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ORIGINAL ARTICLE

Prescription Pattern of the Patient with Coronary Artery Disease: A Study in a Tertiary Care Hospital in Bangladesh

LOHANI MD. TAJUL ISLAM[1], MD. JAHANGIR HOSSAIN[2*], ABU FOYEZ MD. MOTIOUR RAHMAN[3], MD ABDUS SALAM[1], SARJANA SULTANA[4], MOHAMMAD AL MAMUN[1], SOHEL MAHMUD[1], ABU SADIQUE ABDULLAH[1],

[1]Department of Cardiology, Bangladesh Medical University (BMU), Shahbag, Dhaka, [2]Department of Surgical Oncology, Bangladesh Medical University (BMU), Shahbag, Dhaka, [3]Department of Cardiology, National Institute of cardiovascular diseases and hospital (NICVD), [4]Department of Orthodontis (Dental), Bangladesh Medical University (BMU), Shahbag, Dhaka.

Address of Correspondence: Dr. Md. Jahangir Hossain, Associate Professor, Department of Surgical Oncology, Bangladesh Medical University (BMU), Shahbag, Dhaka. E-mail: jahangirhossain980@gmail.com;

Abstract

Background: Coronary artery disease (CAD) represents a leading cause of morbidity and mortality worldwide, with prescription patterns serving as a critical indicator of adherence to clinical practice guidelines. In Bangladesh, data on real-world prescribing practices for CAD patients in tertiary care settings remain limited. Objective: To evaluate the prescription pattern of drugs among patients with coronary artery disease attending a tertiary care hospital in Bangladesh.

Methods: This prospective observational study was conducted at the Department of Cardiology, Bangladesh Medical University, Dhaka, Bangladesh, from January 2024 to June 2024. A total of 387 patients diagnosed with coronary artery disease were enrolled. Data on demographic characteristics and prescribed medications were collected and analyzed using SPSS version 23.0.

Results: Among 387 patients, the mean age was 58.4 ± 11.2 years, with 64.3% male. Antiplatelets (96.1%) and statins (94.6%) were most prescribed, followed by beta-blockers (82.4%) and ACEIs/ARBs (78.8%). Dual antiplatelet therapy was significantly higher in acute coronary syndrome versus chronic coronary syndrome (82.7% vs. 50.3%, p<0.001). Elderly patients received fewer beta-blockers (73.5% vs. 86.2%, p=0.002), and females received fewer statins (91.3% vs. 96.4%, p=0.041).

Conclusion: Prescription patterns for CAD patients in this tertiary care setting showed good adherence to guideline-directed therapy for antiplatelets and statins. However, optimizing beta-blocker use in elderly patients and addressing gender-based prescribing disparities remain essential for improving clinical outcomes.

Keywords: Antiplatelet agents, Beta-blockers, Coronary artery disease, Guideline adherence, Prescription pattern, Statins

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Introduction

Cardiovascular diseases (CVDs) remain the foremost global cause of mortality, accounting for an estimated 17.9 million deaths annually, with coronary artery disease (CAD) constituting the largest proportion of this burden [1]. CAD, characterized by atherosclerosis of the epicardial arteries, leads to myocardial ischemia, infarction, and progressive heart failure, imposing a significant clinical and economic strain on healthcare systems worldwide [2]. The epidemiological transition in low- and middle-income countries (LMICs), including Bangladesh, has resulted in a sharp rise in CAD prevalence, driven by urbanization, sedentary lifestyles, and dietary changes. This shift has transformed CAD from a once-rare entity to a leading public health challenge in these regions [3,4]. In Bangladesh, the burden of CAD is substantial, with studies reporting increasing rates of hospitalization and premature death due to acute coronary syndromes [5]. The management of CAD relies on a multifaceted approach encompassing lifestyle modification, revascularization when indicated, and long-term pharmacological therapy. Guideline-directed medical therapy (GDMT)—which typically includes antiplatelet agents, statins, beta-blockers, and angiotensin-converting

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enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs)—has been unequivocally proven to reduce mortality, prevent recurrent ischemic events, and improve quality of life [6,7]. Adherence to these evidence-based pharmacotherapies is a critical determinant of patient outcomes. Despite the existence of robust international clinical practice guidelines, such as those from the European Society of Cardiology (ESC) and the American College of Cardiology (ACC), the translation of these recommendations into real-world clinical practice often varies significantly [8]. This disconnect between evidence and practice is influenced by multiple factors, including patient-specific characteristics (e.g., comorbidities, polypharmacy, socioeconomic status), healthcare system constraints (e.g., drug availability, cost), and prescriber-related variables (e.g., clinical judgment, specialty training) [9,10]. In resource-limited settings like Bangladesh, such variations can be particularly pronounced, potentially leading to suboptimal use of life-saving medications. Evaluating prescription patterns through observational studies serves as a vital tool for assessing the quality of clinical care. Such studies provide pragmatic insights into how physicians prescribe in routine practice, identify gaps between guideline recommendations and actual prescribing, and highlight areas requiring quality improvement interventions [11]. A limited number of studies from Bangladesh have previously explored prescribing trends in CAD; however, many are dated or conducted in single-center settings with small sample sizes, leaving a gap in contemporary data reflecting current practice in major tertiary care institutions [12,13]. Furthermore, the evolving landscape of CAD pharmacotherapy, including the increasing use of newer antiplatelet agents and high-intensity statins, necessitates updated analyses. Understanding the current prescription pattern in a leading tertiary care hospital is crucial, as such institutions often set the standard for practice across the country. The findings can inform clinicians, guide the development of local treatment protocols, and assist policymakers in ensuring the availability of essential cardiovascular medications. Therefore, this study was designed to evaluate the prescription pattern of drugs among patients with coronary artery disease attending the Department of Cardiology at Bangladesh Medical University, Dhaka, providing a contemporary snapshot of pharmacotherapy practice in a tertiary care setting in Bangladesh.

Methodology

This prospective observational study was conducted among patients diagnosed with coronary artery disease (CAD) who attended the Department of Cardiology at Bangladesh Medical University, Dhaka, Bangladesh. The study was carried out over six months from January 2024 to June 2024.

Inclusion criteria

Patients aged 18 years or older with a confirmed diagnosis of CAD, including stable angina, unstable angina, non-ST-segment elevation myocardial infarction (NSTEMI), ST-segment elevation myocardial infarction (STEMI), or those with a history of prior coronary revascularization (percutaneous coronary intervention or coronary artery bypass grafting), were eligible for enrollment.

Exclusion criteria

Patients were excluded from the study if they had a concomitant diagnosis of valvular heart disease requiring surgical intervention, congenital heart disease, cardiomyopathy not attributable to ischemic etiology, or significant hepatic or renal impairment (estimated glomerular filtration rate <30 mL/min/1.73m²). Additionally, pregnant women and patients unable to provide informed consent were excluded.

Study procedure

A total of 387 patients meeting the eligibility criteria were consecutively enrolled following informed written consent. Demographic data, clinical history, and complete details of prescribed medications—including drug names, dosages, frequencies, and durations—were recorded using a structured case report form. Prescriptions were reviewed from outpatient records and discharge summaries.

Data analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 23.0. Descriptive statistics were employed, with categorical variables presented as frequencies and percentages, and continuous variables expressed as mean ± standard deviation.

Result

A total of 387 patients with confirmed coronary artery disease (CAD) were enrolled in this study. The mean age of the study population was 58.4 ± 11.2 years, with ages ranging from 32 to 82 years. Male patients constituted 64.3% (n=249) of the cohort, while females accounted for 35.7% (n=138), yielding a male-to-female ratio of approximately 1.8:1. Regarding body mass index (BMI), 41.6% of patients were classified as overweight (BMI 23.0–27.5 kg/m²), while 28.9% fell into the obese

category (BMI e”27.5 kg/m²), reflecting a high prevalence of excess body weight in the study population. The distribution of CAD types revealed that chronic coronary syndrome (stable angina) was the most common presentation, observed in 44.7% of patients. Acute coronary syndrome (ACS) accounted for 55.3% of cases, which included ST-segment elevation myocardial infarction (STEMI) in 18.1%, non-ST-segment elevation myocardial infarction (NSTEMI) in 21.4%, and unstable angina in 15.8%. A history of prior percutaneous coronary intervention (PCI) was present in 32.0% of patients, while 14.5% had undergone prior coronary artery bypass grafting (CABG). Regarding cardiovascular risk factors, hypertension was the most prevalent comorbidity (68.5%), followed by type 2 diabetes mellitus (52.7%), dyslipidemia (48.1%), and current smoking (31.5%). The prescription pattern analysis demonstrated high utilization of guideline-directed medical therapy. Antiplatelet agents were prescribed in 96.1% of patients, with aspirin monotherapy used in 27.9% and dual antiplatelet therapy (DAPT) in 68.2%. Statins were prescribed in 94.6% of cases, with atorvastatin being the most commonly used agent (78.3%), followed by rosuvastatin (16.3%). Beta-blockers were prescribed in 82.4% of patients, among which carvedilol (45.1%) and bisoprolol (37.2%) were the predominant agents. Renin-angiotensin system blockers (ACEIs/ARBs) were used in 78.8% of patients, with ramipril (32.8%) and telmisartan (28.0%) being the most frequent. Nitrates were prescribed in 54.0% of patients, primarily for symptom management. Calcium channel blockers were used in 23.5% of cases, predominantly among patients with vasospastic angina or those with contraindications to beta-blockers. Comparison of prescription patterns between acute coronary syndrome (ACS) and chronic coronary syndrome (CCS) patients revealed notable differences. DAPT utilization was significantly higher in the ACS group compared to the CCS group (82.7% vs. 50.3%, p<0.001). Similarly, beta-blocker prescription was more frequent in ACS patients (88.3% vs. 74.7%, p=0.001). Conversely, nitrate use was higher in CCS patients (62.4% vs. 47.2%, p=0.004). No significant differences were observed between the two groups regarding statin utilization (95.3% vs. 93.6%, p=0.489) or ACEI/ARB use (80.4% vs. 76.9%, p=0.415). Prescription patterns also varied significantly according to age groups. Patients aged e”65 years received significantly lower rates of beta-blockers (73.5% vs. 86.2% in younger patients, p=0.002) and DAPT (59.8% vs. 72.3%, p=0.013) compared to their younger counterparts. Additionally, female patients were less likely to receive statins (91.3% vs. 96.4% in males, p=0.041) and beta-blockers (77.5% vs. 85.1%, p=0.062) compared to male patients, though the latter did not reach statistical significance.

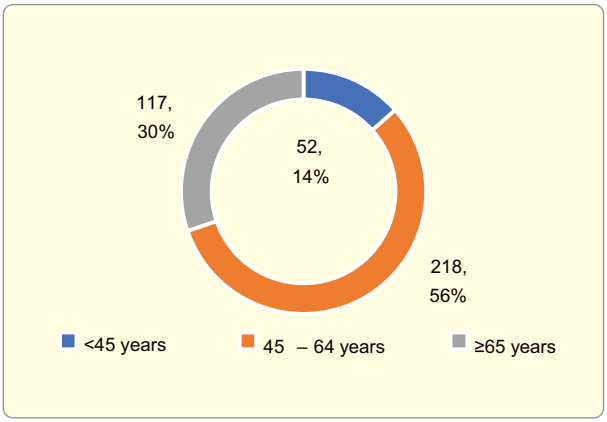

Figure 1: *Age distribution of participants (N=387)*

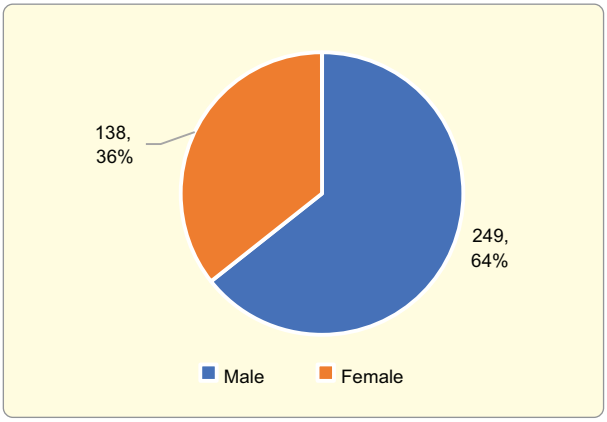

Figure 2: *Gender distribution of participants*

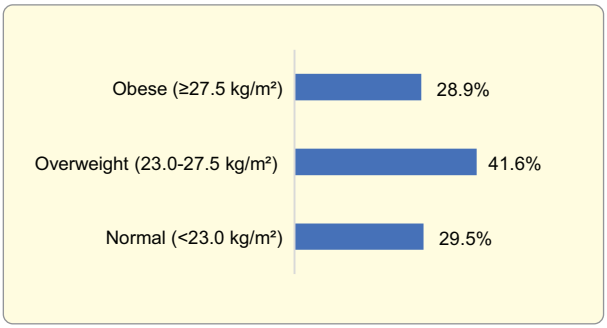

Figure 3: *BMI distribution of participants*

Table-I

Clinical presentation and risk factor profile

Category	n (%)
Type of CAD	
Chronic Coronary Syndrome	173 (44.7)
Acute Coronary Syndrome	214 (55.3)
ACS subtypes (n=214)	
STEMI	70 (18.1)
NSTEMI	83 (21.4)
Unstable Angina	61 (15.8)
Revascularization history	
Prior PCI	124 (32.0)
Prior CABG	56 (14.5)
Risk factors	
Hypertension	265 (68.5)
Type 2 Diabetes Mellitus	204 (52.7)
Dyslipidemia	186 (48.1)
Current Smoking	122 (31.5)

Table-II

Overall prescription pattern of cardiovascular drugs

Prescribed	Agents	(n, %)
n (%)	Common	
Antiplatelets		
372 (96.1)	Aspirin	364 (94.1)
	Clopidogrel	268 (69.3)
	Ticagrelor	31 (8.0)
Statins		
366 (94.6)	Atorvastatin	303 (78.3)
	Rosuvastatin	63 (16.3)
Beta-blockers		
319 (82.4)	Carvedilol	174 (45.0)
	Bisoprolol	144 (37.2)
	Metoprolol	52 (13.4)
ACEIs/ARBs		
305 (78.8)	Ramipril	127 (32.8)
	Telmisartan	108 (27.9)
	Losartan	49 (12.7)
Nitrates		
209 (54.0)	IM	186 (48.1)
Calcium Channel Blockers		
91 (23.5)	Amlodipine	73 (18.9)

IM: Isosorbide Mononitrate

Table-III

Comparison of prescription patterns between ACS and CCS groups

Drug Class	ACS Group (n=214) n (%)	CCS Group (n=173) n (%)	p-value
Antiplatelets	209 (97.7)	163 (94.2)	0.072
Aspirin Monotherapy	32 (15.0)	76 (43.9)	<0.001
Dual Antiplatelet Therapy	177 (82.7)	87 (50.3)	<0.001
Statins	204 (95.3)	162 (93.6)	0.489
Beta-blockers	189 (88.3)	130 (75.1)	0.001
ACEIs/ARBs	172 (80.4)	133 (76.9)	0.415
Nitrates	101 (47.2)	108 (62.4)	0.004
Calcium Channel Blockers	44 (20.6)	47 (27.2)	0.124

The chi-square test was used to compare groups. p-values <0.05 were considered statistically significant.

Table-IV

Comparison of prescription patterns by age group

Drug Class	Age <65 Years (n=270) n (%)	Age e”65 Years (n=117) n (%)	p-value
Antiplatelets	261 (96.7)	111 (94.9)	0.386
Dual Antiplatelet Therapy	195 (72.2)	70 (59.8)	0.013
Statins	258 (95.6)	108 (92.3)	0.197
Beta-blockers	233 (86.3)	86 (73.5)	0.002
ACEIs/ARBs	217 (80.4)	88 (75.2)	0.253
Nitrates	149 (55.2)	60 (51.3)	0.477

The chi-square test was used to compare groups. p-values <0.05 were considered statistically significant.

Table-V

Comparison of prescription patterns by sex

Drug Class	Male (n=249), n (%)	Female (n=138), n (%)	p-value
Antiplatelets	240 (96.4)	132 (95.7)	0.722
Dual Antiplatelet Therapy	174 (69.9)	91 (65.9)	0.425
Statins	240 (96.4)	126 (91.3)	0.041
Beta-blockers	212 (85.1)	107 (77.5)	0.062
ACEIs/ARBs	198 (79.5)	107 (77.5)	0.647
Nitrates	136 (54.6)	73 (52.9)	0.744

The chi-square test was used to compare groups. p-values <0.05 were considered statistically significant.

Discussion

This prospective observational study evaluated the prescription patterns of 387 patients with coronary artery disease (CAD) attending a tertiary care hospital in Bangladesh, revealing both strengths and areas for improvement in the implementation of guideline-directed medical therapy (GDMT). The findings demonstrate high utilization rates of antiplatelet agents and statins, consistent with contemporary recommendations, while highlighting gaps in prescribing beta-blockers and renin-angiotensin system blockers among specific subgroups. The demographic profile of the study population, with a mean age of 58.4 years and male predominance (64.3%), is consistent with previous reports from South Asian CAD cohorts [14,15]. The high prevalence of hypertension (68.5%) and diabetes mellitus (52.7%) observed in this study mirrors the growing burden of cardiometabolic risk factors in Bangladesh, reflecting the epidemiological transition documented in recent population-based surveys [16,17]. These findings underscore the necessity of comprehensive risk factor management alongside pharmacotherapy. The prescription rate of antiplatelet agents (96.1%) and statins (94.6%) represents a notable achievement in secondary prevention. This high adherence to antiplatelet therapy is comparable to findings from the Prospective Urban Rural Epidemiology (PURE) study, which reported utilization rates of 80–90% in high-income countries but significantly lower rates in low-income settings [18]. The current study's superior figures likely reflect the tertiary care context, where specialized cardiology services and protocol-driven care are concentrated. Dual antiplatelet therapy (DAPT) utilization was significantly higher in ACS patients (82.7%) compared to CCS patients (50.3%, p<0.001), appropriately reflecting current guidelines that recommend DAPT for 6–12 months following an acute event [7,19]. Statin utilization (94.6%) in this study is particularly encouraging, given that lipid-lowering therapy is a cornerstone of secondary prevention. The predominance of atorvastatin (78.3%) aligns with evidence supporting high-intensity statin therapy in CAD patients [6]. However, the finding that female patients were significantly less likely to receive statins than males (91.3% vs. 96.4%, p=0.041) is concerning and has been observed in other studies, suggesting potential gender disparities in cardiovascular pharmacotherapy that warrant further investigation [20]. Beta-blockers were prescribed in 82.4% of patients, with significantly higher utilization in the ACS group (88.3%) compared to the CCS group (75.1%, p=0.001). While this overall rate is commendable, the observed underutilization in elderly patients (73.5% vs. 86.2% in younger patients, p=0.002) raises concerns. Older adults are often at higher risk of recurrent ischemic events yet may be less likely to receive beta-blockers due to concerns about bradycardia, hypotension, or perceived frailty [21]. Similarly, ACEI/ARB utilization (78.8%) demonstrates moderate adherence to guidelines, though opportunities remain for optimization, particularly given the high prevalence of diabetes and hypertension in this cohort [22]. The prescription of nitrates (54.0%), with higher utilization in CCS patients (62.4% vs. 47.2% in ACS, p=0.004), reflects their role in symptom management rather than mortality reduction. This pattern is consistent with clinical practice where nitrates are employed more frequently instable angina for relief of exertional symptoms [7]. Calcium channel blocker usage (23.5%) was comparatively lower, typically reserved for patients with vasospastic angina or those intolerant to beta-blockers. Several limitations of this study should be acknowledged. First, as a single-center study conducted in a tertiary care hospital, the findings may not be generalizable to district-level or primary care settings in Bangladesh. Second, the cross-sectional design captured prescriptions at a single time point, precluding assessment of medication adherence, dose titration, or long-term persistence. Third,

information on socioeconomic factors, medication affordability, and out-of-pocket costs—which significantly influence prescribing decisions in resource-limited settings—was not collected [23]. Fourth, the study did not evaluate the appropriateness of drug dosages relative to guideline recommendations, which represents an important dimension of prescription quality [24]. Despite these limitations, this study provides valuable contemporary data on CAD prescription patterns in Bangladesh. The high utilization of antiplatelet agents and statins reflects substantial progress in implementing evidence-based care. However, the identified gaps—particularly regarding beta-blocker underutilization in elderly patients and statin underprescription in women—highlight areas for targeted quality improvement interventions. Future research should focus on evaluating the clinical outcomes associated with these prescribing patterns and exploring the barriers to optimal GDMT implementation in the Bangladeshi healthcare context [25].

Limitations

This single-center study in a tertiary care setting may limit generalizability to primary or secondary care levels in Bangladesh. The cross-sectional design captured prescriptions at one time point, precluding assessment of medication adherence, dose appropriateness, or long-term clinical outcomes.

Conclusion

This study demonstrates high adherence to guideline-directed medical therapy for coronary artery disease in a tertiary care hospital in Bangladesh, particularly regarding antiplatelet and statin utilization. However, gaps exist in beta-blocker prescription among elderly patients and statin use in females. Targeted interventions addressing these disparities, alongside continued emphasis on protocol-based prescribing, are essential to optimize pharmacotherapeutic outcomes in this population.

Recommendation

Regular clinical audits, implementation of protocol-based prescribing checklists, and targeted educational interventions for clinicians addressing gender- and age-based prescribing disparities are recommended to further optimize guideline-directed medical therapy adherence in coronary artery disease management.

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