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Effect Of Pain Nursing Intervention on Self-Efficacy of Adult Patients Having Cancer and Undergoing Chemotherapy

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Abstract: Background: Cancer is a group of diseases characterized by the uncontrolled growth of abnormal cells. Chemotherapy is a vital treatment for cancer; however, it is also associated with serious complications that require standard nursing care. The purpose of the present study is to examine the effect of protocol of nursing care on cancer pain self-efficacy among patients receiving chemotherapy. **Design**: A quasi-experimental research design was utilized. **Setting**: The study was conducted in the Department of Clinical Oncology and Nuclear Medicine at Menoufia University Hospital and El Helal Hospital - Menoufia Health Insurance, Egypt. **Sample**: A consecutive sample of 170 adult patients, diagnosed with cancer, had either planned for or received chemotherapy treatment. They were divided randomly into two equal groups, with eighty-five patients in each group. **Three instruments** were used in data collection; 1) A Structured Interviewing Questionnaire, 2) A 10-point horizontal visual analog pain scale, and 3) Pain Self-Efficacy Questionnaire (PSEQ). **Results**: The mean total pain intensity was 6.72±1.29 for study group and 6.67±1.62 for control group that was highly significantly decreased to 4.82± 0.902 among study group versus to 6.78±1.54 for control group during follow-up. The mean total pain self- efficacy was highly significantly improved among study group post protocol of care and during follow up compared to control group. **Conclusion**: The study revealed that implementing a nursing care protocol had a positive impact on reducing pain intensity and improving pain self-efficacy among patients. **Recommendation**: To enhance patient's wellbeing, it is advisable to promote their participation in chemotherapy education programs, with a strong focus on pain self-efficacy to empower them in managing pain and promoting sense of control. Additionally, the developed nursing care protocol should be recommended for all cancer patients to effectively optimize pain self-efficacy outcomes.

Key words: *Cancer; Chemotherapy; Pain; Self-Efficacy.*

Introduction

World Health Organization (2021) reported that cancer is a devastating and complex disease that continues to pose a major health challenge worldwide. In recent years, extensive research has shed light on the complex molecular mechanisms responsible for cancer progression and led to remarkable advances in diagnosis and treatment. Also, Sung et al. (2021) stated that there were 19.3 million new cancer cases and 10 million cancer-related deaths worldwide. This alarming statistic underscores the urgent need to understand the complex nature of cancer, develop innovative therapies, and implement effective prevention strategies to combat this relentless enemy.

In Egypt 324,949 patients with malignant diseases were treated during 2019. The highest incidence figures for specific cancer cases in Egypt in 2020 were: liver (27,895), breast (22,038), bladder (10,655), non-Hodgkin's lymphoma (7,305), lung (6,538), leukemia (5,231) and prostate (4767) (Sayed et al., 2022).

There are unknown causes of cancer but many risk factors are responsible for producing it. Predisposing factors for cancer encompass a broad spectrum of elements, including genetic susceptibility, environmental exposures, lifestyle choices, and demographic characteristics. Genetic factors, such as inherited mutations in specific genes, can significantly increase the risk of certain cancers. Environmental factors, like exposure to carcinogens in tobacco smoke, occupational hazards, and environmental pollutants, play a crucial role in cancer development. Unhealthy lifestyle choices, such as a diet high in processed foods, sedentary behavior, excessive alcohol consumption, and tobacco use, are well-established risk factors. Additionally, age, gender, and family history can also predispose individuals to various types of cancer. These factors often interact and contribute to the complex etiology of cancer (Cohen et al., 2019& Klein, 2021 & Nagalapur & Karamudi, 2022). Cancer treatment modalities can be divided into conventional (traditional) and advanced (modern) novel categories. Entities, such as the type of cancer, site, and severity, guide to select treatment options and its progress. The most widely used traditional treatment methods are surgery, chemotherapy, and radiotherapy, while modern modalities include hormone therapy, anti-angiogenic, stem cell therapies, immunotherapy, and dendritic cell-based immunotherapy (Debela et al., 2021).

Chemotherapy is one of the predominant cancer therapies to date. It is an aggressive form of chemical drug therapy aimed to destroying fast-growing cells in the body. It is often used in combination with other treatments such as surgery, radiation therapy, or hormone therapy. Normally, cancer drugs work by damaging the RNA or DNA that defines the cell how to copy itself when it divides. They also induce cell suicide (auto-death or apoptosis). Chemotherapy drugs that kill cancer cells, only when they are dividing, are called cell-cycle specific.

While chemotherapy that kill dormant cancer cells are said to be non-cell cycle specific. The chemotherapy regimen depends on the type of cells, how fast they divide, and how long the drug lasts. Therefore, chemotherapy is usually administered in cycles. but its development has suffered from various deadly side effects related to the non-specific toxicity of common chemical drugs (Wu et al., 2022).

Cancer pain is a general term for a large range of different conditions, characterized by different etiology, characteristics, and pathological mechanisms. it is one of the most debilitating symptoms, affecting about 66 % of cancer patients (Caraceni & Shkodra, 2019). Cancer pain can be caused by cancer itself or cancer treatment. its management is possible as various evidence suggested that 80-90% of cancer pain (CP) can be alleviated by following World Health Organization (WHO) guidelines for managing cancer pain. The guidelines intended to provide evidence-based guidance to health-care providers on appropriate approaches to initiate and manage cancer pain in adolescents and adults, including older persons (Darawad et al., 2019)

Chemotherapy-induced peripheral neuropathy (CIPN) is a common, painful, and dose-limiting side effect of chemotherapy. It is generally dose-dependent. Typically, symptoms begin in the first two months of treatment, worsen as treatment progresses, and then stabilize soon after cessation. However, symptoms can persist long after treatment (Huang et al., 2021 & Edwards et al., 2019). Approximately 50-90% of patients undergoing chemotherapy are affected by CIPN and are at high risk of chronicity (approximately 30-40% (Edwards et al., 2019).

Numerous CIPN symptoms have been identified in the population. All of which significantly impact patients' quality of life. Patients who experience CIPN symptoms have been found to have significant difficulties performing everyday activities. Mechanical allodynia, difficulties with fine finger movements, unsteady gait (numbness and loss of joint position sense), pain while walking, and cold-exacerbated pain episodes (cold hypersensitivity) have all been reported in these patients (Sałat, 2020).

Self-efficacy, is a concept introduced by psychologist Albert Bandura, who is a fundamental component of human psychology that plays a pivotal role in shaping behavior, motivation, and resilience (Fawzy, 2023). At its core, self-efficacy refers to an individual's belief in their ability to successfully accomplish specific tasks or goals. This belief is not merely a reflection of skills or knowledge but encompasses confidence in one's capacity to overcome challenges, persevere in adversity, and achieve desired outcomes. It is a dynamic and context-specific construct that influences how individuals approach new endeavors, cope with difficulties, and persist in pursuing their objectives (Hussain et al., 2022).

In the realm of healthcare, Pain self-efficacy is a critical psychological construct, particularly in individuals dealing with chronic pain conditions.

Rooted in Albert Bandura's social cognitive theory, pain self-efficacy refers to an individual's belief in their ability to manage and control pain effectively (Valenta et al., 2018). This belief is not solely dependent on actual pain management skills but encompasses confidence in employing coping strategies, adhering to treatment plans, and navigating the emotional and physical challenges associated with persistent pain. In essence, pain self-efficacy influences how individuals perceive, interpret, and respond to their pain experiences, playing a significant role in their overall well-being (Abuladze et al., 2022 & Bishay et al., 2023).

Cancer pain self-efficacy is a critical aspect of the psychosocial landscape for individuals navigating the complex challenges associated with cancer and its related pain. This concept reflects an individual's confidence in their ability to manage and control the pain resulting from cancer and its treatments. The experience of cancer pain is multifaceted, encompassing physical discomfort, emotional distress, and potential limitations in daily activities. In this context, individuals with higher levels of cancer pain self-efficacy are more likely to approach their pain with a sense of empowerment, actively engaging in strategies to alleviate and cope with the challenges that arise (Almeida et al., 2023 & Kim et al., 2023).

Nurses play a major role in cancer pain assessment and management. Their role should imply assessing and reassessing patients' pain, choosing and administering the appropriate treatment, using non-pharmacological pain management interventions, educating patients and their families about pain, and advocating for patients. Thus, sufficient knowledge and positive attitudes toward pain management are required to achieve those roles (Darawad et al., 2019 & Nkonde, 2022).

Significance of the Study

Pain is a distressing symptom commonly experienced by cancer patients, and it remains one of the most feared aspects of the disease. Prevalence studies indicated that a significant proportion, ranging from 37% to 64%, of individuals diagnosed with cancer continue to grapple with pain. (Broemer et al., 2021). Pain is a distressing symptom commonly experienced by cancer patients, and it remains one of the most feared aspects of the disease. Prevalence studies indicated that a significant proportion, ranging from 37% to 64%, of individuals diagnosed with cancer continue to grapple with pain. The prevalence of pain in cancer patients at various stages of the disease ranged from 33% to 64% worldwide. The prevalence of pain varies from 50% at diagnosis to 75% in advanced stages (Kibret et al., 2023). Cancer pain among Egyptian patients who suffer from metastatic cancer is associated with a heavy burden of physical and psychological symptoms. The severity of the pain is related to the severity of other present symptoms. Proper symptom assessment (physical and psychological) is essential for the proper control of cancer pain and improving the quality of life among

advanced cancer patients (Al-sayed et al., 2017).

Purpose of the Study

The purpose of the present study is to examine the effect of protocol of nursing care on cancer pain self-efficacy among patients receiving chemotherapy.

Research Hypothesis:

1) Patients who receive Protocol of Nursing Care (study group) will have higher pain self-efficacy level than patients who don't (control group).

Operational definition:

- **Pain nursing Intervention:**

it is refers to the measurable nursing actions (pharmacological , non-pharmacological, educational, and collaborative) aimed at assessing, reducing, and managing a patient's pain, evaluated by changes in pain scores and improved comfort or function.

- **Pain Self-Efficacy:**

It is operationally defined in terms of one's overall confidence in the ability to deal with symptoms, stresses or limitations associated with a pain condition or in terms of the ability to manage, control or decrease specific components of symptoms or disability (e.g., ability to decrease pain, ability to complete certain tasks). It was assessed using pain self efficacy questionnaire (instrument three).

- **Cancer pain:**

It is operationally defined as chemotherapy-induced peripheral neuropathy (CIPN) which is a clinical condition characterized by presence of sensory, motor, or autonomic symptoms in the peripheral nervous system, directly attributable to the administration of chemotherapy agents. These symptoms may include tingling, numbness, pain, weakness, and impaired sensation in the extremities, which can significantly impact a patient's quality of life. It was assessed by 10-point horizontal visual analog pain scale (Instrument II).

Methods

Research design:

A quasi-experimental research design (study and control) was utilized to achieve the purpose of this study. It is an empirical interventional study used to estimate the causal impact of an intervention on a target population without random assignment (Attimu-eshun, 2022).

Research Setting:

The current study was conducted in the Department of Clinical Oncology and Nuclear Medicine at Menoufia University Hospital and El Helal Hospital - Menoufia Health Insurance, Egypt.

Sample:

A consecutive sample of 170 adult patients diagnosed with cancer from both sexes and able to communicate, had planned for or received chemotherapy treatment, and were willing to participate in the study was included in this study. The subjects were assigned randomly and equally divided into two groups, eighty-five patients for each group:

- Study group (I), exposed to the nursing care protocol along with routine hospital care.
- Control group (II), were exposed only to routine hospital care.

The study subjects were selected according to the following criteria:

- ❖ Free from psychiatric problems that make them unable or unwilling to receive the required information.
- ❖ Free from critical illness in order to not interfere with the assessment of pain severity

Sample size was determined based on the following equation:

n = N/ 1+ N(e)^2 (Chaokromthong & Sintao, 2021).

n is the required sample size from the population under study

N is the whole population that is under study

e is the precision or sampling error which is usually 0.10,0.05 or 0.01

flow rate of the population =1029 patients

e= 0.07.

Confidence = 93%

n = 1029/ 1+ 1029(0.07)^2

n = 1029/ 1+ 1029(0.0049)

n = 1029/ 6. 0421=170,305 patients

Instruments:

<u>Instrument one</u>: Structured interview questionnaire:

It was developed by the researcher to assess baseline bio sociodemographic characteristics as well as subjects' knowledge level. It consists of the following three parts:

- **Part one**: Sociodemographic data: It included 10 questions about the subjects, age, sex, educational level, occupation, marital status, family size, monthly income, and smoking status.
- **Part two**: Medical data: It included 21 questions about past and present medical history such as diagnosis, cancer stage, family history of cancer, history of hospitalization, history of surgical operation and history of experiencing pain as a result of cancer or its treatments .Also, history of chemotherapy regimen was assessed (type of chemotherapy, number of chemotherapy cycles and methods of administering chemotherapy).

<u>Instrument two</u>: 10-point horizontal visual analog pain scale:

It was developed by Bain et al., (2005) to rate the subject's level of pain intensity. The scale is from zero to ten in which zero means no pain, while a score from 1 to 3 denotes mild pain, a score from 4 to 6 denotes moderate pain and a score from 7 to 10 indicates severe pain. The reliability of the scale was demonstrated with high internal consistency (0.936) and strong test, retest agreement (correlation coefficient was 0.93 observed (Gallagher et al., 2002)

<u>Instrument three</u>: Pain Self-Efficacy Questionnaire (PSEQ):

It was developed by Nicholas (2007) to assess the confidence of subjects in performing activities while in pain. It is a 10-item questionnaire. It contains ten questions that account for pain with the consideration of specific functional tasks. Each question item offers seven response categories on a numerical Likert scale that range from not at all confident to completely confident. The

questions vary from specific tasks to general considerations of managing function requirements. The Pain Self-Efficacy Questionnaire (PSEQ) was translated by Almutairi et al. (2023) into Arabic to culturally adapt and validate the Arabic version of the Pain Self-Efficacy Questionnaire (PSEQ-A) in Arab people to measure pain self-efficacy.

Scoring system:

- Each item is rated by selecting a number on a 7-point scale:
- 0 = not at all confident
- 6 = completely confident

A total score was calculated by summing the scores for each of the 10 items, yielding a maximum total score of 60 (Higher scores reflect stronger self-efficacy beliefs).

Validity

were tested for their Face validity by five experts in the field of Nursing (3 experts) and Medical specialties (2 experts) to ascertain relevance and completeness.

Reliability:

The first instrument was tested for reliability using a test-retest method and a person correlation coefficient formula was used. The period between both tests was two weeks and the result was 0.97 for the first instrument. While the second instrument is the Visual Analog Pain Scale (VAPS) which has been shown to be accurate, valid, reliable, and reproducible way to measure pain intensity, internal consistency (0.93) (Gallagher et al., 2002) and third instrument The PSEQ has high internal consistency (0.90 Cronbach's alpha) and test-retest reliability is high (0.79) over a 3-month period (Almutairi et al., 2023).

Ethical Considerations:

A written approval from the Ethical and Research Committee of the Faculty of Nursing, Menoufia University was obtained prior to data collection. Written consent was obtained from all subjects who met the inclusion criteria and agreed to participate in the study after an explanation of the purpose, procedure and benefit of the study. Each subject was assured that any obtained information would be confidential and would only be used for the purpose, procedure and benefit of the study. The researcher emphasized that participation in the study was entirely voluntary and anonymity of the subjects was assured through coding data. Subjects were also informed that they could withdraw from the study at any time without penalty and refusal to participate in the study wouldn't affect their care. Moreover, they were assured that the nature of the questionnaire didn't cause any physical or emotional harm to them.

Pilot study:

Prior to data collection, a pilot study was conducted on 10% of the study sample (17 patients) to test the feasibility, clarity, and applicability of the instruments then necessary modifications were made so these patients were excluded from the study sample.

Data collection:

- Written approval: A formal letter from the Dean of the Faculty of

Nursing, Menoufia University was sent to the responsible authorities of the study settings to obtain their permission to carry out the study after explanation of the purpose of the study.

- Data collection was extended for 7 months from the first of February 2023 to the end of 20 August 2023.
- Data collection was carried out through the following phases:

1) Assessment phase:

- Subjects of both groups who agreed to participate in the study and fulfilled the inclusion criteria were interviewed individually by the researcher in the Department of Clinical Oncology and Nuclear Medicine at Menoufia University Hospital and at the El Helal Hospital - Menoufia Health Insurance.
- The researcher assessed each participant of both groups for demographic and medical data using first and second part of instrument I. This assessment took about 10 to 15 minutes / participant.
- Each participant of study and control groups was assessed for their knowledge about cancer, chemotherapy and pain using third part of the first instrument. This assessed took about 15 minutes.
- All participant of both groups were assessed for pain intensity using the second instrument. Pain intensity assessment took about 10 minutes.
- All participants of both groups were assessed for their confidence to perform activities while in pain using instrument III. This assessment took 10- 15 minutes.
- Data was collected in five days of each week from Sunday to Thursday from 9.00 A.M. to 5.00 P.M. according to the attendance policies of each hospital.

2) Planning phase:

- Based on baseline assessment data, the needs of studied participants and using the relevant literature (El-seadi et al., 2020, Musavi et al., 2021, Wei et al., 2021), the researcher prepared a training plan as well as a handout illustrative booklet in a simple Arabic language about cancer, chemotherapy and pain related chemotherapy. In addition, it included information about the nursing intervention that decreases the severity of pain such as pharmacological and non-pharmacological nursing interventions during the chemotherapy. The booklet contained the following: definition of cancer, pathophysiology of cancer, metastases of cancer, predisposing factors, warning signs, treatment modalities, chemotherapy and its side effects, pain related to chemotherapy, pharmacological and non-pharmacological management of pain.
- Three teaching sessions were planned for study group. Each of which was 30-45 minutes duration.

3) Implementation phase:

The previously prepared booklet was distributed by the researcher at the beginning of the first session. Lectures, group discussions, and videos were used for illustration. The prepared protocol of care was conducted through the following sessions:

- During the first session: At the beginning of the session, the researcher provided each subject of the study group with information related to cancer such as definition, risk factors, warning signs, prevention, and how to diagnose and manage cancer). At the end of this session, the researcher allowed each subject to ask questions and provided them with answers.
- At the beginning of the second session, the researcher refreshed the previously learnt knowledge and then gave information about chemotherapy such as a definition, indications, methods of administration, and side effects. At the end of the second session, the researcher summarized the received information and allowed subjects to ask questions then provided them with question's answers.
- At the beginning of the third session, the researcher reinforced the received information, answered any questions, and solved any problem that might arise during training then all subjects of the study group (I) were given instructions on pain related to chemotherapy such as causes, manifestations and either pharmacological and non-pharmacological management methods how to deal with the pain associated with chemotherapy such as physiotherapy, relaxation therapy, occupational therapy, acupuncture, electrical nerve stimulation, guided imagery, distraction, biofeedback.
- All over the session, patients were instructed on how to communicate about pain and how to contact healthcare providers. Communicating with health care providers about pain and enhanced pain-related coping skills (for example, self-monitoring, problem-solving, and changing non-adaptive perceptions of pain) were emphasized.

4) Evaluation phase:

- All subjects of both groups were assessed twice post implementing the nursing care protocol (after 15 days and after one month) for their knowledge, pain intensity, and self-efficacy using all instruments (part three of instrument I, instrument II, and instrument III).
- A comparison was made between both groups (study and control groups) after two weeks and one month post teaching sessions to examine the effect of a protocol of nursing care on cancer pain self-efficacy among patients receiving chemotherapy.

Results

Table 1 reveals that the mean age for study group was 52.94 ± 7.27 years and 54.18 ± 7.36 years for control group. More than half of study group (54.1%) were male, while, more than half of control group (56.5%) were female. As regard educational level, less than half of both groups (44.7%, 47%) respectively had secondary education. Regarding occupation, more than one third of both groups (40%, 36.5%) respectively had administrative work. The majority of study and control groups (84.7%, 88.2%) respectively were married. Regarding family size, more than half of study and control groups (57.6%, 53%) respectively had

5-6 persons. Regarding income, about two thirds of both groups (70.6% & 64.7%) respectively had somewhat sufficient income. Regarding smoking, the majority of both groups (80.0% and 81.2%) respectively were nonsmokers. There were no statistically significant differences between both groups related to all socio demographic characteristics.

Table 2 illustrates that about one third of study and control groups (28.2%, 34.1%) respectively had gastrointestinal cancer. Nearby half of them (57.6%, 49.4%) respectively were in stage II cancer. The highest percentage of study and control groups (69.4%, 81.2%) respectively did not have family history for cancer. Regarding duration of cancer, more than three fourths of study group (76.4%) and more than two thirds of control group (67.1%) diagnosed with cancer from less than one year. As regard previous surgery, about two thirds of study and control groups (64.7% and 60%) respectively did not have previous surgery because of cancer. The majority of both groups who had previous surgery (86.7%, 85.3%) had surgery for obtaining sample.

Regarding types of chemotherapy More than one third of study group (35.3%) used Cyclophosphamide, while more than one quarter of control group (29.4%) used Antimetabolites. About one third of study and control group (31.8% & 42.4%) respectively received 3-4 chemotherapy cycles. Regarding Method of administering chemotherapy, the majority of both groups (89.4 %& 92.9%) respectively received chemotherapy intravenously. There were no statistically significant differences between both groups related to their cancer history.

Table (3) stated that about three quarters of study and control groups (70.6%, 77.6%) respectively were previously hospitalized. Regarding Frequency of hospitalization, about half of study and control groups (58.4% and 44%) respectively were hospitalized once or twice. About two thirds of previously hospitalized of patients of both groups (60.0% and 60.6%) respectively admitted to hospital for Follow-up of cancer-related treatment. There were no statistically significant differences between both groups related to all items of past medical history.

Table 4 presents that, 100% of the study and control groups had history of pain as a result of cancer or its treatments. About one third (40.0% & 34.1%) of study and control groups respectively had pain from 30 – 60 minutes. 41.2% and 57.6% of study and control groups respectively had pain once / day. Regarding factors increasing pain, more than two thirds of both groups (70.6% & 68.2 %) had increasing pain as a result of physical effort. About two thirds of both groups (65.9% & 70.6 %) respectively had a numbness of hands or feet as a result of pain. As regard factors reducing pain more than half of study and control groups (55.3%, 58.8%) respectively, their pain relieved by medication. More than half of both groups (64.7% & 58.8%) respectively used tramadol as a pain killer. The results showed that there was no statistical significant

differences between both groups regarding all items of pain history.

Table 5 This table shows that pre intervention the mean total pain self-efficacy for study group was 23.57 ± 6.76 & 21.49 ± 10.5 for control group that was highly significantly improved among study group to 33.80 ± 4.11 & 37.65 ± 3.65 post pain nursing intervention and during follow up respectively compared to 21.14 ± 10.7 & 21.14 ± 10.7 of control group respectively.

Table (1): Distribution of study and control groups according to their sociodemographic data (n=170).

Socio demographic data	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
Age					2.056	0.358
31 -	10	11.8	11	12.9		
44 -	37	43.5	28	33.0		
57 - 65 years	38	44.7	46	54.1		
Mean ± S.D	52.94 ± 7.27		54.18 ± 7.36		T= 2.781	0.131
Gender					1.907	0.167
Male	46	54.1	37	43.5		
Female	39	45.9	48	56.5		
Education level					1.902	0.859
Illiterate	3	3.5	5	5.9		
Read and write	6	7.1	5	5.9		
Basic education	13	15.3	13	15.3		
Secondary education	38	44.7	40	47.0		
University education	20	23.5	20	23.5		
Post graduate studies	5	5.9	2	2.4		
Occupation					3.168	0.366
Administrative work	34	40.0	31	36.5		
Manual work	20	23.5	13	15.3		
Retired	12	14.1	14	16.5		
Housewife	19	22.4	27	31.7		
Marital status					2.261	0.520
Single	3	3.5	2	2.4		
Married	72	84.7	75	88.2		
Widowed	8	9.4	8	9.4		
Divorced	2	2.4	0	0.0		
Family Size					1.658	0.437
2 -4 persons	30	35.3	29	34.1		
5-6 persons	49	57.6	45	53.0		
More than 6 people	6	7.1	11	12.9		
Monthly income					1.764	0.414
Sufficient	10	11.8	8	9.4		
Somewhat sufficient	60	70.6	55	64.7		
Not enough	15	17.6	22	25.9		
Smoking					1.000	0.500
Yes	17	20.0	16	18.8		
No	68	80.0	69	81.2		
Number of cigarette / days	(n=17)		(n=16)		0.207	0.902
1-10 cigarettes	14	82.4	14	87.5		
11-20 cigarettes	3	17.6	2	12.5		

Note: χ^2: Chi-square test t: Student t-test
FET: Fisher Exact Test. ns= not significant (p>0.05)

Table (2): Distribution of study and control groups according to their cancer history (n=170).

Cancer history	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
***Diagnosis**					4.680	0.134
Respiratory cancer	12	14.1	24	28.2		
Circulatory cancer	3	3.5	2	2.4		
Lymphatic cancer	24	28.2	10	11.8		
Urinary cancer	10	11.8	8	9.4		
Gastrointestinal cancer	24	28.2	29	34.1		
Bone cancer	11	12.9	6	7.1		
Genital cancer	9	10.6	9	10.6		
Endocrine cancer	1	1.2	5	5.9		
Nervous system cancer	2	2.4	2	2.4		
Cancer stage					1.384	0.708
Stage I	14	16.5	19	22.4		
Stage II	49	57.6	42	49.4		
Stage III	12	14.1	13	15.3		
Stage IV	10	11.8	11	12.9		
Family History of Cancer					3.162	0.688
Yes	26	30.6	16	18.8		
No	59	69.4	69	81.2		
Degree of relationship	**(n=26)**		**(n=16)**		4.620	0.202
First degree	6	23.1	5	31.2		
Second degree	10	38.4	4	25.0		
Third degree	6	23.1	7	43.8		
Fourth degree	4	15.4	0	0.0		
Duration of cancer/ year					2.119	0.548
Less than 1 year	65	76.4	57	67.1		
1-2 years	10	11.8	12	14.1		
More than 2years	10	11.8	16	18.8		
Previous surgery because of cancer					0.401	0.527
Yes	30	35.3	34	40.0		
No	55	64.7	51	60.0		
***Type of surgery**	**(n=30)**		**(n=34)**		1.115	0.284
Diagnostic surgery (sample)	26	86.7	29	85.3		
Therapeutic surgery (tumor removal)	22	73.3	16	47.1		
***Type of chemotherapy**					4.871	0.157
Alkylating agents	20	23.5	12	14.1		
Cyclophosphamide	33	35.3	4	4.7		
Plant alkaloids	25	29.4	22	25.9		
Antimetabolites	17	20.0	25	29.4		
Anti-tumor antibiotic	11	12.9	5	5.9		
Topoisomerase inhibitors	1	1.2	8	9.4		
All the above	3	3.5	13	15.3		

Note: χ^2: Chi-square test t: Student t-test

FET: Fisher Exact Test. *ns= not significant (p>0.05)*

Continued Table (2): Distribution of study and control groups according to their cancer history (n=170).

Cancer history	Study group (n=85)		Control group (n=85)		Test of Significance	
	No.	%	No.	%	X^2	P-Value
Number of chemotherapy cycles						
1-2	4	4.7	5	5.9		
3-4	27	31.8	36	42.4		
5-6	11	12.9	10	11.8		
7-8	12	14.1	14	16.5	5.484	0.688
8-10	18	21.2	8	9.4		
10 and above	13	15.3	12	14.1		
***Method of administering chemotherapy**						
Oral	29	34.1	23	27.1		
Intravenous	76	89.4	79	92.9	4.830	0.701
intramuscular	5	5.9	2	2.4		
Topical	5	5.9	0	0.0		
Subcutaneous	4	4.7	0	0.0		

Table (3): Distribution of study and control groups according to their past medical history (n=170).

dical history	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
Previous hospitalization						
Yes	60	70.6	66	77.6	1.104	0.293
No	25	29.4	19	22.4		
Frequency of hospitalization						
1-2	35	58.4	29	44.0		
3-4	18	30.0	22	33.3	2.150	0.207
5-6	2	3.3	7	10.6		
7 or more	5	8.3	8	12.1		
Reason for Previous hospitalization						
For medical examinations	21	35.0	24	36.4		
For surgery	18	30.0	21	31.8	1.857	0.231
Follow-up of cancer-related treatment	36	60.0	40	60.6		

Table (4): Distribution of study and control groups regarding their pain history (n=170).

Pain history	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
History of pain caused by cancer or its treatments						
Yes	85	100.0	85	100.0	0.000	1.000
No	0	0.0	0	0.0		
***Time of pain**						
At morning	52	61.2	40	47.1		
At Afternoon	22	25.9	15	17.6	2.511	0.189
At Evening	22	25.9	31	36.5		
After medication	41	48.2	32	37.6		
Before medication	10	11.8	12	14.1		
Duration of pain						
Less than 30 minutes	33	38.8	26	30.6		
30-60 minutes	34	40.0	29	34.1	4.227	0.121
More than 60 minutes	18	21.2	30	35.3		
Frequency of pain						
Once /day	35	41.2	49	57.6		
2-4 times/day	34	40.0	23	27.1	1.567	0.622
2-4 times / week	2	2.4	7	8.2		
lasts all the day	14	16.5	6	7.1		
***Factors increasing pain**						
Physical effort	60	70.6	58	68.2		
Psychological stress	44	51.8	53	62.4	1.755	0.498
Heat	17	20.0	15	17.6		
Cold	22	25.9	14	16.5		
Loneliness	7	8.2	12	14.1		
***Effect of pain**						
Numbness of hands or feet	56	65.9	60	70.6		
Mouth pain.	40	47.1	44	51.8		
Severe complain	27	31.8	30	35.3	2.088	0.300
Increased temperature sensation	32	37.6	28	32.9		
Muscle weakness	43	50.6	40	47.1		
Loss of balance	39	45.9	35	41.2		
***Factors reducing pain**						
Rest	37	43.5	40	47.1		
Relaxation	30	35.3	32	37.6		
Sleep	24	28.2	21	24.7		
Cold	22	25.9	25	29.4		
Heat	9	10.6	8	9.4	1.616	0.440
Medicines	47	55.3	50	58.8		
Vomiting	4	4.7	5	5.9		
Deep breathing	12	14.1	10	11.8		
Isolation	2	2.4	3	3.5		
Attempt to distract	5	5.9	4	4.7		
Pain killers for cancer patients						
Tramadol	55	64.7	50	58.8		
Tylenol and others	9	10.6	6	7.0	5.417	0.247
Advil	6	7.0	8	9.4		
Morphine	10	11.8	19	22.4		
Naproxen	5	5.9	2	2.4		

Table (5): Mean total and subtotal pain self-efficacy score among study and control groups throughout study periods (n=170).

Total and subtotal pain self-efficacy score	Study group (n=85)			Control group (n=85)			(p1)	(p2)	(p3)
	Pre-protocol of care	Post protocol of care	Follow-up	Pre-protocol of care	Post protocol of care	Follow-up			
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD			
Enjoying things despite of pain.	**2.58 ± 1.00**	**3.54 ± 0.86**	**4.05 ± 0.082**	**2.49 ± 1.27**	**2.40 ± 1.34**	**2.39 ± 0.148**	**t=0.467 p=0.641**	**t=6.569 p=0.000****	**t= 9.814 p=0.000****
Doing most of household chores, despite the pain.	**2.29 ± 1.05**	**3.38 ± 0.91**	**3.69 ± 0.090**	**2.00 ± 1.60**	**1.98 ± 1.61**	**1.98 ± 0.176**	**t=1.412 p=0.160**	**t=6.948 p=0.000****	**t= 8.705 p=0.000****
Socializing with friends and/or family members as usual despite of pain.	**2.36 ± 0.80**	**3.13 ± 0.75**	**3.60 ± 0.089**	**2.99 ± 1.71**	**3.00 ± 1.69**	**2.99 ± 0.186**	**t=3.038 p=0.003****	**t=0.643 p=0.521**	**t= 2.968 p=0.003****
Coping with pain in most situations.	**1.95 ± 0.96**	**2.62 ± 0.70**	**3.36 ± 0.064**	**2.01 ± 1.33**	**1.98 ± 1.34**	**1.99 ± 0.145**	**t=0.330 p=0.742**	**t=3.926 p=0.000****	**t= 8.653 p=0.000****
Carrying out part of work despite the pain.	**2.49 ± 1.04**	**3.42 ± 0.85**	**3.53 ± 0.088**	**1.91 ± 1.47**	**1.86 ±1.44**	**1.85 ± 0.157**	**t=3.00 p=0.003****	**t=8.624 p=0.000****	**t= 9.329 p=0.000****
Still doing many of the things I enjoy doing despite of pain.	**2.60 ± 1.14**	**3.44 ± 1.02**	**3.56 ± 0.098**	**2.11 ± 1.44**	**2.09 ± 1.46**	**2.11 ± 0.158**	**t=2.465 p=0.051**	**t=6.921 p=0.000****	**t= 7.844 p=0.000****
Coping with pain without medication.	1.78 ± 0.90	2.47 ± 0.73	3.09 ± 0.078	1.60 ± 1.33	1.58 ±1.33	1.56 ± 0.145	t=1.007 p=0.315	t=5.425 p=0.000**	t= 9.275 p=0.000**
Still accomplishing most of life's goals, despite of pain.	2.61± 1.05	3.58 ±0.94	3.82 ± 0.087	2.05 ± 1.46	2.01 ± 1.47	2.04 ± 0.158	t=2.183 p=0.015*	t=8.235 p=0.000**	t= 9.894 p=0.000**
Living a normal lifestyle, despite the pain.	2.22 ± 1.83	3.86 ± 0.80	4.22 ± 0.081	1.99±1.48	1.94 ± 1.48	1.94 ± 0.161	t=0.919 p=0.359	t=10.481 p=0.000**	t= 12.676 p=0.000**
Gradually becoming more active, despite the pain.	2.68 ± 1.71	4.36 ± 0.72	4.72 ± 0.088	2.35±1.79	2.31 ± 1.78	2.31 ± 0.193	t=1.118 p=0.265	t=9.885 p=0.000**	t= 11.370 p=0.000**
Total score	23.57 ± 6.76	33.80 ± 4.11	37.65 ± 3.65	21.49 ± 10.5	21.14 ± 10.7	21.14 ± 10.7	t=1.536 p=0.126	t=10.17 p=0.000**	t=13.41 p=0.000**

P1: p value for comparing between two groups at pre- protocol of care. P2: p value for comparing between two groups at post protocol of care.
P3: p value for comparing between two groups at Follow-up phase. t= Paired t.test. **: Highly statistically significant at p < 0.001.

Discussion

Cancer, often a life-altering diagnosis, entails a multifaceted journey that frequently involves chemotherapy as a critical component of treatment. While chemotherapy has proven effective in targeting and reducing cancer cells, it often comes with a significant burden pain, including the challenging condition known as Chemotherapy-Induced Peripheral Neuropathy (CIPN). Cancer patients undergoing chemotherapy may experience varying degrees of pain, ranging from mild discomfort to severe and debilitating sensations. CIPN, specifically, is characterized by tingling, numbness, and pain in the extremities, affecting the patient's quality of life. This pain management is an essential aspect of comprehensive treatment, aiming not only to alleviate suffering but also to empower patients with the tools to maintain their well-being and continue their fight against cancer (Moeini et al., 2023 & Szklener et al., 2023).

This study focuses on Effect of pain nursing intervention on pain self-efficacy among patients receiving chemotherapy. In this study, the researcher examined the complex relationships between pain nursing intervention on pain self-efficacy. This chapter provides a platform for a comprehensive analysis of the current study findings, their significance in the context of cancer care, and their broader implications for healthcare practice and policy. The researcher carefully examined the implications of the current study findings, consider the possible mechanisms underlying the observed effects, and discuss how the current research contributes to the growing

Regarding the presence of pain, the current study's results revealed that all participants of both groups experienced cancer-related pain. This finding is consistent with the findings of Van Den Beuken-Van Everdingen et al. (2016), who studied "Update on prevalence of pain in patients with cancer " at Netherlands and reported that the prevalence of pain in different cancer patient groups was major after curative treatment. This may be related to either cancer itself which release chemicals that can cause pain or the chemotherapy treatment which can exerts new toxic effects and sensory nerve injury that may cause neuropathic pain.

The result of the current study reported that about half of the participants of both groups had pain once / day especially at morning and lasting for 30-60 minutes. This finding is consistent with the findings of Villegas et al. (2021) who studied " Characterizing breakthrough cancer pain using ecological momentary assessment with a smartphone app" at Spain and reported that the pain episode take 30-60 minutes particularly challenging in the morning Appearance of pain in the morning is can be due to prolonged periods of sleep, that may lead to long time without analgesic medication.

Regarding factors increasing pain, more than two thirds of both groups had increasing pain as a result of physical effort. This finding disagrees with Kleckner et al. (2021) who studied "Longitudinal study of inflammatory,

behavioral, clinical, and psychosocial risk factors for chemotherapy-induced peripheral neuropathy" which was conducted through the University of Rochester Cancer Center (URCC) National Cancer Institute, (NCI) Community Oncology Research Program (NCORP) and suggested that one of the strongest risk factors for CIPN symptom severity is the symptom cluster of fatigue, anxiety, and depression. This difference may be due to Kleckner's study core purpose was to assess risk factors of CIPN especially psychological risk factors which were not from factors in the current study.

Regarding the pain effect, the study results demonstrated that about two thirds of both groups had a numbness of hands or feet. This result is in line with the findings of Licht et al. (2021) who studied "Chemotherapy-induced peripheral neuropathy (CIPN)" at Ludwig Boltzmann Institute for Rehabilitation Research ,Vienna and stated that approximately two thirds of affected CIPN patients reported numbness and tingling of feet and/or toes are more frequently affected than hands and/or fingers. Also, on the same line Maihöfner et al. (2021) conducted a study titled " Chemotherapy-induced peripheral neuropathy (CIPN): Current therapies and topical treatment option with high-concentration capsaicin" at Department of Oncology, Bethanien Hospital, Frankfurt Main, Germany who found that more than two thirds of patients were simultaneously affected by numbness and tingling at upper and lower limbs, although presence of symptoms exclusively in the feet. This may be due to the most common method of administrating chemotherapy for those patients was IV route that may be cause venous spasm which can cause numbness. Also, chemotherapy may affect the function of nerve cells by altering ion channels and neurotransmitters and cellular damage, including damage to the nerve cells which leads to numbness and tingling in the upper and lower limbs.

Regarding the used painkiller, the study results demonstrated that more than half of both groups used tramadol as a painkiller. This finding agrees with Ou et al. (2022) who studied "Tramadol versus codeine and the short-term risk of cardiovascular events in patients with non-cancer pain" at Ottawa, Canada, and stated that about two-thirds of cancer patients depend on tramadol to relieve pain. This may be related to the fact that tramadol is considered versatile because it has both opioid and non-opioid properties and it has been considered to have a lower potential for abuse and dependence compared to some other opioids, especially for patients who need long-term pain management.

Pain self-efficacy throughout study periods

Leroux et al. (2018) who studied "A nursing intervention increases quality of life and self- efficacy in migraine" at Montreal and stated that self-efficacy has been shown to be a determining factor of quality of life in chronic pain conditions and plays a role in mood and coping behaviors. This report explained the results of present study which revealed that there were highly significant improvements in all items of

self-efficacy score between study and control groups, post-implementing pain nursing intervention on pain self-efficacy, and during the follow-up period than before. These findings are supported by Hassankhani et al. (2023) who studied the "Enhancing cancer pain self-management" at northwestern Iran, which suggested that the effectiveness of interventions for pain relief in cancer patients underscores the importance of tailored nursing care protocols. Also, these results align with the findings of Sharifpour et al. (2021) who studied the "Effects of virtual reality therapy on perceived pain intensity, anxiety, catastrophising and self-efficacy among adolescents with cancer" at Isfahan City, Iran, and stated that the effect of virtual reality therapy was significant in increasing pain self-efficacy. Moreover, the findings of Hirata et al. (2021) who studied "Relationship between pain intensity , pain catastrophizing , and self-efficacy in patients with frozen shoulder" at Hiroshima, Japan and revealed that the educational program for patient with chronic pain, increasing pain self-efficacy. From the researcher's perspective, this intervention not only provides effective pain management but also empower patients to have greater control over their pain, ultimately contributing to an improved quality of life during their cancer journey.

This result aligns with the work of Kizza, (2019), who studied "The Influence of a home-based education intervention on family caregivers' knowledge and self-efficacy for cancer pain management in adult patients within a resource-limited setting" at Uganda noted a significant increase in knowledge and self-efficacy for pain management after intervention. Furthermore, the study findings resonate with the conclusions that were drawn by Sivakumar & Susila, (2021), who studied "Effectiveness of Self-care Measures on Knowledge, Self-efficacy and Performance Status among Cancer Patients" at south India and reported statistically significant positive correlations between knowledge and self-efficacy.

These findings can guide healthcare providers in developing more effective pain management strategies that take into account self-efficacy levels.

These finding support the study hypothesis that showed improvement in pain self-efficacy level among patient post protocol of care and during follow up.

Finally, according to the current result, the provided pain nursing intervention for patients with cancer who received chemotherapy had a significant impact on improving pain self-efficacy.

Conclusions:

In light of the current study, it can be concluded that: the implementation of the pain nursing intervention had a significant effect on improving pain self-efficacy. Also, it can empower cancer patients to better manage their pain and cope with the challenges associated with chemotherapy. This not only leads to improved pain control but also positively influences the patients overall.

Recommendations:

1) Oncology patients should be encouraged to attend training teaching program about

chemotherapy. The emphasis on self-efficacy is commendable and empowering patients to actively participate in their pain management can foster a sense of control and positively impact their overall well-being.

2) Develop nursing intervention that are tailored to the individual needs of cancer patients. Recognize that each patient's pain experience is unique and personalized care plans can optimize pain self-efficacy outcomes.

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