

Evaluation of Pharmaceutical Care Application in Iraqi Hospital

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الخلاصة

صممت هذه الدراسة لتقييم فعالية تطبيق الرعاية الصيدلانية في مستشفى عراقي في تقليل المخاطر المصاحبة لاستعمال العلاجات حيث يكون للصيدلاني السريري الدور المهم في تطبيقها. وكانت الرعاية الصيدلانية قد أدخلت اول مرة في المستشفيات في الولايات المتحدة الأمريكية في تسعينيات القرن الماضي كمرحلة متطورة للصيدلة السريرية التي ادخلت اول مرة في الستينيات وتطورت بشكل ملحوظ في الثمانينات من نفس القرن.

150 مريضاً شملوا بهذه الدراسة وتراوحت اعمارهم بين شهرين و 12 سنة وطبقت في مستشفى بابل للنسائية والاطفال في محافظة بابل, حيث صنّفوا في خمس مجموعات وكل مجموعة قسمت بدورها الى جزئين متساويين وطبقت خطة الرعاية الصيدلانية في الجزء الاول من كل مجموعة لمعرفة تأثيرها على تحسين حالة المرضى. وكانت مجموعات المرضى كالتالي: 30 من مرضى الجهاز التنفسي, 30 من مرضى الاختلال الايضي, 30 من مرضى الجهاز الهضمي, 30 من مرضى القلب والاعوية الدموية و اخيرا 30 من مرضى الدم .

تمت متابعة جميع المرضى سريريا لتشخيص المخاطر المصاحبة للعلاجات واطهرت النتائج بان تطبيق هذه الخطة ساهم في تقليل هذه المخاطر, زيادة الفعالية العلاجية للعلاجات واخيرا الفائدة الاقتصادية للمريض والمستشفى.

من الممكن زيادة فوائد تطبيق الرعاية الصيدلانية وذلك بتطبيقها على نطاق واسع, زيادة مهارة الصيدلاني ليأخذ دوره كاملاً واخيرا تشجيع باقي اعضاء الطاقم الطبي وخاصة الاطباء لتقبل الدور الجديد للصيدلاني في المستشفى .

Abstract

This study was designed to evaluate the effect of application of pharmaceutical care in an Iraqi hospital in decreasing drug-related problems in which the clinical pharmacist play the important role in Pharmaceutical care that introduced in the nineties of the previous century in the United States as a

progression and development of the clinical pharmacy that starts in the sixties of the same century and developed in eighties.

150 patients were included in this study aged between two months to twelve years in Babylon hospital for gynecology and children. Those patients were classified to 5 groups. Each group divided into 2 equal subgroups in which the pharmaceutical care plan was formulated to one of them to see the effectiveness of such application on those patients using the SOAP note (Subjective, Objective, Assessment and Plan), the groups are: 30 Respiratory disease patients, 30 Metabolic disease patients 30 Gastrointestinal disease patients, 30 Cardiovascular disease patients and 30 Hematological disease patients.

All patients were followed clinically to detect the causes of drug-related problems and the results revealed that the application of pharmaceutical care in the hospital can result in decreasing drug-related problems, increasing the therapeutic effectiveness of drugs, decreasing the risk of drug use and has economic benefits for the patient and the hospital.

The benefits of pharmaceutical care can be increased by application of such plans on large scales, qualifying the pharmacists in Iraq professionally to take their responsibilities and also other health care professionals especially physicians must be encouraged to accept the new roles of pharmacists.

Introduction

Pharmaceutical care, the phrase and its underlying meaning have been the principal concern of innumerable articles, discussions, curriculum planning meetings, pharmacy classes, and continuing professional development for over a decade^[1].

Pharmaceutical care was defined by Douglas Hepler and Linda Strand as the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life^[2]. Then another definition has been developed at the Peters Institute of Pharmaceutical Practice within the college of Pharmacy at the University of Minnesota-is that pharmaceutical care is "a practice in which the practitioner takes responsibility for a patient's drug related needs and holds him or herself accountable for meeting these needs" ^[3]. Provision of pharmaceutical care overlaps somewhat with other aspects of pharmacy practice, which include^[4]: Clinical Pharmacy ,Patient Counseling and Pharmaceutical Services.

Pharmaceutical Care Planning is a systemic, comprehensive process with three primary functions^[5]:

- 1- Identify a patient's actual and potential drug-related problems.
- 2- Resolve the patient's actual drug-related problems.
- 3- Prevent the patient's potential drug-related problems.

The general steps involved in creating a pharmaceutical care plan are^[5] create patient database, the therapeutic relationship, assess drug-related

problems, establish therapeutic goals, design a therapeutic regimen, specify monitoring parameters, initiating the therapeutic regimen and monitoring plan and redesigning the therapeutic regimen and monitoring plan.

The provision of pharmaceutical care does not imply that the pharmacist is no longer responsible for dispensing functions. In many instances, however, implementation of pharmaceutical care services necessitates a redesign of the professional work flow, with assignment of technical functions to technical personnel under the direct supervision and responsibility of the pharmacist^[4]. Pharmaceutical care Participate in Developing and Evaluating Medication-Use Policies which include the following points^[6]:

- 1- Provide pharmacotherapy expertise to the health system in the development of its medication use, patient care, and research-related policies.
- 2- Assume responsibility for the health system's ongoing adherence to its medication-use policies.
- 3- Generate and disseminate new knowledge in pharmacotherapy (e.g., review article, case report or series, original research).

In Establishing the Patient Record, the patient record provides readily available information that is needed to identify and assess medical problems. It is necessary for designing patient-specific care plans and documenting pharmaceutical care^[7].

To establish an accurate patient record, the practitioner (pharmacist) must have a good understanding of the pathophysiology and clinical presentation of commonly encountered medical conditions so that he or she can correlate certain signs and symptoms with a disease^[8].

The medical community has long used a problem-oriented medical record or SOAP note to record information in the medical record or using a standardized format. Each medical problem is identified, listed sequentially, and assigned a number. Subjective data and objective data in support of each delineated, an assessment is made, and a plan of action identified. The first letter of the four key words (subjective, objective, assessment, and plan) serve as the basis for the SOAP acronym^[8].

Usually, the eight possible negative outcomes of drug therapy which represent the drug-related problems are ^[9]: Untreated condition, Improper drug selection, Sub therapeutic dosage, Failure to receive drugs, Over dosage, Adverse drug reactions, Drug interactions and Drug use without indication.

A Model for Pharmacist-Physician Collaborative Working Relationship was synthesized from models of interpersonal relationships, business relationships, and collaborative care. The progressive stages of the pharmacist-physician CWR model are: Stage 0 -- Professional Awareness; Stage 1 -- Professional Recognition; Stage 2 -- Exploration and Trial; Stage 3 -- Professional Relationship Expansion; and Stage 4 -- Commitment to the Collaborative Working Relationship^[10].

Materials and Methods

This study was applied in Babylon, in the Babylon Hospital for Gynecology and Children for 3 months from 1/7/2005 to 1/10/2005. The number of patients enrolled in this study was 150 patients aged between 2 months to 12 years and classified into 5 groups and each group divided into 2 subgroups in which the pharmaceutical care plan was applied in the first part patients only in each group using the SOAP note as shown in figure 1. The 5 patients groups enrolled in this study were:

Group I: 30 respiratory disease patients.

Group II: 30 gastrointestinal disease patients.

Group III: 30 metabolic disease patients.

Group IV: 30 cardiovascular disease patients.

Group V: 30 hematological disease patients.

Each group divided into 2 equal parts, A and B, in which the pharmaceutical care plan was applied in part A of each group only (IA, IIA, IIIA, IVA and VA groups). We detect clinically drug- related problems in which we select 3 usual negative outcomes of drug therapy which represent the drug- related problems which are: Drug- related problems caused by improper drug selection, Drug-related problems caused by drug adverse reaction and Drug- related problems caused by drug interaction.

The statistical analysis of the data was performed utilizing student t-test. P value < 0.05 was considered to be significantly different.

Result and Discussion

Table - 1 shows that the percent of Drug-Related Problems Caused by improper drug selection is greater in patients groups (IB, IIB, IIIB, IVB, and VB) in whom pharmaceutical care plan (P.C.P.) was not formulated than the patients groups (IA, IIA, IIIA, IVA, and VA) in whom pharmaceutical care plan (P.C.P.) was formulated. Also the percentage of Drug-Related Problems Caused by improper drug selection in patients in whom (P.C.P.) was formulated without consideration of patient group was found to be 4% while in patients in whom (P.C.P.) was not formulated the percentage was found to be 20% as shown in table -1 and illustrated in figure – 2.

The statistical analysis showed that there was no significant difference among patients groups (the control group and the trial group) $P > 0.05$. But when we compare between patients in whom (P.C.P.) was formulated without consideration of the patient group with patients in whom (P.C.P.) was not formulated, the statistical analysis showed that there was a significant difference $P < 0.05$.

Improper drug selection can result from selection or prescribing drugs without consideration of age of the patient, laboratory data or patient state or any other concepts of the prescribing process. The drug related problems caused by

improper drug selection which detected in the hospital during this study include the use of third generation cephalosporins without culture, use of antibiotics for viral infections, use of some drugs which induce an allergic reactions in some patients without doing drug sensitivity tests, those problems caused by improper drug selection can be minimized by the application of pharmaceutical care with the inclusion of the hospital pharmacist in this process. Good experience and training of the pharmacist in the application of pharmaceutical care can decrease improper drug selection and leads to selection of appropriate drugs to give the desired outcomes of the therapeutic process, also in patients in whom pharmaceutical care was not applied, the difference in the experience and knowledge of the physicians in the proper selection of drugs can make a difference in decreasing or increasing drug related problems caused by improper drug selection. The no significant difference between patients groups may indicate the need for the inclusion of large patient groups and this assumption may be supported by the fact that there was significant difference between patient groups in whom pharmaceutical care was applied without consideration of the patient group and patient groups in whom pharmaceutical care was not applied.

The other type of drug-related problems we deal with in this study are those caused by adverse drug reaction which defined by the World Health Organization (WHO) as any response to a drug that is noxious and unintended, and that occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of disease or for the modification of physiologic function^[11]. Those adverse reactions are responsible for a significant number of deaths and for a significant amount of healthcare costs^[12].

Table -2 shows that the percent of Drug-Related Problems Caused by adverse drug reaction is greater in patients groups (IB, IIB, IIIB, IVB, and VB) in whom (P.C.P.) was not formulated than the patients groups (IA, IIA, IIIA, IVA, and VA) in whom (P.C.P.) was formulated. Also the percentage of Drug-Related Problems Caused by adverse drug reaction in patients in whom (P.C.P.) was formulated without consideration of patient group was found to be 2.6% while in patients in whom (P.C.P.) was not formulated the percentage was found to be 17.3% as shown in table -2 and illustrated in figure -3.

The statistical analysis showed that there was no significant difference among patients groups (the control group and the trial group) $P > 0.05$ except group IVA and group IVB. There was a significant difference between patient group IVA and IVB, P value < 0.05 . But when we compare between patients in whom pharmaceutical care was formulated without consideration of the patient group with patients in whom pharmaceutical care plan was not formulated, the statistical analysis showed that there was a significant difference, P value < 0.05 .

Examples of those adverse drug reactions detected in the hospital were antibiotic associated diarrhea, extra pyramidal symptoms due to use of metoclopramide, hyponatremia and hypokalemia due to use of diuretics and

many other problems. This requires a pharmacist with enough knowledge about the adverse effects of drugs and how can these adverse drug reactions prevented or treated when occur. Again some adverse drug reactions need a certain period of time to be occur and sometimes it needs long periods of time for the drug to be accumulated in the body or long time for an adverse drug reaction to be occur in the body, in our situation of study we take patients treated mostly for acute illness or disease and do not use drugs for long periods of time and sometimes there is no enough time for the adverse drug reaction to be occur or detected in the hospital and this is may be the cause that there is no significant difference between some patients groups or this indicate the need for inclusion of large population groups in the study and this can be supported when we compare between patient groups in whom pharmaceutical care was applied without consideration of the patient group with patient groups in whom pharmaceutical care was not applied and the statistical analysis showed that there was a significant difference.

The last type of drug related problems we try to decrease in the hospital are those caused by drug-drug interactions (DDIs). The overall prevalence of drug interactions is 50% to 60%. Those that affect pharmacodynamics or pharmacokinetics have a prevalence of approximately 5% to 9%. About 7% of hospitalizations are due to drug interactions^[13]. The need to reduce errors in the administration of prescription medications has focused attention on the prevention of DDIs^[14]. Table -3 shows that the percent of Drug-Related Problems Caused by drug interactions was greater in patients groups (IB, IIB, IIIB, IVB, and VB) in whom (P.C.P.) was not formulated than the patients groups (IA, IIA, IIIA, IVA, and VA) in whom (P.C.P.) was formulated. Also the percentage of Drug-Related Problems Caused by drug interactions in patients in whom (P.C.P.) was formulated without consideration of patient group was found to be 4% while in patients in whom (P.C.P.) was not formulated the percentage was found to be 14.6% as shown in table -3 and illustrated in figure -4.

The statistical analysis showed that there was no significant difference among patients groups (the control group and the trial group) P value >0.05, But when we compare between patients in whom pharmaceutical care was formulated without consideration of the patient group with patients in whom pharmaceutical care plan was not formulated, the statistical analysis showed that there was a significant difference P value < 0.05.

The results of drug related problems caused by drug interactions indicate to certain limit that the application of pharmaceutical care in the hospital can aid in decreasing drug interactions and there are many interactions between some drugs occur in our hospitals and some of these drug interactions are preventable like some drugs which are pharmacologically antagonized and the pharmacist can prevent these drug interactions by instruct the patient to put a gap of time between taking of these drugs, also some drug interactions which occur outside the body between drugs like the interaction between some drugs and I.V fluids

so this process needs a pharmacist with enough knowledge about drug interactions and here there is a difference among pharmacists. Sometimes drug interaction need a certain period of time to occur or it appears with chronic use, in our situation of study we take patients (children and pediatrics) who do not use drugs for long periods of time or chronically, so sometimes there is not enough time for the drug interaction to occur or to be detected clinically and this may be the reason that there was no significant difference between some patient groups or this indicate the need for inclusion of large population groups in the study and this can be supported when we compare between patient groups in whom pharmaceutical care was applied without consideration of the patient group with patient groups in whom pharmaceutical care was not applied in which the statistical analysis showed that there was a significant difference.

Barriers of the Application of Pharmaceutical Care in Iraq:

There are several barriers of the application of pharmaceutical care in Iraq include the following points:

- 1 - Self confidence of the pharmacists which is required for the pharmacist to take responsibility for the patient's drug related needs and to communicate with the patient and the health care professionals.
- 2 - The pharmacist-physician relationship represents a barrier to the application of pharmaceutical care because the pharmacist-physician relationship sometimes is not at the desired level and should be improved.
- 3 - The pharmacist-patient relationship sometimes is less than the desired level or not builds to be strong relationship and the pharmacist has difficulties in talking with the patient or in taking the information from the patient.
- 4 - The health system organizations and the laws of these organizations represent a barrier to the new roles of pharmacists provided by pharmaceutical care, so the laws of the health system organizations should be changed to give more responsibilities to the pharmacist in relation to therapeutic process.
- 5 - The need of highly professionally and trained pharmacists in sufficient no. in the hospital or the health organization for pharmaceutical care to be applied, because pharmaceutical care needs to be applied completely in all departments of the hospital.

These barriers to the application of pharmaceutical care in Iraq should be studied and evaluated by separated study or future study, considering the above points or other causes presented or appeared during the future study.

Conclusions

Based on the results of this study, the following conclusions can be made:

- 1 - The application of the pharmaceutical care in Iraqi hospitals can aid in decreasing Drug-Related Problems that lead to increase the therapeutic

effectiveness of drugs, decrease the time of stay in the hospital and has economic benefits for the patient and the hospital.

- 2 - The hospital pharmacist should be involved in the application of the pharmaceutical care in the hospital and the pharmacist-patient relationship should be improved to a value that enable the pharmacist to communicate and talk with patient or to take the information directly from the patient in addition the relationship between the pharmacist and other health care professionals such as the physician and nursing staff should be improved, also other health care professionals especially physicians must be prepared to accept the new roles of the pharmacist if pharmaceutical care is applied in Iraq.
- 3 - The barriers of application of pharmaceutical care in Iraq can be studied to document these barriers and to resolve these barriers in order to improve the patient quality of life.

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Patient group	No. of patients affected	Percentage of patients affected	Drug Related Problems and its frequency
IA	0	0%	
IB	3	20%	Use of combination of antibiotics for several days without improvement(1),use of third generation cephalosporin without culture(1),use of antibiotics for viral infection(1)
IIA	1	6.6%	Use of third generation cephalosporin without culture(1)
IIB	3	20%	Use of ampicillin for patient allergic to penicillin without doing drug sensitivity test(1),use of antitussive drug for productive cough(1),use of antidiarrheals for infectious diarrhea(1)
IIIA	1	6.6%	Use of iron preparation for patient with B12 deficiency anemia
IIIB	4	26.6%	Use of G/S I.V. solution for patient with hypokalemia(1), Use of iron preparation for patient with B12 deficiency anemia(1), use of antidiarrheals for infectious diarrhea(1), use of antitussive drug for productive cough(1)
IVA	1	6.6%	use of antitussive drug for productive cough
IVB	3	20%	Use of expectorants for dry cough(1), Use of third generation cephalosporin without culture(1), use of antitussive drug for productive cough
VA	0	0%	
VB	2	13.3%	use of antidiarrheals for infectious diarrhea(1), use of antitussive drug for productive cough
Total no. of Patients affected in P.C.P. formulated groups	3	4%	
Total no. of Patients affected in unformulated P.C.P. groups	15	20%	

Table 1: Results of Drug-Related Problems Caused by Improper Drug Selection.

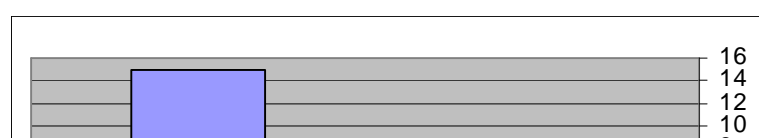


Figure 2: Drug-Related Problems Caused by Improper Drug Selection

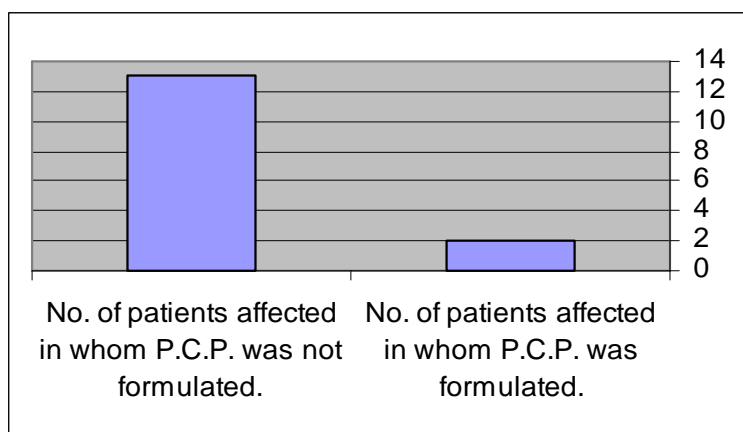


Figure 3: Drug-Related Problems Caused by Adverse Drug Reaction

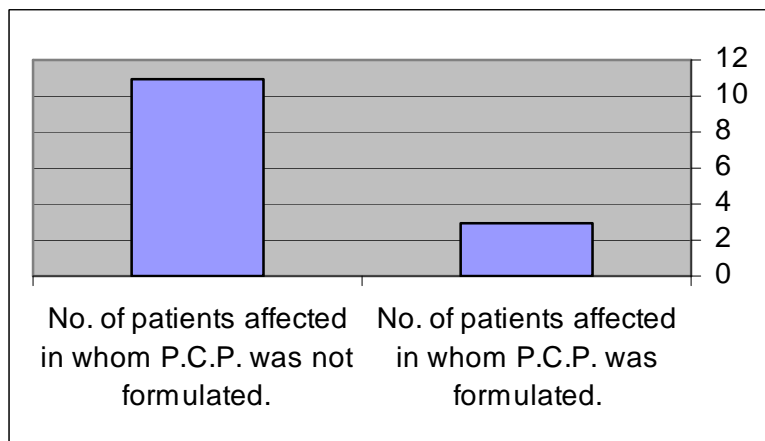


Figure 4: Drug-Related Problems Caused by Drug Interaction

Patient group	No. of patients affected	percentage	Drug Related Problems and its frequency
IA	0	0%	
IB	2	13.3%	Tachycardia due to use of salbutamol(1),antibiotic associated diarrhea(1)
IIA	1	6.6%	antibiotic associated diarrhea(1)
IIB	3	20%	Extrapyramidal symptoms(EPS)due to metoclopramide(1),hyponatremia and hypokalemia due to use of furosemide(1),tachycardia due to salbutamol(1)
IIIA	1	6.6%	hyponatremia and hypokalemia due to use of furosemide(1)
IIIB	3	20%	antibiotic associated diarrhea(2), tachycardia due to salbutamol(1)
IVA	0	0%	
IVB	3	20%	Extrapyramidal symptoms(EPS)due to metoclopramide(1), antibiotic associated diarrhea(2)
VA	0	0%	
VB	2	13.3%	hyponatremia and hypokalemia due to use of furosemide(1), constipation due to use of iron preparation
Total no. of Patients in P.C.P. formulated groups	2	2.6%	
Total no. of Patients in unformulated P.C.P. groups	13	17.3%	

Table 2: Results of Drug-Related Problems Caused by Adverse Drug Reaction.

Patient group	No. of	percentage	Drug Related Problems
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	patients affected		and its frequency
IA	1	6.6%	Use of metoclopramide drop with hyoscine drops(1)
IB	2	13.3%	Aminophylline with G/W I.V solution(1),salbutamol with I.V solution(1)
IIA	1	6.6%	Use of metoclopramide drop with hyoscine drops(1)
IIB	3	20%	Aminophylline with G/W I.V solution(1),salbutamol with I.V solution(1), metoclopramide drop with hyoscine drops(1)
IIIA	1	6.6%	metoclopramide drop with hyoscine drops(1)
IIIB	2	13.3%	Aminophylline with G/W I.V solution(1), metoclopramide drop with hyoscine drops(1)
IVA	0	0%	
IVB	2	13.3%	salbutamol with I.V solution(1), metoclopramide drop with hyoscine drops(1)
VA	0	0%	
VB	2	13.3%	Aminophylline with G/W I.V solution(1), metoclopramide drop with hyoscine drops(1)
Total no. of Patients in P.C.P. formulated groups	3	4%	
Total no. of Patients in unformulated P.C.P. groups	11	14.6%	

Table 3: Results of Drug-Related Problems Caused by Drug Interactions.