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Adverse effects associated with chemotherapy in cancer patients: a survey from Hillah (Iraq)

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ABSTRACT

Most cancer patients undergo at least one type of chemotherapy, which is often accompanied by a wide range of adverse effects, from mild symptoms such as nausea, vomiting, and hair loss to life-threatening complications. This retrospective cross-sectional study utilized a paper-based questionnaire targeting cancer patients receiving chemotherapy at the Oncology Center of the Imam Sadiq Teaching Hospital and at the Marjan Medical City Hospital in Hillah, Iraq. The study was conducted between December 6, 2022, and April 30, 2023. A total of 64 patients, aged 1 to 80 years, participated in the study. The most represented age groups were 61–70 years (26.56%), 41–50 years (25%), and 51–60 years (23.43%). The sample included 59.37% females and 40.62% males. Various cancer types were reported, with breast cancer being the most prevalent (40.62%). Both adjuvant and neoadjuvant chemotherapy protocols were documented. Twenty-three distinct adverse effects were identified; the most common included fatigue, exhaustion, and loss of energy (76.56%), anorexia (62.5%), bone and muscle pain (62.5%), vision disorders (57.81%), drowsiness and prolonged sleep (54.69%), sleep disorders (51.56%), as well as nausea and vomiting (50%). All cancer patients (100%) experienced at least one adverse effect as a results of the chemotherapy they received.

1. Introduction

Although chemotherapy improves cancer patient survival and enhances quality of life, its toxicity remains a significant concern. Chemotherapy

PHARMAKEFTIKI, 37, 2S, 2025 | 140-143

is associated with a wide spectrum of adverse effects, ranging from mild symptoms such as nausea, vomiting, and hair loss to more severe and potentially life-threatening complications, including febrile neutropenia, bone marrow suppression, acute oral mucositis, and sepsis. These adverse effects may arise due to the resistance of cancer cells to chemotherapy and their structural and functional similarities to normal cells. The severity and nature of chemotherapy-induced adverse effects vary depending on the specific agents used. These effects may be short-term, long-term, or delayed, while not all chemotherapeutic agents produce the same side effects. Alarmingly, some adverse effects may manifest late and pose serious health risks[1,2]. Given the limited number of Iraqi studies in this field, the present study aimed at assessing the adverse effects of chemotherapy among cancer patients during treatment.

2. Methodology

This retrospective cross-sectional study was based on a paper-based questionnaire administered to cancer patients receiving chemotherapy at the Oncology Center of the Imam Sadiq Teaching Hospital and at the Marjan Medical City Hospital in Hillah, Iraq. The study was conducted from December 6, 2022, to April 30, 2023. A chi-squared test was used in order to identify statistically significant relationships between the assessed variables. Patients who provided oral consent were interviewed prior to the administration of their chemotherapy dose, with consideration given to their psychological state. Patients undergoing concurrent radiotherapy and chemotherapy were excluded so as to avoid confounding effects due to overlapping side effects. Ethical approval for the study was granted by the Ethics Committee of the College of Pharmacy of the University of Babylon (approval number: A-0045; date: February 9, 2025).

3. Results and Discussion

In recent years, surveys of cancer patients have provided more accurate and realistic insights into the adverse effects of chemotherapy than those obtained solely from clinical trials[3]. A total of 64 patients, aged 1 to 80 years, participated in the study. The most represented age groups were 61–70 years (26.56%), 41–50 years (25%), and 51–60 years (23.43%). The sample included 59.37% females and 40.62% males.

A variety of cancer types were recorded, with breast cancer being the most prevalent (26 patients; 40.62%), followed by lung and bladder cancer (8 patients each; 12.5% each), brain cancer (6 patients; 9.37%), and liver, ureteral, and shoulder cancers (2 patients each, 3.12% each). Other cancers included colon, eye, small bowel, kidney, throat, lymph node, hand, and uterine cancers (1 patient each; 1.56% each). Notably, the Iraqi Cancer Council's 2022 annual report has also identified breast cancer as the most common cancer type in Iraq[4].

As far as the timing of chemotherapy initiation is concerned, 42 patients (65.6%) received chemotherapy after cancer resection surgery, while 22 patients (34.4%) received it beforehand. Chemotherapy is often administered in conjunction with surgery or other treatments such as radiotherapy, targeted therapy, or immunotherapy. Neoadjuvant chemotherapy, given before surgery, aims at shrinking tumours and facilitating less invasive, more effective surgical procedures. In contrast, adjuvant chemotherapy, administered postoperatively, targets residual cancer cells in order to reduce the risk of recurrence or metastasis[1]. No anti-cancer therapy is entirely free of toxicity. In this study, 23 distinct adverse effects were reported, and all patients (100%) experienced at least one, which often hindered treatment adherence and increased the likelihood of discontinuation. Due to differences in study conditions, timeframes, and populations, a direct comparison of adverse effect incidence rates with those of other studies is challenging.

Table 1 presents the most frequently reported adverse effects of chemotherapy identified by our study. Previous studies have shown that females are more susceptible to chemotherapy-related fatigue, influenced by factors such as inflammation, neuroticism, insomnia, pain, and depression[3,5]. A loss of appetite may result from nausea, vomiting, oral ulcers, altered taste, or psychological distress. Chemotherapy-induced alopecia typically begins at 2–3 weeks after treatment initiation, as rapidly dividing hair follicle cells are dam-

PHARMAKEFTIKI, 37, 2S, 2025 | 140-143

Table 1. Adverse effects associated with chemotherapy among the patients participating in our study.

Adverse effects	**Frequency (%)**	**Association with sex** (*p*-value)	**Association with age** (*p*-value)
Fatigue, exhaustion, and feeling of loss of energy	49 (76.56%)	0.702	0.603
Anorexia	40 (62.50%)	0.6	0.72
Bone and muscle aches	40 (62.50%)	0.501	0.561
Vision disorders	37 (57.81%)	0.6	0.79
Drowsiness and prolonged sleep	35 (54.69%)	0.609	0.54
Sleep disorders	33 (51.56%)	0.59	0.6
Nausea and vomiting	32 (50.00%)	0.55	0.61
Immunodeficiency	30 (46.88%)	0.7	0.78
Stomach and intestinal ache (spasms)	28 (43.75%)	0.59	0.71
Feeling of bloating and an increase in the size of the abdomen	26 (40.63%)	0.7	0.77
Vertigo	25 (39.06%)	0.901	0.56
Nail pigmentation	25 (39.06%)	0.8	0.81
Itching and skin sensitivity	25 (39.06%)	0.5	0.89
Headaches	24 (37.50%)	0.95	0.59
Hyperglycaemia	17 (26.56%)	0.508	0.76
Ulcers and pain in the mouth	16 (25.00%)	0.8	0.88
Loss of hair, eyelashes, and eyebrows	15 (23.44%)	0.605	0.78
Anaemia	12 (18.75%)	0.508	0.66
Hypertension	11 (17.19%)	0.94	0.9
Kidney problems	10 (15.63%)	0.55	0.9
Nail loss	9 (14.06%)	0.507	0.93
Heart problems	7 (10.94%)	0.803	0.57
High blood cholesterol	6 (9.38%)	0.501	0.915
How long do adverse effects last?			
Duration of adverse effects	**Frequency (%)**		
More than a week	35 (54.68%)		
A week	22 (34.38%)		
Less than a week	7 (10.94%)		

aged by cytotoxic agents[6].

As shown in Table 1, no statistically significant relationships were found between the reported adverse effect rates and the patients' sex or age. However, other studies have reported significant associations between adverse effects and the type or mechanism of chemotherapy used[2].

Explanations for the toxicity exerted by chemotherapy vary. Commonly cited mechanisms include systemic DNA damage, inflammation in healthy tissues, and direct cytotoxicity to normal cells. Recent studies have proposed that chemotherapy may induces double-strand DNA breaks and activate inflammatory and apoptotic pathways, thereby contributing to its toxic effects[7].

Finally, as far as the duration of adverse effects is concerned, patients were categorized into three groups: 54.68% of them experienced symptoms lasting more than one week, 34.38% of them experienced symptoms that lasted for one week, and 10.94% of them experienced symptoms that lasted for less than one week (Table 1). Although the half-life of most chemotherapeutic agents is approximately 24 h, their toxic effects may persist for 2–3 weeks, depending on the patient and the specific chemotherapy regimen followed.

PHARMAKEFTIKI, 37, 2S, 2025 | 140-143

4. Conclusion

This survey-based study has documented chemotherapy-associated adverse effects in a realistic clinical context, thereby contributing to a better understanding of patient experiences and treatment outcomes in Iraq. Incorporating routine surveys of chemotherapy-related adverse effects into standard clinical practice has become essential. Such assessments can support the timely identification and management of side effects, thereby improving patients' emotional well-being and enhancing adherence to chemotherapy regimens.

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Conflicts of interest

None exist.

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