

# Impact of Clinical Pharmacist Intervention on Chemotherapy Knowledge, Attitude, and Practice among Breast Cancer Women

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## Abstract:

**Background:** Drug toxicity and side effects of chemotherapy have a negative impact on breast cancer patients.

**Objectives:** To evaluate the effectiveness of pharmaceutical interventions in improving breast cancer patients' knowledge, attitude, and practice regarding breast cancer chemotherapy.

**Methods:** A pre-post clinical pharmacist interventional study was conducted at the chemotherapy ward of AlHabbobi Hospital in AlNasiriyah City, located in the south of Iraq. The study involved fifty women with breast cancer who were provided with comprehensive pharmaceutical care and a self-compiled medication knowledge guide pamphlet. Two sessions were conducted for each patient; the first session was conducted after the patient filled out a questionnaire at baseline and the second session was conducted after 21 days, depending on the chemotherapy schedule. Each session lasted for approximately 45 minutes. Participants were requested to refill the questionnaire at the end of the study. Within the group, a paired *t*-test was used to compare the changes before and after the intervention.

**Results:** The clinical pharmacist's intervention significantly increased the knowledge, attitude, and practice of breast cancer patients regarding chemotherapy. After the intervention, there was a significant increase (*P* value < 0.05) in the accuracy of patients' answers to the knowledge domain. Many of the answers improved from 92% to 100% accuracy.

**Conclusion:** The intervention of a clinical pharmacist is crucial in reducing complications and adverse effects associated with breast cancer chemotherapy.

**Keywords:** Attitude; Chemotherapy; Knowledge; Practice; Pharmaceutical care.

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## Introduction

Breast cancer (BC) is the most prevalent type of cancer in women globally (1–3) and has the second highest death rate after lung cancer (4). BC accounted for 27.67% of all cancer cases among adult females and had an incidence rate of 31.01 per 100,000 persons (5). One widely used method of managing BC is chemotherapy. Drug toxicities and adverse drug reactions (ADRs) frequently happen during chemotherapy. Severe ADRs often discontinue chemotherapy and can even fail (6). Notably, patients experience a "trend-avoid" psychological conflict due to their worries about the side effects of chemotherapy and their expectations for the treatment's success (7). Evidence showed that clinical pharmacists improve the management and prevention of drug-related issues in cancer care (8). Clinical pharmacists' pharmacological care aids patients in understanding their medication (9). A cross-sectional survey revealed that patients are willing to pay for pharmacist counseling services that are routinely provided during chemotherapy (10). Enhancing cancer patients' knowledge about their treatments, particularly the crucial function of chemotherapy,

may improve adherence, increase patient compliance, and minimize the severity of side effects (11)

Pharmacists can help patients to adhere their pharmacotherapeutic regimens and monitoring plans by preparing and motivating them to do so through patient education and counseling (12, 13)

Even though numerous studies have examined the advantages of pharmacist intervention (PI) for patients in oncology wards (14–16), nonetheless, there is no previous study in Iraq to assess the effectiveness of pharmaceutical interventions (PI) on breast cancer patients' knowledge, attitude, and practice (KAP) regarding chemotherapy that intended to improve the adherence to, and knowledge about, pharmacotherapy in patients and to maximize the efficacy and minimize the adverse drug events. This study aimed to evaluate the efficacy of the PI on chemotherapy KAP in women on BC chemotherapy.

## Patients and Methods

**Study Design:** This was a pre-post interventional study on a sample of 50 BC patients who were admitted to the oncology ward at AlHabbobi Hospital in AL Nasiriya City, South of Iraq, and treated with chemotherapy, between October 2022

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and May 2023. This center is a referral center in Dhi Qar province.

**Eligible Patients:** The BC patients enrolled in this study obeyed the following inclusion criteria (1) pathologically diagnosed BC (all stages), according to pathology reports (2). Who has been taking chemotherapy? (3) Aged between 18 and 60 (4). Agreed to participate in the study. Whereas the exclusion criteria of the BC patients were those: (1) who did not consent to participate (2). With hearing, speech, or cognition problems might have difficulty understanding the questions. (3) Who has not been prescribed chemotherapy? (4) Who provided incomplete information during the completion of the questionnaire?

**Ethical approval:** The study was submitted to the "College of Pharmacy, University of Baghdad" and approval was obtained from the Scientific and Ethical Committee (approval number: REAFUBCP5122022). Additionally, approval from the Ministry of Health was obtained. Patients' consent to participate in the current study was obtained verbally.

**Study process:** The levels of KAP at baseline and after the educational session were assessed for each patient (a convenient sampling method was used to recruit the patients). Afterward, the patients received comprehensive pharmaceutical care and a self-compiled Breast Cancer Patients Medication Knowledge Guide pamphlet. A handout was prepared based on up-to-date medical literature and referenced textbooks (17–19); then was translated into a formal Arabic language for patients to be easily understood by the patients. The pamphlet was examined and evaluated by five Ph.D.-holding faculty members in the Department of Clinical Pharmacy, College of Pharmacy, and University of Baghdad's scientific committee, using the face validation procedure and three oncology specialist doctors at the oncology ward of AlHabbobi Hospital in AL Nasiriya City. The pamphlet contained the following medical information: (1) the purpose of chemotherapy, (2) prevention and management of adverse drug reactions (3) caution that should be taken while receiving chemotherapy; and (4) dietary advice. Comprehensive pharmaceutical care includes face-to-face and psychological supporting services that clinical pharmacist provides. Each patient received two sessions, each one lasting approximately 45 minutes, the first was after filling out the questionnaire the patients at the beginning of the study, and the second after 21 days, depending on the schedule of receiving chemotherapy (patients come to the hospital just at the time of receiving chemotherapy). In addition, the clinical pharmacist was in full contact with patients through mobile phones, and the patient could chat with them when he needed to. At the end of the study, participants were asked to refill the questionnaire. For the knowledge dimension, the single-choice and multiple-choice questions with correct answers receive (one point) while the other questions receive

(zero points). The total scores are between (0 - and 19). Each response option in the attitude dimension has 5 levels: Completely agree, agree, neutral, disagree, and completely disagree. These levels correlate to a score of (5, 4, 3, 2, or 1). The total scores are between "1 – 25". For the practice dimension, each correct answer gets (one point), with total scores between (0 – 4).

**Data Collection and Study Instruments:** A specifically designed data collection sheet collected the demographics and clinical characteristics data. Based on three previous studies (20–22), a formalized KAP questionnaire for chemotherapy was created. The chemotherapy KAP Questionnaire has three domains and 23 items (14, 5, and 4 are knowledge, attitude, and practice-related items, respectively). A higher score denotes high knowledge, positive attitude, and good behavior.

**Statistical analysis:**

The statistical package for the social sciences software SPSS (version 26.0) was used to analyze all the data. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as number and frequency. A paired *t*-test was used to compare the changes before and after the intervention within the group. A probability less than 0.05 was considered significant.

**Results**

**Demographic and clinical characteristics**

The mean age of the participants was 43.48 ± 9.61 years. As shown in Table 1, most patients were married, had low levels of education, and were in the first stage of BC.

**Table (1): Demographic and clinical characteristics**

Variable	Number	Percentage %	Variable
Age	(18-29)	3	6.0
	(30-39)	14	28.0
	(40-49)	19	38.0
	(50-60)	14	28.0
Marital Status	Married	46	92.0
	Single	4	8.0
Educational level	Primary	27	54.0
	Secondary	9	18.0
	Graduated	14	28.0
Living place	Urban	22	44.0
	Rural	28	56.0
Cancer staging	Stage 1	32	64.0
	Stage 2	10	20.0
	Stage 3	4	8.0

**Knowledge, attitude, and practice scores before and after the pharmacist intervention**

Patients' KAP scores before and after PI, for all dimensions were significantly increased (*P* value < 0.05) after PI, the knowledge dimension increased by eight scores, and each attitude and practice dimension increased by one score as shown in Table 2.

**Table (2): Patient's knowledge, attitude, and practice scores before and after pharmacist intervention**

Scores	Before PI		After PI		P*
	Mean	S.D	Mean	S.D	
Knowledge Scores	5.68	2.52	13.18	2.53	0.000 <sup>#</sup>
Attitude Scores	20.22	2.14	21.08	1.72	0.016 <sup>#</sup>
Practice Scores	2.18	0.66	3.32	0.76	0.000 <sup>#</sup>

\* Within group comparison (before versus after study scores), Paired t-test.

# P-value less than 0.05 is considered significant. (PI) Pharmaceutical intervention (S.D.) Standard deviation. In knowledge, attitude, and practice, we notice a clear score change after the pharmaceutical intervention, where the P-value of all dimensions is less than 0.05 (significant level).

**Knowledge dimension pre- and post-pharmaceutical intervention:**

Details of patient's answers to the knowledge dimensional questions are shown in Table 3 the patient's knowledge aspect has increased significantly ( $P$  value  $< 0.05$  as shown in Table 2) after clinical pharmacist intervention, as many of the answers were from 92 to 100 percentage in true line, as in questions 1, 5, 6, 7, 10, 13 and 14.

**Table (3): Knowledge dimension pre- and post-pharmaceutical intervention**

[\(Supplementary file\)](#)

**Attitude dimension pre- and post-pharmaceutical intervention:**

Details of patients' answers to the attitude domain questions and the obvious positive attitudes for all patients after clinical pharmacist intervention are shown in Table 4.

**Table (4): Attitude dimension pre- and post-pharmaceutical intervention**

[\(Supplementary file\)](#)

**Practice domain pre- and post-pharmaceutical intervention**

Details of patients' answers to the practice domain questions and the obvious positive behaviors for all patients after clinical pharmacist intervention are shown in Table 5.

**Table (5): Practice domain pre- and post-pharmaceutical intervention**

[\(Supplementary file\)](#)

**Discussion**

A previous Iraqi study evaluating BC patients' beliefs about their medications revealed a high level of concern regarding the use of these medications, with the conclusion that physicians should implement educational programs to improve these beliefs, which may have positive consequences on the outcome of cancer therapy(23). Indeed, PI could positively impact patients' KAP (24), as demonstrated by the finding of the present study, wherein the knowledge dimension a clear change was noticed in the patients' answers for the better, as some questions such as the fifth and tenth questions were correctly answered by all patients after the PI.

Through this questionnaire, patients learned how to know whether platelets are few or not, from the symptoms associated with that, what they do if the white blood cells decrease by avoiding patients with influenza or any infectious disease, and how they treat the metallic taste that occurs in the mouth due to some types of chemotherapy, by eating food with plastic tools and leaving metal utensils and spoons, and how they deal with cases of diarrhea or constipation by eating foods low in fiber in case of diarrhea and rich in fiber in case of constipation (25).

The results we obtained were similar to the results of the study conducted in China (25) on patients who received chemotherapy to evaluate the impact of the pharmaceutical intervention on chemotherapy KAP where chemotherapy knowledge scores of patients had changed for the better after CPI ( $P < 0.05$ ). Additionally, a systematic review showed an improvement in the outcome measures after educational pharmaceutical intervention on adult outpatients with cancer (26). A prospective, randomized, controlled study was carried out on patients newly diagnosed with cancer during chemotherapy administration, which shows an improvement in patient-related outcomes after a PI and counseling program, in comparison to the normal care group (28). A pilot quality initiative study was conducted in New York, shown to benefit patients from pharmacist-led intervention in understanding their chemotherapy regimen and side effects (29). Many studies support the effective role that clinical pharmacists can take in various fields, including raising awareness among patients. Where a pilot study conducted in Nepal showed an urgent necessity for clinical pharmacist services in cancer care (30).

As for the attitude dimension the patient's beliefs about the adverse effects, as they believed that the adverse effects would continue with them even after the end of chemotherapy treatment, but their belief has been changed after the second session and reviewing the booklet designed by the researcher.

A prospective, randomized, controlled study conducted in China, showed a positive attitude toward chemotherapy treatment and improving patient's dealing with chemotherapy adverse effects after pharmaceutical intervention (20). A pre-post study conducted in Australia on lung cancer patients, where patient's beliefs and adherence to the medications significantly improved ( $P < 0.001$ ) after clinical pharmacist intervention (30). A pilot study has shown favorable results after a 4-month evaluation period, where the pharmacists have made a substantial number of clinical interventions and provided patient education that leads to positive beliefs regarding chemotherapy treatment (31).

Regarding the practice dimension, the patients learned how to deal with the problems that happened while receiving chemotherapy, for example, how to tell the nurse quickly to stop the chemotherapy due to its leaking out of the blood vessels, and how to

deal with the fatigue caused by the treatment, by saving energy and combining work and adequate rest. In a cohort study conducted in Japan, the antiemetic costs significantly decreased after PI, (33) Results obtained by the present study are consistent with the first study conducted on Chinese patients to assess the role of PI on chemotherapy KAP which found that the patients' chemotherapy practice scores were improved after the PI ( $P < 0.05$ ) (20). A pre-post study conducted in the United States on cancer patients where chemotherapy-induced nausea and vomiting significantly decreased after PI (statistical significance not reported) (34). A cohort study conducted in Spain on cancer patients where medication adherence significantly improved after PI, (35).

According to findings from previous studies, PI of clinical pharmacists demonstrated a positive impact on patients with BC, effectively enhancing positive emotions and modifying several undesirable behaviors (36–40)

During the study periods, most patients' questions were about the side effects and what foods they could eat. They didn't eat foods that contained sugars and didn't eat meat because they heard from other people that cancer cells feed on sugars only. In addition to the chemotherapy-induced lost appetite, they avoid eating many foods like milk and fiber-rich food necessary to build muscles and regenerate cells destroyed by chemotherapy. They can eat all foods except those that worsen the side effects (41), for example, in the case of diarrhea they avoid drinking milk and fiber-enriched food, while in the case of constipation, they can take them. These misconceptions might indirectly affect life quality (42).

(Chemotherapy and You)(17), the book of the National Cancer Institute provided a list of appropriate foods for each chemotherapy adverse effect. This study's designed pamphlet was well-received by patients, who changed their perspective on food, and this has improved cancer patients' KAP. In addition, oncologists who read this booklet stated that it would reduce their workload, as most patients' questions are about what they can eat.

The widespread acceptance of clinical pharmacists as psychological supporters (43) and patient medication educators was notable in the current study. The majority of patient consultation issues were about adverse drug reactions. Patients with cancer would like to learn as much as they can. Last but not least, the patient's social demographic makeup, the illness's stage, and the course of therapy significantly impacted pharmacological care's effectiveness. Therefore, when implementing a comprehensive pharmaceutical care service, consideration should be given to each patient's unique characteristics and measurements.

#### Limitations:

The limitations of the current study were the small sample size, short study period, and single-center study.

#### Conclusions

A clinical pharmacist-led educational intervention significantly enhances the chemotherapy KAP of breast cancer patients and is crucial in reducing chemotherapy-related complications and adverse effects.

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#### Authors' declaration:

We confirm that the authors do all the tables in the manuscript. Besides, the tables, which are not mine /ours, have been given permission for re-publication attached to the manuscript. Authors sign on ethical consideration's approval-Ethical clearance: The local ethical committee in (the College of Pharmacy, University of Baghdad) approved the project according to the code number (REAFUBCP5122022).

**Conflicts of Interest:** None

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#### Author contributions:

Study conception & design: (Samer I. Mohammed). Literature search: (Karrar H. AlKashaf). Data acquisition: (Karrar H. AlKashaf). Data analysis & interpretation: (Karrar H. AlKashaf). Manuscript preparation: (Karrar H. AlKashaf). Manuscript editing & review: (Karrar H. AlKashaf, Samer I. Mohammed).

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## تأثير تدخل الصيدلي السريري على المعرفة والسلوك والممارسة بخصوص العلاج الكيميائي بين النساء المصابات بسرطان الثدي

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الخلاصة:

الخلفية: إن سمية الدواء والآثار الجانبية للعلاج الكيميائي تؤثر سلباً على مرضى سرطان الثدي. الأهداف: لتقييم فعالية التدخلات الصيدلانية في تحسين معرفة مرضى سرطان الثدي ومواقفهم وممارساتهم فيما يتعلق بالعلاج الكيميائي لسرطان الثدي.

المرضى وطرق العمل/ المواد وطرق العمل: أجريت دراسة تدخلية صيدلانية سريرية قبل وبعد في جناح العلاج الكيميائي في مستشفى الحبوبى في مدينة الناصرية الواقعة في جنوب العراق. شملت الدراسة خمسين امرأة مصابة بسرطان الثدي وتم تزويدهن بالرعاية الصيدلانية الشاملة وكنيب دليل المعرفة الدوائية الذي تم تجميعه ذاتياً. تم إجراء جلستين لكل مريض. تم إجراء الجلسة الأولى بعد أن قام المريض بملاء استبيان في الأساس وتم إجراء الجلسة الثانية بعد 21 يوماً، اعتماداً على جدول العلاج الكيميائي. واستغرقت كل جلسة حوالي 45 دقيقة. وطلب من المشاركين إعادة ملاء الاستبيان في نهاية الدراسة. داخل المجموعة، تم استخدام اختبار t المزدوج لمقارنة التغييرات قبل التدخل وبعده.

النتائج: أدى تدخل الصيدلي السريري إلى زيادة كبيرة في المعرفة والمواقف والممارسة لدى مرضى سرطان الثدي فيما يتعلق بالعلاج الكيميائي. بعد التدخل، كانت هناك زيادة كبيرة (قيمة  $P < 0.05$ ) في دقة إجابات المرضى على مجال المعرفة. في الواقع، تحسنت دقة العديد من الإجابات من 92% إلى 100%.

الاستنتاجات: يعد تدخل الصيدلي السريري أمراً بالغ الأهمية في تقليل المضاعفات والآثار الضارة المرتبطة بالعلاج الكيميائي لسرطان الثدي الكلمات المفتاحية: السلوك؛ العلاج الكيميائي. المعرفة؛ الممارسة؛ الرعاية الصيدلانية.