

## EFFECTIVENESS OF SUPERVISED AND NON-SUPERVISED CARDIAC REHABILITATION ON SUBJECTS WITH POST CORONARY ARTERY BY-PASS SURGERY

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### ABSTRACT

**Aim:** To study the effect of supervised home based cardiac rehabilitation versus unsupervised home based cardiac rehabilitation in improving health related quality of life after CABG by MacNew questionnaire

**Method:** 60 subjects recruited for the study after CABG and they were conveniently allotted into supervised group and unsupervised group. Both the groups' baseline HRQOL is assessed by Macnew questionnaire in the hospital at the time of discharge. both groups were given home based cardiac rehabilitation program which includes, risk factors modifications, and life style modification and structured home based aerobic exercise program three to five sessions per week for 6 weeks. Supervised group is contacted during the study by house visit and phone calls but unsupervised group were not contacted for 6 weeks.

**Outcome measures:** Macnew HRQOL questionnaire was administered to assess the quality of life at baseline and after three months of rehabilitation program for both the groups.

**Results:** Significant improvements were found in both groups for the majority of subscales of Macnew HRQOL at first week and after 6 weeks of follow-up. However, these improvements did not differ significantly between the groups. Compared to the unsupervised group significant differences (P=0.012) for the emotional subscale were found and not much differences in physical (p<.41) and social (p<.68) domains of Macnew HRQOL in the supervised than the unsupervised group.

**Conclusion:** HRQOL after HBCR in CABG patients improved markedly over time, but no significant or clinically important differences were found when compared with supervised and unsupervised group. Thus work to further develop and test the effect of a SHBCR on HRQOL in patients undergoing rehabilitation following CABG is warranted.

**KEYWORDS:** Non supervised cardiac Rehabilitation, supervised cardiac Rehabilitation, Post CABG; HRQOL; MacNew HRQOL questionnaire

## I. INTRODUCTION

In the clinical course of CAD, there are many aspects where patient's quality of life may be affected.<sup>1</sup> Coronary artery bypass graft (CABG) surgery is a treatment of coronary artery disease (CAD).<sup>2</sup> Following CABG there may be many post-operative complications like hemorrhage, pain, infection of the suture site and other physical and psychological problems which could lead to change in quality of life. World Health Organization (WHO) defined quality of life (QOL) as individuals' perceptions of their placement in life, in the context of the cultures and values in the societies in which they live and in relation to the standardising goals and expectations concerns. Quality of life can also be defined as the subjective experience of a person's own life.<sup>3, 4</sup> The quality of life following CABG has been significant improvement when the individual has involving exercise as a part of cardiac rehabilitation.<sup>5</sup>

Cardiac rehabilitation (CR) is an individualized, comprehensive program developed by using various principles of rehabilitation medicine with the aim to maintain, restore, and increase the optimal physical, psychological, social, emotional, vocational, and economic status of patients with cardiovascular disease (CVDs). It requires a patient's active participation and involves medical evaluation, exercise prescription, cardiac risk reduction and modification, education, and counseling.<sup>6</sup> The goal of CR are to change the natural history of the disease, to reduce mortality and morbidity, to increase the patient's functional capacity, and ultimately to limit or reverse the pathological process leading to CVD.<sup>7-11</sup> Moderate to vigorous exercise is now prescribed not only for the prevention of ischemic heart disease but also as a major component of treatment after myocardial infarction, angioplasty, coronary bypass surgery, heart transplantation, congenital heart disease and stable congestive heart failure.<sup>12-18</sup>

In Indian population post CABG IInd and IIIrd phase cardiac rehabilitation awareness is growing and home based cardiac rehabilitation has been proved to be effective in improving quality of life.<sup>19</sup> Many people do follow it, may be its supervised or unsupervised follow up. How far it is realistic and accurate can be found out by this study through disease specific MacNew HRQOL questionnaire.

Sample selection: Inclusion criteria: Subject who is undergone CABG surgery, Both gender with age group of 40-70 The subjects were excluded from the study are Patients unable or unwilling to complete the study, CABG associated with other heart surgeries, Patients who are previously undergone CABG, Patients with severe respiratory and neurological problems, Patients with severe musculoskeletal problems.

Procedure: Subject who have undergone CABG and who fulfill the inclusion criteria are included in the study. A written informed consent is taken from all subjects prior to participation. All the subjects HRQOL assessed two times during the study by using MacNew HRQOL questionnaire. During inpatient cardiac rehabilitation standard intervention protocol is followed. Baseline reference evaluation at the last day of discharge by the MacNew HRQOL questionnaire and education and progression of activity as a home based exercise program and do's and don'ts also be taught to the patient as given below. Orientation to the cardiac rehabilitation program is given to all subjects, two sessions of informal health education about their condition and disease is given to these patients and to their family members and awareness about cardiac rehabilitation and its benefits also explained to the subjects. Risk factors modifications for individual patients, life style modification which include weight control advice nutrition, relaxation, behavior modification and smoking cessation advice also be given prior to the start of rehabilitation program.

Exercise component of cardiac rehabilitation program is an individualized program of aerobic exercises preferably brisk walking. Initial session of exercise prescription and training is given in the department under supervision and then the home program protocol is given to the all patient to be performed at home for 6 weeks. Training is given to all patients regarding palpating the pulse and calculating the heart rate and to perceive the Borg's Rating of Perceived Exertion (RPE) for monitoring the intensity.

Education also given to all subjects regarding signs and Symptoms to be monitored while doing exercise programs and the do and don'ts and the termination criteria for the exercises are explained properly to them. Brisk walking is the preferred mode of exercise with intensity 50 to 70% HRmax or RPE of 11 to 14

The duration of exercise program was 30 to 50 minutes/day– warm up session for 10 minutes which includes stretching and gentle active exercise to larger muscle groups like and trunk muscles, lower limb and aerobic

walking program for 20 to 30 minutes, and then finally cool down session for about 10 minutes which includes stretching exercises and gentle active exercise or walking with slow pace for at least four sessions per week for total durations of 6 weeks. above exercise program and training protocol is given according to the "Exercise Standards" A Statement for Healthcare Professionals from the American Heart Association.<sup>20</sup> Randomly subjects are divided into A and B groups. All the subjects divided in to two groups Group A comprises of subjects who are continued the exercise after discharge under supervision (supervised group) and Group B subjects who are continued the exercise after discharge without supervision (unsupervised group). Group A were regularly contacted to find whether they are adhering to the exercise program or not by direct home visit and by telephone. Any advice or change in program is given to subjects where it was necessary.

In the group B (unsupervised group) all 30 subjects were advised to enroll for home based cardiac rehabilitation and exercise home program were given to them. But not contacted for 6 weeks and contacted directly after 6 weeks for the assessment of HRQOL. Re- assessment has been taken from both the groups after 6 weeks from date of discharge.

## II. RESULTS

Scoring system of the Macnew HRQOL questionnaire: The contribution of each item in the Macnew questionnaire to the three domains of 'physical', 'emotional', and 'social' were evaluated. The maximum possible score for each item was 7 (good health-related quality of life) and the minimum 1 (poor health-related quality of life). The emotional score was calculated as the average of responses to 14 items contributing to the emotional domain; the Physical Score was the average of 13 items contributing to the physical domain, and the social score the average of 13 items contributing to the social domain. The scoring of the items in the three domains was in accordance with the recommended practice and a global score also was calculated. The quality of life scores in all the domains of Macnew HRQOL questionnaire score in between the group (Emotional  $p < 0.58$ , physical  $p < 0.91$ , and social  $p < 0.58$ , and global score is  $p < 0.89$ , shows there is no significant difference in the Macnew HRQOL questionnaire scores in any domains in the groups group were noted. The Mann-Whitney U test in-between group difference showed no significant difference (Table.1)

The quality of life scores in all the domains of Macnew HRQOL questionnaire in the supervised group (Emotional  $p < 0.0001$ , physical  $p < 0.0001$  and social  $p < 0.0001$  domains and global score is  $p < 0.0001$  showed significant improvement after 12 weeks compared to the baseline Macnew HRQOL score ( $p < 0.0001$ ). (Table.2)

The quality of life scores in all the domains of Macnew HRQOL questionnaire in the unsupervised group (Emotional  $p < 0.0001$ , physical  $p < 0.001$  and social  $p < 0.0001$  and global score is  $p < 0.0001$  domains showed significant improvement after 12 weeks compared to the baseline Macnew HRQOL score ( $p < 0.0001$ ). (Table.3) this within group difference is analyzed by Wilcoxon on signed rank test.

The quality of life scores in all the domains of Macnew HRQOL questionnaire in the supervised group Emotional  $p < 0.012$ , shows highly significant improvement but But there was not much significant improvement in the quality of life scores in physical  $p < 0.41$ , and social  $p < 0.68$ , domains global score is  $p < 0.48$  in the supervised group were noted. The Mann-Whitney U test in-between group difference showed significant improvement in the Emotional domain in supervised group compared to the unsupervised group after 12 weeks of home based cardiac rehabilitation (Table.4)

## III. DISCUSSION

The quality of life enhancement is a primary goal of rehabilitation following CABG internationally,<sup>21</sup> only a limited number (10– 30%) of heart disease patients participate in cardiac rehabilitation.<sup>22,23</sup> However, few randomised controlled trials (RCTs) have evaluated the effect of rehabilitation programs on CABG patients' health-related quality of life (HRQoL). RCTs have tested a home communication intervention by telephone calls<sup>24</sup> or telehealth device,<sup>25,26</sup> weekly group sessions with a behavioural and educational intervention,<sup>27</sup> multidisciplinary cardiac rehabilitation groups<sup>28</sup> and home-based versus hospital-based cardiac rehabilitation focusing on exercise<sup>29</sup>

Thus, there is limited evidence on what should be included and what works in cardiac rehabilitation programs. No study on a supervised home-based cardiac rehabilitation of CABG patients was found. The

baseline data of the demographic and outcome variables did not show any statistical significant difference between the patient population in both groups. Out of total 60 patients enrolled in the study, 50 completed with a dropout rate of 16 percentages. Out of this dropouts 7 (23%) from unsupervised group and 3(10%) from supervised group. This indicates that there was good participation in the supervised home based cardiac rehabilitation program than unsupervised home based cardiac rehabilitation program. In previous studies, the drop rates reported were 20 percentages in the first three months to 50% at sixth month.<sup>30-33</sup>

Drop outs from our study may be due to compliance of individual with program, family, cultural and social constraints. The most common reason cited for dropping out of the rehabilitation program was work, followed by lack of motivation or commitment.<sup>34</sup>

Among the 50 patients who completed the program, 23 had undergone unsupervised home based cardiac rehabilitation and 27 had supervised. Demographic characteristics of the patients across the two groups were homogenous.

In our study we found that the supervised home based program for coronary artery bypass graft patients has led to a significant improvement in all the domains of MacNew HRQOL questionnaire score demonstrated improvements in emotional, physical and social components. Several studies have shown that organized, high-intensity exercise regimens can benefit HRQL in both diseased and healthy populations.<sup>5</sup> Our group have conducted research relevant to physiotherapeutic intervention on various neurological and musculoskeletal ailments<sup>35-40</sup>, this chronic respiratory disorder warrants further experimental research by our group in signifying the results. Our study extends these findings by showing that structured and intense supervised home based program is positively related to multiple domains of HRQOL in CABG patients. An active lifestyle preserves physical function, which may possibly contribute to higher levels of HRQL scores in domains related to physical health.

The present study supports the notion that group having higher physical activity levels had greater values but not statistical significant in all of the domains of HRQOL except emotional domain related to physical health than their more sedentary counterparts without any structured exercise program.<sup>41</sup>

An alternate explanation is that individuals change overtime and the basis on which they make a HRQOL judgment may also change. The nature of response shift is highly complex and has important implications for interpretation of results when change scores measured over time are analyzed.<sup>41</sup>

Lack of motivation psychological support and an proper guidance and progression exercise component may have contributed to the insignificant changes in Strategies also need to be developed that will improve the referral from physicians and surgeons to cardiac rehabilitation program and wide spread awareness initiative are needed to improve the quality of life in cardiac patients in the developing countries.<sup>19</sup> This study addressed the limiting factor which usually affects patient's participations to the institution based cardiac rehabilitation programs in developing country like India hence initially patients with coronary heart diseases who had been surgically managed can be given supervised Home based program which is be feasible, cost effective and benefits the patients with coronary artery disease who undergone CABG surgery in improving their quality of life till adequate facilities and awareness is created to be feasible for institutional based rehabilitation and simple unsupervised home based cardiac rehabilitation .

#### IV. CONCLUSION

Based on the statistical outcome and available literature, it is concluded that the HRQoL after HBCR in CABG patients improved markedly over time, but no significant or clinically important differences were found when compared with supervised and unsupervised group. Thus, work to further develop and test the effect of a SHBCR on HRQoL in patients undergoing rehabilitation following CABG is warranted.

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Table 1: Baseline Macnew HRQoL score in between SHBCR & USHBCR group

Domain	Supervised	Unsupervised	P value
Emotional	4.42±1.10	4.51±0.89	>0.58 NS
Physical	4.45±1.21	4.42±0.92	>0.90 NS
Social	4.48±1.25	4.20±0.89	>0.58 NS
Global	4.49±1.12	4.37±0.80	>0.87 NS

Table 2: Effect of Supervised home based cardiac rehabilitation group

Domain	Pre	Post	P value
Emotional	4.42±1.10	6.25±0.57	<0.0001 (VHS)
Physical	4.42±1.21	6.23±0.46	<0.0001 (VHS)
Social	4.48±1.25	6.05±0.50	<0.0001 (VHS)
Global	4.49±1.13	6.16±0.47	<0.0001 (VHS)

Table 3: Effect of Non supervised home based cardiac rehabilitation group

Domain	Pre	Post	P value
Emotional	4.51±0.89	5.79±0.52	<0.0001 (VHS)
Physical	4.42±0.92	5.99±0.55	<0.0001 (VHS)
Social	4.20±0.88	5.84±0.51	<0.0001 (VHS)
Global	4.37±0.82	5.87±0.47	<0.0001 (VHS)

Table 4: Effect of mean gain in Improvement Between the SHBCR & USHBCR group.

Domain	Supervised	Unsupervised	P value
Emotional	1.83±0.887	1.28±0.60	<0.012 (Sig)
Physical	1.76±1.05	1.57±0.89	>0.41 (NS)
Social	1.56±1.06	1.64±0.75	>0.68 (NS)
Global	1.67±0.97	1.50±0.66	>0.49 (NS)