

## A Study to Assess the Effectiveness of a Nurse-Led Intervention on Self-Management of Heart Disease and Compliance with Prescribed Treatment Among Post Myocardial Infarction (MI) Patients at Selected Hospitals in Durg (C.G.)

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### ABSTRACT

Incidence of myocardial infarction (MI) worldwide has increased dramatically, especially in low- and middle-income countries, and has been worsened by fast aging of the population with consequent increase in the number of co-morbidities, expenses for healthcare and readmissions to hospital. This study assessed the efficacy of a nurse-based intervention for enhancing the ability of self-management and adherence to treatment of those patients who sustained MI in the hospitals of Durg, Chhattisgarh. Quantitative experimental design (pretest – posttest) and the Middle Range Theory of Self-Care of Chronic Illness were used in this study. A total of 68 post-MI patients were recruited by purposive sampling and divided into 2 groups: experimental group (34) and control group (34). Collection of data involved demographic and clinical data as well as the Coronary Artery Disease Self-Management Scale (CSMS), which was used for evaluating the research outcomes. The intervention consisted of cardiac rehabilitation sessions, prescribed diet, and medication plan. The control cohort received standard treatment. Pre- and post-tests were conducted at 15 days. The results showed considerable improvement in the experimental group, where the average score on self-management increased from  $67.18 \pm 12.42$  to  $92.85 \pm 10.84$ . Use of a paired t-test resulted in the finding that the differences are very significant ( $t = 8.63$ ,  $p < 0.001$ ). In the post-test, most individuals reached the “excellent” level of self-management while the control group did not show any significant progress. Chi-square analysis revealed meaningful links between self-management scores obtained at the pretest and socio-demographic characteristics included in the analysis, such as education and residence, but no connection was found with any other socio-demographic or clinical characteristics. The study showed that nurse-led interventions made a significant contribution to the increase of self-management capabilities and treatment adherence in patients with MI and proved their importance in cardiac rehabilitation.

**KEYWORDS:** Myocardial infarction, Nurse- led intervention, Self-management, Treatment compliance, Coronary Artery Disease Self-Management Scale (CSMS)

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### 1. INTRODUCTION

Myocardial infarction (MI) remains a major public health concern and a leading cause of morbidity and mortality worldwide. According to the World Health Organization, cardiovascular diseases account for approximately 17.9 million deaths annually, with a substantial proportion attributed to ischemic heart disease [1]. Although mortality rates have declined in many high-income countries, the

burden of MI continues to rise in developing nations such as India, where rapid urbanization, lifestyle transitions, and population aging contribute to increasing incidence rates. In India, cardiovascular diseases account for nearly one-fourth of all deaths, with myocardial infarction affecting a significant proportion of adults, including younger age groups. Despite advances in acute cardiac care, post-MI patients frequently encounter challenges related to inadequate

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self-management, poor treatment adherence, and limited access to structured cardiac rehabilitation programs [II]. These gaps increase the risk of recurrent cardiac events, hospital readmissions, and reduced quality of life. Evidence suggests that many readmissions following MI are potentially preventable through effective secondary prevention strategies, including lifestyle modification, medication adherence, and continuous follow-up care. Nurse-led interventions have emerged as a promising approach to strengthen self-management behaviors and improve compliance with prescribed treatment. Grounded in the Middle-Range Theory of Self-Care of Chronic Illness, such interventions emphasize self-care maintenance, monitoring, and management to enhance patient autonomy and clinical outcomes. In resource-constrained settings, nurse-led models may provide a cost-effective and sustainable strategy to optimize post-MI rehabilitation and reduce the long-term burden of cardiovascular disease [III].

## 2. METHODS: STUDY DESIGN AND SETTING

A quantitative experimental study using a pre-test–post-test control group design was conducted to evaluate the effectiveness of a nurse-led intervention on self-management and treatment compliance among post–myocardial infarction (MI) patients. The study was carried out in selected hospitals of Durg, including Lalbahadur Shastri Hospital Supela, Late Pandurang Ramarao Dongaonkar District Hospital, and HI-TEK Super Specialty Hospital [IV].

### 2.1. Participants and Sampling

The target population comprised post-MI patients attending selected hospitals. Using non-probability purposive sampling, 68 eligible patients were recruited and allocated into an experimental group ( $n = 34$ ) and a control group ( $n = 34$ ). Inclusion criteria included patients diagnosed with MI

within one year, on regular treatment, able to understand Hindi or English, and willing to participate. Patients with major co-morbid conditions were excluded [V-X].

### 2.2. Intervention

The experimental group received a structured nurse-led intervention consisting of post-MI education, a diet chart, a medication compliance card, and demonstration of cardiac conditioning exercises. The control group received routine standard care. The intervention was delivered individually and lasted approximately 45 minutes per participant.

### 2.3. Data Collection Tools

Data were collected using a modified structured questionnaire comprising socio-demographic and clinical variables and the Coronary Artery Disease Self-Management Scale (CSMS). Content validity was established through expert review ( $S-CVI/Ave = 0.99$ ). Reliability testing yielded a Cronbach's alpha of 0.98. Baseline (pre-test) assessment was conducted prior to the intervention, and post-test evaluation was performed on the 15th day using the same instrument. Data were analyzed using descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, unpaired t-test, and chi-square test).

## 3. RESULTS AND DISCUSSION

### 3.1. Results

A total of 68 post–myocardial infarction (MI) patients were included, with 34 participants each in the experimental and control groups. Baseline demographic and clinical characteristics were largely comparable between groups, although hypertension was more prevalent in the experimental group (64.71%) than in the control group (29.41%).

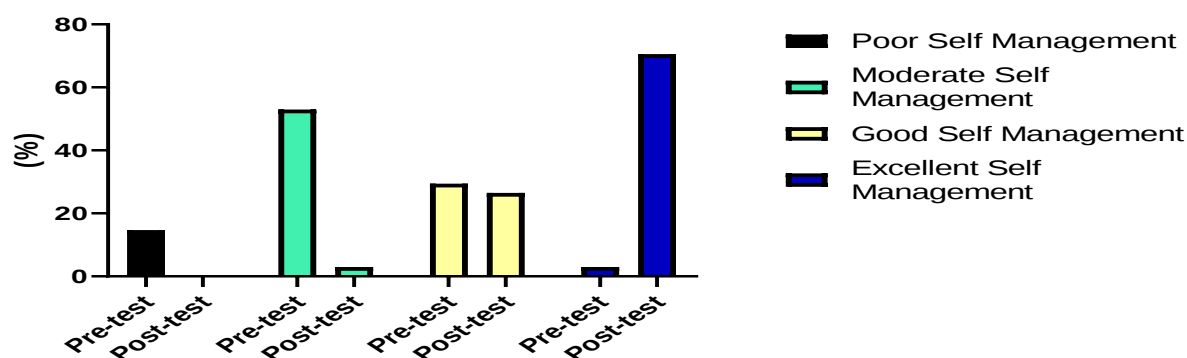


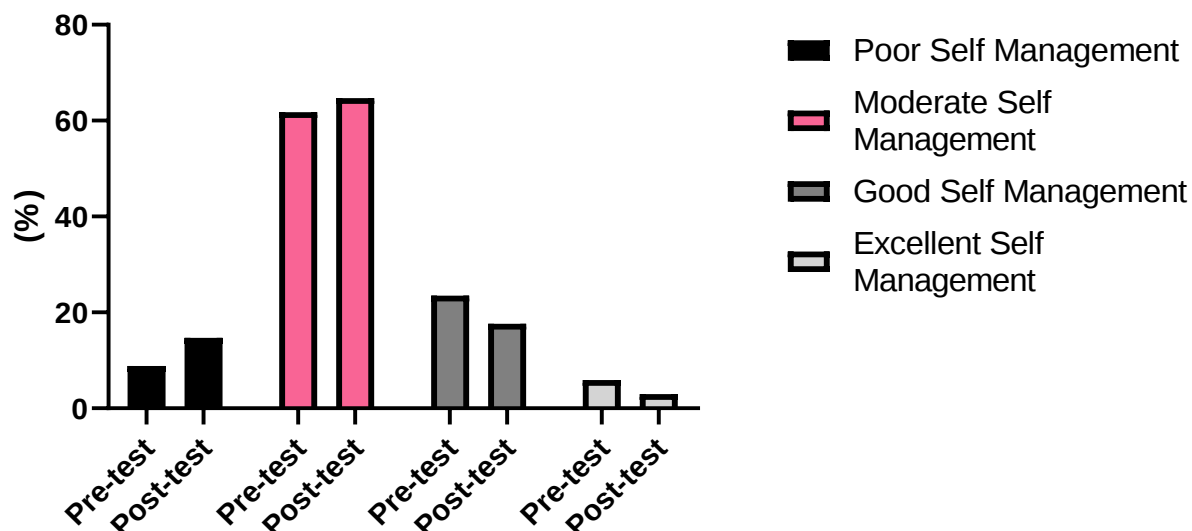
Figure 1. Self-management and compliance with prescribed treatment as measured by CSMS scale in experimental group.

In the pre-test, the majority of 18 (52.94%), demonstrated moderate self-management, 10(29.41%) good self-management, while 5(14.71%) showed poor self-management and only 1(2.94%) reached the excellent

category. However, in the post-test, a significant improvement was observed; 24 (70.59%) of subjects achieved excellent self-management, 9 (26.47%) good self-management, 1(2.94%) moderate self-management, and none

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fell into the poor category.



**Figure 2.** Column diagram showing self-management and compliance with prescribed treatment as measured by the CSMS scale in the control group pre-test. Maximum 21(61.76%) were in the moderate range, 8(23.53%) showing good self-management, 3(8.82%) demonstrating poor self-management, and 2(5.88%) reaching an excellent level. In the post-test, a maximum of 22 (64.71%) were in the moderate category, 6(17.65%) were in the good category, 5 (14.71%) showed poor self-management, and 1(2.94%) achieving an excellent level.

**Table 1.** Effectiveness of nurse-led intervention on self-management of heart disease and compliance with prescribed treatment in experiment group.

| Experimental group | Mean  | Mean% | SD    | Mean difference (Gain %) | df | Paired 't' value | Critical value | p value | inference |
|--------------------|-------|-------|-------|--------------------------|----|------------------|----------------|---------|-----------|
| Pre-test           | 67.18 | 49.76 | 12.42 | 25.67                    | 33 | 8.63             | 3.61           | P<0.001 | HS        |
| Posttest           | 92.85 | 68.78 | 10.84 | (19.02%)                 |    |                  |                |         |           |

The above table shows the 't' value of 8.63, which is higher than the table value of 3.61 at  $p < 0.001$ , which indicates that the nurse-led intervention was highly effective on self-management and compliance with prescribed treatment.

Hence, H1 is accepted - there will be a significant difference in the level of self-management and treatment compliance before the intervention in the experimental group.

**Table 2.** Comparison of self-management of heart disease and compliance with prescribed treatment in experimental versus control group N = 68

| Post-test        | Mean  | Mean% | SD    | Mean difference (Gain %) | DF | unpaired 't' value | Critical value | p values | inference |
|------------------|-------|-------|-------|--------------------------|----|--------------------|----------------|----------|-----------|
| Experiment group | 92.85 | 68.78 | 10.84 | 24.97                    | 33 | 9.79               | 3.44           | P<0.001  | HS        |

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|                      |       |       |       |         |
|----------------------|-------|-------|-------|---------|
| <b>Control group</b> | 67.88 | 50.28 | 10.17 | (18.5%) |
|----------------------|-------|-------|-------|---------|

Above the table, compare post-test self-management in the experimental group had a mean score of 92.85 (68.78%) with an SD of 10.84. The mean gain was 24.97 points (18.5%). The unpaired t-test showed a t-value of 9.79 with 33 degrees

of freedom, exceeding the critical value of 3.44 and yielding  $p < 0.001$ , indicating a highly significant improvement. The control group's post-test mean was 67.88 (50.28%) with an SD of 10.17, showing no meaningful change.

**Table 3. Association between the pre-test self-management of heart disease and compliance with prescribed treatment with selected socio-demographic variables.**

| S. No. | Demographic variables | DF | Critical value | $\chi^2$ values | P values                      | Level of significance          |
|--------|-----------------------|----|----------------|-----------------|-------------------------------|--------------------------------|
| 1.     | age                   | 12 | 21.02          | 12.87           | $>0.05$                       | Not significant                |
| 2.     | Gender                | 3  | 7.82           | 1.82            | $P>0.05$                      | Not significant                |
| 3.     | Education             | 12 | 21.02          | 27.33           | <b><math>P&lt;0.05</math></b> | <b>significant Association</b> |
| 4.     | Marital Status        | 9  | 16.91          | 2.47            | $P>0.05$                      | Not significant                |
| 5      | Types of Family       | 3  | 7.82           | 4.08            | $P>0.05$                      | Not significant                |
| 6.     | Area of Residence     | 3  | 7.82           | 8.44            | <b><math>P&lt;0.05</math></b> | <b>significant Association</b> |
| 7.     | occupation            | 21 | 32.67          | 26.88           | $P>0.05$                      | Not significant                |
| 8.     | medical insurance     | 3  | 7.82           | 2.13            | $P>0.05$                      | Not significant                |
| 9.     | BMI                   | 12 | 21.02          | 13.62           | $P>0.05$                      | Not significant                |

This table show on epict the association between the pretest level of self-management of heart disease and compliance with prescribed treatment with selected socio-demographic variables such as age, Gender, Education, Marital Status, Types of Family, Area of Residence, occupation etc. Chi-square test was used to analyze the association between variables. On applying the chi-square test, demographic variables "Education" and "Residence" were significantly associated ( $p<0.05$ ) with the pre-test self-management and compliance with prescribed treatment as measured by the CSMS scale. The  $\chi^2$  value of Education was 27.33 greater than the table value (21.02) at  $P=0.05$  for 12 degrees of freedom. Similarly, the  $\chi^2$  value of residence was 8.44 greater than the table value (7.82) at  $P=0.05$  for 3 degrees of freedom. Hence,  $H_2$ , i.e, there will be a significant association between the pre-test self-management and compliance with prescribed treatment as measured by the

CSMS scale with their selected socio-demographic variables, is partially accepted.

The table above shows that age, gender, marital status, types of family, occupation, medical insurance, and BMI did not show any significant association ( $p > 0.05$ ) with pre-test self-management and treatment compliance as measured by the CSMS scale. For age, the  $\chi^2$  value was 21.02, which did not exceed the table value (12.87) at  $df = 12$  and therefore was not significant. Similarly, the  $\chi^2$  value for gender was 7.82, less than the table value (1.82) at  $df = 3$ , indicating no significant association. The variables marital status ( $\chi^2 = 16.91$ , table value = 2.47,  $df = 9$ ) and types of family ( $\chi^2 = 7.82$ , table value = 4.08,  $DF = 3$ ) also failed to reach significance. In the same way, occupation ( $\chi^2 = 32.67$ , table value = 26.88,  $DF = 21$ ) and medical insurance ( $\chi^2 = 7.82$ , table value = 2.13,  $DF = 3$ ) showed no significant relationship with self-management or treatment compliance. Likewise, BMI ( $\chi^2 = 21.02$ , table value = 13.62,  $DF = 12$ ) did

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not demonstrate any meaningful association. Hence, these demographic variables did not influence pre-test self-management or adherence to prescribed treatment, indicating that only certain socio-demographic factors, not these, were related to self-management outcomes.

## 4. DISCUSSION

The study found that the experimental group demonstrated a significant improvement in self-management and treatment compliance after the intervention. The mean score increased from  $67.18 \pm 12.42$  to  $92.85 \pm 10.84$ , while the proportion of participants with excellent self-management **rose** from 2.94% to 70.59%. In contrast, the control group showed minimal change, with mean scores shifting only slightly from  $68.53 \pm 10.48$  to  $67.88 \pm 10.17$ . These results indicated that the intervention effectively enhanced self-management and adherence to prescribed treatment among patients with heart disease in the experimental group.

These findings were consistent with the study conducted by Zhu et al., which examined self-management among patients with coronary heart disease more than two years after PCI using a cross-sectional design. Self-management was assessed using the Coronary Artery Disease Self-Management Scale along with clinical indicators such as BMI, total cholesterol, and LDL-C levels. The study reported a moderate level of self-management, with a total CSMS score of  $69.5 \pm 11.0$ . Higher scores were observed in life and emotional management domains, whereas disease management showed comparatively lower scores. The authors suggested that patients in the long-term post-PCI phase required structured nurse-led education to strengthen their self-management practices.

In the present study, the nurse-led intervention significantly improved self-management in the experimental group. The mean score increased from  $67.18 \pm 12.42$  to  $92.85 \pm 10.84$ , representing a gain of 25.67 points (19.02%) with a statistically significant difference ( $t = 8.63$ ,  $p < 0.001$ ). Additionally, 70.59% of participants achieved an excellent level of self-management after the intervention. In contrast, the control group did not demonstrate a statistically significant improvement, as scores changed marginally from  $68.53 \pm 10.48$  to  $67.88 \pm 10.17$  ( $t = 0.26$ ,  $p > 0.05$ ). Furthermore, post-test scores in the experimental group were significantly higher than those in the control group (92.85 vs. 67.88;  $t = 9.79$ ,  $p < 0.001$ ), which confirmed the effectiveness of the nurse-led intervention.

Similar findings were reported by Arjunan and Venkatakrishnan, who demonstrated that nurse-led cardiac rehabilitation programs improved quality of life and several health parameters among patients with heart failure. Likewise, Smith et al. reported that nurse-led interventions enhanced medication adherence and promoted positive lifestyle modifications in patients with heart disease.

Collectively, these studies supported the effectiveness of nurse-led programs in improving patient outcomes and promoting better disease management.

The chi-square analysis in the present study revealed a significant association between pre-test self-management and compliance with prescribed treatment (CSMS scale) and selected demographic variables, particularly education and place of residence. The association with education was statistically significant ( $\chi^2 = 27.33 > 21.02$ ,  $DF = 12$ ,  $p < 0.05$ ), and residence also showed a significant relationship ( $\chi^2 = 8.44 > 7.82$ ,  $DF = 3$ ,  $p < 0.05$ ). Therefore, the research hypothesis ( $H_1$ ), which stated that self-management and treatment compliance were significantly associated with education and residence, was accepted.

These findings were supported by the study conducted by Osei Baah F and colleagues, which examined socio-demographic determinants of self-care maintenance in adults with heart failure. The study included 543 participants with a mean age of  $64.6 \pm 14.3$  years, of whom 72% were White and 63.9% were male. The results showed that self-care maintenance **was** significantly associated with several socio-demographic factors, including race ( $p = 0.018$ ), education ( $p = 0.061$ ), and marital status ( $p = 0.024$ ). These variables collectively explained 3.8% of the variance in self-care maintenance. Participants who were Asian or of mixed ethnicity, those who had some college education and individuals who were married or living with a partner demonstrated higher self-care maintenance scores compared with their counterparts.

## 5. CONCLUSION

This study demonstrates that nurse-led interventions significantly improve self-management and treatment adherence among patients after myocardial infarction. Education level and place of residence were identified as important factors influencing patient outcomes. These findings underscore the vital role of nurses in delivering structured education and continuous support during cardiac rehabilitation. Although limited by sample size and study duration, the results strongly advocate for incorporating nurse-led programs into routine post-MI care. Future research with larger samples, longer follow-up, and objective clinical measures is recommended to further validate these benefits.

### CRedit Authorship Contribution Statement

**Dehuti:** Writing – original draft, **Dr. Mrs. Rema Rajesh:** Data curation, **Mrs. Vijaya Anil,** Investigation: **Roshy Kujur:** Formal analysis, **Akash Gupta:** Writing – original draft, Writing– Reviewing and editing, Figure production, Language editing, Data curation, Conceptualization, Investigation, Supervision, Final editing and Approval, Citation management.

### Declaration of competing interest

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The authors declare that they have no known competing interests.

## Funding

The authors declare that no external funding was received for the preparation of this review.

## Data Availability

“Not Applicable”

## Ethical Statement

Ethical approval was obtained from the institutional ethics committee, and written informed consent was secured from all participants. Confidentiality and anonymity were maintained throughout the study.

## Declaration of generative AI in scientific writing

During the preparation of this work, the author(s) used BioRender for the production of figures. “Grammarly” is used for Grammatical improvement, and no AI is used in this scientific writing. The author is fully responsible for the content.

## Consent to participate

“Not Applicable”

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