Original Article

The Assessment of Incidence of Potential Drug Related Problems and Co-Morbidities in Cardiac Patients, Bangalore, India

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Abstract

Objective: The present study is aimed to determine factors and medications associated with DRPs in geriatric cardiac patients with multiple co morbidities patients. **Methodology:** The study was designed as a prospective observational in a multi-specialty tertiary care hospital in Bangalore, India. The study population was geriatric cardiology patients admitted in to hospital for the duration of 6 months. We assessed the drug interactions, the co-morbid conditions influencing potential DRPs, the adverse drug events through trigger tools. **Result:** A total of 150 DRPs were identified in all 80 study subjects, had DRP frequency of 1.82 ± 2.2 per patient and categories as cognate to ADR 7.30%, DDIs: 21.53%. Most commonplace drug interaction type identified in these patients was moderate drug interaction which account 65.88% followed by minor (26.69%) and major type of drug interaction which was only 7.49%. hyperkalemia (n-4), increase serum creatinine (n-3) and increased INR (N-2) were the most laboratory triggers exist. Casualty assessment of ADRs was carried out using Naranjo's scale most ADRs found were possible (44.74%, n- 17) and probable (31.58%, n-12). In this study, almost one-third of the adverse drug reactions implicated antiplatelets and corticosteroids drugs, HTN (n-53) and DMT2 (n-52) were the major co morbidities associated with MRPs. **Conclusion:** In the patient group included in the present study, occurrence of DRP may result in increased risk of hospital readmission, morbidity, mortality. Further study is necessary to establish efficient strategies for elderly at risk for potential DRPs.

Keywords: Drug related problem, DDIs, ADRs, Naranjo's scale, Trigger tools

Introduction

According to Pharmaceutical Care Network Europe Foundation (PCNE), a Drug Related Problem (DRPs) is characterized as 'an occasion or situation including drug treatment that really or conceivably meddles with wanted wellbeing results. [1] A real problem has brought about clinical signs like unfavorable drug response or treatment disappointment because of off base dose. A potential problem isn't show, however whenever left uncertain, it might prompt drug related mischief to the patient. [2] DRPs incorporate medication blunders and ADRs. It would be greatly improved to forestall drug related problems than to address them, yet this isn't generally conceivable as a result of the multifaceted nature of pharmacotherapy, absence of preparing and information on social insurance suppliers and the conduct of the medication clients. Additionally, some pharmacotherapy problems are the aftereffect of an unforeseen response of the individual, similar to sensitivities, and can't generally be predicted. [3] Therefore, regardless of whether one could examine the medication and patient related variables during a medication audit before a medication is given over to the patient, the assessment of the pharmacotherapy after it has been started still stays important to identify DRPs and advance outcomes. [4] The objective of pharmaceutical consideration is to advance the drug treatment, accomplish positive clinical results inside reasonable monetary consumptions and improve patient's wellbeing related nature of life.[5]

Drug treatment problem among cardiovascular diseases will lead social insurance experts to upgrade drug treatment that may impact wellbeing costs; spare lives, improves wellbeing, decreases grimness and expands personal satisfaction. Familiarity with drugs conveying a high hazard for DRPs, are

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significant components of drug treatment and may add to lessening drug related bleakness and mortality. Since early recognizable proof of the sorts and examples of DRPs and the components related to them may improve the counteraction and the board of DRPs. Arranging and distinguishing drug related problems will likewise empower the expert in coordinated effort of the patient to build a superior consideration plan. By and large the consequence of this action will have great effect on the clinical practice among CVD patients. [6] DRPS may likewise bring about diminished personal satisfaction, and expanded grimness and mortality. [7] Lack of impact of the picked drug can be a test in the patients' administration, and frequently ideal degrees of blood glucose, cholesterol or pulse are not accomplished during drug treatment. This will expand the danger of horribleness and mortality. [8, 9]

Drug collaborations are generally significant in this specific situation and appropriate treatment of drug–drug communications (DDIs) may forestall destructive events. [10] in this way: "at least two drugs associating in such a way, that the viability or poisonousness of at least one drugs is altered". [11] DDI in patients getting multidrug treatment is a significant concern. Such communications may prompt an expanded danger of hospitalization and higher human services costs. [12] Some examinations have discovered that up to 11% of patients experience manifestations related with DDIs and that DDIs are liable for up to 2.8% of hospitaladmissions.[13] Research has likewise indicated that DDIs are related with expanded medicinal services use. [14] According to an as of late distributed investigation, 1% of all clinic affirmations are brought about by DDIs, and 0.05% crisis division visits, 0.6% of the emergency clinic confirmations and 0.1% of pre-hospitalization are brought about by unfavorable drug responses (ADRs) because of DDIs. Potential for drug collaboration is higher with cardiovascular drugs [15] and there are gives an account of expected DDIs in cardiology office from India.[16]

Co-dreariness alludes to the co-event of at least two clinical or mental conditions, which might possibly legitimately connect with one another inside a similar person.[15] hypertension, ischemic heart disease, heart failure, myocardial infarction, pain, chronic kidney disease. Depression, diabetes, anemia, constipation, stroke, asthma, thyroid disease and hearing loss usually make up most prevalent conditions each of which must be considered when developing individual treatment strategies for the management of CVD.[17]

Materials and Methods

The study was designed as a prospective observational in a multi-specialty tertiary care hospital in Bangalore, India. The study population was geriatric cardiology patients admitted in to hospital for the duration of 6 months. The inclusion criteria were all non-surgical geriatric cardiology patients of both sexes with age >60 years. The exclusion criteria were surgical patients of both sexes with age <60 years, any previous history of surgery. The data was collected from the sources like patient case reports and medication charts. The prospective data collected was fed in to data base; Micromedex®, Medscape® to assess the DDIs. The incidences of DDIs were recorded in to excel sheet for analysis. The practical incidences of DDIs were checked in terms of pharmacokinetic variables, time of drug administration and dosing duration within time. The co morbid conditions like asthma, diabetes mellitus, hyperlipidaemia, thyroid disorders, benign prostatic hypertrophy (BPH), COPD etc were checked by their duration and frequency. The incidences of adverse events were assessed by use ADR trigger tools and Naranjo's scale. The causality assessment for ADRs as well as ADEs was ruled out. The medication triggers and laboratory triggers were assessed for the incidence of ADEs. The data were subjected to analysis and results were expressed in numbers and percentage. The descriptive statistics was done in predesigned Microsoft Excel sheet. The results were depicted as tables and figures according to the type of tools used.

Result and Discusion

This prospective observational study had enrolled a total of 80 geriatric inpatients from the cardiology department for the assessment of incidence of potential drug related problems and associated co morbidities during six months period. The demographic metaphors of the patients were shown that Among the total, 48 (60%) were male and 32 (40%) were female patients with the mean age of 69.28±7.28 (min.: 60 and max.: 86yrs). The presence of associated co morbidities was observed in 77 (96.25%) patients. On an average, each patient has 3 coded diagnoses in which hypertension (66.25%, N-53) and diabetic mellitus (65%, N-52) were the most common conditions followed by Hyperlipidemia (40%, n-32), unstable angina (38.75%, N-31), acute coronary syndrome (37.5%, N-30), Asthma (35%, N-28) and others (Table 1).

Table 1: Co-morbidities and duration of exposure to co morbidities

Comorbidity	%	No. of patients	Average duration (yrs.)
HTN	66.25	53	22.33
CAD	8.75	7	18.33
DM	65	52	28.33
IHD, UA	38.75	31	19.21

CKD	20	16	10.54
Obesity	18.75	15	15.87
Hypothyroidism	10	8	11.62
Asthma	35	28	20.21
BPH	12.5	10	8.59
Pulmonary embolism	10	8	22.34
Hyperlipidemia	40	32	22.66
RHD	10	8	9.37
MI	12.5	10	22.79
ACS	37.5	30	18.18
PVD	22.5	18	14.56
ANAEMIA	25	20	15.67
AF	10	8	18.78
Congestive cardiac failure	17.5	14	28.33
Diabetic nephropathy	5	4	19.04
Dialated Cardiomyopathy	12.5	10	4.89
No comorbidity	3.75	3	

In the potential mechanisms of DDIs**,** synergism mechanisms were more common (64.53%) than antagonism were (36.15%).Based on the categories of DDIs, as understood by (Figure 1).Moderate DDIs was the most common (65.88%) and did not cause any significant clinical effects in patients then, major (7.43%) and minor (26.69%). The anticipated effect of DDI was 62.5% and the observed effect was found to be 37.5%. The most responsible drugs involved in DDI, were Aspirin (19.62%, N-102), and Furosemide (5.77%, N-30) followed by Insulin (5.19%, N-27), Clopidogrel (4.81%, N-25), pantoprazole (4.04%, n-21). In certain cases, it was difficult to assess the clinical effect of DDIs, there were drug combinations, where the interaction of one drug was nullified by the other. The combination with Pantoprazole, Levothyroxine and Furosemide. Ranitidine was found interacted with Levothyroxine led to decreased Levothyroxine effect by increasing gastric pH, whereas Furosemide is reported to increase toxicity of Levothyroxine.

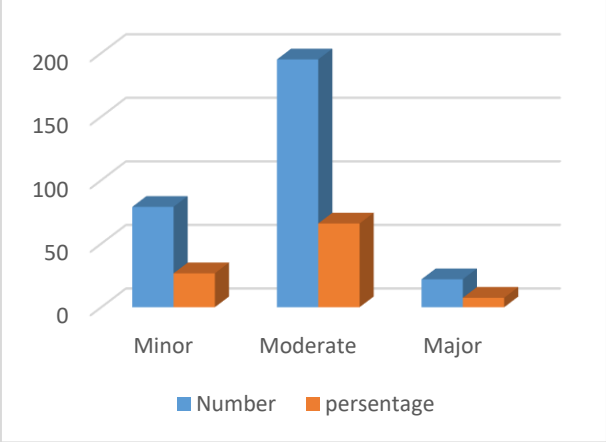

Figure 1: Categories of DDIs

The most common drug classes involved in ADRs were Antiplatelet (aspirin: 15.79%) and Corticosteroids (10.52%). The de-challenge and re-challenge of observed adverse drug events showed (50%, N-19) of ADRs solved after de challenging for e.g., hypokalemia improved after stopping Furosemide, and Hyperglycemic condition got better after stopping corticosteroids which refer to a positive de-challenge (may really be an ADR) and 5.26% of ADEs were apperceived after re challenging which means ADE reoccurring after restating the drug, may be complete or partial (restarted after one week) for e.g., increased serum potassium level (Hyperkalemia) was seen after re administration of Spironolactone (N-2), dizziness via Escitalopram, Bradicardia via Ivabradin were instances of positive re-challenge. Casualty assessment of ADRs was carried out using Naranjo's scale most ADRs found were possible (44.74%, N-17) and probable (31.58%, N-12) as depicted in Table 2. Most ADRs symptoms found were hyperkalemia (10.52%, N-4), dizziness (7.89% N-3), hypernatremia, bleeding, tachycardia, diarrhea, Altered LFT, Altered RFT (each 5.27%, N-2).

Table 2: The Naranjo's scale analysis details

Level of ADR	Avg. score	N	%
Definite	0	0	0
Probable	6.6	12	31.58
Possible	2.57	17	44.74
Doubtful	0	9	23.68

The observed Adverse Drug Events Trigger tools shown in Table 3 in which hyperkalemia (N-4),increase serum creatinine (N-3) and increased INR (N-2) were the most laboratory triggers exist In medication triggers Antidiarrheal

drugs (N-2) and cough suppressants (N-1) were seen and rash was observed as a clinical trigger. The average number of drugs per patient was 6.5, (520 drugs prescribed over 80 patients) and drugs taken by the patient were ranged from 4 to 18. The average duration of hospitalization was 6 ± 3.2 days.

Table 3: The observed Adverse Drug Events Trigger tools

Lab Trigger		Medication Trigger		Clinical Trigger	
Trigger	N	Trigger	N	Trigger	N
Serum glucose<50	1	Antidiarrheal drug	2	Rash	1
INR>6 Rise in serum	2	Cough suppressants	1	-	-
creatinine	3	-	-	-	-
Elevated AST/ALT level	1	-	-	-	-
Hypokalemia	1	-	-	-	-
Hyperkalemia	4	-	-	-	-
Hyponatremia	1	-	-	-	-
Platelet count<50000	2	-	-	-	-
Hypotension	1	-	-	-	-

AST: Aspartate amino Transferase, ALT: Alanine amino Transferase INR: International Normalized Ratio

The most common interactions reported were with Aspirin and Insulin, followed by Heparin and Clopidogrel, and Cefoperazone with Aspirin as depicted in Table4. The oral aspirin vs. insulin was found the highest used drugs (4.39% each) then, heparin vs. Clopidogrel (4.39%). This data demonstrates the role of high protein binding as actor to cause DDIs. The effects reported were Hypoglycemia, increase anticoagulation effect and increase level of Aspirin by acidic competition for renal clearance.

Table 4: shows the prevalence of DDIs

Object drug	Precipitant drug	N	%	Severity	Type	Effects
Aspirin	Insulin	13	4.39	Moderate	Antagonism	Hypoglycemia (decreased GRBS, FBS,symptoms of hypoglycemia)*
Pantoprazole	Clopidogrel	11	3.72	Moderate	Antagonism	Decrease level of clopidogrel by hepatic enzyme CYP3C19
Pantoprazole	Levothyroxin	8	2.7	Minor	Antagonism	Pantoprazole decreases levothyroxine effect by increasing gastric Ph
Cefoperazone	Aspirin	12	4.05	Minor	Synergism	Increase level of aspirin by acidic drug competition for renal clearance
Aspirin	Heparin	11	3.72	Major	Synergism	Increased clotting time, altered aPTT*
Furosemide	Aspirin	12	4.05	Moderate	Antagonism	Electrolyte disturbance; hypokalemia, hyponatremia *
Fondaparinux	Aspirin	4	1.35	Moderate	Synergism	Elevated bleeding and clotting time*
Enoxaparin	Aspirin	10	3.38	Moderate	Synergism	Increase effect of each other by pharmacodynamic synergism
Metoprolol	Albuterol	5	1.69	Moderate	Antagonism	Decreases effects of albuterol
Aspirin	Torsemide	3	1.01	Moderate	Antagonism	Torsemide decreases serum potassium level aspirin increases
Furosemide	Cefprazone	7	2.36	Major	Synergism	Furesomide increases cefoperazone effect
Metoprolol	Aspirin	9	3.04	Moderate	Synergism	Hyperkalemia *
Heparin	Clopidogrel	13	4.39	Moderate	Synergism	Increased clotting time, altered aPTT*
Ticagrelor	Fondaparinux	7	2.36	Major	Synergism	Increase anticoagulation effect
Telmisartan	Insulin	4	1.35	Moderate	Synergism	Hypoglycemia (decreased GRBS, FBS, symptoms of hypoglycemia) *

*represent the adverse effect observed. n: number of DDIs, GRBS: General random blood sugar, FBS: Fasting blood sugar, aPTT: activated partial thromboplastin time

In our study, 48% of patients were found to be males and 38% females, this might be due to increased medication use because of their multiple co morbid conditions and also possible of various risk factors like smoking, alcoholism and

a sedentary life style etc. compared to the female population. This result was similar to the study carried out by the Ganachari, et al., [18] which showed male predominance over females. Similar results had also been obtained in studies conducted by Alagiriswami, et al., [19] and Sathish kumar, et al., [20] which showed an increase in number of male population than females. But a statistical significance for the association could not be established. Till date, there was a lack of evidence to suggest that biological factors associated with gender may affect the pharmacological treatment.[21] In this study most patients were found to be in the age group 60-69 in another study conducted by. Vinks et al [22] it was found that DRPs may frequently occur in adults over 65 years of age using six or more drugs concomitantly. This also indicated that special attention should be done in such group of patients were regular review of drug therapy might help potentially to decrease the drug related problem. The poly-prescribing (average 6.5 drugs per patient) was found to be potential behind the incidence of DRPs was also observed. This observation was supported by a 2002 national survey indicated that 50% of the overall population took 5 or more medications and developed DRPs.[23] This study showed that the average number of drugs taken by the patient per day, number of diseases was shown to be a risk factor for the occurrence of DRPs. In the present study number of drugs were significantly associated with DRPs. Patients who took an average of 5-9 drugs per day were more likely to develop DRPs. This finding was in agreement with those studies done in Tiku rAnbessa, Addis Ababa,[24] Adama, Ethiopia,[25] and oncology unit in Tiku rAnbessa specialized Hospital, Addis Ababa,[26] Norway, [27] and Jordan, [28] in contrast to this a study done in Jimma University Specialized Hospital.

A total of 296 DDIs and 38 ADEs were ruled out in this study; in reference to the previous studies conducted, we identified qualitatively well-known risk factors like DDIs and ADE which were not identified earlier. As we expected, the risk factors incidence Kaufmann et al. [29] regards to DDIs were significantly higher (n-296) out of 80 patients. Roberts et al [30] study also showed similar results in which DDIs accounted for a substantial amount of potential drug toxicity (34.8%). The therapeutic agents most commonly involved in drug interactions and most DDI in the duration of analysis were antiplatelet agents (25.19%) including aspirin, clopidogrel, tirofiban, prasugrel, antihypertensives (22.12%) among which diuretics (9.81%) were mostly used drugs, followed by antidiabetics (9.99%) and corticosteroids (8.46%) *etc*. This was consistent with the published study done by Abraham et al. [31] and Jimmy et al. [32] found that most of the interaction was found with antiplatelet agents and GI drugs. in contrary with a study in France indicated anti-infective and CNS drugs were from the top 3 drug classes involved in DRP. [33] And bleeding was the most common clinical consequence observed in the presents study results of DDIs which correlates with the results of similar studies.[34] followed by hypoglycemia. Alert must be practiced in looking at the specific paces of every DDI by keeping up the typical scope of actuated halfway thromboplastin time (aPTT) and INR esteem in light of the fact that even slight increment or lessening in plasma drug fixation can have significant clinical impacts. Then again, for this equivalent explanation, patients utilizing heparin and warfarin were often subjected to rigorous monitoring of aPTT or INR and doses might be adjusted according to lab reports.[34] From the 296 DDIs identified, 7.43% were major, 65% were moderate and 26.69% were minor interactions which were compared with the results obtained by Jacqueline M et al. [35] There, the major, moderate and minor DDIs were 17%, 56% and 27% respectively. The vulnerability of the patients was not assessed actively in this study, in fact, and insufficient information on the past medical history could be a reason. Quality of this examination is that the DRP cautioning framework contained information on countless drugs just as data on analytic and research facility tests. In contrast to different investigations, notwithstanding including renal capacity, this examination likewise included investigation of other physiological conditions that could adjust the pharmacokinetics of the drugs utilized in cardiovascular illness, for example, liver disappointment, cachexia, and weight. Numerous studies have demonstrated that multidisciplinary management reduced admission rates and overall mortality in patients with chronic cardiovascular diseases such as heart failure.[36] In this study we focused on the incidence of actual DDIs compared to the potential DDIs which might arise out of the given drug combinations. [37, 38] Some of these drug combinations are used for therapeutic benefit in clinical practice. Geriatric patients are vulnerable groups, supposed to experience ADR more often. In our study, 38 suspected offending drugs were reported to induce various ADRs. Of which majority (50%) of the drugs were withdrawn for the management of ADR and (5.26%) re challenge was reported. In this study, almost one third of the adverse drug reactions implicated antiplatelets and corticosteroids drugs. Calcium channel blockers caused a higher incidence of adverse reactions than diuretics. [39, 40] Moreover, stoutness and impeded liver capacity were significant hazard factors in Saudi Arabia, which can be ascribed for the most part to the patients' stationary way of life. What's more, uneven eating regimen (i.e., extreme fat and sugar consumption) was a significant issue, particularly in CVD and diabetic patients in SA. [41] This eating routine may bring about poor power over the conditions and drug-food connections that meddle with the impact of the medication. This could be credited to the distinctions in the strategy, goals just as recommending designs among the past examinations contrasted with that of present investigation. An investigation by Teweleit et al [42] found that the frequently watched ADRs were arrhythmias (27.1%), syncope and varieties in circulatory strain (25.1%). The drugs most as often as possible related to ADR were angiotensin changing over chemical.

An investigation by Zaidenstein et al [43] found that, the causative drugs for ADRs were warfarin (25%), beta-blockers (15%), propafenone (5%), amiodarone (5%) and the most normally watched ADRs were orthostatic hypotension,

dying, arrhythmias and so forth. An examination by Iman et al [44] found that cerebral pain (15.7%) and dazedness (14.3 %) were the ADRs most habitually announced with focal and fringe sensory system issue (37.1%) just as gastrointestinal framework issue (21.4%) being most regularly included frameworks. Digoxin, Atenolol and streptokinase were the most culpable cardiovascular drugs of that review.

These varieties in the event of ADRs and drugs associated with causing regular ADRs might be ascribed to drug utilization and solution example of emergency clinics. Therefore, all these potential adverse reactions should be taken into consideration, especially in the elderly who might suffer significant deleterious effects. Causality assessment results implied that probable ADRs accounts for 31.58% while possible contributed for 44.78% and 23.68%doubtful. Our study can be compared with the study by Ratan J. Lihite, et al. [45] in which most ADRs (93.7%) were classified as possible, and only 10 ADR reports were probable. and opposite with the study by Arulmani *et al*. wherein (62.2%) reactions were assessed to be probable, 52 (31.7%) as possible and (6.1%) as definite. [46, 47] The frequency of ADRs saw in our investigation period (7.30%), while an examination conducted at a showing medical clinic in Belgium via Carnevali et al. revealed 25% rate of ADRs. [47] Our examination results additionally showed that research center triggers were more added to identify ADRs followed by medication triggers and clinical triggers comparative with an investigation did by Raja Sree Gadde, et al. [48] while an investigation conducted by Ganachari *et al* [49] indicated that suspected ADRs were identified majorly by medication triggers followed by laboratory trigger tools and clinical triggers. Most frequent trigger was hyperkalemia (N-4) in our study followed by increase serum creatinin (N-3) and increase INR (N-2). On the contrary, Naessens *et al*. [48, 50] resulted in the maximum probability of anti-emetic (32%) trigger followed by the Diphenhydramine (10%), over-sedation/ Hypotension (3.8%), Vitamin K administration (3.2%), high serum creatinine (2.6%) and glucose less than 50 mg/dl (2.2%). HTN (N-53) and DMT2 (N-52) were the major co morbidities associated with MRPs. Patients with HTN and/or DMT2 are often on poly-pharmacy; this could increase the possibility of ADRs, drug-drug interactions. In this study, multiple CVDs were found to correlate with DRPs, including: acute coronary syndrome (ACS), unstable angina (UA), myocardial infarction (MI), congestive heart failure, AF, IHD, and coronary artery diseases. The poly-pharmacy, different pharmacokinetic and pharmacodynamic changes in geriatric patients may prompt drug–drug collaboration. A portion of the drug associations saw was advantageous (synergistic impact) for the patients. By and large, geriatric patients are progressively inclined to ADRs. The inpatients were recommended with a more noteworthy number of medications and the majority of the patients were under suggestive treatment. The low economic status of the patients, complex dosing regimen, confusion, forgetfulness, lack of information, etc. might be the reason for DRPs. Depended on one or more physicians might led to poly-pharmacy, inappropriate medication and thereby DDIs. Among the selected patients, the majority were prescribed by more than one physician because of multiple co morbidities. And another reason is that the geriatric patients might have more than one disease and therefore more than one specialist of each disease may treat the patients. [51] There were no DRPs attributed to overdose because all the drug therapy was prescribed as per the recommended dose by the concerned cardiologist. Patients with numerous cardiovascular occasions have more potential drug collaborations than patients without cardiovascular sickness. This can be clarified by the wide utilization of cardiovascular drugs, for example, antihypertensive drugs, antiplatelet drugs, anticoagulants, and lipid bringing down drugs in patients. Numerous examinations inferred that the most widely recognized drug class engaged with DRPs was cardiovascular agents.[52] Also; cardiovascular occasions frequently add an extra weight to tolerant conditions and confuse their treatments.

Conclusion

The study identified 150 DRPs in 80 patients with CVDs with a frequency of 1.82 ± 2.2 DRP per patient attending Cardiology Unit of a tertiary care hospital. Improved safety for patients is a universal priority in health care. However, efforts to impact meaningfully on safety and to reduce harm have been slowed by methodologies that fail to identify and quantify relevant clinical mishaps accurately. The study showed that the incidence of DRPs in 80 patients within the cardiac unit of the hospital is high. The study also overemphasizes that the incidence of DRPs increases with an increase in the number of drugs prescribed. The presence of deleterious social habits is also an important contributing factor to the occurrence of drug-related problems. The geriatric populations who have multiple medical problems leads to prescribe more medications, which may be responsible for more DRPs and using six or more drugs concomitantly increase risk of potential DRPs. Hence, it is clearly showed that the pharmaceutical care is very much important in geriatric patients. The most common CVD encountered were hypertensive heart disease, angina and acute coronary syndrome. And diabetes mellitus, hyperlipidemia, asthma, anemia was major co morbid condition along cardiovascular patients. DDI was the main DRP identified. Drug interaction checking for the detection of DDIs, combined with pharmacological expertise, as well as the knowledge of important patient related risk factors, may be valuable for decreasing the number of potentially harmful drug combinations, and therefore contribute to an increase in patient safety. Comprehensive medication review by clinical pharmacists can aid early identification and prevent the DRPs in patients with CVDs. The most drugs involved in DDIs were aspirin, furosemide, insulin and clopidogrel. It also pointed out the explicit list of drug interactions and other drugs that seldom create problems. The most common interactions reported were with Aspirin and Insulin, followed by Heparin and Clopidogrel. This study

draws attention to the problem of ADRs in hospitalized patients and offers a methodological by using Naranjo's scale and triggers tools. The present study found that antiplatelets 15.79% and corticosteroids 10.52% were most drugs owing to ADRs caused by cardiovascular drugs. The most as often as possible announced ADRs were dry hyperkalemia and wooziness the most ordinarily involved cardiovascular drugs causing these ADRs were seen as aspirin, corticosteroids, fondaparinux, furosemide. Since most patients with cardiovascular diseases are on various drugs it isn't phenomenal to see antagonistic drug responses and it is imperative to screen and change treatment as and when the circumstance emerges. Extra checking and consideration towards patients who are at high hazard could lessen the effect of ADR. Especially in the patient gathering remembered for the current investigation, event of DRP may bring about expanded danger of emergency clinic readmission, grimness, mortality. Further study is necessary to establish efficient strategies for elderly at risk for potential DRPs. People with CVDs and co morbidities should receive special attention to avoid drug-related problems. Early identification and management of DRPs would augment the efficacy and outcome of quality healthcare. Identification and resolving DRPs is a serious and important health care tool in the provision of elderly pharmaceutical care. A significant errand for drug specialists is along these lines to recognize, resolve, and forestall the event of DRP in this gathering of patients which, in the coming years, is relied upon to develop extensively in size.

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