WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 16, 654-663. Research Article ISSN 2277–7105

PRESCRIBING PATTERNS AND ASSESSMENT OF SAFETY PROFILE OF DUAL ANTIPLATELET DRUGS IN CORONARY ARTERY DISEASE PATIENTS

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Article Received on
25 June 2024,

Revised on 15 July 2024,
Accepted on 05 August 2024

DOI: 10.20959/wjpr202416-33020

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ABSTRACT

Coronary artery disease (CAD), characterized by reduced blood flow to the heart due to atherosclerotic plaque buildup, affects approximately 1 in 3 healthy individuals according to current trends. Dual antiplatelet therapy (DAPT) has shown significant improvements in patient safety compared to monotherapy, particularly in minimizing hemorrhagic events. Consequently, DAPT has emerged as a major strategy for enhancing the safety profile in CAD patients.

INDEX TERMS: Coronarey artery disease, Dual anti platelet therapy, Ecospirin, Ticagrelor, Adverse drug reactions.

INTRODUCTION

Coronary artery disease (CAD) is a prevalent cardiovascular condition characterized by the narrowing or blockage of coronary arteries due to plaque buildup, resulting in reduced blood flow to the heart muscle.[1] It is a leading cause of mortality globally, contributing to millions of deaths annually.

CAUSES

- CAD primarily stems from atherosclerosis, involving the gradual accumulation of plaque composed of fats, cholesterol, calcium, and fibrin on artery walls.
- Plaque buildup leads to arterial narrowing and stiffness, impairing blood flow to the heart and also condition called carotid artery disease.[2],[3]

RISK FACTORS

- Age, gender, and family history significantly influence CAD risk, with men generally at higher risk and women's risk increasing after menopause.
- Lifestyle factors like smoking, high blood pressure, high cholesterol, diabetes, obesity, and physical inactivity contribute to CAD development.
- Other risk factors include chronic kidney disease, stress, unhealthy diet, alcohol use, and sleep apnea, Diabetes or high blood pressure during pregnancy.[4],[5]

SYMPTOMS

- CAD symptoms can vary from stable angina (temporary chest discomfort during physical activity or stress) to shortness of breath and, in severe cases, heart attacks.
- Women may experience atypical symptoms, including fatigue, shortness of breath, and discomfort in areas like the back, shoulders, or jaw.

MANAGEMENT

Medications

- Cholesterol-lowering drugs (statins, niacin, fibrates, bile acid sequestrants)
- Aspirin (for blood-thinning, with caution due to potential side effects).[6]
- Beta blockers and calcium channel blockers (regulating heart rate and blood pressure)
- ACE inhibitors and ARBs (lowering blood pressure and preventing disease progression)
- Nitroglycerin and ranolazine (for chest pain relief)

Surgeries and Procedures

- Coronary angioplasty and stent placement.[7]
- Coronary artery bypass graft surgery (CABG).[8]

Antiplatelet Agents

- Prevent platelet aggregation[9] and thrombus formation, primarily targeting arterial circulation.
- Widely used in preventing thrombotic events like myocardial infarction and ischemic stroke.

Choice and Dual Antiplatelet Therapy (DAPT)

- Aspirin used with ADP/P2Y inhibitors (clopidogrel, prasugrel, ticagrelor) for increased effectiveness (DAPT).

- Reserved for high-risk patients, reducing cardiovascular events but increasing bleeding risks.[10]

CLASSIFICATION

- ADP receptor inhibitors (e.g., clopidogrel, prasugrel)
- Adenosine reuptake inhibitors (e.g., dipyridamole)
- Irreversible cyclooxygenase inhibitors (e.g., aspirin)

I. AIMS AND OBJECTIVES

AIMS: To assess the prescribing patterns and safety profile of dual anti platelet agents in coronary artery disease patients.

OBJECTIVES

- To assess the prescribing patterns of medication in coronary artery disease patients.
- To assess the prescribing pattern of anti-platelet agents in coronary artery disease patients
- To analyze the safety profile of prescribing dual anti platelet agents.
- To identify conditions requiring dual anti platelet agents prescription

METHODOLGY

- STUDY SITE: This study was carried out at "ESIC MEDICAL COLLEGE AND HOSPITAL".
- STUDY PERIOD: The study was carried out for a period of 6 months.
- STUDY DURATION: The study was carried out for duration of 4 months.
- STUDY POPULATION: The sample size for the study was estimated to be approximately 150 patients.
- STUDY DESIGN: Prospective, observational, cross – sectional study.
- STUDY CRITERIA

a) INCLUSION CRITERIA

- All the CAD patients receiving antiplatelet agents.
- Both genders.
- All the age groups > 18 years.
- All the patients willing to participate in the study.
- Patients having other co-morbid conditions along with CAD.

B) EXCLUSION CRITERIA

- Stay in hospital< 24 hours.
- Patients with other cardiovascular diseases.
- Patients below 18 years age.

❖ STUDY MATERIALS

➢ Data collection form

➢ Informed consent form

RESULTS

Table 1: Distribution of Subjects According To Their Gender.

The total number of subjects included in the study were (n=150)

SEX	Total	PERCENTAGE
FEMALE	38	25.3%
MALE	112	74.7%
TOTAL	150	100%

Table 2: Distribution of Subjects According To Their Age.

AGE	FEMALE	MALE	TOTAL	AGE%
(25-40)	3	12	15	10.0%
(41-50)	12	21	33	22.0%
(51-60)	13	40	53	35.3%
(61-88)	10	39	49	32.7%
TOTAL	38	112	150	100%

Table 3: Distribution of Subjects Based On The Diagnosis.

DIAGNOSIS	FEMALE	MALE	TOTAL	PERCENTAGE
CAD	11	42	53	35.3%
CAD S/P PTCA	9	24	33	22.0%
CAD WITH LVD	6	12	18	12.0%
CAD -NSTEMI	5	11	16	10.7%
CAD S/P CABG	3	13	16	10.7%
CAD - STEMI	1	6	7	4.7%
CAD WITH DCMP	3	2	5	3.3%
ANGINA	0	2	2	1.3%
TOTAL	38	112	150	100%

Table 4: Distribution of Subjects Based On The Comorbidities.

COMORBIDITIES	FEMALE	MALE	TOTAL
C	0	3	3
D	1	3	4
H	5	14	19
K	2	5	7
N	15	50	65
C+D	0	1	1
C+H	1	1	2
D+H	10	17	27
D+L	1	2	3
K+H	1	5	6
L+H	0	1	1
D+H+C	0	3	3
D+H+L	1	0	1
K+D+H	1	7	8
TOTAL	38	112	150

WHERE C=CVA, L= LVD, K= CKD, D= DIABETES, H= HYPERTENSION, T=HYPOTHYROID, N= NO COMORBID CONDITIONS.

Table 5: Distribution of Subjects Based On The Anti Platelet Therapy.

THERAPY	FEMALE	MALE	TOTAL	%
ECO-CLOPIDO-AXCER	0	3	3	2.0%
CLOPIDOGREL	5	5	10	6.7%
ECO-CLOPIDO	8	22	30	20.0%
ECO-AXCER	7	38	45	30.0%
ECOSPIRIN	18	44	62	41.3%
TOTAL	38	112	150	100%

Table 6: Distribution of Subjects Based On Their Independent Samples T- Test After The Administartion of Dual Antiplatelet Therapy.

Independent Samples T-Test							
	Group	N	Mean	Median	SD	SE	p
ANTIPLATELETS	M	112	1.59	2	0.546	0.0516	**0.05**

	F	38	1.39	1	0.495	0.0804	
MEDICATIONS	M	112	8.29	8	2.994	0.2829	**0.048**
	F	38	8.68	8	3.137	0.509	
PROTHROMBIN TIME	M	112	13.71	13.5	2.404	0.2271	**0.049**
	F	38	13.89	13.4	2.216	0.3595	
APTT	M	100	35.96	36	10.835	1.0835	**0.047**
	F	32	36.63	36.4	11.234	1.9859	
HB	M	109	12.05	12	2.316	0.2219	**0.01**
	F	35	10.83	10.7	1.91	0.3229	
ESR	M	68	39.33	30.5	23.944	2.9036	**0.05**
	F	19	43.63	35	30.522	7.0022	

WHERE APTT: aPartial thromboplastin time, HB: Heamoglobin, ESR: Erythrocyte sedimentation rate.

Table 7: Distribution of Subjects Based On The Occurence of Adverse Reactions.

ADVERSE REACTIONS	FEMALE	MALE	TOTAL	PERCENTAGE
NO ADVERSE REACTIONS	28	89	117	78%
RASHES	6	11	17	11.30%
BLEEDING GUMS	2	7	9	6.50%
DIZZINESS	2	5	7	4.60%

Table 8: Distribution of Subjects Based On Number of Durgs Prescribed To Them From Nlem List.

NUMBER OF DRUGS FROM NLEM LIST	FEMALE	MALE	TOTAL	PERCENTAGE
0	0	4	4	2.7%
1	1	6	7	4.7%
2	7	24	31	20.7%
3	7	23	30	20.0%
4	9	26	35	23.3%
5	7	13	20	13.3%
6	5	8	13	8.7%
7	1	4	5	3.3%
8	1	2	3	2.0%
9	0	2	2	1.3%
TOTAL	38	112	150	100%

Table 9: Distribution of Subjects Based On Number of Medications Prescribed.

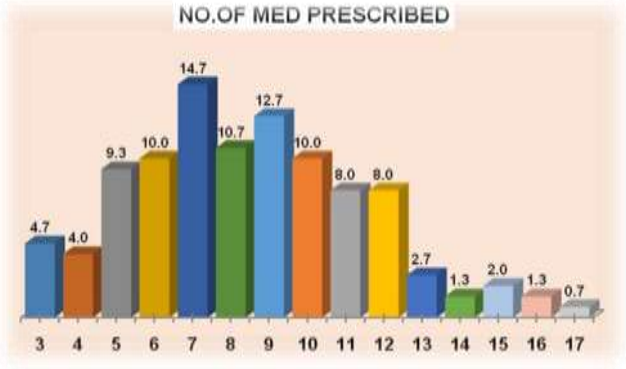
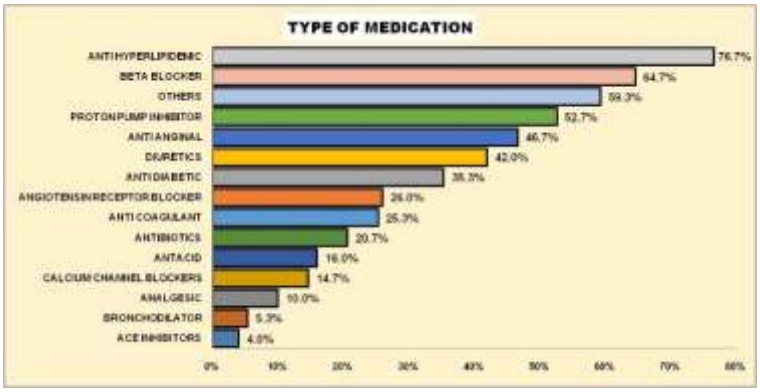


Table 10: Distribution of Subjects Based On Prescribing Patterns of Medications.



❖ DISCUSSION AND CONCLUSION

The study made insightful observations regarding coronary artery disease (CAD) treatment strategies and associated clinical indicators.

When it comes to different hemorrhagic events, DAPT has been shown to be the most effective treatment method for individuals with CAD. The safety profile assessments in CAD patients have been more than efficient with this approach**.**

Gender Disparities in CAD Risk: Among the total subjects, we observed a higher CAD prevalence in men (74.7%) compared to women (25.3%). [**table 1**]

Age-Related CAD Susceptibility: Notably, subjects aged 51-60 exhibited heightened CAD susceptibility (35.3%), while those aged 21-40 showed lower susceptibility (10%). This age-related trend correlates with the gradual progression of atherosclerosis and increased CAD risk with advancing age. [**table 2**]

Comorbidities and Medication Regimens: Our study revealed that many subjects reported no comorbidities (43%). Among those with comorbidities, hypertension (HTN) (12.6%) and diabetes mellitus (DM) (2.6%), with HTN alone (18%), were most prevalent. The high prevalence of HTN and DM in CAD patients is supported by existing literature [**table 4**]

- Prescribing Patterns of Medications: In our study, the majority of subjects were prescribed with 7 medications (14.7%), with 17 medications being the least prescribed (0.7%). The most commonly prescribed medications, apart from antiplatelet therapy, included statins (76.7%), beta-blockers (64.7%), proton pump inhibitors (52.7%), and anti-anginal drugs (46.7%).

Procedural Trends in CAD Management: Despite a significant portion of CAD patients not undergoing procedures (35.3%), percutaneous transluminal coronary angioplasty (PTCA) emerged as the preferred intervention (22.0%), followed by coronary artery bypass grafting (CABG) (10.7%) [**table 3**]. This finding is consistent with literature suggesting PTCA's efficacy in myocardial protection during subsequent non-cardiac procedures.

Dual Antiplatelet Therapy (DAPT) and Clinical Parameters: Our study demonstrated the significance of DAPT in CAD treatment, with aspirin monotherapy (41.3%) and aspirin-ticagrelor (30%) being the most common regimens. DAPT, especially aspirin-ticagrelor, emerged as the most recommended approach, supported by literature [**table 5**].

Clinical Parameters Post DAPT Administration: After DAPT administration, activated partial thromboplastin time (APTT) levels slightly increased but remained within acceptable limits. Similarly, erythrocyte sedimentation rate (ESR) levels increased post-DAPT administration, indicating significant changes in CAD patients [**table 6**].

Hemoglobin (HB) Levels Post DAPT Administration: Following DAPT administration, HB levels exhibited slight variations but remained within clinically acceptable ranges, suggesting minimal impact on hemostasis [**table 7**]. In the end, the CAD patient's physician uses DAPT as a clinically meaningful method to assess the safety parameters. The study's findings highlight the value of using DAPT rather than monotherapy to help CAD patients get well, while also guaranteeing that DAPT has the ability to improve patient care and lead to better health care management for CAD patients.

STRENGTHS

The study findings highlight DAPT's superiority over monotherapy in minimizing hemorrhagic events, making it a better treatment regimen for coronary artery disease patients. Moreover, the study demonstrates that DAPT leads to minimal adverse reactions, thereby enhancing patient safety. The robustness of these conclusions is bolstered by the study's large population sample, ensuring the appropriateness and reliability of the results.

LIMITATIONS

Indeed, the study's short duration of six months presents a limitation as it precludes the monitoring of long-term hemorrhagic events. Consequently, while the findings demonstrate short-term benefits, the long-term efficacy and safety of DAPT in minimizing such events remain uncertain.

ACKNOWLEDGMENTS

We extend our sincere appreciation to Dr. P.D.S.S. Prakash, Pharm.D, Assistant Professor at Malla Reddy College of Pharmacy, for his invaluable guidance during our dissertation work. Additionally, we express our gratitude to Dr. Maleha Butul, MBBS, MD, DM - Pharmacology, Associate Professor at ESIC Medical College and Super Specialty Hospital, Sanathnagar, for her unwavering support throughout our academic journey.

CONFLICT OF INTEREST: All authors declare that they have no conflicts of interest.

SOURCE OF FUNDING: Self funded, which is as per requirement of academic year.

ETHICAL CLEARENCE: Since the research is observational study with respect to the current guidelines of therapy, no subjects were prone to the administration of experimental substances. Indeed, the ethical committee of the institution had scrutinized the veracity of the project objectives and issued Ethics approval certificate which is enclosed herewith.

REFERENCES

1. Baber U, Holmes D, Halperin J, Fuster V. Definitions of acute coronary syndromes. In: Fuster V, Harrington RA, Narula J, Eapen ZJ, eds. Hurst's The Heart, 14e. McGraw Hill; 2017.
2. Coronary heart disease. National Heart, Lung, and Blood Institute. March 8, 2022.
3. Reda A, Ashraf M, Soliman M, Ragy H, Elkersh A, Abdou W, et al. Gender-related differences in risk factors and treatment strategies in patients with acute coronary

syndrome across Egypt: part of the Cardio-Risk Project. Atheroscl Suppl, 2018; 33: E2. doi: 10.1016/j.atherosclerosissup.2018.07.045

4. Wilson PWF. Overview of the possible risk factors for cardiovascular disease. Accessed March 8, 2022.
5. Kivimäki M, Nyberg ST, Batty GD, Fransson EI, Heikkilä K, Alfredsson L, et al. (October 2012). "Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data". Lancet. 380 (9852)
6. Guirguis-Blake JM, Evans CV, Senger CA, O'Connor EA, Whitlock EP (June "Aspirin for the Primary Prevention of Cardiovascular Events: A Systematic Evidence Review for the U.S. Preventive Services Task Force". Annals of Internal Medicine (Systematic Review and Meta-Analysis). (2016).
7. Sipahi I, Akay MH, Dagdelen S, Blitz A, Alhan C. "Coronary artery bypass grafting vs percutaneous coronary intervention and long-term mortality and morbidity in multivessel disease: meta-analysis of randomized clinical trials of the arterial grafting and stenting era"(February 2014).
8. Zhao DF, Edelman JJ, Seco M, Bannon PG, Wilson MK, Byrom MJ, et al. "Coronary Artery Bypass Grafting With and Without Manipulation of the Ascending Aorta: A Network Meta-Analysis". Journal of the American College of Cardiology. (February 2017).
9. Born G, Patrono C. "Antiplatelet drugs". British Journal of Pharmacology, January 2006; 147 Suppl 1 (Suppl 1): S241–S251.
10. Rajeev Gupta, Indu Mohan, Jagat Narula. Trends in Coronary Heart Disease Epidemiology in India, 2016 Mar-Apr; 82(2): 307-15.