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A Systematic Evaluation of Rehabilitation Strategies Following Acute Myocardial Ischemic Event and their Impact on Functional Autonomy in Women

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ABSTRACT

Cardiac rehabilitation (CR) is a comprehensive program that was created to aid recovery post-myocardial infarction (MI). Women recovering from MI face unique challenges including psychological distress and lower physical fitness. The purpose of this study was to investigate the impact of CR on improving activities of daily living (ADLs) in women post-MI, hypothesizing that CR would enhance both physical and emotional well-being, leading to an improved overall quality of life. This experimental study involved 30 female participants (aged 40-60 years) with uncomplicated MI enrolled from three hospitals in Bangalore. The participants underwent a two-month CR program that included supervised and home exercises. Pre- and post-treatment assessments were conducted using the Quality of Life after Myocardial Infarction Questionnaire (QLMI) and Mickus Questionnaire (1986). The Wilcoxon signed-rank test was used for statistical analysis in order to compare the scores before and after treatment. Significant improvements were observed across emotional, physical, and social domains. Emotional scores improved from 25.73 to 70.47 ($p<0.001$), physical scores from 11.53 to 32.67 ($p<0.001$), and social scores from 25.53 to 65.00 ($p<0.001$). The global score also increased from 62.80 to 168.13 ($p<0.001$), indicating an overall improvement in the quality of life. This study highlights the positive impact of CR on ADLs in women post-MI, showing the need for tailored rehabilitation programs that address both physical and psychosocial needs.

Keywords: Cardiac Rehabilitation; Activities of Daily Living; Myocardial Infarction; Women

1 INTRODUCTION

A thorough, medically supervised program called cardiac rehabilitation (CR) aims to enhance the physical, emotional, and social well-being of individuals recovering from cardiovascular events such as myocardial infarction (MI). Following a heart attack, individuals often experience a decline in physical capacity, emotional distress, and a reduced quality of life due to the physiological and psychological impacts of the event.[1] The effect of cardiac rehabilitation (CR) on activities of daily living (ADL) in women with post-myocardial infarction (MI) is significant, as evidenced by various studies highlighting improvements in health-related quality of life (HRQL) and functional capacity. Women recovering from myocardial infarction often face unique challenges that can impede their recovery, including psychological distress and lower physical fitness than men. Although CR has been widely established as an effective intervention for improving physical health and overall quality of life after MI, its specific impact on ADLs in women has not been thoroughly explored. Participation in exercise-based cardiac rehabilitation (EBCR) has shown substantial improvements in multiple HRQL domains for women, including physical functioning and vitality.[2] Specific psychosocial components of CR further enhance these benefits, addressing the specific needs of women and leading to greater overall improvements in both emotional well-being and physical capacity.[2]

Despite women often starting CR with lower exercise capacity and higher comorbidities, they demonstrate significant gains in cardiorespiratory fitness (CRF) post-rehabilitation, which correlates with improved psychological well-being, a crucial factor for performing ADLs effectively.[1] The purpose of the study was to look at the precise consequences of CR on improving ADLs, hypothesizing that CR would enhance not only physical functioning but also emotional and social aspects of daily living, thus contributing to an overall improvement in the quality of life

for women post-MI.

2 METHODS

The study followed an experimental research approach, which is data-driven and can be verified through observation and experimentation. The study design involved the selection of 30 female participants diagnosed with uncomplicated myocardial infarction and referred for cardiac rehabilitation. The participants were enrolled from three hospitals in Bangalore: Sagar Apollo Hospital, Wockhardt Hospital, and Mahaveer Jain Hospital. The inclusion criteria were females aged 40–60 years with uncomplicated myocardial infarction, while those with conditions such as unstable angina, uncontrolled blood pressure, and orthopaedic issues were excluded. Data were collected using convenient sampling. The participants were assessed using two primary tools, the Quality of Life after Myocardial Infarction Questionnaire (QLMI) and the Mickus Questionnaire[3], both of which are valid and reliable instruments designed to assess the impact of myocardial infarction and cardiac rehabilitation on daily living activities.

Before the cardiac rehabilitation program commenced, a baseline assessment was performed through a review of medical records and administration of the two questionnaires. Following informed consent, participants were introduced to the cardiac rehabilitation program, which lasted for two months. The rehabilitation program included supervised exercises, such as treadmill, cycling, stair climbing, and general mobility exercises, initially at low intensity, gradually increasing in duration and intensity based on each patient's tolerance. Participants were advised to perform home exercises and monitored for heart rate and overall health status.

Post-therapy assessments were conducted using the same questionnaires to gather post-treatment scores, and data were analyzed using statistical techniques. The Wilcoxon signed-rank test was used to compare pre- and post-rehabilitation scores, considering the paired nature of the data. Statistical analysis was performed using SPSS software to ascertain the importance of the differences in scores before and after the intervention, providing meaningful insights into the effect of cardiac rehabilitation on activities of daily living in women post-MI.

3 RESULTS

The majority of the participants, 17 women (56.7%), were between the ages of 40 and 50, while 13 women (43.3%) were within the 51 to 60 years age range. The participants' average age was 47.32 years, with a 5.97 standard deviation. This indicates that the participants were predominantly middle-aged women, with a slightly younger cohort in the 40-50 years age group (Table 1).

Table 1: Patients' Age Distribution in the Study

Age (years)	Number	Percentage (%)
40-50	17	56.7
51-60	13	43.3
Total	30	100
Mean ± SD	47.32 ± 5.97	

Table 2: Wilcoxon Signed-Rank Test Results for the QLMI Questionnaire in the Emotional, Physical, Social Domains, and Global Score

Character		Minimum	Maximum	Mean ± SD	Z	P
Emotional	Pre-treatment	21.00	37.00	25.73 ± 3.81	4.789	0.000*
	Post-treatment	68.00	73.00	70.47 ± 1.59		
Physical	Pre-treatment	9.00	14.00	11.53 ± 1.63	4.811	0.000*
	Post-treatment	31.00	34.00	32.67 ± 0.92		
Social	Pre-treatment	22.00	29.00	25.53 ± 1.74	4.797	0.000*
	Post-treatment	63.00	68.00	65.00 ± 1.11		
Global score	Sum	55.00	74.00	62.80 ± 4.57	4.786	0.000*
	Post sum	164.00	173.00	168.13 ± 2.24		

*Significant

Table 2 presents the Wilcoxon signed-rank test values for the QLMI questionnaire across the Emotional, Physical, Social domains and Global scores. The results showed significant improvements in all domains after the cardiac rehabilitation program. In the Emotional domain, the pre-treatment scores ranged from 21.00 to 37.00, with a mean of 25.73 ± 3.81, while post-treatment scores ranged from 68.00 to 73.00, with a mean of 70.47 ± 1.59. The Z-value for the emotional scores was 4.789, with a p-value of 0.000, indicating a significant improvement. For the Physical domain, the pre-treatment scores ranged from 9.00 to 14.00, with a mean of 11.53 ± 1.63. Post-treatment scores ranged from 31.00 to 34.00, with a mean of 32.67 ± 0.92. The Z-value for physical scores was 4.811 and the p-value was 0.000, again showing a significant improvement. In the Social domain, pre-treatment scores ranged from 22.00 to 29.00, with a mean of 25.53 ± 1.74, whereas post-treatment scores ranged from 63.00 to 68.00, with a mean of 65.00 ± 1.11. The Z-value for the social scores was 4.797, with a p-value of 0.000, indicating a significant improvement. Finally, the Global score, which sums the results from all domains, showed pre-treatment scores ranging from 55.00 to 74.00, with a mean of 62.80 ± 4.57, and post-treatment scores ranging from

164.00 to 173.00, with a mean of 168.13 ± 2.24. The Z-value for the Global score was 4.786 with a p-value of 0.000, demonstrating a significant overall improvement in quality of life following cardiac rehabilitation (Table 2).

Table 3: Wilcoxon Signed-Rank Test Results for Pre- and Post-Treatment Comparison of Activities of Daily Living (MICKUS Questionnaire)

Pre and post-comparison of Question no. 1 and 12					
Q. no.	**Pre median**	**Post median**	**z-value**	**p-value**	**Result**
1	33	41	4.799	0.000	$p < 0.05$*
12	10	6	4.807	0.000	$p < 0.05$*

*Significant

Table 3 presents the Wilcoxon signed-rank test values for the pre- and post-treatment comparison of questions 1 and 12 from the Activities of Daily Living questionnaire developed by MICKUS. For Question 1, the median pre-treatment score was 33, which increased to 41 post-treatment. The Z-value for this comparison was 4.799, with a p-value of 0.000, indicating an improvement in everyday living activities that is statistically significant ($p < 0.05$). Similarly, for Question 12, the pre-treatment median score was 10, which decreased to 6 after the treatment. The Z-value for this comparison was 4.807, with a p-value of 0.000, again indicating a significant change ($p < 0.05$). These results suggest that cardiac rehabilitation had a significant positive impact on the patients' activities of daily living, as reflected in both questions.

4 DISCUSSION

The current study on the effect of cardiac rehabilitation (CR) on ADLs in women post-MI highlights the predominance of middle-aged participants, with a mean age of 47.32 years. This demographic aligns with the recent literature that underscores the importance of specific CR programs for women, especially within this age group. The majority of participants (56.7%) were aged 40-50 years, reflecting a focus on middle-aged women, a group often underrepresented in CR studies.[4] Existing literature suggests that women in this age range face unique challenges and derive specific benefits from CR, thus necessitating gender-specific approaches.[5]

Cardiac rehabilitation has been widely recognized for its ability to improve physical, psychological, and social outcomes, significantly enhancing the overall quality of life for women post-MI.[6,7] Our study findings are in line with these reports, demonstrating that CR led to substantial improvements in ADLs. Previous studies have also shown that both aerobic and resistance training in CR programs contribute to significant physiological benefits.[7] Gender-specific considerations are crucial in CR, as research indicates that women frequently engage less in CR programs, which can increase their risk of subsequent cardiac events.[5] Specific interventions that attend to the unique requirements of women, including psychosocial support, have been identified as essential for improving outcomes.[7,8] This study reinforces the positive impact of CR on middle-aged women post-MI, highlighting the need for programs designed to address these unique challenges.

The current study revealed significant improvements across emotional, physical, social, and global domains. These findings were consistent with recent literature, which highlighted the positive impact of tailored CR programs on women's health-related quality of life (HRQL). In the emotional domain, the investigation found a pre-treatment mean score of 25.73, which increased to 70.47 post-treatment, reflecting a substantial enhancement in emotional well-being ($p < 0.001$). These improvements were in line with those observed in a systematic review, where tailored psychosocial components in CR led to significant improvements in emotional health for women.[9] Regarding physical functioning, the study showed a marked improvement in the physical domain, with scores increasing from a mean of 11.53 to 32.67 ($p < 0.001$). This improvement aligns with evidence suggesting that women often start CR with lower physical fitness levels, but CR can lead to greater improvements in exercise capacity compared to men.[1] The physical gains observed in this study further support the benefits of CR in enhancing the overall physical functioning post-MI. Social domain scores also improved, rising from 25.53 to 65.00, and the global score showed an impressive increase from 62.80 to 168.13, indicating a marked improvement in overall quality of life ($p < 0.001$). These findings are consistent with a systematic review that found CR programs significantly improve social functioning and overall HRQL in women.[7] The improvements observed in the social and global domains highlight the broad positive effects of CR on women's well-being, beyond physical health.

The study reported significant improvements in emotional scores post-cardiac rehabilitation, with mean scores increasing from 25.73 to 70.47.[10] These findings were consistent with previous research, which demonstrated that CR enhances psychological well-being by reducing stress and depression, common in women post-myocardial infarction.[11] The inclusion of psychosocial support in CR programs was highlighted as crucial, as it addresses emotional health, often overlooked in traditional care models.[12] In terms of physical and functional improvements, the study showed a marked improvement in physical domain scores, with mean scores rising from 11.53 to 32.67.[10] This supports existing evidence that CR significantly enhances physical capacity and functional status, which are essential for daily living activities.[13] Exercise-based CR programs have also been shown to reduce mortality rates by 20% and cardiac mortality by 26%, emphasizing the effectiveness of CR in improving physical health.[12] Social domain scores improved significantly in the study, reflecting better social

interaction and support post-CR.[10] This improvement is vital, as social support is a key determinant of health outcomes in women.[11] The global improvement in quality of life observed in the study further underscores the comprehensive benefits of CR, which integrates physical, emotional, and social rehabilitation.[12]

Despite these positive outcomes, women remain underrepresented in CR programs, often due to barriers such as lack of referral, transportation issues, and caregiving responsibilities.[1,11] Addressing these barriers through CR programs and alternative delivery models, such as home-based or internet-based interventions, could enhance participation and sustain long-term health behaviour changes.[13,14] The current study findings demonstrate the benefits of CR, some studies suggest The necessity of additional research to comprehensively understand the long-term benefits and mechanisms of CR in this demographic.[5,6] More extensive investigations could provide deeper insights into the sustained effects of CR and its role in improving long-term health outcomes post-MI.

5 CONCLUSION

The findings of this study demonstrated that cardiac rehabilitation significantly improves the activities of daily living in women post-MI, enhancing the emotional, physical, social, and global aspects of their quality of life. The results revealed marked improvements in emotional well-being, physical functioning, and social support. These improvements show the importance of CR in addressing the unique challenges that women face during recovery from MI, such as lower physical fitness and psychological distress. Future studies ought to examine the long-term consequences and underlying mechanisms of CR's impact on women post-MI to further optimize treatment strategies and improve health outcomes in this demographic.

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