Effectiveness of Comprehensive Rehabilitation Programme on health related Self -efficacy and Quality of life of patients with coronary artery disease

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Abstract

Context: In today's world, most deaths are attributable to non-communicable diseases. India has one of the highest burdens of cardiovascular disease (CVD's) worldwide. Cardiac rehabilitation is associated with an improvement in heart rate recovery in patients with heart failure, coronary artery bypass grafts(CABG),or coronary artery disease. The goal of rehabilitation is to maximize activities of daily living and to achieve high level of QOL.

Aims: The aim of the study was to evaluate the Effectiveness of Comprehensive Rehabilitation Programme on health related self -efficacy and quality of life of patients with coronary artery disease.

Setting and Design: A Quasi-Experimental study with non-equivalent control group pre-test post-test design was conducted among a convenient sample of 56 coronary artery disease patients in hospitals of Haryana and Himachal Pradesh.

Material and Methods: Data were collected using Selected demographic and clinical variables proforma, Cardiac Self Efficacy scale and Quality of life scale. Comprehensive Rehabilitation Programme was administered in Experimental group whereas comparison group did not receive any intervention other than the usual care.

Statistical Analysis Used: SPSS version 20 was used for descriptive and inferential for data analysis.

Results: Parametric tests were used for the analysis. There were statistically significant differences in terms of health- related self-efficacy and quality of life of patients between and within experimental and

comparison group. There was no significant correlation between health- related self-efficacy and quality of life. There were no significant associations of self-efficacy and quality of life scores with their demographic and clinical variables.

Conclusion: Comprehensive Rehabilitation Programme was found to be effective in enhancing the health related Self Efficacy and Quality of life among coronary artery disease patients.

Keywords: Effectiveness, Comprehensive Rehabilitation Programme, Health related self-efficacy, Quality of Life

Key Message

Participation in a Cardiac rehabilitation program can promote recovery, enable patients to achieve and maintain better health, and reduce the risk of death in people who have heart disease.

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INTRODUCTION

In today's world, about 32 million deaths are attributable to non-communicable diseases and over half (16.7 million) as a result of coronary heart disease. The burden of cardiovascular diseases (CVDs) is highest in India globally. There has been an increase in the number of deaths due to CVDs from a 2.26 million in 1990 to about 4.77 million in the year 2020. The prevalence rates of coronary heart diseases over past decades have a range of about 1.6% to 7.4% in rural populations and from 1% to 13.2% in urban populations.[1]

As per the current statistics available, there has been an alarming increase in the number of patients having coronary artery disease. An estimate shows that around one billion people worldwide are having hypertension which is expected to increase to 1.56 billion by the year 2025. It is expected that by the year 2030, a current number of 171 million people with coronary artery disease will increase upto 366 million.About 102.2 million people in the United States have hyperlipidemia. [2]

Cardiac self-efficacy is known to be a cardiac-specific measure of a patient's confidence in his or her capacity to carry out activities which may be affected by symptoms and complications of their cardiovascular disease. [2] The role of cardiac self-efficacy can be evaluated using the Cardiac Self-Efficacy Scale (CSE Scale). [3]

Self-efficacy is very important to consider and evaluate in relation to health behaviors, particularly during coronary prevention and rehabilitation.[4]

Low cardiac self-efficacy is known to be a marker of impaired heart function and associated with readmission to hospital with symptoms similar to heart failure. Factors related to a person's perception,such as employment and awareness of risk factors, rather than disease knowledge, are more likely to be associated with high cardiac self-efficacy.[5]

There are basically two aims of health related quality of life (HRQOL): One is allowing the patients to

express their concerns and next is to evaluate varied qualitative situations using a standardized method of measurement. [6]

Cardiac rehabilitation (CR) refers to synchronized multidimensional intermediations premeditated to enhance a cardiac patient's physical, social, and psychological well-being, withthesupplementarygoalsofstabilizing,decelerating,orreversingtheprogressionoftheunderlying atherosclerotic processes,in turn dipping the rates of morbidity and mortality.[7]

It is a medically supervised program intended to improve the overall health and well-being of patients with heart disease. Commonly, these programs include sessions on maintaining healthy heart, exercise training and counseling for reducing stress and making the people return to their previous level of activity as much as possible. [8]

Needs

The overall aims of CR are to improve function, relieve symptoms, and enhance the patient's qualityof life.[51] Exercise-based cardiac rehabilitation programs prove beneficial to the patients in many ways promoting their health and fastening recovery and also improve quality of life. All these, in turn, cause a decline in cardiovascular morbidity and mortality and also have potential economic benefits on a whole. [9]

Since the available literature highlights that there occurs a significant improvement in patients' condition when they undergo cardiac rehabilitation programmes. Thus, the researchers in present study wanted to evaluate the effectiveness of Comprehensive rehabilitation programme on health related self-efficacy and quality of life of patients with coronary artery disease in their setting.

The objectives of the study were:

1) To assess and compare effectiveness of Comprehensive rehabilitation programme on health related self-efficacy and quality of life among patients with coronary artery disease in experimental and comparison group.

2) To determine the relationship between health related self –efficacy and quality of life of patients with coronary artery disease.

3) To find out the association of health related self–efficacy and quality of life with selected demographic and clinical variables of patients with Coronary artery disease.

Subjects and Methods:

Study Design

The study used a "Quasi-Experimental :(non- Equivalent control pretest-post test design".

Study Setting

This is a quasi experimental (Non equivalent control pretest-post test design) with intervention and control groups. The study was conducted at the Civil Hospital Ambala cantt, Maharishi Markandeshwar Superspeciality Hospital, Mullana, Ambala, M.M.Medical college &Hospital Kumarhatti, Solan, Himachal Pradesh.

Ethical Considerations

The ethical consideration for carrying out the study was obtained from institutional ethical committee (Project No:IEC-1845). Formal administrative approval was obtained from Medical Superintendent to conduct the final study. Informed consent was obtained from the respondents and they were assured about the confidentiality of their response. Final study was conducted in the month of April 2021. 56 coronary artery disease patients (26 in Experimental and 30 patients in Comparison group)were selected Convenience sampling technique .Coronary artery disease patients who willing to participate and available at the time data collection were included in the study.

The tools used for assessment included Sullivan cardiac self-efficacy scale and Quality of life scale (EQ-5D-5L) checklist. Sullivan cardiac self-efficacy scale included two dimensions having 13 items in which patient had to choose zero out of four answer categories. Each item of Sullivan cardiac self-efficacy scale was answered using a five-point Likert scalerangingfrom0=Notatall,1=Somewhatconfident,2=Moderatelyconfident,3=Veryconfident, 4=Completely confident. First dimension **represents a person's confidence that he/she can control symptoms (eight items) and the second that he/she can maintain functioning (five items).**

The EQ-5D-5L descriptive system included five dimensions (MOBILITY, SELF-CARE, USUAL ACTIVITIES, PAIN / DISCOMFORT and ANXIETY / DEPRESSION), having five response levels: no problems, slight problems, moderate problems, severe problems, unable to/extreme problems. The health state is indicated by checking the box representing most appropriate response level for each dimension. For quantitative measure of patient's perception of overall health, EQ VAS was used that recorded current health with two endpoints as 'The best health you can imagine' and 'The worst health you can imagine'.

Prior permission was taken from the developers of both the tools for using the tools in the study.

COMPONENTS OF CARDIAC REHABILITATION PROGRAMME (CRP)

CRP was developed considering the components to be included for improving self-efficacy and quality of life of patients with coronary artery disease. It was given to individual patients in the experimental group for a total of four days.

1.Exercise: On day one, after the pre-test, discussion and demonstration of Range of motion exercises, Aerobic exercises, Breathing Exercises,Stretching exercises, Six MinuteWalk Test,Walking was done in the morning for 30 minutes. Video regarding the exercises was sent to the patients in experimental group through whatsapp.

2.Diet: On day two**,** education and awareness regarding diet to be followed was given with the help of video and pamphlet.

3.Meditation: On day three, procedure of meditation was taught to the patients.

4.Medications: Education regarding the importance of taking medications was done on day four.

Videos were prepared for each component and were given to the patients in experimental group through the whatsapp group.

Data collection

On day one, pre assessment of patients' self-efficacy and quality of life was done through interview technique. The patients in the experimental group then received the comprehensive rehabilitation programme on an individual basis for a period of four days using discussion, demonstrations and pamphlet. The videos were sent each day for four days to reinforce the patients to follow the advices given during the rehabilitation programme. It took around 30 minutes to complete intervention on a single patient.

The patients in comparison group received routine care after pre assessment on day one. Routine assessments were carried out in both the groups by researcher every day for four days. In both the groups, post-test 1 was taken on 4th day and post-test 2 was taken telephonically on 15th day.

Socio Demographic and clinical variables

Demographic data of the family members compromised ten items(Age, Gender, Marital status, Educational status, Occupation status ,Family Income, Religion, Dietary pattern, Substance abuse, Have you ever attend any Comprehensive Rehabilitation programme and Clinical variables under study included ten items i.e. such as Height, Weight, BMI, Co morbid illness ,Blood pressure ,Length of stay in CCU, Diagnosis, , Ambulatory status, sleeping pattern, Are you performing Exercise on daily basis. In order to measures Cardiac self efficacy scale and Quality of life questionnaire was used.

Cardiac Self efficacy Scale

This questionnaire includes 13 items in which patient had to choose zero out of four answer categories .Each item of Sullivian cardiac self efficacy scale was answered using a five-point .Likert scale ranging from 0= Not at all, 1= Somewhat confident , 2=Moderately confident, 3=Very confident, 4=Completely confident. The control symptoms dimension consists of eight items and the maintain functioning dimension consists of the remaining five items. Standardized likert scale was taken for the a study after taking permission from the developer of the tool .[10] There are total 13 items each item is having minimum score is 0 and maximum score is 52.On the basis ,the reliability of Self-efficacy was found to be 0.7-1.A study conducted in North India indicated Cronbach,s alpha coefficients of 0.75,for Self-efficacy and total reliability, respectively.

Health related Quality of life

This questionnaire (EQ-5D-5L) was standardized tool developed for assessing the Quality of life . Each dimensions have three response levels of severity: no problems, some problems, extreme problems. The

EQVAS is a 0-100 scale patients are asked to indicate their overall health on the day of questionnaire [11]Standardized likert scale was taken for the a study after taking permission from the developer of the tool .There are total 5 items each item is having minimum score is 0 and maximum score is 100. The total reliability of the measure in the present study using Cronbach's alpha was obtained in 0.7-1.In the present study,the total reliability of the measure was obtained at 0.6.

Data Analysis

Statistical Analysis

The collected data were analyzed using SPSS version 20.

After checking the normality of data through Kolmogorov-Smirnovtest, parametric tests were applied (p>0.05). Both descriptive and inferential statistics were used to analyse the data. Range, mean, median and standard deviation were used to describe the data. Comparison between the groups was carried out by one way ANOVA, t test & Repeated Measure ANOVA test. For dichotomous variables, Chi-square test was used.

Results

In this study, fifty –six coronary artery disease patients in intervention and control groups were surveyed. Most of the study participants in both groups were female, were married, and were homemakers .The mean age of coronary artery disease patients in the intervention and control groups was 35.0 ± 5.79and 25.5 ± 3.90 years, respectively. There was a statistically insignificant difference in demographic data (t = 6.54, P = 0.00) [Table 1]. The mean age of the patients in the control and intervention groups was 32.85 ± 5.355and control group 35.05 ± 5.798 respectively. In addition, 84.6% and 30.% of the participants were male and female, respectively.

Table1:Demographic characteristics of the coronary artery disease patients in the two groups:

Socio demographic variables	Experimental group n=26 f (%)	Comparison Group n= 30 f(%)	χ^2	Df	p valve
1.Age					
1.1 20-40 years	2(7.7)	1(3.3)	0.56	3	0.90[NS]
1.2 41-60 years	12(46.2)	15(50.0)			
1.3 61-80years	10(38.5)	12(40.0)			
1.4 81-90years	2(7.7)	2(6.7)			
2. Gender					

2.1Male	22(84.6)	21(70.0)	1.66	1	0.19^{NS}
2.2 Female	4(15.4)	9(30.0)			
3. Educational status					
3.1 No Formal Education	7(26.9)	6(20.0)			
3.2 Primary Education	6(23.1)	17(56.7)	6.89	3	**0.07***
3.3 Secondary Education	11(42.3)	6(20.0)			
3.4 Higher Secondary	2(7.7)	1(3.3)			
3.5 Graduate	0	0			
3.6 Post- Graduate	0	0			
4. Occupational status					
4.1 House maker	5(19.2)	7(23.3)	7.22	4	0.12^{NS}
4.2 Laborer	3(11.5)	12(40.0)			
4.3 Government Employee	4(15.4)	1(3.3)			
4.4 Private Employee	10(38.5)	9(30.0)			
4.5 Business	4(15.4)	1(3.3)			
5. Family Monthly Income Less than Rs 10,000	2(7.7)	2(6.7)			
			7.22	3	**0.08***
5.2 Rs. 10,000- 30,000	15(57.7)	24(80.0)			
5.3 Rs 31,0000 -50,000	2(7.7)	3(10.0)			
5.4 Up to higher F	7(26.9)	1(3.3)			
6 . Religion					
6.1Hindu	18(69.2)	20(66.7)	2.31	3	0.50^{NS}
6.2 Muslim	4(15.4)	7(23.3)			
6.3 Christian	0	1(3.3)			
6.4 Sikh	4(15.4)	2(6.7)			
7. Marital status					
7.1 Single	2(7.7)	5(16.7)	2.36	3	0.50^{NS}
7.2 Married	22(84.6)	23(76.7)			

7.3 Widower	1(3.8)	2(6.7)			
7.4 Divorced	1(3.8)	0			
8. Dietary Pattern					
8.1 Vegetarian	9(34.6)	19(63.3)	6.16	2	0.46[NS]
8.2 Non vegetarian	12(46.2)	10(33.3)			
8.3 vegetarian	5(19.2)	1(3.3)			
9. Substance use					
9.1 Alcoholic(yes/No)	10(38.5) 16(61.5)	6(20.0) 24(80.0)	2.32	1	0.12[NS]
9.2Smoker/tobacco(Yes/No)	8(38.8) 18(69.2)	5(16.7) 25(83.3)	2.21	1	0.13[NS]
10. Have you ever attend any Comprehensive Rehabilitation programme?					
10.1Yes	0	0			
10.2No	26(100.0%)	30(100.0%)			

Table2: Clinical characteristics of the coronary artery disease patients in the two groups:

Clinical variables	Experimental group n=26 f (%)	Comparison Group n= 30 f(%)	$\chi2$	Df	P,value
1.Height					
1.1 140-160	7(34.6)	17(56.7)	1.97	1	0.96[NS]
1.2 161-180	19(65.4)	14(46.7)			
2.Weight					
2.1 30-60	4(15.4)	17(56.7)	10.1	1	0.00*
2.2 61-90	22(84.6)	13(43.3)			
3.BMI					
3.1Under weight(>18.5)	0	3(10.0)	3.32	2	0.19[NS]
3.2Normal weight(<18.5)	8(30.8)	11(36.7)			
3.3Overweight(<25-29.9)	18(69.2)	16(53.3)			
4.Presence of any co morbid illness					
4.1Yes	21(80.8)	22(73.3)	10.7	1	0.58[NS]

4.2No	5(19.2)	8(26.7)			
5.(A)Blood pressure					
5.1 100-120	6(23.1)	5(16.7)	19.6	3	0.00*
5.2 121-140	10(38.5)	8(26.7)			
5.3 141-160	10(38.5)	8(26.7)			
5.4 161-180	0	9(30.0)			
6.Length of stay in CCU/ICU					
6.1 1 to 3 days	0	0	1.85	1	0.00*
6.2 4 to 6 days	15(57.7)	15(50.0)			
6.3 7 to 10 days	11(42.3)	15(50.0)			
6.4 11 TO 14 days	0	0			
6.5 15 tyo 18 days	0	0			
7.Diagnosis					
7.1 Medical	20(76.9)	21(70.0)	0.34	1	0.56[NS]
7.2Surgical	6(23.1)	7(30.0)			
8.Sleeping pattern					
8.1No sleep	0	1(3.3)	2.48	4	0.64[NS]
8.2 1-3 Hours	2(7.7)	2(6.7)			
8.3 4-6 Hours	21(80.8)	23(76.7)			
8.4 7-8 Hours	2(7.7)	4(13.3)			
8.5 >8 hours	1(3.8)	0			
9.Ambulatory status					
9.1 Dependent	0	2(6.7)	2.72	1	0.25[NS]
9.2Partially Dependent	25(96.2)	25(83.3)			
9.3 Ambulatory	1(3.8)	3(10.0)			
10.Are you performing exercise on daily basis.					
10.1 Yes	26(100.0)	30(100.0)			
10.2 No					

Frequency and Percentage Distribution Showing Comparison of Experimental and Comparison in terms of level of Self-Efficacy with coronary artery disease patients after administration of Comprehensive Rehabilitation programme.(Table3)
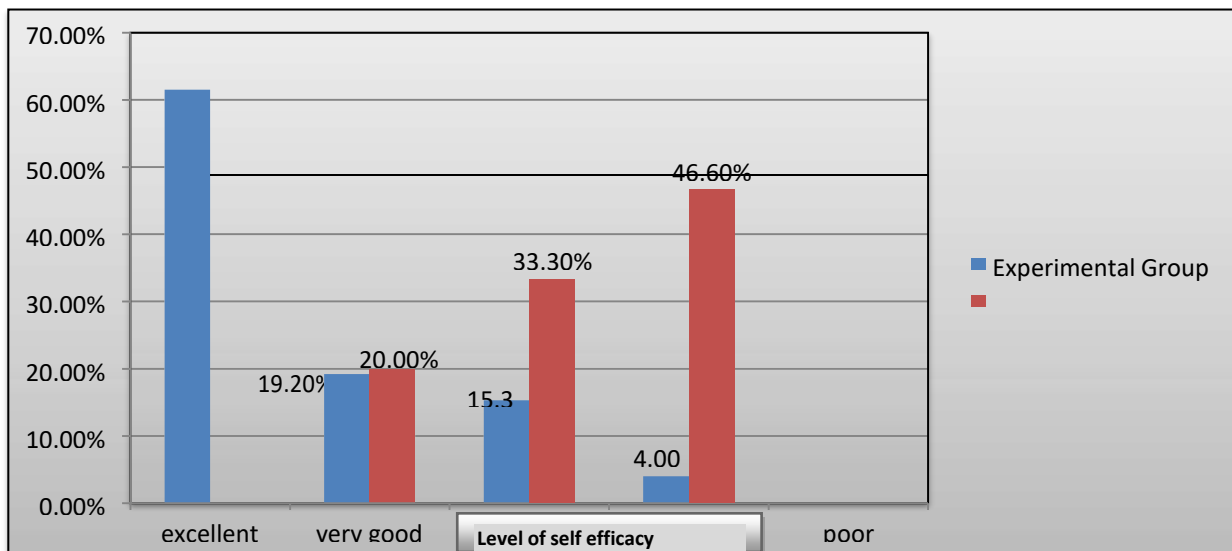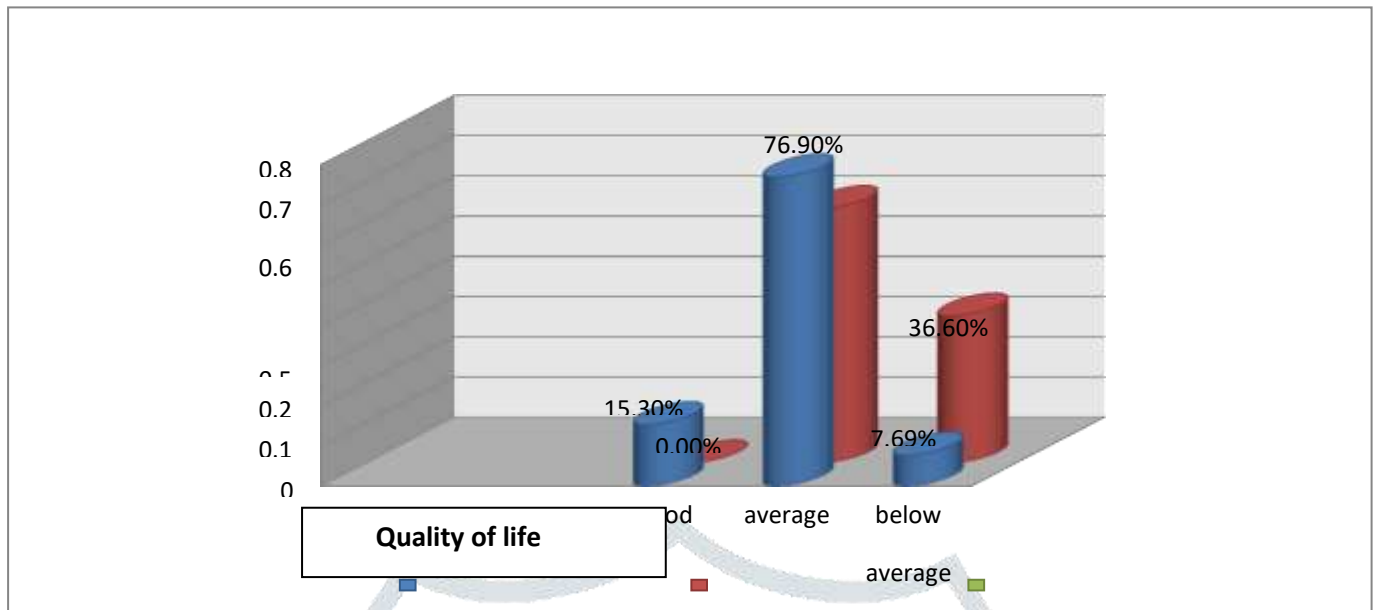
LEVEL OF SELF EFFICACY	RANGE OF SCORE	EXPERIMENTAL GROUP (N=26)	COMPARISON GROUP (N=30)
		POST TEST 2f(%)	POST TEST 2f(%)
Excellent	34-52	16(61.5)	0
Very Good	30-33	5(19.2)	6(20)
Good	24-29	4(15.3)	12(40)
Fair	18-23	1(4)	12(40)
Poor	0-17	0	0

Normality was evaluated using kolmogrov –Smironov test, and the results showed that it follow a normal distribution (P < 0.05). Repeated measure Anova showing the significant difference between groups in terms of self efficacy in experimental and comparison group. In experimental and comparison group there was significant difference in the self efficacy score in pre test (22.0),(17.9),post test 1 (32.8),(24.7),post test 2(35.0)(25.5) and computed F value was 130.2and 15.47which was statistically significant at 0.05 level of significance.**[Table 4].**

Day of intervention	Test	Mean	F value	P value
Experimental group (n=26)	Pre test Post-test 1 Post-test 2	22.0 32.8 35.0	130.2	.000*
Comparison group (n=30)	Pre test Post-test 1 Post-test 2	17.9 24.7 25.5	51.47	.000*

Frequency and Percentage Distribution Showing Comparison in terms of Level of Quality of life among coronary artery disease patients after administration of Comprehensive Rehabilitation programme in experimental and comparison group.**(Table5)**

LEVEL OF QUALITY OFLIFE	RANGE OF SCORE	EXPERIMENTAL GROUP(N=26) POST TEST 2 f(%)	COMPARISONGROUP(N=30) POST TEST2 f(%)
Good	75-100	4(15.3)	0
Average	51-74	20(76.9)	19(63.3)
Below Average	0-50	2(7.69)	11(36.6)

Group	Test	Mean	F value	P value
Experiment algroup (n=26)	Pre test Post-test 1 Post-test 2	12.6 12.0 12.5	0.70	0.49^{NS}
Comparisongroup (n=30)	Pre test Post-test 1 Post-test 2	11 11.2 11.9	2.06	0.13^{NS}

It Shows a depicts repeated measures ANOVA showing the significant difference between the group in terms of Quality of life in experimental and comparison group. In experimental and comparison group there was significant difference in the Quality of life score in pre test (12.6),(11.0),post test1(12.0),(11.2),post test2(12.5)(11.9) and computed F value was 0.70 and 2.06 ,p=0.49 ^{NS} and p=0.13^{NS} which was non significant in experimental and comparison group. **(Table6)**

Discussion

The study aimed to examine the impact of Coronary artery disease patients are provide Comprehensive rehabilitation programme on Self efficacy and quality of life improved of patients during the 1st day to 4th day after discharge provided education of Coronary artery disease patients. Before the patients support program was applied in present research ,the two groups are assessed in terms of Age, Gender, Marital status, Educational status, Occupation status ,Family Income, Religion, Dietary pattern, Substance abuse, Have you ever attend any Comprehensive Rehabilitation programme and Clinical variables under study included ten items i.e. such as Height, Weight, BMI, Co- morbid illness ,Blood pressure ,Length of stay in CCU, Diagnosis, , Ambulatory status, sleeping pattern, Are you performing Exercise on daily basis scores before intervention, While statistical revealed that there was no significant association of pre-test level of self efficacy score of the coronary artery disease patients with their selected variables in

Experimental group and comparison group.

Sullivian MD the CSE Scale, a questionnaire used to measure specific self-efficacy in patients with coronary disease. This differs from the original CSE Scale, which consists of two dimensions.12 Based on the present results, two substantial changes are suggested. The first change in the CSE Scale would be to divide the first eight items into two factors, where the first four items still represent the dimension control symptoms and the subsequent four items represent a new dimension, control illness. The second proposed change is to exclude item 8, which belongs to the dimension control illness. **Ungsinun Intarakamhang(2012) et. al** which showed that less than half(46.7&) of the participants were having Self-efficacy before administering the intervention. The mean self efficacy score in experimental and comparison group are administration of Comprehensive Rehabilitation Programme was 22.0&32.8 respectively and the p value was statically significant p=0.00[*,11]The result was consistent with the study conducted by **Asmaa Mohamed Khorais (2016)** which showed that Self-efficacy score before and after administration of the intervention was from 1.54 & 4.46 respectively and the p value was statistically significant p=0.00.[12]

K P Jyotishana (2018)et al The QOL scores of experimental group were significantly higher than the control group, at posttest 1 and posttest 2 in all domains except social domain at posttest 2 ($P < 0.05$). In both the groups, the QOL scores improved significantly within the group in each domain ($P < 0.05$)except social domain ($P > 0.05$).[13]

Jing Jing et al which showed that there was significant correlation between self efficacy and quality of life scores (r=0.453;p=0.01).[14] The result was consistent with the findings of the study conducted by **Huanhuan Hu(2013)et al** at which show that was no significant correlation was found between the self efficacy and Quality of life after comprehensive rehabilitation programme in experimental Group.(p=.0.005).[15] The result was consistent with the study conducted by **R. RADHA,(2015)et al** was no significant between the pre test self efficacyand quality of life score with selected demographic and clinical variables. [16]**Sharon L.Lewis,Denise Minner –Williams et al** which showed that there was significant association between pre test Self-Efficacy score and Occupational status of Patients.[17]

 Conclusion

As a result of the present study, Comprehensive Rehabilitation Programme (CRP) was found to be effective in improving thehealth related Self Efficacy and Quality of life among coronary artery disease patients.

Limitations

The results cannot be generalized to all coronary artery disease patients since the study The study was not able to be conducted for all the patients due to Covid-19.

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Conflicts of interest

There are no conflicts of interest.

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