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ASSESSMENT OF THE CARDIOVASCULAR BENEFITS OF DAPAGLIFLOZIN IN SUB-CONTINENT PATIENTS UNDERGOING REHABILITATION WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background and purpose: Cardiovascular and Renal Complications are found as burden to Diabetes mellitus patients. SGL2 Transporters although dapagliflozin has shown cardiovascular benefits in clinical trials, real-world evidence in Indian hospitalized patients is limited. This clinical study aimed to evaluate the cardiorenal and metabolic outcomes associated with Dapagliflozin (sodium–glucose cotransporter 2-SGLT2 inhibitor,) in Indian hospitalized patients with Type 2 Diabetes Mellitus (T2DM).

Methodology: A total of 340 hospitalized South Indian patients were screened for eligibility in the present study, and 174 met the inclusion criteria, were enrolled in the study, and were included in the analysis. Baseline demographic characteristics and key laboratory parameters related to cardiac, renal, and metabolic function were collected after Dapagliflozin therapy. Data analysis was performed using SPSS version 20.0, employing descriptive and inferential statistical methods to evaluate the impact of Dapagliflozin on cardiorenal markers and glycaemic outcomes.

Results: Dapagliflozin therapy was significantly associated with improvements in cardiac function indices, renal health markers, and glycaemic control among the 174 participants (106 men and 68 women). The observed beneficial enhancements indicate a positive relationship between dapagliflozin therapy and optimistic, favourable cardiorenal and metabolic outcomes in the inpatient rehabilitation context.

Conclusion: Dapagliflozin treatment significantly enhanced cardiac function, supported by improvement in renal health in hyperglycaemic patients with type 2 diabetes and concurrent cardiac impairment. The current clinical study supports its therapeutic benefits for hospitalized, high-risk patients with T2DM and cardiac dysfunction.

KEYWORDS: Heart failure, Dapagliflozin (Sodium-Glucose Transporter 2-SGLT2Inhibitor), Improved Cardiac function, Type 2 Diabetes Mellitus, Geriatric Indian patients

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a major public health challenge in the Indian subcontinent, driven by the relationship of genetic susceptibility, fast urbanization, sedentary lifestyles, and dietary transitions that collectively fuel its rising prevalence and contribute to premature mortality [1]. Individuals with T2DM in Indian Sub-Continent bear a disproportionately high burden of cardiovascular disease, including coronary artery disease, heart failure, peripheral arterial disease, and stroke, with these complications often occurring at a younger age and progressing more aggressively than in many other populations [2]. The frequent coexistence of central obesity, atherogenic dyslipidaemia, hypertension, and chronic low-grade inflammation further amplifies atherothrombotic risk, creating a distinctly adverse cardiometabolic profile that is characteristic of South Indian populations [3].

T2DM is a progressive metabolic disorder regarded as by insulin resistance and impaired β-cell function, primary to chronic hyperglycaemia and an amplified risk of multi-organ complications [4,5].The global rise in T2DM poses a critical public health concern because of its strong association with both microvascular and macrovascular disease, principally cardiovascular disease (CVD) and chronic kidney disease (CKD) [6]. Patients with T2DM face intrinsically higher cardiovascular risk through interconnected mechanisms such as endothelial dysfunction, oxidative stress, systemic inflammation, dyslipidaemia, arterial stiffness, and hypertension, which together increase the likelihood of major adverse cardiovascular events, including myocardial infarction and stroke. As a result, CVD remains the leading cause of morbidity and mortality among individuals with T2DM, underscoring the need for management strategies that address not only hyperglycaemic control but also comprehensive cardiovascular risk reduction [7,8].

Contemporary clinical guidelines therefore advocate integrating therapies with proven cardiovascular benefit, particularly sodium–glucose cotransporter-2 (SGLT2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists, into the treatment of high-risk patients with T2DM [8,9]. Among these agents, Dapagliflozin, an SGLT2 inhibitor initially developed for glucose lowering, has shown substantial cardiovascular and renal benefits in large clinical trials, including reductions in hospital admission for heart failure and in all-cause mortality among subjects with and without T2DM [10, 11, 12]. These benefits are thought to extend beyond hyperglycaemic effects and may be mediated by improved renal hemodynamic, reductions in preload and afterload, modulation of neurohormonal pathways, and attenuation of systemic inflammation and congestion [13, 14].

However, despite robust trial data, there remains a relative paucity of tangible observational evidence evaluating these cardioprotective effects in routine clinical practice within the South Indian subcontinent, where risk profiles and healthcare contexts differ from those of Western cohorts [15].
Dapagliflozin was well accepted by individuals with type 2 diabetes and chronic renal illness, and it was able to considerably enhance the parameters of glucose management, kidney function, and heart function when it was added to the usual treatment. In addition to this, there was a significant improvement in the management of blood sugar [16].
Dapagliflozin-based fixed-dose combinations (FDCs) for managing Type 2 Diabetes Mellitus (T2DM) in Indian settings. FDC therapy leads to non-glycaemic benefits such as reduced blood pressure and increased vasodilation. It is also noted for its superior cardiovascular safety and is recommended for patients with atherosclerotic cardiovascular disease. Also,the therapy is highlighted for its renal safety profile and is recommended for patients with chronic kidney disease up to stage 3 [17].
Thus, assessing the cardiovascular effects of Dapagliflozin in South Indian populations is particularly relevant, as these groups experience earlier onset and higher rates of both T2DM and atherosclerotic cardiovascular disease compared with many other ethnicities. This observational study primarily focuses on South Indian patients with T2DM undergoing inpatient rehabilitation, evaluating cardiovascular, renal, and as a secondary objective to clarify metabolic and lipid outcomes associated with Dapagliflozin therapy.

METHODS AND PATIENTS

Study Design, Period, and Setting: This was a prospective observational clinical study conducted at the Paalana Institute of Medical Sciences, a tertiary care centre located in Kannadi, Palakkad district, Kerala, South India. The observational clinical study was carried out from January 2025 to September 2025. Participants were recruited from both in patients undergoing cardiovascular rehabilitation and outpatients attending follow-up visits at the Department of Cardiology (figure 1). The observational study adhered to the ethical principles outlined in the Declaration of Helsinki (2013 revision). Ethical approval was obtained from the Institutional Human Ethics Committee (IHEC) of Paalana Institute of Medical Sciences (Reference No: 09/EC/25/AIMS-24) on dated 17/05 2025. Written informed consent was obtained from all participants before enrolment and any study-related procedures.

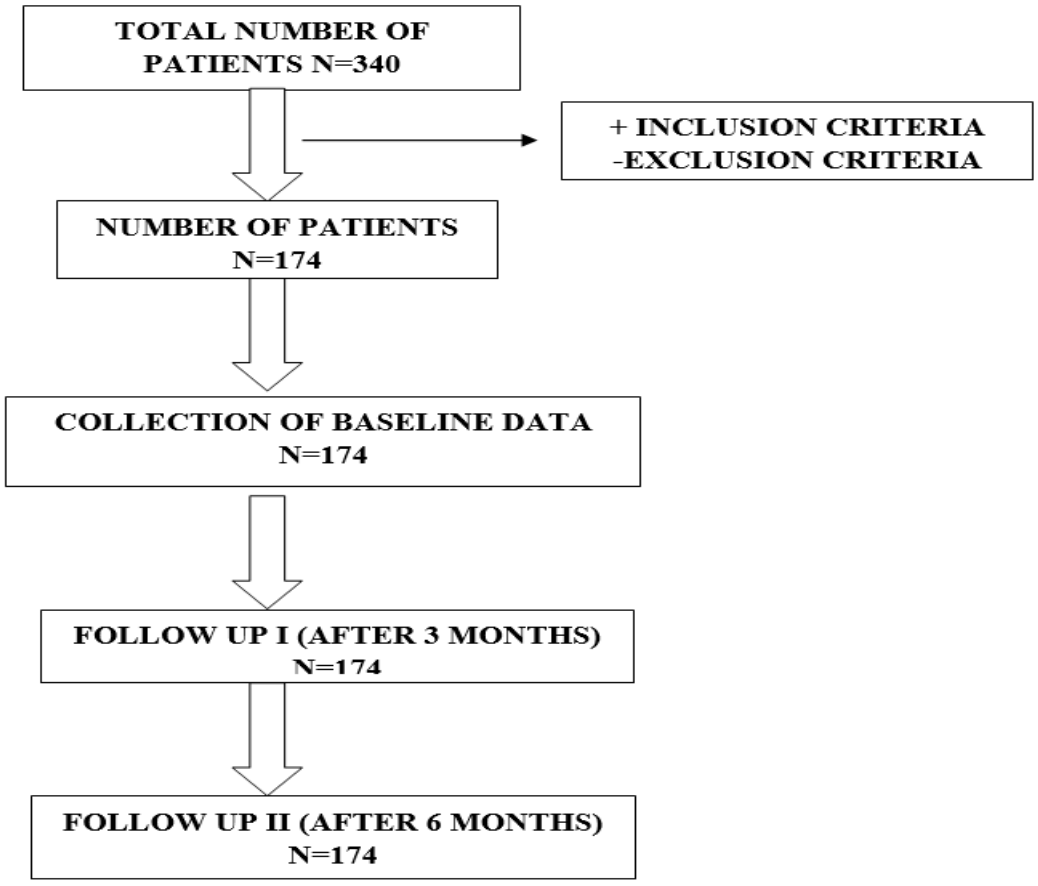

Figure 1. Depicts the overview of the research of participants into various phases throughout the study's follow-up.

Patient Selection Study Population: in the current research, Eligible participants were adult patients (≥18 years) fulfilling the following criteria such as Confirmed diagnosis of T2DM (Blood Glucose levels),those who diagnosed with early or advanced heart failure or other established cardiovascular complications, an patients prescribed with Dapagliflozin (10 mg daily) therapy for at least six months, either initiated prior to or during the study period were included. Patients were excluded if any of the following conditions were present namely Pregnancy or lactation, diagnosed psychological illness or cognitive impairment affecting consent capacity or study compliance,partial baseline clinical or laboratory data.
Data Collection tool sand Method: A standardized, self-validated data collection form was used for systematic recording of variables. Measurements were taken at baseline, 3 months, and 6 months during the observation period.

First part consists of Demographic and Clinical Data such as Age, sex, and relevant clinical history, Cardiac and Hemodynamic Parameters: Echocardiographic Measures: Left Ventricular (LV) systolic function and Left Ventricular Ejection Fraction (LVEF) were assessed based on ASE/EACVI 2016 guidelines. The ASE/EACVI 2016 criteria provide a standardized algorithm to classify diastolic dysfunction into four categories: Normal, Grade I (Mild), Grade II (Moderate), and Grade III (Severe), based on a combination of echocardiographic parameters (e.g., e', E/e', TR velocity, LA volume). Cardiac Biomarkers and Vitals: Heart rate, systolic and diastolic blood pressure, and cardiac troponin levels.
Metabolic and Hyperglycaemic Parameters: Blood Glucose: Fasting Blood Glucose (FBG), Postprandial Blood Glucose (PPBG), Random Blood Glucose (RBG), and Glycated Haemoglobin (HbA1c). Lipid Profile: Total cholesterol, Low-Density Lipoprotein Cholesterol (LDL-C), and triglycerides. Hepatic Enzymes: Serum Glutamic-Oxaloacetic Transaminase (SGOT). Renal Function Parameters: Estimated Glomerular Filtration Rate (eGFR), Serum creatinine levels.

Statistical Analysis

All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS, IBM Corp., Armonk, NY, USA), version 20.0. Qualitative variables, such as sex and hospitalization status, were expressed as frequencies and percentages. Quantitative variables, including Left Ventricular Ejection Fraction (LVEF), Glycated Haemoglobin (HbA1c), and estimated Glomerular Filtration Rate (eGFR), were summarized as mean ± standard deviation (SD).The effectiveness of Dapagliflozin therapy over the six-month observation period was evaluated using the following statistical methods: Cochran's Q test was applied to assess differences in the distribution of qualitative outcomes (for example, changes in heart failure classification) across the three time points: baseline, 3 months, and 6 months. Repeated Measures Analysis of Variance (RMANOVA) was performed to evaluate within-subject mean differences of quantitative variables (including LVEF, serum creatinine, and lipid profile parameters) over the same intervals. A two-tailed P-value of less than 0.05 ($P<0.05$) was considered statistically significant.

RESULTS:

Table-1: Gender & Age-wise distribution of Study participants (N=174)

Gender	**No. of participants**	**Percentage**
Female	68	39.1
Male	106	60.9
Age	**No. of participants**	**Percentage**
18-40	4	2.3
41-60	34	19.5
61-80	136	78.2

A total of 174 cardiac patients were enrolled in the study. The majority were male (106 patients, 60.9%), while females accounted for 68 patients (39.1%). With respect to age distribution, most patients were geriatric patients. A total of 136 participants (78.2%) were between 61 and 80 years of age, 34 patients (19.5%) were aged 41 to 60 years, and only 4 patients (2.3%) were younger than 40 years (Table-1).

A) Assessment of the Shift in Ejection Fraction Following Dapagliflozin Treatment: According to American Heart Association (AHA), American College of Cardiology (ACC), and the European Society of Cardiology (ESC) Patients were categorized to <50% (57 and 20), 50-70% (77 and 52) and >70% (40 and 102) during pre and post Dapagliflozin Treatment visits respectively (figure 2). There was a significant hike in baseline, 57.76±15.354 to follow up II 70.66±15.195 ($p< 0.001$). It was noticed that strong positive correlation (value: 0.701) put forward that the change in ejection fraction was consistent throughout the study (Table-2).

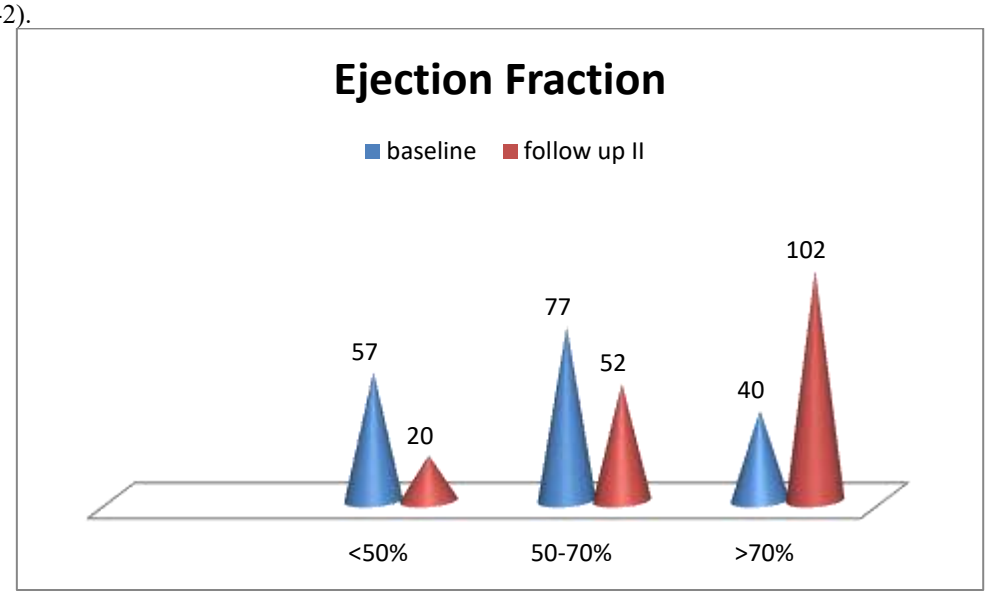

Figure-2: Distribution of Ejection Fraction in study population during pre and post visits, Significant Changes in Ejection Fraction in study Population

Table-2: Distribution Ejection Fraction in cardio patients during pre and post visit (N=174)

Ejection Fraction	Mean + STD	Correlation	P value
Baseline	57.76 +15.354	0.701	<0.001*
Follow up II	70.66 +15.195		

*Significant at p value <0.05

Table 3. Distribution of LV Dysfunction in cardio patients during baseline and end of the visit (N=174)

LV Diastolic Dysfunction		End of the study period (follow up II)			Total	P Value
		Grade 1	Grade 2	Grade 3		
Baseline	Grade 1	13	0	0	13	<0.001*
		100.0%	0.0%	0.0%	100.0%	
	Grade 2	55	27	0	82	
		67.1%	32.9%	0.0%	100.0%	
	Grade 3	0	15	5	20	
		0.0%	75.0%	25.0%	100.0%	
Total		68	42	5	115	
		59.1%	36.5%	4.3%	100.0%	
LV Systolic Dysfunction		**End of the study period (follow up II)**			**Total**	**P Value**
		Mild	**Moderate**	**Severe**		
Baseline	Mild	12	0	0	12	<0.001*
		100.0%	0.0%	0.0%	100.0%	
	Moderate	8	32	0	40	
		20.0%	80.0%	0.0%	100.0%	
	Severe	0	7	0	7	
		0.0%	100.0%	0.0%	100.0%	
Total		20	39	0	59	
		33.9%	66.1%	0.0%	100.0%	

*Significant at *p* value <0.001. LV diastolic dysfunction left ventricular dysfunction, LV systolic dysfunction left ventricular systolic dysfunction

At baseline, 115 patients were evaluated and classified according to the severity of LV diastolic dysfunction, with 13 patients (11.3%) in Grade 1, 82 patients (71.3%) in Grade 2, and 20 patients (17.4%) in Grade 3. Among those with baseline Grade 2 dysfunction, 55 patients (67.1%) improved to Grade 1, while 27 patients (32.9%) remained in Grade 2. In the baseline Grade 3 group, 15 patients (75.0%) improved to Grade 2, and 5 patients (25.0%) remained in Grade 3. Comparison between baseline and Follow-up II demonstrated a highly significant improvement in diastolic function ($p < 0.001$).

LV systolic dysfunction was assessed in 59 patients using LVEF-based severity categories in accordance with ASE/EACVI recommendations, comprising mild dysfunction in 12 patients (20.3%), moderate dysfunction in 40 patients (67.8%), and severe dysfunction in 7 patients (11.9%) at baseline. At Follow-up II, all patients with baseline mild systolic dysfunction (100%) remained stable. Among patients with moderate dysfunction at baseline, 8 patients (20.0%) improved to mild dysfunction, while 32 patients (80.0%) remained moderately impaired, and none progressed to severe dysfunction. particularly, all patients with baseline severe systolic dysfunction (100%) improved to the moderate category at Follow-up II, with no patients remaining in the severe category or showing direct improvement to mild dysfunction (table 3).

Table 4. Distribution of Cardiac Biomarkers (N=174).

Cardiac Biomarkers	Baseline	First review	End of the study period	P value
Troponin 1	26.379±9.7669	26.367±9.4933	26.062±9.6156	0.610
SGPT	32.40±13.804	20.45±14.178	18.47±13.704	<0.001*
SGOT	31.87±15.564	24.44±12.684	21.244±11.8651	<0.001*

*Significant at *p* value <0.001. SGPT: serum glutamate pyruvate transferase. SGOT: Serum Glutamic-Oxaloacetic Transaminase

C) Assessment of Dapagliflozin Treatment on Cardiac Biomarkers:

Table-4 and Table-5 summarize the significant changes in cardiac biomarkers among the 174 patients evaluated baseline, first

follow-up, and second follow-up visits of Dapagliflozin Treatment:
Troponin I: Troponin I levels remained stable throughout the study period, with mean values of 26.37 ± 9.77 ng/L at baseline, 26.37 ± 9.49 ng/L at Follow-up 1, and 26.06 ± 9.62 ng/L at Follow-up 2. There was no statistically significant change across visits (p = 0.610). (Table-4).
SGPT (ALT): SGPT levels demonstrated a highly significant and progressive reduction over time, decreasing from 32.40 ± 13.80 U/L at baseline to 20.45 ± 14.18 U/L at Follow-up 1, and further to 18.47 ± 13.70 U/L at Follow-up 2. The decline was statistically significant (p < 0.001). (Table-4).
SGOT (AST): A similar pattern was observed for SGOT, which decreased from 31.87 ± 15.56 U/L at baseline to 24.44 ± 12.68 U/L at Follow-up 1, and 21.24 ± 11.87 U/L at Follow-up 2. This reduction was also highly significant (p < 0.001), suggesting parallel improvement in hepatic and metabolic status (Table-4).
Table 5 summarizes the changes in key cardiac parameters across baseline, first follow-up I, and follow-up II assessments.

Table 5. Distribution of Heart Rate, Blood Pressure, Total Cholesterol in cardio Patients (N=174).

Cardiac parameters	Baseline	First review (Follow up I)	End of the study period (Follow up II)	P value
Heart rate (bpm)	93.59±15.736	79.39±11.292	75.58±10.398	<0.001*
DBP (mm/Hg)	94.37±16.250	82.96±11.726	80.40±10.122	<0.001*
SBP (mm/Hg)	143.82±15.909	133.47±12.858	126.45±15.181	<0.001*
Total cholesterol (mg/dL)	216.89 ± 69.80	179.47 ± 42.20	168.68 ± 20.20	< 0.001

*Significant at p value(p<0.001) DBP: diastolic blood pressure, SBP: systolic blood pressure.
(i) Heart Rate: A progressive reduction in heart rate was observed in both visits, decreasing from 93.59 ± 15.74 beats/min at baseline to 79.39 ± 11.29 beats/min at Follow-up I, and further to 75.58 ± 10.40 beats/min at Follow-up II. This change was statistically robust (p < 0.001) (Table-5).
(ii) Diastolic Blood Pressure (DBP): DBP showed a consistent decrease over time, reducing from 94.37 ± 16.25 mmHg at baseline to 82.96 ± 11.73 mmHg at Follow-up I, and 80.40 ± 10.12 mmHg at Follow-up II. The overall decrease was highly significant (p < 0.001, Table-5).
(iii) Systolic Blood Pressure (SBP): A significant decrease was observed in SBP, which decreased from 143.82 ± 15.90 mmHg at baseline to 133.47 ± 12.86 mmHg at Follow-up I, and further to 126.45 ± 15.18 mmHg atFollow-up II (p < 0.001, Table-5).
(iv) Total Cholesterol: Total cholesterol levels declined, from 216.89 ± 69.80 mg/dL at baseline to 179.47 ± 42.20 mg/dL at Follow-up 1, and to 168.68 ± 20.20 mg/dL at Follow-up II. This reduction was statistically significant (p < 0.001), indicating favourable lipid profile improvement over time (Table 5).

Table 6. Effect of Dapagliflozin on Blood Sugar Levels in Study Population (N=174)

Types of Blood Glucose	Baseline	First review (Follow up I)	End of the study period (Follow up II)	P value
PPBG	258.08±38.274	237.76±35.194	223.72±37.161	<0.001*
FBG	151.76±31.949	132.11±22.589	120.84±20.607	<0.001*
RBG	193.02±30.588	166.73±13.054	165.67±15.353	<0.001*
HBA1C	7.090±0.7211	6.556±0.7277	6.200±0.6703	<0.001*

*Significant at p value <0.001. PPG: post prandial blood glucose, FBG: fasting blood glucose, RBG: random blood glucose, HBA1C: glycated haemoglobin

D) Effect of Dapagliflozin Treatment on Blood Glycaemic Profile:
(i) Postprandial Blood Sugar (PPBS): PPBS showed a marked decline from 258.08 ± 38.27 mg/dL at baseline to 237.76 ± 35.19 mg/dL at Follow-up I, and further to 223.72 ± 37.16 mg/dL at Follow-up II, withs highly significant (p <0.001, Table-6).
(ii) Fasting Blood Glucose (FBG): FBS levels falling from 151.76 ± 31.95 mg/dL at baseline to 132.11 ± 22.59 mg/dL at Follow-up I, and 120.84 ± 20.61 mg/dL at Follow-up II (p < 0.001, Table-6).
(iii) Random Blood Glucose (RBG): RBG also showed significant decrease, from 193.02 ± 30.59 mg/dL at baseline to 166.73 ± 13.05 mg/dL at Follow-up I, and 165.67 ± 15.35 mg/dL at Follow-up II (p < 0.001, Table-6).
(v) Glycated Haemoglobin (HbA1c): HbA1c levels showed a consistent decline from 7.090 ± 0.721 at baseline to 6.556 ± 0.728 at Follow-up I, and 6.200 ± 0.670 at Follow-up II.

Table-7: Effect on renal function

Renal parameters	Baseline	First review (Follow up I)	End of the study period (Follow up II)	*p* Value
eGFR (ml/min)	58.34±20.227	71.71±21.356	80.74±23.548	<0.001*
Creatinine (mg/dL)	1.684±0.874	1.268±0.277	1.299±0.558	<0.001*

*Significant at *p* value <0.001. eGFR: estimated glomerular filtration rate.

E) Assessment of Dapagliflozin Treatment on Renal Function:

(i) Estimated Glomerular Filtration Rate (eGFR): The mean eGFR showed a steady improvement over the study period. Values increased from 58.34 ± 20.23 mL/min at baseline to 71.71 ± 21.36 mL/min at Follow-up I, and further to 80.74 ± 23.55 mL/min at Follow-up II with p<0.001(table 7)

(ii) (ii) Serum Creatinine: Serum creatinine levels demonstrated a significant reduction from 1.684 ± 0.874 mg/dL at baselineto1.268 ± 0.277 mg/dL at Follow-up I, with a slight increase to 1.299 ± 0.558 mg/dL at Follow-up II. Despite the small rise between follow-up visits, overall improvement from baseline remained statistically significant (p < 0.001, Table-7).

Table-8. Effect on Lipid Profile

Lipid Profile	Baseline	First review (Follow up I)	End of the study period (Follow up II)	P value
Total Cholesterol	216.89±69.798	179.47±42.199	168.68±20.195	<0.001*
LDL	160.95±14.375	154.03±14.714	154.06±14.354	<0.001*
HDL	28.24±5.975	31.97±5.735	41.59±6.952	<0.001*
Triglycerides	164.54±13.608	160.76±10.714	157.39±8.668	<0.001*

*Significant *p* value <0.001, LDL: low density lipoprotein, HDL: high density lipoprotein.

F) Assessment of Dapagliflozin Treatment on Lipid Profile:

(i) Total Cholesterol: Total cholesterol showed a significant reduction from 216.89 ± 69.80 mg/dL at baseline to 179.47 ± 42.20 mg/dL at Follow-up I and 168.68 ± 20.20 mg/dL at Follow-up II (Table-8).

(ii) Low-Density Lipoprotein (LDL): LDL cholesterol levels declined from 160.95 ± 14.38 mg/dL at baseline to 154.03 ± 14.71 mg/dL at Follow-up I and 154.06 ± 14.35 mg/dL at Follow-up II(Table-8).

(iii) High-Density Lipoprotein (HDL): HDL levels showed a significant increase from 28.24 ± 5.98 mg/dL at baseline to 31.97 ± 5.74 mg/dL at Follow-up I and 41.59 ± 6.95 mg/dL at Follow-up II(Table-8).

(iv) Triglycerides: Triglyceride levels significantly decreased from 164.54 ± 13.61 mg/dL at baseline to 160.76 ± 10.71 mg/dL at Follow-up I and 157.39 ± 8.67 mg/dL at Follow-up II. Overall, these findings indicate a consistent and clinically meaningful improvement in lipid parameters among the study population (Table-8).

DISCUSSION

This prospective observational study evaluated the cardiovascular, renal, and metabolic effects of only Dapagliflozin prescribed hospitalized South Indian patients with type 2 diabetes mellitus (T2DM) and high cardiometabolic risk.

Dapagliflozin therapy was associated with a significant and sustained increase in ejection fraction across the follow-up period, with a notable shift of patients from lower to higher ejection-fraction categories [18]. Parallel improvements in LV systolic and diastolic function were evident, including regression of diastolic dysfunction from Grade 2 to Grade 1 and improvement of systolic dysfunction from severe to moderate in a substantial subset. These results suggest favourable reverse remodelling and stabilization of ventricular function in an elderly South Indian population with advanced T2DM and a high burden of cardiovascular risk. The observed cardiac improvements are consistent with established mechanistic pathways of sodium–glucose cotransporter-2 (SGLT2) inhibition, which include reductions in ventricular preload and afterload, attenuation of interstitial fluid volume, improved myocardial energetics, and enhanced ventricular loading conditions [19].

Furthermore, Dapagliflozin treatment resulted in significant reductions in heart rate, systolic blood pressure, and diastolic blood pressure. The absence of reflex tachycardia supports the hypothesis that SGLT2 inhibitors confer hemodynamic benefits primarily through natriuresis, osmotic diuresis, and improved arterial compliance rather than sympathetic activation [20]. Together with the improvements in LV function, these hemodynamic effects may contribute to the reduction in cardiovascular events observed in major outcome trials and align with the drug's protective profile in high-risk populations [21].Throughout the study period, Troponin I levels remained stable, indicating an absence of ongoing myocardial injury and supporting the cardiac safety of Dapagliflozin in the inpatient setting. Hepatic enzymes (SGPT/ALT and SGOT/AST) demonstrated a progressive decline, suggesting improvement in hepatocellular integrity rather than drug-induced liver injury. The combination

of stable cardiac biomarkers and improving hepatic indices reinforces the organ safety profile of Dapagliflozin in this vulnerable group [22, 23].

Dapagliflozin produced significant improvements in multiple glycaemic parameters, including fasting blood glucose, postprandial blood glucose, random blood glucose, and HbA1c. The sustained reduction in HbA1c supports enhanced long-term glycaemic control, an important consideration for South Indian patients who commonly exhibit early-onset diabetes and high carbohydrate consumption [24, 25]. As SGLT2 inhibitors act through an insulin-independent mechanism of increased urinary glucose excretion, their efficacy is maintained even in individuals with marked insulin resistance or β-cell dysfunction [26, 27].

Renal function also improved significantly, marked by increases in estimated glomerular filtration rate and decreases in serum creatinine. These findings are congruent with the reno protective effects of SGLT2 inhibition demonstrated in large cardiovascular and renal outcome trials, including the mitigation of intraglomerular pressure, reduction in hyperfiltration, and enhancement of tubuloglomerular feedback [12, 28]. Favourable changes were also noted in lipid parameters. Total cholesterol and triglycerides declined over time, HDL cholesterol increased substantially, and LDL cholesterol showed modest improvement. Collectively, these shifts indicate a movement toward a less atherogenic lipid profile, which may further reduce long-term cardiovascular risk in a population characterized by high baseline dyslipidaemia [29].

This study adds valuable real-world data from South Indian patients, a group with unique cardiometabolic vulnerabilities, including early-onset T2DM, high dietary carbohydrate intake, smaller body size, and disproportionately high cardiovascular risk. The consistent improvements across cardiac, renal, metabolic, and hemodynamic domains highlight the suitability of Dapagliflozin as a therapeutic agent capable of addressing the complex, interrelated pathophysiology of T2DM in this population. The multi-organ benefits observed support broader clinical use of Dapagliflozin in hospitalized patients with high cardiometabolic burden.

LIMITATIONS

This study has several limitations. Its single-Centre, observational design without a comparator group limits causal inference and may reduce generalizability to broader populations. The follow-up duration/financial constraints for checking echo cardiogram during follow up I, although adequate to capture short- and mid-term changes in functional and biochemical parameters, does not extend to long-term clinical outcomes such as cardiovascular mortality, hospitalization for heart failure, or progression of chronic kidney disease. Additionally, confounding factors such as concomitant medications, dietary changes, and lifestyle modifications during rehabilitation may have influenced the results. Future multicenter, randomized, controlled studies with longer follow-up are warranted to validate and expand upon these findings.

CONCLUSION

In summary, Dapagliflozin therapy in hospitalized South Indian patients with T2DM was associated with significant improvements in LV systolic and diastolic function, hemodynamic parameters, glycaemic control, renal function, and lipid profile, while maintaining stable cardiac biomarkers indicative of preserved myocardial safety. These results support the use of Dapagliflozin as a valuable therapeutic option for high-risk South Indian patients with T2DM, particularly in clinical settings where cardiovascular, renal, and metabolic risks converge.

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Authors' Contribution

Mr. Dawn V J handled data collection, analysis, interpretation, manuscript writing, literature review, and revisions.

Hemalatha Selvaraj and Rosmi Jose contributed to data acquisition, study design, and manuscript preparation. All authors checked and agreed with the final manuscript.

Conflict of Interest

The authors declare that they have no financial conflict of interest about the content of this manuscript.

Data Availability

Data supporting this study can be acquired by the author, Dr. Hemalatha Selvaraj, upon reasonable request.

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