

Research Article

# Retrospective Assessment of the Clinical Pharmacist Sheets among a Few Iraqi General Hospitals

*Karrar Mohammed Abbas<sup>1</sup>, Manal Khalid Abdulridha<sup>2</sup>*

<sup>1</sup>Ministry of Health, Thiqr Health Directorate, Iraq.

<sup>2</sup>Department of Clinical Pharmacy, College of Pharmacy, Mustansiriyah University, Iraq.

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## I N F O

### Corresponding Author:

Manal Khalid Abdulridha, Department of Clinical Pharmacy, College of Pharmacy, Mustansiriyah University, Iraq.

### E-mail Id:

[pharm.mrdha@uomustansiriyah.edu.iq](mailto:pharm.mrdha@uomustansiriyah.edu.iq)

### Orcid Id:

<https://orcid.org/0000-0002-5059-7963>

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## A B S T R A C T

**Background:** Clinical pharmacist sheet is an essential part of the medical record; it highlights the pharmacist's role during hospitalisation through the concept of pharmaceutical care and specific pharmacist collaboration with a patient and other health care teams.

**Objective:** To assess the documentation completeness level of the clinical pharmacist sheet, pharmacist intervention, type and prevalence of Drug-Related Problems.

**Methodology:** A retrospective observational study that included revised 3900 clinical pharmacist sheets from Baghdad and Thiqr Hospitals for 2018, 2019, and 2020. The forms from four departments of the hospitals (internal medicine, surgery, paediatrics, gynaecology and obstetrics). In addition, assessment completeness of the pharmacist documentation level in the clinical pharmacist sheets, and Pharmacist interventions.

**Results:** The overall documentation completeness level in the clinical pharmacist sheets was generally poor (less than 50% of the sheet items were filled in). The best documentation level was presented in the surgery ward (52.34%). A total of 3900 clinical pharmacist sheets were analysed within multi-ward hospitals that revealed variable percentages of DRPs (10%, 8.55%, 12.44%, and 7.42%) in internal medicine, surgery, gynaecology and obstetrics, and paediatric respectively. Findings also revealed a significant decline in pharmacist interventions over the last three years.

**Conclusion:** There was poor documentation completeness level and pharmacist interventions over the last 3 years among clinical pharmacist sheets. Drug selection, dosing, and substituting unavailable drugs with an alternative were the commonest causes of DRPs.

**Keywords:** Drug-Related Problems (DRPs), Clinical Pharmacist, Pharmacist Intervention

## Introduction

Clinical pharmacists are shouldering numerous responsibilities depending upon the available resources in the health care system.<sup>1</sup> These responsibilities and duties vary from prescription review up to prescribing drugs. Australian's Society of Hospital Pharmacy divided them into Patient Medication History, Profile Patient Review, Adverse Drug Reaction Management, Therapeutic Drug Monitoring (TDM), Drug Information Management, and Patient Counselling.<sup>2</sup> Clinical pharmacist sheet is an essential part of the medical record; it highlights the pharmacist's role during inpatient care through the concept of pharmaceutical care and specific pharmacist collaboration with a patient and other health care teams for good therapeutic outcomes.<sup>1</sup>

Clinical pharmacists participate with other multidisciplinary teams to optimise patients' pharmacotherapy, minimise medication errors, and detect and manage drug-related problems during medical rounds.<sup>3</sup> Activities involving patient care within the multi-ward in hospital settings result in effective and safe medication use.<sup>4</sup>

Pharmaceutical care is an essential new concept that rapidly developed after establishing professional pharmacist activities, involving medication preparation and dispensing with the necessity to integrate between clinical pharmacist and individual patients for satisfying desired outcomes.<sup>2,5</sup> Good pharmaceutical care improved patients' quality of life and minimised DRPs.<sup>6</sup> Preventable adverse events each year across a wide range of drug classes can be diminished by clinical pharmacist review of medications chart, and can thus improve patient outcome.<sup>7,8</sup> The patient should be supported with the updated knowledge of their disease condition, medication, and appropriate lifestyle modifications required to understand their condition and thereby improve their quality of life, and prevent or minimise drug-related problems.<sup>9</sup> Therefore, there is an urgent need to evaluate and document the role of clinical pharmacist services in the health care team.

Pharmaceutical care is a form of pharmacy practice in which pharmacists respond to the needs of the patients and offer the best services and most evidence based treatment possible.<sup>10</sup> Medication therapy review and pharmacist interventions are provided by the pharmacist based on several guidelines.<sup>11</sup> Continuing professional development is described as pharmacists' responsibility for periodic maintenance, development, and broadening knowledge, skills, and attitudes to ensure continued competence as professionals throughout their careers. Their efficient collaboration with the health team is crucial as well, as a result; the benefits of a pharmacist's intervention and good documentation potentially improve economic and health-related quality of life, and can provide integrated drug management to patients and caregivers.<sup>12,13</sup>

## Methodology

This is a retrospective observational study on revised clinical pharmacist sheets from Baghdad and Thiqr Hospitals for 2018, 2019, and 2020 which were included from four departments of the hospitals (internal medicine, surgery, paediatrics, gynaecology and obstetrics). Data regarding assessment completeness of the pharmacist documentation level in the clinical pharmacist sheets, assessment of clinical pharmacist interventions according to the Pharmaceutical Care Network Europe (PCNE) classification system for drug-related problems, and assessing any changes in pharmacist intervention each year among different wards, were collected and the sum of drug therapy problems reported in the documented clinical pharmacist sheet was assessed retrospectively. Any inpatient records lacking medication-consult sheets, patient files without admission or discharge date, or patients leaving before 48 hours of admission were excluded from the study. The total number of clinical pharmacist sheets to be revised retrospectively were about 3900. Also, the sum of drug therapy problems reported in the documented clinical pharmacist sheet, revised annually, was collected to assess any changes in pharmacist interventions each year among different wards.

## Results

### Documentation Completeness Level of Clinical Pharmacist Sheets among Multi-ward Hospitals

Figure 1 reveals the documentation completeness level of multi-ward hospitals. In the department of internal medicine in the current study, the figures decreased from 43% to 33% (from 2018 to 2020) and in general surgery, the figures were 64% and 67% for 2018 and 2019 respectively, and declined after that. The completeness level in gynaecological and obstetric wards was 43% in 2018, 35% in 2019, and 29% in 2020. Paediatric ward sheets demonstrated completeness levels of 46.5% and 44% for 2018 and 2019, respectively as good documentation and declined after that.

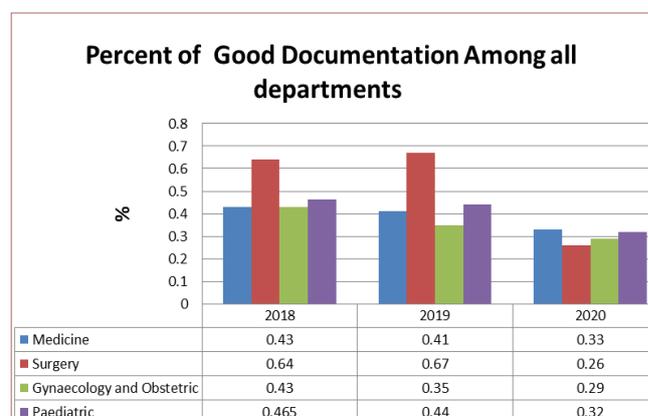


Figure 1. Percentage of Good Documentation for Three Years among Various Departments

### Drug-related Problems according to PCNE Category among Hospital Wards

The various drug-related problems identified from clinical pharmacist sheets of six Iraqi hospitals over the past 3 years (2018, 2019, and 2020) from both governorates (Baghdad and Thiqr) were as follows:

The DRPs identified from internal medicine ward sheets according to PCNE showed that unavailability of drugs represented a major problem (35.55%), while, treatment monitoring deficits represented 20.0% of DRP. Dosing-related problems represented 18.87%, and drug selection problems revealed 16.65% of DRPs as shown in Table 1. Also, the DRPs identified as per the general surgery ward sheets showed that unavailability of drugs represented a major problem (32.46%), while, dosing-related problems represented 24.65% and drug selection problems constituted 12.96% of DRPs as shown in Table 2. The DRPs identified from gynaecological and obstetric ward sheets showed that unavailability of drugs constituted a major problem (32.14%) while drug selection problems constituted 22.3%, and dosing related problems represented 11.59% of DRPs as shown in Table 3.

**Table 1. Causes of Drug-Related Problems in Internal Medicine Ward**

Causes of DRPs	PCNE Category	DRPs	
		n	(%)
ADR	P2.1	2	2.22
Monitoring	C9.1	18	20.00
Administration	C6.6	1	1.11
Drug-food interaction	C7.5	0	0.0
Drug selection problems	C1	15	16.65
DDI	C1.4	8	8.88
CI	C1.1	7	7.77
Patient adherence	C7.8	1	1.11
Dosing related problems	C3	17	18.87
High dose	C3.2	6	6.66
Low dose	C3.1	8	8.88
Dosage regimen too frequent	C3.4	3	3.33
Dispensing	C5	0	0.0
Unavailability of drug	C5.1	32	35.55
Others Add new drug	C9.2	4	4.44
<b>Total</b>		<b>90</b>	<b>100</b>

Data has been presented as number (n) and percentage (%).

Finally, the DRPs identified from the 4 general hospitals' 1200 paediatric ward sheets according to the PCNE showed that unavailability of drugs represented the main problem

(26.97%), along with drug selection problems constituting 22.47%, dosing related problems accounting for 17.98%, and ADR representing 17.98% of DRPs as shown in Table 4.

**Table 2. Causes of Drug-Related Problems in Surgery Ward**

Causes of DRPs	PCNE Category	DRP	
		n	%
ADR	P2	6	7.79
Monitoring	C9.1	0	0
Administration	C6.1	1	1.29
Drug-food interaction	C7.5	0	0
Drug selection problems	C1	10	12.96
DDIs	C1.4	5	6.49
No indication for a drug	C1.3	1	1.29
Inappropriate duplication of drugs	C1.5	2	2.59
Too many drugs prescribed	C1.7	2	2.59
Patient adherence	C7.1	4	5.19
Dosing related problems	C3	19	24.65
Drug dose too low	C3.1	7	9.09
Drug dose too high	C3.2	5	6.49
Dosage regimen not frequent enough	C3.3	3	3.89
Dosage regimen too frequent	C3.4	3	3.89
Wrong dose instructions	C3.5	1	1.29
Dispensing	C5	0	0
Unavailability of drug	C5.1	25	32.46
Other			
Add new drug	C9.2	6	7.79
Duration of treatment too long	C4.2	1	1.29
Cost comparison	C9.2	2	2.59
Iv incompatible	C9.2	3	3.89
<b>Total</b>		<b>77</b>	<b>100</b>

Data has been presented as number (n) and percentage (%).

**Table 3. Causes of Drug-Related Problems in Gynaecology and Obstetrics Ward**

Causes of DRPs	PCNE Category	DRP	
		n	%
ADR	P2	9	8.03
Monitoring	C9.1	4	3.57
Administration	C6	10	8.92
Wrong dosing interval	C6.1	2	1.78

<i>Drug administered via a wrong route</i>	C6.6	8	7.14
<b>Drug-food interaction</b>	C7.5	0	0
<b>Drug-selection problems</b>	C1	25	22.3
<i>Contra-indication</i>	C1.1	6	5.35
<i>DDIs</i>	C1.4	6	5.35
<i>Wrong duplication of therapeutic group</i>	C1.5	12	10.71
<i>Too many drugs prescribed</i>	C1.7	1	0.89
<b>Patient adherence</b>	C7.1	11	9.82
Dosing	C3	13	11.59
<i>Drug dose too low</i>	C3.1	3	2.67
<i>Drug dose too high</i>	C3.2	7	6.25
<i>Dosage regimen too frequent</i>	C3.4	3	2.67
<b>Dispensing</b>	C5	0	0
<b>Unavailability of drug</b>	C5.1	36	32.14
<b>Other</b>			
<i>Add new drug</i>	C9.2	4	3.57
<b>Total</b>		112	100

Data has been presented as number (n) and percentage (%).

**Table 4. Causes of Drug-Related Problems in Paediatric Ward**

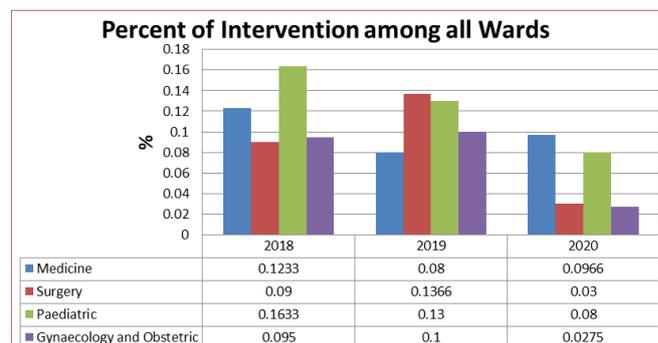
Causes of DRPs	PCNE Category	DRP	
		n	%
<b>ADR</b>	<b>P2</b>	16	17.98
<b>Monitoring</b>	C9.1	0	0
<b>Administration</b>	C6	4	4.49
<i>Drug over administered</i>	C6.3	1	1.12
<i>Inappropriate timing of administration or dosing interval</i>	C6.1	3	3.37
<b>Drug-food interaction</b>	C7.5	0	0
<b>Drug-selection problems</b>	(C1)	20	22.47
<i>CI</i>	C1.1	4	4.49
<i>No indication for drugs</i>	C1.3	1	1.12
<i>DDI</i>	C1.4	10	11.23
<i>Inappropriate duplication of therapeutic group</i>	C1.5	4	4.49
<i>Too many drugs prescribed</i>	C1.7	1	1.12
<b>Patient adherence</b>	C7.1	1	1.12
<b>Dosing related problems</b>	C3	16	17.98
<i>Drug dose too low</i>	C3.1	9	10.11

<i>Drug dose too high</i>	C3.2	2	2.25
<i>Dosage regimen too frequent</i>	C3.4	2	2.25
<i>Wrong dose instructions</i>	C3.5	3	3.37
<b>Dispensing</b>	C5	0	0
<b>Unavailability of drug</b>	C5.1	24	26.97
<b>Other</b>	C4.2	2	2.25
<i>Duration of treatment too long</i>	C9.2	2	2.25
<i>IV incompatible</i>	C9.2	4	4.49
<b>Total</b>		<b>89</b>	<b>100</b>

Data has been presented as number (n) and percentage (%).

### Changes in Pharmacist Interventions among different Hospitals Wards

Figure 2 shows the percentage of pharmacist interventions within multi-ward hospitals. The percentage for paediatric ward was 16.33% in 2018 and declined after that. 13.66% was the best recorded figure in the surgery ward during 2019. The percentage for gynaecological and obstetric ward did not exceed 9.5% in 2018. The internal medicine ward reached 12.33% in 2018 and declined in 2019 and 2020.



**Figure 2 .Percentage of Pharmacist Intervention for Three Years a**

### Discussion

#### Documentation-completeness of Clinical Pharmacist Sheet among Different Wards

The core responsibilities of inpatient pharmacists include reviewing and documenting interventions in the clinical pharmaceutical sheet.<sup>14</sup> Medical documentation is a comprehensive, reliable, sufficient, timely assists healthcare practitioners in minimising medical errors, and serves as valuable medical-legal evidence.<sup>15</sup> Complete documentation of medication review and other elements related to the patient's condition is extremely important for admitted patients, and the absence of any critical information may result in unfavourable treatment-related problems.<sup>16</sup>

This study of documentation completeness level of the

internal medicine in the current study done retrospectively for 3 years by random sampling of 900 clinical pharmacist sheet from 3 hospitals (Baghdad teaching hospital, Al-Hussien teaching hospital, and Souq-Al-Shiukh general hospital) revealed poor documentation level (39%). Nevertheless, the completeness level of documentation of clinical pharmacist sheet of the general surgery ward was fairly consistent (52.34%) as good for 2018, 2019 and 2020. Moreover, the completeness level of randomly sampled clinical pharmaceutical sheets from the gynaecological and obstetric ward (Baghdad teaching hospital, Bint Al-Huda teaching hospital, and Souq-Al-Shiukh general hospital) was 35.7%.

Paediatric ward sheets in the current study (Welfare teaching hospital for paediatric in Baghdad province, Bint-Al-Huda teaching hospital, Mohammed Al-Mosauy and Souq Al-Shiukh general hospital in Thiqr province) demonstrated poor completeness levels (40.8%). Previous studies conducted in different countries worldwide as in Rwanda reported an increase in the completeness of medical records of the maternity unit over one year (25% to 67 %).<sup>17</sup> Another study conducted in Ethiopia reported a gap in medical record completeness before and after one year of a quality intervention programme, after which the completeness of medical records improved from 14% to 84%.<sup>18</sup> Moreover, the documentation of the pharmacological history of admitted patients was found to be frequently inadequate in a study involving 304 admitted patients from two hospitals in the Netherlands, with 61% of the patients' records being incomplete.<sup>15</sup> Careful documentation in a paediatric ward contributes to better patient assessments more accurate and timely diagnosis along with proper treatment, and allows other health care providers to follow treatment outcomes.<sup>19</sup>

The poor documentation completeness in the current study probably reflected some lack in pharmacist practice to properly document pharmaceutical sheets on one hand, and on the other hand, they may have been caused due to defects in applying quality intervention programmes particularly those concerning general internal medicine and multiple prescriptions. A recent pilot study (2020) among different wards in Iraqi hospitals reported incomplete documenting of the majority of clinical pharmaceutical sheets for the inpatient, particularly in the surgery ward.<sup>20</sup>

### **Drug Related Problems in Clinical Pharmacist Sheets (CPS) over Three Years**

Data collected from Baghdad teaching hospital, Al-Hussien teaching hospital and Souq-Al-Shiukh teaching hospital distributed in Baghdad and Thiqr provinces after reviewing 900 CPS for 3 years revealed several types of DRPs detected in the internal medicine ward in the current. With reference to the PCNE classification system, items of DRPs in the

clinical pharmaceutical sheet included in the patient's file were matched with those in other studies.<sup>21</sup> This scope highlighted the importance of medication review and the presence of clinical pharmacists during tour as a full member of the patient care team in internal medicine ward. It showed that they were probably associated with a substantially lower rate of adverse drug events caused by prescribing errors.

The influence of poly-pharmacy was described in many previous studies.<sup>22,23</sup> Lenssen et al. identified poly-pharmacy as a significant risk factor for DRP growth.<sup>24</sup> Moreover, overall 10.5% of medication errors were reported in North-west England hospitals,<sup>25</sup> which is close to the current finding. Dosing related problem was also a crucial one (18.87%) particularly high dose, low dose, and too frequent dosage. Drug selection was another type of DRP in the internal medicine ward (C1, 16.65%), which caused drug interaction and contraindication. Similar findings were reported previously in 2011 in one of the national hospitals where dosage or frequency of medication followed by addition of drugs to therapy represented the most common issue (32.4% and 19.5% respectively)<sup>26</sup> Globally, as per a study conducted at a multi-specialty teaching hospital, the suboptimal dosing was the most common DRP,<sup>27</sup> Most of the common improper drug selection was related to antibiotics, which is in line with a previous study where anti-infective was the most common class of drug for DRPs.<sup>28</sup>

In the current study, the overall percentage of DRPs was 8.5% of the total clinical pharmaceutical sheets reviewed, which was less than that of the internal medicine ward probably due to low number of drugs dispensed pre and post-operatively. This percentage could be acceptable compared to a few studies done in developed countries that showed that the values reported in a German orthopaedic and accident surgery ward using the APS-Doc coding and Swiss cardiovascular surgery ward using a simplified PCNE classification system were 2.6%<sup>29</sup> and 1.7%,<sup>30</sup> respectively. Another DRPs that reported in the Indian tertiary teaching hospital were 47.6%.<sup>31</sup> The issue of unavailability of drugs (C5.1, 32.46%) that represented a major problem and required recommending drug replacement with another alternative, was not very common elsewhere. Dosing related problems (C3, 24.65%) (particularly too low and too high dose) besides the improper drug selection leading to DDI mainly (C1, 12.96%), represented the major problems in this study. The other category represented less than 10% of DRPs.

A previous hospital-based prospective observational study (2010) designed to assess the prevalence of DTP among patients hospitalised at the surgical ward stated that too low (27.6%) and too high (18.0%) doses were found to be the most common types of DTPs,<sup>32</sup> This is in agreement

with the current finding. Also, in a prospective cohort study (2020) conducted in a Brazilian University Hospital with a total of 12,286 hospitalisation episodes, the DRP detected using Pharmaceutical Care Network Europe 6.2 classification showed that drug use process (18.4%) and treatment duration (31.0%) were the main causes of DRP.<sup>33</sup> A very recent study (2021) conducted among elderly patients from surgical departments classified based on the Pharmaceutical Care Network Europe classification V8.02 reported drug selection (43.1%) and dose selection (43.1%) as the major causes of DRP from a total of 53,231 medication order forms. The results were in line with the current finding except for a higher percentage related to the number of reviewed sheets.<sup>34</sup>

Drug related problems detected from gynaecological and obstetric ward sheets from three Iraqi hospitals (Baghdad teaching hospital, Bint Al-Huda teaching hospital, and Souq Al-Shiukh general hospital) were collected and reviewed. In the current study, the overall percentage of DRPs was 12.44% of the total clinical pharmaceutical sheets reviewed which was higher than that of the above-mentioned wards. The unavailability of drugs, drug selection problems (mainly duplication of therapeutic group, and dosing related problems (C3), all accounted for more than 65% of cases of DRPs. Also, patient adherence problems (C7.1), administration problems (C6) and ADR problems (P2) represent more than 25% of medication-related problems. This finding was lower than that reported in a Norwegian study where the need for additional drugs was 46.7% out of 212 women and was the most frequent.<sup>35</sup> In an Australian study, the highest number of DRPs (49%) was identified among a total of 454 women admitted following caesarean delivery.<sup>36</sup> Recently, in a developing country, among 323 study participants, DRPs mostly in relation to lack of iron supplementation were 70.6%.<sup>37</sup> This large variation in type and percentage of DRPs is likely due to the scope of health care systems, population sample size, and disease distribution.

Paediatric patients are the vulnerable population who are susceptible and sensitive to drug related problems due to their underdeveloped physiological conditions and lack of accurate doses and dosage forms.<sup>38</sup> Four paediatric wards were selected from 4 Iraqi hospitals: Welfare teaching hospital of paediatric, Mohammed Al-Mousaoy for paediatric, Bint Al-Huda teaching hospital, and Souq Al-Shiukh general hospital located in Baghdad and Thiqr provinces. Reviewing 1200 sheets showed 7.42% DRPs as an average. Unavailability of drugs, drug selection problems, and dosing related problems were the major categories similar to other mentioned wards. Drug dose too low and DDI were the most recorded in paediatric sheets. Notably, ADR was reported in 17.98%, of paediatric cases which was

much higher than the other wards. A percentage of 17.3% was reported in a prospective study in Babylon Hospital for Gynaecology and Children for 3 months.<sup>5</sup> Also, 13.4% was reported by Rashed et al.<sup>39</sup> Others reported (71%) major drug interaction, moderate drug interaction and minor drug interaction based on its effect on the therapy of patients.<sup>40</sup>

In developed countries, studies reported other types of DRPs like treatment effectiveness, treatment safety, and non-conformity to guidelines identified in the medication charts.<sup>41,42</sup> along with those related to the choice of drug and drug dosing.<sup>43</sup> The variation could be attributed to differences in training levels of prescribers, knowledge of health professionals responsible for medication review especially the pharmacist, availability of support systems and inter-professional collaboration, and composition of the health care team in these hospitals.<sup>44</sup>

### Changes in Pharmacist Intervention Over Three Years

In the current study, no change in pharmacist intervention was noticed over the past 3 years (2018, 2019 and 2020), though with a very low level of intervention. Also, the pharmacist intervention was fluctuating in the surgery ward with a significant decline in the last year (2020). Moreover, a significant decline was noticed in the percentage of pharmacist intervention in Gynaecology and Obstetric ward sheets, similarly to the paediatric ward. From these findings, it can be speculated that this decline in the pharmacist intervention among different hospital wards starting from 2019 could be attributed to the outbreak of the COVID-19 pandemic. A reasonable number of studies described the role of the pharmacists during the COVID-19 pandemic as important, while some reported a negligible role.<sup>45,46</sup> The overall percentage of pharmacist interventions over the 3 years did not exceed (9.6%) in the current study. In agreement with the current study finding, the computerised physician order in multi-ward from Grenoble University Hospital reported pharmacist interventions equal to 15.7%<sup>47</sup>; a higher percentage was stated by Falcao et al.<sup>48</sup> The physician-pharmacist collaborative partnerships and trust worthiness is a key factor to clinically validate and evaluate any pharmacist intervention.<sup>49</sup>

### Conclusion

There was a decline in documentation completeness-level in subsequent years among clinical pharmacist sheets from different hospitals wards. The best level of documentation completeness was noticed in the general surgery wards. The drug selection problem, dosing related problems, and unavailability of drugs specifically indicated, was the predominant categories of DRPs. A significant variation in the pharmacist intervention over the 3 years was noticed in sheets of surgery, gynaecology, and paediatric wards.

## Limitations of the Study

The collected samples of clinical pharmacist sheets were limited to six hospitals within two provinces retrospectively to 3 years only, and cannot be presumed to be representative of all hospitals. Also, because of physical environment challenges and poor handling of patient files in many hospitals, the current study could not be extended for more than 3 years.

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## Ethical Approval

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**Conflict of Interest:** None

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