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The Effect Of Cardiac Rehabilitation On Physiological And Psychosocial Outcomes In MI Patients

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ABSTRACT:
Myocardial infarction (MI) is a leading cause of morbidity and death all over world, often causing significant physical, emotional, and psychological complications on patients. Cardiac rehabilitation (CR) has come out as an effective method to improve both physiological and psychosocial outcomes recovering from MI. This study examines the impact of a structured cardiac rehabilitation program on MI patients, focusing on changes in physical health, psychological well-being, and overall quality of life. The program includes supervised exercise, education on lifestyle modification, and psychological benefits. Physiologically, CR has been shown to improve cardiovascular fitness, reduce symptoms of heart failure, and enhance overall functional capacity. Study included 30 patients with post MI, fulfilling the inclusion and exclusion criteria and were allocated to perform the Cardiac Rehabilitation program for 12 weeks. This study is an experimental design and a prospective observational study that utilized purposive sampling to select participants. A total sample size of 30 individuals were included post attaining stable health status after MI, the study was conducted at the study centre: Santosh Hospital in Ghaziabad. Patients were assigned to a 12-week comprehensive cardiac rehabilitation program. Cardiac rehabilitation consisted of 36 sessions, each for 50-55 minutes that included education, physical and cardiac care instruction, psychosocial support, and supervised exercise training. There was statistically significant comparison between pretest and post-test of Vo2 Max and Spo2 with $P<0.05$. Vo2 Max (volume of oxygen maximum) is increasing post-test as well as Spo2 (peripheral capillary oxygen saturation) is increasing post-test. There was a statistically significant comparison between pretest and post-test of general well-being scale with $P<0.05$. The value of general well-being scale is increasing after the post-test. There was statistically significant comparison between pretest and post-test of general self-efficacy scale with $P<0.05$. Value of general self-efficacy scale is increasing after post-test thus , cardiac rehabilitation proved to be an effective treatment in myocardial infarction patients.

KEYWORDS: Cardiac Rehabilitation (CR), Myocardial Infarction (MI), HRQOL, General well-being, General self-efficacy scale.

INTRODUCTON:
Cardiac rehabilitation (CR) is a process that involves a multidisciplinary team of health professionals to optimize the status of patient's physical, psychological, psychosocial, and vocational well-being. The CR program has been proven to influence health outcomes in patients with cardiac diseases, particularly myocardial infarction (MI) and stable angina. It is a personalized program of education and exercise. Muscle strength exercise is also reported to have a beneficial effect. There are many the reports with the 20 to 30% training strength improvement of 40 to 50% of the maximum muscle force. The scientific reasons are given in detail in the CR guidelines published by the Agency for Health Care Policy and Research (AHCPR) on the effect of improved exercise tolerance and the effect of enhanced muscle strength. [1]
The CR session includes 3phases: the warm-up, the actual training and the recovery (relaxation) phase. The program is individualized, so it is necessary to correctly select the type, intensity, duration and frequency for maximum therapeutic effect. As part of a cardiac rehabilitation program, physical activity helps with psychological adaptation and contributes to a successful return to work. [16]
Cardiovascular diseases, in particular, myocardial infarction (MI), are the main threats to human health in modern times. Cardiac rehabilitation (CR), and especially increased physical activity, helps prevent the consequences of MI and has a positive impact on physiologic and psychosocial outcomes. Myocardial infarction (MI) - represents cardio myocytes necrosis due to prolonged myocardial ischemia, occurring in the context of an imbalance between cardiac oxygen supply and consumption.
Exercise-based medical rehabilitation is a supplement to drug therapy and post-infarction interventional surgery, as it improves cardiopulmonary function, optimizes drug therapy, decreases risk factors, increases exercise tolerance, improves mental status, reduces the risk of repeated heart attack and cardiac mortality. It includes cardiac parameters as

well as quality of life. After MI, Exercise training may induce positive effects; improve QoL, metabolic equivalents (METs), circulation function, and heart rate; and lower the risk of chronic disease and all-cause mortality. [9]Exercise substantially increased mean work capacity, decreased fatigue, lessened anxiety and depression, and promoted independence and sociability. Neither counselling nor exercise influenced mortality though subjects in the exercise group reported fewer major cardiovascular sequelae. [2]

Healthy lifestyle habits include eating a nutritious diet, managing weight and quitting smoking. Research shows that cardiac rehabilitation can reduce the risk of future heart problems and death from heart disease. Exercise-based cardiac rehabilitation (CR) aims to improve the health and outcomes of people with CHD.[8]

The most important goal of comprehensive CR is to reduce mortality and morbidity in patients with cardiovascular diseases. Implementation of newly available performance measures offers the potential to enhance referral to, enrolment in, and completion of cardiac rehabilitation.[5]Regular physical exercise is very important in CR. Cardiac Rehabilitation has evolved over the past decades from a simple monitoring for the safe return to physical activities to a multidisciplinary approach that focuses on patient education, individually tailored exercise training, modification of the risk factors and the overall well-being of the cardiac patients. [6]Current guidelines support its use in patients after acute coronary syndrome, coronary artery bypass grafting, coronary stent placement, valve surgery, and stable chronic systolic heart failure. Its use in these conditions is supported by a robust body of research demonstrating improved clinical outcomes. [4]

Health-related quality of life (HRQL) instruments provide valid and responsive outcome measures to assess the impact of disease and the response to interventions. This reinforces the importance of addressing health behaviour changes as soon as possible after MI and the usefulness of assessing both generic and specific HRQL in evaluating treatment effectiveness. [3]

MI based Cardiac Rehabilitation including 1. Tailored exercise program (to design and alter exercises as per patient's needs), 2. Aerobic training using treadmill, stepper, static cycling, 3. Resistance training using resistance bands and weight cuffs 4. Physical relaxation exercises including deep breathing, segmental breathing, cognitive exercises and group talk sessions occasionally was held for 12 weeks including 36 sessions in total on patients with Myocardial infarction. Measurements of the cardiac parameters and psychosocial health, quality of life will be performed using respective tools and scales such as Pulse oximeter, Sphygmomanometer, Stethoscope, HRQOL SF 36, General self-efficacy scale and General well-being scale. The results have been ruled out based on impact caused on physiological and psychosocial outcomes in MI patients after successful completion of Cardiac Rehabilitation. This process is an important part of the CR programs that typically include some components such as medical evaluation, education, exercise training, cardiac risk-factor modification, counselling, and psychosocial support. [7]

METHODOLOGY:

Data Collection – A signed consent and permission was taken from the patients and permission was also obtained from the head of the hospital where the study was conducted. Study included 30 patients with post MI, fulfilling the inclusion and exclusion criteria and were allocated to perform the Cardiac Rehabilitation program for 12 weeks.

The study is an experimental design and a prospective observational study that utilized purposive sampling to select participants. A total sample size of 30 individuals were included post attaining stable health status after MI, the study was conducted at the study centre: Santosh Paramedical College in Ghaziabad. The overall duration of the study remained one year, with the intervention also lasting for one year. Samples were chosen conveniently as per their heart health history and were given freedom to participate in the study. Patients were assigned to a 12-week comprehensive cardiac rehabilitation program. Cardiac rehabilitation consisted of 36 sessions, each for 50-55 minutes that included education, physical and cardiac care instruction, psychosocial support, and supervised exercise training.

Data analysed with SPSS window software. Descriptive statistics likepercentage and outcomes were calculated. Inclusion criteria **was** Patients who were stable post MI, Both male and female age ranging between 40-60, Patient's approval and will to perform the rehab program and Exclusion criteria was Any visual, hearing impairment , Neuromuscular/neurological disorders, any Muscular deformity and Any congenital/ progressive or fatal disease. Dependent variable were Blood Pressure, Heart Rate, Vo2 Max, Spo2, BMI, all over physical health and emotional support were the dependent variables in Cardiac Rehabilitation Program followed by the MI patientsand Independent variable were Age, Gender, Educational Status, Occupation

RESULT:

The Cardiac rehabilitation was performed on the MI patients to look for the impact on physiological and psychosocial outcomes. Different variables such as cardiovascular parameters Vo2 max, Heart rate, Spo2 and Bp and scale of General well-being, General self-efficacy and HRQOL SF 36 were measured pre and post-test to find out the results.

In 30 subjects with mean age 49.20, where 56.7% were female and 43.3% were male. There was statistically significant comparison between pretest and post-test of systolic and diastolic blood pressure with $P < 0.05$. Systolic and diastolic blood pressure is decreasing post-test. There was statistically significant comparison between pretest and post-test of resting heart rate with $P < 0.05$. Resting heart rate is decreasing post-test. There was statistically significant comparison

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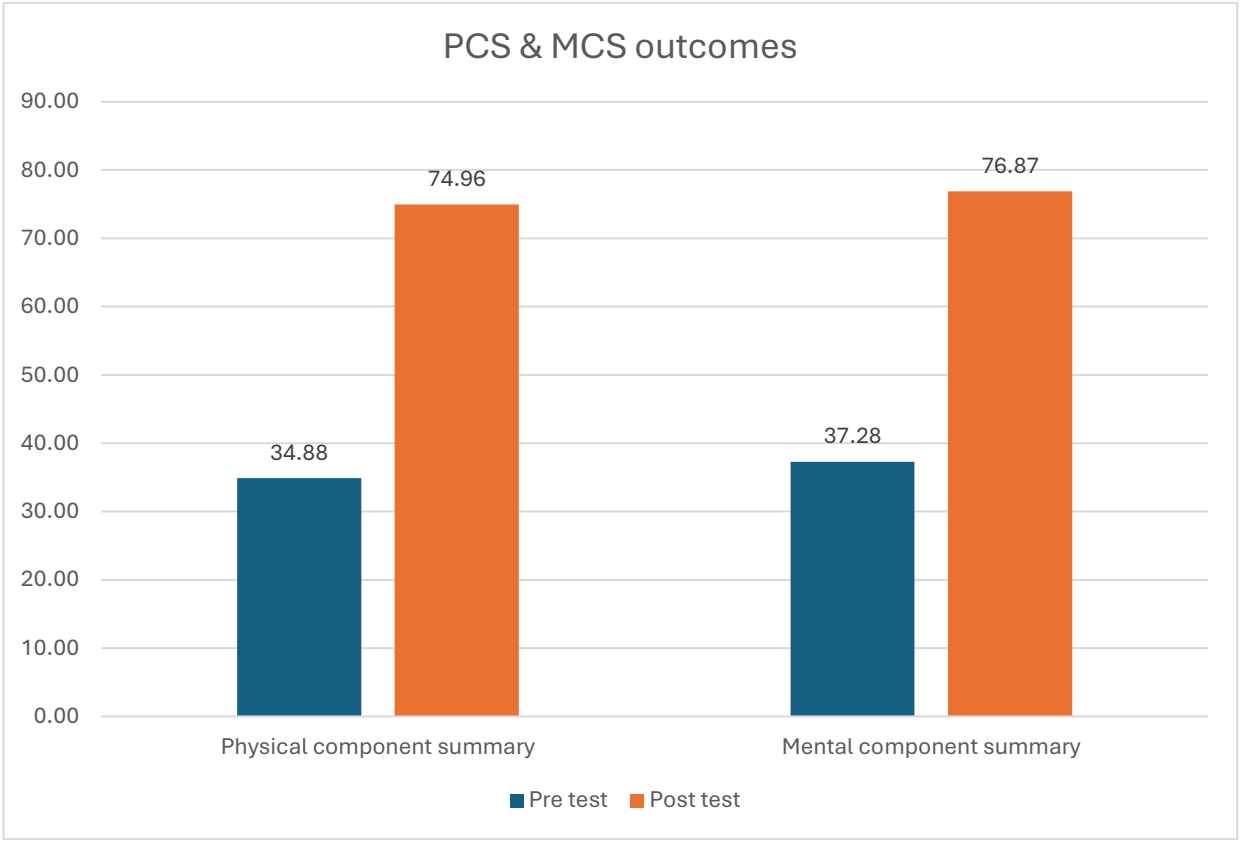
between pretest and post-test of Vo2 Max and Spo2 with P<0.05. Vo2 Max (volume of oxygen maximum) is increasing post-test as well as Spo2 (peripheral capillary oxygen saturation) is increasing post-test. There was a statistically significant comparison between pretest and post-test of general well-being scale with P<0.05. The value of general well-being scale is increasing after the post-test. There was statistically significant comparison between pretest and post-test of general self-efficacy scale with P<0.05. Value of general self-efficacy scale is increasing after post-test.

Table 1: Comparison between pretest and post-test of physical component summary & mental component summary of patients recovering from myocardial infarction N=30

Outcomes	Pretest (Mean ± SD)	Post test (Mean ± SD)	Paired t test	DF	P-value	Result
Physical component summary (PCS)	34.88 ± 4.858	74.96 ± 6.133	33.466	29	0.001	Significant
Mental component summary (MCS)	37.28 ± 4.802	76.87 ± 5.822	42.710	29	0.001	Significant

Table 1 shows that there was a statistically significant comparison between pretest and post-test of physical component summary with P<0.05. value of physical component summary is increasing after post-test.
There was a statistically significant comparison between pretest and posttest of mental component summary with P<0.05. Value of mental component summary is increasing after posttest.
The group bar chart shows PCS and MCS mean score in pretest and posttest.



Below is the correlation analysis made between the cardiovascular parameters and questionnaires measuring patient's general well-being, general self-efficacy and health related quality of life.

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Table 2: Correlation between pretest and posttest of different parameters of patients recovering from myocardial infarction N=30

Outcomes	Correlation Value	P-value	Result
Pre Vs Post volume of oxygen (Vo2) maximum	0.030 (No correlation)	0.874	Insignificant
Pre Vs Post Systolic blood pressure	0.664 (moderated correlation)	0.001	Significant
Pre Vs Post Diastolic blood pressure	0.109 (little correlation)	0.565	Insignificant
Pre Vs Post Resting Heart rate	0.632 (moderated correlated)	0.001	Significant
Pre Vs Post peripheral capillary oxygen saturation (Spo2)	0.118 (little correlation)	0.533	Insignificant
Pre Vs Post General well-being scale	0.506 (moderate correlated)	0.004	Significant
Pre Vs Post General self-efficacy scale	0.314 (weak correlation)	0.091	Insignificant
Pre Vs Post Physical component summary	0.305 (weak correlation)	0.101	Insignificant
Pre Vs Post Mental component summary	0.557 (moderate correlated)	0.001	Significant

Table 2 shows that there is no significance correlation between pretest and posttest of diastolic blood pressure; volume of oxygen maximum; peripheral capillary oxygen saturation; general self-efficacy scale and physical component summary with $P>0.05$.
There was significance positive moderate correlation between pretest and posttest of systolic blood pressure; resting heart rate; general well-being scale and mental component summary with $P<0.05$. Here a positive correlation shows that the pretest value is increasing than posttest value is also increasing.

DISCUSSION:
The ending of this study proves that MI based Cardiac rehabilitation program shows significant differences in the physiological and psychosocial outcomes. There was significance difference in the pre and post measurements of cardiovascular parameters including Vo2 max, BP, resting HR, Spo2 and general self-efficacy, general well-being, health related quality of life respectively as shown in the results.
Irrespective of the hardships and difficulties faced by patients with MI who had given their consent to pursue the CR, they have experienced better health status and overall wellbeing. With better cardiovascular parameters and improved psychosocial health, people really continue to focus on healthy living protocol. It is a coordinated physical, social and psychological intervention that favourably influences the underlying risk factors to stabilise, slow or reverse disease progression, and facilitates the ability of the patient to preserve or resume an active and functional contribution to the community. Cardiac rehabilitation promotes a healthy and active lifestyle, with the aim of improving quality of life through increased cardiac function; increased exercise tolerance; decreased cardiovascular symptoms; reduced levels of anxiety, depression and stress; return to work; and maintaining independence in activities of daily living. Structured exercise has been identified as being central to the success of cardiac rehabilitation.[24]
Evidence shows that exercise-based CR after cardiac events positively affects the extent of disability and level of quality of life and has also important beneficial role in modifying morbidity and mortality. [12]Effects of cardiac rehabilitation, emphasizing exercise treatment and conditioning, are reviewed regarding patient outcomes, including changes in functional (work) capacity, psychosocial functioning and health-related knowledge, risk factor modification, morbidity and mortality, and cardiac function.[13]This study on patients with MI will work as an intervention for medical practitioners, patients and students to gain another insight on the topic Cardiac rehabilitation and Myocardial infarction.

CONCLUSION:
In conclusion, patients who were stable post Myocardial Infarction followed the Cardiac Rehabilitation program for 12 week shows significant difference in the physiological and psychosocial outcomes such as Spo2, VO2 max, Blood Pressure, Resting heart rate, health related quality of life, general well-being and general self-efficacy. Cardiac rehabilitationperformed initially after surgery of conservative treatment approach post MI can help in reducing the symptoms and deconditioning of the body caused by Heart attack or bed ridden generalised weakness, while CR including different types of training for instance aerobic, resistance, physical relaxation and tailored exercise program can enhance patient's overall health and improve their quality of life.

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REFERENCES:

1. Yasuyuki Hirano, Kazuhiro Izawa, Satoshi Watanabe, Sumio Yamada, Koichiro Oka, Yusuke Kasahara, Kazuto Omiya, et. al.: Physiological and Health-Related Quality of Life Outcomes Following Cardiac Rehabilitation after Cardiac Surgery PMCID: PMC4316505 PMID: 25792940.
2. Stern MJ, Gorman PA, Kaslow P: The group counselling v exercise therapy study: a controlled intervention with subjects following myocardial infarction. Arch Intern Med 143: 1719-1725, 1983.
3. Oldridge N, Gottlieb M, Guyatt G, et al.: Predictors of health related quality of life with cardiac rehabilitation after acute myocardial infarction. J Cardiopulmonary Rehabilitation 18: 95-103, 1998.
4. Sean R McMahon, Philip A Ades, Paul D Thompson Trends in cardiovascular medicine 27 (6), 420-425, 2017.
5. Nanette K Wenger, Journal of the American College of Cardiology 51 (17), 1619-1631, 2008.
6. Warner M Mampuya, Cardiovascular diagnosis and therapy 2 (1), 38, 2012.
7. Adams et al., 2007; Angelish, Bunker, & Schoo, 2008; Fraser & Wendy, 2010; LauWalker, 2004; Lett et al., 2009; Stead, 2009; Sundarajan, Bunker, Begg, Marshall, & McBurney, 2004; Tod, Lacey, & McNeill, 2002; Wenger, 2008.
8. Lindsey Anderson, David R Thompson, Neil Oldridge, Ann-Dorthe Zwisler, Karen Rees, Nicole Martin, Rod S Taylor Cochrane Database of Systematic Reviews, 2016.
9. Greif et al., 1995; Adams et al., 2017; Elshazly et al., 2018; Mora and Valencia, 2018.
10. Pollock, Franklin et al., 2000 Lavie and Milani, 1994.
11. Blumenthal, 1985; Shephard and Franklin, 2001.
12. Ryszard Piotrowicz, Jadwiga Wolszakiewicz, Cardiology journal 15 (5), 481-487, 2008.
13. Philip Greenland, Joyce S Chu Annals of Internal Medicine 109 (8), 650-663, 1988.
14. Balraj S Heran et al. Cochrane Database Syst Rev. 2011.
15. Zubia Qayyum1*, Ambreen Aslam1, Ifra Aimen1, Sania Zahra 2, Mobeena Maqsood 1, Razia Sultana 3.
16. Maxim Badan, Lucia Mazur-Nicorici INTERNAL MEDICINE 2022.
17. Agnieszka Grochulska 1, Sebastian Glowinski 2 and Aleksandra Bryndal 1,* Clin med 2021.
18. Ades, 2001; Fernandez, Salamonson, Griffiths, Juergens, & Davidson, 2008.
19. Irene Kirolos, Danny Yakoub, Fiorella Pendola, Omar Picado, Aghapy Kirolos, Yehoshua C. Levine, Sunil Jha, Rajesh Kabra, Brandon Cave, and Rami N. Khouzam.
20. Sherry L. Grace Ph.D. , Susan E. Abbey M.D. , Zachary M. Shnek Ph.D. , Jane Irvine Ph.D. , Renée-Louise Franche Ph.D. , Donna E. Stewart M.D. 2002.
21. H.M. McGee, D. Hevey , J.H. Horgan 1999.
22. Xianghui Zheng , Yang Zheng , Jing Ma , Maomao Zhang , Yongxiang Zhang , Xianglan Liu , Liangqi Chen , Qingyuan Yang , Yong Sun , Jian Wu , Bo Yu Feb 2019.
23. Achttien, R.J., Staal, J.B., van der Voort, S. *et al.* Exercise-based cardiac rehabilitation in patients with coronary heart disease: a practice guideline. *Neth Heart J* 21, 429–438 (2013) Kym Joanne Price, Brett Ashley Gordon, Stephen Richard Bird, Amanda Clare Benson
24. *European Journal of Preventive Cardiology*, Volume 23, Issue 16, 1 November 2016, Pages 1715–1733
25. Philip A. AdesSteven J. KeteyianGary J. BaladyNancy Houston-MillerDalane W.