

Clinical Pharmacy Services in Jeddah Hospitals: Evaluating Current Situation

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Abstract: Objective: To evaluate the current clinical pharmacy services in government and private hospitals in Jeddah, Saudi Arabia **Design and methods:** A questionnaire was developed, composed of indicators for evaluating clinical pharmacy services recommended by the American Society of Health System Pharmacists (ASHP) guideline and American Collage of Clinical Pharmacy (ACCP). The questioner is composed of five sections: staffing, policy and procedure, drug information services, drug distribution and delivery and finally optimization of medication therapy. Pharmacy director(s) or his/her designees were interviewed by a pharmacy intern to answer the questions. **Result:** The Study included 19 hospitals in the governorate of Jeddah. The total number of clinical pharmacist was 41 pharmacists serving a total of 4697 beds. Lack of documentation of pharmacists' intervention was a major problem, since (26.3%) of our visited hospitals did not have sufficient documentation system although they had pharmacists. In this study only (26.3%) of hospitals had electronic transmission system for prescriptions, and (31.5%) had electronic formulary system. Most hospitals had efficient drug distribution system and (63.1 %) had both unit doses and floor stocks. Intravenous admixtures were not efficient in most hospital, (26.3%) had TPN preparation while (42.1%) prepare sterile IV product in the pharmacy, and only (47.3%) of hospitals had a unit dose repackaging system. The majority of hospitals (94.7%) allowed pharmacist to review patient profile. Some hospitals (57.8%) had a drug use evaluation (DUE) system, the remaining lack this important part of the clinical pharmacy practice and only 5 (26.3%) had drug information services. **Conclusion:** Although the majority of the hospitals attained the minimum criteria for clinical pharmacy services, these services are still insufficient or inefficient to be acceptable. Pharmacist should have expanded role as drug information provider and the number of practicing clinical pharmacist should be increased. Hospital administrators should lead pharmacy practice toward the clinical and patient care practice.

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1. Introduction

Since early 1960s, the concept of clinical pharmacy practice has been evolving in the United States of America. This evolution was driven by health care reform, health science education, advancement of technology, economical reasons and social needs (1-3). The concept was then evolving and growing rapidly worldwide. In 1980, clinical pharmacy practice was introduced in to the curriculum of the college of pharmacy (established in 1959) at King Saud University, Riyadh, Kingdom of Saudi Arabia (KSA). Due to the low number of pharmacy graduates and the increasing demand for pharmacists, especially for the clinically-oriented practitioner, the Saudi government, in 2001, took the decision to establish more pharmacy colleges at different cities to cover all four region of the kingdom. To date, there are 23 colleges of pharmacy (17 government and 6 private) offering the clinically oriented degree-“Doctor of Pharmacy” (Pharm. D) and or the Bachelor of pharmaceutical Science (B.S.) degree. Clinical pharmacy practice is a health science discipline in which pharmacists provide patient care to ensure that

drug therapy is appropriate, cost effective and improves patient's quality of life. It embraces the philosophy of pharmaceutical care in which the pharmacists are held responsible and accountable for ensuring optimal patient outcomes (4-7).

Clinical pharmacy services are usually performed in hospital settings. It should include at a minimum: formulary system management, drug use evaluation (DUE) program, review of every drug order for therapeutic appropriateness and maintenance of patient's drug profile (8). Clinical pharmacy services may be provided by a pharmacist working in a central pharmacy or in satellite pharmacies or may be performed by clinical pharmacists working at patient care area. These services are usually offered also as a part of the unit dose drug distribution system.

It has been almost 36 years since the introduction of clinical pharmacy practice in Saudi Arabia. To date, data regarding clinical pharmacy services in KSA, in particular, western region, is lacking. The aim of this study was to evaluate clinical pharmacy service in Jeddah (the largest city in western region) hospitals, through a questionnaire composed to

evaluate five main areas: staffing, policy and procedures, drug information services (DIS), drug distribution and delivery and finally optimization of medication therapy.

2. Design and Methods

This study is a descriptive study in the form of a questionnaire, which is composed of indicators for evaluating clinical pharmacy services recommended by the American society of health system pharmacists (ASHP) guideline (9,10). The questionnaire was composed of five sections: staffing, policy and procedure (P&P), drug information services (DIS), drug distribution and delivery, and finally optimization of medication therapy. Pharmacy director(s) or his/her designees were interviewed by pharmacy interns to answer the questions. Both governmental and private hospitals were included in this study.

According to the Saudi Food and Drug Authority (SFDA), Jeddah city has 52 hospitals divided into government hospitals (n=16), and private hospitals (n=36). Government hospitals in turn are divided to: Ministry of Health hospitals (n=12), national guards and military hospitals (n=2), a university hospital (n=1), and a specialized tertiary referral hospital and research center (n=1). We divided Jeddah city into four zones: south, north, east, and west. The selection of hospitals was random. Hospitals were also classified according to bed capacity (small: less than 50 beds), (medium: less than 100 beds), and (large: more than 100 beds).

3. Results

Twenty-four hospitals were visited, but only 19 hospitals were included in this study due to preservation for releasing information. Out of 19 hospitals, 11 were private and 8 were government hospitals.

This study covered the four regions in Jeddah city as follows: Five hospitals in the southern region, 6 hospitals in the northern region, 3 hospitals in the eastern region, and 5 hospital in the western region of Jeddah. The study included 2 small hospitals, 6 medium hospitals, and 11 large hospitals. About 58.8% of visited hospitals had received some sort of national accreditation and 63.6% of these hospitals were accredited by Joint Commission International (JCI) and 36.4% were accredited by Makkah Region Quality Program (MRQP), Canadian and central Board for Accreditation of Healthcare Institutions (CBAHI).

Policy and procedure:

All hospitals included in this study had an updated policy and procedures.

Staffing: (see figure 1). Table (1) shows that the total number of pharmacy staff was 667; of which 288 (43.178%) staff members had a bachelor degree, 9 staff members (1.349%) had a Masters degree and only 3 (0.449 %) had a PhD degree. Only Forty-one staff members (6.146%) were clinical pharmacists (hold a Pharm.D. degree). Cumulatively, the total number of beds was 4697.

Table 1: Number/percentage of staff in Jeddah hospitals

Criteria for evaluation	Total (667)	(%)
BS. Pharmacists	288	43.178
MS. Pharmacists	9	1.349
Pharm. D (clinical pharmacists)	41	6.146
Ph.D. Pharmacists	3	0.449
Technicians	248	37.181
Others	78	11.694

Drug Information services (DIS): Out of the 19 hospitals, only 5 (26%) hospitals had an assigned area for DIS staffed with a pharmacist (all were large hospitals). It was also found that the majority (90%) of the drug information enquiries were made by physicians, and the other enquiries (10%) were made by postgraduate students, pharmacists, nurses and the general public. Only 40% of the answers of these enquiries were made through documented written format. The drug information requests were mainly focusing on drug dosing and adverse drug reactions. Updated electronic references such as MICROMEDEX were used in all of the five hospitals. Only four hospitals (80%) of those providing drug information services did formal drug monograph services for new drug additions to the hospital formulary. All five hospitals were actively participating in providing education programs for physicians and nurses (Table 2).

Table 2: Information pertaining DIS

Criteria for evaluation	Total (5)	(%) (26%)
Specialty:		
MD	0	0%
Pharmacists	5	100%
Other(resident)	0	0%
Mode of reply: (most common)		
Verbal	5	100%
Verbal & written	2	40%
Printed literature	0	0
Internet	1	20%

Drug distribution and delivery: Only 5 (26.3%) of the hospitals had electronic system for prescriptions processing, which may reflect a shortage of this essential system in the majority 14 (73.6%) of the studied hospitals (Table 3 & Figure 2). In the studied hospitals, the request and decision of adding a new drug to the hospital formulary were done by pharmacists, physicians or other non-medical employees. Only 6 (31.5%) hospitals had a systematic way for requesting/adding new drugs by taking the decision through Pharmacy and Therapeutics (P&T) committee (see figure 3).

Table 3: Information regarding drug distribution and delivery

Criteria for evaluation	Total (19)	(%)
(Medication)		
Medication order contained in patient medical record	19	100%
Direct copy of prescription	18	94.7%
Hard copy of prescription	10	52.6%
Electronic transmission of prescription	5	26.3%
Both hard and electronic transmission	3	15.7%
Review orders by pharmacist	17	89.4%
(Formulary)		
Present	19	100%
Hard copy formulary	7	36.8%
Electronic formulary system	6	31.5%
Both hard and electronic	6	31.5%
P and T committee take Decision for entering new drug	6	31.5%
(Sterile product)		
IV room	8	42.1%
TPN preparation	5	26.3%
(Distribution system)		
Floor stock	1	5.2%
Unit dose	5	26.3%
Both (floor stock + unit dose)	13	63.1%
Unit dose repackaging	9	47.3%

Medication error: In the included hospitals, reporting of medication errors was made by pharmacists; however, documentation was lacking and we could neither find evidence of drug errors documentation nor a policy for that.

Optimizations of Medication therapy: (see figure 4). Table-4 shows that, in 18 (94.7%) hospitals the pharmacist were allowed to review patients' profiles and in 17 (89.4%) hospitals the pharmacists reviewed the medications regimens in the floor. Also, 17 (89.4%) hospitals had a mechanism to report and

document incidents of adverse drug reactions (ADRs). These ADRs were documented by the pharmacists and nurses in 15 (78.9%) of the studied hospitals. Only 11(57.8%) hospitals had DUE program in place.

Table 4: criteria for optimization of drug therapy

Criteria Optimization of Drug Therapy	(Total) (19)	(%)
PRH allowed to Review Patient Profile	18	94.7%
Patient Medication Review by RPH in floor	17	89.4%
Adverse Drug Reaction reporting or documentation	17	89.4%
Drug - Drug and Drug - Food Interaction reporting	15	78.9%
DUE or DUR system	11	57.8%

4. Discussions

The results of this study are important and unique because they reflect some parts of the current status of clinical pharmacy practice in Jeddah, Saudi Arabia. They are also considered the first database to be published regarding clinical pharmacy practice at western region of KSA. There seems to be a consensus among hospitals that clinical pharmacy practice is a must as all hospitals attained the minimum component of clinical pharmacy services but with varied levels. One major possible reason for these variations is the pharmacist's education and training level as the majority (84.46%) of the total (341) practicing pharmacists held a B.S degree in pharmacy. These pharmacists are usually competent in technical skills to perform usual daily activities (product-oriented activities). Pharmacists with higher degree in pharmacy e.g., M.S., Pharm. D, Ph.D. with proper training are usually more competent than those with B.S. degree in performing clinical activities (11). In this study, only 15.54% pharmacists hold higher degree MS (2.64%), Pharm.D. (12.02%) and Ph.D (0.88%).

In KSA, Pharm. D. holders are usually more exposed to clinical practice during their final year of school and therefore they are more eligible for providing clinical pharmacy services especially those with advanced postgraduate clinical training (Residency). Pharmacists with general or specialized residencies are very few and mainly found in large governmental hospitals. This could explain why large hospitals attained better clinical pharmacy services than others. In addition, large government hospitals are more organized, structured and have systems in place. The number of clinical pharmacists in the 19 hospitals was 41 pharmacists. These pharmacists serve 4697 beds, meaning 1 clinical pharmacist for

every 114 beds. This may indicate shortage in clinical pharmacists numbers. Pharmacists shortage have a negative impact on the health care system (3-4) as shortage of pharmacists leads to increase the workload, which in turn affects the supervision, monitoring, pharmacists training time, education and finally pharmacy services. Such effects have a direct impact on pharmacy skills and consequently may increase medication errors and put patients life at risk.

The majority (73.7%) of hospitals did not have drug information services (DIS). DIS was mainly found in 5 (26.3%) large hospitals. In these hospitals, there was almost a complete acceptance of information provided by the pharmacists as 90% of drug information enquires were made by clinicians. Although all 5 hospitals were staffed with pharmacists, they did not have sufficient documentation systems. In addition, pharmacists were actively participating in educational programs provided to clinicians and nurses. DIS are a vital and crucial services for health care providers because of the rapidly growing information updates, presence of several information sources and lack of time which present a challenge for the busy health care professionals, who don't have enough time to update their knowledge and therefore they need someone to assist them to get the necessary information in a timely manner (12-13). The scope and extent of services provided by the drug information pharmacists are varied among the five large hospitals as 4 (80%) of them do formal drug monograph services. Evaluation of current drug literature for drug monograph is an important step for the inclusion of any drug in hospital formulary in which drug safety, efficacy and cost are extensively evaluated (14-15).

In addition, documentation of clinical activities by pharmacists seems to be poor in most hospitals as only 40% of answered enquires were documented. Pharmacists have always been labeled as poor documenters. The rate of documentation was found to be low among hospital pharmacist in Riyadh area (16).

Although all hospitals had policies and procedures in place, most hospitals lack an internal written guidelines for time intervals for updating their policies and procedures: some hospitals update their policy and procedures annually while other every 2 years or as needed for external requirement such as environmental compliance, accreditation or other governmental regulations.

The majority (73.7%) of hospitals had no electronic system for entering medication orders as only 5 (26.3%) hospitals had electronic transmission system for prescriptions. Pharmacists should review every drug order and enter medication orders written by clinicians through electronic database system to

maintain a complete patient profile. This step is critically important for nurses and clinicians to appropriately follow their patients. In addition, such electronic transmission is very important for pharmacist to accurately document information and maintain an accurate and up to date patient profile (17). Also, pharmacists should be able to access patient profiles for all necessary information pertaining to patient health status. We found that most (94.7%) hospitals allow pharmacists to review patients' profiles, meanwhile medications regimen were reviewed by pharmacists in the floor in 89.4% of hospitals. Therefore, the process necessary to maintain the pharmacist highest practicable level of function and minimize or prevent ADR events related to medication therapy (18,19,20) is lacking in 10.6% of hospitals.

A formulary system is a minimum standard for pharmacies in hospitals. It seems that all (19) hospitals in this study attained this standard; however, just 6 (31.5%) hospitals had an electronic formulary system, therefore updating the formulary may take considerable amount of time for the others. Usually, the P&T committee is responsible for managing the formulary system. The committee is composed of actively practicing physicians, pharmacists, nurses, administrators, quality improvement managers, and other health care professionals and staff who participate in the medication-use process. An active committee is not in place in the majority (69.5%) of the visited hospitals or does not effectively practices its duties. The formulary system should include review and approval of all policies related to the medication-use process. All medication-use policies, regardless of their origination should flow through the P&T committee. The P&T committee should use a structured, evidence-based process in the evaluation of medications for formulary consideration. (21). In this study, only 6 (31.5%) hospitals had the P&T committee take the decision for entering new drug to the hospital formulary and the majority (68.5%) of hospitals still dependent on the pharmacist's or medical doctor single decision.

With respect to distribution system, we found that only one hospital still use the old system (the floor stock system) and 13 hospitals (63.1 %) had both unit dose and floor stock distribution systems. This could be driven by economic reasons and seeking a suitable distribution system. Unit dose systems have several advantages over other alternative distribution methods available in hospital settings. These advantages include improved overall drug control and drug use monitoring, more control of pharmacist workload and scheduling, reduce drug crowed in nursing stations at patient care areas and excellent adaptability with advanced pharmacy technologies.

Therefore, patient care cost, and utilization of resources may better be improved with the use of a unit dose system. The unit dose distribution system should be implemented in all hospitals as the demand of better pharmacy services is growing and clinical pharmacy services provision is offered as part of this system (22).

The majority (57.9%) of hospitals prepared sterile intravenous products at nursing stations while (42.1%) prepared them in pharmacy department. Such practice may therefore increase the nursing staff workload, incidence of medication errors, contamination and cost of care in the majority of hospitals. Ideally, sterile intravenous products should be prepared in a controlled environment in the pharmacy by trained professionals.

All (19) visited hospitals had a reporting system for medication errors in place, but the activity of that system was dependent on individual hospitals and they did not present a written policy for drug errors documentation. The incidence of harmful events or risk has been defined as drug misadventure, which include ADR and medications errors (23-24). All studied hospitals reported the medication errors for institutional purposes and they did not report them to Saudi Food and Drug Administration (SFDA) or Ministry of Health (MOH) for farther evaluation and information dissemination. The unavailability of written policies may have been contributed to hospital administrators' conservative approach toward releasing some of their data or internal policies; therefore, we could not confirm the existence of such policies.

Some hospitals have a few documented errors per month (3-10 errors /month), while other hospitals documented more than 100 errors /month. The variation in reporting and documenting medication errors is dependent on the hospital size, effective reporting system and the active participation of pharmacist and their role in the P&T committee.

It is crucial to have an effective way of documenting and reporting medication errors because drug use; either prescribed or non prescribed; and drug administration devices have known or unknown potential to harm patients or put patient at risk. Prevention of medication errors has a positive and direct impact on patients mortality and health care cost. Therefore, the ASHP urged all hospitals to have an effective system to prevent, report and document all types of medication error events with active participation of pharmacists in collaboration with other health care providers.

To ensure that medicines are used appropriately in a health care setting, drug use evaluation (DUE) program should be in place. DUE is a systematic criteria-based evaluation of drug use. It can be

structured so that it will help in assessing the actual process of prescribing, dispensing or administering of a drug. Drug indications, dose and interactions usually assessed through DUE program (25). DUE program is lacking in (42.2%) of hospitals an important part of clinical pharmacy services. Our study had some limitations, including the fact that we collected our information by interviewing pharmacy directors or his /her delegates in the studied hospitals, which make our data dependent on the information provided by that person. Some of this information was insufficient and we could not determine the accuracy of information provided. Also, lack of statistical records of the institutions and the small number of visited hospitals visited, were considered among the limitation of the study.

5. Conclusion

Although the majority of the hospitals attained the minimum criteria for clinical pharmacy services, these services are still insufficient or inefficient to be acceptable and there is still much room for improvement in terms of services provided, documenting current services and improving qualifications and training of clinical pharmacists hired. Furthermore, clinical pharmacist should have expanded roles as drug information providers and the number of practicing clinical pharmacists should be increased. Hospital and pharmacy administrators should lead pharmacy practice toward the clinical and patient care era in order to have better overall patient outcomes.

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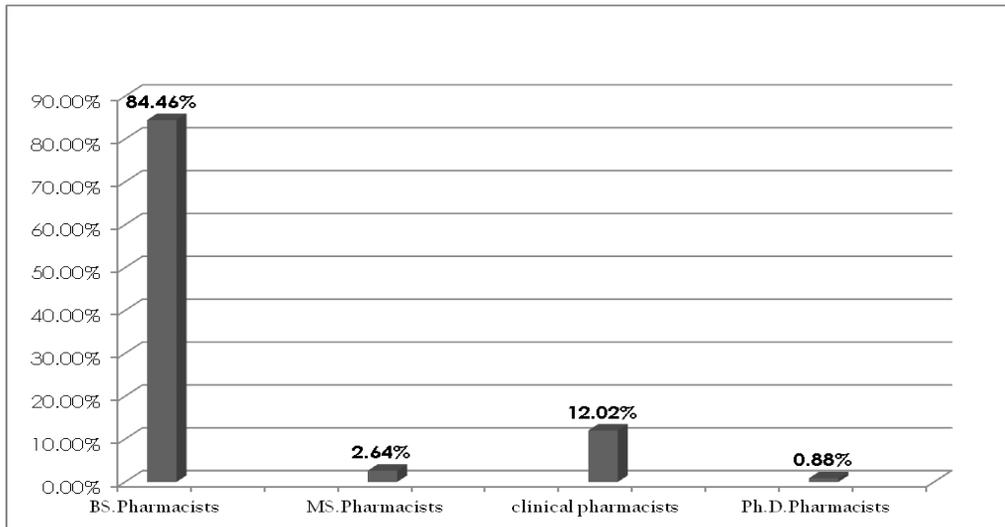


Figure 1: Percentage of staffing in Jeddah hospitals

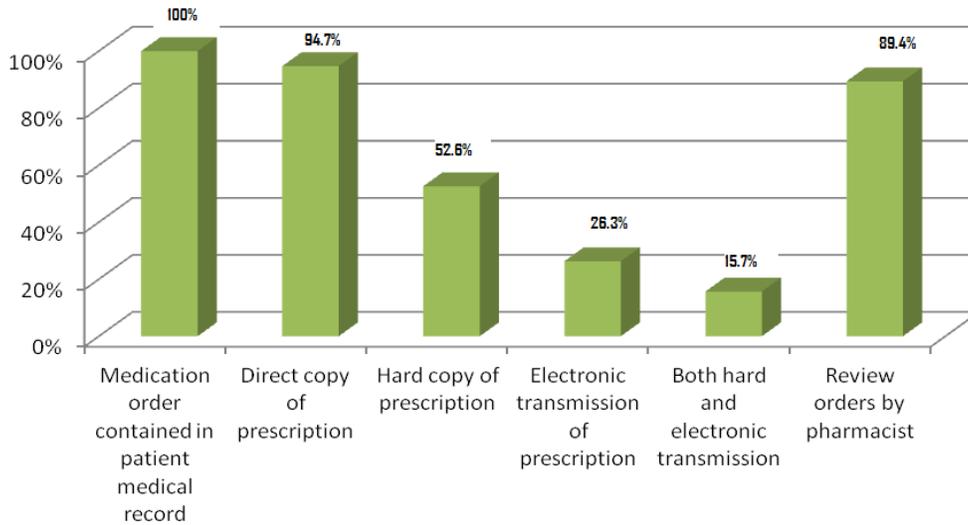


Figure 2: Drug distribution and delivery (Medication)

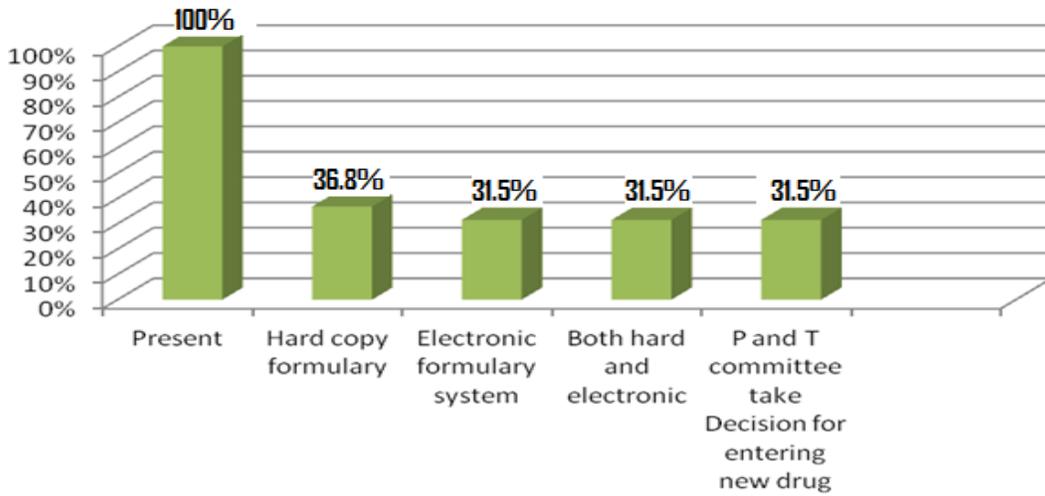


Figure 3: Drug distribution and delivery (Formulary)

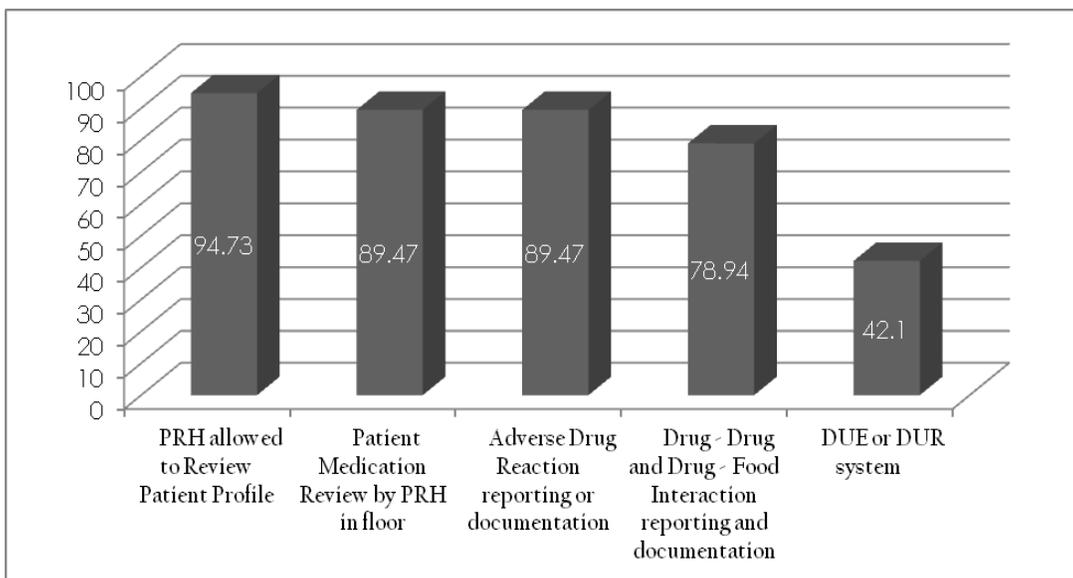


Figure 4: optimizations medication therapy

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