https://menj.journals.ekb.eg
Print ISSN: 2735-3974
Online ISSN: 2735-3982
DOI: 10.21608/menj.2024.447881

MNJ
Menoufia Nursing Journal
Faculty of Nursing
Menoufia University

Effect of Nursing Care Management on Pain Intensity among Adult Patients Undergoing Chemotherapy

Muhannad Abdullah H. Al Shaer[1], Manal El-Sayed Fareed [2], Neima Ali Riad Alseeady [3], Lamiaa Abd Elsalam Elgamasy [4]

[1]M.Sc. Nursing Science, Irbid National University,
[2]professor of Medical Surgical Nursing,
[3]Professor of Medical Surgical Nursing,
[4]lecturer of Medical Surgical Nursing,
[2,3,4] Faculty of Nursing, Menoufia University.

Abstract: Background: Cancer remains among the most common serious health problems and the second leading cause of death globally, affecting millions of people worldwide. The purpose of the present study is to examine effect of nursing care management on pain intensity among adult patients undergoing chemotherapy introduction. **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. **Two instruments** were used in data collection; 1) A Structured Interviewing Questionnaire, 2) A 10-point horizontal visual analog pain scale. **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. **Conclusion**: The study revealed that implementing a nursing care protocol had a positive impact on reducing pain intensity among patients. **Recommendation**: 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.

Key words: *Chemotherapy; Nursing Care Management; Pain Intensity*

Introduction

Cancer is considered the second leading cause of death around the world. Health-promoting behaviors are the major determinants of health (Kazempour et al., 2021). 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 this context, the introduction discusses the latest insights into cancer biology, the evolving landscape of cancer therapies, and the importance of early diagnosis and prevention to limit their global impact (Sung et al., 2021).

General symptoms arise due to the long-distance effects of the cancer, unrelated to direct or metastatic spread. These may include a change in bowel or bladder habits, unintentional weight loss, fever, excessive tiredness, a wound that doesn't heal, unusual bleeding from anywhere, a lump or bump, indigestion and difficulty swallowing, and an overt change in the shape and size of any part of the body (Nagalapur & Karamudi, 2022).

Cancer pain is a general term for a large range of different pain conditions, characterized by different etiology, characteristics, and pathological mechanisms. it is one of the most debilitating symptoms, affecting about 66 % of cancer patients (Nagalapur & Karamudi, 2022) Cancer pain can be caused by cancer itself or cancer treatment. its management is possible as various evidence suggests that 80-90% of cancer pain (CP) can be alleviated by following World Health Organization (WHO) guidelines for managing cancer pain.

Chemotherapy is one of the predominant cancer therapies to date (Wu et al., 2022). It is an aggressive form of chemical drug therapy aimed at destroying fast-growing cells in the body. It is commonly used to treat cancer because cancer cells grow and divide faster than other cells. 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 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. Chemotherapy that kills dormant cancer cells is 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).

Side effects of chemotherapy included nausea and vomiting, can be prevented or relieved with antiemetic prophylaxis. Other side effects, such as anemia, may require dose adjustments or interruptions in subsequent courses of treatment but are less urgent. Some serious side effects such as fever, infection, and unusual bruising or bleeding should be reported to the Health Care team immediately as they are associated with prolonged hospitalization, reduced quality of life, and death (Olver et al., 2018). In general, the characteristics, timing, and duration of symptoms of CIPN depend on the chemotherapy drug used. Most often these symptoms appear after several (3-4) courses of treatment;

However, the immediate manifestation of CIPN symptoms has also been reported, and in some patients, these symptoms can persist for years (Sałat, 2020)

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., 2020 & 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. In general, the chemotherapeutic agent used determines the characteristics, onset time, and duration of CIPN symptoms (Huang et al., 2020).

Pain is a common experience reported by 90% of cancer patients at any stage of the disease. About 80% of people with advanced disease experience moderate to severe pain, and 50% of patients report poor pain control. Pain syndromes are divided into those resulting from the direct impact of the tumor on surrounding tissues and structures (85%), side effects of treatment (17%), pain related to disease progression (9%), and pain from other causes not related to malignancy (Virgen et al., 2022). Therefore, it is very important for cancer patients with pain to determine whether the pain is cancer-related, treatment-related, or caused by other comorbidities so that the necessary treatment can be administered (Caraceni & Shkodra, 2019).

Cancer pain is an umbrella term for a wide range of different pain conditions characterized by different etiologies, features, and pathologic mechanisms. Given the importance of pain classification for an individual assessment and tailored treatment strategy, there is not yet an accepted standard classification system and a variety of cancer pain classification schemes are available and used in research and clinical settings (Nicholas et al., 2019).

In general, the characteristics, timing, and duration of CIPN symptoms depend on the chemotherapy drug used. Most often these symptoms appear after several (3-4) courses of treatment; However, immediate manifestations of CIPN symptoms have also been reported, and these symptoms can persist for years for some patients (Sałat, 2020).

The most common pain syndrome resulting from chemotherapy is chemotherapy-induced peripheral neuropathy (CIPN) (Szklener et al.,

2023). Chemotherapy-Induced Peripheral Neuropathy (CIPN) is a complex condition with a multifaceted pathophysiology. It primarily arises as a consequence of the neurotoxic effects of chemotherapy drugs. These drugs can damage peripheral nerves, particularly the longer sensory axons, by disrupting the microtubules and mitochondria necessary for nerve cell function. This damage leads to altered neuronal signaling, impaired nerve conduction, and aberrant sensory processing. Additionally, chemotherapy-induced oxidative stress and inflammation can contribute to nerve injury. The exact pathophysiological mechanisms can vary depending on the specific chemotherapy agents used, making CIPN a heterogeneous condition. The resulting peripheral neuropathy often presents with symptoms like tingling, numbness, and pain in the hands and feet. Managing CIPN involves understanding its pathophysiology and employing strategies to mitigate nerve damage and alleviate symptoms (Loprinzi et al., 2020).

The pathophysiology of CIPN after cancer therapies was analyzed. Chemotherapeutic agents exert neurotoxic effects on myelin sheaths (myelinopathy), sensory cell bodies of the dorsal root ganglion (neuropathy), and axonal components (axonopathy), including ion channels, microtubules, mitochondria, and associated capillaries. Subsequently, general degenerative pathways are activated, leading to the production of proinflammatory cytokines, activation of apoptosis signaling cascades, and changes in neuronal excitability, which can subsequently lead to the loss of epidermal fibers. In addition to dysfunction of peripheral neurons, long-term changes in the central nervous system can also cause chronic pain (Maihöfner et al., 2021).

Roles of the nurse in controlling the cancer pain include believing the patient, assessing the pain, planning the care service, implementing analgesic treatment to the patient, assessing the efficiency of the treatment, assuring the treatment to be specific for specific patient and increase pain self-efficacy. It is recommended that comprehensive pain assessment and giving information and educating the cancer patients should be critical part of patient's care to improve pain self-efficacy (Uysal N., 2018).

Significance of the Study

pain may resurface months or even years after initial treatment or persist over time. For those cancer patients who report pain, it significantly hampers their daily activities, affecting 69% of cases, and distressingly, 32% even express thoughts of suicide. Furthermore, research underscores the tendency to underestimate and undervalue the severity of pain in cancer patients. Importantly, cancer's negative impact on overall survival has been demonstrated (Broemer et al., 2021).

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).

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

Purpose of the Study

The purpose of the present study is to examine effect of nursing care management on pain intensity among adult patients undergoing chemotherapy introduction.

Research Hypothesis:

1) Patients who receive nursing care management (study group) will have higher ability to control pain than patients who don't (control group).
2) Patients who nursing care management (study group) will have lower pain intensity than patients who don't (control group).

Operational definition:

- **Protocol of Nursing Care:**

It is operationally defined as a set of scientific information and instructions that were given to cancer patients undergoing chemotherapy to apply it for reducing pain resulting from treatment. These instructions included teaching about cancer pain as definition, causes, manifestations and nursing procedures to relieve pain and its various effects such as physical therapy, relaxation therapy, electrical nerve stimulation, occupational therapy, guided imagery, distraction, acupuncture and biofeedback.

- **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 any type of cancer from both sexes and able to communicate in the study, 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),** who exposed to the nursing care protocol along with routine hospital care.
- **Control group (II),** who 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

A simple random sample was used to assign them into two equal groups (study and control). Eighty -five patients for each group.

Instruments:

Instrument I: 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 as well as pain killer Also, history of chemotherapy regimen was assessed (type of chemotherapy, number of chemotherapy cycles and methods of administering chemotherapy).
- **Part three**: Patient's knowledge: It included questions about subjects' knowledge about cancer, chemotherapy and cancer pain.

Instrument II: 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)

Methods:

- **Instruments development:**

The first instrument was developed by the researcher, while the second was developed by Bain et al., (2005) and the third instrument was developed by Nicholas et al., (2007), then they were tested for their content 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) 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 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 setting to obtain permission to carry out the study after explanation of the purpose of the study. Data collection was extended over a period of 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:

- Written approval: A formal letter from the Dean of the Faculty of Nursing, Menoufia University was sent to the responsible authorities of the study setting to obtain permission to carry out the study after explanation of the purpose of the study.
- Data collection was extended over a period of 7 months from the first of February 2023 to the end of 20 August 2023. Data collection was carried out through the following phases

2) Planning phase:

- The researcher divided the sample into two groups. study group and control group
- Based base line assessment data and needs of studied subjects and using 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, treatments modalities, chemotherapy, side effects of chemotherapy, pain related to chemotherapy, pharmacological and non-pharmacological treatment of pain.

3) Implementation phase:

- All subjects of study groups were taught about the basic principles regarding pain and pain management. The nursing care protocol which provided to cancer patients was designed in a modern and contemporary way through educational videos, a booklet to reduce pain resulting from chemotherapy for cancer patients, and individualized face-to-face training sessions, which were (30-45) minutes in duration.
- Patients were directed to report their pain in a diary.
- Patients were instructed on how to communicate about pain and how to contact healthcare providers. Communicate 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.
- Common techniques have been used to reduce pain associated with chemotherapy such as physical therapy (massage, acupuncture, relaxation therapy, skin and electrical nerve stimulation, emotional support, and counseling).
- Each participant in the study group was interviewed individually before starting chemotherapy to teach them how to manage cancer pain. Three teaching sessions were conducted for each subject in the study group. Each session lasted about (30-45) minutes. 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. This session took about 30 minutes.

- ❖ At the beginning of the second session, the researcher refreshed the previously learned knowledge and then gave information about chemotherapy such as a definition, indications, methods of administration and side effects.
- ❖ At the end of second session, the researcher summarized the received information and allowed subjects to ask questions then provided them with question's answers. This session took about 40 minutes.
- ❖ 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, manifestation and either pharmacological and non-pharmacological, how to deal with the pain associated with chemotherapy such as physiotherapy, relaxation therapy, Occupational therapy, acupuncture, Electrical nerve stimulation, Guided imagery, Distraction, Biofeedback. This session took about 45 minutes.

4) Evaluation phase:

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

Results

Table 1 revealed that the mean age for study group was 52.94 ± 7.27., while for control group was 54.18 ± 7.36. More than half of study group (54.1%) was male, while more than half of control group (56.5%) was female. As regard educational level, more than one third of both groups (44.7%, 47%) respectively were secondary education. Regarding occupation, more than one third of both groups (40%, 36.5%) worked in administrative work. The majority of study and control groups (84.7%, 88.2%) respectively were married. Regarding family size, more than half of both groups (57.6%, 53%) respectively were have 5-6 persons. Regarding income, more than two third of both groups (70.6% & 64.7%) respectively were somewhat sufficient. Regarding smoking, the majority of both groups (80.0% and 81.2%) respectively were no smoking. While less than one quadrant of both groups (20.0%, 18.8%) respectively were smoking about 1- 10 cigarette daily. There were no statistically significant differences between two groups related to all Scio demographic characteristics.

Table 2 illustrated that about one third of study group and control groups

(28.2%, 34.1%) respectively were diagnosed with gastrointestinal cancer, while more than half of control group (56.5%) was female. As regard cancer stage, about half of both groups (57.6%, 49.4%) respectively were in phase II. Regarding family history of cancer, more than two thirds of study and control group (69.4%, 81.2%) respectively have no family history of cancer. Otherwise, patients that have history of cancer, more than one third of study group (38.4%) were from secondary relationship, while more than one third of control group (43.8%) were from third degree relationship. Regarding hospitalization, about three quadrants of both groups (70.6%, 77.6%) respectively were have previous hospitalization. Patients who already admitted, about half of the both groups (58.4%, 44%) respectively stay in the hospital from 1-2 days. Regarding reasons of hospitalization, about two thirds of both groups (60.0% and 60.6%) respectively were admitted to Follow-up of cancer-related treatment. There were no statistically significant differences between two groups related to their past and present medical history.

Table (3) explained that more than one third of the study and control groups (49.4%, 42.2%) respectively were have duration of cancer from 6-12 months. As regards to previous surgery, which about two thirds (64.7% and 60%) respectively of both groups were haven't any previous surgery. Otherwise, the majority of both groups (86.7%, 85.3%) have diagnostic surgery (sample).

Table 4 show Regarding history of pain, 100% of the study and control groups had history of pain. Duration of pain, more than one third (40.0%) of the study group had pain from 30 – 60 minutes, while more than one third (35.3%) of the control group had pain more than 60 minutes. And frequency of pain, about half of the study and control (41.2%, 57.6%) respectively groups were had pain 1 time / day. Regard to factors that elevate pain, more than two third of both groups (70.6% & 68.2 %) respectively have increasing pain from physical effort. Effect of pain, more than two third of both groups (65.9% & 70.6 %) respectively were have a numbness usually in the hands or feet.

Table 5 revealed that, regard factors that reduce pain more than half of the study and control groups (55.3%, 58.8%) respectively have reduction of pain through medication. More than one third of study group (35.3%) was use cyclophosphamide drug, while more than one quarter of control group (29.4%) was using anti-metabolic drug. As regard the number of sessions, about one third of study and control group (31.8% & 42.4%) respectively were taken from 3-4 sessions. Regarding Method of administering chemotherapy, the majority of both groups (89.4%,92.9%) respectively were received chemotherapy intravenously. Regarding Pain killers for cancer patients, more than half of both groups (64.7% & 58.8%) respectively were use tramadol.

The results showed that; there was no statistically significant differences existed between study and control

group according to their past and present medical history.

Figure (1): showed that no statistically significant difference was existed between both study and control groups pre intervention. However, post intervention and at follow up period a highly statistically significant difference was existed between the both groups at p value< 0.000.

Table 6 showed that the mean of study and control groups were (6.72 ± 1.29 & 6.67 ± 1.62) respectively pre intervention. While the mean of post intervention period was (5.76±1.31& 6.76±1.52) respectively for both study and control groups. Otherwise, the mean of follow up period was (4.82±0.902 & 6.78 ± 1.54) respectively for the both study and control groups. There is a highly statistically significant difference in post intervention and follow up period at p value< 0.000.

Figure (2): showed that there was a highly statistically significant difference between study and control group regarding their total pain intensity at p value < 0.000.

Table (1): Distribution of the studied samples according to their socio demographic data.

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
18 - 30 years	0	0.0	0	0.0		
31 - 43 years	10	11.8	11	12.9		
44 - 56 years	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		
If you are a smoker,	**(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		
>20 cigarettes	0	0.0	0	0.0		

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

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

Table (2): Distribution of the studied samples according to their cancer history.

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		
Cancer of the lymphatic system	24	28.2	10	11.8		
Cancer of the urinary system	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		
Skin cancer	0	0.0	0	0.0		
Cancer in the nervous system	2	2.4	2	2.4		
Cancer stage					1.384	0.708
Phase I	14	16.5	19	22.4		
Phase II	49	57.6	42	49.4		
Phase III	12	14.1	13	15.3		
Phase 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		
If yes, what is the relationship?	**(n=26)**		**(n=16)**		4.620	0.202
First-degree relationship	6	23.1	5	31.2		
Secondary relationship	10	38.4	4	25.0		
Third degree relationship	6	23.1	7	43.8		
Fourth degree relationship	4	15.4	0	0.0		
Have you ever been hospitalized?					1.104	0.293
Yes	60	70.6	66	77.6		
No	25	29.4	19	22.4		
If yes, how often are you admitted to the hospital?	**(n=60)**		**(n=66)**		2.150	0.207
1-2	35	58.4	29	44.0		
3-4	18	30.0	22	33.3		
5-6	2	3.3	7	10.6		
7 or more	5	8.3	8	12.1		
***If yes, what is the reason for hospitalization?**	**(n=60)**		**(n=66)**		1.857	0.231
For medical examinations	21	35.0	24	36.4		
For surgery.	18	30.0	21	31.8		
Follow-up of cancer-related treatment	36	60.0	40	60.6		

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

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

Table (3): Continued distribution of the studied samples according to their cancer history.

Past and present medical history	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
Duration of cancer						
Less than 6 months	23	27.0	21	24.7	2.119	0.548
6-12 months	42	49.4	36	42.4		
1-2 years	10	11.8	12	14.1		
More than 2years	10	11.8	16	18.8		
Have you undergone previous surgery (after cancer diagnosis)?						
Yes	30	35.3	34	40.0	0.401	0.527
No	55	64.7	51	60.0		
***If yes, what kind of surgery?**	**(n=30)**		**(n=34)**			
Diagnostic surgery (sample)	26	86.7	29	85.3	1.115	0.284
Therapeutic surgery (tumor removal)	22	73.3	16	47.1		

Table (4): Distribution of the studied samples according to their pain history.

Items	Study group (n=85)		Control group (n=85)		Test of significance	
	No.	%	No.	%	X^2	P-Value
History from pain caused by cancer or its treatments					0.000	1.000
Yes	85	100.0	85	100.0		
No	0	0.0	0	0.0		
***If yes, Time of pain**					2.511	0.189
At morning	52	61.2	40	47.1		
At Afternoon	22	25.9	15	17.6		
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?					4.227	0.121
Less than 30 minutes	33	38.8	26	30.6		
30-60 minutes	34	40.0	29	34.1		
More than 60 minutes	18	21.2	30	35.3		
Frequency of pain?					1.567	0.622
1time/day	35	41.2	49	57.6		
2-4 times/day	34	40.0	23	27.1		
2-4 times / week	2	2.4	7	8.2		
It lasts all day	14	16.5	6	7.1		
***Factors that elevated pain**					1.755	0.498
Physical effort	60	70.6	58	68.2		
Psychological pressure	44	51.8	53	62.4		
Heat	17	20.0	15	17.6		
Cold	22	25.9	14	16.5		
Loneliness	7	8.2	12	14.1		
***Effect of pain**					2.088	0.300
Numbness or numbness usually in the hands or feet	56	65.9	60	70.6		
Mouth pain.	40	47.1	44	51.8		
Severe and sudden pain	27	31.8	30	35.3		
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 that reduce pain**					1.616	0.440
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		
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					5.417	0.247
Aspirin	55	64.7	50	58.8		
Tylenol and others	9	10.6	6	7.0		
Advil	6	7.0	8	9.4		
Morphine	10	11.8	19	22.4		
Naproxen	5	5.9	2	2.4		

Table (5): Distribution of the studied samples according to their chemotherapy history.

Items	Study group		Control group		Test of	
	No.	%	No.	%	X^2	P-
***Type of chemotherapy**					4.871	0.157
Corrosive Factors	20	23.5	12	14.1		
Cyclophosphamide	33	35.3	4	4.7		
Plant alkaloids	25	29.4	22	25.9		
Anti-metabolic	17	20.0	25	29.4		
Anti-tumor antibiotic	11	12.9	5	5.9		
Topoizmerase inhibitors	1	1.2	8	9.4		
All the above	3	3.5	13	15.3		
The number of sessions					5.484	0.688
1-2 Sessions	4	4.7	5	5.9		
3-4 Sessions	27	31.8	36	42.4		
5-6 Sessions	11	12.9	10	11.8		
7-8 Sessions	12	14.1	14	16.5		
8-10 Sessions	18	21.2	8	9.4		
10 and above	13	15.3	12	14.1		
***Method of administering chemotherapy**					4.830	0.701
Oral	29	34.1	23	27.1		
Intravenous	76	89.4	79	92.9		
Muscular	5	5.9	2	2.4		
Topical	5	5.9	0	0.0		
Subcutaneous	4	4.7	0	0.0		

Figure (1): Percentage distribution of the study and control groups according to their total knowledge throughout study periods.

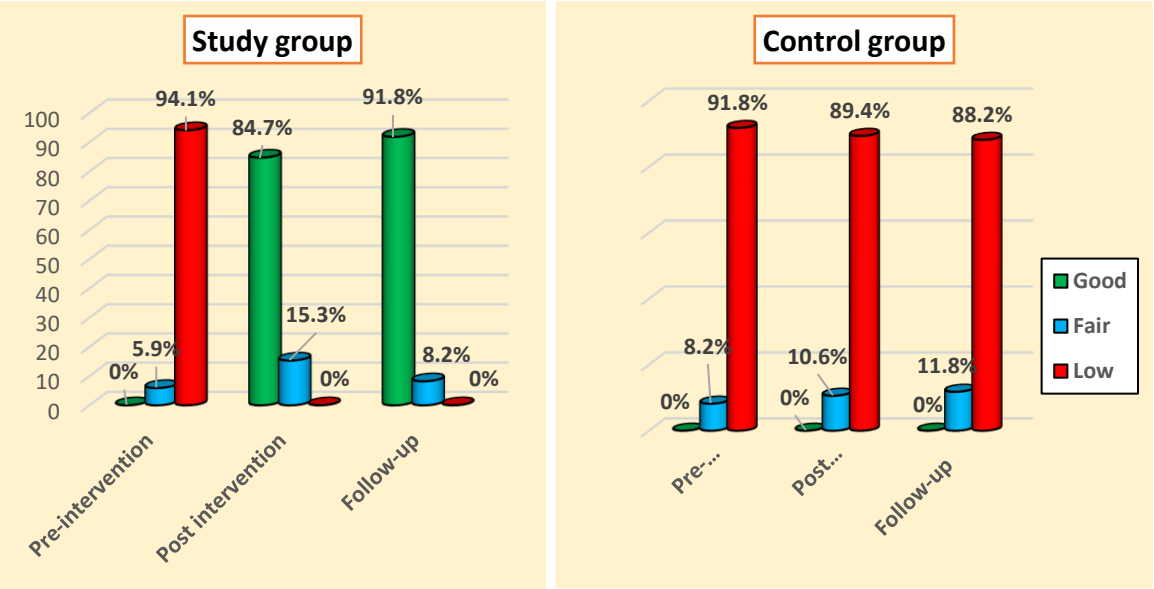
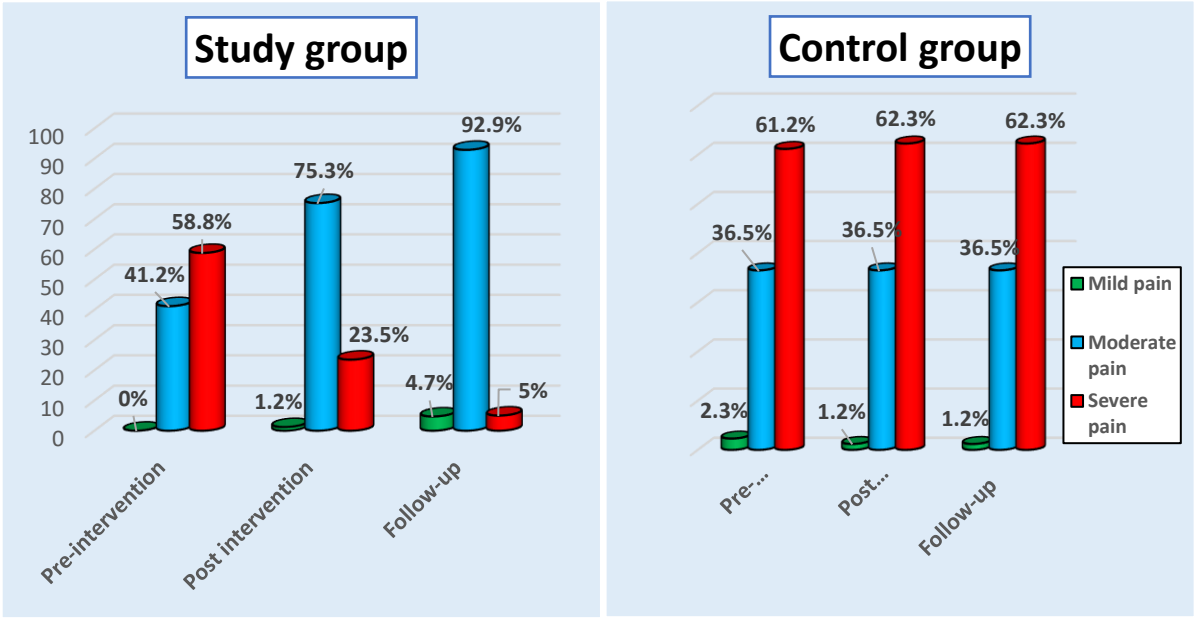


Table (6): Distribution of the study and control groups according to their total pain intensity throughout study periods.

Levels of pain intensity	Pre-intervention				Post intervention				Follow-up				Test of significant		
	Study group		Control group		Study group		Control group		Study group		Control group		(p1)	(p2)	(p3)
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Mild pain	0	0.0	2	2.3	1	1.2	1	1.2	4	4.7	1	1.2	X^2=2.282 p=0.826	X^2=26.38 p=0.000**	X^2=70.03 p=0.000**
Moderate pain	35	41.2	31	36.5	64	75.3	31	36.5	79	92.9	31	36.5			
Severe pain	50	58.8	52	61.2	20	23.5	53	62.3	2	2.4	53	62.3			
Mean ± SD	6.72 ± 1.29		6.67 ± 1.62		5.76±1.31		6.76±1.52		4.82±0.902		6.78 ± 1.54		t=0.208 p=0.853	t=4.579 p=0.000**	t=10.06 p=0.000**

Figure (2): Percentage distribution of the study and control groups according to their total pain intensity throughout study periods.



Discussion

This research delves into the multifaceted implications and key insights gleaned from the study on the "Effect of Protocol of Nursing Care on Cancer Pain Self-Efficacy among Patients Receiving Chemotherapy." In this study, the student researcher examined the complex relationships between care protocols and cancer patients' Self-Efficacy in pain management during chemotherapy. 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 student researcher will carefully examine 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 body of knowledge in the field of cancer pain treatment. In addition, the student researcher will explore the practical applications of the current study results and provide recommendations for healthcare professionals, policymakers, and future research projects aimed at improving the well-being and treatment experiences of cancer patients undergoing chemotherapy.

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 burdenpain, 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. Pain management in cancer care is thus 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.

The present study results illustrated that highest proportion of both studied groups age 57-years to less than 65 years. This finding is consistent with those obtained by El-seadi et al., (2020), Nayak et al., (2017),Abu El-Kass et al., (2021) , Chan & Ismail, (2014) reported that the majority of patients with cancer in Malaysian general hospital age 45-64-years. Moreover, this finding was incompatible with Kurian et al., (2018) who stated that the majority of the patients with cancer age 50 years or younger. So, from researcher’s point of view, the difference was due to the study being conducted in two different societies in customs and traditions such as lifestyle, eating and smoking, which affect the average age of humans. so, attention should be given to this age group through routine screening tests

for patients to reduce the burden of cancer.

Concerning gender, the results of the current study reveal that slightly more than half of the participants were males. This observation corresponds with the findings of Kırca and Kutlutürkan 2021 study titled "The impact of progressive relaxation exercises on treatment-related symptoms and self-efficacy in patients with lung cancer undergoing chemotherapy," which also reported a predominance of male participants. While this result contradicts the study conducted by Lou et al., (2011), which found that nearly two-thirds of participants were female, the researcher's perspective suggests that males tend to bear more responsibilities and burdens, which can expose them to higher levels of stress and additional risk factors such as smoking and exposure to pollution compared to females.

Regarding the participants' educational background, the findings of the current study indicate that slightly over one-third of individuals in both groups had completed secondary education. This outcome aligns with the research conducted by Chan and Ismail in 2014, where they noted that 40% of the cancer patients, they studied had a secondary education level. However, Kang and Seo (2022) study yielded contrasting results, as they reported that the majority of their participants had achieved the highest academic degrees, including bachelor's and master's degrees or higher. The researcher's perspective attributes this discrepancy to cultural differences among the study populations.

Regarding occupation, in terms of occupation, over one-third of participants in both groups are engaged in administrative roles. These outcomes align with the findings reported by Kırca & Kutlutürkan, (2021), where the patients in their study were predominantly employed. However, these results do not correspond with the findings of Üstündag and Zencirci , (2015), who noted that nearly half of the chemotherapy-receiving cancer patients in their study were homemakers. From the researcher's perspective, the disparity between the current study and Üstündag and Zencirci , (2015), study can be attributed to differences in the target sample; their study specifically focused on females as they were studying breast cancer.

Regarding Marital status Regarding marital status, most participants in both the study and control groups were married. This finding is consistent with Kennedy&Parker (2019) report, which also noted that the majority of the studied group was married. However, there is a discrepancy with the findings of Kang and Seo (2022), as they reported that the majority of their participants were unmarried. This difference can be attributed to the varying average ages of the samples; the sample in the current study had an average age of around 54 years, while Kang and Seo (2022)sample had an average age of approximately 28 years, where marriage is more common.

Regarding family size and income, the results of the current study indicate that more than half of the participants in both groups had family sizes ranging

from 5 to 6 persons, and their income was moderately sufficient. This finding aligns with Kazempour et al. (2021) study, which similarly emphasizes the significance of an adequate economic status in influencing individuals' quality of life and its pivotal role in sustaining their living standards, particularly in light of medical and hospitalization expenses. Additionally, Kazempour et al. (2021) underscore the adverse impact of a low-income level on self-efficacy. From the researcher's perspective, both income level and the larger family size can contribute to a reduced focus on early cancer detection methods and can also influence the quality of treatment received by the patient due to financial vulnerabilities within the family unit.

The findings regarding smoking habits within the context of the present study provoke an interesting discussion. It was observed that less than a quarter of participants in both the study and control groups reported smoking between 1 to 10 cigarettes. This trend aligns with the results reported by Saetan et al., (2020) study, which indicated that their participants had no history of smoking. From the researcher's perspective, this intriguing pattern may be indicative of the profound impact of a cancer diagnosis on patients' attitudes toward smoking.

One plausible interpretation of these findings is that the fear of the potential consequences of smoking, particularly in the context of cancer, serves as a powerful motivator for smoking cessation. A cancer diagnosis can be a life-altering event, prompting individuals to reevaluate their lifestyle choices and prioritize their health. Consequently, it is conceivable that many patients, upon learning about their cancer diagnosis, make a conscious decision to quit smoking in an effort to reduce further health risks and enhance their overall well-being.

Regarding the cancer diagnoses, the study findings revealed that approximately one-third of both the study and control groups had been diagnosed with gastrointestinal (GI) cancer. This discovery aligns with the results obtained by Siegel et al.,(2019), Chapelle et al.,(2020), Mattiuzzi & Lippi, (2019), which also indicated a significant prevalence of GI cancer cases. Conversely, the study conducted by Nayak et al., (2017) presented results that were incongruent with the current findings, reporting a majority of head-and-neck cancer cases. From the researcher's perspective, the elevated incidence of GI cancer may be attributed to a multitude of factors. These could encompass dietary patterns, the widespread occurrence of hepatitis C infections, Helicobacter pylori infections, as well as lifestyle factors like smoking and alcohol consumption. Environmental exposures, including pollution and agricultural practices, may also contribute to this trend. Additionally, genetic predisposition, an aging population, and a lack of comprehensive cancer screening programs could further influence the higher prevalence of GI cancer cases.

Concerning the cancer stage, the study's outcomes indicated that approximately half of the participants in both groups were in stage II. This discovery aligns

with the findings reported by Liu et al., (2021) & Guan, (2015), both of which also observed a substantial proportion of cases in stage II. However, El Saghir et al., (2007) reported a contrasting pattern, noting that the majority of breast cancer cases they examined were in stages III and IV. This discrepancy was at odds with the results presented by Binkley et al., (2020), who found that the majority of nodular lymphocyte cases were in stage I.

Regarding the family history of cancer among patients, the study's results indicated that the participants did not have a family history of cancer. This discovery is in line with the findings of Li et al., (2019), who reported that more than half of the carriers had no personal or family history of ovarian cancer. However, the study conducted by Liu et al., (2021)presented results that contradicted the current findings, suggesting that approximately 5-10% of cancer cases are associated with a family history. This contrast with Liu et al.'s findings is also supported by Clements et al., (2022), who concluded that more than one-third of the studied group had a second-degree family history of cancer.

In terms of previous hospitalization, the current study revealed that both groups had experienced prior hospitalizations for cancer-related treatment follow-up. This observation is in agreement with the findings of Feliciana Silva et al., (2020), who similarly noted hospitalizations among patients. From the researcher's perspective, these past hospitalizations can be attributed to various factors, including diagnostic assessments, surgical procedures, and ongoing medical treatments for cancer management.

Regarding the duration of cancer, the findings of this study indicated that over one-third of both the study and control groups had been dealing with cancer for a period ranging from 6 to 12 months. This observation aligns with the results reported by Musavi et al., (2021), who also found that the control groups had a duration of 6 to 12 months. Additionally, these findings are supported by Wakiuchi et al., (2015), who reported that more than half of the patients they studied (55.3%) had been living with the disease for more than six months.

Regarding the presence of pain, the results of this study reveal that all participants experienced recurrent pain, occurring once daily in the morning, lasting for 30-60 minutes, intensifying with physical activity, and subsiding with the use of medication and rest. This pain often presented as numbness, primarily in the hands or feet when reported. This finding is consistent with the findings of Paice & Ferrell, (2011), who estimated the prevalence of pain in cancer patients undergoing active treatment to be around 75%. However, these results are at odds with those presented by Linder & Hooke, (2019) & Acquazzino et al., (2017), who noted that reported pain tended to be of moderate or greater severity and distress. Additionally, the most frequently reported pain locations were the abdomen, lower back, forehead, and upper chest, with neuropathic pain often described as "sharp" or "shooting." This type of pain was most commonly attributed to treatment and

was not associated with the cumulative dose of vincristine. From the researcher's perspective, the high incidence of pain among cancer patients can be attributed to the effects of chemotherapy.

Distribution of the study and control groups according to their knowledge about cancer throughout study periods.

The provided information describes the distribution of the study and control groups based on their total pain intensity scores throughout different study periods.

The results of the present study regarding pain intensity demonstrated a significant difference between the study and control groups both before and after the implementation of the nursing care protocol. This aligns with the findings of Jahn et al., (2014), who observed a reduction in mean pain severity and a decreased use of analgesic drugs with the implementation of the SCION-PAIN program in their intervention group. Similarly, Musavi et al., (2021) reported that effective nursing interventions can effectively alleviate pain in these patients, noting a significant difference in pain intensity levels between the two groups starting from the second week after the intervention.

In contrast, (Valenta et al., 2018) and (Raphaelis et al., 2020) also reported noticeable decreases in both average and worst pain intensity. However, they noted minor differences between the study and control groups during the study period. These varying degrees of difference may be influenced by factors such as the specific interventions used, the timing of assessments, and the characteristics of the patient populations. Nonetheless, the overall trend suggests that nursing care interventions have the potential to significantly improve pain management and reduce pain intensity among patients undergoing chemotherapy.

Conversely, this result contradicts the findings of Koller et al., (2012), who observed no statistically significant alterations in average and worst pain scores when comparing the intervention and control groups. Additionally, Jahn et al., (2014)reported no discernible distinctions in pain intensity between groups during the inpatient phase and one-week post-discharge. However, it is noteworthy that during the follow-up period, specifically at 2- and 4 weeks post-discharge, the intervention group exhibited lower scores in both average pain and worst pain intensity compared to the control group.

Conclusions:

In light of the current study, it can be concluded that: the implementation of the protocol of nursing care had a significant effect on improving patients' level of knowledge who receiving chemotherapy. 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. The findings of the present study indicate that a positive impact of the protocol of nursing care leads to

improving pain severity and enhancing self-efficacy in pain management which can lead to better patient outcomes.

Recommendations:

1) Cooperating with other institutions to improve nursing staff behavior and identify the barrier against application of nursing care management for patients undergoing chemotherapy sessions. Nurses and healthcare providers can benefit from understanding the impact of nursing care management on cancer pain intensity, leading to more effective pain management strategies.
2) Develop nursing care management 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 intensity outcomes.
3) Provide ongoing education and training for healthcare providers, including nurses, on the latest evidence-based practices in pain management, communication, and psychological support. This can help improve the quality of care delivered to cancer patients and enhance their self-managing pain.

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