

## EFFECTS OF CARDIAC REHABILITATION

## P5792 | BEDSIDE

## Cardiac rehabilitation: does age matter?

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**Purpose:** Although a great proportion of patients with coronary heart disease have more than 65 years old, frequently they are not included in the studies and are less likely to be referred to a Cardiac Rehabilitation Program (CRP).

Our aim was to study the effectiveness of CRP in this age range.

**Methods:** We studied 904 consecutive patients that participated in our multidisciplinary CRP. From those, we enrolled patients with known coronary heart disease, after acute coronary syndrome or elective revascularization (729 patients).

The subjects performed 45 minutes of supervised aerobic exercise during approximately 12 weeks, 2/week. We measured different laboratory and clinical parameters at the beginning and at the end of the CRP, including a treadmill stress test.

A cut-off of 65 years-old was used to dichotomize age. The proBNP levels, maximal exercise capacity, heart rate reserve and chronotropic recovery were evaluated as prognostic markers to access the benefits of the CRP.

**Results:** Approximately 36% of our patients had more than 65 years-old and 75% were male.

At baseline, older patients had higher proBNP levels ( $1253 \pm 1802$  pg/mL vs  $530 \pm 590$  pg/mL;  $p < 0.001$ ) and lower functional capacity ( $7.23 \pm 2.1$  METs vs  $9.7 \pm 6.29$  METs;  $p < 0.001$ ). The heart rate reserve and chronotropic recovery were significantly better in younger patients ( $51.6 \pm 9.4\%$  vs  $47.2 \pm 10.7\%$ ,  $p < 0.001$ ;  $23.6 \pm 11.1$  bpm vs  $18.3 \pm 8.8$  bpm,  $p < 0.001$ ).

After the CRP, there was a statistically significant improvement in proBNP levels, maximal exercise capacity, heart rate reserve and chronotropic recovery in both groups.

The degree of improvement in heart rate reserve and chronotropic recovery was similar between the groups. Likewise, the change in functional capacity after CRP was not statistically different, but interestingly there was a trend for a greater improvement in older patients. The improvement in proBNP was also higher in elderly patients ( $-633 \pm 78$  pg/mL vs  $-260 \pm 23$  pg/mL,  $p < 0.001$ ).

**Conclusions:** The benefits of cardiac rehabilitation in terms of functional capacity and prognostic markers were comparable, and even more expressive, in elderly patients. However, since they had lower values at baseline, they could have a greater potential for improvement.

Therefore, if these patients don't have limitations that unable them to participate in a CRP, they should be strongly encouraged to perform systematic and initially supervised exercise training.

Cardiac Rehabilitation is an important secondary prevention strategy in coronary heart disease patients, regardless of age.

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## Status of cardiac rehabilitation services in low- and middle-income countries

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**Purpose:** Despite the benefits of cardiac rehabilitation (CR), there is lack of data on the availability, characteristics, and barriers to feasible CR services in low- and middle-income countries (LMIC). The objectives of this study were to assess the availability and characteristics of CR services and identify barriers to CR implementation and participation in LMIC.

**Methods:** Sixty national cardiac societies, heart associations, and heart foundations and 100 cardiac specialists from LMIC throughout the World Health Organization regions were asked whether CR services were provided to adult cardiac patients at any institute in their countries. Responses were received from 40 LMIC. Of these, cardiac specialists from 23 countries that offered CR services completed a questionnaire which examined the characteristics of the CR services provided by the facility, patients' barriers to CR participation, and approaches that could transcend barriers to participation in CR. Cardiac specialists from 10 countries that did not offer CR services completed another questionnaire which assessed barriers to successful implementation of a CR programme and feasible components for sustainable CR.

**Results:** CR services were available in 26 LMIC (questionnaire non-response=3 LMIC). CR components included exercise training (100%), healthy diet advice (100%), psychological support (95.7%), and smoking cessation (91.3%). Funding sources to operate the CR programmes were private insurance (4.5%), private (40.9%), central government (50.0%), and mixed (22.7%). Cardiac specialists reported "distance to the facility," "costs," and "lack of support/referral from doctor" as the leading barriers for CR participation for patients. Many of the respondents (68.2%) were in favour of a decentralized health care system and listed automatic referral and increasing cardiac specialists' and patients' knowledge regarding CR to transcend barriers.

CR services were not available in 14 LMIC (questionnaire non-response=4 LMIC). The most endorsed barriers for successful implementation of a CR programme were "lack of economic resources," "lack of qualified personnel," "lack of equipment," and "rehabilitation is not supported by health policies." Cardiac specialists

listed patient education, smoking cessation, and counselling regarding medications and diet as feasible components for sustainable CR in these countries.

**Conclusion:** The results suggest the need to increase the availability and accessibility of cost-effective and feasible CR services in low-resource settings to assist in reducing the rate of premature mortality in patients with heart disease.

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## Additional telerehabilitation contributes to a sustained improvement in physical fitness in coronary artery disease patients, who have completed phase 2 of cardiac rehabilitation

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**Purpose:** The purpose of the study was to evaluate whether the addition of a motion sensor with automated feed-back by email or SMS to cardiac rehabilitation (CR) could result in improved health conditions of coronary artery disease (CAD) patients.

**Methods:** 80 CAD patients in phase II of the CR program were included in this RCT after admission for PCI or CABG. Patients with a defibrillator, important arrhythmias or severe heart failure (NYHA class III and IV) were excluded from the trial. The patients in the intervention group ( $n = 40$ ) were asked to wear the motion sensor continuously during the day for 18 weeks. Each week patients received new step goals. The feedback program was designed to gradually increase the patients' activity level. In the control group ( $n = 40$ ), the patients wore an unreadable motion sensor three times for one week for measurement purposes only (week 1, 6 and 18). All patients performed a maximal cardiopulmonary exercise test at week 1, 6 and 18 to determine their VO<sub>2</sub> peak.

**Results:** In the intervention group, the increase in VO<sub>2</sub> peak ( $26.88 \pm 220.33$  ml/min) was significantly higher, than in the control group ( $285.89 \pm 385.44$  ml/min) ( $P = 0.014$ ) at 18 weeks of follow-up (Wilcoxon Signed Rank test). A significant correlation was found between the daily step count and the improvement in VO<sub>2</sub> peak ( $P = 0.030$ ) with a correlation coefficient of 0.473 (Spearman test). The Kaplan-Meier curve showed a trend toward fewer rehospitalisations for patients in the intervention group ( $P = 0.167$ ) (Figure 1).

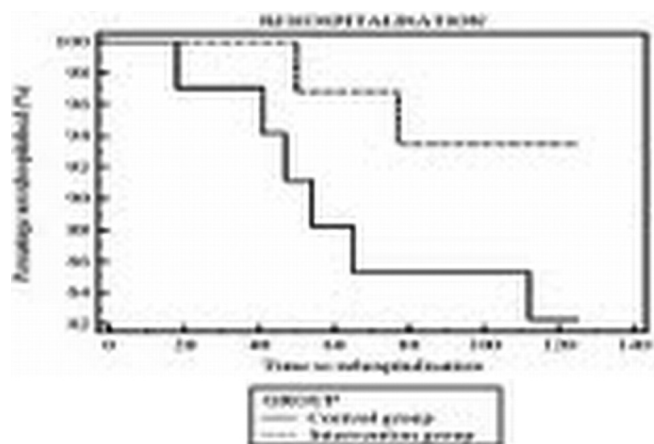


Figure 1. Time to rehospitalisation (days)

**Conclusions:** The addition of a telerehabilitation program to conventional CR resulted in a larger improvement in the patient's physical fitness (VO<sub>2</sub> peak), that correlated with the increase in daily step count. Also the intervention group showed a trend toward fewer rehospitalisations.

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## Functional capacity benefits of cardiac rehabilitation after acute coronary syndrome are sustained in time and independent of left ventricle systolic function

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**Background:** Cardiac rehabilitation has a well known positive impact on physiological and psychosocial status. Left ventricular dysfunction is often regarded as a criterion for postponing referral, even though LV function might not impact on the degree of improvement achieved by the program. The purpose of this study was to evaluate if the benefits of a cardiac rehabilitation program (CRP) after acute coronary syndrome (ACS) on functional capacity (FC) and quality of life perception (QoL) are sustained in time (at 12 month follow up) independently of left ventricular function.

**Methods:** We enrolled 277 consecutive patients who completed a phase 2 CRP after an ACS. Functional capacity (FC) was evaluated in metabolic equivalents