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PREDICTORS OF MEDICATION ADHERENCE AMONG CARDIOVASCULAR PATIENTS IN A TERTIARY CARE HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY REVIEW

G.SAJITH KISHAN¹ , NAGA SUBRAHMANYAM S^{*2} , GUTALA SRI DATTA VENKATESH³ , PADMAJA EJJINENI³ , MANDHAPATI VEERA LAKSHMI³ , SEELAM SRI RAMYA VATHI³ 

¹Consultant Interventional Cardiologist, Department of Cardiology, Apollo Hospital, Kakinada, Andhra Pradesh, India.

²Associate Professor, Department of Pharmacy Practice, Koringa College of Pharmacy, Kakinada

³Pharm D Scholar, Department of Pharmacy Practice, Koringa College of Pharmacy, Koringa, Kakinada, Andhra Pradesh, India.

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***Corresponding author**

Dr. Naga Subrahmanyam S

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ABSTRACT

Background: Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide. Medication adherence plays a crucial role in achieving optimal therapeutic outcomes in cardiovascular patients.

Objective: To review current evidence regarding predictors of medication adherence among cardiovascular patients in tertiary care settings.

Methods: A comprehensive review of recent literature focusing on prospective observational studies, systematic reviews, and cross-sectional studies evaluating predictors of medication adherence in CVD populations.

Results: Medication adherence is influenced by socio-demographic, disease-related, therapy-related, psychological, behavioral, and healthcare system factors. Tools such as MARS, and pharmacy refill records are widely used to assess adherence. Polypharmacy, depression, low health literacy, and poor patient-provider communication were consistently associated with poor adherence.

Conclusion: Identifying predictors of medication adherence enables targeted interventions, improves clinical outcomes, and reduces healthcare burden in cardiovascular patients.

Keywords: Medication adherence; Cardiovascular disease; Predictors; Prospective observational study; Tertiary care hospital.

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INTRODUCTION

Cardiovascular diseases (CVDs), including hypertension, coronary artery disease, heart failure, and stroke, represent a major public health challenge. According to the World Health Organization, cardiovascular diseases account for nearly 20 million deaths annually, making them the leading cause of global mortality [1].

Pharmacological therapy is central to the management of cardiovascular conditions. Medications such as antihypertensives, antiplatelets, beta-blockers, statins, and anticoagulants significantly reduce morbidity and

mortality. However, the effectiveness of these therapies largely depends on patient adherence [2].

Medication adherence is defined as the extent to which a patient's behavior corresponds with agreed recommendations from a healthcare provider. Poor adherence contributes to treatment failure, disease progression, increased hospitalizations, and higher healthcare costs [3].

Prospective observational studies conducted in tertiary care hospitals offer real-world insights into adherence patterns and allow identification of modifiable and non-modifiable predictors [4,5].

BURDEN OF CARDIOVASCULAR DISEASES

Cardiovascular diseases (CVDs) are the leading cause of mortality and morbidity in India, imposing a substantial public health and economic burden. According to the latest Sample Registration Survey (SRS) report (2021–2023) from the Registrar General of India, CVDs account for nearly 31 % of all deaths in the country, making them the single largest cause of mortality among all disease groups.

A recent comprehensive report shows India bears a disproportionate share of the global cardiac burden, contributing to almost 20 % of all heart attack deaths worldwide. The country's cardiovascular mortality rate is approximately 272 per 100 000 population, which is higher than the global average of 235 per 100 000 [6].

Estimates from systematic reviews and meta-analyses suggest the pooled prevalence of cardiovascular disease in the Indian adult population is about 11 % (with slightly higher rates in urban areas compared to rural areas). Furthermore, among adults aged 45 years and above, CVD prevalence has been reported around 5.2 %, emphasizing the rising burden in older age groups.

Cardiovascular disease also significantly contributes to premature mortality, with an estimated 60 % of CVD-related deaths occurring before the age of 70 years. This early onset places a heavy socioeconomic strain on families and the healthcare system by affecting the productive workforce. Moreover, regional data from states like Telangana indicate that nearly 42 % of medically certified deaths are attributable to diseases of the circulatory system, highlighting the burden at subnational levels.

Risk factors such as hypertension, diabetes mellitus, obesity, and tobacco use are highly prevalent in India, contributing significantly to the cardiovascular disease burden. For example, age-standardized CVD incidence is high, and hypertension prevalence among adults is estimated to be around 30 %–31 %.

These statistics underscore that CVD has become a major public health crisis in India, necessitating urgent strategies focused on prevention, early diagnosis, treatment initiation, and chronic disease management, including improved medication adherence among affected populations [7,8].

CONCEPT OF MEDICATION ADHERENCE

Medication adherence is a fundamental component of effective management of chronic diseases, particularly cardiovascular diseases (CVDs), which require long-term pharmacotherapy. Medication adherence refers to the extent to which a patient's medication-taking behavior corresponds with prescribed recommendations from healthcare providers. According to the World Health Organization, adherence includes taking medications correctly as prescribed along with recommended lifestyle modifications.

Medication adherence is especially important in India, where cardiovascular diseases and hypertension are

highly prevalent and require lifelong treatment. However, several studies indicate that adherence to cardiovascular medications remains suboptimal, contributing to poor disease control and increased complications [8].

MEDICATION ADHERENCE PATTERNS IN INDIA [9,10]

Recent epidemiological studies highlight the magnitude of medication non-adherence in India:

A systematic review reported that the pooled adherence rate to antihypertensive medications in India was only about 15.8 %, indicating very low adherence among patients. Another large meta-analysis involving more than 18,000 hypertensive patients found that approximately 48 % of patients were non-adherent to antihypertensive therapy.

Non-adherence was found to be higher in:

- Rural populations
- Patients with low education
- Patients with low socioeconomic status
- Patients receiving multiple medications

These findings indicate that medication adherence is a major public health concern in India and directly influences cardiovascular outcomes.

Adherence to Cardiovascular Medications in Indian Settings

Hospital-based studies in India also demonstrate low adherence rates among cardiovascular patients. Observational research conducted in tertiary care settings reported adherence levels ranging from approximately:

- 20.8 % in hypertension patients
- 28.3 % in congestive heart failure
- 32 % in ischemic heart disease patients

THERAPY-RELATED PREDICTORS

Treatment-related factors significantly influence medication adherence.

Polypharmacy

Cardiovascular patients frequently receive multiple medications such as:

- Antihypertensives
- Antiplatelets
- Statins
- Beta-blockers
- Polypharmacy increases:
- Pill burden
- Confusion
- Risk of missed doses [11]

DOSING FREQUENCY

Medications requiring multiple daily doses show lower adherence compared to once-daily regimens.

Simplified regimens improve adherence [12-13].

Side Effects

Adverse drug reactions are a major reason for medication discontinuation. Common examples include:

- Dizziness
- Fatigue
- Cough from ACE inhibitors
- Gastric irritation

Duration of Therapy

Long-term therapy reduces adherence over time.

Many cardiovascular patients discontinue medication once symptoms improve [14].

Medication adherence research in India has increased in recent years.

- Studies conducted in Indian tertiary care hospitals indicate that medication adherence among cardiovascular patients remains suboptimal. Research conducted among hypertensive patients reported that approximately 40%–60% of patients were non-adherent to antihypertensive therapy.
- Another hospital-based study reported low adherence among coronary artery disease patients.
- Financial constraints were identified as one of the major predictors of non-adherence.
- Many patients discontinued medications due to cost.
- Low health literacy was also identified as a major predictor.
- Patients with poor understanding of disease often showed poor adherence.
- Several Indian studies reported that polypharmacy is common among cardiovascular patients.
- Patients receiving multiple medications often demonstrate poor adherence.
- Distance from healthcare facilities was also identified as a predictor.
- Patients living in rural areas often miss follow-up visits [15-18].

ROLE OF CLINICAL PHARMACIST IN ADHERENCE STUDIES

Clinical pharmacists play an important role in improving medication adherence. Studies have shown that pharmacist-led interventions improve adherence.

These interventions include:

- Patient counseling
- Medication review
- Follow-up monitoring

Patients receiving pharmacist counseling demonstrate better adherence compared to usual care. Medication therapy management programs have also shown positive results [19].

CONCLUSION

Medication adherence is a critical determinant of successful treatment outcomes in patients with cardiovascular diseases. Poor adherence to prescribed therapy remains a major barrier to effective disease control, leading to increased morbidity, mortality, and healthcare costs worldwide. In developing countries such as India, the burden of cardiovascular diseases is

rising rapidly, making medication adherence an essential component of long-term disease management.

This review highlights that medication adherence is influenced by a complex interaction of patient-related, therapy-related, disease-related, healthcare system-related, and socioeconomic factors. Common predictors of poor adherence among cardiovascular patients include advanced age, low educational status, polypharmacy, poor knowledge about disease, high medication costs, and lack of family or social support. Psychological factors such as depression and anxiety also play an important role in influencing adherence behavior.

Evidence from previous studies indicates that adherence rates among cardiovascular patients are often suboptimal, particularly in tertiary care settings where patients frequently require long-term multidrug therapy. The use of standardized adherence assessment tools, patient education programs, counseling services, and regular follow-up has been shown to improve adherence levels and clinical outcomes.

Healthcare professionals, especially clinical pharmacists, play a vital role in improving medication adherence through patient counseling, medication review, and identification of adherence barriers. Implementation of structured adherence programs in tertiary care hospitals can significantly enhance treatment effectiveness and reduce cardiovascular complications.

This prospective observational study is expected to provide valuable insights into the predictors of medication adherence among cardiovascular patients in a tertiary care hospital setting. The findings may help in identifying high-risk patients and developing targeted interventions to improve adherence and overall patient outcomes.

In conclusion, improving medication adherence is essential for the effective management of cardiovascular diseases. Identification of adherence predictors and implementation of appropriate intervention strategies can contribute to better disease control, reduced hospitalization rates, and improved quality of life among cardiovascular patients. Future research should focus on developing cost-effective and patient-centered adherence strategies suitable for resource-limited settings.

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All authors are contributed equally.

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