Analysis on Clinical pharmacy services provided by pharmacists for promoting elderly patients care

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ABSTRACT
Clinical pharmacy services are the services provided by the pharmacists to promote patient care, optimizes medication therapy, promote health and disease prevention. This prospective cross sectional study was conducted in tertiary care hospital over a period of 6 months. This collected data is checked for their appropriateness of any prescription related errors and DRPs were identified. Results obtained were assessed to determine the influence of Clinical pharmacist services. Majority of the prescriptions were with 5-9(62.5%) drugs. The majority of co-morbidities among 125 enrolled patients in age group of 60-70, 55 patients were with 3-4 co-morbidities. Among 125 prescriptions around 12 prescriptions were identified with 622 drug interactions. Among 125 patients 2 (0.277) adverse drug reactions were observed and according to Naranjo's probability assessment scale these adverse drug reactions were mild and 15(2.08%) dispensing errors, 10(1.386%) prescription errors where majority of prescription errors are due to missed written frequencies in the prescriptions. 5(0.693%) administration errors, 5(0.693%)untreated indications were observed. Presence of clinical pharmacist in hospital settings can reduce drug related problems and they can assist other staff in improving patient care.

INTRODUCTION
The advancement of medicine and its research and the development of medicines stilted with pharmacological Research have geometrically doubled quadrupled and forth alleviated problems to mankind. This has led to exponential increased in number of surviving people. This has lead to increase in the number of surviving people; this also has lead to an increase in the elderly population. Compounded, with its attendant problems elderly care has grown from a bud to all tree, as time progressed (Elliott, 2004). This is a suggestion that resonates with several pharmacists and other...
healthcare practitioners. If during a pharmaceutical law class or during clinical rotations, a pharmacist first hears this quotation signals the beginning of a paperwork commitment. From label verification to narcotics inventories, a pharmacist needs paperwork for most operations. For years, pharmacists’ documentation act acted as a way of assigning possession. Documenting when a container of Oxycontin® (oxycodone ER) has been double-counted or inserting initials on a job log allocated responsibility which covers both pharmacist and consumer in the case of unforeseen harmful consequences or optimum therapeutic reaction. A pharmacist’s survival tends to depend primarily on procedures as the career extends healthcare facilities outwards. When pharmacists’ authorities broaden outside vaccine and clinical drug-level control, reporting procedures have grown increasingly nuanced, in most situations involving more than just initials to define possession, yet still compensate for services. The role of the pharmacist in fostering health as part of the healthcare team was established primarily by Mikeal’s ideas and later by Strand and Hepler’s, as a consequence of which the pharmacist’s task today is increasingly patient-oriented, as the pharmacist’s primary concern is the well-being of clients. These concepts lead to the design of a modern clinical approach called Pharmaceutical Care, which suggests that awareness of public health conditions is a priority during patient evaluation. This concept has been guided by the World Health Organisation, the Pan-American Health Organization and the International Pharmaceutical Association since the 1990s, affecting the worldwide organization of pharmaceutical facilities with varying degrees of implementation across nations.

### Altered pharmacokinetics in elderly

1. Maturing brings about numerous physiological changes that could hypothetically influence retention, first-pass digestion, protein authoritative, dissemination and end of medications (World health organisation, 2012). Age-related changes in the gastro-intestinal lot, liver and kidneys are
2. Condensed gastro-intestinal motility
3. Condensed total surface area of absorption
4. Condensed liver blood flow
5. Condensed glomerular filtration
6. Condensed gastric acid secretion
7. Condensed liver size
8. Condensed splanchnic blood flow

### Altered pharmacodynamics in elderly

There is some proof of modified medication reaction or “affectability” in more established grown-ups. Four potential systems have been suggested (Walker and Whittlesea, 2012):

1. Changes in receptor numbers,
2. Changes in receptor affinity,
3. Post receptor alterations, and
4. Age-related impairment of homeostatic mechanisms.

### Medication related issues or problems

1. The major drug related issues are
2. ADRS
3. Drug interactions
4. Medication nonadherence
5. Inappropriate prescribing
6. Medication errors (dispensing or administration or prescription error)
7. Untreated indication
8. Missed dose, over dose, sub-therapeutic dose
9. Drug use without indication

### Aims

1. To assess the drug related issues in elderly patients with polypharmacy.
2. To improve the health outcomes of geriatric patients (Harrison et al., 2004).

### Objectives

1. To enhance the role of a clinical pharmacist in optimizing drug therapy and preventing drug-related problems in elderly patients (Guay et al., 2003).
2. To provide better patient compliance.
3. To improve effectiveness and safety of treatment and quality of life of elderly patients.
4. To reduce the morbidity and mortality
5. To decrease the hospital stay of elderly patients.
METHODOLOGY

This was a potential, cross sectional study showed in various departments of a tertiary care hospital for a phase of 6 months by collecting patient information in accordance with institutional standards of PIPER/EC/PHARM.D/2019-9 in well structured data collection forms after taking written informed consent from patients in both out-patient and in-patient elderly individuals attending the hospital for any medical conditions and assessment of medication related issues were done (Casack, 2004). All the studies were done according to the ICMR guidelines.

**Study period**
The study is being conducted October 2017-March 2018.

**Study design**
A prospective cross-sectional study.

**Presence standards**

1. Patients of either sex of 60 years old and over in both out-patient and in-patient departments.
2. Patients who are ready to stretch agreement.
3. Patients having more than 5 prescribed drugs.

**Exclusion criteria**

1. Patients who are not willing to participate in the study.
2. Patients with life threatening and end stage cancers.
3. Patients who are too weak to participate in the study.
4. Patients aged below 60 years.

**Method of collection of data**
Data is composed from patient case sheets, medication charts, lab reports and through organized interviews with patient or their care takers.

**Study method**
The study was conducted in hospital settings by taking the samples randomly (Dipiro et al., 2005).

For all identified patients meeting study eligibility criteria, data was collected by using well structured data collection forms and questionnaires and assess the MRPs

1. Polypharmacy
2. Noncompliance
3. ADRs
4. Drug-drug interaction

**Ethical clearance**
All events achieved in this study involving human participants were in accordance with the ethical standards of the Priyadarshini Institute of Pharmaceutical Education And Research (PIPER/EC/PHARM D/2019-9).

**Gender wise distribution**
The chi-square value for gender wise distribution to be 4.05. Degree of freedom alpha = 1 or 0.5 at the level of a significance p=0.015 in Table 1.

**Figure 1:** Patients with different co-morbidities are presented

**Figure 2:** Number of Co-morbidities In Different Age Groups

**Figure 3:** Drugs in Each Prescription

**CO morbidities**
Among 125 enrolled patients majority 98 (31%) patients had hypertension followed by 61(19%) patients had diabetes and 37 (12%) patients had CAD, 27(9%) patients had CVA problems followed by patients with different co-morbidities are presented in Figure 1.
Table 1: Gender Wise Distribution

<table>
<thead>
<tr>
<th></th>
<th>Inpatient</th>
<th>Percentage</th>
<th>Outpatient</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29</td>
<td>59.2%</td>
<td>35</td>
<td>46.05%</td>
<td>64(51.2%)</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>40.8%</td>
<td>41</td>
<td>53.94%</td>
<td>61(48.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>100%</td>
<td>76</td>
<td>100%</td>
<td>125(100%)</td>
</tr>
</tbody>
</table>

Table 2: Numbers of Drugs in Each Prescription

<table>
<thead>
<tr>
<th>No of drugs in prescription</th>
<th>Patient age</th>
<th>Total no of drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60-70yrs</td>
<td>71-80yrs</td>
</tr>
<tr>
<td>5-9</td>
<td>60(62.5%)</td>
<td>12(54.54%)</td>
</tr>
<tr>
<td>10-14</td>
<td>33(34.3%)</td>
<td>6(27.27%)</td>
</tr>
<tr>
<td>&gt;14</td>
<td>3(3.125%)</td>
<td>4(18.18%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>96</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 3: Some Examples of Severe Drug Interactions

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Type of interaction</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telmisartran+perindopril</td>
<td>Severe</td>
<td>Increases toxicity of other by Pharmaco dynamic synergism, contraindicated combination</td>
</tr>
<tr>
<td>Escitalopram+domperidone</td>
<td>Severe</td>
<td>Both increase qt prolongation</td>
</tr>
<tr>
<td>Levosulpride+chlorthalidone</td>
<td>Severe</td>
<td>Increase qt prolongation cause dangerous arrhythmias</td>
</tr>
</tbody>
</table>

Figure 4: Drug Interactions per prescription
Figure 5: Type of Drug Interactions
Figure 6: Medication Adherences
Figure 7: Types of Medication Related Problems
Number of drugs in each prescription
Among the enrolled patient minimum of 5 and a maximum of >14 drugs were prescribed per prescription. Majority prescriptions 76(60.8%) contained 5-9 drugs per prescription followed by 41(32.8%) prescriptions in Figure 2.

10-14 drugs, 8(6.4%) prescriptions >14 drugs, the chi-square statistic for relation to polypharmacy increased with age is 9.0289. the p-value is 0.002657. This result is significant at p<0.05 Results are presented in Table 2.

Each category
In a total of 1158 drugs, Majority of drugs prescribed are anti hypertensive’s 170(14.68%) followed by antimicrobials 113(9.758%), 103(8.949%) were statins, 84(7.25%) prescriptions had oral hypoglycemic, followed by PPI’s 62(5.354%), analgesics 60(5.181%) and least prescribed are smooth muscle relaxants, laxatives, antivirals with 3(0.259%) in Figure 3.

Drug interactions per prescription
Among 125 prescriptions around 121 prescriptions were identified with 622 drug interactions. Among those 121 prescriptions, 100 prescriptions were having 1-8 drug interactions followed by18(14.4%) prescriptions having 9-16 drug interactions, 2(1.6%) prescriptions 17-32 drug interactions,1(0.8%)prescriptions having in Figure 4.

>32 drug interactions and 4(3.2%) prescriptions with no drug interactions.

Type of drug interactions
Among 622 drug interactions in 125 prescriptions, 53(8.52) were severe interactions followed by 398(63.98) were moderate interactions and 171(27.4%) were minor drug interactions in Table 3. In Figure 5.

Medication adherence
Among 125 enrolled patients, majority of patients 60(48%) with low adherence followed by36(28.8%) with medium adherence and 29(23.2%) with high adherence in Figure 6.

Medication related problems identified
Among 125 patients 2 (0.277) adverse drug reactions were observed and according to naranjo ‘s probability assessment scale these adverse drug reactions were possible ADRs and 15(2.08%) dispensing errors,10(1.386%) prescription errors where majority of prescription errors are due to missed written frequencies in the prescriptions.5(0.693%) administration errors,5 (0.693%)untreated indications were observed in

Figure 7.

DISCUSSION
Ageing along with its associated physiological and pathological changes—places individuals at a higher risk of multi morbidity and treatment-related complications. Today, polypharmacy, a common and important problem related to drug use, occurs subsequent to this multi morbidity in the elderly in all populations.

Due to these chronic co-morbidities, elderly patients are generally exposed to polypharmacy. Polypharmacy is the most common reason for medication related problems. In this study a total of 1158 drugs were prescribed for 125 geriatric patients, due to polypharmacy nearly 622 drug interactions were observed.

This study showed that 48% of the patients were not taking their medications according to the prescription or having poor medication adherence. The low economic status of the patients, complex dosing regimen, confusion, forgetfulness, visual impairment, impaired dexterity, illiteracy, lack of information, etc. might be the reason for noncompliance in these patients.

The majority of geriatrics had MRP because of more medication requirements and long hospital stay due to their multiple co-morbidities. The most commonly observed are need of counseling, drug interaction, medical chart error monitoring, etc. This might be the reason for geriatric inpatients having more MRP than out patients.

CONCLUSION
Ageing is inevitable. Ageing is progressive and irreversible. Ageing can’t be stopped but for death. As man is science we can only decrease the wear and tear but can’t stop age. As age progress so do the number of diseases and disorders. In today’s world with fine tuned armament of medicines the choices are limitless. To take all diseases and disorders equally a multitude of drugs, Neff to be used. Current prescribing pattern of geriatrics patients showed an unfitting medication, increased potential drug interactions, the complicated medication and an inability to recall the drug regimen, lack of patient education about their medication, poverty, etc. were the risk factors for DRP/noncompliance. This study strongly suggested that there are more existences of DRP due to polypharmacy. Therefore we under the watchful eye of a clack pharmacist a disastrous event can be prevent and will enable us to deliver excellent modern medical care to all people.
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Conflict of Interest

The authors declare that there is no conflict of interest among the authors and research.

REFERENCES


