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Original Research Article

What strategies do cardiologists employ for heart failure management? Insights from Indian clinical practice

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ABSTRACT

Background: Heart failure (HF) is a leading cause of morbidity and mortality in India, with ischemic heart disease (IHD) being a primary contributor, particularly in patients with reduced ejection fraction (HFrEF). Despite comprehensive guidelines, a gap exists between guideline-directed medical therapy (GDMT) and real-world practices.
Methods: A cross-sectional survey of 476 cardiologists across India was conducted from April to June 2023 to evaluate current therapeutic approaches for managing HFrEF. The study assessed alignment with established guidelines, including the American college of cardiology/American heart association (ACC/AHA) recommendations.
Results: HFrEF accounted for 40-60% of HF cases, typically diagnosed at advanced stages New York heart association (NYHA class III), with EF often reduced to 20-30%. While 94.5% of cardiologists supported NT-proBNP testing for HF management and 73.5% endorsed ARNi as first-line therapy, ARNi usage remained suboptimal at 20-60%. Most cardiologists (67%) preferred initiating quadruple therapy within 12-24 weeks of diagnosis, citing medication tolerance as a key barrier to achieving optimal treatment goals.
Conclusions: This study highlights substantial gaps in the adoption of guideline-recommended therapies for HFrEF in India. Improved strategies are needed to address barriers to GDMT implementation and ensure timely interventions to enhance patient outcomes.

Keywords: HF, ARNi therapy, HFrEF, India

INTRODUCTION

Cardiovascular disease (CVD) is currently the leading cause of death in India, and its prevalence is expected to increase.[1] HF is defined as a clinical syndrome with symptoms and/or signs caused by a structural and/or functional cardiac abnormality and corroborated by elevated natriuretic peptide levels and/or objective evidence of pulmonary or systemic congestion.[2] It is characterized by notable morbidity and mortality rates, diminished functional capacity, compromised quality of life, and substantial economic implications.[3,4] In 2000, it was estimated that 30 million individuals in India had coronary heart disease (CHD), representing nearly 3% of the population.[1] The burden of HF has been a concern, particularly in low-to-middle-income countries, where its prevalence has increased by 3.1% over the last decade. In India alone, the HF incidence ranges between 0.5 and 1.7 cases per 1,000 person-years, translating to an alarming number of new cases annually.[5]

Data from the Asian sudden cardiac death in HF (Asian-HF) study, the Trivandrum HF registry (THFR), and the International congestive HF study on Indian patients indicate that IHD is the most prevalent cause of HF.[6] The "double burden" of HF is widely acknowledged in low-or middle-income countries (LMICs). For instance, in India, approximately 22.7 million individuals are affected by HFrEF being the predominant type.[7] Diagnosis of HF primarily relies on clinical evaluation involving medical

history, physical examination, echocardiography, radiological imaging, and laboratory tests, including circulating biomarkers such as brain natriuretic peptide or N-terminal pro-B-type natriuretic peptide. HF is categorised based on left ventricular EF (LVEF) into three groups: HF with preserved EF (HFpEF) for LVEF ≥50%, HFrEF for LVEF <40%, and HF with mid-range EF for LVEF 40%-49%.[8,9] The severity of symptoms in HF is classified according to the NYHA and ACC/AHA in four stages. This classification system is widely utilised in clinical settings due to its predictive value for mortality in HF patients.[2,9]

The cardiological society of India's position statement on the management of HF in India provides a consensus statement that could be applied across the country and offers practical suggestions for the problems specific to the country to improve clinical outcomes, which reduced mortality and hospitalisation.[10] General practitioners (GPs) play a crucial role in managing HF, as initial clinical presentations typically occur in primary care settings where GPs are responsible for the ongoing care of patients with chronic HF. The proper therapeutic management of HF poses a significant challenge for cardiologists.[11] Over the past three decades, pharmacological HFrEF therapies have continuously improved.[12] The 2022 AHA/ACC/HFSA guideline for the management of HF has expanded its recommendations for GDMT for HFrEF. This guideline emphasises combination therapy of four medication classes, including renin-angiotensin system inhibition with angiotensin receptor-neprilysin inhibitors (ARNi), angiotensin-converting enzyme inhibitors (ACEi), or angiotensin (II) receptor blockers (ARB) alone; beta-blockers(BB); mineralocorticoid receptor antagonists (MRAs); and sodium-glucose cotransporter 2 inhibitors (SGLT2i), aimed at reducing risk of death and hospitalisation due to HF.[11-14]

Despite guidelines and efforts to improve HF care, recent registry data show ongoing gaps in outpatient use and dosing of GDMT. There remains a significant disparity between guideline recommendations and real-world practice, emphasising the need for rigorous quality assessment.[7,14]. Some experts suggest starting treatment with SGLT2i and BB, others with ACEi or ARNi, and a recent approach recommends beginning therapy with all four drugs at low doses.[11] In a study by Jose et al in India, various barriers and facilitators to HF care were identified from the perspectives of patients, caregivers, and cardiologists in Kerala. Key barriers included high patient caseloads, non-adherence to GDMT, lack of clear self-management plans, and limited access to cardiac rehabilitation. Additionally, cardiologists noted that multiple chronic conditions often prevented them from initiating or adjusting GDMT as recommended, leading to under-prescription[15]

Although guidelines for HF management exist, there is a pressing need for a more practical and easy-to-use algorithm.[16] Hence, a survey was conducted to examine the current practices in treating HFrEF. This study aimed to evaluate the alignment of existing medical procedures with recognised treatment guidelines, focusing on medication usage and lifestyle interventions. Additionally, the survey assessed integrating lifestyle changes, patient education, and rehabilitation programs into comprehensive HFrEF patient care.

METHODS

Survey design and participants

This study employed a prospective, cross-sectional survey from April 15th to June 15th, 2023. A comprehensive, structured questionnaire of 14 questions facilitated in-depth one-on-one discussions with cardiologists through personal interviews. This standardised methodology ensured consistency in data collection, thus enhancing the credibility and reliability of the research findings. A substantial sample size of 476 cardiologists was included to ensure the robustness and statistical validity of the survey's conclusions. By encompassing a diverse range of respondents, the survey aimed to capture a broad spectrum of perspectives, thereby reducing bias and increasing the relevance of the findings. Cardiologists practicing in India with at least 2 years of clinical experience in managing HF and willing to participate in one-on-one interviews were included in the study. Those not directly involved in HF management or unwilling to provide consent were excluded.

Survey outcomes

The questionnaire focused on gathering insights from cardiologists regarding HF management, covering various aspects such as patient demographics, aetiology, clinical staging, treatment strategies, and preferences. Key areas of inquiry included the prevalence of HFrEF and HFpEF, the incidence of IHD among HFrEF patients, NYHA classification, utilisation of N-terminal pro-brain natriuretic peptide (NT-proBNP) testing, follow-up intervals post-treatment initiation, timeline for medication adoption, tolerance rates, expected EF improvement with ARNi therapy and utilisation, adherence to ACC/AHA recommendations, and dosage preferences. These outcomes provide concise insights into current clinical practices and preferences in HF management.

Data analysis

After data collection, all gathered information was meticulously entered and organised using Microsoft excel 2013. Subsequently, a detailed data analysis was conducted utilising descriptive statistics to derive meaningful insights from the survey outcomes.

RESULTS

The questionnaire-based survey involved 476 cardiologists, focusing on patients with HF. According to

the data, 185 (38.86%) cardiologists, constituting the majority, reported that 40-60% of their HF patients exhibited HFrEF, followed by 159 (33.40%) cardiologists who indicated that 20-40% of their patients fell into this category. In terms of patients with HFpEF, a significant majority of 221 (46.42%) cardiologists noted that 20-40% of their HF patients displayed HFpEF, with 116 (24.36%) cardiologists reporting less than 20% (Figure 1).

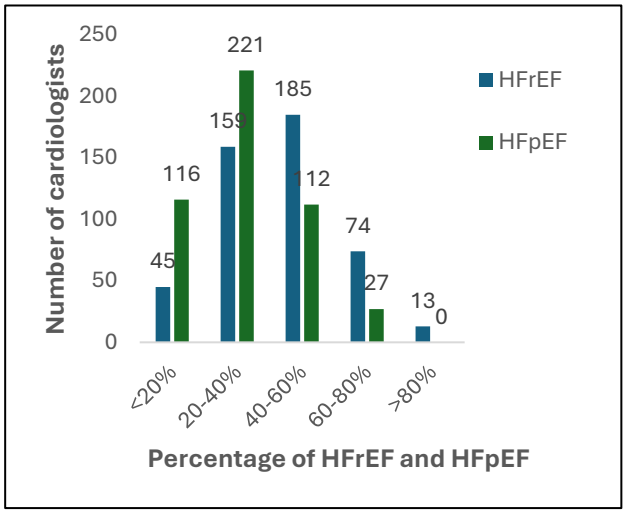

Figure 1: HF patients (%) with reduced EF and preserved EF.

Regarding IHD as a major aetiology in HFrEF patients, the data showed that 178 (37.39%) cardiologists identified 40-60% of their patients with IHD as a significant cause, followed by 165 cardiologists indicating a 20-40% prevalence (Figure 2). Regarding the clinical stages at which HF patients are commonly diagnosed, the majority of 167 (35.08%) cardiologists reported the NYHA III stage as the most common, followed by NYHA I, NYHA IV, and NYHA II. Furthermore, 140 (29.41%) cardiologists found NYHA II the most common, followed by NYHA I, NYHA III, and NYHA IV (Figure 3).

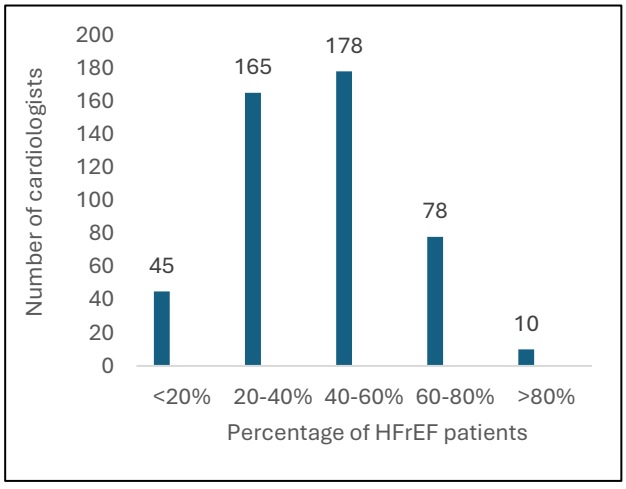

Figure 2: Proportion of IHD as a major aetiology in HFrEF patients.

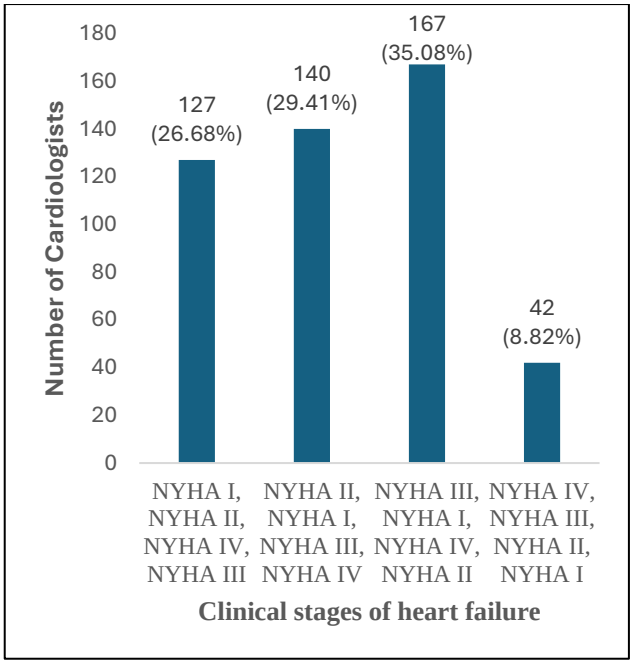

Figure 3: Clinical stages of HF.

Concerning the average EF at the time of HFrEF diagnosis, 212 (44.53%) cardiologists reported an EF in the range of 20-30%, followed by 164 (34.34%) cardiologists reporting a range of 30-40% (Figure 4). Additionally, a majority of 212 (44.53%) cardiologists noted that 20-30% of patients were diagnosed for first time in OPD clinic.

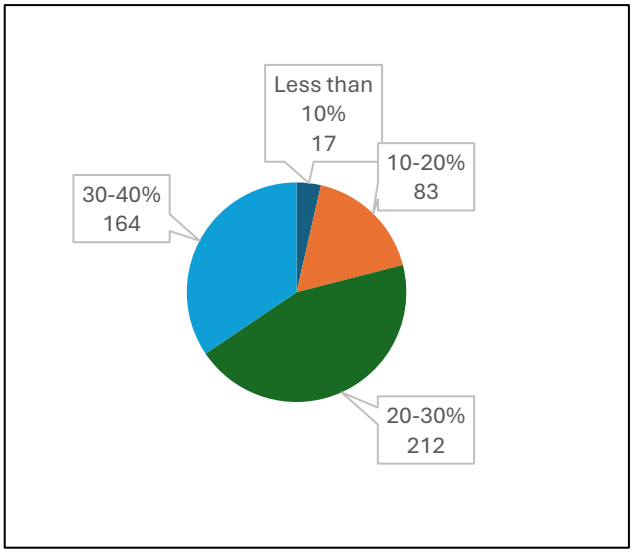

Figure 4: Average EF at the time of HFrEF diagnosis.

A significant majority of 450 (94.53%) cardiologists believed in the efficacy of point-of-care NT pro-BNP testing for improving HF patient outcomes, while a much smaller group of 26 (5.46%) cardiologists disagreed (Figure 5 A). Regarding follow-up visits after HF treatment initiation, the maximum number of 307 (64.49%) cardiologists recommended a first follow-up visit after 2 weeks of treatment (Figure 5 B).

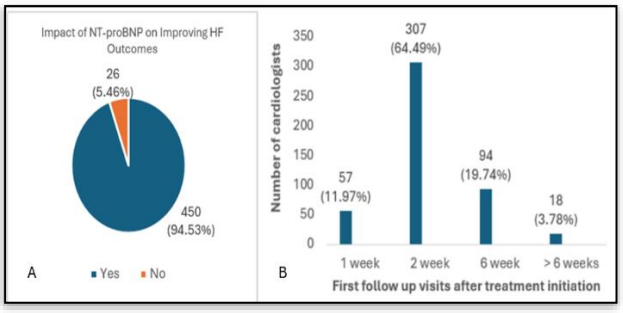

Figure 5 (A and B): Impact of NT-proBNP on HF outcomes and first follow-up interval after treatment initiation.

Regarding the number of weeks required to prescribe all four agents in the majority of HFrEF patients, 245 (51.47%) cardiologists believed that 12-24 weeks were necessary (Figure 6 A), and 176 (36.97%) cardiologists reported that 40-60% of patients could tolerate all four agents in the treatment of HFrEF (BB, RAASi/ARNI, SGLT2i, MRA), followed by 132 (27.73%) cardiologists suggesting a tolerance rate of 20-40% (Figure 6B). Furthermore, a majority of 224 (47.05%) cardiologists expected an average improvement in LVEF of greater than 10% within 1 year of ARNi therapy, followed by 134 (28.15%) cardiologists expecting an improvement of greater than 20% in the same period (Figure 7).

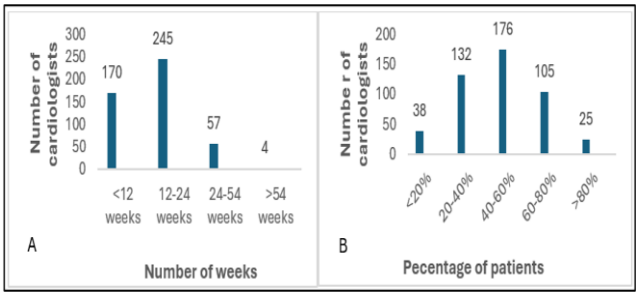

Figure 6 (A and B): Weeks needed for the adoption of all four HF drugs in HFrEF and tolerance of all four HF drugs.

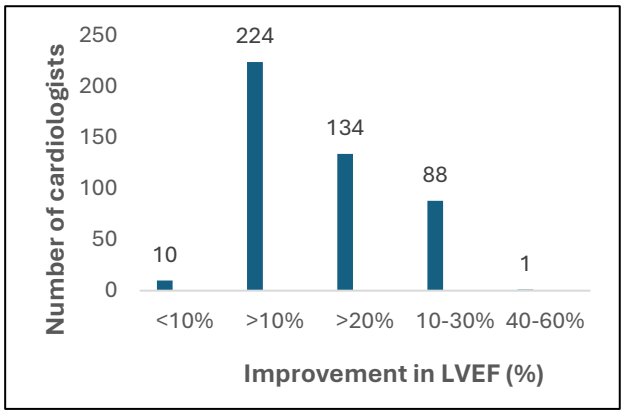

Figure 7: Average 1-year improvement in LVEF with ARNi.

Regarding the current clinical practice for ARNi therapy, 156 (32.77%) and 152 (31.93%) cardiologists reported that 20-40% and 40-60% of all eligible patients, respectively, were taking ARNi (Figure 8). Additionally, 350 (73.52%) cardiologists followed the ACC/AHA guidelines. They recommended ARNi as the first-line therapy for all patients with stage C HFrEF, whereas 105 (22.05%) cardiologists recommended it only for a selected set of stage C patients.

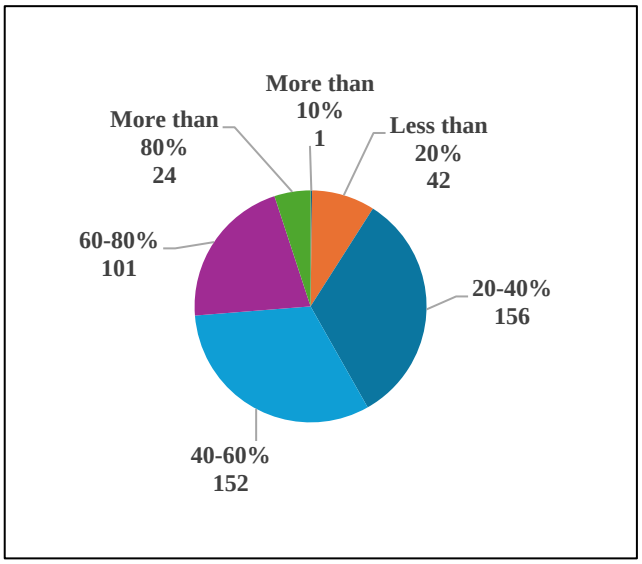

Figure 8: ARNI usage rate among eligible patients.

The most preferred dosing regimen among 229 (48.10%) cardiologists was 50 mg twice daily (BD), 100 mg BD, 200 mg BD, and 25 mg BD.

DISCUSSION

HF represents a substantial global health burden due to its widespread prevalence, significant morbidity, mortality rates, and economic implications. Despite advancements in medical care, the management of HF remains challenging, necessitating a comprehensive understanding of current clinical practices among cardiologists. Our survey revealed several noteworthy insights regarding the clinical perspective of HF management among cardiologists. Several key observations emerge from the analysis of survey responses, shedding light on current practices, preferences, and challenges in the treatment of HFrEF.

According to the survey results, the prevalence of HFrEF and HFpEF ranges between 40-60% and 20-40%, respectively. This data reflects the THFR study, which concluded HFrEF (62%) to be the most common type of HF, followed by HFpEF (20%).[17] Overall, the current survey data re-emphasizes the heterogeneity of HF and highlights the need for tailored management strategies.

The survey data indicates HFrEF to be commonly diagnosed at a moderate stage of reduced EF, specifically

between 20-30%, inferring that many patients are reaching out for medical attention when significant cardiac function impairment has already occurred. In an Indian report by Chopra et al the mean LVEF was found to be 30.0±6.6%.[18] In effectiveness and safety of Sacubitril/Valsartan in HF in India: a retrospective real-world (SAVE) and prospective comparison of ARNi with ACE-I to determine impact on global mortality and morbidity in HF (PARADIGM-HF) clinical studies, the average LVEF was found to be 34% and 30%, respectively.[19,20] According to a study conducted by the Indian national HF registry, the primary presentation observed was HFrEF in approximately two-thirds (65.2%) of the participants, with HFmrEF accounting for 22% and HFpEF for 12.7%. The leading cause of HF was identified as IHD, comprising 72% of cases, followed by dilated cardiomyopathy at 18%.[21]

Most cardiologists identified IHD as a major contributor to HFrEF, emphasising the importance of addressing coronary artery disease in HF management protocols. The role of IHD emerges as a prominent aetiology among patients with HFrEF, aligning with global trends reported in previous studies.[21-23] In the PARADIGM-HF trial, 60% of the patients had ischemic aetiology for HF.[20]

The NYHA classification is a standardised assessment method used to evaluate the clinical staging of HF, focusing on disease severity and the burden of symptoms.[2,13] Our survey revealed that NYHA III is the most common stage of diagnosis among Indian patients, reflecting the substantial functional impairment experienced by individuals with advanced HF. Findings from a multinational observational CaReMe study indicate that out of 629,440 patients with prevalent HF, most patients (74%) had a NYHA class II or class III functional classification, whereas NYHA class I (13%) and class IV (13%) were less frequent.[24] Similarly, findings from the national HF registry in India indicated that over two-thirds (71.2%) of patients exhibited NYHA class III or class IV symptoms.[21]

According to cardiologists who took this survey, the moderate frequency of first-time HFrEF diagnosis in an OPD setting ranges between 20-30% of patients, highlighting primary care cardiologists' crucial role in the early detection and management of HFrEF. In a retrospective analysis, 959,438 patients diagnosed with incident HF were included. Analysis revealed that among those newly diagnosed with HF, 38% received their diagnosis in acute care settings, while 62% were diagnosed in OPD settings.[25]

Cardiologists widely supported the integration of point-of-care NT pro-BNP testing as a valuable tool for optimising HF management and improving patient outcomes, as supported by various clinical studies [19,20,26]. This emphasises the importance of incorporating biomarker-based assessments into routine clinical practice to enhance diagnostic accuracy and guide therapeutic decision-making.

Our data suggests that a 2-week follow-up was the most preferred post-treatment initiation, facilitating timely assessment of treatment efficacy and patient response. This is similar to the current HF guidelines that recommend a follow-up visit, ideally within the first two weeks after discharge, to assess clinical status, fluid balance, symptoms, and basic laboratory parameters, including renal function and creatinine levels.[27]

Our survey also sheds light on the cardiologists' medication adoption patterns and treatment preferences. The prevalent belief among cardiologists that a 12 to 24-week timeframe is adequate for implementing a complete treatment regimen indicates a general agreement on the expected time for patients to adapt and respond to a multi-agent therapeutic approach. Given that many benefits of foundational treatments are observed within 30 days of treatment initiation, it is recommended that therapy involving all four pillar drugs be initiated within a four-week timeframe.[28] Hence, enhanced understanding among cardiologists is essential in this regard. The GDMT advises starting quadruple therapy at low doses, following stabilisation of patients' hemodynamics, in the days before hospital discharge. The advantage of initiating treatment during hospitalisation is the opportunity for vigilant monitoring of vital signs, fluid status, and critical laboratory parameters such as potassium and creatinine.[29]

A 2020 analysis found that 65-year-old patients receiving all four drug classes could gain 4.4 additional life years compared to those on just an ACEi/ARB and BB regimen.[30] Moreover, an extensive 2022 systematic review and network meta-analysis showed a hazard ratio of 0.39 [95% CI 0.31-0.49] for simultaneous treatment with all four drug classes versus no treatment.[31] Moreover, a significant but manageable proportion of patients can tolerate a complex 4-agent regimen, emphasising need to prioritise eligible patients within comprehensive patient-centred strategy to maximise medication tolerance collectively and prevent withdrawal of lifesaving medications.[32]

Most cardiologists reported an ARNi utilisation rate of 20-60%, indicating underutilisation of this vital drug despite guideline recommendations. The collective anticipation of an EF improvement exceeding 10% within one year of ARNi therapy indicates a moderately optimistic outlook on the therapeutic efficacy of ARNi in enhancing cardiac function among HFrEF patients. An increase in mean LVEF of 4.9% at 6 months and 7.5% at 12 months of ARNI therapy was observed in the ARTIM HF trial.[33]

The predominant recommendation of ARNi as a first-line treatment for stage C HFrEF by the majority of cardiologists strongly indicates a high level of alignment between clinical practice and ACC/AHA guidelines[13] Recent large-scale randomised clinical trials have also provided compelling evidence that ARNi is superior to ACEi in reducing mortality and HF hospitalisation and improving quality of life in patients with stage C HFrEF.[34,35] Furthermore, the 50 mg BD dose was the most

commonly selected starting dose, implying that cardiologists follow the prescribing information and guideline recommendations for the initiation and up-titration of ARNi.[34,36,37]

This geographical variation of the participating cardiologists from various states and cities ensures a diverse perspective. This survey did not assess the usage pattern of other HF drugs like SGLT2i, BB, and MRAs for the management of HF. A more in-depth survey can be planned to capture complete data, including patient demographics, comorbidities, utilisation of HF drugs, and challenges or barriers to optimising GDMT.

Limitations

Despite the inclusion of a substantial sample size of 476 cardiologists, the survey may not fully capture the diversity of clinical practices across various regions and healthcare settings in India. Additionally, the study's findings might have limited applicability to regions with distinct patient demographics, healthcare infrastructure, or resource availability, underscoring the need for further research to improve the generalizability and contextual relevance of the results.

CONCLUSION

The survey offers a comprehensive insight into the current practices and perspectives of cardiologists managing HF. The widespread acceptance of ARNi as an initial therapy indicates that clinical approaches closely follow ACC/AHA guidelines, establishing it as a standard in managing HFrEF. Nonetheless, despite the preference for multi-agent regimens, there are variations in tolerance levels and timing of implementation, emphasising the necessity for tailored treatment strategies for individual patients. Additionally, the diversity in the prevalence of IHD and HFpEF underscores the complexity of HF epidemiology, urging broader epidemiological investigations. These findings significantly shape clinical guidelines and targeted educational initiatives for cardiologists.

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