

# Prescription evaluation practice by final year pharmacy students

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## ABSTRACT

Pharmacists can be defined as a healthcare professional responsible for medication dispensations as well as ensuring patient safety through appropriate medication utilization. They play a significant role not only on the overall healthcare cost implications but also the patient safety concerns when using medications. The scope of this paper will be to evaluate the practice of prescription amongst the final pharmacy students in the school through the use of a prospective research methodology. From 137 students, 31 failed to identify the error in dosing (22.6%) while 106 (77.4%) responded with the presence of error and from these 102 (74.5%) recommended to adjust the dose according to patient weight correctly.

**Keywords:** Prescription, Dose adjustment, Pharmacy practice, Education, Cefazolin.

## Introduction

A pharmacist can be described as a healthcare professional responsible for medication dispensations as well as ensuring patient safety through appropriate medication utilization. In the ancient periods, the function of the pharmacists was majorly described as compounding which was later replaced by the drug dispensation<sup>[1]</sup>. In both systems, the overall goal of the practice of pharmacy involves the provision of medications alongside a range of healthcare services in striving to assist individuals and society in general in making the most appropriate use of their medications. Nevertheless, the current functions of the pharmacists need to be broadened to incorporate concepts in pharmaceutical care comprising of identification, preventions as well as generating the most appropriate interventions in addressing drug-related concerns alongside motivating the patient populations to properly use their medications<sup>[2]</sup>. The

shifting pharmacists' roles characterized by being a patient counselor in ambulatory environments have been considered for medical advancement. Despite all such advancement, pharmacy students are subjected to same challenges that are experienced by other students of medicine with regards to the actual implementation of the acquired theoretical pharmacy knowledge into practice<sup>[3]</sup>. It is thus prudent to note that pharmacists play a significant role not only on the overall healthcare cost implications, but also the patient safety concerns when using medications. The scope of this paper will be to evaluate the practice of prescription amongst the final pharmacy students in the school.

The World Health Organization 2017 report estimates that over 42 Billion US dollars are the costs that are associated with errors in medications every year<sup>[4]</sup>. Consequently, the world health governing body initiated a global safety challenge on the overall safety of medication with an intention of reducing harm that are attributed to medication errors by 50% globally by the year 2022. Additionally, health educational institutions were also required to act as the change accelerators in their areas of jurisdictions. The national coordinating council for reporting medical error (NCCMERP) proposed the evaluation of whether a correct dose has been given as well as whether the dosing guidelines have been adopted in the strategy to accelerate medication use system and prevent occurrence of errors<sup>[5]</sup>.

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Medicine prescription is one of the major medical interventions that form the cornerstone in physician's roles in practice of medicine. In Australia, for instance, approximately 280 million prescriptions are dispensed every year under the government initiated Pharmaceutical Benefits Scheme, whereas in the UK, over one billion prescriptions have been undertaken under the National Health Service [6]. Even though healthcare revolves around administration of medicine, the actual prescription poses significant risks. A literature search on the medication errors in Australia, for instance, reveals that for every 5 prescriptions, 1 was a victim of prescription error [7]. A prescription error review undertaken before and after electronic platform of prescription reported 1.4 to 1.8 moderate prescription errors that were likely to result in prolonged hospital stay, severe disability or even death [8].

There is greater need for the pharmacy students to have a clear understanding of an ideal process of medication management that can be identified in various settings that includes hospital as well as community sectors [9]. The UK Pharmacy Council Accreditation Standards for Programs on Pharmacy stipulates that it is important for pharmacy students to experience a hospital practice setting which is likely to give them an opportunity to have hands on experience in the working of an actual hospital [10]. However, majority of the higher institutions of learning in the UK finds greater challenge to undertake hospital placements to all its pharmacy students citing various reasons. One study alleges that course time limitations as well as higher rates of enrolment reduces the capacity of the institutions to adequately review their curriculum on teaching pharmacy making students incapable of undertaking a successful prescription as well as drug administration [11].

The many problems associated with medications that comprise of adverse effects, non-adherence as well as medicine interactions which have been cited to strain the resources in the overall healthcare system not only in the UK but also in other jurisdictions [12]. One research has estimated that in Australia over 190,000 of its annual hospital administrations are associated with medication-related problems which translate into \$ 660 million in medical expenses [13]. A greater proportion of the medication associated challenges are as a result of errors in medications which is normally encountered in the course of prescription, dispensation as well as medicine administrations which piles up the overall harm or even a patient's death. Another research indicates that 50% of the patient admissions in the UK hospitals as a result of medication related challenges can be adequately prevented [14]. Notably, an adequate as well as ideal medicine management by the healthcare professionals is the cornerstone in enhancing desired health outcomes. Nonetheless, another study indicated that the medication management pathway comprises a complex pathway and thus is prone to errors as well as interventions in the course of drug prescription, administration or even use [15]. It is thus critical to note that health services should integrate the process of medication management that is characterized by an appropriate training of the healthcare professionals so as to ensure they have greater competencies in

following such procedures correctly to minimize any chance of occurrences of medication-related problems.

Many studies have suggested the use of simulations which connotes a generic term referring to replication of an ideal world experiences. One study, for instance describes simulation-based learning as an approach for learning that has adopted simulation in variety of its modalities as well as applications to realize the various goals of education through experiential learning [16]. Other literature puts emphasis on the greater need to adopt an assortment of technology-based learning to adequately train as well as educate professionals in healthcare primarily for pharmacy students. Many studies have supported the technology-enhanced as well as simulation-based learning into the overall curriculum of pharmacy program [17].

### Case scenario

A 49 years old female weighing 120 kilograms admitted for hysterectomy and was prescribed single dose of cefazolin 1 g intravenously to prevent postoperative infection.

### Management

The preferred empiric agent to prevent post-operative infection in gynaecological surgeries is cefazolin and the dose should be weight-based. In hysterectomy, the dose of cefazolin is one gram as a single dose and this dose should be doubled in obese patients [18].

### Methods and Instruments

A complete pharmacy program takes a minimum of five years. The study enrolled pharmacy students in their final year that totaled 137 in number. These cross-sectional prospective studies received the permission from the University Institutional Review Board. The questionnaire was distributed to all the 137 students electronically. One week before the actual commencement of the study, the study participants were oriented to the scope of the study after which their consent was received. In addition, the self-administered and completed questionnaire responses were of highest anonymity alongside adherence to the highest level of confidentiality.

### Instruments

During the calendar year 2018-2019, hundred and thirty-seven students in their final year enrolled in college of pharmacy and registered for "integrated patient care laboratory CPP 444" course were given a case scenario with cefazolin drug prescription. Students were asked individually to evaluate cefazolin drug prescription for accuracy and appropriateness. Responses recorded as "yes" for presence of medication errors or "no" for the absence of it. In case of errors, the type of error should be identified, and the correct recommendation must be pointed. Statistical analyses were conducted with the SPSS version 24 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were performed to explain the results.

## Result and Discussions

### i) Error in dosing

A total of one hundred and thirty-seven students in their final year participated in the study. From the total final year student populations, 31 were unable to identify any error in dosing. The 31 students represented 22.6% of the overall student of pharmacy population in their final year. This suggests that the same percentage will be transferred into the actual practice which in the long run subjects the patients into prescription errors. An error in prescription translates into increased cost of healthcare as well as prolonged stay in the hospital. Above all, it leads to wastage of the scarce medical resources available, which might expose human to strains of drug resistant species of disease-causing microorganisms. On the other hand, 106 of the student participants were able to identify an error in dosing which represents 77.4%.

### ii) Ability to propose cefazolin

On another instance, 102 (74.5%) individuals that identified the error in dosing proposed for the adjustment of the dosing according to the weight of the patient which was the ultimate variable of the study. The dosing requirement is in accordance to the standard recommendation where it is stipulated that there is need to increase the cefazolin dose to 2g from 1 g in those patients who have weights that exceeds 80 kg<sup>[19]</sup>. Moreover, the survey proposes that for those individuals with weight of over 120 kg, a dose of 3 g is required. Another study suggests that the overall intentions of antimicrobial surgical prophylaxis in the context of frequency, dosing, duration as well as timing is to attain the optimum concentrations of the tissue and serum antibiotics which exceeds the minimum inhibitory concentrations in most of the organisms that are prone to be experienced when incision is undertaken as well as in the course of the surgical procedure.

## Conclusions

The prescription practice amongst the final year pharmacy students indicated that greater majority of the students were able to identify the error in dosing. However, the other portion of the student populations who were unable to identify the dosing error were considered to be high. Secondly, the identification of the correct drug was also witnessed amongst the individuals who identified the presence of a dosing error. It is thus important to note that even though greater percentage of the student populations were able to identify dosing errors, the remaining percentage incapable of identifying the errors is much significant that when they are placed in various healthcare institutions, the overall effect is out of proportion. There is need to review the curriculum to address some of the learning limitations that might expose weaknesses in the overall training in pharmacy.

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## Conflict of Interest

The author declares that she has no conflict of interest.

## Ethics Approval

Institutional review board (IRB Log Number: 18-0334) and considering the national regulations that govern the protection of human subjects.

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