An Evaluation of Interventions by Clinical Pharmacists in a Tertiary Hospital

Sarah Anne Robert*, Suet Yin Chin, Lay Yen Gan, Chee Lan Lau, Kiew Bing Pau, Shue Hong Kong, Farah Waheeda Tajurudin, Mei Kuen Yin, Sheah Lin Ghan, Nur Jannah Azman, Xin Yun Chua, Poy Kei Lye, Stephanie Wai Yee Tan, Muhd Nordin Saud, Dexter Van Dort

ABSTRACT

Introduction: Problems with medication therapy are a major concern in health care because of the associated increase in morbidity, mortality and increased cost of treatment. Clinical pharmacy services are well established in developed countries such as the United States and have been reported to reduce adverse drug events, medication errors, patient’s length of stay, mortality rates and costs. Clinical pharmacists proactively ensure rational medication use, avoiding medication errors at point of prescribing. They participate in ward rounds, communicate with the team in the wards, interview patients, perform medication reconciliation, provide counselling, therapeutic drug monitoring, antibiotic stewardship, discharge screening and follow ups. Any discrepancy or problems detected will be conveyed to the relevant team member for correction. Objective: To describe and evaluate the interventions performed by clinical pharmacists in a tertiary teaching hospital in Malaysia. Method: A clinical pharmacy observational retrospective study was conducted between January and December 2019. Fourteen clinical pharmacists were assigned to respective wards in the medical, surgery and intensive care units to provide pharmaceutical care. All interventions performed in the wards were documented systematically. Result: A total of 3345 interventions were recorded. The most frequent interventions were on rational drug therapy (n = 1456, 43.5%), followed by corrections made on prescription (n = 1349, 40.3%) and changes in dosage and frequency (n = 540, 16.2%). The majority of suggestions (n = 3264, 97.6%) have been accepted. Conclusion: To our knowledge, this is the first study reporting clinical pharmacist interventions in a teaching hospital in Malaysia. The involvement of clinical pharmacist in the wards contributed to the optimisation of pharmacotherapy, safety and better patients’ outcomes. There was good inter-professional collaboration at the ward level.

INTRODUCTION

Clinical pharmacists are pharmacy practitioners who specialize in providing care for patients directly and managing patients’ medications [1]. The American College of Clinical Pharmacy defines clinical pharmacy as a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness and disease prevention. This practice which uses the philosophy of pharmaceutical care, blends a caring orientation with specialized therapeutic knowledge, experience and judgement for the purpose of ensuring optimal patient outcomes [2]. Clinical pharmacists proactively ensure rational medication use, avoiding medication errors at the point of prescribing.

Clinical pharmacy services are well established in developed countries such as the United States and have been reported to reduce adverse drug events, medication errors, patients’ length of stay, mortality rates and costs [1]. Studies have shown that

*Correspondence: sarahrobert@ppukm.ukm.edu.my
with clinical pharmacist participation in medical inpatient acute care teams and medication chart review, preventable adverse drug events were reduced by as high as 78% [3,4]. Clinical pharmacist involvement in critical care team rounds resulted in a potential cost saving of more than $210 000 in 4.5 months [5]. Participation in ward rounds, communicating with the health care team in the wards, interviewing patients, medication reconciliation, providing counselling, therapeutic drug monitoring, discharge screening and follow up has shown better patient health outcomes [1]. In antimicrobial stewardship programmes, clinical pharmacists were also key members; with participation in developing guidelines, policy, monitoring drug usage, reviewing complex cases, intravenous to oral conversion and review of the appropriateness of antimicrobial use in an attempt to reduce antimicrobial resistance. This has promoted the implementation of clinical pharmacy services globally including in developing countries.

Malaysia has introduced ward-based clinical pharmacy services, where clinical pharmacists are given the responsibility of ensuring that patients receive optimal treatment, provide counselling and promote proper and effective use of drugs. With the paucity of reports about clinical pharmacists’ intervention during ward rounds in Malaysian hospitals, this study aims to describe and evaluate the interventions performed by clinical pharmacists in the wards in a tertiary teaching hospital in Malaysia.

METHOD

Study Design

This was an observational retrospective study conducted by fourteen clinical pharmacists in a single teaching hospital from 1st January to 31st December 2019. Clinical pharmacists were assigned to fourteen wards (7 medical wards, 3 surgical wards, 1 intensive care unit, 1 coronary care unit, 1 coronary recovery ward, 1 neonatal intensive care unit) and were accountable to document all the interventions done while carrying out other clinical tasks in the wards.

Intervention, Data Collection and Data Analysis

All documented interventions were conveyed to prescribers or nurses by direct communication, noting on the patient chart or phone messaging to the relevant team member. The intervention was considered accepted if the prescription was modified as suggested within 2 working days. The data recorded were then classified based on quantities and types of interventions [6,7]. They were then categorised into prescription issues, dose and frequency modifications and rationalization of therapy. Prescription issues included wrong drug indented, strength or route and transcribing near misses’ rectification. Dose and frequency modifications have included dose optimisation or adjustment according to infection site and organ function. Rationalization of therapy was based on drug indication and de-escalation of antibiotics according to culture. The data was analysed using SPSS version 26 using descriptive statistics.

RESULT AND DISCUSSION

In this study, a total of 3345 pharmaceutical interventions were documented throughout one year. This demonstrates the importance of clinical pharmacists based in the wards as part of the team. Pharmaceutical care delivered by the clinical pharmacists likely has improved pharmacotherapy by appropriate prescribing, monitoring and administration of medication. The interventions performed were classified into three main categories, with the most frequent one being rational therapy (n = 1456, 43.5%), followed by correction on prescription (n = 1349, 40.3%) and changes in dose or frequency (n = 540, 16.2%). Figure I.

The detailed characteristics of interventions and frequency are summarised in Table I. Rational therapy was based on suggestions to restart medications patients were taking but missed out in the prescription (n = 381, 11.4%), suggestions for intravenous to oral switch (n = 362, 10.8%), drugs prescribed without an indication (n = 175, 5.2%), correction on drug administration (n = 155, 4.6%), double therapy (n = 131, 3.9%), suggestions to monitor lab parameters (n = 119, 3.6%), inappropriate route of administration / suitability of formulation for nasogastric tube feeding (n = 46, 1.4%), contraindication (n = 45, 1.3%), duration of therapy (n = 36, 1.1%), and drug-drug interactions (n = 6, 0.02%). Suggestions for intravenous to oral switch were indicated, having advantages such as reduced risk of thrombophlebitis and bacteraemia from use of venous access, possibility of earlier discharge and cost savings [8]. Discontinuing unnecessary prescription also contributes to avoid adverse drug reactions [9]. In addition, reviewing the appropriateness of antimicrobial use to ensure judicial use in the medical, surgical and intensive care units of the hospital contributes to reducing the emergence of antimicrobial resistance and health-care-associated infections [10].

Corrections on prescriptions included interventions performed during prescribing and transcribing stages. Patients case notes and medication charts were reviewed and clarification were also made when a deviation between prescriber’s order and medication chart were detected. The numbers were as follows: wrong dose (n = 479, 14.3%), missed medication (n = 289, 8.6%), wrong frequency (n = 276, 8.3%), wrong drug (n = 211, 6.3%), wrong duration (n = 72, 2.2%), duplicated prescription and wrong patient both (n = 9, 0.3%). Wrong dose was the most frequent intervention made. Despite different ways of classifying types of intervention done, our results were
consistent with other studies where most common types of drug related problem were reported to be dose too low [11]. The least frequent intervention was incomplete prescription (0.1%, n = 4) such as prescription without dose, frequency, formulation or strength clearly stated. This may be attributed to the electronic prescribing system.

Changes / adjustments in dose and frequency were based on renal and hepatic function (n = 288, 8.6%) and optimised dosage based on indication (n = 252, 7.5%). Changes in dose and frequency in particular renal and hepatic adjustments directly influences the minimisation of adverse drug reactions from overdosing, avoiding prolonged stay and indirectly saves cost [12].

Overall, total of 97.6% (n = 3264) interventions were accepted by the team. Globally, including Asian countries, an acceptance rate of 41 - 96% has been reported [3,13]. An example of rejected interventions is as follows: suggestion for addition of statin therapy in a patient with underlying ischaemic heart disease, reason for rejection was patient low-density lipoprotein was 1.54mmol/L and physician was keen to review angiogram findings first. The high acceptance of pharmacist’s intervention demonstrates successful integration of clinical pharmacists into the hospital multidisciplinary team to improve pharmacotherapy of warded patients using evidence-based medicine. This study showed that the team in the ward were willing to accept and use the expert input of ward pharmacists to improve the quality of patient healthcare and safe use of medicine. In addition, clinical pharmacists were always available for drug information consultation or clarification for both physicians and nurses. A total of 1879 queries received in the ward were answered by clinical pharmacists in the one-year period. In addition, updates on new drugs, guidelines, policies, product recalls and availability of supply were provided continuously. To our knowledge, this is the first study reporting on clinical pharmacist interventions in a teaching hospital in Malaysia. We reckon that ward-based clinical pharmacy services by adequately trained pharmacists is a key component within the hospital setting as a cost-effective, safety and quality improvement pharmacotherapy measure.

This study has limitations. Although the same training and classification system was used in recording the interventions; there may be variation in definitions. This may limit the generalisability of the results. The clinical pharmacists also have different levels of experiences.

**CONCLUSION**

The high number of interventions and acceptance in the wards indicates the need of clinical pharmacists to be part of the healthcare team. In addition to improving patients’ outcome, the inter-professional collaborations are better enriched.

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**CONFLICT OF INTEREST**

This study has no conflict of interest. This research did not receive any specific grant from funding agencies in public, commercial or not-for-profit sectors.
REFERENCE


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