Effect of Tailored Nursing Program on Selected Responses among Jordanian Patients with Lung Cancer

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ABSTRACT

Background: Health status affects patients with lung cancer due to disease symptoms, treatment side effects and overall physical limits. Tailored nursing care have an effective role in reducing intensity of symptoms and chemotherapy side effects.

Aim: To investigate the effect of a tailored nursing program on selected responses (chemotherapy side effects) among Jordanian patients with lung cancer. Design: A quasi-experimental design (nonequivalent, pre-posttest control group).

Tools: Tool (I): Demographic and medical data tools (DMDS). While Tool (II): Chemotherapy side effects worksheet.

Setting: Amman, the capital city of Jordan. Al-Bashir Hospital, Hashemite Kingdom of Jordan, is in the Jabal Ashrafieh area of Al-Taj Street. The oncology department consists of 7 rooms for women, and 8 rooms for men knowing that each room equipped with 2 beds.

Sample: A convenient sample over 6 consecutive months. 60 adult participants with a confirmed diagnosis of primary lung cancer. The sample was randomly assigned to the study and control groups, each of them was consisting of 30 participants.

Results: Over a period of three weeks, the study revealed significant differences in chemotherapy side effects between study and control groups regarding fever, fatigue, nausea, and vomiting scores that decreased in the study group but worsened in the control group (p < 0.001). Mouth sores, diarrhea, constipation, loss of appetite, dysphagia, and edema were decreased in the study group, with opposite results in the control group (p < 0.001).

Conclusion: A tailored nursing program was effective in reducing chemotherapy side effects among Jordanian patients with lung cancer.

Recommendation: Establishing and development of tailored nursing program for patients with lung cancer to reduce intensity of chemotherapy side effects. Replicating the study to a large sample size from different types of cancer is recommended.

Keywords: Lung cancer, Tailored nursing program, Chemotherapy side effects

INTRODUCTION

Cancer is a non-communicable disease characterized by the abnormal division, infiltration, and destruction of normal bodily tissue by abnormal cells (Mahmud, Rahman, Mishu & Kabir, 2022). Lung cancer is categorized into two types: small-cell lung cancer and non-small-cell lung cancer. Small cell lung cancer (SCLC) constitutes approximately fifteen percent of lung malignancies and primarily impacts those with a history of smoking. It distinguishes itself from other types of lung cancer by its quick proliferation, elevated speed of expansion, and early inclination to metastasize to other body regions (Mansour et al., 2024). Lung cancer ranking is the second most common cause of mortality in Jordan. Morbidity and mortality rates are projected to rise, adding an excessive burden on healthcare systems in Jordan compared to other nations worldwide (Xu, Ren, Zhou & Liu, 2022).

Apparently, there are several leading risk factors for lung cancer that include smoking, which is primarily responsible for about 95 percent of lung cancer cases and the remaining five percent are caused by the influence of asbestos, environmental as well as genetic factors and other cancer-causing agents at the workplace (Gariazzo et al., 2021). Pleural involvement in lung cancer may present as pleural thickening or nodules or as a malignant pleural effusion. Around ten percent to fifteen percent of lung cancer cases could develop a malignant pleural

effusion throughout their disease. In some cases, this effusion may be the only presenting feature and it may affect only one side of the chest. (Yang & Wang, 2023).

Patients with Lung cancer typically experience a variety of uncomfortable symptoms before and during diagnosis and treatment. These symptoms vary by lung cancer classification and stage. Chronic cough that worsens is the most common sign of lung cancer. Hemoptysis is coughing up rust-colored blood or sputum. Tumors can constrict airways or accumulate fluid around the lungs, causing shortness of breath or wheezing (Pestana & Ibrahim, 2021).

In managing and treating cancer, there are three main types of cancer management: curative, control, and palliative treatment modalities. Furthermore, hormonal therapy, targeted therapy, chemotherapy, and radiotherapy are regarded as medical modalities (American Cancer Society, 2024 & Board, 2024). Treatment for lung cancer is either a neoadjuvant chemotherapy that is started before surgical management or adjuvant chemotherapy, which is started after surgical management (Watson &Nazario, 2022).Chest pain can vary in severity and worsen with deep breath or coughing. When a tumor affects nearby structures, it may cause dysphonia, dysphagia, and facial or cervical edema. Resistant respiratory infections like bronchitis or pneumonia can result from lung cancer. Also, lung cancer can cause bone pain, headaches, dizziness, and neurological symptoms if it spreads to the brain (Sung, Hyun, Leach, Yabroff& Jemal, 2020).

Additionally, chemotherapy for lung cancer may produce many side effects such as fever, fatigue, nausea, vomiting, mouth sores, diarrhea, constipation, loss of appetite, pain or difficulty with swallowing, allergic reaction, itching or rash, shortness of breath, and muscle or joint pain. Nausea and vomiting are common side effects of chemotherapy, which are caused by stimuli from both the gastrointestinal tract and the central nervous system. Chemotherapy and radiation treatments used to combat lung cancer can also increase the risk of developing a secondary malignancy in later years. These side effects, combined with the primary symptoms of lung cancer, create a complex and challenging experience for patients during both diagnosis and treatment. The symptoms of the disease , chemotherapy side effects, and potential complications of the lung cancer can have emphasizing the importance of establishing comprehensive nursing management (Parajuli &Hupcey, 2021).

 Nurses play a vital role in the management of participants with lung cancer to stabilize their clinical status and prevent further complications, which could be achieved through various educational programs to improve the clinical outcomes of participants with lung cancer (Gautam & Shankar, 2023). Also nurses have a crucial role in helping the patients to cope with treatment side effects and maintain their health status, this study aims to fill the gap by investigating the effectiveness of a specialized nursing program by focusing on Jordanian oncology nurses and their role in managing chemotherapy-related side effects. Also, this study seeks to improve the quality of nursing care provided to patients with lung cancer receiving chemotherapy with potential implications for broader clinical practice, and nursing education. Moreover, this study addresses an unmet need for structured nursing interventions tailored to the unique cultural and healthcare context of Jordan to improve patient outcomes through better symptom management. Therefore, the current study aimed to investigate the effect of a tailored nursing program on selected responses (chemotherapy side effects) among Jordanian patients with lung cancer.

Significance of the study

By 2050, the number of cancer cases is predicted to increase to 35 million based solely on projected population growth, Lung cancer is the most commonly diagnosed cancer and the leading cause of cancer death worldwide, with almost 2.5 million cases (1 in 8 cancers) and 1.8 million deaths (1 in 5 deaths) (American cancer society, 2024). on the same line, lung cancer ranks among the five most frequent types of cancer in 15 of the 22 Arab countries in the Middle East and North Africa, including Jordan (Zaromytidou, 2021) Addressing the challenges and weaknesses of the nursing program is the basis for enhancing the survival rate for patients living with lung cancer.

The current research is based on the promises that by enhancing the nursing design program, Jordanian oncology nurses are bound to improve nursing care quality and help patients enhance their functionality and health status. In effect, the implications of the proposed study extend to clinical practice, nursing research, and education. Hopefully, the current study findings added to the nursing body of knowledge and will benefit clinical nurses in applying the proposed educational program with the aim of improving their knowledge, practices, and nursing research.

Methods
Aim: Investigate the effect of a tailored nursing program on selected responses (chemotherapy side effects) among Jordanian patients with lung cancer.

Research hypothesis
To achieve the purpose of the present study, the following hypothesis was formulated:
H_1: The total post-mean scores of the chemotherapy side effects of patients with lung cancer who receive a

designed nursing program will be different from the total post-mean scores of the chemotherapy side effects of patients with lung cancer who receive only routine hospital care.

Design

The proposed study utilized a quasi-experimental design (non-equivalent, pre-posttest control group) was employed.

Sample

A convenient sample of 60 adults with a confirmed diagnosis of primary lung cancer was collected over six months. These patients, admitted for their second chemotherapy session after completing the first round of adjuvant chemotherapy at Al-Bashir Hospital, were randomly assigned to the study and control groups, each consisting of 30 participants.

Inclusion Criteria: Participants who were receiving adjuvant chemotherapy at the first week in the second cycle, and had a first-time diagnosis of primary lung cancer.

Exclusion Criteria: Participants have been excluded incase of receiving other treatment modalities or were comatose.

Setting

The current study was conducted in Amman, the capital city of Jordan. Al-Bashir Hospital, established in 1945, is recognized as the oldest and largest hospital in the Hashemite Kingdom of Jordan. Al-Bashir Hospital boasts a capacity of 1,925 beds, making it a vital institution for both routine and specialized medical care.

Data Collection Tools

Two tools were used by the researchers based on a comprehensive review of relevant national and international tools to assess the effect of tailored nursing program on selected responses among Jordanian patients with lung cancer:

Tool 1: Demographic and Medical Data Tool (DMDS) - Tool I: This tool collected demographic information such as age, gender, marital status, education, employment, residence, smoking habits, and insurance. The medical data section included details on the patient's current, past, and family medical history, allergies, chemotherapy regimen, lungcancer duration, and vital signs such as oxygen levels, respiration, pulse, and blood pressure.

Tool II: Chemotherapy Side Effects Worksheet - Tool II: Adopted from the American Cancer Society, this tool tracked chemotherapy side effects over seven days, including symptoms like fever, chills, fatigue, nausea, and vomiting. Each item was scored on a scale from 0 (none) to 3 (severe), with a total score range of 0–51. A low score indicated that the participant's functional status was maintained despite undergoing chemotherapy. The tool demonstrated high construct, face, and discriminant validity. Its internal reliability, measured by Cronbach's alpha, was 0.89, with subscales scoring above 0.77, confirming its suitability for the study (Zhao et al., 2013; Polit & Beck, 2017).

Pilot study

In order to determine the comprehensibility, relevance, and require time consumption of using tools, an initial investigation was conducted on 10% of the targeted sample. The study tools were clear and feasible and did not need any modifications so that pilot study sample was included in the study.

Ethical considerations: Approval (IORG0006883) from the Research Ethics Committee of the Faculty of Nursing, Cairo University was conducted. Furthermore, the current study has been approved with the official authorization received from the Ethical Committee of the Al-Bashir Hospital. Signed consent was obtained from the participants who chose to participate in the study.

Procedures

The researchers conducted a thorough review of the literature and used the most recent evidence-based guidelines for lung cancer to develop a program based on the assessment of the patients' specific needs (Zhang, Lu, Fan, & Wang, 2022; Gamal, Gaber, Sheta, & Elsayed, 2023).

The nursing program was implemented according to structured protocol, consisting of three phases: preparatory, implementation, and evaluation phases.

Preparatory phase: Data were initially collected from the control group and later from the study group. The following tools were used for one-to-one interviews with patients: **Tool I** (Demographic and Medical Data Tools) and **Tool II** (Chemotherapy Side Effects Worksheet). As reported by Wang, Zimmermann, Parikh, Mansfield & Adjei, 2019), baseline data were gathered using **Tool I** and **Tool II** during the second cycle, immediately following the first session of adjuvant chemotherapy. Each patient was interviewed individually by

the researchers.

Implementation phase: During the first week of adjuvant chemotherapy, each patient was individually interviewed by the researchers. Smith et al. (2015) recommended a total weekly instruction time of two to three hours. The program addressed chemotherapy-related side effects using a simple Arabic reference manual. The program consisted of six sessions, one per day, each lasting 30 minutes, with rest periods of 5–10 minutes between sessions. All patients at Al-Bashir Hospital received a standardized treatment plan, which included adjuvant chemotherapy with antineoplastic agents, alkylating drugs, platinum analogues, and vinca alkaloids as part of routine hospital care.

Evaluation phase: Patients were followed up for two weeks. At the end of the second week was considered as the 1st post intervention reading. The reading at the end of 3rd week was considered as the 2nd post intervention.

Statistical Analysis

The investigation was carried out with the Statistical Package for the Social Sciences (SPSS) Version 27 for Windows (IBM Corp. 2020). Data Analysis: Descriptive statistics are useful for summarizing patient features and baselines including frequency, percentage, and mean± sd. Analysis of variance and t test were used. The P value was ≤ 0.05, indicating significance.

RESULTS

Finding of the current study are presented in two sections, as the following:

Section I: Describes demographic characteristics and medical data of the study and control groups (table 1, 2) were related.

Section II: Delineates hypothesis testing for being supported or not (tables 3, 6) were related.

Table 1.a: Frequency and percentage distribution of the study and control group regarding demographic data (n=60)

Items	Study group n= 30		Control group n=30		X^2	P value
	N	%	N	%		
Age (years)						
18<27	0	0	0	0	1.34	0.720
27<37	2	6.7	4	13.3		
37<47	15	50.0	15	50.0		
47<57	11	36.7	8	26.7		
>57	2	6.7	3	10.0		
Mean ± SD	46.50±8.81		46.30±8.37			
Gender						
Male	20	66.7	13	43.3	3.300	0.069
Female	10	33.3	17	56.7		
Marital status						
Married	28	93.3	27	90.0	0.218	0.640
Divorced	2	6.7	3	10.0		
Education						
-Primary school level	2	6.7	2	6.7	2.120	0.714
-Preparatory school	1	3.3	2	6.7		
-Secondary school level	7	23.3	10	33.3		
-Bachelor	19	63.3	16	53.3		
- Master	1	3.3	0	0		

P value is significant ≤ 0. 05* and P value is highly significant ≤ 0. 001** at 2-tailed

Table(1): Demonstrated that the studied sample was homogenous as there was a statistically insignificant difference have been observed among the control and study groups in terms of age, gender, income, marital status, education. Concerning the most common age range was 37 to less than 47 years, with 50% in both groups. The study group had 66.7% male participants compared to 43.3% in the control group, however the difference was not statistically significant (X²=3.30, P=0.069). Most participants were married (93.3% in the study group and 90.0% in the control group). Educational backgrounds were similar, with 63.3% of the study group holding a bachelor's degree compared to 53.3% in the control group, with no significant differences

observed (X²=2.120, P=0.714).

Table 1.b: Frequency and percentage distribution of the study and control groups regarding demographic data (n=60)

Items	Study groupn= 30		Control group n=30		X²	P value
	N	%	N	%		
Job						
Retired	7	23.3	5	16.7	3.593	0.166
Employee	16	53.3	11	36.7		
- Casual worker	7	23.3	14	46.7		
Residence						
Rural	30	100.0	28	93.3	2.069	0.150
Urban	0	0	2	6.7		
Smoking						
Yes	9	30.0	7	23.3	0.181	0.670
No	21	70.0	23	76.7		
Number of cigarettes per day						
Mean±SD	9.78±5.26		9.88±4.97		t=0.039	0.969
Are you stopped smoking						
Yes	9	100	7	100	constant	
No	0	0	0	0		
Income						
- Enough	27	90.0	29	96.7	1.07	0.301
- Not enough	3	10.0	1	3.3		

P value is significant ≤ 0. 05* and P value is highly significant ≤ 0. 001** at 2-tailed

Table(1): Demonstrated that the studied sample was homogenous as there was no statistically significant differences have been observed among the control and study groups. In terms of job status, the distribution shows that a higher percentage of the study group (53.3%) were employed compared to the control group (36.7%). However, the differences were not statistically significant differences(X² = 3.593, P=0.166). Regarding residency, all the study group were living in rural areas, while the control group had 93.3% in rural areas and 6.7% in urban areas. However, this difference was not statistically significant (X²=2.069, P=0.150). There is no significant difference in smoking habit between the study group (30.0%) and the control group (23.3%) (X²=0.181, P=0.670). The study group smoked an average of 9.78±5.26 cigarettes per day, while the control group smoked 9.88±4.97 cigarettes per day. There was no significant difference as (X²= 0.039, P=0.969). All smokers in both groups reported attempting to quit. Finally, 90.0% of the study group and 96.7% of the control group reported having enough income and there was no statistically significant difference (X²=1.07, P=0.301).

Table 2: Frequency and percentage distribution of the study and control groups regarding medical data (n=60)

Items	Study group n= 30		Control group n=30		X²	P value
	N	%	N	%		
Duration of lung cancer (Months)						
Mean±SD	4.25±1.43		4.63±1.50		1.012	0.316
Past history						
Yes	25	83.3	20	66.7	2.22	.136
No	5	16.7	10	33.3		
If yes	(n=25)		(n=20)			
- Diabetes Mellitus	18	60.0	12	60	1.491	0.222
-Hypertension	4	13.3	6	30		
-Renal diseases	3	10.0	2	10		
Family history						
Yes	26	86.7	23	76.7	1.002	.317
No	4	13.3	7	23.3		
Allergies						

Yes	2	6.7	3	10.0	0.001	0.972
No	28	93.3	27	90.0		
Vital signs						
-Oxygen saturation	92.60±1.75		92.63±1.82		t=.072	.943
-Respiration	23.10±2.50		23.67±2.78		t=.830	.410
-Pulse	76.30±6.09		75.90 ±6.29		t=.250	.803
-Systolic blood pressure	115.13±5.66		111.60±6.68		t=2.21	.031
-Diastolic blood pressure	73.83±7.80		70.97±7.02		t=1.50	.140

P value is significant ≤ 0. 05* and P value is highly significant ≤ 0. 001** at 2-tailed

Table (2): There was no significant difference in the mean duration of lung cancer between the study group (4.25 ± 1.43 months) and the control group (4.63 ± 1.50 months) (P = 0.316). Diabetes mellitus was prevalent in both groups (60%), although hypertension was more common in the control group (30%) than in the study group (13.3%) X^2= 1.491, p= 0.222. The majority of the study group (93.3%) and control group (90%) were had no allergies, with no significant difference (X^2= 0.001, P = 0.972). Regarding vital sign, there was no statistical difference between study and control groups.

Table 3.a: Comparison of study participants regarding chemotherapy side effects severity score in both study and control groups (n=60, study =30, control = 30).

Outcome Measure	Study Mean ± SD	Control Mean ± SD	t test	P value
Fever/Chills				
Baseline	1.71± 0.23	1.71± 0.24	0.199	0.843
2nd week	1.53± 0.24	1.59± 0.18	1.045	0.300
3rd week	1.06± 0.10	1.75± 0.20	17.222	<0.001**
F, (p value)	61.12 (**<0.001**)			
Fatigue (Feeling Weak)				
Baseline	2.20± 0.23	2.18 ± 0.23	0.183	0.855
2nd week	1.69± 0.33	2.19± 0.22	6.916	<0.001**
3rd week	1.24± 0.017	2.75± 0.92	8.772	<0.001**
F, (p value)	49.86 (**<0.001**)			
Nausea				
Baseline	1.88± 0.41	1.86± 0.29	0.208	0.836
2nd week	1.43± 0.26	2.01± 0.27	8.318	<0.001**
3rd week	1.11± 0.13	2.28± 0.25	23.022	<0.001**
F, (p value)	88.66 (**<0.001**)			
Vomiting				
Baseline	1.63± 0.27	1.67± 0.31	0.605	0.547
2nd week	1.40± 0.17	2.04± 0.25	11.516	<0.001**
3rd week	1.19± 0.11	2.47± 0.19	31.925	<0.001**
F, (p value)	102.63 (**<0.001**)			

P value is significant ≤ 0. 05* and P value is highly significant ≤ 0. 001** at 2-tailed

Table (3.a): Displays the mean severity scores for chemotherapy side effects in both study and control groups. There was statistical significant difference between study and control groups regarding fever at the third week (F = 61.12) while, fatigue, nausea and vomiting as (F=49.86, 88.66, 102.63 (<0.001**) respectively at the end of 2nd and 3rd week of intervention.

Cont., table (3.b): Comparison of study participants regarding chemotherapy side effects severity score in both study and control groups (n=60, study =30, control = 30).

Outcome Measure	Study Mean ± SD	Control Mean ± SD	t test	P value
Mouth Sores				
Baseline	1.40± 0.15	1.99± 0.19	0.162	0.872

2nd week	1.62± 0.31	1.64± 0.33	13.177	<0.001**
3rd week	1.19± 0.09	2.36± 0.24	25.094	<0.001**
F, (p value)	91.34 (**<0.001**)			
Diarrhea				
Baseline	1.45± 0.24	1.44± 0.26	0.023	0.982
2nd week	1.26± 0.19	1.68± 0.30	7.574	<0.001**
3rd week	1.15± 0.11	1.80± 0.39	8.814	<0.001**
F, (p value)	30.84 (**<0.001**)			
Constipation				
Baseline	1.34± 0.28	1.36± 0.30	0 .226	0.822
2nd week	1.11± 0.12	1.84± 0.22	11.554	<0.001**
3rd week	1.07± 0.11	2.09± 0.33	16.308	<0.001**
F, (p value)	63.74 (**<0.001**)			

P value is significant $\leq 0.05*$ and P value is highly significant $\leq 0.001**$ at 2-tailed

Table (3.b): Demonstrates significant differences in the severity of chemotherapy side effects between the study and control groups. Regarding mouth sores, diarrhea and constipationas (F=91.34, 30.84, 63.74 (<0.001**) respectively at the 2nd and 3rd week of intervention.

Cont., table (3.c): Comparison of study participants regarding chemotherapy side effects severity score in both study and control group (n=60, study =30, control = 30).

Outcome Measure	Study Mean ± SD	Control Mean ± SD	t test	P value
Loss of Appetite (Anorexia):				
Baseline	1.97± 0.40	1.98±0.40	0.109	0.914
2nd week	1.49± 0.18	2.17±0.26	11.068	<0.001**
3rd week	1.27± 0.10	2.61±0.27	24.923	<0.001**
F, (p value)	78.58 (**<0.001**)			
Pain or difficulty with swallowing:				
Baseline	1.69± 0.28	1.70±0.29	0.323	0.748
2nd week	1.45± 0.26	1.68±0.37	6.565	<0.001**
3rd week	1.20± 0.11	2.37±0.26	22.798	<0.001**
F, (p value)	76.12 (**<0.001**)			
Swelling (Edema) in Hands or Feet:				
Baseline	1.54± 0.30	1.53±0.28	0.053	0.958
2nd week	1.32± 0.21	1.92±0.28	9.410	<0.001**
3rd week	1.15± 0.15	2.20±0.22	21.617	<0.001**
F, (p value)	68.01 (**<0.001**)			
Allergic Reaction:				
Baseline	1.60± 0.27	1.61±0.30	0.216	0.830
2nd week	1.29± 0.19	1.78±0.31	7.539	<0.001**
3rd week	1.1±0.12	2.17±0.25	21.372	<0.001**
F, (p value)	70.94 (**<0.001**)			

P value is significant $\leq 0.05*$ and P value is highly significant $\leq 0.001**$ at 2-tailed

Table (3.c): Displays there was statistical significant difference between study and control groups regarding loss of appetite (anorexia),pain or difficulty with swallowing, swelling (edema) in hands or feet and allergic reaction as (F=78.58,76.12, 68.01,70.94 (<0.001**) respectively at the end of 2nd and 3rd week of intervention.

Cont., table (3.d): Comparison of study participants regarding chemotherapy side effects severity score in both study and control group (n=60, study =30, control = 30).

Outcome Measure	Study Mean ± SD	Control Mean ± SD	t test	P value
Itching or Rash:				
Baseline	1.49± 0.20	1.48±0.20	0.116	0.908
2nd week	1.35± 0.16	2.05±0.23	13.880	<0.001**
3rd week	1.17±0.08	2.37±0.22	28.411	<0.001**

F, (p value)	144.53 (**<0.001****)			
Shortness of Breath:				
Baseline	1.68± 0.25	1.67±0.26	0.046	0.964
2nd week	1.41± 0.19	2.20±0.20	15.300	<0.001**
3rd week	1.22± 0.11	2.47±0.33	19.829	<0.001**
F, (p value)	124.09 (**<0.001****)			
Muscle or Joint Pain:				
Baseline	1.51± 0.31	1.52±0.32	0 .071	0.944
2nd week	1.34± 0.19	2.20±0.20	13.583	<0.001**
3rd week	1.20± 0.13	2.18±0.24	19.658	<0.001**
F, (p value)	62.17 (**<0.001****)			
Numbness or Tingling in Hands or Feet:				
Baseline	1.54± 0.35	1.53±0.34	0.039	0.969
2nd week	1.28± 0.15	1.95±0.27	11.817	<0.001**
3rd week	1.15± 0.13	2.19±0.31	16.863	<0.001**
F, (p value)	55.62 (**<0.001****)			

P value is significant $\leq 0. 05^*$ and P value is highly significant $\leq 0. 001^{**}$ at 2-tailed

Table (3.d): Presents significant reductions in chemotherapy side effects in the study group. There was statistical significant difference between study and control groups regarding itching or rash, shortness of breath, muscle or joint pain and numbness or tingling in hands or feet as (F=144.53, 124.09, 62.17, 55.62 (<0.001**) respectively at the end of 2nd and 3rd week of intervention.

DISCUSSION

Lung cancer is a primary source of morbidity and mortality among patients globally, despite the medical improvements in the diagnosis and treatment of the disease. Incidence and death rates of lung cancer are constantly increasing in the developing countries due to the more common use of tobacco, increase in air pollution and industrialization. The Jordanian population is no exception to the increasing burden of lung cancer as illuminated by (Yang, Liu, Bai, Wang, & Powell, 2020)

In the current study, the studied sample was homogenous as there was no statistically significant differences between the study and control groups in terms of age, gender, income, marital status, education, smoking status, or age. This could be explained in the light of the fact that achieving homogeneity in scientific research which is critical for reducing confounding variables and improving internal validity. Researchers can better analyze the impact of interventions by ensuring that both groups have identical demographic profiles, medical data. These findings were corroborated those of a study conducted by (Du, 2022), which found that there were no statistically significant differences between two groups regarding the aspects of age,and gender. Also, Ning et al., (2021) showed that there were no significant differences in baseline characteristics between the study and control group (P ≥ 0.05).

Notably, half of both groups their age was ranged between 37 to less than 47 years, and the mean age for both the study and control groups was nearly similar, with the study group having a mean age of 46.50 years (SD = 8.81) and the control group having a mean age of 46.30 years (SD = 8.37). Also, investigation findings revealed that most of the study sample had been married and the majority had attained a bachelor's degree, more than half were employed, all the study group was from rural areas compering to the most of the control group, did not smoke, reported sufficient income, and had ceased smoking if they were previous smokers.

As regards age and gender, the study findings could be due to an increased peak of lung cancer in Jordan in males at aged of 40 to 47 years old that based on the current finding. Added to that, participants residing in rural areas had limited access to healthcare services and health education programs. Regarding income, people with high income usually had a low commitment to healthy dietary recommendations and had poor lifestyle habits, let them more susceptible to various types of cancer as a result of the strict relationship between cancer and unhealthy lifestyle habits as denoted by WHO alerts.

In the same context, a study done by Mou and Zheng (2022) reported that the mean age of the study sample was 48.34±8.23 years, and more than two-thirds were male. Similarly, Hu, Zou, Fu and Zhou (2023) pointed out that study group had a higher proportion of males. Both groups exhibit similar educational distributions, with slightly more participants having higher education.

Concerning medical data, the investigation discoveries showed that there was a statistically insignificant difference as both groups were homogenous, as represented by the following regarding duration of lung cancer, history, family history, and allergies. These findings were in agreement with Hu et al., (2023), who showed that there were no significant differences concerning comorbidity (chronic lung disease, hypertension, diabetes, hyperlipidemia, and cardiovascular disease) or pathological classification between the two groups was at (P ≥ 0.05).

In terms of past medical history, diabetes mellitus emerges as a major variable, with two third of both groups reporting its presence. Hypertension is another major variable in this context, with two third of the control group reporting its presence. A study found that significant variations in systolic blood pressure, fasting blood glucose, total cholesterol, and body weight are related to a greater risk of developing lung cancer. Moreover, acute disease was indicated by a recent diagnosis before the study, and short durations also show that lung cancer is aggressive and has a poor prognosis.

The study findings revealed that a consistent pattern across the factors examined. At baseline, both the study and control groups had equal scores, indicating that their conditions were similar. However, as the intervention progressed, in the second and third weeks, substantial differences emerged. When compared to the control group, the study group consistently showed significant improvements in all side effects, such as fever/chills, fatigue, nausea, vomiting, sore mouth, diarrhea, constipation, loss of appetite, pain or difficulty swallowing, swelling, allergic reactions, itching or rash, shortness of breath, muscle or joint pain, and numbness or tingling in hands or feet.

Chemotherapy frequently causes side effects such as fever and chills, which are common symptoms of a compromised immune system. This immunosuppression increases susceptibility to infections, and Lage et al. (2020) have demonstrated the necessity of monitoring for fever, which may suggest neutropenia, a dangerous illness requiring immediate medical care. Yu et al. (2022) backed this up by stating that close monitoring and health education can help lessen the frequency and severity of these adverse effects.

A common adverse effect was fatigue, which has a major impact on patients' quality of life. It frequently worsens as chemotherapy advances, affecting both physical and mental well-being. Karakus, Ozer, and Bozcuk's (2022) indicated that focused therapies, such as physical activity and counseling, effectively reduced weariness (p ≤.05). Also the researchers found a similarly with Spahrkas, Looijmans, Sanderman, and Hagedoorn (2020) found that web-based support greatly reduced fatigue and improved patient outcomes. Fatigue is a persistent condition that requires continuing management since it can impair everyday functioning, raise distress, and lower the patient's drive for self-care.

Researchers retrieved that Nausea and vomiting are common side effects of chemotherapy and Soh, Ho, Ho, and Tam (2020) and Rha, Nam, and Lee (2020) added that these signs and symptoms can significantly reduce appetite and general quality of life. Also they founded that antiemetic drugs and dietary changes can often effectively manage these adverse effects. However, approaches such as behavioral therapies have proven promise in reducing nausea. Martin, Loomis, and Dean (2021) emphasized the necessity of treating these symptoms early on, since prolonged nausea can lead to dehydration and malnutrition, aggravating the patient's recovery.

Researchers explained increasing of mouth sores that is dramatically related to the counter attacking of chemotherapy against the highly multiplicated body cells and the mucosa is counting one of these body cells, often known as mucositis, which is a painful and uncomfortable side effect. Chen et al., (2020) reported that oral care procedures dramatically reduced the severity of mucositis in cancer patients, especially when paired with nutrition support. Managing mucositis is critical not just for patient comfort, but also for preventing subsequent infections that can jeopardize health.

The researchers clarified that gastrointestinal side effects such as diarrhea and constipation are common with chemotherapy. While diarrhea is frequently associated with the medications' direct effects on the gastrointestinal tract, constipation can develop from decreased physical activity, gastrointestinal motility and opioid use for pain management. Quist et al. (2020) found that dietary changes and frequent hydration reduced symptoms for both disorders, however thorough monitoring of bowel function is critical to avoid consequences such as dehydration from diarrhea or bowel blockage from constipation.

Unfortunately, loss of appetite might cause malnutrition, slowing recovery and increasing the likelihood of treatment delays. Rha et al. (2020) indicated that counseling and individualized nutrition regimens improved appetite and overall nutritional status in patients receiving chemotherapy. Loss of appetite is complex, frequently associated with nausea, changed taste, and psychological load of cancer therapy, emphasizing the importance of holistic care.

Dysphagia is typically caused by mucositis or esophagitis that could lead to deficiency in nutritional intake according to the current research. Bade et al., (2021) were agreed that pain management and the use of relaxing medications, can help alleviate these problems. Emphasized that the progressive nature of these symptoms, if not treated, can result in severe malnutrition and weight loss.

Edema in the current study result was captured that explained as chemotherapy consequence. Kırca and Kutlutürkan (2021) reported that frequent exercise and compression therapy reduced edema and improved patient comfort. Edema can also be an indication of kidney or cardiac problems, emphasizing the importance of regular monitoring.

Allergic responses, which might present as itching, rash, or anaphylaxis, are uncommon but potentially fatal adverse effects. To avoid serious consequences, the researchers emphasized that these reactions must be closely monitored throughout chemotherapy sessions and treated with antihistamines or steroids. On the other hand,

Yang et al., (2020) stated that personalized treatment regimens are required to reduce the likelihood of allergic responses.

Dyspnea is frequently link to lung toxicity or fluid retention as chemotherapy side effects and lung disease progression as observed during the study. Chen et al., (2020) were agreed with current research explanation as they reported that stressed the relevance of exercise and respiratory therapy for increasing lung function and reducing dyspnea. Dyspnea may develop as the disease progresses, as shown by Martin et al., (2021), making it critical to distinguish between side symptoms and cancer progression.

Muscle and joint discomfort are other common problems associated with chemotherapy. Quist et al., (2020) found that physical treatment and regular exercise could greatly reduce these symptoms while increasing mobility and quality of life. Furthermore, pain management is an important element of care to ensure that patients may go about their everyday activities without discomfort.

As explained by the researchers, numbness in the hands/feets, might be caused by chemotherapy that induced nerve damage. This side effect can severely impede participant functionality and may last long after treatment is completed. Kırca and Kutlutürkan (2021) are on the same line as they believed that implementing preventative methods, such as dose modifications and supportive therapy like vitamin supplements, can lower the occurrence and severity of neuropathy. Addressing these side effects holistically increases patient comfort while also increasing adherence to chemotherapy regimens, since patients are less likely to terminate treatment due to adverse effects.

To conclude, the researchers explained the overall findings of the current study support the importance in treating chemotherapy side effects. Tailored care, which includes physical therapies, psychological support, dietary changes, and close monitoring of disease symptoms, can greatly lessen the severity of these side effects, resulting in better patient outcomes and overall well-being. Many chemotherapy-related side effects are progressive, necessitating proactive care, especially because symptoms could increase over time if it was not treated properly.

CONCLUSION

A tailored nursing program was effective in reducing chemotherapy side effects as GIT manifestation, edema, mouth sore and allergic reaction among Jordanian patients as shows there was statistical significant difference between study and control groups that support the hypothesis testing of the current study.

Recommendations
1. Develop and implement nursing care plan that be tailored with different with patients' needs that addressing specific side effects of chemotherapy and its symptoms management.
2. Provide ongoing teaching and training program for nurses on managing common side effects of patients with lung cancer treatment.
3. Conduct regular assessment of participants' side effects and overall well-being to adjust care plan as needed and address any emerging issues promptly.
4. Replication of the study on a larger sample size.

Limitations of the study
1. The study was limited to a specific context, therefore it may not be representative of other care environments
2. Measuring the vital signs at once that was only during patient's admission.

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