



Prevalence of Physical and Psychological Effects of Chemotherapy and its association with Prostate Cancer Patients' Knowledge

مدى انتشار التأثيرات الجسدية والنفسية للعلاج الكيميائي وارتباطه
بمعارف مرضى سرطان البروستات

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Abstract

Background: prostate cancer is one of the most common cancer affecting men globally. Chemotherapy remains an essential method for treating advance and metastatic prostate cancer. Although the benefits, chemotherapy have many physical and psychological side effects on cancer patients that effect on patients' quality of life.

Objectives: This study aims to identify the prevalence of physical and psychological effects of chemotherapy and its association with prostate cancer patients' knowledge.

Methods: An descriptive correlational study was conducted to assess prevalence of physical and psychological effects of chemotherapy and its association with prostate cancer patients' knowledge. The study conducted from the period of 15th March 2024 up to 1st March 2025. A non-probability (convenience sampling) was used to select the study. The sample of the study consist of 50 patients diagnosed with prostate cancer receiving chemotherapeutic agents. A self-administration constructive questionnaire was used. The questionnaire composed of; Part one: Socio-demographic data of the study sample, Part two: Clinical Data, Part three: physical and psychological effects of chemotherapy, and part four: patients' knowledge regarding managing side effects of chemotherapy. The data were collected and analyzed by using SPSS version 26.

Results: the most prevalent physical effects of chemotherapy among patients were; fatigue, nausea and vomiting. And common

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psychological effects of chemotherapy were decreased libido as well as depression among prostate cancer patients.

Conclusions: the study findings that the correlation of patients' knowledge was weak correlation with prevalence of physical and psychological effects of chemotherapy.

Recommendations: the study recommended to develop an instructional program related to managing the side effects of chemotherapy for prostate cancer patients, supervised by healthcare providers consisting of doctors, pharmacists and nurses. As well as conduct a study to explore another factors correlated to the prevalence of side effects of chemotherapy.

Keywords: Prevalence, Prostate cancer, Knowledge, Side effects, Chemotherapy

خلفية الدراسة: يعد سرطان البروستات أحد أكثر أنواع السرطانات شيوعاً بين الرجال على مستوى العالم. يعتبر العلاج الكيميائي طريقة أساسية لعلاج سرطان البروستات المتقدم والنقيلي. على الرغم من فوائده، إلا أن العلاج الكيميائي له العديد من الآثار الجانبية الجسدية والنفسية على مرضى السرطان والتي تؤثر على جودة حياة المرضى.

الأهداف: تهدف هذه الدراسة إلى تحديد انتشار التأثيرات الجسدية والنفسية للعلاج الكيميائي وارتباطه بمعارف مرضى سرطان البروستات.

المنهجية: أجريت دراسة وصفية ارتباطية لمعرفة انتشار التأثيرات الجسدية والنفسية للعلاج الكيميائي وارتباطه بمعارف مرضى سرطان البروستات. أجريت الدراسة من الفترة من ١٥ مارس ٢٠٢٤ حتى ١ مارس ٢٠٢٥. تم استخدام عينة غير احتمالية (عينة ملائمة) لاختيار عينة الدراسة والتي تتكون من ٥٠ مريضاً تم تشخيص إصابتهم بسرطان البروستات ويتلقون ادوية العلاج الكيميائي. تم استخدام استبيان بناء ذاتي الملئ. يتكون الاستبيان من أربعة أجزاء: الجزء الأول: البيانات الاجتماعية والديموغرافية لعينة الدراسة، الجزء الثاني: البيانات السريرية، الجزء الثالث: الآثار الجسدية والنفسية للعلاج الكيميائي، والجزء الرابع: معارف المرضى فيما يتعلق بإدارة الآثار الجانبية للعلاج الكيميائي. تم جمع البيانات وتحليلها باستخدام برنامج SPSS الإصدار ٢٦.

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النتائج: كانت الآثار الجسدية الأكثر انتشارًا للعلاج الكيميائي بين المرضى هي التعب والغثيان والقيء. وكانت الآثار النفسية الشائعة للعلاج الكيميائي هي انخفاض الرغبة الجنسية وكذلك الاكتئاب بين مرضى سرطان البروستات.

الاستنتاجات: توصلت الدراسة إلى أن ارتباط معارف المرضى كان ارتباطًا ضعيفًا بالآثار الجسدية والنفسية للعلاج الكيميائي.

التوصيات: أوصت الدراسة بتطوير برنامج إرشادي يتعلق بإدارة الآثار الجانبية للعلاج الكيميائي لمرضى سرطان البروستات، بإشراف مقدمي الرعاية الصحية من الأطباء والصيادلة والممرضين، وكذلك إجراء دراسة لاستكشاف عوامل أخرى مرتبطة بانتشار الآثار الجانبية للعلاج الكيميائي.

الكلمات المفتاحية: انتشار، سرطان البروستات، معارف المرضى، الآثار الجانبية، العلاج الكيميائي.

1. Introduction:

Prostate cancer (PC) considered major issues affecting men worldwide. Prostate Cancer defined as a malignancy tumor that originates within the cellular structure of the prostate gland. The majority of prostate carcinomas initiate in the epithelial cells that encapsulate the prostate gland; these neoplasms are classified as acinar adenocarcinomas. A significant number of these neoplasms exhibit a remarkably indolent growth pattern and are not predisposed to metastasis; however, certain variants may exhibit a more accelerated growth rate (ESMO 2022). Prostate cancer is recognized as the most prevalent neoplasm globally, contributing significantly to the overall incidence of cancer-related mortality (Culp 2020).

Although there are several modalities for treating prostate cancer, chemotherapy remain an effective way for treating advance cases. The adverse effects of cancer chemotherapy can be either acute or long-term and require monitoring. Furthermore, it necessitates multi-disciplinary oversight, as certain patient demographics may be more susceptible to problems. Comprehension of symptom management related to chemotherapy

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among cancer patients can enhance quality of life, alleviate adverse symptoms, and facilitate palliative effects. Chemotherapy can be used to manage cancer patients to palliate symptoms of cancer by shrinking the tumor (Abid and Mohammed 2023). Chemotherapy have several name, including anticancer, antineoplastic agent or cytotoxic drugs. The function of cytotoxic drugs is the treatment of malignant tumors including prostate cancer (Hussein and Mansour 2019). Chemotherapy agents may induce side effects, according the specific type and dosage administered, as well as the duration of the treatment. Chemotherapy induces numerous side effects and severe problems that impact the physical, psychological, social, and spiritual aspects of patient's life, potentially altering their functioning for extended periods, ranging from months to years. Consequently, patients require knowledge regarding chemotherapy treatment and scheduling, potential side effects, and self-care requirements. (Abu El-Kass et al 2021). According to Aslam et al., the reported side effects most commonly included weakness (95%), fatigue (90%), nausea (77%), alopecia (76%), and emesis (75%). Each of these adverse effects was reported by over 70% of the patients. Additional notable side effects encompassed mucositis, xerostomia, and paresthesia, whereas diarrhea, abdominal cramping, and cognitive dysfunction were recorded as less prevalent adverse events. Furthermore, other side effects not outlined were also reported by certain patients, specifically pyrexia, constipation, mood fluctuations, and weight reduction (Aslam 1014).

The deficiency of knowledge regarding chemotherapy treatment and the management of associated adverse effects may lead to higher hospital admissions, increased morbidity, and diminished quality of life for cancer survivors. Conversely, enhanced understanding of chemotherapy side effects can improve self-care practices for managing these effects, thereby contributing to an improved quality of life (Gomez et al 2021). Cancer patients require information to recognize the side effects associated with chemotherapy and the appropriate actions to mitigate them. The provision of adequate pre-chemotherapy information, encompassing side effects and self-care strategies, has been shown to mitigate

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specific treatment-related concerns and improve physical and psychosocial outcomes (Aranda et al 2012). Research involving cancer patients indicated that the side effects of chemotherapy and their management were prioritized among the necessary information. A local survey indicated that the management and prevention of possible side effects were identified as the most significant treatment-related informational needs, alongside the rationale for treatment and its efficacy against cancer. There exists a persistent disparity between the actual needs of patients and the information supplied by healthcare professionals (Lei et al 2011). Patients adherence and self-management to the treatment plan still essential part of health outcome that challenge the caregivers. (Al-Ganmi et al., 2024).

2. Objectives of the study:

- To determine the most prevalent physical and psychological effects of chemotherapy among patients with prostate cancer
- To assess knowledge of the patients regarding management side effects of chemotherapy.
- To find the association between prevalence of physical and psychological effects of chemotherapy with patients' knowledge.

3. Methodology:

A descriptive correlational study was conducted to assess prevalence of physical and psychological effects of chemotherapy and its association with prostate cancer patients' knowledge. A non-probability (convenience sampling) was used to select the study. The sample of the study consist of 50 patients diagnosed with prostate cancer arriving the center of oncology and hematology in Kirkuk city for receiving chemotherapeutic agents. The study conducted from the period of 15th March 2024 up to 1st March 2025. A self-administration constructive questionnaire was used. The questionnaire composed of; Part one: Socio-demographic data, Part two: Clinical Data, Part three: physical and psychological effects of

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chemotherapy reported by patients, and part four: patients' knowledge regarding managing side effects of chemotherapy. Validity of the instrument done by presenting the questionnaire and program to panel of fifteen experts from variety in nursing specialties related to the field of the present study. The internal consistency and test- retest methods were used to determine the reliability of questionnaire in current study (0.75). Data collection were conducted by interviewing techniques individually with the participants. The data were collected and analyzed by using SPSS version 26. Data analyzed by utilization of descriptive statistics; (frequency, percentage, mean, and standard deviation). And inferential statistics; (Pearson correlation).

4. Results:

Table (1): Distribution of Patients according to their Socio-demographic Characteristics (N=50)

No.	Characteristics	f	%	
1	Age (year)	54 – 59	9	18
		60 – 65	16	32
		66 – 71	25	50
		Total	50	100
2	Level of education	Not read & write	11	22
		Read & write	9	18
		Primary	5	10
		Intermediate	7	14
		Secondary	5	10
		Diploma	6	12
		Bachelor +	7	14
		Total	50	100
3	Occupation	Employee	6	12
		Self-employee	25	50
		Retired	10	20
		Jobless	9	18
		Total	50	100
4	Self-learning	No	37	74
		Yes	13	26
		Total	50	100

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5	Learning source	None	37	74
		Scientific website	2	4
		Social network	2	4
		Doctor/nurse	2	4
		Book/magazine	0	0
		More than one	7	14
		Total	50	100

No: Number, f: Frequency, %: Percentage

The analysis in table 1 indicates the majority of patients fall within the 66–71 age range (50%). A notable percentage of patients have low educational level (22%). concerning occupational status, a significant proportion of patients (50%) are self-employed. The patients reported that they not engaging in self-learning (74%).

Table (2): Distribution of Patients according to their Clinical Variables (N=50)

No.	Variables		f	%
1	Cancer duration	1 – 3 years	34	68
		4 – 6 years	16	32
		Total	50	100
2	Duration of chemotherapy	< 1 year	21	42
		1 – 2 year	17	34
		3 – 4 years	11	22
		5 < years	1	2
		Total	50	100
3	Type of chemotherapy	Taxotere	29	58
		Carboplastin	6	12
		Carbazitaxel	8	16
		Gemzar	3	6
		Doctaxel	4	8
		Total	50	100
4	Chronic disease	No	29	58
		Yes	21	42
		Total	50	100
	Type of disease	None	29	58

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5		Hypertension	7	14
		Diabetes	7	14
		Other	7	14
		Total	50	100
6	Family history of prostate ca	No	33	66
		Yes	17	34
		Total	50	100

No: Number, f: Frequency, %: Percentage.

The table (2) reveals that most of patients have been dealing with prostate cancer for 1–3 years (68%). The duration of chemotherapy refers that most patients have been undergoing chemotherapy for less than 1 year (42%). The most commonly used chemotherapy drug is Taxotere with (58%) of patients receiving this treatment. Regarding chronic disease, a majority of patients do not have chronic diseases (58%). Regarding family history of the patients, there were (34%) of the patients were family history of prostate cancer.

Table (3): Distribution of Patients according to physical and psychological Effect of Chemotherapy (N=50).

No.	Physical effect of chemotherapy		f	%
1	Fatigue	No	22	44
		Yes	28	56
2	Nausea and Vomiting	No	21	42
		Yes	29	58
3	Diarrhea or Constipation	No	34	68
		Yes	16	32
4	Loss of appetite	No	34	68
		Yes	16	32
5	Mouth sore	No	39	78
		Yes	11	22
6	Taste and smell changes	No	39	78
		Yes	11	22
7	Weight change	No	36	72
		Yes	14	28

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8	Hair loss	No	40	80
		Yes	10	20
9	Easy bleeding or bruising	No	40	80
		Yes	10	20
10	Infection and weak immunity	No	30	60
		Yes	20	40
11	Pain (headache, muscle pain)	No	34	68
		Yes	16	32
12	Skin and nail color change	No	40	80
		Yes	10	20
13	Skin irritation, dryness	No	46	92
		Yes	4	8
14	Peripheral neuropathy	No	32	64
		Yes	18	36
15	Abnormal urinary pattern	No	31	62
		Yes	19	38
No.	Psychological effect of chemotherapy		F	%
1	Thinking change	No	34	68
		Yes	16	32
2	Memory change	No	30	60
		Yes	20	40
3	Social problem	No	33	66
		Yes	17	34
4	Erectile dysfunction	No	35	70
		Yes	15	30
5	Decreased libido	No	22	44
		Yes	28	56
6	Sleep disturbance	No	32	64
		Yes	18	36
7	Anxiety	No	32	64
		Yes	18	36
8	depression	No	24	48
		Yes	26	52

Table (3) highlights the distribution of current physical and psychological effects of chemotherapy among study samples: *Fatigue* (56%), *Nausea*, and *Vomiting* (58%) are common physical

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effects that the patients experiencing. *Infection and Weak Immunity* show (40%) of patients reporting this side effects. Skin irritation were revealed less physical effects of chemotherapy among participants. Regarding psychological effects of chemotherapy; the study samples were demonstrating *decreased libido* (56%) and *depression* (52 %) the most psychological symptom the patients reporting.

Table (4): Assessment of Patients' Knowledge about Management Side Effect of Chemotherapy.

No.	Knowledge about side effect on;	Mean	SD	Ass.
1	Gastrointestinal	3.16	.871	Poor
2	Blood	2.14	.646	Poor
3	Nervous System	1.64	.825	Poor
4	Urinary System	1.88	.845	Poor
5	Immune System	1.54	.883	Poor
6	Integumentary System	2.26	.886	Poor

M: Mean, SD: Standard deviation, Ass: Assessment

Table (4) shows the level of knowledge of prostate cancer patients, which exhibit that knowledge of the samples was poor for all sections of the questionnaire.

Table (5): Correlation between patients' knowledge and physical and psychological effects of chemotherapy.

Correlation		Patients knowledge	Physical and Psychological effects
Patients knowledge	Pearson correlation	1	.164
	Sig. (2-tailed)		.489
	N	50	50
Physical and Psychological effects	Pearson correlation	.164	1
	Sig. (2-tailed)	.489	
	N	50	50

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Table (5) shows that the correlation of patients' knowledge was weak correlation with prevalence of physical and psychological effects of chemotherapy at $p\text{-value} < 0.05$.

5. Discussion:

The present study aims to identify the prevalence of physical and psychological effects associated with chemotherapy and determine their association with patients' knowledge of side effect management. Side effects of chemotherapy are an important issue for cancer specialists, as it causes many undesirable effects among patients. oncologist, pharmacists and nursing oncology are interested in educating patients about self-management the side effects of chemotherapy. The overall knowledge score in the current findings revealed inadequate knowledge for all section of the questionnaire. Knowledge play an important role in patients' experience. According to the study conducted by Majeed and Atiyah were revealed poor knowledge among patients regarding screening of prostate cancer and contributing factors (Majeed and Atiyah 2021). The findings of the present study exhibit inadequate knowledge concerning management side effect of chemotherapy of gastrointestinal system especially in given anti-emetics before session of chemotherapy and dividing meals to six small meals. The results similar with Cope 2022 that indicates despite of advances in medication to prevent nausea and vomiting affect most patients undergoing chemotherapy (Cope 2022). Also patients exhibit insufficient knowledge regarding managing side effects of chemotherapy for integumentary system as in items of regrow of hair within 4-12 months after completing session of chemotherapy and protect the sensitive scalp after chemotherapy by using hat. Several techniques the healthcare providers can be assumed to ease chemotherapy-induced side effects for patients with cancer (Al-Jubouri et al 2021).

Regarding side effects related to chemotherapy, most patients experience side effects which may include nausea, vomiting, fatigue, hair loss, and infection (Mohammed and Aburaghif 2018)

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(Odah and Hattab 2023). Most cancer patient experiencing physical side effects of chemotherapy as well as social and psychological aspects (Sagt et al 2016). The findings of the current study exhibit that fatigue, nausea and vomiting as a physical effects of chemotherapy were most reported among participants, weak immunity also reported as moderately prevalent among patients. Studies found similar findings in which chemotherapy induced side effects; fatigue, nausea and vomiting were mostly experienced by patients (Yao et al 2017). Altun and Sonkaya conducted a descriptive study on cancer patients receiving chemotherapy after the first session. Their study confirmed that the most common side effects of chemotherapy were nausea, vomiting, and fatigue. The results of the study found the most prevalent psychological effect of chemotherapy were decreased libido and depression among cancer patients (Altun and Sonkaya 2018). According to a cross-sectional study conducted on cancer patients to identify the psychological effects of chemotherapy, they found that approximately a quarter of the sample suffers from psychological side effects of chemotherapy, including anxiety and depression (El Kheir and Ibrahim 2019) (Kingsely et al 2024).

According to the results of the study, patients' knowledge about the treatment of side effects of chemotherapy was inadequate for overall parts of the questionnaire and the relationship between knowledge and the prevalence of side effects of chemotherapy was very weak. This means that patient knowledge is not significant in the prevalence of side effects of chemotherapy. There may be other factors that are important in the prevalence of physical and psychological side effects of chemotherapy, such as the patient's health status or medical follow-up of the patient.

References:

European Society for Medical Oncology (ESMO), what is Prostate cancer, Introduction to prostate cancer, 2022, 4, available at <https://www.esmo.org/content/download/6630/115205/1/EN-Prostate-Cancer-Guide-for-Patients.pdf>

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- Culp M, Soerjomataram I, Efstathiou J, Bray F, Jemal A. Recent global patterns in prostate cancer incidence and mortality rates. *Eur Urol* 2020; 77:38–52.
- Abid J, Mohammed W, Effectiveness of an Instructional Program on Patients' Knowledge about Home Safety While Receiving Anti - Cancer Medications at Al- Karama Teaching Hospital in Al-Kut City. (2022). *Iraqi National Journal of Nursing Specialties*, 34(2), 8-15. <https://doi.org/10.58897/injns.v34i2.571>
- Hussein B, Mansour K, (2019). Effectiveness of an educational program on nurses' knowledge regarding management of extravasation vesicant intravenous chemotherapy at oncology centers in Baghdad city. *Iraqi National Journal of Nursing Specialties*. 32(2):75-86. <https://doi.org/10.58897/injns.v32i2.338>
- Abu El-Kass S, Ragheb M, Hamed S, Turkman A, Zaki A., Needs and self-care efficacy for cancer patients suffering from side effects of chemotherapy. *J Oncol*. 2021; 2021:8880366.
- Aslam, M., Naveed, S., Ahmed, A., Abbas, Z., Gull, I. and Athar, M. Side Effects of Chemotherapy in Cancer Patients and Evaluation of Patients Opinion about Starvation Based Differential Chemotherapy. *Journal of Cancer Therapy*, 2014, 5, 817-822.
- Gomez D, Calderón C, Carmona-Bayonas A, et al. Impact of adjuvant therapy toxicity on quality of life and emotional symptoms in patients with colon cancer: a latent class analysis. *Clin Transl Oncol*. 2021;23(3):657-662.
- Aranda S, Jefford M, Yates P, et al. Impact of a novel nurse-led prechemotherapy education intervention on patient distress, symptom burden, and treatment-related information and support needs: results from a randomised, controlled trial. *Ann Oncol*, 2012, 23, p: 222-31.
- Lei C, Har Y, Abdullah K. Informational needs of breast cancer patients on chemotherapy: differences between patients' and nurses' perceptions. *Asian Pac J Cancer Prev*, 2011, 12, p: 797-802.
- Al-Ganmi AHA, Majeed HM, Najm MA. Experiences of Nurses in Providing Care for Patients on the Cancer Journey: A Cross-Sectional Survey. *The Malaysian Journal of Nursing*. 2024;16(1):212-9. <https://doi.org/10.31674/mjn.2024.v16i01.021>
- Mohammed A, Aburaghif L, (2018). Effectiveness of Teaching Program on Nurses' Knowledge Concerning the Side Effects of Chemotherapy among Children with Leukemia at Oncology Wards in Baghdad City. *Iraqi National Journal of Nursing Specialties*. 31(1):14-23. <https://doi.org/10.58897/injns.v31i1.288>

Prevalence of Physical and Psychological Effects of Chemotherapy and its association with Prostate Cancer Patients' Knowledge

- Odah Q. Hattab W. Effectiveness of an Educational Program on Nurses' Knowledge Toward Early Prediction of Acquired Weakness in The Intensive Care Unit. (2023). *Iraqi National Journal of Nursing Specialties*, 36(1), 27-34. <https://doi.org/10.58897/injns.v36i1.653>
- Sagt KR, Qassim WJ, Abed RI. Assessment of psychosocial aspects of patients with rectal cancer under chemotherapy in Baghdad city. *Journal of Contemporary Medical Sciences*. 2016;2(6):36-41. Retrieved from <https://www.jocms.org/index.php/jcms/article/view/69>
- Majeed HM, Atiyah HH. Assessment of employees' knowledge concerning contributing factors and early detection for Prostate Cancer in Baghdad University Colleges in Bab-Almudam. *Indian Journal of Forensic Medicine & Toxicology*. 2021;15(1):1712-7. <https://doi.org/10.37506/ijfmt.v15i1.13656>
- Cope, D. Clinical Updates in Nausea and Vomiting. *Semin. Oncol. Nurs.* 2022, 38, 151249.
- Al-Jubouri M, Isam S, Hussein S, Machuca-Contreras F. Recitation of quran and music to reduce chemotherapy-induced anxiety among adult patients with cancer: A clinical trial. *Nursing open*. 2021 Jul;8(4):1606-14 <https://onlinelibrary.wiley.com/doi/full/10.1002/nop2.781>
- Yao, Y., Ji, C., He, Y., & Pan, Y. (2017). Relationship between *Helicobacter pylori* infection and vomiting induced by gastrointestinal cancer chemotherapy. *Internal Medicine Journal*, 47(7), 792-797. <https://doi.org/10.1111/imj.13428>
- Altun İ, Sonkaya A. The Most Common Side Effects Experienced by Patients Were Receiving First Cycle of Chemotherapy. *Iran J Public Health*. 2018 Aug;47(8):1218-1219.
- El Kheir DY, Ibrahim AH. Epidemiological assessment of distress during chemotherapy: who is affected? *J Taibah Univ Med Sci*. 2019 Oct 8;14(5):448-453. doi: 10.1016/j.jtumed.2019.08.004.
- Kingsley, A., Olukayode, O. H. O., Olose, E., & Akaba, E. (2024). Psychological complications of chemotherapy and management among cancer patients: A review for physician education in Nigeria. *Onkologia i Radioterapia*, 18(9).