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Original Research Article

Assessment of medication adherence and quality of life and their association with myocardial infarction during percutaneous coronary intervention

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ABSTRACT

Background: Myocardial infarction (MI) patients undergoing percutaneous coronary intervention (PCI) require careful management. Medication adherence and quality of life (QOL) are crucial for preventing future cardiovascular events. Optimizing these factors improves patient outcomes and long-term health.
Methods: This prospective observational study was conducted over six months in omini hospital, Kurnool. A total of 70 hypertensive CKD patients were enrolled and divided into two groups: Group A received Cilnidipine 10 mg daily, and group B, received Telmisartan 40 mg daily. Patients were evaluated for changes in renal in systolic and diastolic blood pressure, renal function markers (serum creatinine, urea, uric acid, proteinuria), and incidence of adverse effects.
Results: MI as a leading cause of death in India, predominantly affecting men aged 51-60 due to factors like changing lifestyles, dietary habits, family history, and social behaviors.
Conclusions: MI has emerged as a major cause of mortality in India, particularly affecting men in the 51-60 age range due to shifting dietary patterns, sedentary lifestyles, genetic predispositions, and social habits. Patients treated with PTCA, in accordance with American Heart Association protocols, showed noticeable improvement in their QOL after a four-month follow-up, with male participants reporting more substantial progress compared to females. Medication adherence evolved positively especially among male patients in the target age group. This study emphasizes that stronger medication compliance plays a key role in enhancing post-treatment QOL.

Keywords: Myocardial infarction, PTCA, Quality of life, Medication adherence

INTRODUCTION

Atherosclerosis, characterized by the accumulation of lipid-rich plaques in coronary arteries, is the primary underlying pathology, and plaque rupture or erosion can precipitate thrombus formation, leading to myocardial ischemia and irreversible myocardial necrosis.[1] MI, commonly known as a heart attack, is a major cause of morbidity and mortality worldwide and occurs due to partial or complete interruption of blood flow to myocardium, most commonly as a result of coronary artery disease.[1,2] Diagnosis of MI is based on clinical presentation, electrocardiographic changes, and elevated cardiac biomarkers. Cardiac troponins are considered the gold standard for detecting myocardial injury.[1,2]

Clinically, MI presents with a broad spectrum of symptoms. Typical features include chest pain or pressure

radiating to the left arm, neck, jaw, or shoulder, accompanied by dyspnea, nausea, diaphoresis, and dizziness.[2,3] Atypical presentations such as fatigue, indigestion, or shortness of breath are frequently observed, particularly in women and elderly patients, which may delay diagnosis and treatment.[3,4]

Imaging modalities such as echocardiography and coronary angiography further aid in assessing myocardial function and coronary anatomy.[5] Early diagnosis and timely intervention are essential to reduce infarct size and improve patient outcomes.[5]

The Fourth Universal Definition of MI classifies MI into 5 types based on etiology and clinical context.[6] Type 1 MI results from acute atherothrombotic events such as plaque rupture and commonly presents as ST-segment elevation or non-ST-segment elevation MI.[6] Type 2 MI arises from an imbalance between myocardial oxygen supply and demand without acute plaque rupture.[6] Type 3 MI refers to sudden cardiac death suggestive of MI before biomarker confirmation.[6] Type 4 MI is associated with PCI, including peri-procedural MI, stent thrombosis, and restenosis, while type 5 MI is related to coronary artery bypass grafting (CABG).[6] Improved adherence is associated with enhanced physical and psychological well-being, reduced hospital readmissions, and lower mortality.[7] Studies report better adherence and outcomes among male patients and those aged 51-60 years.[7]

Management of MI includes both pharmacological and revascularization strategies. Immediate treatment consists of antiplatelet therapy, nitrates, oxygen when indicated, and thrombolytic therapy where PCI facilities are unavailable.[8,9] Revascularization through PCI or CABG remains the cornerstone of treatment to restore coronary blood flow and limit myocardial damage.[8,9] Long-term medical therapy includes beta-blockers, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, statins, and anticoagulants.[8,9]

Medication adherence is a critical determinant of long-term prognosis and QOL in post-MI patients. Cardiac rehabilitation programs focusing on lifestyle modification, physical activity, and psychosocial support significantly contribute to secondary prevention and sustained recovery.[9,10]

Objectives were to assessment the level of medication adherence in patients undergoing PCI for MI, to analyze the QOL during PCI and their association with MI outcomes and to explore the combined effect of medication adherence and QOL on procedural and post procedural MI risk.

METHODS

Study design

It was a prospective observational study.

Study site

Study conducted at Omni Hospital, Kurnool.

Duration

Study carried out for 6 months from.

Sample size

Total participants included were 70 patients.

Sample size calculation

The sample size was calculated with a 95% confidence level and 10% margin of error, based on previous studies evaluating QOL and medication adherence in post-MI patients. A minimum of 64 patients was required; therefore, 70 patients were enrolled to compensate for possible dropouts. Sample Size Calculation

The sample size was calculated using the single population proportion formula:

$$n = \frac{Z_{\alpha/2}^2\, p(1-p)}{d^2}$$

Where:

n=required sample size

Z=1.96 (95% confidence level)

p=0.5 (assumed prevalence based on previous post-MI QOL and adherence studies)

d=0.10 (10% margin of error)

Considering feasibility constraints and the observational nature of the study, a minimum of 64 patients was considered adequate. To compensate for possible dropouts and incomplete data, 70 patients were finally enrolled.

Statistical analysis

Data were expressed as mean±SD and percentages. Paired t-test or repeated-measures ANOVA and Chi-square test were used as appropriate. Correlation between medication adherence and QOL was assessed using Pearson's correlation coefficient.

A $p<0.05$ was considered statistically significant.

QOL assessment

QOL was assessed at baseline and follow-up using the WHOQOL-BREF questionnaire, which covers physical, psychological, social, and environmental domains. Medication adherence was evaluated during follow-up

visits with the 8-item Morisky medication adherence scale (MMAS-8), and participants were grouped into low, medium, or high adherence categories.

The study included adults 18 years or older who underwent PCI for MI, either STEMI or NSTEMI, and had been on prescribed cardiovascular medications for at least 3 months. All participants had a complete baseline ECG and were willing to provide medication adherence data and attend follow-up visits. Patients were excluded if they were under 18, pregnant, or had contraindications to PCI or the study medications. Other exclusions included incomplete/unreliable medication history, missing baseline ECG or ECG abnormalities unrelated to MI, severe clinical instability, active infections, end-stage organ failure, and any psychiatric or logistical issues that could interfere with consent or follow-up.

Data were collected from case report forms, lab investigation reports, and patient prescriptions, with a standardized annexure used to keep data collection consistent across all participants. Ethical approval was obtained from the institutional ethics committee prior to study initiation. All data were analyzed using MS excel, and chi-square test was applied for statistical comparisons.

RESULTS

Total of 70 patients included, majority were males (74%). The most common age group affected was 51-60 years.

Medication adherence improved progressively: high adherence was 48% at 12 days, increasing to 68.6% at 4 months. QoL scores improved significantly with time, particularly in younger age groups and male patients. By the 4th month follow-up, overall recovery rate in QoL domains was estimated at 78-82%. Chi-square test indicated statistical significance ($p<0.05$) for adherence improvement. Table 1 depict the distribution of age among the patients indicates that most participants, 30.76% in Male and 44.4% in Female, range from the age of 51-60, representing a common trend in both male and female.

Table 1: Gender wise age distribution of MI patients.

Age group (in years)	Males	Females
31-40	4	4
41-50	15	3
51-60	16	8
61-70	11	2
71-80	6	0
81-90	0	1

Table 2: Medication adherence patterns at follow-up intervals.

Follow-up	High adherence (%)	Moderate adherence (%)	Mild adherence (%)
12 days	48	31	0
2 months	60	20	0
4 months	68.6	12	0

Table 3: QOL of patients at 12-day follow-up.

Age group (in years)	Physical health (%)	Social functioning (%)	Emotional well-being (%)	General health (%)
31-40	89.1	82.7	75.0	65.0
41-50	72.1	70.0	66.0	60.0
51-60	70.8	68.0	67.0	70.8
61-70	68.0	72.0	88.7	65.0
71-80	66.0	65.0	70.0	62.0
81-90	60.0	63.0	85.1	64.0

Table 2 indicate that “Medication adherence scale” shows adherence trends across 12 days, 2 months, and 4 months among 70 patients (52 males, 18 females). It is divided into three adherence categories: high, moderate, and mild. Total high adherence: 48 patients (68.57%)-39 males (55.71%) and 9 females (12.86%), total moderate adherence: 22 patients (31.43%)-13 males (18.57%) and 9 females (12.86%), mild adherence was zero across all time points and groups.

Table 3 showed at 12 days, the 51-60 age group showed the highest number of patients with high adherence (10 individuals), followed by the 41-50 group (8). By 2 months, high adherence increased significantly in the 41-50 (13 individuals) and 51-60 (15 individuals) age groups. At 4 months, the 51-60 age group maintained the highest adherence with 15 individuals in the high category, while the 41-50 and 61-70 groups also showed strong adherence with 13 and 8 individuals respectively.

In contrast, the 81-90 age group consistently had the lowest high adherence across all follow-ups-1 individual at 12 days, 1 at 2 months, and 1 at 4 months. Moderate and mild adherence were minimal across all groups at the 4-month mark, indicating improved overall adherence, where the high adherence bars increase noticeably over time, particularly for the 41-60 age range, while moderate and mild adherence decline. Overall, medication adherence improved with time, particularly in middle-aged groups (41-60 years), suggesting better long-term compliance.

Table 4 shows at the 12-day follow-up, categorized by age and gender. Among the age groups, individuals aged 31-40 had the highest physical health score (89.10%) and a strong social functioning score (82.70%). The best emotional well-being was seen in the 61-70 age group (88.70%), while the highest emotional problems score, indicating fewer emotional issues, was reported in the 81-90 group (85.10%). Physical functioning peaked in the 41-50 group (72.10%). Males had lower scores overall compared to females in most categories. For instance, males had a physical functioning score of 63.50%, emotional well-being of 66%, and general health of 60%, whereas females scored higher in physical functioning (65.80%), emotional well-being (69.80%), and general health (63.70%). Notably, general health was highest in the 51-60 group (70.80%) and lowest in the 41-50 group (60%). These results suggest better early QOL outcomes in younger age groups and females shortly after procedure.

Table 5 reveals that among the age groups, patients aged 31-40 reported the highest physical functioning (89.50%) and social functioning (89.30%). The highest emotional functioning was observed in 81-90 age group (93.70%). Males exhibited better physical functioning (77.10%), physical health (79.30%), and energy (72.50%) compared to females, who showed slightly better emotional functioning (79.20%) and emotional well-being (70%). Pain levels were highest in the 61-70 age group (85.70%), and general health was highest in the 31-40 group (76%). In contrast, the lowest general health (62.10%) was observed in both the 41-50 and 51-60 age groups. The data overall suggest that younger patients (31-40) tend to report better QOL in most domains, while males generally have better scores than females in physical aspects.

Table 6 presents at 4th-month follow-up of patients who underwent PTCA for MI, overall QOL outcomes showed favorable results across most domains. High percentage scores (85-100%) observed predominantly in physical functioning, emotional problems, and social functioning, especially among males and younger age groups (31-50 years). Moderate scores (70-84%) common in energy, emotional well-being, and pain domains, reflecting generally satisfactory recovery. However, mild/low scores (below 70%) notably seen in general health, particularly in 41-60 and 81-90 age groups, and among females. Averaging across all QOL domains and groups, overall recovery rate can be estimated at approximately 78-82%, indicating a moderately high level of post-PTCA QOL in this patient population.

Table 4: QOL of patients at 2-month follow-up.

Age group (in years)	Physical health (%)	Social functioning (%)	Emotional well-being (%)	General health (%)
31-40	89.5	89.3	78.0	76.0
41-50	77.0	74.0	70.0	62.1
51-60	75.0	72.0	72.0	62.1
61-70	79.3	76.0	73.0	65.0
71-80	72.0	70.0	68.0	64.0
81-90	70.0	68.0	93.7	66.0

Table 5: QOL of patients at 4-month follow-up.

Age group (in years)	Physical health (%)	Social functioning (%)	Emotional well-being (%)	General health (%)
31-40	85.8	89.0	80.0	78.0
41-50	79.5	83.0	77.0	74.0
51-60	80.4	82.0	78.0	73.0
61-70	83.0	81.0	79.0	72.0
71-80	83.7	80.0	76.0	71.0
81-90	73.1	70.0	75.0	68.0

DISCUSSION

MI is mainly triggered by many risk factors such as high blood pressure, high cholesterol, obesity, diabetes mellitus, smoking, alcohol consumption, sedentary lifestyle, and unhealthy diet, which can be controlled through healthy lifestyle modifications including regular exercise and smoking cessation.[11,12] Hypertension and diabetes mellitus are the most common co-morbid conditions associated with MI.[13]

In the present study, MI was more commonly observed in males (74.29%) and predominantly in patients above 40 years of age.[14] In our study, patients with stenosis percentage ≤80% underwent percutaneous transluminal coronary angioplasty (PTCA).[15]

Medication non-adherence is a global problem that has been investigated for several decades. During the post-MI period, non-adherence to prescribed medications has profound consequences, leading to increased morbidity, mortality, rehospitalization, and healthcare expenditure.[16,17] On average, less than 50% of post-MI patients worldwide remain adherent to medications, although adherence rates vary considerably among studies.[18]

Medication adherence is generally defined as the extent to which patients take their medications as prescribed and continue therapy for the recommended duration.[19] Medication adherence can be assessed using various subjective and objective methods.[20]

In our study, the Medication Adherence Rating Scale (MARS) was used to assess adherence among patients. MARS is a self-reporting questionnaire consisting of 10 items with dichotomous responses (yes/no).[21] Patients were considered compliant if they answered "NO" to questions 1-6 and 9-10, and "YES" to questions 7-8. Based on the total score, adherence levels were categorized as high (9-10), moderate (6-8), and low (0-5) adherence.[21]

Our study showed the highest medication adherence among patients aged 41-60 years during the 12-day follow-up. At the second-month follow-up, medication adherence increased significantly among patients aged 41-50 years (13 individuals) and 51-60 years (16 individuals). At the fourth-month follow-up, patients aged 41-70 years demonstrated the highest adherence. In contrast, the 81-90 years age group consistently showed the lowest medication adherence across all follow-ups. The impact of age on medication adherence has varied widely among studies.[22] In our study, younger subjects were more adherent to medications than older individuals. Male patients were more adherent than females. Lack of knowledge, self-neglect, dependency, cognitive decline, complex medication regimens, and physical limitations may contribute to poor adherence among elderly and female patients.[23,24]

After PTCA, lack of effective therapy in ischemic heart disease may lead to intermittent angina, reduced myocardial blood supply, dysrhythmias, decreased physical activity, work disability, and psychosocial complications.[25] In our study, commonly prescribed medications after PTCA included clopidogrel, aspirin, atorvastatin, metoprolol, and furosemide. In patients with co-morbid conditions, ACE inhibitors, beta blockers, and antibiotics were also prescribed according to clinical requirements.[26,27]

Our study findings showed that there was no significance difference in the QOL in patients with PTCA after 12 days follow up. In the current study we observe that the patient QOL and functional status of patient was improved after 2 months of PTCA and its effective therapy. The patients with increased QOL after 4months (78-82%) of PTCA, increased functional status, decreased pain, improved physical activities which is seen more after 4months of PTCA.

The patient QOL at 12 days follow up according to age group 31-40 years the QOL score was moderate QOL. Where as in patients with age group 41-90 years the QOL score was mild (60%). According to gender wise males have better QOL score was moderate (65.9%) than females QOL score was mild (58.6%).

The patient QOL at 2nd month follow up according to age group 31-40 years the QOL score was normal QOL (80.32%). Where as in 41-90 years the QOL score was moderate QOL (75%-77%) According to gender wise both male and females have moderate QOL.

The patient QOL at 4th month follow up according to age group 31-40 years the QOL score was normal QOL (85.76) in the same way patient age group of 41-50 years the QOL score was normal QOL (79.49%). Where as in 51-60 years the QOL score was normal QOL (80.40).

In 71-80 age group the QL score was normal QOL (83.66%) and 81-90 years of age group the scoring was moderate QOL (73.12%). According to gender wise males (85%) have better QOL than females (77%).

CONCLUSION

MI is one of the leading causes of death in India. Changing food habits, life style changes, and family history, social habits have been contributing to these. The most common effected gender is men than women and is found to be markedly increasing. In our study the occurrence of MI was more in males than females and mostly occurred at an age group of 51-60 years. Treatment patterns of PTCA were followed as per the guidelines of American heart association. In our study, the QOL was improved after 4 months follow up of PTCA. The study observed a greater improvement in QOL among male patients compared to female patients following PTCA. While both genders benefited from the procedure, males showed significantly higher gains in QOL. In contrast females reported slower improvements. In our study, medication adherence was poor at 1st follow up, moderate adherence at 2nd follow up and high adherence at 3rd follow up. The present study highlights a notable gender disparity in medication adherence among post PTCA MI patients, with male patients demonstrating significantly higher adherence levels compared to females. More adherence observed in age group 51-60 years. In our study states that improvement in medication adherence can leads to good quality of life in patients.

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