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Evaluation of cardiac MRI findings and their association with clinical characteristics and outcomes in patients with dilated cardiomyopathy and left ventricular systolic dysfunction: A prospective observational study.

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ABSTRACT

Background:

Dilated cardiomyopathy (DCM) is a major cause of chronic heart failure and is characterized by left ventricular (LV) dilatation with impaired systolic function. Prognosis in DCM varies widely and depends on underlying myocardial pathology.

Aim:

To evaluate cardiac MRI findings and analyze their association with clinical characteristics and outcomes in patients with dilated cardiomyopathy and left ventricular systolic dysfunction.

Materials and Methods:

This prospective observational study included 100 patients diagnosed with DCM and LV systolic dysfunction. All participants underwent CMR using a standardized imaging protocol. Left and right ventricular volumes, LV ejection fraction (LVEF), and the presence and pattern of LGE were assessed. Clinical data and outcomes, including heart failure–related hospitalizations, ventricular arrhythmias, and all-cause mortality, were recorded during follow-up. Associations between CMR parameters, clinical variables, and outcomes were analyzed using appropriate statistical methods.

Results:

The mean age of patients was 52.6 ± 11.4 years, with a male predominance (68%). LGE suggestive of myocardial fibrosis was detected in 62% of patients, most commonly showing a mid-wall pattern. Patients with LGE demonstrated significantly lower LVEF compared to those without LGE (27.4 ± 5.8% vs. 33.5 ± 6.1%; $p < 0.001$). Adverse clinical outcomes, including recurrent heart failure hospitalization, ventricular arrhythmias, and mortality, were more frequent among LGE-positive patients.

Conclusion:

Cardiac MRI provides comprehensive diagnostic and prognostic information in dilated cardiomyopathy. The presence of myocardial fibrosis on LGE is strongly associated with poorer LV function and unfavorable clinical outcomes, highlighting its role in risk stratification.

Recommendations:

Routine incorporation of cardiac MRI with LGE assessment is recommended in patients with DCM for early risk stratification. Patients with LGE may benefit from closer follow-up, aggressive heart failure management, and timely consideration of device therapy to improve clinical outcomes.

Keywords: *Dilated cardiomyopathy; Cardiac magnetic resonance imaging; Late gadolinium enhancement; Myocardial fibrosis; Left ventricular systolic dysfunction; Prognosis.*

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INTRODUCTION

Dilated cardiomyopathy (DCM) is a primary myocardial disorder characterized by left ventricular dilatation and systolic dysfunction that cannot be explained by abnormal loading conditions or significant coronary artery disease (1). It is one of the leading causes of heart failure and a major contributor to morbidity and mortality worldwide, particularly among the working-age population. Patients with DCM exhibit a heterogeneous clinical course, ranging from asymptomatic left ventricular dysfunction to advanced heart failure, malignant ventricular arrhythmias, thromboembolic events, and sudden cardiac death (2).

Left ventricular systolic dysfunction is the defining feature of DCM and remains the most important determinant of prognosis. Although clinical assessment and echocardiography are routinely used for diagnosis and follow-up, these modalities provide limited information regarding underlying myocardial pathology and often fail to accurately predict disease progression and outcomes (2,3). This has led to growing interest in advanced imaging techniques that can offer comprehensive functional assessment along with myocardial tissue characterization.

Cardiac magnetic resonance imaging (CMR) has emerged as the reference standard for non-invasive evaluation of cardiomyopathies due to its high spatial resolution and excellent reproducibility in assessing ventricular volumes, ejection fraction, and myocardial mass (4). In addition to functional assessment, contrast-enhanced CMR using late gadolinium enhancement (LGE) enables in vivo visualization of myocardial fibrosis, which represents a key pathological substrate in dilated cardiomyopathy (5).

Myocardial fibrosis plays a central role in adverse ventricular remodeling, systolic dysfunction, and electrical instability. Several studies have demonstrated that the presence of LGE in patients with non-ischemic DCM is independently associated with increased risk of heart failure progression, ventricular arrhythmias, sudden cardiac death, and all-cause mortality (3,6,7). Furthermore, the extent and pattern of fibrosis, particularly mid-wall fibrosis, have been shown to provide incremental prognostic value beyond conventional clinical and echocardiographic parameters (6,7).

Recent advances in CMR techniques, including T1 mapping and extracellular volume quantification, have further improved the ability to detect diffuse myocardial fibrosis that may not be evident on conventional LGE imaging (8). These tissue characterization techniques have shown significant associations with left ventricular systolic dysfunction and adverse clinical outcomes, reinforcing the role of CMR as a powerful tool for risk stratification in DCM.

Therefore, evaluating cardiac MRI findings and their relationship with clinical characteristics and outcomes in patients with dilated cardiomyopathy and left ventricular systolic dysfunction is of significant clinical importance. Such an approach may enhance prognostic assessment, facilitate individualized management strategies, and improve overall patient outcomes.

MATERIALS AND METHODS

Study design

This was a hospital-based, single-center, prospective observational study conducted at a tertiary care teaching hospital. The study was designed to evaluate cardiac magnetic resonance imaging findings and their association with clinical characteristics and outcomes in patients with dilated cardiomyopathy and left ventricular systolic dysfunction under routine clinical practice conditions.

Study setting and duration

The study was carried out in the Department of Radiology in collaboration with the Department of Cardiology at Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India, a tertiary care teaching hospital catering to patients from Amalapuram and the surrounding coastal regions of Andhra Pradesh. The study was conducted over a period of 18 months, from June 2024 to December 2025.

Study Population

Patients clinically suspected or previously diagnosed with dilated cardiomyopathy with left ventricular systolic dysfunction and referred for cardiac MRI were included in the study.

Sample Size

A total of 100 consecutive patients fulfilling the inclusion criteria were enrolled during the study period.

Inclusion Criteria

Adult patients aged ≥18 years.

Patients diagnosed with dilated cardiomyopathy based on clinical and echocardiographic criteria.

Presence of left ventricular systolic dysfunction (LVEF ≤40% on echocardiography).

Patients referred for cardiac MRI for evaluation of cardiomyopathy.

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Patients who provided written informed consent.

Exclusion Criteria

Significant coronary artery disease (>50% stenosis on coronary angiography or prior myocardial infarction).
Contraindications to MRI (e.g., non-MRI compatible pacemakers, cochlear implants, metallic foreign bodies).
Known hypersensitivity to gadolinium-based contrast agents.
Severe renal dysfunction (eGFR <30 mL/min/1.73 m²).
Other cardiomyopathies (hypertrophic, restrictive, arrhythmogenic right ventricular cardiomyopathy).
Poor image quality precluded adequate analysis.

Clinical Evaluation

Detailed clinical data were recorded, including:
Age and gender
Presenting symptoms (dyspnea, chest pain, palpitations, syncope)
New York Heart Association (NYHA) functional class
Risk factors and comorbidities (hypertension, diabetes mellitus, alcohol intake)
Relevant laboratory and echocardiographic findings

Cardiac MRI Protocol

Cardiac MRI was performed using a 1.5T / 3T MRI scanner with a dedicated cardiac coil. Imaging was acquired with electrocardiographic gating and breath-hold techniques.
MRI sequences included:
Cine balanced steady-state free precession (bSSFP) sequences in standard long-axis and short-axis planes for ventricular function.
T1-weighted and T2-weighted sequences as required.
Late gadolinium enhancement (LGE) imaging was performed 10–15 minutes after intravenous administration of gadolinium-based contrast (0.1–0.2 mmol/kg).

Image Analysis

MRI images were analyzed on a dedicated workstation.
Parameters assessed included:
Left ventricular end-diastolic volume (LVEDV)
Left ventricular end-systolic volume (LVESV)
Left ventricular ejection fraction (LVEF)
Myocardial mass
Presence, pattern, and extent of late gadolinium enhancement (mid-wall, subepicardial, patchy)
LGE was assessed visually and semi-quantitatively. Patients were categorized based on the presence or absence of myocardial fibrosis.

Outcome Measures

Clinical outcomes were assessed during the study period and/or follow-up, including:
Heart failure progression or hospitalization
Occurrence of ventricular arrhythmias
All-cause mortality

Bias

Several measures were adopted to minimize potential sources of bias. Selection bias was reduced by enrolling consecutive patients who fulfilled the eligibility criteria during the study period. Clear inclusion and exclusion criteria were used to ensure a uniform study population and to avoid the inclusion of patients with ischemic cardiomyopathy or other cardiomyopathy subtypes that could confound interpretation. Information bias was minimized by using a standardized case record form for the collection of demographic, clinical, and outcome data. Measurement bias was addressed by performing cardiac MRI using a predefined imaging protocol and analyzing all scans on a dedicated workstation using uniform parameters. To reduce observer-related variability, image interpretation was based on established cardiac MRI criteria for ventricular function and late gadolinium enhancement patterns. Confounding was further limited by excluding major alternative causes of left ventricular dysfunction, such as significant coronary artery disease and other structural cardiomyopathies. Despite these precautions, the possibility of residual confounding and referral bias inherent to a single-center hospital-based observational study cannot be completely excluded.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Continuous variables were expressed as mean ± standard deviation, and categorical variables were expressed as frequencies and percentages. For group-wise comparisons, Student's t-test was used for continuous variables, and the Chi-square test was used for categorical variables. Fisher's exact test was used when the expected frequency in any cell was less than 5. Correlation analysis for continuous MRI-derived parameters and clinical variables was performed using Pearson's or Spearman's correlation coefficient, as appropriate. A p-value <0.05 was considered statistically significant.

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Ethical Considerations

The study was approved by the Institutional Ethics Committee, Konaseema Institute of Medical Science, Amalapuram, Andhra Pradesh, India. Written informed consent was obtained from all participants before inclusion in the study. Patient confidentiality was maintained throughout.

Result

Study Population and Clinical Characteristics

A total of 100 patients with dilated cardiomyopathy and left ventricular systolic dysfunction were included in the study. The mean age was 52.6 ± 11.4 years, with a male predominance (68%). Dyspnea was the most common presenting symptom. Most patients belonged to the NYHA functional class III or IV, indicating advanced disease at presentation.

Table 1 summarizes the demographic and clinical characteristics of the study population.

Variable	Number / Mean ± SD	Percentage (%)
Age (years)	52.6 ± 11.4	—
Male	68	68
Female	32	32
Dyspnea	82	82
Fatigue	64	64
Palpitations	29	29
Syncope	12	12
Hypertension	46	46
Diabetes mellitus	38	38
NYHA Class III–IV	78	78

Cardiac MRI Functional Assessment

Cardiac MRI demonstrated left ventricular dilatation in all patients. The mean left ventricular end-diastolic volume was 198.4 ± 36.2 mL, and the mean left ventricular end-systolic volume was 143.7 ± 32.8 mL. The mean left ventricular ejection fraction measured on MRI was 29.8 ± 6.5%.
Details of MRI-derived functional parameters are shown in Table 2.

Table 2: Cardiac MRI Functional Parameters

Parameter	Mean ± SD
LVEDV (mL)	198.4 ± 36.2
LVESV (mL)	143.7 ± 32.8
LVEF (%)	29.8 ± 6.5

Myocardial Fibrosis on Cardiac MRI

Late gadolinium enhancement (LGE), indicative of myocardial fibrosis, was detected in 62 patients (62%), while 38 patients (38%) showed no LGE. Among LGE-positive patients, mid-wall fibrosis was the most frequent pattern, followed by patchy and subepicardial patterns.
The distribution of LGE and fibrosis patterns is presented in Table 3.

Table 3: Distribution and Pattern of Late Gadolinium Enhancement

LGE Status / Pattern	Number	Percentage (%)
LGE present	62	62
LGE absent	38	38
Mid-wall fibrosis	41	66.1
Patchy fibrosis	13	21.0
Subepicardial fibrosis	8	12.9

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Association of Cardiac MRI Findings with Clinical Outcomes

Patients with LGE had significantly lower left ventricular ejection fraction compared to those without LGE (27.4 ± 5.8% vs 33.5 ± 6.1%, p < 0.001). Adverse clinical outcomes were more common in the LGE-positive group, including heart failure hospitalization, ventricular arrhythmias, and mortality.

The association between LGE and clinical outcomes is shown in Table 4.

Table 4: Association of Late Gadolinium Enhancement with Clinical Outcomes

Outcome	LGE Present (n=62)	LGE Absent (n=38)	Statistical test	p-value
Mean LVEF (%)	27.4 ± 5.8	33.5 ± 6.1	Student's t-test	<0.001
HF hospitalization	33 (53.2%)	9 (23.7%)	Chi-square test	<0.001
Ventricular arrhythmias	21 (33.9%)	5 (13.2%)	Chi-square test	0.02
Mortality	11 (17.7%)	3 (7.9%)	Chi-square test*	—

Patients with LGE had significantly lower left ventricular ejection fraction compared with those without LGE [27.4 ± 5.8% vs 33.5 ± 6.1%; p < 0.001] on Student's t-test. Among categorical outcomes, heart failure hospitalization was significantly more frequent in the LGE-positive group than in the LGE-negative group [33/62, 53.2% vs 9/38, 23.7%], with a significant Chi-square association [χ^2 = 8.44, p = 0.004]. Ventricular arrhythmias were also significantly more common in patients with LGE [21/62, 33.9%] than in those without LGE [5/38, 13.2%], and this difference was statistically significant [χ^2 = 5.25, p = 0.022]. Mortality was higher in the LGE-positive group [11/62, 17.7%] than in the LGE-negative group [3/38, 7.9%], but the association was not statistically significant [χ^2 = 1.90, p = 0.168].

DISCUSSION

Dilated cardiomyopathy (DCM) with left ventricular systolic dysfunction is a significant cause of morbidity and mortality due to progressive heart failure, arrhythmias, and sudden cardiac death. Accurate assessment of myocardial structure and function is essential for risk stratification and management. In this study, cardiac magnetic resonance imaging (CMR) was used to evaluate ventricular function and detect myocardial fibrosis using late gadolinium enhancement (LGE), and its association with clinical characteristics and outcomes was analyzed.

Demographics and Clinical Profile

In the present cohort, the mean age was 52.6 ± 11.4 years, and males constituted 68% of the study population. This demographic profile suggests that dilated cardiomyopathy with left ventricular systolic dysfunction predominantly affects middle-aged adults during a clinically important phase of life, thereby imposing a substantial functional and socioeconomic burden. The predominance of men in this study is comparable to observations from previous non-ischemic DCM cohorts and may reflect sex-related differences in disease susceptibility, exposure to risk factors, referral patterns, or health-seeking behavior [9,10]. Notably, 78% of patients were in NYHA class III–IV at presentation, indicating that a large proportion had already progressed to advanced symptomatic heart failure by the time of evaluation. This pattern supports the view that DCM often remains clinically silent or nonspecific in its early stages and is detected only after significant ventricular remodeling and functional deterioration have occurred [9,10]. Dyspnea was the most frequent presenting symptom, followed by fatigue and palpitations, whereas syncope was less common. These findings are clinically plausible because progressive systolic dysfunction typically first manifests as exertional breathlessness and reduced exercise tolerance, while syncope tends to occur later and may reflect more severe electrical instability or hemodynamic compromise [11].

Cardiac MRI Functional Assessment

Cardiac magnetic resonance imaging enabled the precise quantification of ventricular volumes and systolic performance in this study. The mean LVEF of 29.8 ± 6.5% indicates moderate-to-severe impairment of left ventricular systolic function, consistent with advanced myocardial dysfunction in the enrolled population. This finding reinforces the value of CMR as a robust imaging modality in DCM, particularly because accurate measurement of ventricular size and function is essential for diagnosis,

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severity assessment, therapeutic planning, and prognostic stratification. In patients with markedly dilated ventricles, echocardiography may be limited by geometric assumptions and interobserver variability, whereas CMR offers superior reproducibility and volumetric accuracy [12,13]. Therefore, the use of CMR in the present study not only strengthened phenotypic characterization of the disease but also provided a more reliable framework for correlating structural abnormalities with clinical outcomes.

Myocardial Fibrosis Detected by LGE

Myocardial fibrosis, as detected by late gadolinium enhancement, was present in 62% of patients, with a mid-wall pattern being the most frequent. This prevalence lies within the range reported in prior studies of non-ischemic DCM and underscores the high burden of replacement fibrosis in patients with established systolic dysfunction. The predominance of mid-wall enhancement is particularly important because it represents a characteristic non-ischemic pattern and helps differentiate DCM from ischemic cardiomyopathy, where fibrosis typically involves the subendocardial or transmural distribution corresponding to coronary territories. Pathophysiologically, this pattern likely reflects chronic myocardial injury, inflammation, myocyte loss, and reparative collagen deposition occurring during adverse remodeling. Thus, the observed fibrosis is not merely an imaging abnormality but a marker of underlying structural disease progression, mechanical inefficiency, and arrhythmogenic vulnerability. The presence of patchy and subepicardial fibrosis in a smaller subset also highlights the heterogeneity of myocardial injury in DCM and may reflect differences in etiology, disease chronicity, or myocardial remodeling pathways.

Association with Functional Parameters and Clinical Severity

Patients with LGE had significantly lower LVEF than those without LGE [27.4 ± 5.8% vs 33.5 ± 6.1%, $p < 0.001$], indicating a clear association between myocardial fibrosis and worsening systolic performance. This finding suggests that fibrosis is not simply an incidental feature but a structural correlate of advanced myocardial damage and impaired contractility. Fibrotic replacement reduces the amount of functional myocardium, disrupts coordinated contraction, and contributes to progressive ventricular dysfunction. In addition, LGE-positive patients were more likely to belong to NYHA class III–IV, supporting the clinical relevance of fibrosis in determining symptom burden and functional limitation. Taken together, these results indicate that myocardial fibrosis identified on CMR reflects both anatomical disease severity and clinical decompensation. This interpretation is in agreement with earlier studies demonstrating that the presence and extent of LGE correlate with impaired systolic function and more advanced heart failure status in DCM [13].

Prognostic Significance

An important finding of the present study is that myocardial fibrosis was associated with a higher frequency of adverse clinical outcomes. Heart failure hospitalizations were substantially more common in LGE-positive patients than in LGE-negative patients, and ventricular arrhythmias also occurred more frequently in the fibrosis group. Mortality was numerically higher among patients with LGE as well. These findings indicate that the presence of fibrosis identifies a subgroup with a more unstable disease course and worse short-term clinical trajectory. From a mechanistic standpoint, fibrosis contributes to mechanical dysfunction by impairing contractile reserve and promoting adverse remodeling, while at the same time creating regions of conduction heterogeneity that facilitate re-entry and ventricular arrhythmogenesis. Therefore, LGE appears to serve as both a marker of structural myocardial injury and a clinically meaningful prognostic biomarker. The present results are consistent with prior literature showing that LGE is an independent predictor of ventricular arrhythmias, sudden cardiac death, progression of heart failure, and all-cause mortality in patients with DCM. These observations support the role of CMR-based tissue characterization in risk stratification and in identifying patients who may require closer surveillance and more aggressive therapeutic intervention.

Generalizability

The findings of this study are broadly applicable to adult patients with non-ischemic dilated cardiomyopathy and left ventricular systolic dysfunction managed in tertiary care settings. The demographic profile, clinical presentation, and prevalence of myocardial fibrosis observed are comparable to those reported in other regional and international cohorts. Use of standardized cardiac MRI protocols enhances external validity. However, extrapolation to community-based populations, early-stage disease, pediatric patients, or centers without access to advanced CMR techniques should be undertaken with caution.

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Conclusion

This study underscores the pivotal role of cardiac magnetic resonance imaging in the comprehensive evaluation of patients with dilated cardiomyopathy and left ventricular systolic dysfunction. Cardiac MRI enables precise assessment of ventricular volumes and systolic performance while uniquely providing myocardial tissue characterization through late gadolinium enhancement. A substantial proportion of patients demonstrated myocardial fibrosis, predominantly with a mid-wall pattern, which was strongly associated with reduced left ventricular ejection fraction, advanced NYHA functional class, and a higher incidence of adverse outcomes, including heart failure hospitalizations, ventricular arrhythmias, and mortality. These findings emphasize the incremental prognostic value of cardiac MRI beyond conventional modalities, supporting its routine use for risk stratification and optimized clinical management.

Strengths and Limitations

The study's strengths include the use of standardized CMR protocols and prospective clinical follow-up. Limitations include the single-center design, modest sample size, and lack of long-term follow-up beyond the study period. Diffuse fibrosis not detectable by conventional LGE imaging may have been missed, as T1 mapping and extracellular volume quantification were not performed. Despite these limitations, the study highlights the significant role of CMR in evaluating myocardial fibrosis and prognostication in DCM.

Recommendations

Based on the study findings, routine incorporation of cardiac magnetic resonance imaging with late gadolinium enhancement should be encouraged in the evaluation of patients with dilated cardiomyopathy and left ventricular systolic dysfunction. Identification of myocardial fibrosis can aid early risk stratification and help recognize patients at higher risk for adverse outcomes. LGE-positive patients may benefit from closer clinical surveillance, optimization of guideline-directed medical therapy, and timely referral for advanced interventions such as an implantable cardioverter-defibrillator or cardiac resynchronization therapy when indicated. Future studies with larger, multicenter cohorts and longer follow-up, including advanced CMR techniques like T1 mapping, are recommended to further refine prognostic assessment and management strategies.

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Abbreviations

DCM – Dilated cardiomyopathy
LV – Left ventricle
LVEF – Left ventricular ejection fraction
CMR – Cardiac magnetic resonance imaging
LGE – Late gadolinium enhancement
LVEDV – Left ventricular end-diastolic volume
LVESV – Left ventricular end-systolic volume
NYHA – New York Heart Association
HF – Heart failure
MRI – Magnetic resonance imaging
ICD – Implantable cardioverter-defibrillator
ECG – Electrocardiogram
eGFR – Estimated glomerular filtration rate

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

PSN-Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.BK-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript, revision of the manuscript.RD-Review of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation.AA-Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript

Data availability

Data available on request

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Dr. Roja Dwarampudi is an Assistant Professor in the Department of Radiology at Konaseema Institute of Medical Sciences, Amalapuram. Her professional interests encompass diagnostic radiology, MRI interpretation, and radiological correlation with clinical outcomes. She is engaged in teaching, clinical service, and collaborative research activities within the department.

Dr. Anand Acharya, MBBS, MD (Pharmacology), currently serves as Dean and Professor, Department of Pharmacology, at the Konaseema Institute of Medical Sciences & Research Foundation (KIMS&RF), Amalapuram, Andhra Pradesh, India. A distinguished academician, researcher, and medical education leader, he has been pivotal in transforming KIMS&RF from its formative phase into a premier medical institution with over 200 undergraduate and 100 postgraduate seats.

With more than 18 years of teaching and administrative experience, Dr. Acharya has held several leadership positions, including Vice Principal, Principal, Chief Warden, Member Secretary of Institutional Ethics and Animal Ethics Committees, and is an approved PhD Guide under Dr. NTR University of Health Sciences, Vijayawada. His visionary leadership has significantly enhanced the institution's academic quality, clinical exposure, research infrastructure, and postgraduate training standards.

He has completed prestigious national faculty development programs such as the Revised Basic Course Workshop (rBCW), Advanced Course in Medical Education (ACME), and National Teacher Training Course (NTTC, JIPMER, Puducherry). He also serves as Coordinator for Pharmacovigilance and Materiovigilance Programs under IPC–PvPI and MoHFW, Government of India, contributing actively to national drug safety and regulatory initiatives.

A prolific academician, Dr. Acharya has authored and co-authored more than 100 scientific publications in reputed national and international indexed journals. His wide-ranging research covers toxicology, pharmacovigilance, antimicrobial resistance, endocrinology, neuropharmacology, and clinical pharmacology. His recent studies include long-term analyses of pyrethroid, paraquat, and chlorpyrifos poisoning, investigations into antimicrobial resistance trends, and predictive models for treatment outcomes in dermatological and toxicological emergencies.

Dr. Acharya's professional interests include clinical pharmacology, toxicovigilance, rational drug use, pharmacovigilance systems, and innovations in medical education technologies. He continues to mentor numerous postgraduate and undergraduate researchers while playing an integral role in curriculum reform, ethics governance, and institutional academic advancement.ORCID iD: https://orcid.org/0009-0000-7967-9092

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