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# THE ROLE OF PHARMACISTS IN MITIGATING MEDICATION ERRORS IN GERIATRIC PATIENTS A SINGLE CENTER STUDY

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**Abstract:**

**Objectives:** The multifaceted study aims to quantify markers of pharmacist effectiveness in medication mistake abatement among elderly people through interventions at the Lady Reading Hospital in Peshawar over six months.

**Study design:** A prospective observational study.

**Place and duration of study:** The esteemed Department of Pharmacy at Lady Reading Hospital, Peshawar, from January to July 2019.

**Methods:** a prospective observational study. Clinical pharmacists clinically investigated the drug plans of 200 geriatric patients meticulously, keeping a defrauder record of medication errors medication-related issues, and episodes of pharmacist intervention nations in all details and transparencies. To dig deeper another descriptive section was used to summarize the information in the units and reveal frequencies, rates, and top and low gravity subjects. It also included standard deviation measures for constant factors. Patient outcomes related to the provision of pharmacist interventions were studied in terms of the drop in the incidence of medication errors and the acceptance level of doctors' proposals.

**Results:** Among the 200 patients, we identified a total of 380 medication-related problems. This means that on average, each patient had 1. 90 such issues. The most common problems were about medication effectiveness, unnecessary drug treatments, and missed or double dosages. Pharmacists were involved in 670 cases, in which 41% of interactions were carried out at the level of endorsements. Impressively, 91. 7% of the suggestions were taken into account by the doctors, leading to 65. 8% of drug-related problems are terminated. It was a clear demonstration of the critical role pharmacists have played in improving drug health and effectiveness for the elderly at LRH.

**Conclusion:** the role of pharmacists in reducing medication errors among older patients was greatly demonstrated. This demonstrated how pharmacists play a crucial role in improving medication safety and in bettering health outcomes.

**Keywords:** Senior patients, medication botches, pharmacist intercessions, patient wellbeing.

## Introduction

Medication error is a crucial problem in healthcare, especially among geriatric patients who are more prone to the problem because they have multiple illnesses and always use several medicines (polypharmacy). These mistakes can be the cause of adverse drug events (ADEs), hospitalization, higher healthcare costs, and even death(1). Geriatric patients are the most vulnerable because of the age-related physiological changes that affect drug metabolism and excretion as well as an increased prevalence of chronic diseases that require complex medication regimens(2). Pharmacists have a key role in medication error prevention through the implementation of different measures. Their roles are not limited to just dispensing drugs but they also need to do medication therapy management, patient education, and collaboration with other healthcare professionals(3). The pharmacists will conduct a detailed medication review in which case they will identify DRPs including but not limited to ineffective drugs, misdosing, and drug interaction. Numerous studies have revealed that the pharmacist's services become a significant credit in ensuring both the safety and effectiveness of medicines(4). The results of various types of Study indicate that pharmacist actions can considerably decrease the risks of drug errors. For instance, studies have revealed that hospital management can reduce the occurrence of adverse drug reactions through the collaborative efforts of pharmacist-led medicine reviews(5). In one case, Studies suggest that older patients who receive pharmacists' involvement in geriatric care teams, would reduce the number of hospital readmissions and emergency department visits as a result of drug-related problems (6) The main focus of the study was to find out the extent pharmacists put in to help address the issue of medication errors among the elderly. The above Study becomes even more vital when there is also a dearth of studies on the net effects of the pharmacists' interventions in this age demo in the Pakistani health care system(7). Through the Study, we planned to categorize and quantify DRPs, the pharmacist's approach to intervention, and the success rate of interventions carried out among prescribers. The study results could do a tremendous job of raising awareness about the benefits of using pharmacists the healthcare workers which would lead to an increase in the safety of medication among elderly patients(8). The retrospective study of the older adult records was conducted, where the pharmacists reviewed the cases that may have a drug-related problem, and then provided the interventions. The objectives that were set were to determine the different categories of DRPs, perform an analysis of the causes and outcomes of pharmacist's interventions, and evaluate the extent to which these interventions are accepted by doctors. The aim was to implement a system that would ensure that geriatric patients receive the highest quality care by minimizing the errors in drug administration and their consequences(9).

## Methods

This retrospective study has been carried out at the LRH Department of Pharmacy, Peshawar, involving the collection of data from the period ranging from January to July 2019. It was ultimately the review of drug interactions in elderly patients, and the rationale behind the pharmacist interventions which would prevent those errors. This review was done through analyzing the patient records, as it was especially aimed at finding and documenting DRPs and pharmacist solutions. To determine the complexities related to prescription drugs for patients over 65 years old, experts performed a medication review. Every prescription was checked to see if the dosage was correct, if the prescribed drug that did not cause interactions was safe for the patient, and to see if they were for the condition of the patient. The pharmacist assisted by recommending the pill identification of unnecessary meds, initiation of the therapies, dose adjusting if needed, and patient education. All consultations were recorded, and the CUGs' decision and acceptance of the interventions were also documented.

**Inclusion Criteria**

- Patients age 65 years and above.
- Lady Reading Hospital documented the cases of patients who were admitted during the study period (January 2019 to July 2019).
- Patients with a complete medical history, including the history of medications.
- Patients who received at least one pharmacist intervention were less likely to be readmitted to the hospital within 30 days.

**Exclusion Criteria**

- They are patients who are less than 65 years old.
- Those who have incomplete medical records.
- Patients who were not engaged in the pharmacist interventions.
- One-day-stay patients.

**Data Collection**

Data was collected from electronic medical records and contained the patient's demographics, medical history, medication list, and the details of pharmacist interventions. DRP data were recorded, including the types of interventions and outcomes. The primary data parameters were the DRPs identified, the nature of the pharmacist interventions, and the acceptance rate of these interventions by prescribers.

**Statistical Analysis**

Descriptive statistics are applied to analyze the data. The DRP's frequency and kind were classified and shown in percentages. As well, the acceptance rate of prescription drugs by physicians was also estimated. The data processing was done with the SPSS software (version 20. 0). A chi-square test was run to find out the significance of the differences in DRPs before and after the pharmacist interventions, where a p-value of less than 0. 05 was considered to be statistically significant. The information gained from the experiment showed the success of pharmacist interventions in minimizing medication errors among the elderly.

**Results**

Out of 380 patients drug-related problems (DRPs) among the 200 geriatric patients who were in the study, which is 1. 90 DRPs per patient. DRPs most often were associated with treatment effectiveness (47. 6%), unnecessary drug treatment (28. 2%), and adverse drug events (24. 2%). Pharmacists carried out 670 interventions, 41. 0% of these were prescriber-level interventions, followed by drug-level (39. 1%) and patient/caregiver level (16. 1%). The prescription-based acceptance rate of these interventions was very high, at 91. 7%. The role of the pharmacist in improving medication safety and therapeutic outcomes cannot be overemphasized. This was evident in the study as 65. 8% resolution of the identified DRPs was achieved following pharmacist interventions. This underlines the need for a multidisciplinary approach involving pharmacists in the healthcare team, particularly for handling the complex medication regimens of geriatric patients, and, ultimately, reducing the risk of adverse drug events and improving patient care.

**Table 1: Patient Demographics**

| Demographic | Number of Patients | Percentage (%) |
|---|---|---|
| Total Patients | 200 | 100 |
| Gender | | |
| - Male | 135 | 67.5 |
| - Female | 65 | 32.5 |
| Age (years) | | |
| - Mean (SD) | 67.3 (7.5) | |
| Residence | | |

| | | |
|---|---|---|
| - Rural | 137 | 68.5 |
| - Urban | 63 | 31.5 |
| Education Level | | |
| - No formal education | 133 | 66.5 |
| - Formal education | 67 | 33.5 |
| Monthly Income (≥800 PKR) | 73 | 36.5 |

**Table 2:** Clinical Characteristics

| **Characteristic** | **Number of Patients** | **Percentage (%)** |
|---|---|---|
| Average Number of Clinical Conditions | 2.20 (1.57) | |
| Average Number of Medications | 3.90 (2.11) | |
| Common Medical Conditions | | |
| - Heart Failure | 48 | 24.0 |
| - Stroke | 26 | 13.0 |
| - Benign Prostatic Hyperplasia | 22 | 11.0 |
| Polypharmacy (≥5 medications) | 71 | 35.5 |

**Table 3:** Prevalence of Drug-Related Problems (DRPs)

| **DRP Category** | **Number of DRPs** | **Percentage (%)** |
|---|---|---|
| Treatment Effectiveness Related | 181 | 47.6 |
| Unnecessary Drug Treatment | 107 | 28.2 |
| Adverse Drug Event | 92 | 24.2 |
| Average Number of DRPs per Patient | 1.90 (1.47) | |
| Patients with ≥1 DRP | 163 | 81.5 |

**Table 4:** Causes of Drug-Related Problems

| **Cause** | **Number of Causes** | **Percentage (%)** |
|---|---|---|
| Inappropriate Drug Selection | 252 | 54.1 |
| Inappropriate Dose Selection | 68 | 14.6 |
| Drug Use Process | 57 | 12.2 |
| Presence of New Indication for Treatment | 168 | 36.1 |
| No Indication for Prescribed Drug | 96 | 20.6 |
| Inappropriate Drug According to Guidelines | 78 | 16.7 |

**Table 5:** Clinical Pharmacist Interventions

| **Intervention Level** | **Number of Interventions** | **Percentage (%)** |
|---|---|---|
| Prescriber Level | 274 | 41.0 |
| - Accepted by Prescribers | 253 | 91.7 |
| Drug Level | 262 | 39.1 |
| Patient/Caregiver Level | 108 | 16.1 |
| Type of Prescriber Interventions | | |
| - Proposed/Discussed | 227 | 82.7 |
| - Drug Stopped/New Drug Started | 78 | 30.5 each |

**Table 6:** Outcomes of Pharmacist Interventions

| **Outcome** | **Number of DRPs Resolved** | **Percentage (%)** |
|---|---|---|
| DRPs Resolved | 433 | 65.8 |
| DRPs Not Resolved | 181 | 27.6 |
| Physician Acceptance of Interventions | 370 | 91.5 |

**Discussion:**

The relationships with the previous Studies give the meaning and context to what was observed. The Study at LRH has shown that pharmacists serve as a cornerstone for identifying drug-related problems (DRPs) and resolving them (Pharmacist intervention results in a resolution of 65% of DRPs). 1 out of 8 recommended DRPs gets accepted by physicians which marks a significant success rate of 91. 7%(10). The extent to which pharmacist-led interventions enhance medication safety in geriatrics

care. Studyers from different parts of the world have also supported these findings that pharmacists are the key to reducing medication errors. A review of the literature by Gillespie et al(11). (2009) reveals that pharmacists' interventions can be effective in reducing medication errors and improving adherence among the elderly, which is consistent with the outcome at LRH where the DRPs were lower and older adults were willing to accept the pharmacists' interventions. In other words, Lee et al. (2013) in their randomized controlled trial demonstrated that pharmacy care programs could markedly improve the outcomes through medication adherence and lower hospital readmissions parallel to the results of the LRH study (12). The findings of Spinewine et al. (2007) were also relevant as they showed that medication review sessions by pharmacists were essential in correcting this in conjunction with the LRH findings where inappropriate drug selection and dosing mistakes contributed greatly to the DRPs remedied. Pharmacist interventions, which are not only concerned with correcting prescriptions, focus on a more holistic view of the patient's health through patient education and teaming up with the healthcare team, as can be seen in the LRH study. Hol et al. (2015) showed that the comprehensive approach not only prevents the occurrence of immediate risks but also leads to long-term health outcomes by educating patients on their medications, consequently, reducing emergency department visits(13). Nevertheless, the success of those interventions still depends on the teamwork within the healthcare. The LRH pharmacist recommendations are more likely to be accepted due to the communication skills, and respect for pharmacists' roles. This may not be the case in all healthcare settings. The study of O'Mahony et al. (2015) indicates that different settings have different levels of acceptance and implementation of the pharmacists' recommendations. This calls for better coordination of the healthcare professionals (14). Pharmacists also play the role of lowering health utilization and costs. Christensen and Lundh (2016) said pharmacist intervention could be the reason for decreasing hospital readmissions and ED visits, which are costly to the healthcare system(15). The study of LRH probably shows similar results, but the economic analysis in the study is not as detailed as we would expect.

**Limitations in Geriatric Care**

Although the positive aspects of geriatric care are highlighted, the struggles in this field are still enormous. Polymerization, multiple comorbidities, and more drug adverse reactions in this population call for a tailored and vigilant pharmacotherapy approach. LRH data indicate that the problem is indeed complex as shown by a high rate of DRPs even with the pharmacists actively involved in it.

**Future Directions**

Progressing to the extent of making pharmacists key members of the multidisciplinary care team and adopting digital health records and tools that allow real-time data sharing will boost the effectiveness and timeliness of pharmacist interventions. In addition, training and policy that complement this role are also a good idea that may lead to a better outcome.

**Conclusion**

The study shows that pharmacists are playing a vital role in the medication safety of the elderly. The future direction of Study will be the carrying out of longitudinal studies to assess the long-term results of pharmacist interventions and the investigation of new approaches which will enable pharmacists to be better integrated into the broader healthcare teams.

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