(RESEARCH ARTICLE)

Telmisartan in the management of the cardiovascular disease continuum in the real world setting in India

Amit Kumar [1, *], Devashish Chatterjee [2], Debasish Saha [3], Samanta Hansda [4] and Devi Prasad T [5]

[1] Department of Diabetology, Global Health Clinic, Bihar, Patna, India.
[2] Department of Cardiology, Dr Devashish Chatterjee Clinic, Bihar, Patna, India.
[3] Department of General Medicine and Diabetology, Manipal Hospital Broadway, Kolkata, India.
[4] Department of General Medicine and Diabetology, IR Clinic, Saltora, West Bengal, India.
[5] Department of Internal Medicine, Renova Hospitals, Secundarabad, Hyderabad, India.

Abstract

Background: The cardiovascular disease continuum (CVDC) is a progressive sequence of events that may lead to advanced cardiovascular (CV) disease. This questionnaire-based study aims to provide insights into real-world effectiveness, safety and adherence of telmisartan in managing hypertension (HT) and associated CV conditions.

Methods: This questionnaire-based study was conducted among Indian HCPs from between November 2024 to February 2025. A questionnaire comprising 16 questions explored preferences of health care professionals (HCPs) for use of telmisartan in last 10 patients with CVDC.

Results: A total of 49 HCP were included in this study. The 65.31% of HCPs newly diagnosed < 5 patients with HT. Maximum HCPs (69.39%) noted diabetes mellitus has risk factor. In patients with long standing hypertension, both reduction of left ventricular hypertrophy and no progression to angina was noted by 79.59% of HCPs after treatment. A substantial majority of 69.39% of HCPs reported telmisartan controlled blood pressure (BP) for 24 hours. The ambulatory BP recording was done for 2 patients by 51.02% of HCPs. The 40.82% of HCPs reported single patient had undergone percutaneous coronary intervention. Well controlled BP was recorded by 51.02% HCPs. The 51.02% of HCPs indicated that 50% of diabetic patients reached their target BP in spite of the comorbid disease. Metoprolol was prescribed in combination therapy by 59.18% of HCPs. All the HCPs rated telmisartan efficacy, safety and adherence to treatment as excellent and good.

Conclusion: This study revealed insights into telmisartan's efficacy, safety and adherence in management of HT.

Keywords: Hypertension; Metoprolol; Efficacy; Safety; Adherence

1. Introduction

The cardiovascular disease continuum (CVDC) encompasses a series of risk factors that trigger processes causing tissue damage, which in turn sets off a sequence of events ultimately leading to advanced or end-stage cardiovascular disease [1]. Continuum like vascular and myocardial remodeling, atherosclerotic processes and endothelial damage are caused by risk factors [2]. The causative risk factors are diabetes mellitus (DM), dyslipidemia, hypertension (HTN), smoking and visceral obesity [1]. Early identification of the risk factors and initiation of treatment could stop or slow down CVDC further progression. Antihypertensive drugs and statins are commonly used for correction of cardiovascular (CV) risk

factors which prevents the advancement of cardiovascular disease and the further complications [3]. The choice of drug its monotherapy or combination therapy depends on cautious evaluation of an individual patient. Telmisartan is a long-acting angiotensin receptor blocker (ARB) which is generally used for the treatment of HTN and for CV risk reduction [4]. It exhibits the longest plasma half-life and the strong binding affinity for the angiotensin II receptor type 1 (AT1) receptor [5]. A meta-analysis found that telmisartan was effective in controlling 24-h blood pressure (BP) compared with other ARBs like losartan and valsartan [6].

The primary objective of this study was to evaluate the real-world effectiveness, safety, and adherence of telmisartan in managing HT and associated CV conditions across multiple regions in India. The study aimed to gather clinical insights from practicing doctors on the use of telmisartan in different patient populations, particularly those with diabetes, long-standing HT, and post-myocardial infarction (MI) cases. Additionally, the study sought to assess the impact of telmisartan on BP control, nocturnal BP patterns, cardiovascular event prevention, and patient adherence.

2. Methods

2.1. Study design

This questionnaire-based study was designed to evaluate the real-world use of telmisartan in cardiovascular disease continuum among HCPs across India between November 2024 to February 2025. Participation in the study was completely voluntary. All study-related information, including the questionnaire, was thoroughly explained to participants and verbal consent was obtained before participation. The research procedures and data analysis were designed to protect the confidentiality and anonymity of the healthcare providers (HCPs).

2.2. Study questionnaire

The study questionnaire was designed based on existing literature, clinical guidelines, and expert opinions. It consisted of 16 questions focusing on hypertension, risk factors, patient response to treatment, ease of symptoms, choice of drug, safety and adverse events. The questionnaire focused on last 10 patients with cardiovascular continuum treated with telmisartan. The study protocol was approved by the independent ethics committee (ACEAS-Independent Ethics Committee, Ahmedabad, Date of approval: 26 November 2024).

2.3. Data collection method

Study participants received a brief explanation of the study's purpose and instructions for completing the questionnaire. The questionnaire was administered in person, over the phone, or through online platforms to HCPs.

2.4. Data analysis

Responses to questions were entered into Microsoft excel. Descriptive analysis was performed and outcome was presented as percentages.

3. Results

A total of 49 HCP were included in this study. The highest percentage of HCPs (65.31%) newly diagnosed less than 5 patients with HT, while 26.53% diagnosed 6 patients among last 10 patients. Maximum HCPs (69.39%) noted diabetes mellitus and 16.33% recorded family history of coronary artery disease (CAD) has CV risk factors in patients treated with telmisartan (Table 1).

Table 1 Baseline characteristics

Option	Response of HCPs (N=49)
Out of these 10 patients how many was newly diagnosed patients with hypertension?	
<5	32 (65.31)
6	13 (26.53)
7	4 (8.16)
What were the CV risk factors in these patients you treated with telmisartan?	

Diabetes mellitus	34 (69.39)
Obesity	2 (4.08)
Smoking	5 (10.20)
Family History of CAD	8 (16.33)
Data represented as n (%), CAD, coronary artery disease; CV, cardio vascular; HCPs, health care providers.	

The most of HCPs (65.31%) after treatment with telmisartan observed systolic blood pressure (SBP) and diastolic blood pressure (DBP) at target in patients, 26.53% of HCPs saw reduction of microalbuminuria. In patients with long standing hypertension, both reduction of left ventricular hypertrophy (LVH) and no progression to angina was noted by 79.59% of HCPs after treatment. A substantial majority of 69.39% of HCPs reported telmisartan controlled BP for 24 hours, while 20.41% of HCPs noted the conversion of the non-dipper nocturnal BP to dipper pattern after giving telmisartan. The 40.82% of HCPs reported out of last 10 patients, single patient had undergone percutaneous coronary intervention (PCI) and prescribed with telmisartan, while 30.61% noted 2 patients. All three benefits of telmisartan; sustained control of BP, no recurrent angina events, reduction of left ventricular remodeling when telmisartan was initiated at discharge were observed in post PCI patients by 79.59% of HCPs. In patients with heart failure well controlled BP was recorded by 51.02% HCPs, while 36.73% of HCPs saw improved quality of life in last 10 patients. The nearly half of HCPs (51.02%) indicated that 50% of diabetic patients (5 out of 10) reached their target BP regardless of the comorbid disease such as diabetes, obesity. The 38.78% of HCPs respondent all 10 patients reached target BP. The ambulatory BP recording was done for 2 patients by 51.02% of HCPs, while 28.57% of HCPs did not record it. The 81.63% of HCPs did not note any adverse effects in their last 10 patients, while 10.20% of HCPs noted dizziness in their patient. The Beta blocker, metoprolol was prescribed in combination therapy after MI by 59.18% of HCPs. The 28.57% of HCPs preferred bisoprolol as combination drug along with telmisartan to reduce heart rate (Table 2).

Table 2 Response of patient to treatment recorded by HCPs.

Option	Response of HCPs (N=49)
In these patients with diabetes and hypertension what were the benefits you observed after treatment with telmisartan?	
SBP and DBP at target	32 (65.31)
Reduction of microalbuminuria	13 (26.53)
Reduction of uric acid	0
Improved glycemic control	4 (8.16)
In any of these 10 patients who had long standing hypertension what were the benefits of telmisartan, you observed?	
Reduction of LVH	6 (12.24)
No progression to angina	4 (8.16)
Both of the above	39 (79.59)
What are the key benefits on BP control seen with telmisartan in these 10 patients which prevented CV events?	
Telmisartan converted the non-dipper nocturnal BP to dipper pattern	10 (20.41)
Telmisartan controlled BP for 24 hours	34 (69.39)
Telmisartan prevented early morning rise of BP	5 (10.20)
How many of these 10 patients had undergone PCI and had been prescribed telmisartan?	
1	20 (40.82)
2	15 (30.61)
<2	14 (28.57)

What were the benefits of telmisartan you observed in post PCI patients?	
Sustained control of BP	6 (12.24)
No recurrent angina events	1(2.04)
Reduction of left ventricular remodeling when telmisartan was initiated at discharge	3 (6.12)
All of the above	39 (79.59)
In patients with heart failure what were the benefits' observed in these patients?	
Well controlled BP	25 (51.02)
No further decline in GFR	6 (12.24)
Improved quality of life	18 (36.73)
How many of these 10 patients with diabetes reached target BP regardless of the comorbid disease such as diabetes, obesity?	
All	19 (38.78)
50%	25 (51.02)
30%	5 (10.20)
How many of these 10 patients did you perform an ABPM?	
None	14 (28.57)
2	25 (51.02)
>2	10 (20.41)
Did you observe a non-dipper pattern of BP in these patients?	
Yes	25 (51.02)
No	24 (48.98)
What were the adverse effects complained by these 10 patients treated with telmisartan?	
None	40 (81.63)
Dizziness	5 (10.20)
Weakness	4 (8.16)
In patients who required combination therapy after MI, which beta blocker did you prescribe along telmisartan to reduce heart rate?	
Metoprolol	29 (59.18)
Carvedilol	6 (12.24)
Bisoprolol	14 (28.57)
Data represented as n (%), ABPM, ambulatory BP recording; BP, blood pressure; CV, cardio vascular; DBP, diastolic blood pressure; GFR, glomerular filtration rate; HCPs, health care providers, SBP, systolic blood pressure; LVH, left ventricular hypertrophy; MI, myocardial infarction; PCI, percutaneous coronary intervention	

Efficacy of telmisartan was rated excellent by 71.43% of HCPs, 26.53% rated as good. In terms of safety telmisartan was rated excellent by 77.55% of HCPs, 22.45% of rated it good. Additionally, 63.75% of HCPs rated adherence to telmisartan treatment as excellent and 36.73% rated it good (Table 3).

Table 3 Efficacy, safety and adherence to treatment with telmisartan**.**

Option	Response of HCPs (N=49)
How would you rate the efficacy of telmisartan in these 10 patients?	
Excellent	35 (71.43)
Good	13 (26.53)
Fair	1 (2.04)
Poor	-
How would you rate the safety of telmisartan in these 10 patients?	
Excellent	38 (77.55)
Good	11 (22.45)
Fair	-
Poor	-
How would you rate the adherence to treatment with telmisartan in these 10 patients?	
Excellent	31 (63.75)
Good	18 (36.73)
Fair	-
Poor	-
Data represented as n (%), HCPs, health care providers	

4. Discussion

This study gathered data through a structured questionnaire completed by 49 doctors, providing valuable real-world insights that can help refine hypertension management strategies and optimize telmisartan's role in CV care.

Maximum HCPs (65.31%) newly diagnosed less than 5 patients with HT, while 26.53% diagnosed 6 patients among last 10 patients these results are similar to other study where 53.21% HCPs opined that 30 to 50% patients visiting suffer from HT [4]. This uniformity highlights the prevalent nature of HT in clinical settings and underscores the importance of routine blood pressure monitoring. Maximum HCPs (69.39%) noted DM has CV risk factors in patients treated with telmisartan these results are consistent with another study where highest proportion of DM was reported in 61.6% of patients on telmisartan monotherapy [7]. Telmisartan's dual action as an angiotensin II receptor blocker and partial PPAR-γ agonist may contribute to its efficacy in managing both hypertension and metabolic parameters in diabetic patients [8].

The most of HCPs (65.31%) after treatment with telmisartan observed improvement in SBP and DBP as seen in another study where, telmisartan 80 mg once daily in patients with mild-to-moderate hypertension showed significant reductions in 24-hour SBP and DBP after 35 days of treatment [9]. After treatment, 79.59% of HCPs noted reduction of LVH and no progression to angina in patients with long standing hypertension. Similar results were observed in other studies, indicating enhanced cardiac performance [10, 11]. Control of BP for 24 hours was observed by majority of HCPs (69.39%) post telmisartan consumption which was inline with SURGE2 study [12]. Well controlled BP was recorded in patients with heart failure by 51.02% HCPs, in another study with telmisartan similar results were observed [13]. Regardless of comorbid conditions such as diabetes and obesity, nearly half of healthcare professionals (51.02%) reported that 50% of their diabetic patients (5 out of 10) achieved target blood pressure levels. Parallel findings were reported in a study by Khan et al [7]. The Beta blocker; metoprolol was prescribed in combination therapy after MI by 59.18% of HCPs, same rate of prescription of combination therapy was seen in another study [14]. It remains a gold standard beta-blocker for heart rate control, BP management, and secondary prevention.

The 97.96% of HCPs rated efficacy of telmisartan as good to excellent indicating that patients experienced substantial reductions in blood pressure and were able to reach their target BP goals, same rate of efficacy and tolerability was found in global evaluation of another study [13].

In terms of safety telmisartan was rated good to excellent by 100% of HCPs, this aligns with findings from a study where adverse events were reported in only 1.9% of cases and global tolerability was rated as very good or good in 96.8% of patients, demonstrating telmisartan's favorable safety profile across diverse patient subgroups [15].

The limitation of this study includes a small sample size, which may limit the generalizability of the findings. Long-term follow-up is essential to assess the sustained efficacy and safety of a treatment. Short-term studies may not detect delayed adverse effects or the durability of therapeutic benefits. However, this study suggests that telmisartan not only effectively manages blood pressure but also contributes to cardiac remodeling, potentially reducing the risk of angina in patients with chronic hypertension.

5. Conclusion

This comprehensive real-world study provided valuable insights into telmisartan's efficacy, safety, adherence, and its impact across diverse regions in India. From a clinical implication's standpoint, the findings of this study strongly support telmisartan's prominent role in HT management in India, especially in the context of the broader CVDC.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Funding

References

[1]   Chrysant SG. A new paradigm in the treatment of the cardiovascular disease continuum: focus on prevention. Hippokratia. 2011;15(1):7-11.

[2]   Faienza MF, Urbano F, Lassandro G, Valente F, D'Amato G, Portincasa P, et al. The Cardiovascular Disease (CVD) Risk Continuum from Prenatal Life to Adulthood: A Literature Review. Int J Environ Res Public Health. 2022;19(14):8282.

[3]   Rizwan TN, Roshene R. Cardiovascular Disease Continuum-An Update. J med sci clin Res. 20165(4):2455-450.

[4]   Chopda MB, Gadkar SG, Yashwanth AL, Kumar R, Dabhade DC, Newale SR. Nationwide surveillance for Telmisartan alone or with combination at real world therapy in Indian patients with hypertension (START). Int J Res Med Sci. 2021;9(10):3091.

[5]   Yum Y, Kim JH, Joo HJ, Kim YH, Kim EJ. Three-Year Cardiovascular Outcomes of Telmisartan in Patients With Hypertension: An Electronic Health Record-Based Cohort Study. Am J Hypertens. 2024;37(6):429-37.

[6]   Kumari K, Toppo MS, Majhi L, Kumar A. Blood pressure-lowering effect of telmisartan compared to losartan among mild to moderate essential hypertensive adult subjects: A meta-analysis. J Family Med Prim Care. 2022;11(10):6227-35.

[7]   Khan MY, Pandit S, Abdulkutty J, Navasundi G, Hazra PK, Phadke U, et al. Effectiveness of Telmisartan on Blood Pressure Control in Hypertensive Patients in India: A Real-World Retrospective Study from Electronic Medical Records. Cardiol Ther. 2021;10(1):255-69.

[8]   Ayza MA, Zewdie KA, Tesfaye BA, Gebrekirstos ST, Berhe DF. Anti-Diabetic Effect of Telmisartan Through its Partial PPARγ-Agonistic Activity. Diabetes Metab Syndr Obes. 2020;13:3627-35.

[9] Parra Carrillo JZ, Fernández M, Barrera M, Bahena J, Estrella M, Olivares Ruiz R, et al. Effect of telmisartan 80 mg once daily on 24-h blood pressure profile in patients with mild-to-moderate hypertension failing to respond to prior antihypertensive therapy. Int J Clin Pract Suppl. 2004;(145):9-15.

[10] Mattioli AV, Zennaro M, Bonatti S, Bonetti L, Mattioli G. Regression of left ventricular hypertrophy and improvement of diastolic function in hypertensive patients treated with telmisartan. Int J Cardiol. 2004;97(3):383-8.

[11] Telmisartan Randomised AssessmeNt Study in ACE iNtolerant subjects with cardiovascular Disease (TRANSCEND) Investigators; Yusuf S, Teo K, Anderson C, Pogue J, Dyal L, Copland I, Schumacher H, Dagenais G, Sleight P. Effects of the angiotensin-receptor blocker telmisartan on cardiovascular events in high-risk patients intolerant to angiotensin-converting enzyme inhibitors: a randomised controlled trial. Lancet. 2008;372(9644):1174-83.

[12] Redon J, Bilo G, Parati G; Surge Steering Committee. The effects of telmisartan alone or in combination with hydrochlorothiazide on morning home blood pressure control: the SURGE 2 practice-based study. Blood Press. 2013;22(6):377-85.

[13] Prem Kumar A, Ghorai A, Kriplani V, Dash RK, Aravinda J, Shamanna P, et al. Clinical data analysis of telmisartan for hypertension management in Indian population. Bioinformation. 2021;17(6):652-9.

[14] Kathiresan M, Saxena A, Tripathy P, Tripathi S, Upendra G. Management of hypertensive patients with ischemic heart disease and the role of a fixed-dose combination of telmisartan and metoprolol: A physician-based research survey. Int J Adv Med. 2023;10:367-76.

[15] Michel MC, Bohner H, Köster J, Schäfers R, Heemann U. Safety of telmisartan in patients with arterial hypertension : an open-label observational study. Drug Saf. 2004;27(5):335-44.