

## ORIGINAL ARTICLE

**Effectiveness of Nursing Interventions on Physical and Psychological Outcome among Cancer Patients Undergoing Chemotherapy**

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**Abstract:**

**Background:** Cancer patient's undergoing chemotherapy experiences a variety of side effects which has influence on prognosis of illness, activity of daily living and the quality of life. There is a need of nursing care interventions for management and prevention of problem among cancer patients. **Aim & Objectives:** The present study aimed to assess the effectiveness of nursing interventions on physical and psychological outcome among cancer patients undergoing chemotherapy. **Material and Methods:** A true experimental study, post test only design with control group approach was conducted among 130 cancer patients undergoing chemotherapy at oncology ward of Pravara Rural Hospital, Loni (Bk), Ahmednagar, Maharashtra. Cancer patients who are 18 years old or older were selected with systematic random sampling method. Pre tested semi structured interview schedule was used to gather data. The assessment of health status before start of chemotherapy was carried out, followed by the nursing interventions was implemented based on patient needs and problems, and the post test was conducted after the period of interventions. The collected data was tabulated and analyzed using appropriate statistical methods wherever required. **Results:** The results revealed that the cancer patients experienced a wide range of physical and psychological problems prior to chemotherapy treatment. Cancer patients who received nursing interventions had improved post test mean scores on chemotherapy symptoms, pain and fatigue; emotional well being, anxiety and depression

than the patients who received routine care, notably it was statistically significant at  $p < 0.05$  level. A significant association was observed between physical, psychological outcome variables and the socio demographic characteristics like sex, site of cancer, stage of cancer, duration of cancer, metastasis of cancer and the regimen of chemotherapy at  $p < 0.05$  level. **Conclusion:** This study demonstrated that the nursing interventions were well accepted by cancer patients and has significant effect towards the improvement of physical and psychological outcomes of cancer patients undergoing chemotherapy.

**Keywords:** Cancer, Effectiveness, Nursing Interventions, Physical Outcome, Psychological Outcome

**Introduction:**

Cancer – a non communicable disease, emerging as one of the major public health problem in India. Cancer affects everyone and represents a tremendous burden on patients, families and societies. Its impact is likely to increase substantially, cause a lot of pain and suffering, if not treated properly on time, results in death [1].

Cancer treatment aims to cure the disease, prolong life and improve the quality of remaining life. The principal means for treating the cancer are surgery, chemotherapy, radiation therapy and hormonal therapy. Chemotherapy is one of three pillars of cancer treatment, and more than half of cancer patients receive chemotherapy as a form of

treatment. Though the chemotherapeutic drug kills cancer cells, it damages the normal cell and cause side effects with varying severity [2].

The commonly reported symptoms due to chemotherapy among cancer patients undergoing chemotherapy treatment are bone marrow suppression, infections, anorexia, alopecia, fatigue, pain, nausea, vomiting, diarrhea, mucositis and extravasation etc. These side effects can be debilitating and can make life very unpleasant [3]. These symptoms affect the patients, both physically and psychologically, and further exert a negative influence on treatment, prognosis of disease and quality of life [4].

As a cancer care team member, the oncology nurse must be able to assess side effects, develop appropriate interventions, and provide effective management of any chemotherapy related symptoms. In addition the nurse must give information to the patient, educating him about these side effects and showing how best to manage them and how to recognize that he needs to seek medical intervention, for the attainment of desirable level of physical and psychological health [5]. Further, a number of scientific evidences have demonstrated that the nursing interventions improves the patients physical and psychological health, social functioning and reduce both treatment and disease related distress. The present study was conducted to assess the effectiveness of nursing interventions on physical and psychological outcome among cancer patients undergoing chemotherapy in Pravara Rural Hospital, Loni (Bk), Maharashtra.

#### **Material and Methods:**

A true experimental study was carried out on cancer patients undergoing chemotherapy treatment at Pravara Rural Hospital, Loni (Bk), Maharashtra. Sample size was set using openepi,

open source calculator – SSCC. The estimated Sample Size for Case – Control Study was 130 i.e. 65 in cases and 65 in controls, by Fleiss method with correction factor [6]. Patients were selected using systematic random sampling technique, based on criteria's of selection. Cancer patients who were 18 years old or older, undergoing chemotherapy and willing to participate were included, whereas the patients who had acute illness, psychiatric or neurological illness, and who underwent surgery or radiation therapy were excluded from the study.

An ethical approval was obtained from Institutional Ethics Committee of Pravara Institute of Medical Sciences (Deemed University), Loni (Bk). The purpose of study was explained to the patients, and a written informed consent was sought before enrolling them. After the collection of baseline data, out of 390 eligible patients, 130 patients were randomized to experimental group (n=65) and to control group (n=65) respectively. From the population every third patient is selected (systematic) randomly, and the chosen first sample was enrolled in experimental group and second sample in the control group and so on... till the achievement of determined sample size.

Patients in experimental group received planned nursing interventions delivered by a nurse interventionist, whereas patients in control group received routine care from the ward nurses. The *planned nursing interventions* consisted of IV access care, oral care, back massage, Progressive Muscle Relaxation therapy, breathing exercises, flexibility exercises, infection control measures, nutritional care, counseling, spiritual care with pre determined schedule; which were delivered with a pre determined frequency throughout the course of hospital stay. The *routine care* consisted of IV access care, oral care, back massage and infection

control measures; and it was also delivered throughout a course of hospital stay. The Average number of hospital stay for patients of experimental group was 5 days [range: 2 to 10] and control group was 4 days [range: 2 to 13]

**Nurse Interventionist:**

Out of 245 nurses, 12 nurses were randomly chosen as nurse interventionist, further they were adequately trained by the researcher. The preparation was carried out in the form of modular training (total – 50 hrs; theory – 14 hrs and practicals – 36 hrs) for seven days with the help of self prepared chemotherapy nursing module, which comprised of XII chapters in congruence with nursing interventions. Alongside, as part of training one day field visit to specialty hospitals was arranged to Tata Memorial Hospital, and Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, Mumbai for mastery over chemotherapy nursing care. After training, they were placed in oncology ward for one month on rotations to render planned nursing interventions to cancer patients undergoing chemotherapy in experimental group.

**Measures:**

Pre tested semi structured interview schedule was used to gather data. The socio demographic data was elicited from patients and disease related information was obtained from hospital records. Further, the tool comprised of assessment of health status, physical outcome assessment and psychological outcome assessment. The physical outcome variables like chemotherapy symptoms, pain, fatigue, oral Mucositis, nausea and vomiting

and extravasation, and the psychological outcome variables like emotional well being, anxiety, depression and patient concerns were included in the tool. The tool comprised of visual analog scale, The Brief Fatigue Symptom Inventory, WHO Oral Mucositis grading scale, The Morrow Assessment of Nausea and Emesis, The Extravasation grading scale, Emotional wellbeing scale, and Hospital Anxiety and Depression scale. Assessment of health status before start of chemotherapy was carried out, followed by the planned nursing interventions was implemented by nurse interventionist based on patient needs, while post test was carried out after a period of interventions (i.e. on the day of discharge). All the data were gathered and recorded by the nurse interventionists. Based on obtained scores the severity of problems was categorized in to 'no, mild, moderate, severe and very severe'. The collected data was tabulated and analyzed using appropriate statistical methods wherever required like mean, SD, Z test, unpaired t test, Chi-square test and ANOVA test. The data analysis was performed using <http://www.openepi.com>. The statistical level of significance was calculated at  $p < 0.05$  level.

**Results:**

A total of 130 cancer patients participated in the study. The baseline data and clinical characteristics of cancer were well balanced between experimental and control groups. Table 1 and 2 shows the cancer patients socio demographic data and clinical characteristics of cancer.

**Table 1: Distribution of Cancer Patients According to Socio Demographic Data**

Socio demographic data	Experimental group (n=65)		Control group (n=65)	
	Number	Percent	Number	Percent
<b>Age</b>				
? 35 years	10	15	06	09
36 – 45 years	09	14	20	31
46 – 55 years	12	18	21	32
56 – 65 years	22	34	09	14
66 – 75 years	12	18	09	14
<b>Gender</b>				
Male	34	52	31	48
Female	31	48	34	52
<b>Education</b>				
Primary	26	40	25	38
Secondary	14	22	18	28
Higher secondary	03	05	03	05
Graduate	02	03	07	11
Illiterate	20	30	12	18
<b>Occupation</b>				
House wife	29	45	31	48
Daily wages	06	09	05	08
Agriculture	21	32	18	28
Private employee	07	11	10	15
Business	02	03	01	01
<b>Monthly Income</b>				
Below Rs.3000	13	20	08	12
Rs 3001 – 6000	29	45	29	45
Rs 6001 – 9000	19	29	20	31
Above Rs. 9001	04	06	08	12
<b>Religion</b>				
Hindu	55	85	54	83
Christian	06	09	06	09
Muslim	04	06	05	08

**Table 2: Distribution of Cancer Patients According to Clinical Characteristics**

Clinical characteristics	Experimental group (n=65)		Control group (n=65)	
	Number	Percent	Number	Percent
<b>Category of Cancer</b>				
Carcinoma	60	92	64	98
Sarcoma	02	03	-	-
Leukemia and lymphoma	03	05	01	02
<b>Site of Cancer</b>				
Breast	06	09	06	09
Cervix	09	14	19	29
Lymphoma	03	05	01	02
Head and neck	19	29	17	26
Lung	08	12	04	06
Bone	02	03	-	-
Esophagus	04	06	06	09
Others	14	22	12	19
<b>Stage of Cancer</b>				
Stage II	27	42	22	34
Stage III	34	52	35	54
Stage IV	04	06	08	12
<b>Family History of Cancer</b>				
Present	07	11	09	14
Absent	58	89	56	86
<b>Metastasis Status</b>				
Present	15	23	17	26
Absent	50	77	48	74
<b>Course of Chemotherapy</b>				
Initial	18	28	19	29
Second	17	26	14	22
Third	22	34	24	37
Fourth	07	11	08	12
Fifth	01	01	-	-
<b>Chemotherapy Regimen</b>				
Paclitaxel+Cisplatin	30	46	31	48
Paclitaxel+Carboplatin	13	20	07	11
Etoposide+Cisplatin	03	05	02	03
5 Flurouracil	02	03	04	06
Others	17	26	21	32
<b>Chemotherapy Category</b>				
Alkylating agents	02	03	02	03
Anti metabolites	02	03	05	08
Mitotic inhibitors	-	-	02	03
Combination therapy	61	94	56	86

Table 3 shows the health status of cancer patients before the start of chemotherapy. Cancer patient's physical and psychological symptoms were collected on a symptom list. The cancer patients had many physical symptoms related to disease process and treatment, including pain, fatigue, weight loss, anorexia, difficulty in sleeping, difficulty in swallowing and hair loss etc; and psychological symptoms such as anxiety, depression and problem with emotional wellbeing.

Based on the data in Table 4, the post test mean scores of chemotherapy related symptoms ( $Z=2.74$ ), pain ( $Z=3.33$ ) and fatigue ( $Z=4.48$ ) in the experimental group was lower than the control group and the difference between two groups was statistically significant. Results from Z test did not show significant difference in other physical outcome variable such as oral Mucositis, nausea and vomiting at  $p<0.05$  level.

**Table 3: Signs and Symptoms of Cancer Patients Prior to Start of Chemotherapy**

Signs and Symptoms Related to	Experimental group (n=65)		Control group (n=65)	
	Number	Percent	Number	Percent
<b>A) Physical Health</b>				
Pain	65	100	65	100
Weight loss	35	54	28	43
Change of appetite	32	49	28	43
Fatigue	30	46	33	51
Difficulty in sleeping	30	46	31	48
Difficulty in swallowing	27	42	23	36
Hair loss	24	37	25	38
Oral Mucositis	21	32	16	25
Shortness of breath	16	25	12	18
Cough with sputum	13	20	07	11
Difficulty in mobility	10	15	14	22
Vaginal discharge	09	14	20	31
Fever	07	11	04	06
Vomiting	05	08	03	05
Other symptoms	31	48	19	29
<b>b) Psychological Health</b>				
Emotional wellbeing	36	55	33	51
Anxiety	43	66	42	65
Depression	33	51	35	54
Irritability	27	42	32	49

**Table 4: Comparison of Physical Outcome Mean Scores of Experimental and Control Group**

Variable	Experimental group (n=65)	Control group (n=65)	Z value
<b>Physical outcome</b>	<b>Mean±SD</b>	<b>Mean±SD</b>	
Other chemotherapy symptoms**	5.35±1.81	6.65±2.01	2.74*
Pain	2.88±1.06	3.78±1.13	3.33*
Fatigue (severity)	4.55±2.73	7.82±3.18	4.48*
Severity (impact)	6.77±4.18	8.22±5.41	
Oral Mucositis	0.57±0.53	0.51±0.57	0.44
Nausea	0.43±0.48	0.45±0.52	0.16
Vomiting	0.26±0.44	0.25±0.76	0.07

\* Significant, table value: 1.96 at  $p < 0.05$  level, \*\* - These consists of pain, fatigue, oral mucositis, nausea and vomiting

Based on the data in Table 5, the post test mean scores of emotional wellbeing ( $Z=3.89$ ) was changed significantly as incremental direction than control group. Further, the mean scores of other variables like anxiety ( $Z=2.91$ ) and depression ( $Z=2.69$ ) in the experimental group was lower than control group and the difference between two groups was statistically significant. It was evident that the planned nursing interventions effective in reducing the physical and psychological symptoms of cancer patients undergoing chemotherapy treatment.

The above depicted fig 1 and 2 highlights that in experimental group most (93%) had 'mild to moderate level' of pain, 79% had 'no to mild level' of fatigue, 51% had 'some wellbeing risk', 96% and 97% had 'no to mild' anxiety and depression respectively whereas in control group majority (80%) had 'moderate to severe' pain, 71% had 'mild to moderate' fatigue, and 74% had 'some wellbeing risk' and 74% and 63% had 'mild to moderate' anxiety and depression respectively. The severity of physical and psychological symptoms was lesser in experimental group compared to control group.

**Table 5: Comparison of Psychological Outcome Mean Scores of Experimental and Control Group (N=65)**

Variable	Experimental group (n=65)	Control group (n=65)	Z value
<b>Psychological Outcome</b>	<b>Mean±SD</b>	<b>Mean±SD</b>	
Emotional well being	29.2±2.55	26.3±3.50	3.89*
Anxiety	7.75±2.04	9.26±2.15	2.91*
Depression	6.89±1.99	8.25±2.06	2.69*
Patient concern	1.25±0.94	1.49±0.97	1.02

\* Significant, table value: 1.96 at  $p < 0.05$  level

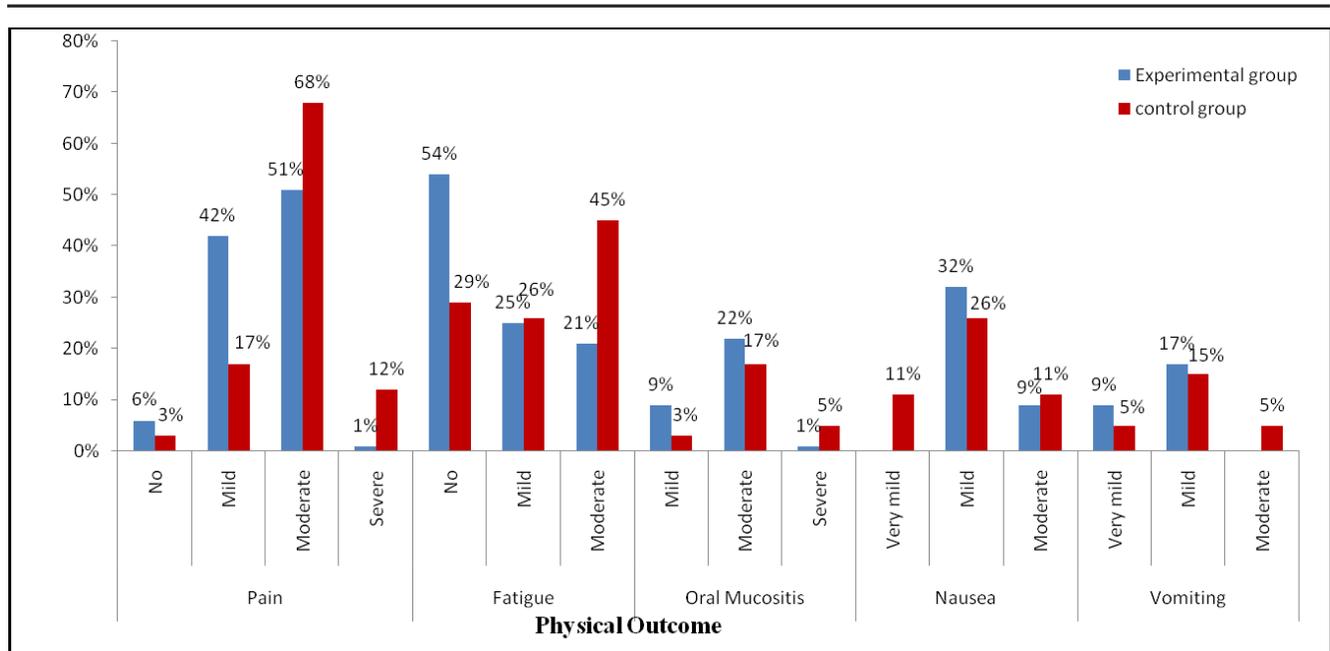


Fig 1: Comparison of Physical Symptoms Severity in Experimental and Control Group

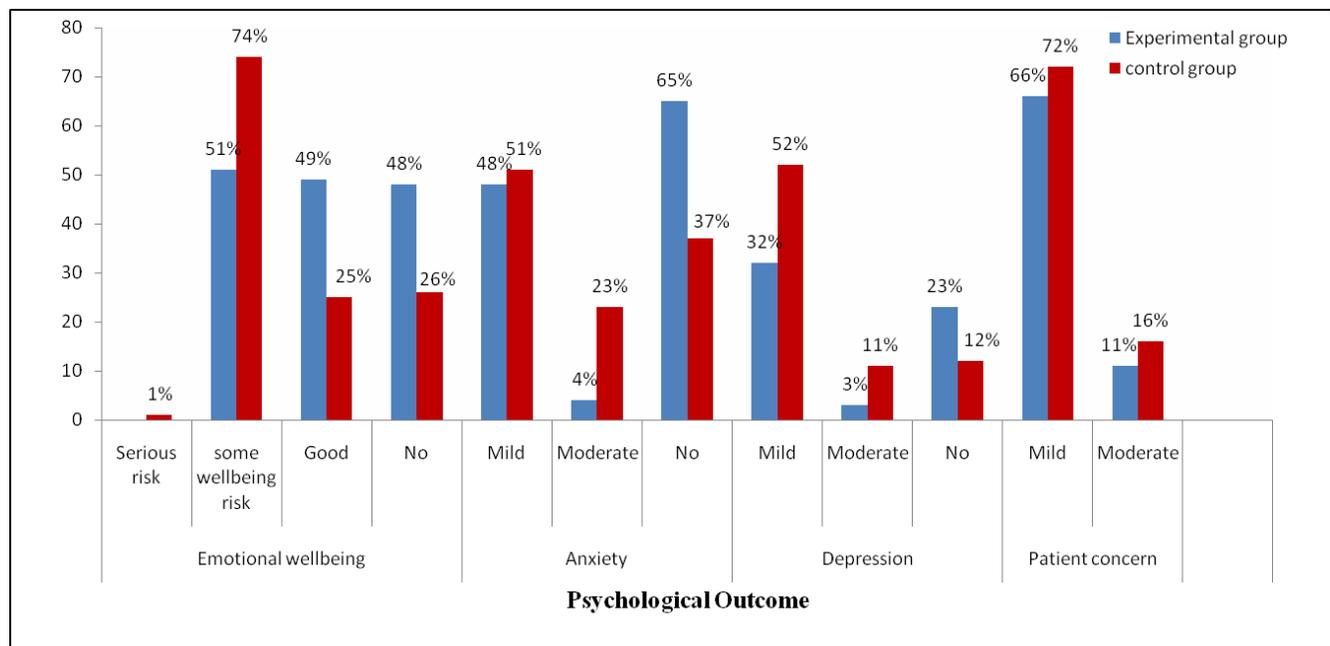
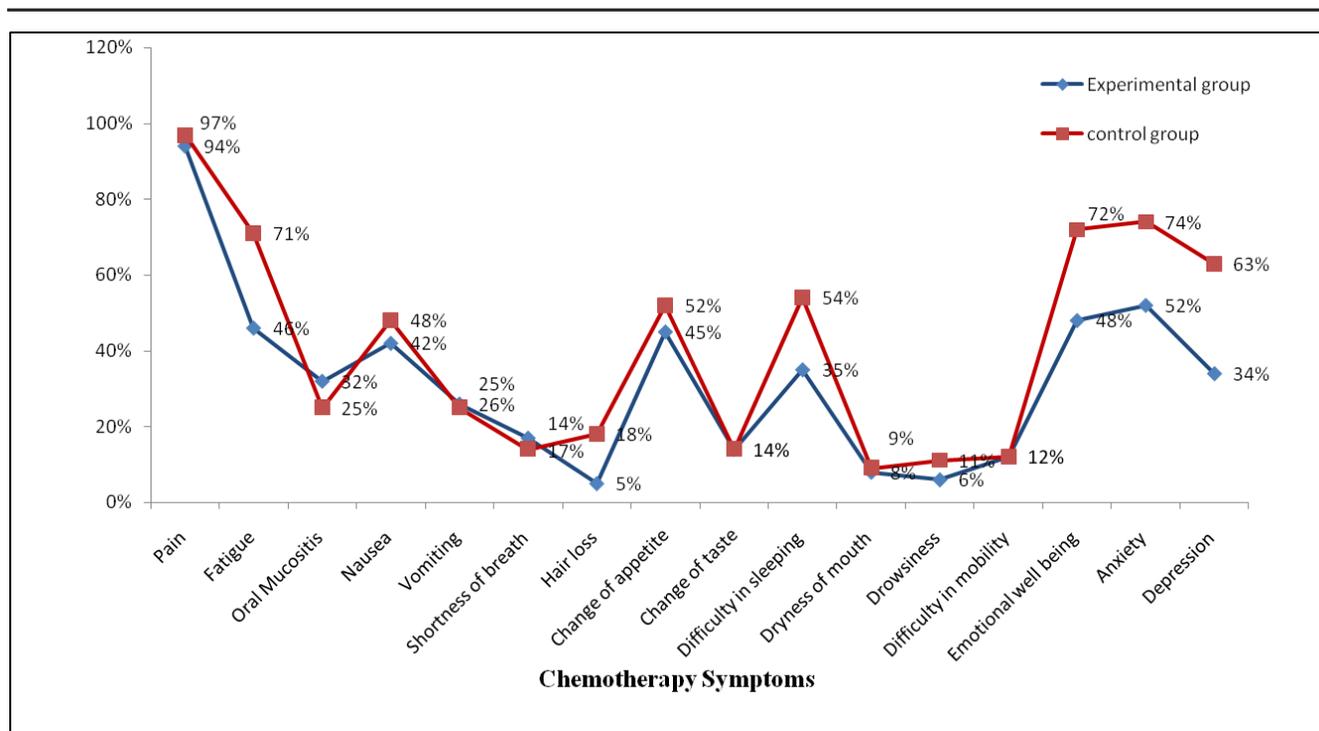


Fig 2: Comparison of Psychological Symptoms Severity in Experimental and Control Group



**Fig. 3 Comparison of Chemotherapy related Symptoms Experienced By Cancer Patients in Experimental and Control Group**

Figure 3 (line graph) shows, cancer patients undergoing chemotherapy treatment experienced wide range of treatment related symptoms. Though the symptoms experienced by cancer patients were similar in both groups, the experimental group patients reported lower percentage of symptoms than control group patients.

**Patient concerns:**

In regard to patient concern: the major concern was 'unable to meet the financial needs for cancer care' (69%) followed by 'worried about the future' (34%) and 'felt different from others' (22%). Further, a mere 6 percent of patients worried about relationship with partner, and friends and relatives.

**Association of Physical, Psychological Outcome with Sociodemographic Variables:**

The computed chi square test revealed that chemotherapy related symptoms (  $\chi^2=3.86$ ), pain (  $\chi^2=12.74$ ), fatigue (  $\chi^2=6.99$ ) and oral Mucositis (  $\chi^2=5.99$ ) were significantly associated with 'sex' of patient. Similarly oral mucositis (  $\chi^2=7.24$ ) and nausea (  $\chi^2=3.93$ ) was associated with 'site of cancer'; further, chemotherapy related symptoms (  $\chi^2=4.34$ ), nausea (  $\chi^2=5.43$ ) and vomiting (  $\chi^2=3.89$ ) had significant association with 'stage of cancer'. The chemotherapy symptoms (  $\chi^2=5.75$ ) and pain (  $\chi^2=9.58$ ) was associated with 'regimen of chemotherapy drugs'.

A statistically significant association was found between patient concern (  $\chi^2=5.96$ ) and 'sex' of patient, while problems with emotional wellbeing

( $\chi^2=3.87$ ) and depression ( $\chi^2=4.25$ ) was associated with 'stage of cancer'. Further, problem with emotional wellbeing ( $\chi^2=3.89$ ) had significant association with 'duration of cancer'; and anxiety ( $\chi^2=3.91$ ) was significantly associated with 'course of chemotherapy' at the significance level of  $p<0.05$ .

### Discussion:

Cancer patients suffer from a multitude of intense physical and psychological symptoms regardless of stage of disease, which are accompanied by declines in physical and psychological wellbeing. Pain is the most common symptom experienced by all (100%) cancer patients. It has been observed by Miaskowski C, Dodd M and Lee K [7], that most (80%) of cancer patients suffer from pain and it's still one of the most frequent and distressing symptom in cancer patients particularly in advanced stage of disease.

More than half of cancer patients under study have psychological symptoms like anxiety, depression and problem in emotional wellbeing. These results are consistent with a study of Jadoon AN, Munir W, Shahzad AM and Choudhry SZ [8], that overall (66%) of cancer patients have been found to have depression and anxiety. It upholds the fact that the cancer diagnosis and treatment is prone to have profound effects on psychological health status of patients. Cancer patients undergoing chemotherapy treatment in experimental group have experienced significantly lower chemotherapy related symptoms, pain and fatigue than control group patients. It is evident with findings that the planned nursing interventions are found effective in improving the physical outcome variables. It is consistent with the individual studies by Tony AT and Glick OJ [9]; Kim JY and Sook Seo N [10]; Hayama Y and Inoue T [11]; Aghabarari M, Ahmadi F, Agha Alinejad H, Mohammadi E and Hajizadeh E [12];

Babacan AG and Olcay C [13] and Bahrami M, Baloochestani E, Amini A and Eghbali M [14]. They have also found the impact of nursing interventions like massage, progressive muscle relaxation therapy, breathing exercise, designed exercise program, emotional support and prayer on various chemotherapy symptoms; further these interventions have been significantly effective in decreasing the severity of symptoms and had shown positive effect.

The cancer patients who have received planned nursing interventions have shown much lower rate of psychological symptoms like anxiety, depression, and a significant improvement of emotional wellbeing than the counter parts. Cassileth RB and Vickers JA [15]; Herizchi S, Asvadi I, Piri I, Golchin M, Shabanlui R and Sanaat Z [16]; Kashani F, Babaee S, Bahrami M and Valiani M [17] also have noticed that the nursing interventions like massage, Progressive Muscle Relaxation Therapy, breathing exercise, psycho educative care and prayer enhance psychological health status and quality of life. Evidence is accumulating that nursing interventions improve emotional adjustment, and reduces both treatment and disease related distress in cancer patients.

In both groups, cancer patients have experienced similar chemotherapy related symptoms like pain, anxiety, problem with emotional wellbeing, fatigue and change of appetite, and difficulty in sleeping. However, the severity of symptoms in experimental group has been significantly lesser than control group. Speaking in a same stream, Nazik E, Arslan S, Nazik H, Narin MA, Karlancic M and Zeynep [18], have reported that the common symptoms experienced by patients receiving chemotherapy have been loss of wellbeing, fatigue, pain, anxiety, depression and appetite changes etc.

In addition to, numbers of systematic reviews have recommended that these interventions are simple and applicable in all health centers and even at homes of patients who suffer from chemotherapy symptoms. As a service provider, nurses assess needs and problems of cancer patients, and helps or resolves problems, or to satisfy their needs with nursing interventions.

### Conclusion:

Cancer patients suffer with variety of health problems, distress and have a lack of information, and a need for access to healthcare. Nurses play a vital role in the delivery of comprehensive care to people with cancer. It is essential that the structured training and education of nursing workforce provides nurses with a sound knowledge, understanding and competence for care of cancer patients, and their families.

The results revealed that planned nursing interventions have significant impact on reduction of chemotherapy symptoms, pain, fatigue, anxiety and depression; and improves the emotional wellbeing of cancer patients undergoing chemotherapy treatment. The nursing interventions rendered by nurse interventionist are well accepted by cancer patients, have better response to intervention, and have more positive perceptions of the usefulness of intervention.

Overall the nursing interventions have been effective in improving the physical and psychological outcomes of cancer patients undergoing chemotherapy treatment.

### What this study adds:

The result of our study adds to the evidence that the cancer patients undergoing experience chemotherapy variety of symptoms. This study has also demonstrated that planned nursing interventions have potential for health care services to minimize severity of chemotherapy and disease related symptoms. The study also highlights that modular training is an effective method of importing knowledge and develops skill of nurses to practice safe chemotherapy nursing care. Further, results emphasize that nursing professionals working in cancer care areas need a specialized education and training to render quality nursing care.

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