Role of β-Blockers Across the Cardiovascular Continuum: A Real-World Perception Survey (ROBUST)

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Abstract

Background: Understanding Indian healthcare professionals' (HCPs) perceptions of beta (β)-blockers is critical, given the high burden of hypertension (HTN) and cardiovascular (CV) diseases in the country.

Materials and methods: A cross-sectional survey was conducted among 1,000 Indian HCPs, including consulting physicians, cardiologists, and specialists in diabetes/metabolism experienced in managing adult patients across the HTN and CV disease continuum. Conducted between April 2023 and March 2024, the survey employed a 26-item structured questionnaire, developed through literature review and expert consultation, to assess β-blockers utilization patterns, prescribing preferences, and perceived barriers.

Results: Responses from 855 HCPs were analyzed. Consulting physicians (431; 50.4%) and cardiologists (342; 40.0%) formed the majority. β-blockers were prescribed to 25–50% of patients with HTN by 489 (57.2%) HCPs. Approximately 429 (50.2%) observed a systolic BP reduction of 10–15 mm Hg, while 465 (54.4%) reported a diastolic BP reduction of 5–10 mm Hg. β-blockers were commonly prescribed for heart failure (381; 44.6%), postmyocardial infarction (214; 25%), and chronic coronary syndrome (309; 36.1%). Metoprolol was the preferred BB in 75% of HTN, post-MI, chronic coronary syndrome (CCS), and AF cases, and in 66.2% for HF management.

Conclusion: This survey highlights real-world prescribing patterns and perceptions of β-blockers in India, with metoprolol emerging as the most preferred agent across multiple CV indications, reflecting its strong clinical acceptance and perceived efficacy.

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Introduction

Cardiovascular disease (CVD) remains the leading cause of mortality in India, accounting for more than one-fourth of annual deaths. Hypertension (HTN) is a key modifiable risk factor and a major contributor to this burden.[1] India bears a disproportionate share of the global HTN burden, with nearly 35–40% of adults affected, yet fewer than 20% achieving adequate blood pressure (BP) control.[2] This challenge is magnified by the younger age at which CVD manifests, as more than half of CVD-related deaths in India occur before 70 years of age, compared with fewer than one-fourth in most Western countries.[3] In Southeast Asia, similar trends are observed, driven by rapid urbanization, high dietary salt intake, obesity, and sedentary lifestyles.[4]

Despite significant advances in treatment options, gaps persist in diagnosis, treatment adherence, and long-term management, particularly in primary care, where the majority of hypertensive patients are managed. Real-world outcomes often lag behind those observed in clinical trials. Suboptimal implementation of guideline-directed medical therapy (GDMT), inconsistent prescribing practices, and under-recognition of critical risk factors such as elevated resting heart rate (HR) continue to limit the optimal cardiovascular (CV) risk reduction.

Beta-blockers have been a cornerstone in CV management for decades, demonstrating benefits across multiple disease states, including HTN, coronary artery disease (CAD), arrhythmias, and heart failure with reduced ejection fraction (HFrEF). Their pleiotropic effects, such as attenuation of sympathetic overactivity, reduction in myocardial oxygen demand, improvement in ventricular function, and stabilization of hemodynamic translate into improved survival and fewer CV events.[5–8] Metoprolol, a highly cardioselective β1-blocker, is among the most widely studied and clinically utilized β-blocker, with extensive evidence supporting its efficacy in lowering BP, controlling HR, and reducing major adverse CV events (MACE). It demonstrates the broadest range of approved cardiovascular indications, including hypertension, angina pectoris, heart failure, myocardial infarction (MI), cardiac arrhythmias, and for the prevention of cardiac death and reinfarction following the acute phase of MI.[9–11]

Despite strong evidence, β-blockers remain underutilized in routine clinical practice due to variable prescribing patterns, concerns about metabolic effects, and inconsistent interpretation of evolving guidelines.[12] As most available data originate from Western populations, evidence is needed in India to address its unique demographics, higher burden of premature CAD, and healthcare system challenges, and to guide optimal clinical decision-making and improve outcomes.

Insights from this perception survey provide actionable guidance for primary care physicians (PCPs) and general practitioners who are at the forefront of managing HTN and related CV conditions. Unlike randomized controlled trials that assess efficacy and safety under controlled conditions, surveys capture prescribing behavior, clinical decision-making, and perceived barriers in routine practice. Such data can help identify opportunities for targeted education, awareness campaigns, and consensus-building to improve the implementation of evidence-based therapies.

Recognizing this need, the present survey was designed to assess the utilization patterns of β-blockers across the CV continuum in Indian clinical practice. A structured 26-item, closed-ended questionnaire, developed through literature review and expert consultation, assessed healthcare professionals' (HCPs') perceptions, prescribing preferences, and the rationale guiding routine use. The findings aim to characterize current trends, identify gaps in practice, and

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provide actionable insights to optimize beta-blocker use in alignment with clinical evidence and guideline recommendations.

Materials and Methods

A cross-sectional survey was conducted between April 2023 and March 2024 among 1,000 HCPs across India. The participants included consulting physicians from internal medicine, cardiology, diabetology, and metabolic specialties, as well as other clinicians with experience managing adult patients (≥18 years) with CV risk factors or established CV disease. All HCPs provided informed consent, and measures were taken to ensure confidentiality and anonymity of the collected data. The study protocol was reviewed and approved by the Institutional Ethics Committee, Maharashtra, in accordance with ICH CGP, New Clinical Trials Rules Amendment 2022, New Clinical Trials Rules 2019, ICMR guidelines, and other applicable regulatory requirements vide Protocol no.: AP/SOL/RB/RWS-04-2023.

The study employed a structured sampling framework to ensure representation across regions, practice settings (public and private), and care levels (primary, secondary, tertiary). This approach aimed to maximize the generalizability of the findings.

Survey Instrument and Development

A structured questionnaire was designed to collect HCP perceptions of β-blockers' utilization in routine cardiology practice across diverse Indian healthcare settings. The survey instrument was designed following a comprehensive review of current literature on beta-blocker use in HTN and CV disease management. Expert input from senior cardiologists and CV specialists was sought to ensure accuracy and clinical relevance. A pilot test involving 10 HCPs assessed the questionnaire reliability, validity, and completeness, and the feedback was incorporated into the final version.

The final questionnaire consisted of 26 closed-ended questions or statements covering multiple aspects of beta-blocker use, including prescribing patterns, perceived efficacy, safety, preferred agents, barriers to optimal use, and alignment with clinical practice guidelines. Hard copies of the questionnaire were distributed personally to all 1,000 HCPs.

Questionnaire Assessment

Given closed-ended nature of the survey items, responses were collected through predefined options to ensure consistency in capturing perceptions related to beta-blocker use in CV care.

Data Analysis

Of the 1,000 questionnaires distributed, 855 were completed and returned (response rate: 85.5%). Data from these responses were transferred to Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics (frequencies, percentages) were used to summarize responses, while cross-tabulations and chi-square tests explored associations between variables. Statistical significance was set at $p < 0.05$.

Results

Study Population

A total of 855 HCPs completed the survey (response rate: 85.5%). Respondents represented diverse regions of India, with most from the West (34.6%), East (27.4%), and South (25.0%). The majority were consulting physicians (50.4%) and cardiologists (40.0%), ensuring broad representation of specialties involved in CV care.

Table 1 summarizes survey responses on β-blocker prescribing patterns in HTN management, including patient distribution, first- and second-line use, preferred agents, observed BP reductions, dosing trends, and preferred fixed-dose combinations.

Beta-blocker Use in HTN Management

Over half of respondents (57.2%) reported prescribing β-blockers to 25–50% of their hypertensive patients. Among patients with compelling indications (e.g., post-MI, high sympathetic drive), 39.8% of HCPs prescribed them as first-line therapy, while 45.4% reported limiting their use to ≤25% of patients without compelling indications. They were commonly used as second-line therapy, with 52.4% prescribing them to 25–50% of hypertensive patients.

Beta-blockers were preferentially selected for patients with elevated heart rate (51.5%), high CV risk (42.2%), and younger age (26.9%). Nearly half of respondents (48.8%) prescribed them "most of the time" for young women planning pregnancy, and 55.2% used them "most of the time" in patients with high resting HR.

Metoprolol was the most preferred agent (74.9%) for HTN management, with over half of healthcare professionals reporting a 10–15 mm Hg reduction in systolic BP (50.2%) and a 5–10 mm Hg reduction in diastolic BP (54.4%). Among fixed-dose combinations, angiotensin receptor blocker (ARB)-based regimens were most frequently selected (53.1%), followed by calcium-channel blocker combinations (39.3%).

Beta-blocker Use in HF

In HFrEF, 43.2% of HCPs identified β-Blockers as the therapy providing maximum mortality benefit at discharge, followed by angiotensin receptor-neprilysin inhibitors (ARNIs, 36.6%). In the outpatient setting, 44.6% reported prescribing β-blockers to 25–50% of their HF patients.

Low heart rate (61.6%) and low BP (27.7%) were the most common reasons cited for not prescribing β-blockers. Despite these barriers, 31.7% of HCPs prescribed them to >75% of HF patients. Metoprolol remained the preferred beta-blocker (66.2%), followed by bisoprolol (21.3%) and carvedilol (15.0%). For HFpEF, 56.0% reported prescribing them "most of the time."

Beta-blocker Use in Post-MI Care

At discharge following MI, 39.4% of respondents prescribed β-blockers to >75% of their patients, with metoprolol the most common choice (78.1%), followed by bisoprolol (17.5%). Low HR (61.4%) and low BP (31.9%) were the most frequently reported reasons for withholding β-blockers post-MI.

Beta-blocker use in CCS and AF

In chronic coronary syndrome (CCS), 36.1% of HCPs reported prescribing β-blockers to 25–50% of patients, with metoprolol being the most preferred agent (82.7%). For HR control in AF, metoprolol was chosen by 85.4% of respondents, followed by bisoprolol (13.9%).

Figure 1 summarizes the role and utilization of β-blockers across the CVD continuum based on survey findings.

Preferred Beta-blockers Across Indications

Metoprolol consistently emerged as the preferred β-Blocker across all CV indications (Fig. 2, and Table 2), with the highest use observed in AF (85.4%) and CCS (82.7%).

Subset Analysis–Cardiologists

Cardiologists reported even higher beta-blocker utilization across all indications. Over 93% prescribed them to >25% of their hypertensive patients, >87% used them as first-line therapy for compelling indications, and >90% as second-line therapy. In HF, >97% reported prescribing β-blockers in the outpatient setting, and >95% prescribed them for CCS and post-MI care. More than 87% observed >10 mm Hg reduction in systolic BP with metoprolol, and >77% reported >10 mm Hg reduction in diastolic BP.

Table 3 summarizes the overall and cardiologist-specific prescribing patterns of β-Blockers, highlighting metoprolol's role in

Table 1: Survey findings on β-blocker use and prescribing trends in hypertension

S. no	*Question*	*Options*	*HCP response n (%)*	*p-value*	*95% CI*
1.	Percentage of total HTN patients on β-blockers	0–25% 25–50% 50–75% >75%	148 (17.3) 489 (57.2) 188 (22) 30 (3.5)	<0.001	2.93–3.03
2.	Percentage of patients with compelling indications prescribed β-blocker as the first line in HTN management	0–25% 25–50% 50–75% >75%	276 (32.3) 340 (39.8) 166 (19.4) 73 (8.5)	<0.001	2.64–2.76
3.	Percentage of patients without compelling indications prescribed β-blocker as the first line in HTN management	0–25% 25–50% 50–75% >75%	388 (45.4) 362 (42.3) 93 (10.9) 12 (1.4)	<0.001	2.58–2.67
4.	Percentage of patients prescribed β-blocker as a second line in HTN management	0–25% 25–50% 50–75% >75%	206 (24.1) 448 (52.4) 175 (20.5) 26 (3)	<0.001	2.85–2.95
5.	Approximate percentage of HTN patients with resistant HTN	0–10% 10–20% 20–30% >30%	328 (38.4) 314 (36.7) 171 (20) 42 (4.9)	<0.001	2.66–2.77
6.	Various conditions β-blocker prescribed as a first line in HTN management	High HR High CV Risk Young Obese	440 (51.5) 361 (42.2) 230 (26.9) 150 (17.5)	<0.001	1.65–1.81 1.20–1.24 2.05–2.22 3.13–3.24
7.	Frequency of β-blocker prescription as first-line for young female HTN patients planning pregnancy	Rarely Sometimes Most of time Always	117 (13.7) 185 (21.6) 417 (48.8) 136 (15.9)	<0.001	2.34–2.48
8.	Frequency of β-blocker prescription for HTN management in patients with high resting heart rates	Rarely Sometimes Most of time Always	34 (4) 193 (22.6) 472 (55.2) 156 (18.3)	<0.001	2.24–2.38
9.	Most preferred β-blocker in HTN management	Metoprolol Bisoprolol Carvedilol Nebivolol	641 (75) 181 (21.2) 1 (0.1) 1 (0.1)	<0.001	1.16–1.26 1.56–1.74 3.06–3.31 2.80–3.02
10.	Approximate reduction in Systolic BP with metoprolol	<5 mm Hg 5–10 mm Hg 10–15 mm Hg 15–20 mm Hg >20 mm Hg	0 252 (29.5) 429 (50.2) 160 (18.7) 14 (1.6)	<0.001	2.70–2.82
11.	Approximate reduction in diastolic BP with metoprolol	<5 mm Hg 5–10 mm Hg 10–15 mm Hg 15–20 mm Hg >20 mm Hg	0 465 (54.4) 289 (33.8) 91 (10.6) 10 (1.2)	<0.001	3.12–3.25
12.	The maximum daily dose of metoprolol (ER) prescribed in HTN management	50 mg 100 mg 150 mg 200 mg	205 (24) 482 (56.4) 58 (6.8) 110 (12.9)	<0.001	1.96–2.13
13.	Preferred antihypertensive class for fixed-dose combination with a β-blocker in HTN management	ARB CCB ACE-I diuretic	454 (53.1) 336 (39.3) 73 (8.5) 82 (9.6)	<0.001	1.18–1.26 1.31–1.48 2.24–2.50 2.58–2.94
14.	Molecules that provide maximum mortality benefit in HFrEF patients during discharge posthospitalization	β-blocker ARNI Diuretic MRA SGLT-2 A combination of all	369 (43.2) 313 (36.6) 65 (7.6) 74 (8.6) 137 (16) 222 (26)	<0.001	4.28–4.58

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S. no	Question	Options	HCP response n (%)	p-value	95% CI
15.	Percentage of patients prescribed β-blocker in OPD for HF management	0–25% 25–50% 50–75% >75%	67 (7.8) 381 (44.6) 156 (18.1) 252 (29.5)	<0.001	2.44–2.59
16.	The most common reasons for not prescribing β-blocker in HF management	Low HR Low BP Airway disease Fluid overload	561 (61.6) 237 (27.7) 92 (10.8) 109 (12.7)	<0.001	1.17–1.28 1.57–1.75 2.23–2.51 2.45–2.76
17.	Percentage of HF patients on β-blocker	0–25% 25–50% 50–75% >75%	140 (16.4) 263 (30.8) 181 (21.2) 271 (31.7)	<0.001	2.34–2.49
18.	Preferred β-blocker in HF management	Metoprolol Bisoprolol Carvedilol Nebivolol	566 (66.2) 182 (21.3) 128 (15) 5 (0.6)	<0.001	1.30–1.42 1.57–1.73 2.02–2.27 3.37–3.59
19.	Frequency of prescribing β-blocker in HF with preserved ejection fraction (HFpEF) management	Rarely Sometimes Most of the time Always	32 (3.7) 181 (21.2) 479 (56) 163 (19.1)	<0.001	2.20–2.34
20.	Percentage of patients prescribed β-blocker as the first line in post-MI at discharge	0–25% 25–50% 50–75% >75%	106 (12.4) 214 (25) 198 (23.2) 337 (39.4)	<0.001	2.24–2.40
21.	Preferred β-blocker in post-MI management	Metoprolol Bisoprolol Carvedilol Nebivolol	668 (78.1) 150 (17.5) 57 (6.7) 7 (0.8)	<0.001	1.14–1.22 1.67–1.85 2.42–2.65 3.44–3.65
22.	The most common reasons for not prescribing β-blocker post-MI management	Low HR Low BP Airway Disease Fluid Overload	525 (61.4) 273 (31.9) 119 (13.9) 57 (6.7)	<0.001	1.20–1.30 1.39–1.69 2.18–2.47 2.59–2.93
23.	Percentage of chronic coronary syndrome (CCS) patients on β-blocker	0–25% 25–50% 50–75% >75%	106 (12.4) 309 (36.1) 182 (21.3) 258 (30.2)	<0.001	2.41 to 2.56
24.	Preferred β-blocker in CCS management	Metoprolol Bisoprolol Carvedilol Nebivolol	707 (82.7) 109 (12.7) 31 (3.6) 13 (1.5)	<0.001	3.68–3.78
25.	HTN guidelines do not discriminate sufficiently between different β-blockers in their use as antihypertensive drugs, despite diverse properties	Strongly agree Somewhat agree Somewhat disagree	308 (36) 367 (42.9) 169 (19.8)	<0.001	1.90–2.02
26.	Preferred β-blocker for HR control in atrial fibrillation (AF) management	Metoprolol Bisoprolol Carvedilol Nebivolol	730 (85.4) 119 (13.9) 26 (3) 15 (1.8)	<0.001	1.02–1.06 1.58–1.77 2.74–3.07 3.35–3.36

ACE-I, angiotensin-converting enzyme inhibitor; BP, blood pressure; MI, myocardial infarction; MRA, mineralocorticoid receptor antagonist; OPD, outpatient department; SGLT-2, sodium–glucose cotransporter-2 inhibitor

Table 2: β-blocker preferences across indications

Indication	Metoprolol (%)	Bisoprolol (%)	Carvedilol (%)	Nebivolol (%)
HTN	74.97	21.16	0.11	0.11
HF	66.19	21.28	14.97	0.58
Post-MI	78.12	17.54	6.66	0.81
CCS	82.69	12.74	3.62	1.52
AF	85.38	13.91	3.04	1.75

Table 3: Prescribing patterns of β-blockers–overall vs cardiologists

Parameter	*Overall HCPs (n = 855)*	*Cardiologists (subset)*
β-blocker use in hypertension	57.2% prescribed β-blockers to 25–50% of patients	>93% prescribed β-blockers to >25% of patients
β-blocker as first-line therapy (compelling indications)	39.8%	>87%
β-blocker as second-line therapy (hypertension)	52.4% prescribed to 25–50% of patients	>90%
Metoprolol–systolic BP reduction	50.2% observed 10–15 mm Hg reduction	>87% observed >10 mm Hg reduction
Metoprolol–diastolic BP reduction	54.4% observed a 5–10 mm Hg reduction	>77% observed >10 mm Hg reduction
β-blocker prescription in HF outpatients	44.6%	>97%
β-blocker prescription in CCS (first-line therapy)	36.1%; metoprolol preferred by 82.7%	>95%
β-blocker prescription in post-MI (first-line therapy)	25%; metoprolol preferred by 78.1%	>95%
β-blocker use in AF	85.4% preferred metoprolol	High (not separately quantified)

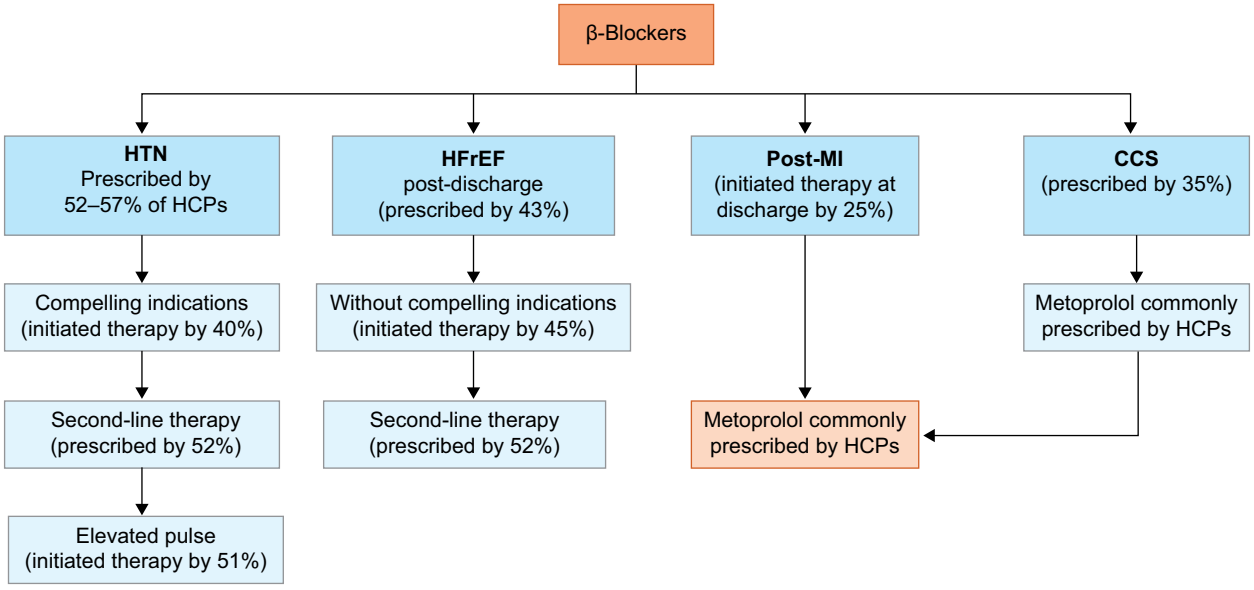

Fig. 1: Role of β-blockers in the CVD continuum as reported by Indian HCPs

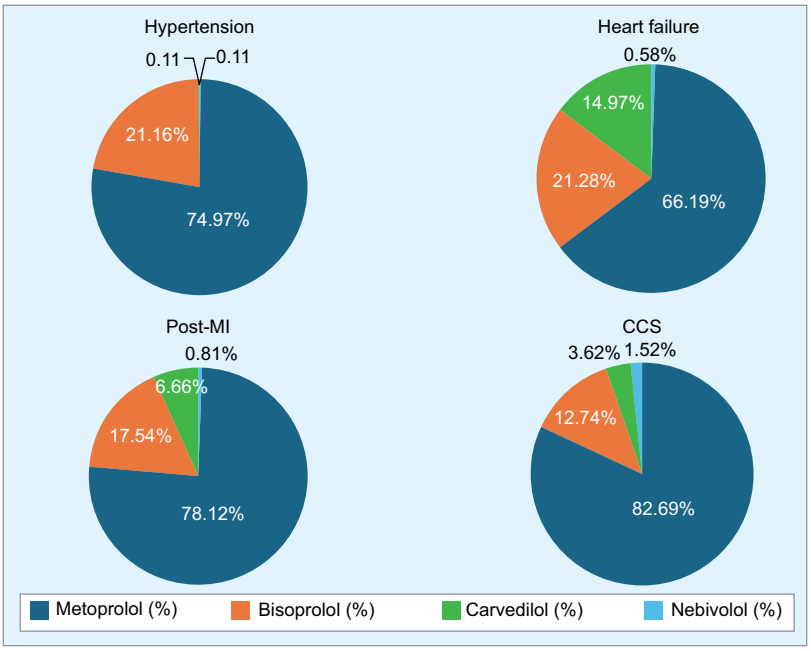

Fig. 2: Beta-blocker preferences across indications

BP reduction and its preferential use across multiple CV indications.

Discussion

This nationwide survey provides valuable real-world insights into β-Blocker prescribing patterns across the CV care continuum in India. The findings reaffirm their central role in the management of HTN, HF, post-MI, CCS, and AF, while also revealing areas where clinical practice deviates from international recommendations, most notably in HFpEF.

Beta-blocker Use in HTN

More than half of the surveyed clinicians reported prescribing β-blockers to 25–50% of their hypertensive patients, suggesting moderate but growing adoption for BP control. This aligns with the 2023 European Society of HTN (ESH) guidelines, which position β-blockers alongside renin–angiotensin system (RAS) blockers, calcium channel blockers, and thiazide diuretics as

first-line options, particularly for patients with compelling indications such as ischemic heart disease, arrhythmias, or HF.[13–15]

Metoprolol was the most commonly prescribed β-blocker, with respondents reporting meaningful reductions in both systolic and diastolic BP. Frequent use of fixed-dose combinations (FDCs) with ARBs highlights a pragmatic approach to improving adherence and ensuring comprehensive CV risk reduction.[16] Together, these findings suggest growing clinical confidence in metoprolol as a cornerstone of antihypertensive therapy in India, consistent with global evidence and local consensus.

Beta-blocker Use in HF

Nearly half of respondents identified β-blockers as the treatment conferring the greatest mortality benefit in HFrEF, consistent with GDMT recommendations advocating for evidence-based β-blocker (metoprolol succinate, bisoprolol, or carvedilol) to reduce morbidity and mortality.[17] However, the 44.6% outpatient prescription rate suggests continued underutilization, possibly reflecting therapeutic inertia, fear of bradycardia or hypotension, and suboptimal up-titration in real-world practice.

Interestingly, over half of respondents reported prescribing them in HFpEF, despite current ESC and AHA/ACC guidelines not recommending β-blockers as first-line therapy for this subgroup. This discrepancy likely reflects limited pharmacologic alternatives, the perceived benefit of heart rate control, and clinician experience suggesting symptomatic improvement in select HFpEF patients. These data underscore an ongoing evidence–practice gap and highlight the need for prospective studies to clarify the role of β-blockers in HFpEF.

Beta-blocker in Post-MI

Metoprolol was overwhelmingly favored for post-MI management, with nearly 80% of respondents prescribing it. This aligns with evidence showing that early intravenous administration in STEMI can reduce infarct size, limit microvascular obstruction, and improve long-term left ventricular function.[18–22] Importantly, such levels of cardioprotection have not been consistently demonstrated with other β-blockers, reinforcing metoprolol's unique value in acute MI care.[23] Although this evidence does not extend to long-term maintenance therapy since all patients received β-blockers from day 1, other reperfusion-era studies have primarily focused on short-term use in STEMI.[24] Supporting these findings, an Indian expert panel survey reported metoprolol as the preferred β-blocker post-PCI in 77% of cases and for HF management in 46%, reflecting its widespread acceptance and perceived clinical advantage in post-MI and HF care.[25]

Beta-blocker in Chronic Coronary Syndrome

Approximately one-third of respondents prescribed β-Blocker to patients with CCS, with metoprolol being the dominant choice (82.7%). These findings are in line with current guidelines recommending β-blockers for patients with CAD, prior MI, or HFrEF, and for those requiring antianginal therapy.[26] Beyond symptom relief, they offer cardioprotective, antiarrhythmic, and secondary preventive benefits. Nevertheless, the moderate prescription rate observed suggests room for improvement in optimizing long-term β-blocker therapy, particularly in patients without contraindications.[27,28]

Beta-blocker in AF

For ventricular rate control in AF, metoprolol was preferred by over 85% of respondents, reflecting its cardioselective profile, reliable rate-lowering effect, and favorable tolerability compared with nonselective β-blockers.[29] These findings echo data from large meta-analyses indicating improved outcomes with β-blocker therapy in AF patients, particularly those with coexisting HF.[30,31]

Beta-blockers and Combination Preferences

In the present survey, 53.1% of HCPs preferred ARB in fixed-dose combinations for HTN treatment, consistent with Kathiresan et al.'s pan-India survey, which found that telmisartan and metoprolol FDCs improved BP control, heart rate, patient compliance, and adherence. Among ARBs and β-blockers, telmisartan (97.0%) and metoprolol (86.0%) emerged as the most preferred agents, with 91.0% of physicians preferring combination when monotherapy proved insufficient. Physicians identified prevention of new CV events (63.0%) and improved quality of life (61.0%) as the key benefits of this combination. Moreover, 97.0, 90.0, and 40.0% of physicians agreed or strongly agreed that FDC could be prescribed to hypertensive patients with ischemic heart disease (IHD), HF, and diabetes, respectively.[32] These findings reinforce metoprolol's position as a robust β-blocker of choice across diverse cardiology and clinical practice settings in India.

Safety Profile of Beta-blockers

Our survey findings align with post-marketing safety data from the FDA Adverse Event Reporting System (FAERS), which highlight the importance of β-blocker selection in patients with asthma or asthma-like adverse events (AEs). FAERS, a large repository of real-world AEs reports, indicates that while cardioselective agents such as metoprolol and nebivolol demonstrate relatively lower AE risk, nonselective or less selective β-blockers including bisoprolol, and propranolol show higher risk and warrant cautious use.[33–35]

In our study, HCPs also emphasized safety considerations as a key determinant of β-blocker choice, with metoprolol being preferred for its favorable cardioselectivity and lower propensity to trigger bronchospasm. These findings reinforce the clinical relevance of balancing efficacy with safety, particularly in patient subgroups with comorbid respiratory conditions.

Strengths and Limitations

The primary strength of this survey is the participation of 855 HCPs across diverse specialties and geographic regions, enhancing the robustness and representativeness of the findings. This broad participation provides a comprehensive overview of real-world β-blocker utilization in varied clinical settings and cardiovascular conditions in India, while capturing prescribing patterns, clinical perceptions, and practical challenges in daily practice.

Key limitations include reliance on self-reported data, which may introduce recall or social desirability bias, and the absence of patient-level outcomes, limiting direct correlation of clinical success. Although no formal sample-size calculation was performed, the large and diverse respondent pool strengthens the representativeness of the findings. The findings reflect prescribing patterns during April 2023–March 2024 and may have evolved with emerging evidence or guideline updates. Furthermore, the study design captures current practices but does not establish causality or longitudinal trends. Future research should include prospective and longitudinal designs to evaluate patient outcomes and compare different β-blockers to optimize their real-world utilization.

Conclusion

This nationwide questionnaire-based survey provides valuable real-world evidence of the prescribing behavior of healthcare professionals regarding β-blocker use across the HTN and broader CVD disease spectrum in India. Despite their well-established role in improving morbidity and mortality outcomes, the survey reveals suboptimal

utilization, particularly in patient populations where these agents confer the greatest prognostic benefits. The persistence of uncontrolled heart rates among treated patients highlights therapeutic inertia, inadequate dose optimization, and potential hesitancy in initiating or up-titrating β-blocker therapy.

Metoprolol (ER) emerged as the most preferred β-blocker, reflecting its consistent efficacy, tolerability, and clinical acceptance across major CVD indications, including HTN, HF, post-MI, CCS, and AF. The predominance of FDCs with ARBs, followed by calcium channel blockers (CCBs), underscores a pragmatic strategy aimed at improving blood pressure control, adherence, and overall cardiovascular risk management.

Importantly, this survey highlights actionable insights for primary care physicians, who play a pivotal role in the early identification and management of hypertension in India. By leveraging these findings, primary care practitioners can enhance treatment individualization, prioritize heart rate optimization, and align their prescribing patterns with contemporary evidence-based guidelines. Reinforcing physician awareness, addressing barriers to β-blocker initiation, and fostering confidence in their safe, effective use have the potential to substantially improve cardiovascular outcomes and bridge critical gaps between clinical evidence and real-world practice in India.

Supplementary Material

The supplementary file, detailing non-author collaborations, is available at the web link below.

https://ajantameddialogue.com/casestudy/robust-study-nonauthor-collaborators-japi

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