Analysis of Prescriptions for Various Effects of Polypharmacy in a South Indian Tertiary Care Hospital, Bangalore, India

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Abstract

Objective: The present study is aimed to analysis of prescriptions for different impacts of polypharmacy in a south Indian tertiary care hospital. Methodology: The study was conducted in the Out-patient pharmacy department of Bangalore Baptist Hospital (BBH) Hebbal. In this method, the inpatient case sheets and prescriptions will be screened for Analysis of medicines for different impacts of polypharmacy on consistent schedule. All the recommended prescriptions alongside different drugs and relevant data will be noted in a customized data collection form to discover the polypharmacy and other. The investigation patients will be pursued every day until their release. The Micromedex, Medscape, articles and significant references books will be utilized as tools to review the collected data. The prescribed medication will be checked for their existence in the hospital and also the relevant dosing calculation and polypharmacy. Check for any error in prescription such as doses, frequency and route of administration and analysis of prescription for any polypharmacy etc. Result: In our study population out of 980 patient's prescriptions contains polypharmacy, which that 520 were male and 460 were female. and thus the average number of drugs per patient was 7, Extensive (70%) poly pharmacy was observed in study population. In our study various classes of drug like Pantoprazole, Aspirin, Paracetamol, Zincovit, Levocetrizin etc. Were prescribed. According to 980 prescriptions analyzed, 142 prescriptions comprised of potential drug interactions and it was found that 235 drug interactions were present. From drug interactions, aspirin/clopidogrel and clopidogrel/atorvastatin were most common drug interaction pairs observed among prescribed medications. Out of the 235 interventions proposed, the most incessant recommendation was on observing for adverse effect (44.01%) followed by dose adjustment (15.81%). 25.64% of interventions were accepted and therapy was changed. During the study period, a total of 28 adverse drug reactions were recorded among 234 pDDIs identified. Conclusion: As the population ages, polypharmacy increases. The elderly often requires multiple medications to treat multiple health-related conditions. The demographic details of study population shown that 70 % of polypharmacy occurred in elderly people. Because they use 6 or more medicine. Out of the patients evaluated, 69.18% are prescribed 6 or more concurrent drugs, 15.7%, or 199 patients, are prescribed one or more potentially inappropriate drugs, and 9.3% meet both definitions of polypharmacy used in this study.

Keywords: Polypharmacy, Hospital, Bangalore, India

Introduction

Polypharmacy, or the utilization of various prescriptions to treat a patient, has had some negative implications. It has been seen, in any event, as less than elegant, and at worst, as extremely problematic to use anything more than the bare minimum of medications to relieve symptoms. Notwithstanding the general absence of tasteful in putting various factors into the equation, there are some genuine issues that should be considered (Kramer, 2000).

No prescription routine has any expectation of being compelling if the medications themselves are not really ingested. It is not adequate that a specific combination of medications is powerful. It is just as important that it is possible for the patient to take the medications as prescribed. Combinations that are so complicated that the patient can't monitor them won't treat patient's symptoms regardless of how awesome the medications may function separately or together. Patients, generally, have a complicated psychological relationship with their prescriptions. If patients feel intellectually vanquished by the prescriptions that have been endorsed - that is, if they do not feel smart enough to manage the medications as recommended, at that point they will withdraw from treatment and not take few or the majority of their medication (Kramer, 2000).

Polypharmacy is most normal in the old, influencing about 40% of older adults living in their own homes (Haider et al., 2009). About 21% of adults with intellectual disability are also exposed to polypharmacy (Haider et al., 2014). Polypharmacy is not always bad, but it

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is bad in many instances, often being more harmful than helpful or presenting too much risk for too little benefit. Therefore, health professionals consider it a situation that requires observing and audit to approve whether the majority of the medications are still fundamental. Worries about polypharmacy incorporate expanded adverse drug reactions, drug interactions, prescribing course, And higher costs (Haider et al., 2007). Polypharmacy is often associated with a decreased Quality, including decreased mobility and cognition (Polypharmacy in Elderly Patients, 2015).

In this day and age where medical decision making is frequently affected and sometimes controlled by financial considerations, it is usually for specialists to become disappointed and regularly resentful when cost turns into an issue in deciding the fitting treatment for a patient. The most well-known situation for such a response is the point at which a physician is informed that there is an elective treatment that is nearly as great and significantly more affordable. When the third parties interject themselves into the specialist -patient relationship in this way, it is simple for a physician to feel that the financial requirements and not nature of consideration are leading American drug in the 21st century. Regardless of this, be that as it may, cost must be considered as an issue for deciding the treatment plan. By and by, if the cost of a particular mix of meds makes it incomprehensible for patients to get the meds, they won't take them, and everything considered the solution routine will be unable. Indeed, even the most liberal protection plans have impediments or copy on medications. It is significant while thinking about polypharmacy to think about the financial impact at least on the patient, if not on the healthcare system as a whole. The more medications recommended, the higher the expense, and the more intricacies are made as a result (Kramer, 2000). For all the above cases, Analysis of prescriptions for various effects of polypharmacy in a south Indian tertiary care hospital is so significant and Need for study.

Materials and Methods

This examination was directed at Bangalore Baptist Hospital (BBH) Hebbal a multispecialty tertiary care teaching hospital. The investigation will be led for a time of a half year in 2017. In this strategy, the inpatient case sheets and medicines will be screened for Analysis of prescriptions for various effects of polypharmacy on consistent schedule. All the recommended drugs alongside different prescriptions and significant data will be noted in a modified information accumulation structure to discover the polypharmacy and other. The investigation patients will be pursued day by day until their release. The Micromedex, Medscape, articles and relevant references books will be used as tools to review the collected data. The prescribed medication will be checked for their existence in the hospital and also the relevant dosing calculation and polypharmacy. Check for any error in prescription such as doses, frequency and route of administration and analysis of prescription for any polypharmacy etc. All the outpatient's/inpatients prescriptions presented at outpatient pharmacy collected on daily basis and for polypharmacy, the prescriptions reviewed and it is noted in a predefined data collection form. The prescription components, drug utilization conduct and endorsing consistence to hospital formulary were noted and oppressed for Analysis of prescriptions for different impacts of polypharmacy.

Result and Discusion

Mostly the causes of polypharmacy are the patients having more medications and the patient not reliable on single doctor because of that not a single doctor knows about all medications of particular patients. Study's found that among older adult's polypharmacy is a common problem who older than age 65 is taking More than 5 medications per week 44% of men and 57% of women More than 9 medications per week 12% of both men and women The drug include in this are mostly OTC product such as acetaminophen, ibuprofen, aspirin, vitamin and mineral supplements and herbal products. table1

In our study population out of 980 patient's prescriptions contains polypharmacy, which that 520 were male and 460 were female and in Paediatric population 53% were male and 47% were female. In Special population highest number i.e. 8.57% male and 8.16% females are in the age group 51-60 years. 9.18% males and 8.57% females were in the age group of 61-70. according my demographic detail polypharmacy accrued in elderly patient. And we can say that almost polypharmacy patients were old people.

Among 980 study population, 384 (38.2%) were hospitalized for five to ten days, 359(39.7%) were hospitalized for less than five days and 237 (22.1%) were hospitalized for more than 10 days. Median hospital stay was 6 days.

Table 1: Number of drug usage by study patients

Number of Drug Dispensed	Male		Female		Total	
	N	%	N	%	N	%
1,2,3	22	2.25	14	1.43	36	3.67
4,5,6	152	15.51	114	11.63	266	27.14
7,8,9	346	35.31	332	33.88	678	69.18

N=980

In our study various classes of drug like Pantoprazole, Aspirin, Paracetamol, Zincovit, Levocetrizin, Atorvastatin etc. Were prescribed. Out of which 53% males, 47 % females were prescribed with Pantoprazole which were highest among monotherapy.

Different class of medications are endorsed in our study populace dependent on the patient condition and comorbidities .out of which 87 males, 47 females are prescribed with atorvastatin drugs which were highest followed. Totally 20.74% atorvastatin were prescribed. 16.41% of patient used Pantoprazole, 10.22 H. Actapid, 6.81% Zicovit, 6.5% Ceftriaxone, 5.27 Paracetamol and etc. Figure 1
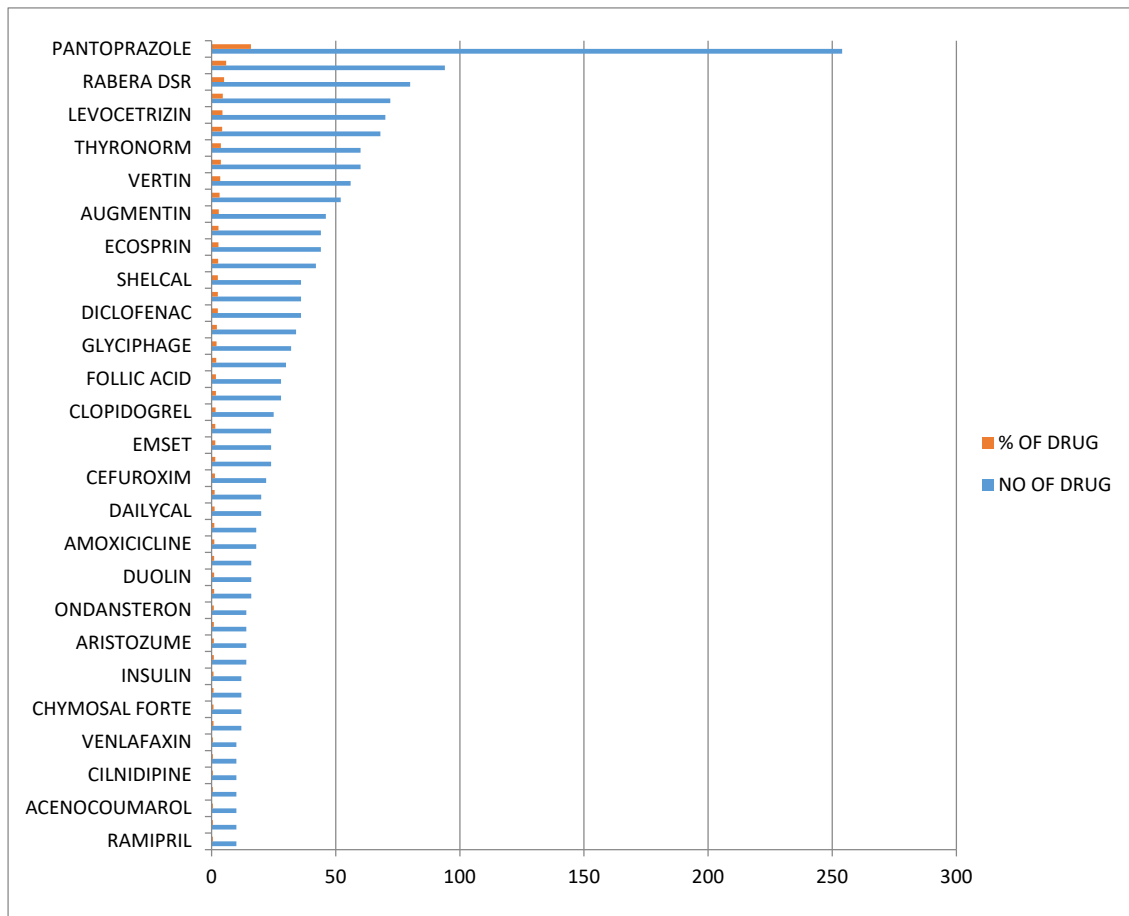

Figure 1: bar chart of study Patients Based on Number of medications Prescribed

Worries about polypharmacy incorporate expanded adverse drug reactions, drug interactions, Pharmacists Intervention, prescribing cascade and higher costs. Polypharmacy is often associated with decreased quality of life, including decreased mobility and cognition.

Table 2: Summary of potential drug-drug interaction

Parameters		Total	
		N	%
Severity	Major	101	40.59
	Moderate	145	58.11
	Minor	6	1.28
Pharmacodynamics Interaction		147	57.26
Pharmacokinetic Interaction		91	36.75
Unknown Mechanism		18	5.98
Management	Monitoring	185	73.93
	Dose adjustment	38	13.67

Out of 980 prescriptions analyzed, 142 prescriptions comprised of potential drug interactions and it was found that 235 drug interactions were present. The incidence of potential drug interaction was 63.64%. Other studied showed the incidence rate of 30.67% from South Indian Hospital (Patel et al., 2011), 91.6% from Pakistan (Qato et al., 2016) and 14.66% from Manipal University. (Mateti et al., 2011) Among 235 drug interaction 90 types of interaction combinations were identified. However, another investigation of South Indian teaching hospital identified 388 pDDIs in 249 patients including 51 unique medications with a total of 74 different drug combinations. Cardiovascular patients have recently been found to have a higher shot of having drug interactions contrasted with other gathering of patients. (Patel et al., 2011) Table 2

In most patients of the cases one potential drug interaction were identified with median of 1.67 potential drug-drug interactions. Among them 30% of prescription had two potential drug-drug interactions. Table 3

The most common interacting pair identified were aspirin/clopidogrel, clopidogrel/atorvastatin, atorvastatin/amiodarone and atorvastatin/azithromycin. The pDDIs involving aspirin (19.65%) and atorvastatin (17.09%) were most common. The values obtained here is similar to study in India where Patel et al reported aspirin (44.85%) followed by atorvastatin (7.22%).

Table 3: Frequency of drug interaction in study population

Frequency of pDDI	Male		Female		Total	
	N	%	N	%	N	%
1	52	37.14	23	16.42	75	53.57
2	25	17.85	18	12.14	43	30
3	14	10	5	3.57	19	13.57
4	2	1.42	0	0	2	1.42
5	2	1.42	0	0	2	1.42

N=142

Of the 234 interventions proposed, the most incessant recommendation was on observing for adverse effect (44.01%) trailed by dose adjustment (15.81%). 25.64% of interventions were acknowledged and treatment was changed. A study conducted in Coimbatore reported 251 interventions which is higher than this study. Of the 251 intervention, most common were related to drug interaction followed by doing changes. This higher result might be due to more of sample size than this current study (Abraham and Devi, 2012).

Table 4: Observed adverse drug-drug interaction

Object Drug	Precipitant Drug	No. of ADI	Adverse outcome
Enalapril	Spironolactone	2	Hyperkalemia
Aspirin	Clopidogrel	6	GI bleeding
Amiodarone	Atorvastatin	1	Muscle pain
Clopidogrel	Acenocoumarol	2	bleeding
Venlafaxine	Ivabradine	1	QT prolong
Furosemide	Hydrocortisone	2	Hypokalemia
Aspirin	Acenocoumarol	3	Bleeding
Domperidone	Cilnidipine	2	QT prolong
Insulin	Aspirin	1	Hypoglycemia
Aspirin	Heparin	1	bleeding
Clopidogrel	Atorvastatin	2	thrombocytopenia
Aspirin	Telmisartan	1	Increase creatinine
Insulin	Nebivolol	1	hypoglycemia
Domperidone	Atorvastatin	1	QT prolong
Amiodarone	Nebivolol	1	bradycardia
Spironolactone	Aspirin	1	hyperkalemia
Metformin	Ramipril	2	hypoglycemia

The pharmacist role with respect to clinical results of different adverse events is very significant as pDDIs are a noteworthy factor for hospitalization of patients. A clinical pharmacist can help in the improvement of pharmacotherapy. A clinical pharmacist can discover factors that may result in irrational prescriptions. Such factors are called ''drug related problems'' and may change the ideal impacts of medications. The role of pharmacist in the created world is all around perceived but this profession is not well established in the developing nations including India. The absence of appropriate role of pharmacist in less created nations is driving patients with higher ratio of drug related problems. This can be reduced by clinical pharmacist's active participation in direct patient care.

The incidence rate of adverse drug interactions was found to be 20%. This rate is similar to the study conducted in Iran (Fialova et al., 2005). Another study reported 17.53% of observed drug interaction which is lower than this study. The most common drug interaction pair resulting in adverse drug reaction was aspirin/clopidogrel (5). Bleeding was the most important interaction in 8 cases followed by hypoglycaemia (4) and QT-interval prolongation (4). The most common objective drug is aspirin and precipitant drug is clopidogrel. Similarly, Bleeding was most common clinical effect of observed drug interaction in South Indian study. (Patel et al., 2011) table 4,5

Table 5: Details of Observed drug interaction (adverse drug interaction)

Interacting drug	No.	Effect	WHO causality	Naranjo Causality	Severity
Enalapril/Spironolactone	2	Hyperkalaemia	probable	Probable	Mild
Aspirin/Clopidogrel	6	bleeding	probable	Probable	Major
Amiodarone/atorvastatin	1	Muscle pain	possible	Possible	Mild
Clopidogrel/Acenocoumarol	2	bleeding	probable	Probable	Moderate
Venlafaxine/Ivabradine	1	QT prolong	possible	Possible	Moderate
Furosemide/Hydrocortisone	2	Hypokalaemia	probable	Probable	Mild
Aspirin/Acenocoumarol	3	Bleeding	possible	Probable	Moderate
Domperidone/Cilnidipine		QT prolong	possible	Possible	Mild
Insulin/aspirin	1	Hypoglycaemia	probable	Possible	Moderate
Aspirin/Heparin	1	bleeding	possible	Possible	Moderate
Aspirin/Telmisartan	1	Increase creatinine	possible	Probable	Mild
Insulin/nebivolol	1	hypoglycaemia	probable	Probable	Moderate
Domperidone/Atorvastatin	1	QT prolong	possible	Probable	Mild
Amiodarone/nebivolol	1	bradycardia	possible	Probable	Moderate
Spironolactone/aspirin	1	hyperkalaemia	probable	Probable	Moderate
Metformin/Ramipril	2	hypoglycaemia	possible	Possible	Mild

Conclusion

In our study population out of 980 patient's prescriptions contains polypharmacy, which that 520 were male and 460 were female and in Paediatric population 53% were male and 47% were female. All this information can be Concluded that:

1. As the population ages, polypharmacy increases. The elderly often requires multiple medications to treat multiple health-related conditions. The demographic details of study population shown that 70 % of polypharmacy occurred in elderly people, because they use 6 or more medicine.
2. Out of the patients evaluated, 69.18% are prescribed 6 or more concurrent drugs, 15.7%, or 199 patients, are prescribed one or more potentially inappropriate drugs, and 9.3% meet both definitions of polypharmacy used in this study.
3. An ongoing hospitalization additionally puts you at risk of polypharmacy. Medicines are begun and halted quite frequently during your hospital stay.
4. Multiple specialists are recommending prescriptions for a similar patient. When a patient begins a medication, it is never discontinued.
5. Doctor changes from one med to another within the same therapeutic class; but the patient doesn't quit taking the principal prescription. For example: You are taking Protonix 40mg and Dr. gives you a medicine for Prevacid 30mg. Both of these meds are in a comparable therapeutic class "Proton Pump Inhibitors" and work comparative way. Nobody ought to be on both these prescriptions. Prescription drugs changing to over-the-counter (OTC) status is another issue region in this therapeutic class. A patient may take Prilosec (OTC) and get a content for Protonix, Prevacid, etc. This is reason it is important to the point that you take every one of the medications you take all the time with you when you go to doctor.

6. Doctors likewise may have a patient on a brand name drug and write the next prescription for a generic drug. Precedent: A patient is taking Coumadin 5mg day by day; the Doctor gives patient a prescription for Jantoven 5mg, exchange name for Coumadin. The patient keeps on taking both not understanding they are a similar medication. This could have destroying results.

7. In an effort to cut costs, patients fill prescriptions at few drug stores. When you pick the most cost-effective pharmacy, stick to one drug store. One pharmacy would have a total rundown of every one of your medications to better inform you of duplications, interactions, etc.

8. Lack of patient education is the most widely recognized reason. Specialists don't educate patients or patients don't ask questions.

9. This investigation demonstrates that DDIs are frequent among hospitalized cardiac patients. About 234 drug interactions were reported during study period with median number of 1.67 pDDIs in the cardiac patients. It was discovered that occurrence of pDDIs was related with old age, polypharmacy and expanded lengths of hospital stay. Polypharmacy was high in the present examination which can be limited by the fitting utilization of the drug. This examination underlines the need to consider pDDIs during therapeutic planning, protect patients from outcome of drug interactions. Moreover, giving DDI related data to the prescribers and drug interaction ready programming to the administering pharmacist can play a vital role in limiting the frequency rate of DDI.

10. The most of interactions were pharmacodynamics in nature, having moderate seriousness. Anti-platelets and anti-coagulants were normally embroiled in numerous PDDIs in this examination and subsequently require serious checking during therapy. The most common management plan found in present study for most of the drug. The study reported that about 26% of intervention proposed were accepted by physician.

11. The incidence rate of adverse drug interactions was found to be 20%. The results provided an insight to the healthcare providers on the importance of monitoring and reporting of adverse drug interactions. The active inclusion of a well-prepared clinical pharmacist for recognizing the adverse drug interactions and conveying the mindfulness classes for the healthcare professional's experts with respect to the need of announcing the occurrence could improve the situation in under-revealed hospitals.

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