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Impact of Clinical Pharmacist Interventions in the Medical Ward – A study at Alkhor Hospital

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ABSTRACT

Medication error is an essential variable to determine patient safety. So it is crucial to realize the bottle necks of care giving. Studies proved that the role of clinical pharmacist can attribute to positive outcomes in patient care. The main objective is to assess the impact of the interventions provided by clinical pharmacist in the medical wards. Secondary objectives comprise of evaluating the impact of intervention in the patients with renal failure, assessing the acceptance by physician and estimating the effect of intervention in cost saving. The set of interventions collected are regrouped into various categories like indications, safety, dosing and miscellaneous. Under each category, sub-categories are listed and their respective percentages are explained using pictorial representation. Also, the acceptance rate of the interventions by the physician is calculated. The cost saving accrued because of the interventions is estimated to look into to know how the role of clinical pharmacist can help the patients economically. The interventions are regrouped into: indication – 36.3 %; safety – 40.8 %; dosing – 16.03 % and miscellaneous – 6.8 %. Majority of the interventions are given for safety and the acceptance rate of the interventions by the physicians is high – 87.2 %. It is also found that 40 % of these interventions accrued to cost saving to the patients. There is a possibility of multiple benefits, by allotting a clinical pharmacist for every medical team in the ward. This strategy helps the patients to gain better health care and cost saving.

Keywords: Intervention, Adverse Drug Reaction (ADR), International Normalized Ratio (INR), Acceptance Rate, Clinical Pharmacist.

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INTRODUCTION

Clinical pharmacy, being a branch of pharmacy explains about the role of clinical pharmacist in patient care and drug therapy. It is a discipline of health sciences and is more towards need based drug prescription and wellness orientation of the patient. The expanded definition of Clinical Pharmacy is provided by the American College of Clinical Pharmacy, viz., Clinical pharmacy is a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness and disease prevention. The practice of clinical pharmacy embraces the philosophy of pharmaceutical care; it blends a caring orientation with specialized therapeutic knowledge, experience and judgment for the purpose of ensuring effective patient outcomes. As a discipline, clinical pharmacy also has an obligation to contribute to the generation of new knowledge that advances health and quality of life [1]. The difference between the roles of pharmacist and clinical pharmacist is, the former adheres to drug advocacy and their chemical combinations and the latter deals with gamut of patient related tasks with the knowledge of multiple disciplines coupled with ushering technologies. In addition, clinical pharmacist synthesizes the experience gained in various perspectives (ethical, legal, social etc.,) and applies it for the betterment of the patient. Many studies stressed the significance of the clinical pharmacist in the present day world of increasing burden of disease and increasing technology [2]. Not just the drug related issues and adverse drug events, the clinical pharmacist aids in reducing the costs incurred by the hospital as well as the patients to a great extent by providing apt information [3]. Having understood the role of clinical phramasist, the present study is carried out in AlKhor Hospital to understand the impact of the interventions of the clinical pharmacist in the medical ward.

Literature Review and Theoretical Frame work

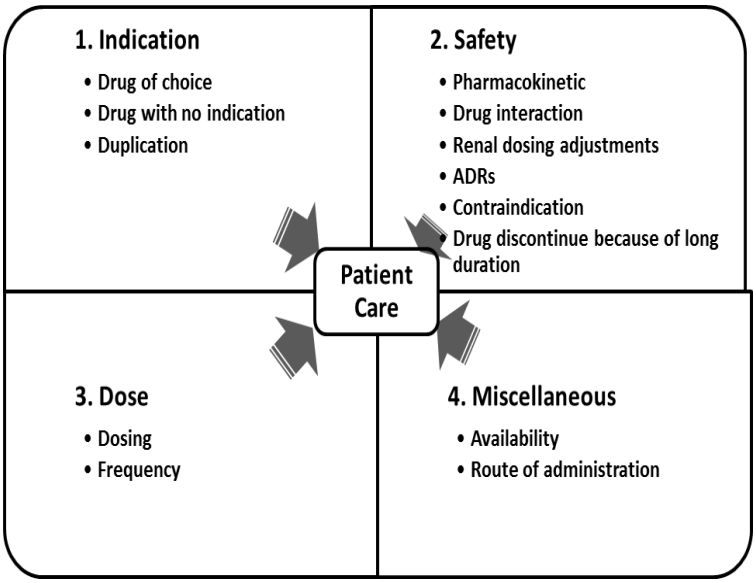
Role of Clinical Pharmacist – Significance

Medication error is an essential variable to determine patient safety services. So it is crucial to realize the bottle necks of care giving and hence resolving the medication error by providing required educational program. The study conducted in the infectious ward of Imam Hospital, Iran proved that medication errors occurs frequently in medical wards and the intervention of clinical pharmcists can effectively prevent these errors [4]. The effect of these errors emphasises the need for continuous monitoring and implementation byclinical phramacists. Clinical pharmacists during their rounds in the wards provide a measurable and valuable contribution to the optimization of pharmacotherapy in close co-operation with the medical team. For example, the selection of the most appropriate drug in terms of efficacy, dosage, adverse events, interactions, drug formulation

and cost. This is achieved by intensive discussions with doctors about therapeutic options for sustained success regarding the quality of pharmacotherapy. In the study done[5], 2,312 pharmaceutical interventions are recorded during a research, which is conducted for a period of 2-years demonstrating the necessity for the clinical pharmacists as being part of the multidisciplinary team. They observed that about half of the interventions comprise recommendations for the withdrawal or replacement of a drug following rational and economic criteria. Also, they inferred that participation of a clinical pharmacist during ward rounds is very helpful for the optimization of pharmacotherapy. Advices for dosing of drugs, especially dose adjustments in renal or liver failure are given in about one-third of the recorded interventions. These interventions have direct influence on the reduction of adverse drug events, which other wise lead to fatal conditions of the patients. Indicators of drug are used forth achievement of ideal drug result (e.g. a satisfactory INR during anticoagulation) and this results in the decrease of adverse drug outcomes such as organ impairment, MI or bleeding). INR stands for International Normalized Ratio, which is a system established by the World Health Organization (WHO) and the International Committee on Thrombosis and Hemostasis for reporting the results of blood coagulation (clotting) tests[6]. Citing the example of Warfarin, it is explained how the role of pharmacist reduced the drug complication of the patients drastically. A comparative study is done between the two groups of patients. One group of patients, hospitalized and have daily visits of the pharmacist and the other did not have any supervision of clinical pharmacist. The results of the study disclose that for the former group, which is monitored by the pharmacist has the appropriate level of INR for long period[7]. In contrary, there is no considerable change in the INR values of the second group. In a retrospective study carried out in lipid-monitoring clinics proved statistically that the clinical pharmacist led dyslipidemia patients had low-density lipoprotein than their counter parts ($p = 0.049$). This is achieved by careful administration of drug therapy and team work of clinicians and clinical pharmacist [8]. The interventions suggested by the clinical pharmacist also had a great impact in the hypertensive clinics. By following these interventions and optimum drug therapy, blood pressure of the patients has become possible[9]. The test conducted between two groups of glycemic patients with type II diabetes portrayed the advantage that the patients gained as a result of the interventions of clinical pharmacist. The group that followed the interventions had better reduction in hemoglobin A1c (HbA1c) than the other group [10]. Another study explained about the services of clinical pharmacist in the inpatient medical care. By reviewing 36 studies, that comprises of 17,000 patients, it is well understood that the interventions of clinical pharmacist not only reduce adverse drug reactions or medication errors, but also improve medication

adherence, knowledge and appropriateness[11]. In addition, studies voiced that the drug-related problems are better addressed by the interventions of clinical pharmacist. Right from ordering the medicine to the occurrence of untoward situations, the pharmacist takes critical dicisions by working with the teams and plays a key role in drug administration and patient care [12]. On the whole, there are considerable advantages researchers have found from their studies, like apt levels of lipids, reduced days of hospital stay, optimal INR levels, decrease in the number of re-admissions and heart failures [13]. This evidence infers that participation and intervention of clinical pharmacists in health care has a positive influence on clinical outcomes.

Theoretical Framework of Indicators



Methodology

With the knowledge gained by the extol review and the theoretical frame work, the following primary and secondary objectives are framed.

Primary Objective

- To assess the impact of the interventions provided by clinical pharmacist in the medical wards.

Secondary Objective

- To evaluate the impact of clinical pharmacist intervention on the patients with renal failure and other issues.
- To assess the acceptance of clinical pharmacist interventions by the physician.
- To estimate the role of Clinical Pharmacist in Cost saving.

MATERIALS AND METHODS

This is descriptive study carried in AlKhor Hospital (HMC) in Doha, Qatar. The study is done by considering 200 patients with the age group above 13 years. Among all the patients, those who are

admitted under the medical team at Alkhor Hospital during the period April 2013 to October 2013 are only considered for the study.

***Inclusion* Criteria**

Any adult patient admitted under medical team in period between April 2013 to October 2013.

Exclusion Criteria

- Any patient aged less than 13 years.
- Patients admitted through specializations other than medical team.

Data collection Method

Data is collected for a period of six months (April 2013 – October 2013) by recording the interventions proposed in the medical ward at Alkhor hospital. The Hospital contains 192 beds and out of them 20 beds are for medical ward. Patients are first admitted by the emergency department then admitted to the medical ward. The medical team consists of specialized consultant (Head of the team), two resident doctors and trained clinical pharmacist. There is one clinical pharmacist in Alkhor hospital, who reviews patient profiles, the progress note of the patients and all the relevant physician orders like lab results, etcetera of the patients during the rounds with the medical team. During the rounds the clinical pharmacist deals with the issues like recommending about drug therapy, answering the question by the team regarding medication. The clinical pharmacist records these interventions/recommendations in the intervention monitoring form and record the outcome of the intervention (acceptance or rejection by the team members). This data is kept available in the pharmacy for any further studies.

Data management and Analysis

The data thus collected regarding the interventions is stored with the principle investigator. Pertinent statistical techniques are applied on the data to understand the extent of impact the above said interventions of the clinical pharmacist have on the process of patient care, qualitatively and quantitatively. The qualitative impact is assessed in terms of the accepted percentage of the interventions and the quantitative impact is understood in the form of the cost saved by implementing the interventions. This analysis is carried out by the statistical team at Hamad Medical Corporation. Analysis is performed using the latest version of the statistical Package, SPSS 20.0. In addition, to the first level of statistics used for the analysis – Pictorial representation, second level of statistics – Pearson's Correlation Coefficient is also used to know the causal relations among the variables involved in the study. On the whole, a total of 424 interventions are recommended for 200 patients during the six months period of study. Among them, 370 interventions are accepted by the physicians. The Medical ward is covered by one clinical

pharmacist and the interventions made are categorized into four groups. (1).Interventions related to the indications; (2).Interventions regarding safety; (3).Interventions regarding the dosing and(4) Miscellaneous. This is one of the few studies that describe the clinical pharmacist activities in the medical ward in the Middle East hospital setting and first of its kind in the Qatar setting. For the sake of this study, a total of 424 interventions are made during a period of six months. These interventions are categorized into four groups - indications, safety, dosing and miscellaneous.

Table 1: Types of Interventions and their Percentages

Type of Intervention	Quantity	Percentage
Indication	154	36.3
Safety	173	40.8
Dosing	68	16.03
Miscellaneous	29	6.8
Total	424	100

Among all the interventions, majority is suggested about the 'safety' (40.8%), which includes therapeutic drug monitoring, ADRs, drugs discontinued because of long duration, contraindication, drug interaction, dosing adjustment. This indicates the role of clinical pharmacist in reducing drug related problems, which in turn helps in improving the safety of the patients. Another intervention 'indications' accrued to 36.3% in second place, which includes drug recommendation, drug with no indication and duplication. Among these interventions, 'drug recommendation' has more frequency of occurrence (n=97) followed by 'drug discontinued because of no clear indication' (n=45) and 'duplication' (n=12). These results coincide with the output of the French study done [14] assessed the role of the interventions of clinical pharmacist in a French Hospital. The interventions/suggestions of clinical pharmacist helps to get better health outcomes by providing renal dosing service to improve the safety of renal failure patients. These interventions are vital because they avoid overdosing, drug related problems and adverse drug reaction in such group of patients, as the relative over dosage in patients with renal insufficiency, receiving the standard dose, may lead to severe impairment and/or prolonged length of stay in the Hospital. In this study there are 41 interventions suggested for 200 patients about renal dose adjustment. Also, it is observed from the correlation analysis that there is negative relationship between the renal dose adjustment and ADRs, which reveals that the clinical pharmacist helps to control the ADRs by managing the renal dose adjustment (person correlation value: - 0.450). This relation is affirmed in the observational study [15], which revealed that patients hospitalized with Chronic Kidney Disease in the intervention group decrease by 16% with a significance level ($p = 0.001$).

Table 2: Percentage of Interventions related to Indication

	Frequency	Percent
Drug recommendation	97	63.0
Drug with no indication	45	29.2
Duplication	12	7.8
Total	154	100.0

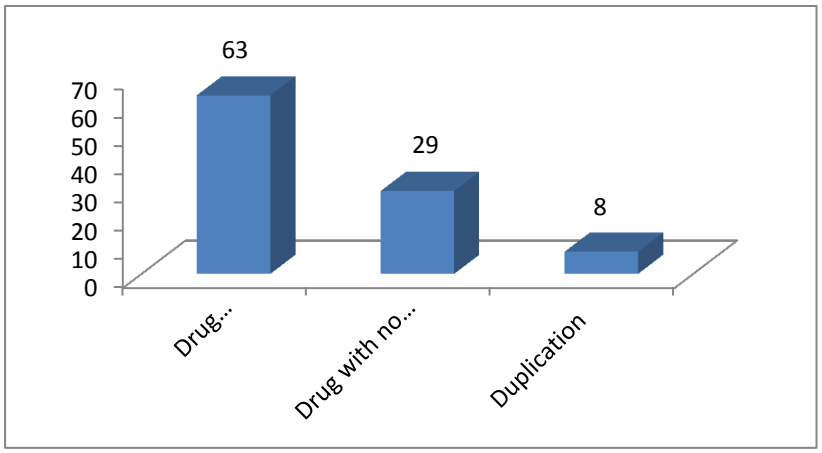


Figure 1: Percentage of Interventions related to Indication

The total number of interventions regarding the indications is given in table 2. From the figure (1), it can be understood that among the total 154 interventions, drug recommendation related are 97 (63%), drug with no indications related are 45 (29.3%) and regarding Duplication are 12 (7.8 %).

Table 3: Percentage of Interventions related to Safety

	Frequency	Percent
TDM	35	20.2
Drug interaction	30	17.3
Renal dosing Adjustment	41	23.7
ADRs	10	5.8
Contraindication	7	4.0
Drug discontinued because of long duration	50	28.9
Total	173	100.0

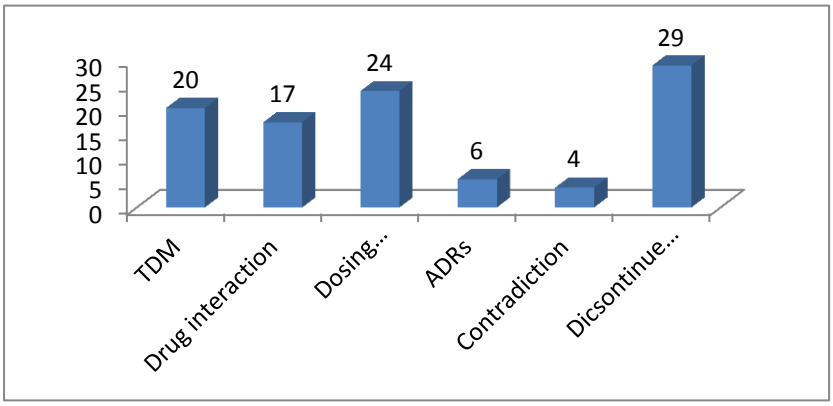


Figure 2: Percentage of Interventions Related to Safety

Interventions regarding the safety are tabulated above and figure (2) reveals that among the total number of interventions regarding the safety (173), therapeutic drug monitoring related are 35 (20.2 %), drug interaction related are 30 (17.3%), renal dose adjustment related are 41 (23.7 %), ADRs 10 (5.8 %), Contraindications related are 7 (4%) and the interventions drug discontinued because of duration are 50 (28.9 %). In this study, the drug interaction interventions proposed are 30 (17.3 %). So, the interventions made by clinical pharmacist reduce the rate of drug related problem and hence the ADRs. Thus, it is found that the participation of clinical pharmacist in wards could play an important role in the detection and management of clinically significant drug-drug interactions [10].

Table 4: Percentage of Interventions related to Dose

	Frequency	Percent
Dosing	53	77.9
Frequency	15	22.1
Total	68	100.0

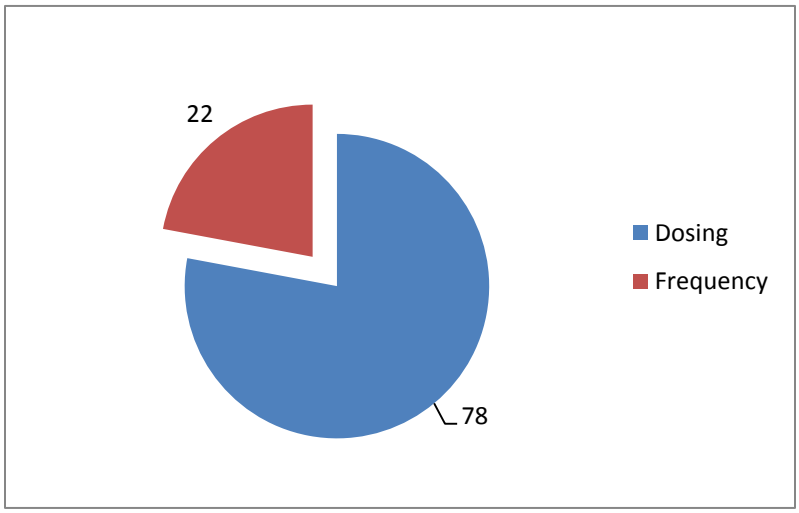


Figure 3:Percentage of Interventions related to Dose

Intervention regarding the dosing are given in table (4) and figure(3) explains the percentage of intervention regarding dosing as 77.9 (n= 53), regarding frequency as 22.1 percent (n= 15) among the total of 68 interventions related to dosing [Table (1)]

Table 5: Percentage of Miscellaneous Interventions

	Frequency	Percent
Availability	15	51.7
Route of administration	14	48.3
Total	29	100.0

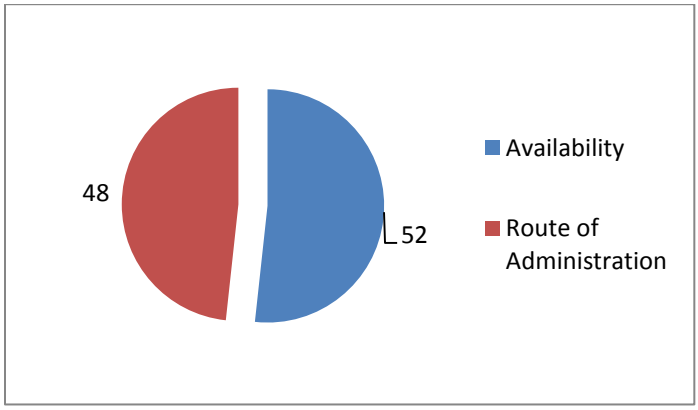


Figure 4: Percentage of Miscellaneous Interventions

From miscellaneous interventions table (5) and figure (4), it can be understood that among the total interventions(n=29) [Table (1)], Intervention regarding the availability are 15 (52 %) and route of administration related are 14 (48 %). Studies proved that the interventions suggested by the clinical pharmacist not only help to achieve better health outcome of the patient, but also help to reduce the cost of drug usage (by suggesting appropriate number of days the drug has to be consumed rather for a long period), renal dose adjustment, drugs with no clear indication, route of administration, contraindication, duplication. The analysis done to understand the cost efficiency revealed that 169 (40 %) interventions accrued to cost saving.

Table 6: Percentage of Interventions Accrue to Cost Saving

Intervention	Frequency	Percentage
Drugs discontinue because of long duration	50	12
Renal dose adjustment	41	10
Drugs with no clear indication	45	11
Route of administration (IV to Oral)	14	3
Contraindication	7	2
Duplication	12	3
Total	**169**	**40**

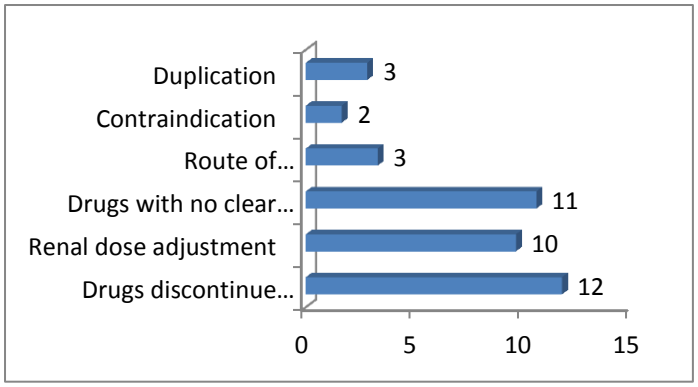


Figure 5: Percentage of Interventions accrues to Cost saving

As seen in table (6), at least 40% of clinical pharmacy services have the potential to reduce the cost of pharmacotherapy and the estimation is just based on changing the drug administration route from IV to oral, drugs discontinued because of long duration, drugs discontinued because of duplication, drugs discontinued because of no clear indication, renal dosing adjustment, contraindicated drugs, prevention of ADR's and the cost of their management. Depicting the same cost saving concept, it is inferred through their study that clinical pharmacy interventions have an impact on the cost saving by 32 percent [13].

Table 7: Acceptance rate of interventions by Clinicians

Intervention	Frequency	Percentage
Accepted	370	87.2
Not accepted	54	12.8

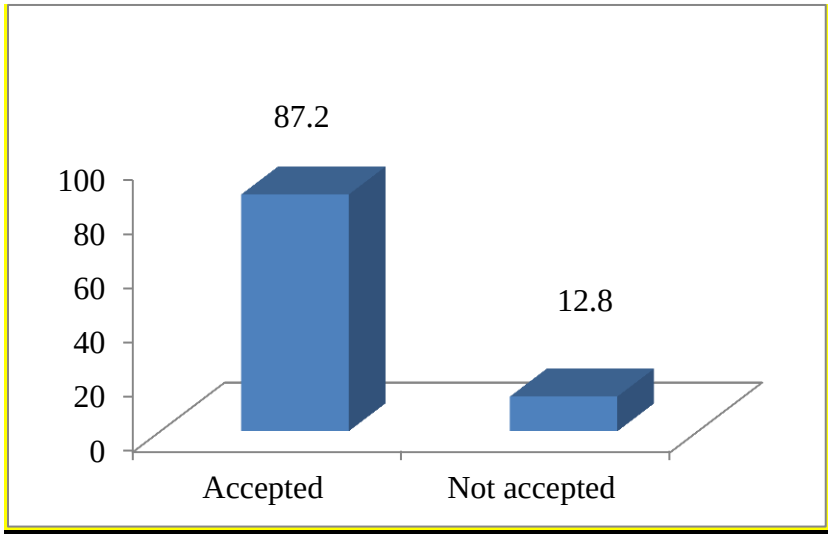


Figure 6: The rate of acceptance

The rate of acceptance of the interventions by the physicians is another yard stick to realize the significance of the clinical pharmacist. In the present study, there is 87.2 percent of the interventions are accepted by the physicians and hence implemented in the process of patient care. As these kind of studies attribute to improved patient care, conducting them is the need of the hour[14]. This is also affirmed in the study[15], which found that the number of clinical pharmacists per 100 occupied beds is associated with reduced number of adverse drug events, length of stay and even mortality rates ($p = 0.023$). Participation of clinical pharmacist in the medication process, right from dispensing the drug to the administration can reduce medication errors and is beneficial to patient care. This can be achieved better by the rounds of clinical pharmacist in the medical wards and checking different steps of the pharmaceutical care [16].

CONCLUSION

From this analysis, it is clear that clinical pharmacists played an important role in optimization of drug therapy by avoiding drug related problems. His / Her role was very much apparent qualitatively and quantitatively in the process of patient care. The participation of clinical pharmacist in medical ward had a potential impact in reducing drug costs for the patient as well as for the hospital. By the acceptance rate of interventions by the physicians, it can be inferred that clinical pharmacist's interventions are highly relevant and they not only contribute to the betterment of health care outcomes but also fosters the inter professional collaboration. Recognizing the gains accrued by the clinical pharmacist in patient care vertical and taking strategic strides so that there is at least one clinical pharmacist with every medical team is the need of the hour. It is equally important to the policy makers to look into this aspect in order to achieve service excellency in the Hospitals.

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