Survey Report

Perception Mapping of Indian on Therapeutic Usage of Beta-blockers in Patients with Hypertension and Coronary Artery Disease

Version No.: 1.1

The study was conducted according to the approved protocol and in compliance with the protocol, Good Clinical Practice (GCP), and other applicable local regulatory requirements.

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1 INTRODUCTION

High blood pressure is a significant modifiable risk factor for all forms of coronary artery disease (CAD). In individuals without established cardiovascular disease, the lowest systolic pressures (ranging from 90–114 mmHg) and diastolic pressures (ranging from 60–74 mmHg) are linked to the lowest risk of developing CAD. While diastolic blood pressure is the strongest indicator of CAD in younger and middle-aged adults, this association reverses in people over 60, with pulse pressure emerging as the strongest direct predictor of CAD in this age group [1]. The 2017 American College of Cardiology (ACC) and American Heart Association (AHA) guidelines have suggested a BP threshold of ≥130/80 mmHg for initiation of antihypertension drug treatment in the general adult population [2].

The association of hypertension and coronary heart disease is a frequent one. There are several pathophysiologic mechanisms which link both diseases. Hypertension induces endothelial dysfunction, exacerbates the atherosclerotic process and it contributes to make the atherosclerotic plaque more unstable. Left ventricular hypertrophy, which is the usual complication of hypertension, promotes a decrease of ‘coronary reserve’ and increases myocardial oxygen demand, both mechanisms contributing to myocardial ischaemia [3].

The current approach to managing hypertension favors the use of a multidrug regimen at lower doses rather than relying on a single drug at the highest tolerable dose. This strategy leverages the complementary actions of different medications targeting various pathways, while also minimizing the side effects that can occur when a single drug is used at its maximum dose and then reduced to manage adverse reactions. Although beta blockers were a mainstay in hypertension treatment during the 20th century, numerous studies have highlighted their relatively weaker antihypertensive effects in older patients [4].

Beta-blockers are the preferred treatment for hypertension in patients with coronary artery disease and angina. Their ability to reduce ischemia and angina stems from their negative effects on heart rate (chronotropic) and contractility (inotropic). By lowering the heart rate, they increase the time for coronary perfusion during diastole, while also reducing the heart's oxygen demand through their effects on contractility and heart rate. Cardioselective beta-blockers, specifically those that are beta-1

selective and lack intrinsic sympathomimetic activity, such as metoprolol or bisoprolol, are recommended for this purpose [5, 6].

Despite their established benefits, the use of beta-blockers in clinical practice may vary among physicians, influenced by individual clinical experiences, patient profiles, and the presence of comorbidities. Understanding the prescribing patterns and perceptions of Indian physicians regarding the therapeutic use of beta-blockers in patients with hypertension and CAD is essential. This survey aims to map the current practices, preferences, and perceptions of healthcare providers, shedding light on the factors that guide their treatment decisions.

2 RATIONALE OF THE STUDY

The management of hypertension in patients with CAD is a critical area of focus due to the significant implications for cardiovascular health and patient outcomes. As hypertension remains one of the leading modifiable risk factors for CAD, understanding how physicians approach the treatment of this condition is essential. Despite the established benefits of beta-blockers in managing both hypertension and CAD, there is variability in their use among healthcare providers. This variability may stem from differences in clinical experience, patient demographics, and the presence of comorbidities, all of which can influence prescribing patterns. Therefore, a comprehensive survey of physicians' perceptions and practices regarding beta-blocker therapy in this patient population is necessary to identify current trends and inform future treatment strategies.

Moreover, as healthcare evolves, it becomes increasingly important to align clinical practices with evidence-based guidelines to ensure optimal patient care. The existing literature may not fully capture the nuances of prescribing behaviors in different regions, especially in the Indian context, where the healthcare landscape may present unique challenges. This survey aims to fill that gap by mapping the current prescribing habits of physicians treating hypertension in patients with CAD, exploring their preferred therapeutic classes, and understanding the rationale behind their choices. By gathering insights on the frequency of hypertension among CAD patients, preferred medications, and associated comorbidities, the survey will provide valuable data that can guide clinical practice and educational initiatives. Ultimately, this understanding will facilitate the development of more tailored treatment protocols

that reflect the realities of managing hypertension and CAD in diverse patient populations, contributing to improved health outcomes.

3 STUDY OBJECTIVE

The primary objective of this study is to evaluate the perceptions and prescribing practices of Indian physicians regarding the use of beta-blockers in the management of hypertension in patients with CAD.

4 METHODS

This study employs a cross-sectional, questionnaire-based survey to understand the perceptions and prescribing habits of physicians concerning beta-blockers for hypertension management in patients with CAD. A structured, 12-question electronic survey will be disseminated to cardiologists, internists, and general practitioners through professional networks and medical associations. The questionnaire will collect information on the prevalence of hypertension and CAD among their patients, preferred antihypertensive medication classes, frequency of beta-blocker use, and the rationale behind their prescribing choices. Additionally, it will address the comorbidities often encountered in these patients and assess adherence to clinical guidelines as well as perceptions of the long-term safety profile of beta-blockers. The study procedure includes identifying and inviting physicians, providing them with comprehensive participation details, and collecting survey responses securely. Once the data collection phase concludes, statistical analysis will be conducted to identify trends and summarize the results. The findings will be compiled into a comprehensive report, and the study outcomes will be disseminated through scientific publications or conference presentations, offering valuable insights into current clinical practices and potentially informing future treatment approaches.

5 RESULTS

A total of 89 HCPs participated in the survey. Below is the summary of the responses.

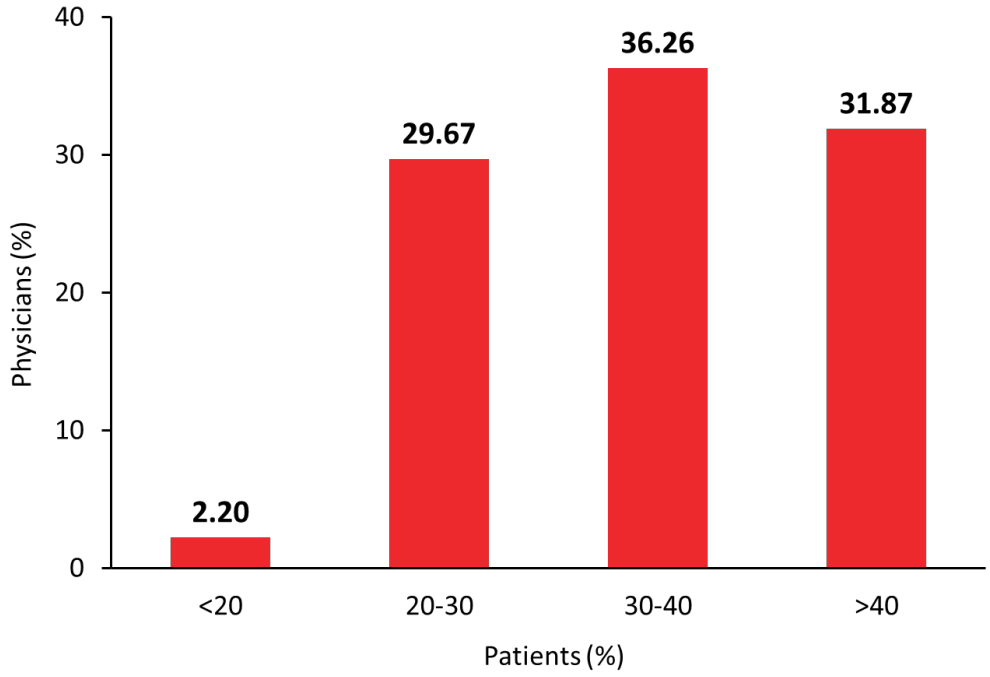
1. In your clinical practice, what percentage of your patient's present with hypertension (HTN)?

A. <20%

B. 20-30%

C. 30-40%

D. >40%



- Approximately, 36.26% of physicians observed 30-40% of patients present with HTN.
- Around 31.87% and 29.67% of physicians noted more than 40% and 20-30% of patients respectively present with HTN.
- A small proportion (2.20%) of physicians has seen less than 20% of patients present with HTN

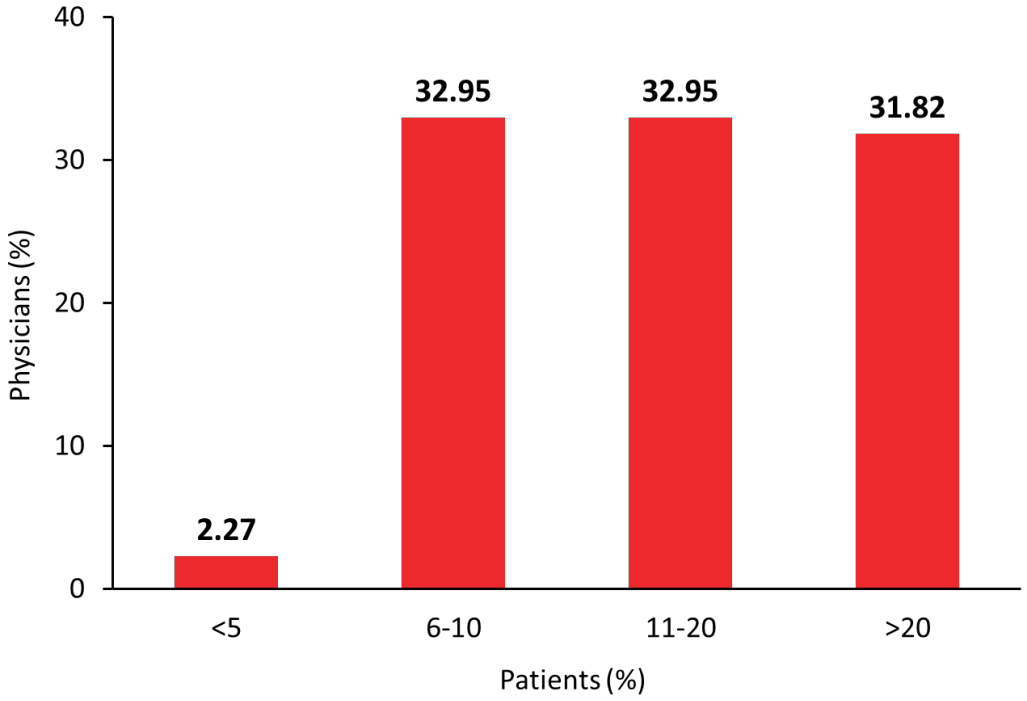
2. In your clinical practice, what percentage of your patient's present with HTN and Coronary Artery Disease (CAD)?

A. <5%

B. 6-10%

C. 11-20%

D. >20%



- Around two groups of 32.95% of physicians observed 6-10% and 11-20% of patients present with HTN and CAD.
- Approximately, 31.82% of physicians noted more than 20% of patients present with HTN and CAD.
- A small proportion (2.27%) of physicians has seen less than 5% of patients present with HTN and CAD.

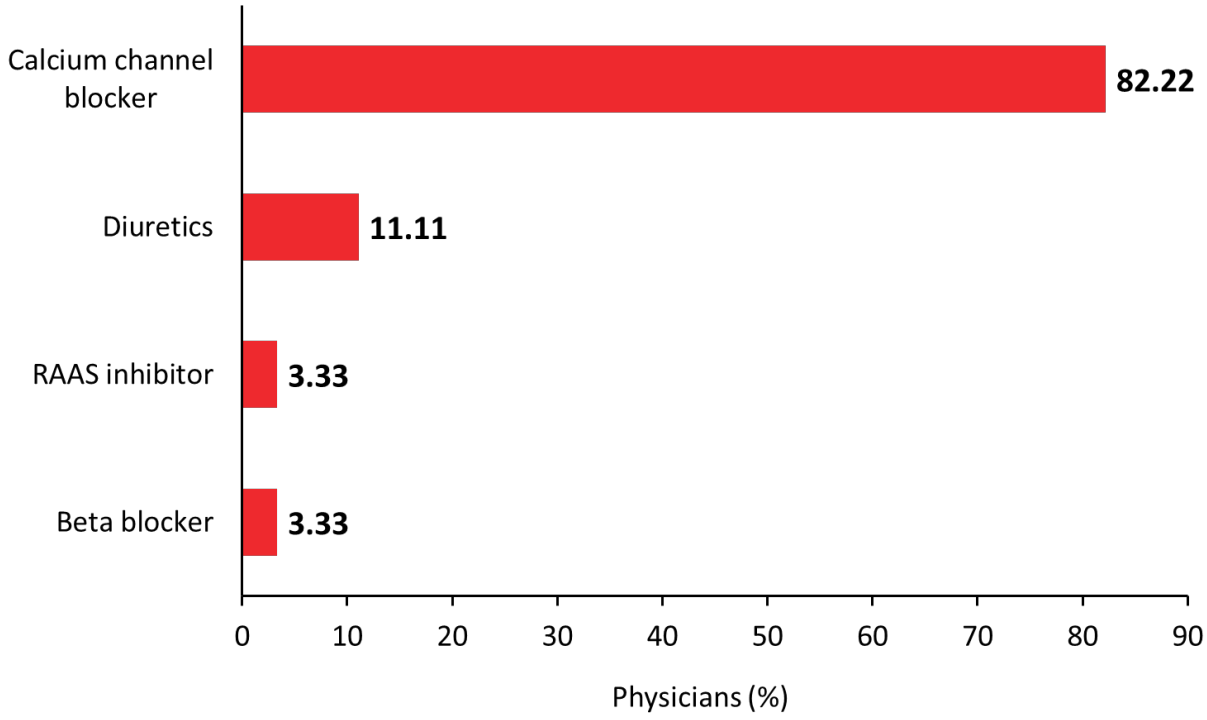
3. Which is the preferred class of drug in patients with HTN and CAD in your clinical practice?

A. Beta-Blockers

B. RAAS inhibitors

C. Diuretics

D. Calcium Channel Blockers



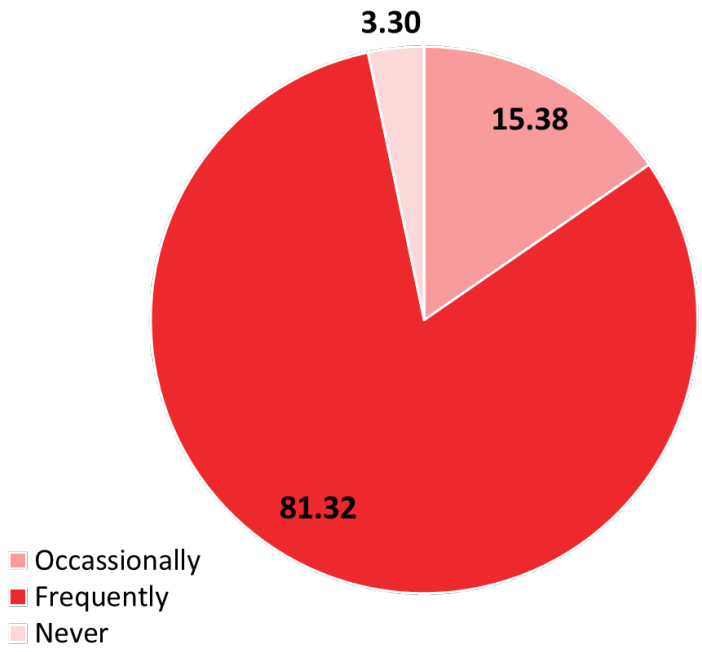
- The majority (82.22%) of physicians preferred calcium channel blocker class of drugs in patients with HTN and CAD in your clinical practice.
- Approximately, 11.11% of physicians preferred diuretics class of drugs in patients with HTN and CAD in your clinical practice.
- Around two groups of 3.33% of physicians preferred RAAS inhibitor and beta blockers class of drugs in patients with HTN and CAD in your clinical practice.

4. How often do you prescribe the Beta-blockers for patients with Hypertension and CAD?

A. Occasionally

B. Frequently

C. Never



- The majority (81.32%) of physicians frequently prescribe the Beta-blockers for patients with HTN and CAD.
- Approximately, 15.38% of physicians occasionally prescribe the Beta-blockers for patients with HTN and CAD.
- Around 3.30% of physicians never prescribe the Beta-blockers for patients with HTN and CAD.

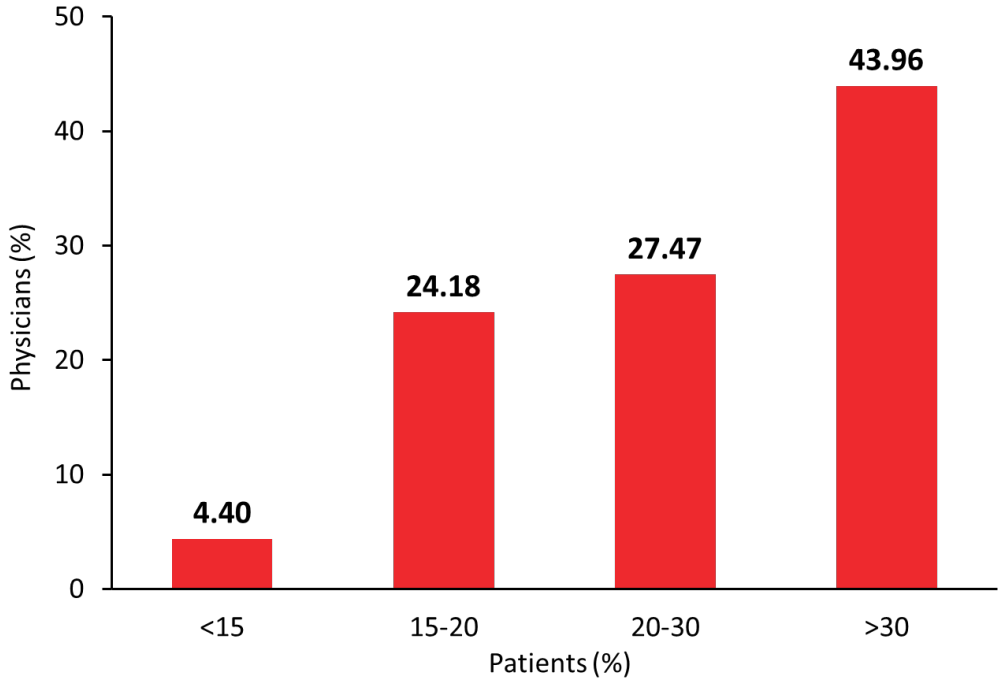
5. What percentage of patients are usually prescribed with Beta-blocker therapy in management of Hypertension with CAD in your practice?

A. <15%

B. 15-20%

C. 20-30%

D. >30%



- Around 43.96% of physicians usually prescribe more than 30% of patients with beta-blocker therapy in management of HTN with CAD in their practice.
- Approximately, 27.47% of physicians usually prescribe 20-30% of patients with beta-blocker therapy in management of HTN with CAD in their practice.
- Similarly, 24.18% of physicians usually prescribe 15-20% of patients with beta-blocker therapy in management of HTN with CAD in their practice.
- A small proportion (4.40%) of physicians usually prescribe less than 15% of patients with beta-blocker therapy in management of HTN with CAD in their practice.

6. Which beta-blocker is usually preferred by you in patients with Hypertension and CAD?

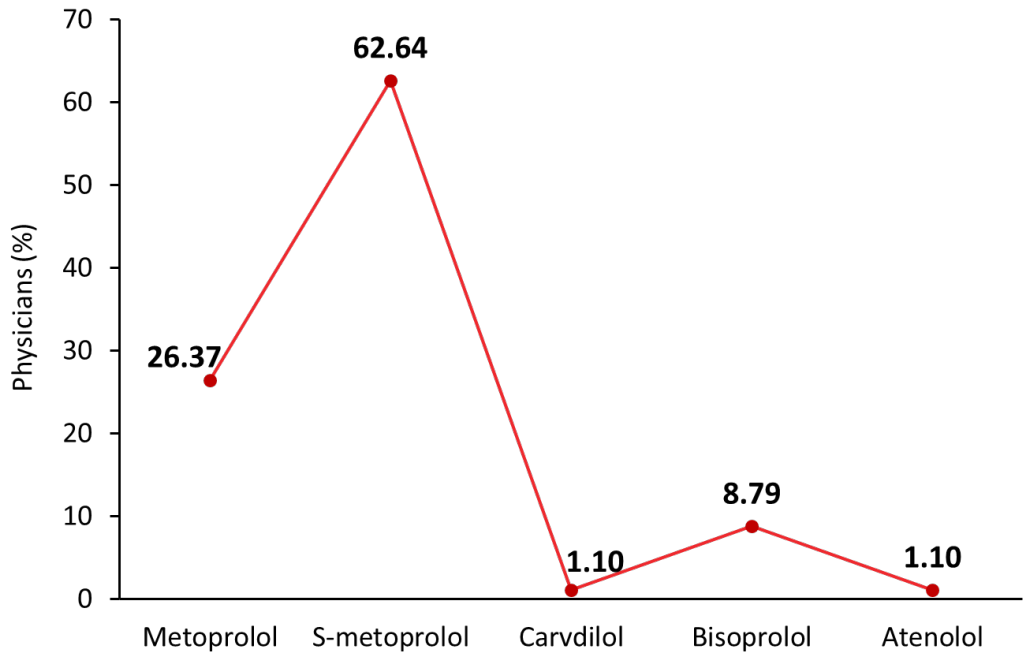
A. Metoprolol

B. S-Metoprolol

C. Carvedilol

D. Bisoprolol

E. Atenolol



- The majority (62.64%) of physicians usually preferred S-metoprolol n patients with HTN and CAD.
- About 26.37% of physicians usually preferred metoprolol n patients with HTN and CAD.
- Meanwhile, 8.79% of physicians usually preferred bisprolol in patients with HTN and CAD.
- Around two groups of 1.10% of physicians usually preferred carvidilol and atenolol in patients with HTN and CAD.

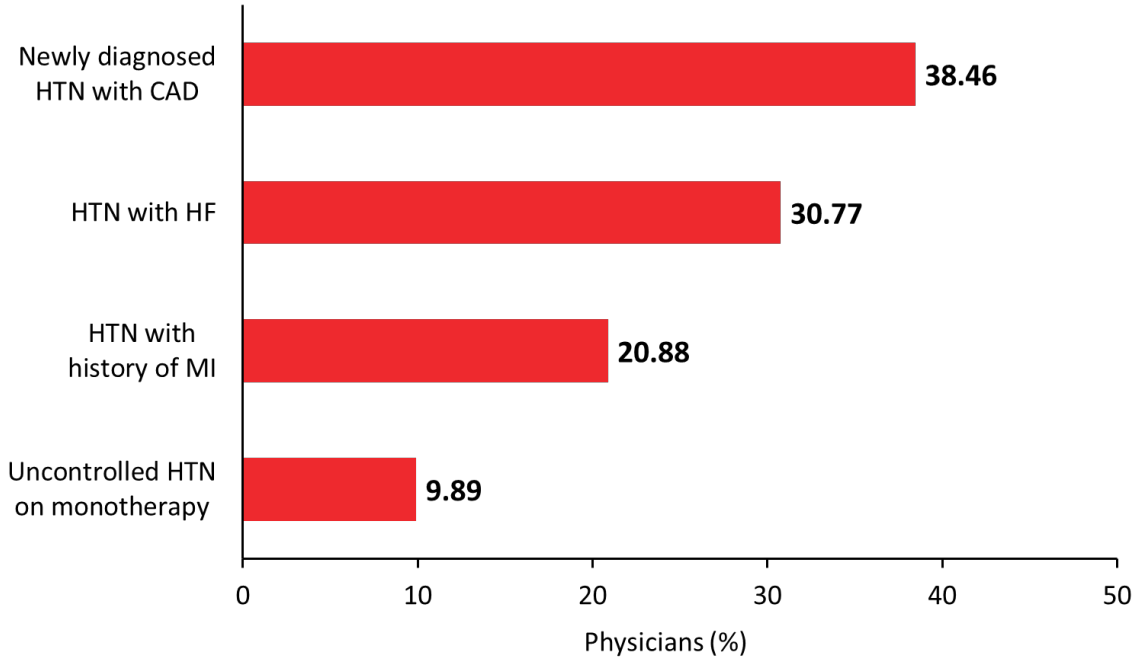
7. In which of the following patient profiles do you most commonly prescribe Beta-blockers?

A. Uncontrolled Hypertension on monotherapy

B. Newly diagnosed Hypertension with CAD

C. Hypertension with Heart Failure

D. Hypertension with history of Myocardial Infarction



- Approximately, 38.46% of physicians prescribe beta-blockers to the patients with newly diagnosed HTN with CAD
- Around 30.77% of physicians prescribe beta-blockers to the patients having HTN with HF
- Similarly, 20.88% of physicians prescribe beta-blockers to the patients having HTN with history of MI.
- A small proportion (9.89%) of physicians prescribe beta-blockers to the patients having uncontrolled HTN on monotherapy.

8. In your practice, what is/are the primary intention(s) for prescribing Beta-blockers in Hypertension and CAD patients? (Can mark more than 1 option, if required)

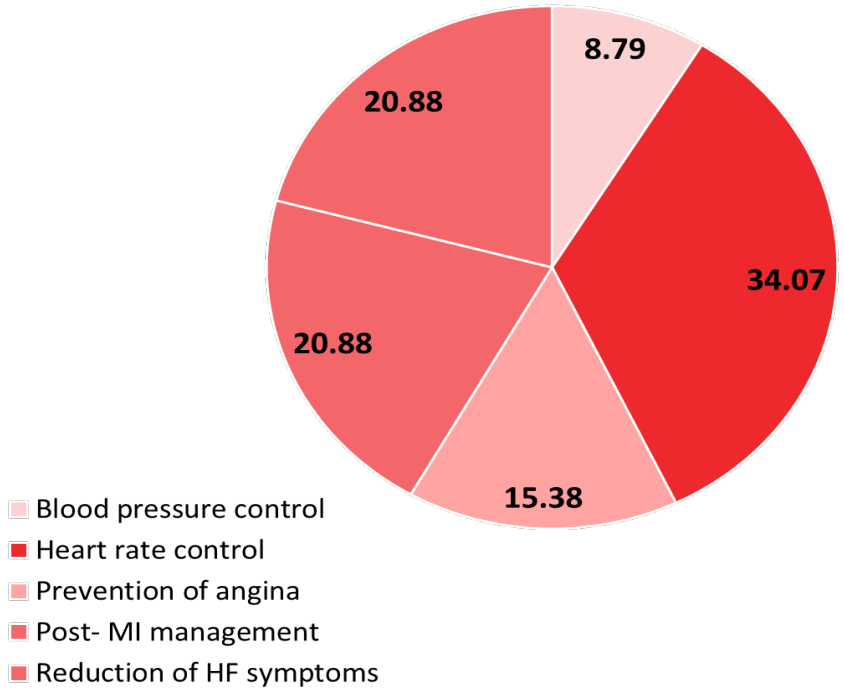
A. Blood pressure control

B. Heart rate control

C. Prevention of Angina

D. Post-MI Management

E. Reduction of Heart Failure symptoms



- The primary intention of 34.07% of physicians for prescribing beta-blockers in HTN and CAD patients is to control heart rate
- Around two groups of 20.88% of physicians prescribes beta blockers in HTN and CAD patient with intention to post-MI management and reduction of HF symptoms.
- The primary intention of 15.38% of physicians for prescribing beta-blockers in HTN and CAD patients is to prevent from angina.
- Similarly 8.79% of physicians prescribes beta blockers in HTN and CAD patient with intention to control blood pressure.

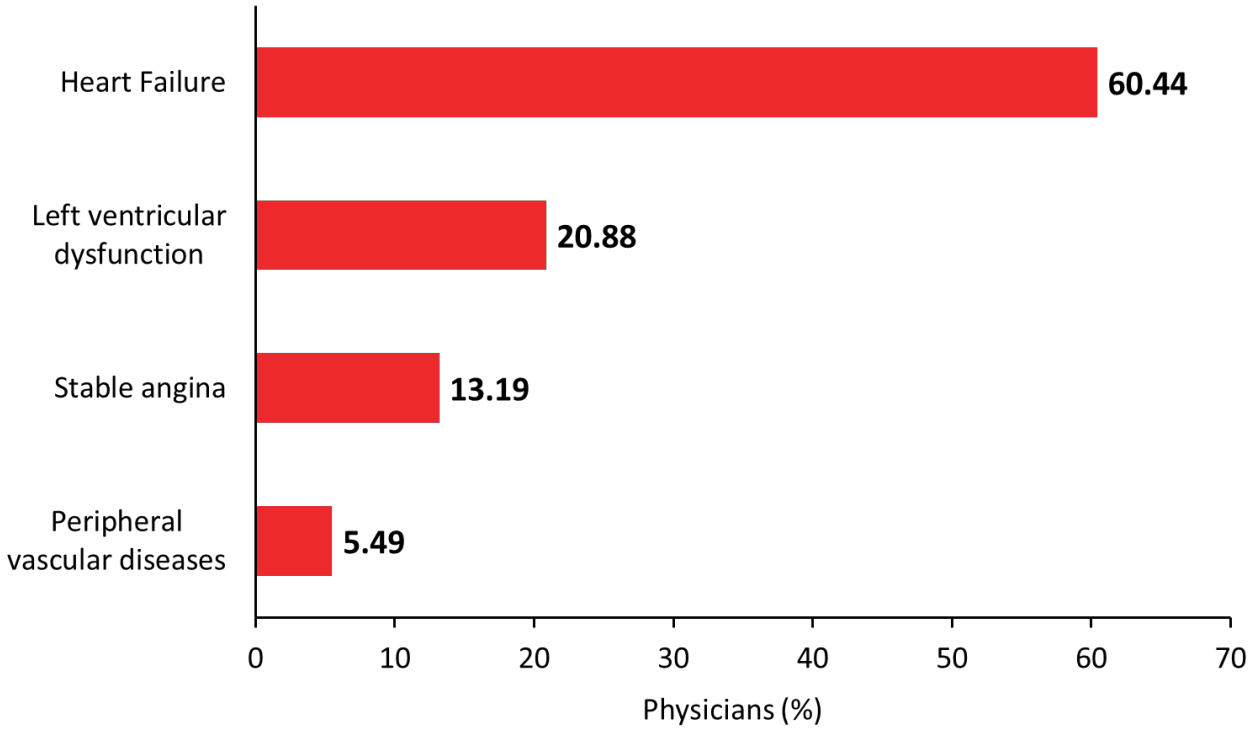
9. Which is/are common comorbidity (ies) in HTN and CAD patients where you prescribe Beta blockers? (Can mark more than 1 option, if required)

A. Heart Failure

B. Left Ventricular Dysfunction

C. Stable Angina

D. Peripheral Vascular Disease



- The majority (60.44%) of the physicians observed heart failure as the common comorbidity in HTN and CAD patients to prescribe beta blockers.
- About 20.88% of the physicians noted left ventricular dysfunction as the common comorbidity in HTN and CAD patients to prescribe beta blockers.
- Approximately, 13.99% of physicians has seen stable angina as the common comorbidity in HTN and CAD patients to prescribe beta blockers.
- Around 5.49% of physicians observed peripheral vascular diseases as the common comorbidity in HTN and CAD patients to prescribe beta blockers.

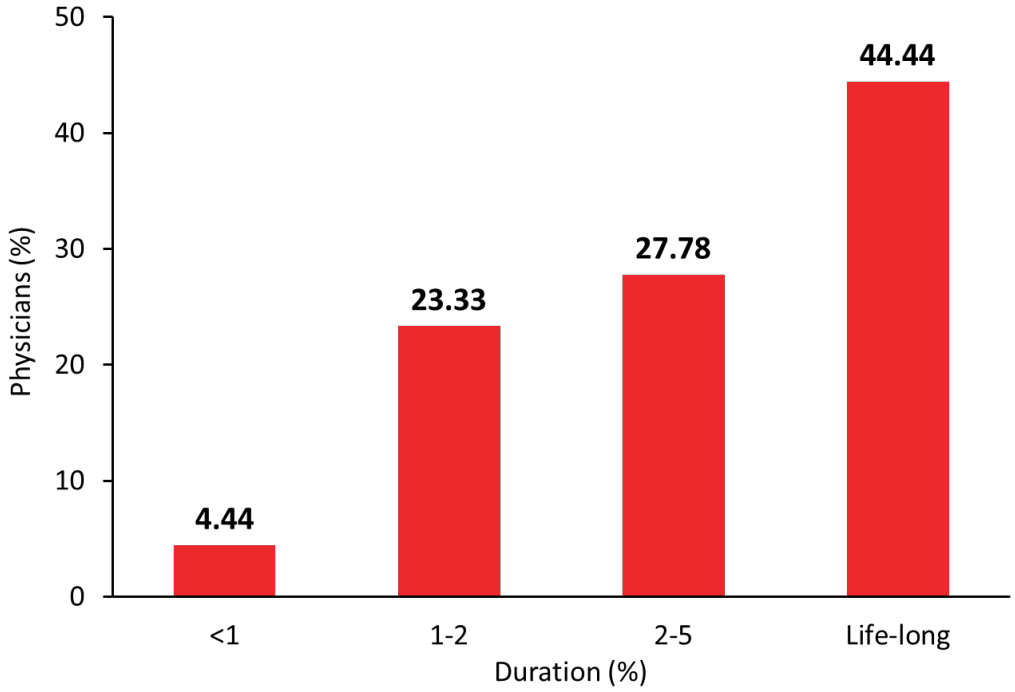
10. What is the usual duration of therapy with Beta-blocker therapy in patients with HTN and CAD in your clinical practice?

A. 2 years to 5 years

B. 1 year to 2 years

C. >2 years to 5 years

D. Life-long



- According to 44.44% of physicians, the usual duration of beta-blocker therapy in patients with HTN and CAD should be lifelong in their clinical practice.
- Around 27.78% of physicians believes, the usual duration of beta-blocker therapy in patients with HTN and CAD should be 2 to 5 years in their clinical practice.
- Similarly 23.33% of physicians observed the usual duration of beta-blocker therapy in patients with HTN and CAD in their clinical practice to be 1 to 2 years.
- A small proportion (4.44%) of physicians noted the usual duration of beta-blocker therapy in patients with HTN and CAD in their clinical practice to be 1 to 2 years.

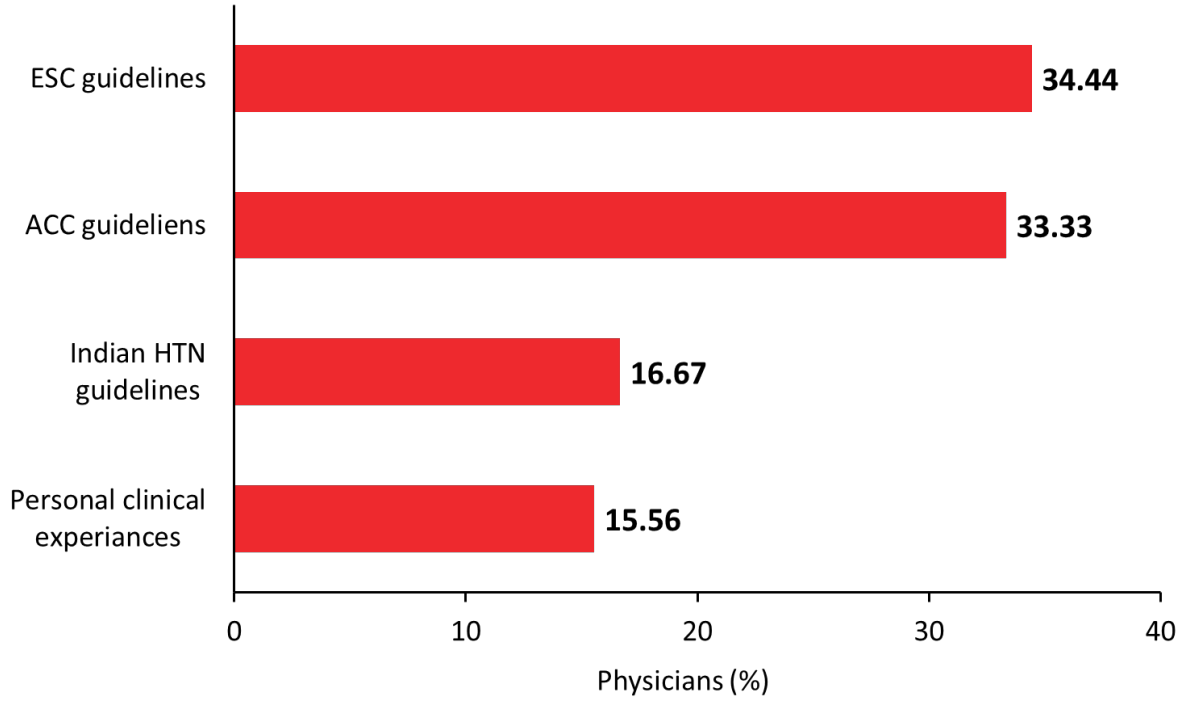
11. Which specific guideline(s) do you follow while prescribing Beta-blocker therapy? (Can mark more than 1 option, if required)

A. European Society of Cardiology (ESC) Guidelines

B. American College of Cardiology (ACC) Guidelines

C. Indian Hypertension Guidelines

D. Personal clinical experience



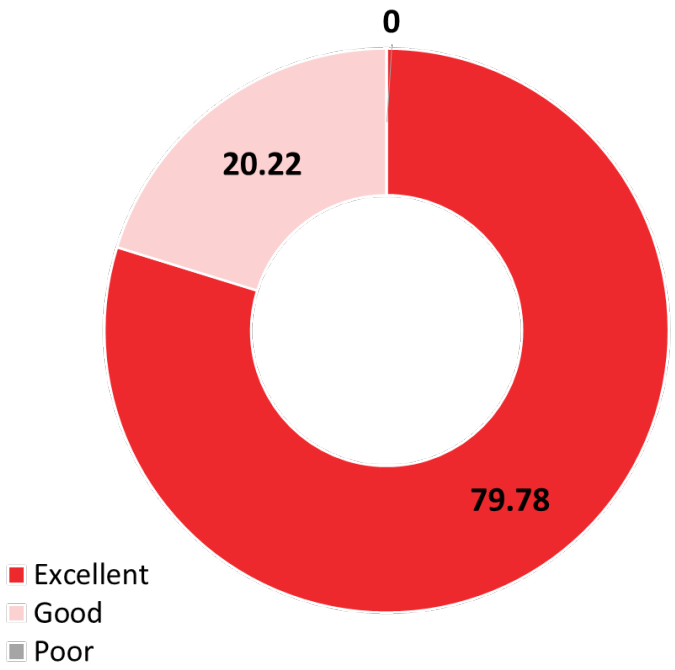
- Around 34.44% of physicians follow ESC guidelines while prescribing Beta-blocker therapy.
- Approximately, 33.33% of physicians follow ACC guidelines while prescribing beta-blocker therapy.
- Similarly, 16.67% of physicians follow Indian HTN guidelines while prescribing beta-blocker therapy.
- About 15.56% of physicians follow personal clinical experiences guidelines while prescribing beta-blocker therapy.

12. In your opinion, how is the long-term safety profile of Beta-blocker therapy in Patients with HTN and CAD?

A. Excellent

B. Good

C. Poor



- The majority (79.78%) of physicians observed excellent long-term safety profile of Beta-blocker therapy in Patients with HTN and CAD.
- Around 20.22% of physicians noted good long-term safety profile of Beta-blocker therapy in Patients with HTN and CAD
- No physicians noted poor long-term safety profile of Beta-blocker therapy in Patients with HTN and CAD.

6 SUMMARY

This summary provides an overview of physicians' observations and practices regarding the management of hypertension (HTN) and coronary artery disease (CAD) using various treatments, particularly beta-blockers.Approximately 36.26% of physicians report that 30-40% of their patients present with hypertension (HTN). A significant percentage of physicians—31.87% and 29.67%—indicate that more than 40% and 20-30% of patients, respectively, have HTN. For patients with both HTN and CAD, 31.82% of physicians observe that over 20% of their patients have both conditions, while smaller groups observe lower prevalence rates. In terms of treatment preference, 82.22% of physicians favor calcium channel blockers for HTN and CAD management, while diuretics are preferred by 11.11%. Beta-blockers, frequently prescribed by 81.32% of physicians, are also widely used, with 43.96% prescribing them to over 30% of patients with HTN and CAD. Beta-blocker choice varies, with S-metoprolol favored by 62.64%, followed by metoprolol (26.37%) and bisoprolol (8.79%). These are often prescribed to newly diagnosed patients or those with heart failure (HF), myocardial infarction (MI), or uncontrolled HTN on monotherapy.

The primary objectives for prescribing beta-blockers include heart rate control (34.07%), post-MI management, HF symptom reduction (20.88%), angina prevention (15.38%), and blood pressure control (8.79%). Common comorbidities prompting beta-blocker use include HF (60.44%) and left ventricular dysfunction (20.88%).Duration recommendations for beta-blocker therapy vary, with 44.44% of physicians advocating lifelong use and others suggesting 2-5 years (27.78%) or 1-2 years (23.33%). Clinical guidelines followed by physicians include ESC (34.44%) and ACC (33.33%), with some referencing Indian HTN guidelines (16.67%) or personal experience (15.56%).In terms of safety, the majority of physicians (79.78%) report excellent long-term outcomes with beta-blockers, and 20.22% note a good safety profile, with no physicians rating the safety profile as poor.

7 DISCUSSION

The survey of physician practices in managing patients with hypertension (HTN) and coronary artery disease (CAD) provides insights into the prevalence of HTN and the preferences for pharmacological management in this patient population. According to the data, approximately 36.26% of physicians observed HTN prevalence between 30-40% in their patients, with others noting prevalence levels either above 40% (31.87%) or between 20-30% (29.67%). A smaller group (2.20%) saw HTN rates below 20%. For patients with combined HTN and CAD, the majority (32.95%) reported a prevalence of 6-20%, and around 31.82% observed this condition in over 20% of their patients.Calcium channel blockers are the most commonly used drug class among physicians (82.22%) for managing HTN and CAD. Diuretics (11.11%) and beta-blockers (3.33%) were less preferred, although beta-blockers are frequently prescribed by 81.32% of physicians. For many physicians (43.96%), beta-blocker therapy is initiated in more than 30% of patients, often preferred in forms like S-metoprolol (62.64%) and metoprolol (26.37%). Beta-blockers are commonly prescribed for newly diagnosed HTN with CAD (38.46%), HTN with heart failure (30.77%), or in patients with a history of myocardial infarction (20.88%).

Regarding treatment intent, 34.07% of physicians prescribe beta-blockers primarily to control heart rate, with others focusing on post-MI management (20.88%) or heart failure symptom reduction (20.88%). Heart failure is the most frequently observed comorbidity for prescribing beta-blockers (60.44%), followed by left ventricular dysfunction (20.88%).Long-term therapy is considered standard, with 44.44% of physicians recommending lifelong use of beta-blockers for HTN and CAD, while others suggest shorter durations based on individual cases. In following guidelines, 34.44% of physicians adhere to ESC guidelines, and 33.33% follow ACC guidelines. Safety assessments reveal that 79.78% of physicians rate beta-blockers as having an excellent long-term safety profile, with no reports of poor outcomes, reinforcing beta-blockers' role in managing HTN and CAD effectively.

8 CLINICAL RECOMMENDATIONS

- In managing hypertension (HTN) and coronary artery disease (CAD), physicians typically prioritize a multi-drug approach that balances efficacy and patient-specific needs.
- A significant number of physicians (82.22%) prefer using calcium channel blockers for patients with HTN and CAD, while smaller proportions choose diuretics, RAAS inhibitors, or beta-blockers based on specific clinical scenarios.
- For beta-blockers, a substantial 81.32% of physicians frequently prescribe these agents, especially in cases of newly diagnosed HTN with CAD, heart failure (HF), or a history of myocardial infarction (MI).
- Beta-blockers, particularly S-metoprolol, are highly favored for their safety profile and efficacy, with S-metoprolol prescribed by 62.64% of physicians for HTN and CAD management.
- This choice aligns with their primary goals: controlling heart rate, post-MI management, reducing HF symptoms, and angina prevention.
- Among physicians, the long-term safety of beta-blockers is well-regarded, with 79.78% rating it as excellent, indicating their trust in beta-blockers as a mainstay therapy for prolonged treatment.
- Clinical practice guidelines significantly influence treatment decisions; approximately 34.44% of physicians follow the ESC guidelines, while others refer to ACC or Indian HTN guidelines.
- Duration of beta-blocker therapy also varies, with 44.44% of physicians recommending lifelong therapy, while others prefer defined durations, such as 2 to 5 years, based on patient response and condition progression.
- In conclusion, effective HTN and CAD management typically involves individualized treatment plans, adherence to clinical guidelines, and careful selection of drug classes based on patient comorbidities and treatment goals.

9 CONSULTANT OPINION

Physicians frequently encounter hypertension (HTN) among patients, with varying prevalence in clinical practice. Many observe that HTN often coexists with coronary artery disease (CAD), necessitating a tailored approach to medication. Calcium channel blockers are commonly preferred as an initial treatment for HTN in patients with CAD, though some clinicians also opt for diuretics, RAAS inhibitors, or beta-blockers. Beta-blockers are widely used in managing HTN with CAD, prescribed frequently for their efficacy in reducing heart rate, managing post-myocardial infarction (MI) cases, and minimizing heart failure (HF) symptoms. They are typically recommended for new HTN cases or for patients with HTN complicated by HF or a history of MI. Physicians commonly rely on beta-blockers like S-metoprolol, metoprolol, and, to a lesser extent, bisoprolol, with long-term therapy often advised to maintain cardiovascular stability.

Guideline adherence varies, with some physicians following ESC or ACC protocols, while others lean on national standards or personal clinical experience. In terms of safety, beta-blockers are generally seen as a reliable, long-term treatment with favorable safety profiles in HTN and CAD management. Most physicians aim for lifelong beta-blocker therapy, especially when addressing complex comorbidities like heart failure and left ventricular dysfunction, which are frequently observed alongside HTN and CAD.

10 MARKET OPPORTUNITIES

- The market for hypertension (HTN) and coronary artery disease (CAD) medications, particularly beta-blockers, calcium channel blockers, diuretics, and RAAS inhibitors, presents several opportunities based on prescribing trends and physician preferences.
- Given that beta-blockers are commonly prescribed by the majority of physicians for patients with HTN and CAD, there is strong market demand for this class, particularly variants like S-metoprolol, metoprolol, and bisoprolol.
- This demand is heightened by the critical roles these drugs play in heart rate control, post-MI management, and symptom reduction in heart failure (HF), making them a mainstay in long-term patient care.
- The observed preference for specific beta-blockers also suggests opportunities to develop or market formulations tailored for enhanced compliance and safety, particularly for lifelong usage, as seen with the favorable long-term safety profile recognized by physicians.
- Additionally, guidelines influence prescribing patterns, with many physicians following established recommendations from ESC, ACC, and Indian HTN guidelines, creating a favorable environment for drugs compliant with these protocols.
- The noted prevalence of comorbidities like HF, left ventricular dysfunction, and stable angina in patients with HTN and CAD underscores the importance of combination therapies and personalized treatment options.
- This presents a potential for growth in combined drug offerings or complementary therapies that can address the spectrum of conditions within this patient demographic.

11 MARKET POSITIONING

- The market positioning for hypertension (HTN) and coronary artery disease (CAD) medications emphasizes effectiveness, diverse patient needs, and safety. Calcium channel blockers are widely preferred, seen as the first choice by most physicians for patients with combined HTN and CAD.
- This choice is based on their efficacy and compatibility with various patient profiles. Diuretics serve as an alternative for patients needing complementary treatment, reinforcing the broad spectrum of solutions in this category.
- Beta-blockers hold a strong position, especially among physicians targeting heart rate control, post-myocardial infarction care, and heart failure symptom management.
- They are commonly prescribed both for newly diagnosed patients and those with specific conditions, such as left ventricular dysfunction and stable angina. The preference for different types, like S-metoprolol and metoprolol, reflects physician confidence in customized beta-blocker options for various patient profiles.
- Safety is a critical factor, with the majority of physicians endorsing beta-blockers' long-term reliability. Guidelines from major institutions, such as the ESC and ACC, guide prescribing practices, underscoring the clinical backing these medications receive.
- Overall, these drugs are positioned as safe, effective options for managing complex conditions, appealing to both guideline-oriented and experience-driven prescribers.

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