis, nausea and vomiting and oral care practice as compared to the control group, with significant statistical difference between them.

All the results from the table 8 support Hypothesis (3).

Table (8) Mean difference of self management scores in pre and post questionnaire sheet between study and control group

Variables	Pre assessment tool results		t-test p value	Post assessment tool results		t-test p value
	Study group(n=30)	Control group(n=30)		Study group(n=30)	Control group(n=30)	
	X ± SD	X ± SD		X ± SD	X SD	
Self management of constipation	1.66 ± 0.54	1.70±0.534	435.5 .785 NS	3.90±0.99	1.96±0.71	54.000* < 0.001
Self management of diarrhea	1.830 ± 0.590	2.00 ± 0.83	364.0 .139 NS	3.26±1.17	2.33±0.47	240.000* .001
Self management of mucositis	3.200 ± 0.840	3.33 ± 1.26	372.5 .215 NS	4.43±0.81	3.53±0.77	209.000* < 0.001
Self management of nausea and vomiting	3.200 ± 0.840	3.20 ± 1.03	429.5 .748 NS	4.53±1.19	3.20±1.03	182.500* < 0.001
Self oral care practice	2.16 ± 0.379	2.13 ± 0.628	445.0 .925 NS	3.30±0.83	2.13±0.62	142.000* < 0.001
Total	12.20 ± 1.60	12.36 ± 3.16	324.0 .058 NS	19.40±3.30	13.16±2.33	54.000* < 0.001

N.S=Not Significant   *Significant at the ≤ 0.05 probability level

4. Disscussion
Intensity of chemotherapy adverse effects before, during and after chemotherapeutic cycles

The current study indicates that minority of patients in both group had nausea and vomiting, diarrhea and also constipation. While all patients in both group had no mucositis before the first chemotherapeutic cycle.

This finding was documented by Fayed (2011) who reported that symptoms of gastrointestinal cancer may include abdominal pain, tenderness, or discomfort, change in bowel habits such as frequency or change in consistency or shape of stool, rectal bleeding or blood in stool, loss of appetite, nausea/vomiting, unintentional weight loss and fatigue. These symptoms of gastrointestinal cancer may vary from one patient to another depending on type of cancer, age, functional and health status of the patient.

In this respect, John, and colleagues (2011) reported that in 306 articles assessing symptoms and signs of colorectal cancer (CRC) in the general population and in primary and secondary care, a change to looser stool and/or increased frequency of defecation occurred in 60–91% of patients with a distal cancer and in 40–61% of patients with a proximal cancer and also they added diarrhea or a change in bowel habit was commonly associated with rectal bleeding in patients with bowel cancer although constipation is not described as a high-risk symptom.

Speaking in the same stream, Dinh (2011) reported that the common symptoms of colorectal cancer include rectal bleeding, changes in bowel habits, nausea, vomiting, anemia, anorexia, rectal pain and mucus in stools.

The current study revealed that the study group, in the last chemotherapeutic cycle had fewer chemotherapy adverse effects, (nausea and vomiting, mucositis, diarrhea and constipation)   as compared to the same subjects in the second and fourth chemotherapeutic cycles. In addition the majority of the study group had no nausea and vomiting, mucositis, diarrhea and constipation as compared to control group. Moreover, the incidence of grade 1 and 2 mucositis were lower in the study group compared to control group, with significant statistical difference between them.   This finding was

congruent with Kearney and colleagues (2008) who reported that nursing intervention had a positive impact on patients' experiences of nausea, vomiting and mucositis,

The results of the current study were not on the same line with Jahn and colleagues (2009) who mentioned that the Self-care improvement through Oncology Nursing (SCION) program did not result in a significant difference in the incidence of anorexia, nausea, and emesis symptoms as compared to standard care.

The results of current study were documented by Molassiotis and colleagues(2009) who noted that the cancer patients who received home care nursing program (HCN) experienced significant improvements in symptoms of oral mucositis, diarrhea, constipation, nausea, pain, fatigue, and insomnia compared with those in the standard care group,

Another study was carried out by Dodd and colleagues (2008) reported that oncology clinicians should consider the teaching of patients and urging them to use good oral hygiene practices as necessary and potentially preventive measures against chemotherapy-induced oral mucositis,

Knowledge and self management scores of the studied sample

Cancer patients' ability to control symptoms and to maintain reasonable quality of life is limited due to lack of knowledge, guidance, and instructions from health care providers. So oncology nurses have an important roles in assessing patients for appropriate therapy and increasing their knowledge, improving self care activities and providing timely interventions to reduce therapy-associated toxicities and maximize treatment efficacy (Viale & Sommers, 2007)

As evident from the current study, there was no significant difference between study and control group subjects regarding pre assessment tool results. While the results of post assessment tool revealed that study group showed a higher mean score of knowledge and self management as compared to the control group, with significant statistical difference between them. The researcher views that subjects of the study group showed a higher mean score of knowledge and self management of chemotherapy adverse effects as compared to subjects of the control group as result of nursing rehabilitation program that was applied by the researcher, it included health teaching regarding side effects of chemotherapy as mucositis, nausea, vomiting, diarrhea and constipation, and how they can be prevented or reduced and also information about balanced diet according to their body weight and finally practice

psychomotor skill of oral care to reduce intensity of mucositis.

Results of The current study were documented by Delmar and colleagues (2008) who suggested that the self-care approach is effective in improving the quality of life for unstable cancer patients by reducing suffering and increasing controlling capabilities.

In this respect, Franklin, and colleagues (2010) reported that oncology and rehabilitation nurses must advocate for their patients in order to minimize the impact of treatment and disease-related side effects on long-term function and quality of life. Early and repeated assessment of cancer patients, rehabilitation needs must become part of the nursing standard evaluation process. Moreover, they have an important role in promoting the rehabilitation goal of maintaining optimal independent function of cancer patients.

Another study done by Zhiyong (2011) reported that nursing intervention for cancer patients can improve patient's quality of lifethrough decreasing level of pain, improving appetite and mental status, increasing hours of sleepand decreasing treatment side effects.

In contrast, Jahn and colleagues (2009) revealed no difference regarding patients' knowledge of side effects, self-care interventions between subjects of study and control group and health-related quality of life was significantly better for patients in the control group.

Summary

Cancer is a disease of aging, with aging function of multiple organ systems decrease, co morbidities develop, and functional status is affected so elderly cancer patients may be at risk for developing complications of cytotoxic chemotherapy. The role of rehabilitative oncology nurses are essential to prevent or minimize these complications, and also to help patients to cope with treatment and minimize psychological morbidity from it, through comprehensive geriatric assessment and intervention that increase self care abilities to manage selected side effects of chemotherapy, promote independence level of activity of daily living, therefore enhance holistic care and improve quality of life of elderly cancer patients.

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