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# Contents

# Articles

# Exercise

**1. Exercise training workloads in cardiac rehabilitation are associated with clinical outcomes in patients with heart failure**

**Author(s):** Keteyian S.J.; Kerrigan D.J.; Lewis B.; Ehrman J.K.; Brawner C.A.

**Abstract:**Background: In patients with coronary heart disease, the exercise workload (i.e., metabolic equivalents of task, METs) at which patients exercise train upon entry and completion of cardiac rehabilitation (CR) are independently related to prognosis. Unknown is the association between exercise training workloads in CR and clinical outcomes in patients with heart failure (HF). Methods: Patients with HF who participated in an early outpatient CR program were used in this retrospective analysis. Exercise workloads upon entry and completion of CR were converted to METs. The primary outcome was all-cause mortality and the secondary outcome was HF hospitalization. Cox regression analysis was used to assess the adjusted risk between MET levels in CR and clinical outcomes. Results: Among 707 patients, the median exercise training workload at the start and end of CR was 2.5 METs (IQR 2.1 to 3.1 METs) and 3.2 METS (IQR 2.7 to 4.1 METs), respectively, for men and 2.2 METs (IQR 1.9 to 2.6 METs) and 2.9 METS (IQR 2.3 to 3.4 METs), respectively, for women. There were 242 deaths and 266 HF hospitalizations. METs achieved at the end of CR had the strongest independent association with all-cause mortality (adjusted HR, 95% CI: 0.58, 0.48-0.70) and HF hospitalization (adjusted HR, 95% CI: 0.62, 0.52-0.74). Each 1 MET higher work load at the end of CR was associated with a 42% and 38% lower adjusted risk for all-cause mortality and HF hospitalization, respectively. Conclusions: In a diverse cohort of patients with chronic HF our data suggests that an easily accessible measure of exercise capacity (i.e., METs) that is collected during CR is independently associated with the adjusted risk for both all-cause mortality and HF-specific

hospitalization. Training at MET levels <3.5 METs identifies patients that might benefit from closer clinical surveillance and reinforced adherence to medical and lifestyle preventive strategies.Copyright © 2018 Elsevier, Inc.

**Database:** EMBASE

## 2. Validation of Exercise Capacity as a Surrogate Endpoint in Exercise-Based Rehabilitation for Heart Failure: A Meta-Analysis of Randomized Controlled Trials

**Author(s):** Ciani O.; Walker S.; Warren F.C.; Taylor R.S.; Piepoli M.; Smart N.; Uddin J.; Zwisler A.D.; Davos C.H.

**Abstract:**Objectives: This study sought to validate exercise capacity (EC) as a surrogate for mortality, hospitalization, and health-related quality of life (HRQOL). Background: EC is often used as a primary outcome in exercise-based cardiac rehabilitation (CR) trials of heart failure (HF) via direct cardiorespiratory assessment of maximum oxygen uptake (VO2peak) or through submaximal tests, such as the 6-min walk test (6MWT). Methods: After a systematic review, 31 randomized trials of exercise-based CR compared with no exercise control (4,784 HF patients) were included. Outcomes were pooled using random effects meta-analyses, and inverse variance weighted linear regression equations were fitted to estimate the relationship between the CR on EC and all-cause mortality, hospitalization, and HRQOL. Spearman correlation coefficient (rho), $R^2$ at trial level, and surrogate threshold effect (STE) were calculated. STE represents the intercept of the prediction band of the regression line with null effect on the final outcome. Results: Exercise-based CR is associated with positive effects on EC measured through VO2peak (+3.10 ml/kg/min; 95% confidence interval [CI]: 2.01 to 4.20) or 6MWT (+41.15 m; 95% CI: 16.68 to 65.63) compared to control. The analyses showed a low level of association between improvements in EC (VO2peak or 6MWT) and mortality and hospitalization. Moderate levels of correlation between EC with HRQOL were seen (e.g., $R^2<52\%$; rho< 0.72). Estimated STE was an increase of 5 ml/kg/min for VO2peak and 80 m for 6MWT to predict a significant improvement in HRQOL. Conclusions: The study results indicate that EC is a poor surrogate endpoint for mortality and hospitalization but has moderate validity as a surrogate for HRQOL. Further research is needed to confirm these findings across other HF interventions.Copyright © 2018

**Database:** EMBASE

## 3. Cardiac Rehabilitation Participation Rates and Outcomes for Patients with Heart Failure

**Author(s):** Rengo J.L.; Savage P.D.; Ades P.A.; Barrett T.

**Abstract:**Purpose: Exercise training has been shown to reduce combined cardiovascular mortality and hospitalizations in patients with chronic heart failure (CHF) with reduced ejection fraction (HFrEF). Whereas there are extensive data on exercise training for individuals with HFrEF in a research setting, the experience of delivering cardiac rehabilitation (CR) services in the clinical

setting has not been well described. With little knowledge regarding the number of qualifying patients with HFrEF in the United States, we described our 18-month experience recruiting hospitalized inpatients and stable outpatients into phase 2 CR. Methods: Patients hospitalized with CHF HFrEF were tracked for enrollment in CR. Exercise training response was described for patients identified as inpatients and for stable HFrEF outpatients referred from cardiology clinic or heart failure clinic. Results: The cohort included 83 patients hospitalized with CHF and 36 outpatients. Only 17% (14/83) of eligible HFrEF inpatients enrolled in CR following CHF hospitalization compared with 97% (35/36) outpatient referrals. Improvements in aerobic capacity for the total cohort were observed whether expressed as estimated metabolic equivalents (n = 19, 4.6 +/- 1.6 to 6.2 +/- 2.4, P <.0001) or o2peak (n = 14, 14.4 +/- 3.5 to 16.4 +/- 4.6 mL/kg/min, P =.02) for those who completed CR. Conclusion: Significant barriers to recruiting and enrolling patients with HFrEF were observed and only 17% of inpatients attended CR. Systematic in-hospital referral with close followup in the outpatient setting has the potential to capture more eligible patients. The participation of referred stable outpatients with HFrEF was much higher. Regardless of the referral source, patients with HFrEF completing CR can expect improvements in aerobic capacity, muscle strength, and depressive symptoms.

**Database:** EMBASE

### 4. Physical training and cardiac rehabilitation in heart failure patients

**Author(s):** de Gregorio C.

**Publication Date:** 2018

**Publication Type(s):** Chapter

**Abstract:**Regardless of advances in medical and interventional treatment of cardiovascular disease (CVD), a limited number of patients attend a cardiac rehabilitation (CR) programme on a regular basis. Due to modern therapies more individuals will be surviving an acute cardiovascular event, but the expected burden of chronic heart failure will be increasing worldwide. However, both in high- and low-income countries, secondary prevention after an acute myocardial infarction or stroke has been implemented in less than a half of eligible patients. Combined interventions are still needed to reduce decompensations, hospitalizations and mortality in heart failure patients from any origin. In addition to medical treatments, regular exercise has been demonstrated to improve metabolic and hemodynamic conditions in both asymptomatic risk factor carriers and cardiac patients. Risk factor control and exercise should gather together for an effective management of patients. Exercise-based training is a core component of primary and secondary prevention. It should involve healthy carriers of cardiovascular risk factors, and patients with cardiomyopathy as well. The supposed attenuated effect of CR in the era of advanced revascularization and structural interventions is due to the heterogeneity of training models and physical training in the literature. Moreover, lifestyle modification, psycho-social challenges and patient's compliance are potential confounders. In this chapter the most recent evidences about training modalities and potential benefit of CR in heart failure patients are discussed.Copyright © 2018, Springer International Publishing AG.

**Database:** EMBASE

**5. Effect of cardiac rehabilitation on muscle mass, muscle strength, and exercise tolerance in patients with heart failure**

**Author(s):** Kim K.; Lee S.; Hong S.; Kim S.

**Source:** Journal of Heart and Lung Transplantation; Apr 2018; vol. 37 (no. 4)

**Publication Date:** Apr 2018

**Publication Type(s):** Conference Abstract

**Abstract:**Purpose: Patients with heart failure (HF) are generally advised to train at much lower workloads than the standard guidelines for strength training suggest. The effects of cardiac rehabilitation (CR) on muscle mass, muscle strength, and exercise tolerance in patients with HF who received CR during and after hospitalization have not been fully elucidated. Methods: We enrolled 258 consecutive patients who completed a supervised CR for 6 months after HF hospitalization. We measured mid-upper arm muscle area (MAMA), handgrip power (HGP), muscle strength of the knee extensor (Ext) and flexor (Flex), and exercise tolerance at the beginning and end of CR. Outcome measures were changes in muscular strength, cardiopulmonary function (VO2max), maximal short exercise capacity, body composition and health-related quality of life (HRQOL) between baseline and follow-up. Results: Ejection fraction (EF) of 126 patients at baseline was under 50% (HFrEF) and the other 132 patients was over 50% (HFpEF). No significant differences in confounding factors, including age, gender, or number of CR sessions, were observed between the two groups. At the beginning of CR, the levels of Ext muscle strength and peak VO2 were significantly lower in the HFrEF group than in the HFpEF. At the end of CR, significant improvement in the levels of muscle strength, HGP, and exercise tolerance was observed in both groups. The levels of Ext muscle strength, HGP, thigh circumference, and MAMA were significantly lower in the HFrEF group than in the HFpEF group. However VO2 max increased more significantly in HFrEFby 20% than in HFpEF by 12%. Different functional scales of HRQOL improved (p < 0.01), with effect sizes varying from 0.47 to 0.82. Muscle strength correlated significantly with physical functioning before and after the training program. At the end of CR, the levels of thigh circumference and MAMA correlated with Ext and Flex muscle strength as well as with HGP. Percent changes in the levels of Ext muscle strength were significantly correlated with those of MAMA and VO2 max. Conclusion: These data suggest that improvement in muscle strength may be influenced by changes in muscle mass and VO2 max in HF patients undergoing CR after hospitalization. A CR program, including muscle mass intervention and education, may improve deterioration in exercise tolerance in HF patients both HFrEF and HFpEF.

**Database:** EMBASE


**6. A physical rehabilitation program is effective in pediatric patients awaiting heart transplant: A case series**

**Author(s):** Vogel C.; Allen K.; Thrush P.; Gambetta K.; Ward K.; Jackson L.

**Source:** World Journal for Pediatric and Congenital Hearth Surgery; Mar 2018; vol. 9 (no. 2)

**Publication Date:** Mar 2018

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Cardiac rehabilitation is successful at improving quality of life, aerobic capacity, and strength in adult heart transplant patients. Despite its documented benefits in adults, there is limited experience in pediatric patients. Five hospitalized patients (three males, aged 12-18 years old) listed status 1a for heart transplant participated in physical therapy and formalized exercise programs in the inpatient setting. Two of the patients carried a diagnosis of dilated cardiomyopathy and were supported with Heartware HVAD. Three patients with failing Fontan

physiology were supported with intravenous milrinone while waiting for transplant. Methods: Patients participated in biweekly physical therapy sessions pretransplant consisting of aerobic exercise, ventila-tory efficiency training via incentive spirometry, and lower extremity (LE) strengthening. Aerobic exercise consisted of interval training; patients walked 100-to 200-foot distances "fast," followed by 100-to 200-foot distances "slow." LE strengthening consisted of step-ups, squats, and lunges. Outside of sessions, patients were asked to participate in daily walks, incentive spirometry, and LE exercises. The patients' aerobic progress was monitored with the six-Minute Walk Test (6MWT) and their LE muscular endurance was measured with the 30-second chair rise test. Results: An average of 27 total sessions (range 10-39) were completed per patient, with an average of 7 sessions per patient completed posttransplant (range 5-9). Aerobic capacity as measured by 6MWT increased from an average of 1,084.7 ft at initial evaluation (range 868.5-1,306 ft) to 1,848 ft prior to transplant (range 1,434-2,338 ft), with two-to three-week posttransplant average distances of 1,798 ft (range 1,440-2,158 ft). Scores on the 30-second chair rise test increased from an average of 14.8 repetitions on first evaluation (range 9-16), to 25.2 repetitions pretransplant (range 14-40), and 28 repetitions two to three weeks post-transplant (range 16-45). All patients were successfully extubated on postoperative day 1 after transplant. There were no major adverse events associated with physical therapy sessions pre-or posttransplant. Conclusions: An inpatient physical rehabilitation program can be safely implemented and is effective in improving aerobic capacity and LE muscular endurance in pediatric patients awaiting heart transplants while supported medically or mechanically. Additional trials with larger cohorts and formal cardiac rehabilitation programs are warranted.

**Database:** EMBASE


**7. Exercise-based cardiac rehabilitation for adults with stable angina**

**Author(s):** Long L.; Anderson L.; Dewhirst A.M.; Taylor R.S.; He J.; Gandhi M.; Bridges C.

Available  at Cochrane Database of Systematic Reviews -  from Cochrane Collaboration (Wiley)

**Abstract:**Background: A previous Cochrane review has shown that exercise-based cardiac rehabilitation (CR) can benefit myocardial infarction and post-revascularisation patients. However, the impact on stable angina remains unclear and guidance is inconsistent. Whilst recommended in the guidelines of American College of Cardiology/American Heart Association and the European Society of Cardiology, in the UK the National Institute for Health and Care Excellence (NICE) states that there is "no evidence to suggest that CR is clinically or cost-effective for managing stable angina". Objectives: To assess the effects of exercise-based CR compared to usual care for adults with stable angina. Search methods: We updated searches from the previous Cochrane review 'Exercise-based cardiac rehabilitation for patients with coronary heart disease' by searching the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, DARE, CINAHL and Web of Science on 2 October 2017. We searched two trials registers, and performed reference checking and forward-citation searching of all primary studies and review articles, to identify additional studies. Selection criteria: We included randomised controlled trials (RCTs) with a follow-up period of at least six months, which compared structured exercise-based CR with usual care for people with stable angina. Data collection and analysis: Two review authors independently assessed the risk of bias and extracted data according to the Cochrane Handbook for Systematic Reviews of

Interventions. Two review authors also independently assessed the quality of the evidence using GRADE principles and we presented this information in a 'Summary of findings' table. Main results: Seven studies (581 participants) met our inclusion criteria. Trials had an intervention length of 6 weeks to 12 months and follow-up length of 6 to 12 months. The comparison group in all trials was usual care (without any form of structured exercise training or advice) or a no-exercise comparator. The mean age of participants within the trials ranged from 50 to 66 years, the majority of participants being male (range: 74% to 100%). In terms of risk of bias, the majority of studies were unclear about their generation of the randomisation sequence and concealment processes. One study was at high risk of detection bias as it did not blind its participants or outcome assessors, and two studies had a high risk of attrition bias due to the numbers of participants lost to follow-up. Two trials were at high risk of outcome reporting bias. Given the high risk of bias, small number of trials and participants, and concerns about applicability, we downgraded our assessments of the quality of the evidence using the GRADE tool. Due to the very low-quality of the evidence base, we are uncertain about the effect of exercise-based CR on all-cause mortality (risk ratio (RR) 1.01, 95% confidence interval (CI) 0.18 to 5.67; 195 participants; 3 studies; very low-quality evidence), acute myocardial infarction (RR 0.33, 95% CI 0.07 to 1.63; 254 participants; 3 studies; very low-quality evidence) and cardiovascular-related hospital admissions (RR 0.14, 95% CI 0.02 to 1.1; 101 participants; 1 study; very low-quality evidence). We found low-quality evidence that exercise-based CR may result in a small improvement in exercise capacity compared to control (standardised mean difference (SMD) 0.45, 95% CI 0.20 to 0.70; 267 participants; 5 studies, low-quality evidence). We were unable to draw conclusions about the impact of exercise-based CR on quality of life (angina frequency and emotional health-related quality-of-life score) and CR-related adverse events (e.g. skeletomuscular injury, cardiac arrhythmia), due to the very low quality of evidence. No data were reported on return to work. Authors' conclusions: Due to the small number of trials and their small size, potential risk of bias and concerns about imprecision and lack of applicability, we are uncertain of the effects of exercise-based CR compared to control on mortality, morbidity, cardiovascular hospital admissions, adverse events, return to work and health-related quality of life in people with stable angina. Low-quality evidence indicates that exercise-based CR may result in a small increase in exercise capacity compared to usual care. High-quality, well-reported randomised trials are needed to assess the benefits and harms of exercise-based CR for adults with stable angina. Such trials need to collect patient-relevant outcomes, including clinical events and health-related quality of life. They should also assess cost-effectiveness, and recruit participants that are reflective of the real-world population of people with angina.Copyright © 2018 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

**Database:** EMBASE


**8. Effect of an exercise-based cardiac rehabilitation program "Baduanjin Eight-Silken-Movements with self-efficacy building" for heart failure (BESMILE-HF study): Study protocol for a randomized controlled trial**

**Author(s):** Chen X.; Lundborg C.S.; Marrone G.; Wen Z.; Jiang W.; Lu W.; Lin X.

**Source:** Trials; Mar 2018; vol. 19 (no. 1)

**Publication Date:** Mar 2018

**Publication Type(s):** Article

Available at Trials - from BioMed Central

Available at Trials - from Europe PubMed Central - Open Access

Available at Trials - from EBSCO (MEDLINE Complete)

Available at Trials - from PubMed Central

**Abstract:**Background: Exercise-based cardiac rehabilitation is a beneficial therapy for patients with chronic heart failure. The delivery of exercise-based cardiac rehabilitation should adopt an evidence-based approach, as well as be culturally appropriate and sensitive to individual needs and preferences. The Baduanjin Eight-Silken-Movements with Self-efficacy Building for Heart Failure (BESMILE-HF) program is the first to apply a traditional Chinese exercise, Baduanjin, as the core component in an exercise-based cardiac rehabilitation program. This trial aims to assess the efficacy, safety, and acceptability of the addition of the BESMILE-HF program to usual medications for patients with chronic heart failure. Methods/design: The BESMILE-HF study is a mixed-design study. It includes a two-group, parallel, randomized controlled trial with 200 chronic heart failure patients, as well as a qualitative component. Patients will be randomized into either an intervention group receiving the 12-week BESMILE-HF program plus usual medications, or a control group receiving only usual medications. The primary outcomes are peak oxygen consumption assessed using a cardiopulmonary exercise test, and disease-specific quality of life using the Minnesota Living with Heart Failure Questionnaire. The secondary outcomes are: exercise performance, exercise self-efficacy, general quality of life, dyspnea and fatigue, depression, cardiac function, prognostic and inflammatory indicator levels, hospitalization, use of medications, and major adverse cardiac events. Assessments will be carried out at baseline, and at the 4th week, 8th week, and 12th week. The qualitative component will include a semi-structure interview describing patients' experiences with the intervention. Discussion: This study can provide evidence for how to deliver a contextually adapted exercise-based cardiac rehabilitation program with the potential to be scaled up throughout China.Copyright © 2018 The Author(s).

**Database:** EMBASE


## 9. The prognostic significance of improvement in exercise capacity in heart failure patients who participate in cardiac rehabilitation programme

**Author(s):** Sabbag A.; Mazin I.; Rott D.; Hay I.; Gang N.; Tzur B.; Goldkorn R.; Goldenberg I.; Klempfner R.; Israel A.

**Abstract:**Introduction: There are limited contemporary data regarding the association between improvement in cardiovascular fitness in heart failure patients who participate in a cardiac rehabilitation programme and the risk of subsequent hospitalisations. Methods: The study population comprised 421 patients with heart failure who participated in our cardiac rehabilitation programme between the years 2009 and 2016. All were evaluated by a standard exercise stress test before initiation, and underwent a second exercise stress test on completion of 3 +/- 1 months of training. Participants were dichotomised by fitness level at baseline, according to the percentage of predicted age and sex norms achieved. Each group was further divided according to its degree of functional improvement, between the baseline and the follow-up exercise stress test. Major improvement was defined as improvement above the median value in each group. The combined primary endpoint was cardiac hospitalisation or all-cause mortality. Results: A total of 211 (50%) patients had low baseline fitness (<73% (median)) for age and sex-predicted metabolic equivalents of task value. Compared to patients with higher fitness, those with a low baseline fitness were more

commonly smokers, had diabetes and were obese (P < 0.05 for all). Multivariable Cox proportional hazard regression analysis showed that, independent of baseline capacity, an improvement of 5% of predicted fitness was associated with a corresponding 10% reduced risk of cardiac hospitalisation or all-cause mortality (P < 0.001). Conclusion: In heart failure patients participating in a cardiac rehabilitation programme, improved cardiovascular fitness is associated with reduced mortality or cardiac hospitalisation risk during long-term follow-up, independent of baseline fitness.Copyright © 2018, © The European Society of Cardiology 2018.

**Database:** EMBASE

# Rehabilitation

### 10. Shared care versus hospital-based cardiac rehabilitation: A cost-utility analysis based on a randomised controlled trial

**Author(s):** Bertelsen J.B.; Kanstrup H.; Christense K.L.; Dehbarez N.T.; Sogaard R.; Refsgaard J.; Johnsen S.P.; Qvist I.; Christensen B.

Available  at Open Heart -  from HighWire - Free Full Text

Available  at Open Heart -  from Europe PubMed Central - Open Access

Available  at Open Heart -  from PubMed Central

**Abstract:**Background: Changes in the organisation of chronic healthcare, an increased awareness of costs and challenges of low adherence in cardiac rehabilitation (CR) call for the exploration of more flexible CR programmes as alternatives to hospital-based CR (H-CR). A model of shared care cardiac rehabilitation (SC-CR) that included general practitioners and the municipality was developed. The aim of this study was to analyse the cost utility of SC-CR versus H-CR. Methods: The cost-utility analysis was based on a randomised controlled trial of 212 patients who were allocated to SC-CR or H-CR and followed up for 12 months. A societal cost perspective was applied that included the cost of intervention, informal time, healthcare and productivity loss. Costing was based on a microcosting approach for the intervention and on national administrative registries for the other cost categories. Quality-adjusted life years (QALYs) were based on the EuroQol 5-Dimensions measurements at baseline, after 4 months and after 12 months. Conventional costeffectiveness methodology was employed to estimate the net benefit of SC-CR. Results: The average cost of SC-CR was 165.5 kDKK and H-CR 163 kDKK. Productivity loss comprised 74.1kDKK and 65.9 kDKK. SC-CR cost was an additional 2.5 kDKK (95% CI -38.1 to 43.1) = (0.33; -5.1 to 5.8 k) and a QALY gain of 0.02 (95% CI -0.03 to 0.06). The probability that SC-CR would be cost-effective was 59% for a threshold value of willingness to pay of 300 kDKK (k40.3). Conclusion: CR after shared care model and H-CR are comparable and similar in socioeconomic terms.Copyright © Article author(s) (or their employer(s) unless otherwise stated in the text of the article) 2018.

**Database:** EMBASE

### 11. Patient preferences for types of community-based cardiac rehabilitation programme

**Author(s):** Chia S.; Yap A.F.; Wong X.Y.; Toon M.L.; Seah Y.; Lim C.; Tay H.Y.; Kwan Y.H.; Fong W.; Low L.L.

**Source:** Heart Asia; Jan 2018; vol. 10 (no. 1)

**Publication Date:** Jan 2018

**Publication Type(s):** Article

Available at Heart Asia -  from Europe PubMed Central - Open Access

Available at Heart Asia -  from PubMed Central

**Abstract:**Introduction Cardiac rehabilitation (CR) improves mortality, morbidity and quality of life of cardiovascular patients. However, its uptake is poor especially in the hospitals due to long travel distances and office hours constraints. Community-based CR is a possible solution. Objectives To understand the type of communitybased CR preferred and identify patient characteristics associated

with certain programme combinations. Methods A cross-sectional survey was administered to a randomised list of patients at risk for or with cardiovascular diseases at two community-based CR centres. Participants were presented with nine hypothetical choice sets and asked to choose only one of the two alternative programme combinations in each choice set. Attributes include support group presence, cash incentives, upfront deposit and outof-pocket cost. The counts for each combination were tallied and corrected for repeats. Chi-square test and logistic regression were performed to understand the characteristics associated with the preferred CR combination. Results After correcting for repeats, patients most (85.2%) prefer CR programmes with new group activities, support group, cash rewards, deposit and out-of-pocket cost, and few exercise equipment with physiotherapist presence without the need for monitoring equipment. Patients with more than three bedrooms in their house are less likely (OR 0.367; CI 0.17 to 0.80; P=0.011) to choose the choice with no physiotherapist and few equipment available. Conclusion This is the first study to explore patients? preferences for different types of community CR. Higher income patients prefer physiotherapist presence and are willing to settle for less equipment. Our study serves as a guide for designing future community-based CR programmes.

**Database:** EMBASE

## 12. Barriers for the referral to outpatient cardiac rehabilitation: A predictive model including actual and perceived risk factors and perceived control

**Author(s):** Soroush A.; Heydarpour B.; Komasi S.; Saeidi M.; Ezzati P.

**Source:** Annals of Cardiac Anaesthesia; 2018; vol. 21 (no. 3); p. 249-254

**Publication Date:** 2018

**Publication Type(s):** Article

Available at Annals of Cardiac Anaesthesia -  from Europe PubMed Central - Open Access

Available at Annals of Cardiac Anaesthesia -  from ProQuest (Hospital Premium Collection) - NHS Version

Available at Annals of Cardiac Anaesthesia -  from EBSCO (MEDLINE Complete)

**Abstract:**Objective: To assess the roles of demographic factors, actual and perceived risk factors, and perceived control in the referral to cardiac rehabilitation (CR) after coronary artery bypass graft (CABG). Methods: In this cross-sectional study, data related to 312 CABG patients in a hospital of the Western part of Iran, gathered through demographics and actual risk factors' checklist, open single

item of perceived heart risk factors, life stressful events scale, and perceived control questionnaire. Data analyzed by binary logistic regression. Results: The results showed that only 8.3% of CABG patients refer to CR. The facilitators of this referral included official employment (P < 0.05), coronary history (P = 0.016), and hyperlipidemia (P = 0.030) but more distance to the CR center (P = 0.042) and perceived physiological risk factor (P = 0.025) are concerned as the barriers for the referral to CR. Conclusion: Providing appropriate awareness about the benefits of CR for patients with regard to their job status, coronary history, and perception about the illness risk factors can be effective in referral to CR. In addition, the presence of CR centers in towns and facilitated achievement to these centers can play a significant role in patients' participation.

**Database:** EMBASE


### 13. Dietary interventions in cardiac rehabilitation - The gap between guidelines and clinical practice

**Author(s):** Kristensen M.B.; Dieperink K.B.; Rossau H.K.; Egholm C.L.; Zwisler A.-D.; Viggers L.; Bertelsen B.M.

**Abstract:**Background & aims: An unhealthy diet is a risk factor for ischemic heart disease (IHD) and therefore cardiac rehabilitation (CR) should include dietary interventions. In 2007, CR became a shared responsibility between Danish hospitals and municipalities. Later, a national clinical guideline including recommendations on dietary interventions was developed to facilitate implementation of CR. The aim of the present study is: 1) To describe provision of dietary interventions in CR for IHD patients in Denmark in 2013 and 2015 emphasizing differences between hospitals and municipalities, and 2) To evaluate the implementation of the national clinical guideline in clinical practice. Methods: A repeated nationwide cross-sectional electronic survey was carried out in 2013 and 2015. Participation was mandatory for all Danish hospital departments offering CR (n = 36), but voluntary for municipalities (n = 98) reaching response rates of 82% and 89% in 2013 and 2015, respectively. The electronic survey covered the core components of dietary interventions in CR as described in the national clinical guideline. Results: In 2015, 72% of municipalities provided dietary interventions. This proportion was significantly higher in hospitals (94%, p = 0.007). 26% and 38% of hospitals screened systematically for dietary intervention needs in 2013 and 2015, respectively. Corresponding results from municipalities were 26% and 29%. No significant differences were seen in clinical practice over time. Conclusions: The results of this study identified a major gap between recommendations in the national clinical guideline and actual clinical practice on dietary interventions in CR in Danish hospitals and municipalities. The study confirmed that implementation of guidelines in clinical practice takes time and requires an intensive effort.Copyright © 2018 European Society for Clinical Nutrition and Metabolism

**Database:** EMBASE


### 14. Referral for cardiac rehabilitation after acute myocardial infarction: Insights from nationwide AMIS Plus registry 2005-2017

**Author(s):** Witassek F.; Radovanovic D.; Hermann M.; Erne P.; Rickli H.

**Abstract:**Background: It is known that referral rates for cardiac rehabilitation (CR) after an acute myocardial infarction (AMI) are low despite the class I recommendation in the present guidelines. In this study we therefore aimed to identify predictors for referral in Switzerland. Design and methods: We used data from the Swiss AMIS Plus registry including patients admitted between 2005 and 2017 with ST-elevation myocardial infarction (STEMI) or Non-STEMI (NSTEMI) to a Swiss hospital. We compared baseline characteristics, treatment and complications of patients with a recommendation for either stationary or ambulatory CR at discharge with those for whom it was indicated that they went home after hospitalisation without a CR recommendation. Patients transferred to another hospital after the index hospitalisation were excluded. Multivariable logistic regression analysis was used to identify the strongest predictors for a CR referral. Results: Among the 23,222 patients included, 10,940 (47.1%) had a CR recommendation while 12,282 (52.9%) did not. Patients referred for CR were younger (62.6 vs. 68.2 years, p<0.001) and had a higher prevalence of obesity (22.0% vs. 20.4%, p=0.004). Apart from smoking (44.0% vs. 34.9%, p<0.001), they had less risk factors such as dyslipidaemia (55.0% vs. 60.1%, p<0.001), hypertension (55.6% vs. 65.3%, p<0.001) and diabetes (16.7% vs. 21.5%, p<0.001). Independent predictors of referral for CR were STEMI (OR 1.61; 95%CI 1.52-1.71), performed PCI (OR 2.65; 95%CI 2.42-2.90) and Killip class >2 (OR 1.58; 95%CI 1.36-1.84). Furthermore, in-hospital complications, such as reinfarction (OR 2.16; 95%CI 1.46-3.21), cardiogenic shock (OR 2.29; 95%CI 1.76-2.99), atrial fibrillation at discharge (OR 1.34; 95%CI 1.01-1.78), sepsis (OR 2.09; 95%CI 1.32-3.29), cerebrovascular event (OR 2.68; 95%CI 1.72-4.18) and bleeding (OR 1.36; 95%CI 1.14-1.63) favoured referral for CR, while age >65years, previous myocardial infarction, cerebrovascular disease or peripheral artery disease had a negative impact on referral for CR. Conclusions: Our data from 23,222 AMI patients demonstrate that patients referred for CR are younger, more obese and had more often STEMI. In-hospital complications were strong predictors for CR recommendation but hypertension, dyslipidaemia and diabetes were less present in CR patients.

**Database:** EMBASE

### 15. Obstructive sleep apnea in cardiac rehabilitation patients

**Author(s):** Hupin D.; Pichot V.; Sforza E.; Maudoux D.; Barthelemy J.-C.; Roche F.; Berger M.; Raffin J.; Lietar C.; Poyraz E.

**Abstract:**Study Objectives: Although regular physical activity improves obstructive sleep apnea (OSA) in the general population, this finding has not been assessed in postmyocardial infarction (MI) patients in a rehabilitation setting (coronary artery disease, CAD). We aimed to determine whether cardiac rehabilitation may benefit post-MI patients in terms of OSA disease and associated autonomic nervous system (ANS) activity. Methods: Consecutive post-MI patients participating in the ambulatory cardiac rehabilitation program of St-Etienne University Hospital were included in this study. The apnea-hypopnea index calculated from electrocardiogram (ECG)-derived respiration (AHIEDR) was obtained through nocturnal Holter ECG recordings. According to AHIEDR, patients were classified as normal, mild, moderate, or severe OSA (< 5, 5-14, 15-29, >= 30, respectively).

Physiological performance (peak VO2) was established via cardiopulmonary exercise testing. ANS activity was evaluated through spontaneous baroreflex sensibility as well as heart rate variability analysis. Results: Of the 105 patients with CAD and OSA included (95 men, 55.2 +/- 12.4 years), 100 had at least 1 cardiovascular risk factor (98%) and 52 patients (50%) had an ANS dysfunction. Surprisingly, 68 of these patients with OSA (65%) were free of classical diurnal symptoms usually associated with sleep apnea. In response to cardiac rehabilitation, AHIEDR decreased significantly (-9.3 +/- 9.5, P < .0001) only in patients with severe OSA, and the decrease was even greater when peak VO2 and baroreflex sensibility improved beyond 20% compared to basal values (-11.6 +/- 9.1, P < .001). Conclusions: Severe OSA in patients with CAD is significantly improved after 2 months of cardiopulmonary rehabilitation. Reviving ANS activity through physical activity might be a target for complementary therapy of OSA in patients with CAD.Copyright © 2018 American Academy of Sleep Medicine. All rights reserved.

**Database:** EMBASE

### 16. Health care system re-design to achieve universal access to cardiac rehabilitation services: Implications for population health and health policy

**Author(s):** Frisbee S.J.; Stranges S.; Suskin N.; Pierce A.; Ricci J.

**Abstract:**Objective: The efficacy of cardiac rehabilitation programs (CRP) is well established, and completion of such programs post-event is standard-of-care worldwide. Despite universal recommendations, participation in CRP is alarmingly low: 14%-35% in the US, and <15% in Ontario The inability to achieve even 50% participation in CRP represents a failure of health care systems (HCS) to deliver effective services. This failure is particularly vexing in Canada, where the central tenet and legal requirement of the HCS is universal access to all medically necessary services. A team of health care providers and administrators in Ontario used a systems-integration approach to re-design the HCS in one healthcare region (HCR) to make an evidence-based CRP universally available The key features of this HCS-integrated CRP (HCS-I-CRP) and population health impact are reported here. Methods: The HCS-I-CRP included harmonized criteria that triggered automatic referral to a HCR-wide coordinating center, which directed eligible patients to a CRP provided in community-based setting (LCB-CRP). Fourteen LCB-CRP, available within a 30-minute drive, were trained to provide standardized CRP. Detailed patient outcomes were tracked in a database. Using administrative data, within-HCR participation rates were monitored, and population-level health impacts between the HCR imple-menting the HCS-I-CRP and all other HCRs in Ontario were compared for the 2-years prior and 1-year after the HCS-I-CRP implementation. Results: More than 11,000 patients were referred through the HCS-I-CRP to a LCB-CRP The estimated overall participation and completion rates were 31% and 67%. Population health impacts included (p<0.05): larger HCR-wide reduction in visits to family practitioners, cardiologists, and internists for any cardiac reason; larger HCR-wide reductions in hospitalizations, emergency department visits, and visits to cardiologist and internists for acute coronary syndrome; and larger HCR-wide reductions in visits to family practitioners and cardiologists for heart failure. Reductions in HCR-wide mortality for acute coronary syndrome approached significance (p0.097). Conclusions: The HCS-I-CRP was extremely successful: referrals exceeded the capacity of LCB-CRPs and enrollment was capped. Despite this, statistically significant, population health benefits were observed. We anticipate a

province-wide HCS-I-CRP, initiated and buttressed by provincial policy, would achieve near universal access to CRP and population health benefits similar to or greater than those reported here.

**Database:** EMBASE

**17. Outcomes of region-wide cardiac rehabilitation**

**Author(s):** Frisbee S.J.; Stranges S.; Suskin N.; Pierce A.; Ricci J.

**Source:** Atherosclerosis Supplements; Jun 2018; vol. 32 ; p. 15-16

**Publication Date:** Jun 2018

**Publication Type(s):** Conference Abstract

**Abstract:**Objective: Cardiac rehabilitation (CR) is recommended for patients with cardiovascular disease, however the impact of a region-wide, centrally managed CR model with local non-medical community-based delivery of CR is unknown in a universal health care system setting. To determine the impact of a regional 6-month, once per week supervised exercise session CR model on mortality and re-hospitalization compared to a matched control within a regional health care system. Methods: The regional CR service comprised: a standardized regional referral strategy for patients with established cardiac disease including stable heart failure, local (within a 30-minute drive time from place of residence) CR service delivery by trained CR professionals. Patient data that was prospectively entered into a regional CR database for patients referred to CR from 2012 through 2014, was linked to government mandated administrative databases and all-cause mortality and hospital-ization rates were compared between patients who were referred to CR vs. a matched cohort who were not. Matching included age, sex, year of referral, socioeconomic status, and cardiac condition at hospital discharge. Mortality and re-hospitalization were assessed at 1-yr post index cardiac event excluding the initial 6-month period to account for immortal time bias. Results: Fewer patients who completed CR compared to matched controls died (14/1,318 (1.1%) vs. 31/1,318 (2.4%),p0.011), or were readmitted to hospital (128 (9.7%) vs. 190 (14.4%),p<0.001). Fewer patients who started but did not complete CR died compared to matched controls (10/639 (1.6%) vs. 21/639 (3.3%),p0.045), however there was no difference in hospital readmission rates between CR non-completers compared to matched controls (18.0% vs. 14.9%,p0.13). More patients who were referred to CR but did not enroll in CR, died compared to matched controls (241/3,933 (6.1%) vs. 196/3,933 (5.0%),p0.027), or were readmitted to hospital (932 (23.7%) vs. 643 (16.3%),p<0.001). Conclusions: Patients who completed a regionally coordinated, locally delivered, standardized CR program close to home, experienced lower mortality & re-hospitalization rates compared to matched patients not referred to CR. This was not likely due to a referral bias as patients referred to CR but did not enroll fared worse compared to matched non-CR referred patients. Healthcare system decision-makers (provincial governments) should strongly consider funding regional CR strategies.

**Database:** EMBASE

**18. Rehabilitation enablement in chronic heart failure (REACH-HF) a multicentre randomised controlled trial of facilitated self-care rehabilitation intervention in heart failure with reduced ejection fraction**

**Author(s):** Dalal H.; Britten N.; Greaves C.; Abraham C.; Jolly K.; Davis R.; Doherty P.; Austin J.; Van Lingen R.; Wingham J.; Warren F.; Green C.; Singh S.; Paul K.; Lang C.; Smith K.; Eyre V.; Hayward C.

**Source:** Heart; Jun 2018; vol. 104

**Publication Date:** Jun 2018

**Publication Type(s):** Conference Abstract

**Abstract:**Introduction Evidence from systematic reviews and meta-analyses of randomised trials has led the National Institute of health and Care Excellence (NICE) and international guideline bodies to recommend centre-based cardiac rehabilitation (CR) as an effective and safe intervention for heart failure. CR reduces the risk of hospitalisations and improves health related quality of life (HRQoL). Nevertheless, CR uptake for heart failure (HF) remains suboptimal and alternative delivery models, such as home-based programmes are therefore needed. The REACH-HF multi-centre trial (ISRCTN86234930) was designed to evaluate the effectiveness of a novel evidenceinformed home-based rehabilitation intervention in heart failure with reduced ejection fraction (HFrEF) patients. Methods Patients from 4 UK centres with a left ventricular ejection fraction of <45% were randomised 1:1 between January 2015 and February 2016 to the REACH-HF intervention (self-help manual facilitated by trained nurses or physiotherapists over 12 weeks) plus usual care (intervention group) or usual care alone (control group). Outcome data was collected at baseline at 4, 6 and 12 months. The primary outcome was the disease specific HRQoL using the Minnesota Living with Heart Failure questionnaire (MLHFQ) at 12 months. Secondary outcomes included death, hospitalisation, generic quality of life (EuroQol-5-Dimension-EQ-5D-5L), psychological wellbeing (Hospital Anxiety and Depression Scale, HADS), exercise capacity (incremental shuttle walk test-ISWT), and physical activity (accelerometry). Results We met our recruitment target of 216 patients (mean age 69.8 years, 78.5% male; 80% with New York Heart Association (NYHA) Class II/III). Compared with control, the intervention group was associated with a clinically meaningful improvement in the total MLHFQ score at 12 month follow up of -5.7 (95% CI: -10.6 to -0.7, p=0.025, intention to treat analysis). At 12 months there were a total of 8 deaths -4 in each group and 19 hospital admissions in the intervention group and 24 in controls - 3 versus 6 HF-related admissions respectively. There was no between group difference in mean EQ-5D-5L (-0.024,-0.091 to 0.04), 0.49), HADS Anxiety score (0.1 (-0.8 to 1.0), 0.83), HADS Depression score (-0.2 (-1.1 to 0.6), 0.56) or in exercise capacity (ISWT in metres: 0.1 (-33.3 to 33.5), 1.0) and physical activity (number of days per week with at least 10 min per day activity >100 millig-unit: 0.2 (-0.4 to 0.7), 0.6). Conclusion Our findings indicate that the addition of the REACH-HF home-based rehabilitation-intervention to usual care for the management of HFrEF results in clinically important improvements in disease-specific HRQoL and has the potential to reduce hospital admissions. The REACH-HF intervention had no impact on generic HRQoL, psychological wellbeing, exercise capacity or physical activity.

**Database:** EMBASE

**19. Determinants of successful completion of cardiac rehabilitation when secondary prevention programs are made universally accessible**

**Author(s):** Frisbee S.J.; Stranges S.; Suskin N.; Pierce A.; Ricci J.

**Abstract:**Introduction: Cardiac rehabilitation programs (CRP) after a cardiovascular event are standard-of-care worldwide, though participation remains very low (14%-35% in the US and <15% in Ontario). Removing health care system (HCS) barriers to accessing CRPs is essential to realize patient and popu-lation level health benefits, and to understand patient barriers to completion of CRP. Objective: To develop a regional delivery system for CRP that removes HCS barriers to CRP so that patient factors affecting CRP completion can be ascertained. Methods: One health care region (HCR) in Ontario implemented a regional CRP that was fully integrated into the HCS The integrated CRP

(HCS-I-CRP) automated referrals to an HCR-wide coordinating center which directed patients to a to a CRP in a local, community-based setting (LCB-CRP) within a 30-minute drive The CRP was standardized across all LCB-CRPs. Information related to the referral, initiation, and completion of the CRP was collected and analyzed. Results: Automated inpatient and community referrals were received for cardiac or non-cardiac related hospitalizations (62% and 29%), or ambulatory health care visits (9%) The age distribution of patients referred from hospital and community sources was similar, though community referred patients were less complex (lower JH-ACG category). In comparing the patient characteristics (completed vs. started but did not complete), the following patterns were observed: (1) completion rates were nearly identical across hospital and community referral sources; (2) older patients were more likely to compete the CRP (72% (70-89yo) vs. 57% (40-49yo)); (3) while there were more referrals for men (61.5%) than women, completion rates for men and women were nearly identical; (4) neigh-borhood income quintile of patients was not associated with completion; (5) sicker patients were less likely to complete the CRP (higher resource utilization band, JH-ACG, and Charlson index); and (6) patients with heart failure were least likely to complete the CRP (58.8% vs. 66.8% for all other diagnoses). Conclusions: An HCS-I-CRP with automatic referral to a LCB-CRP within a 30-minute drive removed traditional barriers to completing CRP: there were no socioeconomic or gender differences in CRP completion, and elderly patients had higher completion rates. Sicker patients were least likely to complete CRP.

**Database:** EMBASE

### 20. Does service timing matter for psychological outcomes in cardiac rehabilitation? Insights from the national audit of cardiac rehabilitation

**Author(s):** Sumner J.; Bohnke J.R.; Doherty P.

**Source:** European Journal of Preventive Cardiology; 2018; vol. 25 (no. 1); p. 19-28

**Publication Date:** 2018

**Publication Type(s):** Article

Available at European journal of preventive cardiology - from PubMed Central

**Abstract:**Background: The presence of mental health conditions in cardiac rehabilitation (CR) patients such as anxiety and depression can lead to reduced programme adherence, increased mortality and increased re-occurrence of cardiovascular events undermining the aims and benefit of CR. Earlier research has identified a relationship between delayed commencement of CR and poorer physical activity outcomes. This study wished to explore whether a similar relationship between CR wait time and mental health outcomes can be found and to what degree participation in CR varies by mental health status. Methods: Data from the UK National Audit of Cardiac Rehabilitation, a dataset that captures information on routine CR practice and patient outcomes, was extracted between 2012 and 2016. Logistic and multinomial regression models were used to explore the relationship between timing of CR and mental health outcomes measured on the hospital anxiety and depression scale. Results: The results of this study showed participation in CR varied by mental health status, particularly in relation to completion of CR, with a higher proportion of non-completers with symptoms of anxiety (5% higher) and symptoms of depression (8% higher). Regression analyses also revealed that delays to CR commencement significantly impact mental health outcomes post-CR. Conclusion: In these analyses CR wait time has been shown to predict the outcome of anxiety and depression status to the extent that delays in starting CR are detrimental. Programmes falling outside the 4-week window for commencement of CR following referral must strive to reduce wait

times to avoid negative impacts to patient outcome.Copyright © The European Society of Cardiology 2017.

**Database:** EMBASE

## 21. Erectile dysfunction: A forgotten determinant of cardiac rehabilitation program success

**Author(s):** Helena Nascimento H.; Rocha A.; Braga M.; Pinto R.; Tavares-Silva M.; Pestana G.; Araujo P.; Nunes A.; Torres S.; Rodrigues J.; Araujo V.; Parada F.; Maciel M.J.

**Source:** European Journal of Heart Failure; May 2018; vol. 20 ; p. 502-503

**Publication Date:** May 2018

**Publication Type(s):** Conference Abstract

Available at European Journal of Heart Failure - from Wiley Online Library Medicine and Nursing Collection 2018 - NHS

**Abstract:**Introduction: In order to improve cardiac rehabilitation program (CRP) success, it is of paramount importance to identify vulnerable groups of patients. Erectile dysfunction (ED) is a powerful indicator of cardiovascular risk and poor outcome. Therefore, our study main goal was to evaluate ED role as a predictor of functional capacity as a surrogate of CRP success. Methods: From a registry of 840 consecutive patients (pts) enrolled in a cardiac rehabilitation program after an acute coronary syndrome (ACS), between 2008 and 2016, we studied the male pts. Sociodemographic and clinical data was prospectively collected. Depression was assessed using the HospitalAnxiety and Depression Scale (HADS) and ED through the 5-Questions International Index of Erectile Function (IIEF). ED was defined as an IIEF < 17. Results: From a total of 637 male pts studied, ED was present in 300 patients (47%). Cardiac event was a ST-elevation ACS in 45.7% and a non-ST-elevation ACS in 54.3%. ED group of pts was significantly older (56.8+/-9.4 vs. 52.0+/-9.3 years-old, p < 0.001), has lower educational level (8.0+/-4.6 vs. 9.1+/-5.0, p = 0.005) and higher levels of HADS-depression (5.1+/-3.9 vs. 3.6+/-3.7, p < 0.001). Regarding the cardiovascular risk factor, hypertension and diabetes were significantly more prevalent in ED pts (p < 0.005). Also, coronary artery disease was more severe in this group (number of coronary vessel disease: 1.5+/-0.8 vs. 1.3+/-0.6, p = 0.001). In terms of functional capacity, the ED pts performed worse both at the beginning (METs 8.6+/-2.3 vs. 9.5+/-2.2, p < 0.001) and at the end of the CRP (METs 10.2+/-2.0 vs. 11.4+/-2.4, p < 0.001). Nevertheless, the CRP program significantly improved the functional capacity (degree of METs improvement 1.6+/-1.8, p < 0.001) and reduced the HADS depression levels (1.1+/-4.2, p = 0.014) in these pts. Conclusion: ED is a highly prevalent condition inACS population and its impact on quality of life is undeniable. Moreover, it must be recognized as a predictor of poorer performance in CRP programs. Therefore, sexual function assessment should integrate ACS patient evaluation, and tailored strategies ought to be conceived in order to achieve CRP success.

**Database:** EMBASE

## 22. Effect of the patient education - Learning and Coping strategies - in cardiac rehabilitation on return to work at one year: A randomised controlled trial show (LC-REHAB)

**Author(s):** Bitsch B.L.; Nielsen C.V.; Stapelfeldt C.M.; Lynggaard V.

**Source:** BMC Cardiovascular Disorders; May 2018; vol. 18 (no. 1)

**Publication Date:** May 2018

**Publication Type(s):** Article

**Abstract:**Background: Personal resources are identified as important for the ability to return to work (RTW) for patients with ischaemic heart disease (IHD) or heart failure (HF) undergoing cardiac rehabilitation (CR). The patient education 'Learning and Coping' (LC) addresses personal resources through a pedagogical approach. This trial aimed to assess effect of adding LC strategies in CR compared to standard CR measured on RTW status at one-year follow-up after CR. Methods: In an open parallel randomised controlled trial, patients with IHD or HF were block-randomised in a 1:1 ratio to the LC arm (LC plus CR) or the control arm (CR alone) across three Danish hospital units. Eligible patients were aged 18 to <=60 and had not left the labour market. The intervention was developed from an inductive pedagogical approach consisting of individual interviews and group based teaching by health professionals with experienced patients as co-educators. The control arm consisted of deductive teaching (standard CR). RTW status was derived from the Danish Register for Evaluation of Marginalisation (DREAM). Blinding was not possible. The effect was evaluated by logistic regression analysis and reported as crude and adjusted odds ratios (OR) with 95% confidence interval (CI). Results: The population for the present analysis was N=244 (LC arm: n=119 versus control arm: n=125). No difference in RTW status was found at one year across arms (LC arm: 64.7% versus control arm: 68.8%, adjusted odds ratio OR: 0.76, 95% CI: 0.43-1.31). Conclusion: Addition of LC strategies in CR showed no improvement in RTW at one year follow-up.Copyright © 2018 The Author(s).

**Database:** EMBASE

### 23. Measuring Inpatient Rehabilitation Facility Quality of Care: Discharge Self-Care Functional Status Quality Measure

**Author(s):** Pardasaney P.K.; Deutsch A.; Iriondo-Perez J.; Ingber M.J.; McMullen T.

**Abstract:**Objective: To describe the calculation and psychometric properties of the discharge self-care functional status quality measure implemented in the Centers for Medicare & Medicaid Services' (CMS) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program on October 1, 2016. Design: Medicare fee-for-service (FFS) patients from 38 IRFs that participated in the CMS Post-Acute Care Payment Reform Demonstration were included in this cohort study. Data came from the Continuity Assessment Record and Evaluation Item Set, IRF-Patient Assessment Instrument, and Medicare claims. For each patient, we calculated an expected discharge self-care score, risk-adjusted for demographic and baseline clinical characteristics. The performance score of each IRF equaled the percentage of patient stays where the observed discharge self-care score met or exceeded the expected score. We assessed the measure's discriminatory ability across IRFs and reliability. Setting: IRFs. Participants: Medicare FFS patients aged >=21 years (N=4769). Interventions: Not applicable. Main Outcome Measures: Facility-level discharge self-care quality measure performance score. Results: A total of 4769 patient stays were included; 57% of stays were in women, and 12.1% were in patients aged <65 years. Stroke was the most common diagnosis (21.8%). The mean+/-SD

performance score was 55.1%+/-16.6% (range, 25.8%-100%). About 54% of IRFs had scores significantly different from the percentage of stays that met or exceeded the expected discharge self-care score in the overall demonstration sample. The quality measure showed strong reliability, with intraclass correlation coefficients of.91. Conclusions: The discharge self-care quality measure showed strong discriminatory ability and reliability, representing an important initial step in evaluation of IRF self-care outcomes. A wide range in performance scores suggested a gap in quality of care across IRFs. Future work should include testing the measure with nationwide data from all IRFs.Copyright © 2017

**Database:** EMBASE

### 24. Referral for cardiac rehabilitation after acute myocardial infarction: Insights from nationwide AMIS Plus registry 2005-2017

**Author(s):** Hermann M.; Witassek F.; Erne P.; Radovanovic D.; Rickli H.

**Source:** International Journal of Cardiology; Jun 2018; vol. 261 ; p. 1-5

**Publication Date:** Jun 2018

**Publication Type(s):** Article

**Abstract:**Background: Referral rates for cardiac rehabilitation (CR) after an acute myocardial infarction (AMI) are low despite a Class I recommendation in the present guidelines. Therefore, we aimed to identify predictors for referral and patient characteristics from the national Swiss AMIS Plus registry. Design and methods: Data were extracted from the Swiss AMIS Plus registry between 2005 and 2017, which included patients with ST-elevation myocardial infarction (STEMI) and Non-ST-elevation myocardial infarction (NSTEMI). For 32,416 patient (93.2%) data about destination at discharge were available with 10,940 (33.7%) having a recommendation for CR while 12,282 (37.9%) went home. 9194 (28.4%) were transferred to another hospital after index hospitalisation and were excluded. Results: Patients referred to CR were younger (62.6 vs. 68.2 years) and had a higher prevalence of obesity (22.0% vs. 20.4%). Except for smoking (44.0% vs 34.9%), they had less risk factors such as dyslipidemia (55.0% vs. 60.1%), hypertension (55.6% vs. 65.3%) and diabetes (16.7% vs. 21.5%). Patients with in-hospital complications were more likely being referred for CR. Furthermore, STEMI (OR 1.61; CI 1.52-1.71), performed PCI (OR 2.65; CI 2.42-2.90) and Killip class >2 (OR 1.58; CI 1.36-1.84) favoured referral for CR, while age > 65 years, previous myocardial infarction, cerebrovascular disease or peripheral artery disease had a negative impact on referral for CR. Conclusions: Our data from 23,222 patients after AMI demonstrate that in Switzerland patients referred for CR are younger, more obese with more STEMI. In-hospital complications were strong predictors for CR recommendation. Unlike anticipated, other risk factors were less present in CR patients.Copyright © 2018 Elsevier B.V.

**Database:** EMBASE

### 25. Association of Cardiac Rehabilitation With Decreased Hospitalizations and Mortality After Ventricular Assist Device Implantation

**Author(s):** Bachmann J.M.; Duncan M.S.; Lindenfeld J.; Wang T.J.; Freiberg M.S.; Shah A.S.; Greevy R.A.; Keteyian S.J.; Thomas R.J.; Whooley M.A.

**Source:** JACC: Heart Failure; Feb 2018; vol. 6 (no. 2); p. 130-139

**Publication Date:** Feb 2018

**Publication Type(s):** Article

**Abstract:**Objectives: This study characterized cardiac rehabilitation (CR) use in ventricular assist device (VAD) recipients in the United States and the association of CR with 1-year hospitalization and mortality by using the 2013 to 2015 Medicare files. Background: Exercise-based CR is indicated in patients with heart failure with reduced ejection fraction, but no data exist regarding CR participation after VAD implantation. Methods: The study included Medicare beneficiaries enrolled for disability or age >65 years. The investigators identified VAD recipients by diagnosis codes and cumulated CR sessions occurring within 1 year after VAD implantation. Multivariable-adjusted Andersen-Gill models were used to evaluate the association of CR with 1-year hospitalization risk, and Cox regression was used to evaluate the association of CR with 1-year mortality. Results: There were 1,164 VADs implanted in Medicare beneficiaries in the United States in 2014. CR use was low, with 348 patients (30%) participating in CR programs. The Midwest had the highest proportion of VAD recipients who began CR (38%), whereas the Northeast had the lowest proportion of CR participants (25%). Each 5-year increase in age was associated with attending an additional 1.6 CR sessions (95% confidence interval [CI]: 0.7 to 2.5; p < 0.001). CR participation was associated with a 23% lower 1-year hospitalization risk (95% CI: 11% to 33%; p < 0.001) and a 47% lower 1-year mortality risk (95% CI: 18% to 66%; p < 0.01) after multivariable adjustment. Conclusions: Approximately one-third of VAD recipients attend CR. Although it is not possible to account fully for unmeasured confounding, VAD recipients who participate in CR appear to have lower risks for hospitalization and mortality.Copyright © 2018 American College of Cardiology Foundation

**Database:** EMBASE

## 26. Randomised controlled trial of two advanced and extended cardiac rehabilitation programmes

**Author(s):** Sunamura M.; Ter Hoeve N.; Van Den Berg-Emons R.J.G.; Stam H.J.; Geleijnse M.L.; Boersma E.; Van Domburg R.T.; Haverkamp M.

**Publication Type(s):** Article

Available  at Heart (British Cardiac Society) -  from BMJ Journals - NHS

Available  at Heart (British Cardiac Society) -  from BMJ Journals

**Abstract:**Objective The OPTICARE (OPTImal CArdiac REhabilitation) randomised controlled trial compared two advanced and extended cardiac rehabilitation (CR) programmes to standard CR for patients with acute coronary syndrome (ACS). These programmes were designed to stimulate permanent adoption of a heart-healthy lifestyle. The primary outcome was the SCORE (Systematic COronary Risk Evaluation) 10-year cardiovascular mortality risk function at 18 months follow-up. Methods In total, 914 patients with ACS (age, 57 years; 81% men) were randomised to: (1) 3 months standard CR (CR-only); (2) standard CR including three additional face-to-face active lifestyle counselling sessions and extended with three group fitness training and general lifestyle counselling sessions in the first 9 months after standard CR (CR+F); or (3) standard CR extended for 9 months with five to six telephone general lifestyle counselling sessions (CR+T). Results In an intention-to-treat analysis, we found no difference in the SCORE risk function at 18 months between CR+F and CR-only (3.30% vs 3.47%; p=0.48), or CR+T and CR-only (3.02% vs 3.47%; p=0.39). In a per-protocol analysis, two of three modifiable SCORE parameters favoured CR+F over CR-only: current smoking

(13.4% vs 21.3%; p<0.001) and total cholesterol (3.9 vs 4.3 mmol/L; p<0.001). The smoking rate was also lower in CR+T compared with the CR-only (12.9% vs 21.3%; p<0.05). Conclusions Extending CR with extra behavioural counselling (group sessions or individual telephone sessions) does not confer additional benefits with respect to SCORE parameters. Patients largely reach target levels for modifiable risk factors with few hospital readmissions already following standard CR.

**Database:** EMBASE

### 27. Cardiac rehabilitation protects against the expansion of abdominal aortic aneurysm

**Author(s):** Nakayama A.; Morita H.; Komuro I.; Hoshina K.; Uemura Y.; Nagayama M.; Tomoike H.

**Source:** Journal of the American Heart Association; Mar 2018; vol. 7 (no. 5)

**Publication Date:** Mar 2018

**Publication Type(s):** Article

Available  at Journal of the American Heart Association -  from Wiley Online Library Free Content - NHS

Available  at Journal of the American Heart Association -  from HighWire - Free Full Text

Available  at Journal of the American Heart Association -  from Europe PubMed Central - Open Access

Available  at Journal of the American Heart Association -  from PubMed Central

**Abstract:**Background--Virtually no reports on the effects of exercise in patients with a small abdominal aortic aneurysm (AAA) exist. Methods and Results--We conducted a retrospective cohort study on 1515 patients with a small AAA before surgery at 2 highvolume hospitals in Tokyo, Japan, from April 2004 to September 2015. A carefully modified cardiac rehabilitation program without excessive blood pressure elevation during exercise was prescribed to 50 patients with an AAA. Using propensity score matching, mortality and clinical outcomes, including AAA expansion rate, were compared between 2 groups: rehabilitation group and nonrehabilitation group. The background characteristics of the rehabilitation group (n=49) and the nonrehabilitation group (n=163) were almost identical. The risk for AAA repair was much lower in the rehabilitation group after matching (before matching: hazard ratio, 0.43; 95% confidence interval, 0.25-0.72; P=0.001; and after matching: hazard ratio, 0.19; 95% confidence interval, 0.07- 0.50; P < 0.001). AAA expansion rate was slower in the rehabilitation group (before matching: rehabilitation versus nonrehabilitation group, 2.3+/-3.7 versus 3.8+/-3.4 mm/y [P=0.008]; after matching: rehabilitation versus nonrehabilitation group, 2.1+/-3.0 versus 4.5+/-4.0 mm/y [P < 0.001]). Elevation of blood pressure during exercise was positively correlated with AAA expansion rate after the rehabilitation program (r=0.569, P < 0.001). Conclusions--Cardiac rehabilitation protects against the expansion of small AAAs and mitigates the risk associated with AAA repair, possibly because of the decreased elevation of blood pressure during exercise.Copyright © 2018 The Authors.

**Database:** EMBASE

# Technology

**28. Text4Heart II - improving medication adherence in people with heart disease: A study protocol for a randomized controlled trial**

**Author(s):** Maddison R.; Rawstorn J.C.; Stewart R.; Benatar J.; Doughty R.; Scott T.; Kerr A.; Whittaker R.; Jiang Y.; Bartley H.; Rolleston A.; Estabrooks P.; Sullivan R.K.; Pfaeffli Dale L.

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**Abstract:**Background: Cardiac rehabilitation (CR) is an essential component of contemporary management for patients with coronary heart disease, including following an acute coronary syndrome (ACS). CR typically involves education and support to assist people following an ACS to make lifestyle changes and prevent subsequent events. Despite its benefits, uptake and participation in tradition CR programs is low. The use of mobile technologies (mHealth) offers the potential to improve reach, access, and delivery of CR support. We aim to determine the effectiveness and cost-effectiveness of a text-messaging intervention (Text4Heart II) to improve adherence to medication and lifestyle change in addition to usual care in people following an ACS. A second aim is to use the RE-AIM framework to inform the potential implementation of Text4Heart II within health services in New Zealand. Methods: Text4Heart II is a two-arm, parallel, superiority randomized controlled trial conducted in two large metropolitan hospitals in Auckland, New Zealand. Three hundred and thirty participants will be randomized to either a 24-week theory- and evidence-based personalized text message program to support self-management in addition to usual CR, or usual CR alone (control). Outcomes are assessed at 6 and 12 months. The primary outcome is the proportion of participants adhering to medication at 6 months as measured by dispensed records. Secondary outcomes include medication adherence at 12 months, the proportion of participants adhering to self-reported healthy behaviors (physical activity, fruit and vegetable consumption, moderating alcohol intake and smoking status) measured using a composite health behavior score, self-reported medication adherence, cardiovascular risk factors (lipids, blood pressure), readmissions and related hospital events at 6 and 12 months. A cost-effectiveness analysis will also be conducted. Using the RE-AIM framework, we will determine uptake and sustainability of the intervention. Discussion: The Text4Heart II trial will determine the effectiveness of a text-messaging intervention to improve adherence to medication and lifestyle behaviors at both 6 and 12 months. Using the RE-AIM framework this trial will provide much needed data and insight into the potential implementation of Text4Heart II. This trial addresses many limitations/criticisms of previous mHealth trials; it builds on our Text4Heart pilot trial, it is adequately powered, has sufficient duration to elicit behavior change, and the follow-up assessments (6 and 12 months) are long enough to determine the sustained effect of the intervention.Copyright © 2018 The Author(s).

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**29. Smartphones in the secondary prevention of cardiovascular disease: A systematic review**

**Author(s):** Hamilton S.J.; Mills B.; Birch E.M.; Thompson S.C.

**Abstract:**Background: Cardiac Rehabilitation (CR) and secondary prevention are effective components of evidence-based management for cardiac patients, resulting in improved clinical and behavioural outcomes. Mobile health (mHealth) is a rapidly growing health delivery method that has the potential to enhance CR and heart failure management. We undertook a systematic review to assess the evidence around mHealth interventions for CR and heart failure management for service and patient outcomes, cost effectiveness with a view to how mHealth could be utilized for rural, remote and Indigenous cardiac patients. Methods: A comprehensive search of databases using key terms was conducted for the years 2000 to August 2016 to identify randomised and non-randomised trials utilizing smartphone functionality and a model of care that included CR and heart failure management. Included studies were assessed for quality and risk of bias and data extraction was undertaken by two independent reviewers. Results: Nine studies described a mix of mHealth interventions for CR (5 studies) and heart failure (4 studies) in the following categories: feasibility, utility and uptake studies; and randomised controlled trials. Studies showed that mHealth delivery for CR and heart failure management is feasible with high rates of participant engagement, acceptance, usage, and adherence. Moreover, mHealth delivery of CR was as effective as traditional centre-based CR (TCR) with significant improvement in quality of life. Hospital utilization for heart failure patients showed inconsistent reductions. There was limited inclusion of rural participants. Conclusion: Mobile health delivery has the potential to improve access to CR and heart failure management for patients unable to attend TCR programs. Feasibility testing of culturally appropriate mHealth delivery for CR and heart failure management is required in rural and remote settings with subsequent implementation and evaluation into local health care services.Copyright © 2018 The Author(s).

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## 30. A text/email messaging service for cardiac rehabilitation

**Author(s):** Marshall W.; Galaz E.; Belz L.; Benatar J.

**Abstract:**Aim: To develop a patient- centered text and email message support service to encourage self-management, medication adherence and lifestyle changes in patients eligible for cardiac rehabilitation (CR). Method: A working group comprising a CR nurse, CR doctor, nurse manager, quality improvement manager and performance improvement project manager was formed. The scope of the project included creating messages, assessing technology requirements, privacy issues and practical application of this program. Through an iterative process, messages were modified

following consultation with invested stakeholders including clinicians, nurses, psychologists, the local Whanau Ora service and patients. The service will be activated during phase one once verbal or written (electronically) consent is obtained with an option to unsubscribe at any point. Outcome measures for the programme will include recurrent rehospitalization at 6 months, medication dispensing at 12 months and attendance at CR programmes. Results: Messages from clinical trials were found to be relevant to research outcomes and not patient needs. Feedback suggests that personalized streams are needed dependent on diagnosis (atherosclerosis, spontaneous coronary artery dissection, and Takotsubo cardiomyopathy) and risk factors like smoking. Messages will be sent 5 days a week for 4-6 months and include advice on a graduated exercise programme (including advice on sex), nutrition, safety, smoking cessation, stress management, medication, support groups and information about respective diagnoses. Patients can respond to a message and a CR nurse will be notified. Future plans are to have the texts translated into a number of languages common within this DHB with adaptations to address specific cultural needs. Conclusion: Messaging services used in research did not address the needs of patients. These services will be an adjunct to the existingCRprogrammeto improve adherence and clinical outcomes. Messages in multiple languages with culturally appropriate messages have the potential to address current shortfalls in our service.

**Database:** EMBASE

**31. SMARTphone and social media-based Cardiac Rehabilitation and Secondary Prevention (SMART-CR/SP) for patients with coronary heart disease in China: A randomised controlled trial protocol**

**Author(s):** Dorje T.; Scheer A.; Tan B.-K.; Maiorana A.; Zhao G.; Tsokey L.; Wang J.; Chen Y.; Ge J.; Tso K.

**Source:** BMJ Open; Jun 2018; vol. 8 (no. 6)

**Publication Date:** Jun 2018

**Publication Type(s):** Article

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Available at BMJ open - from Europe PubMed Central - Open Access

Available at BMJ open - from PubMed Central

**Abstract:**Introduction The burden of cardiovascular disease (CVD) is rapidly increasing in developing countries, however access to cardiac rehabilitation and secondary prevention (CR/SP) in these countries is limited. Alternative delivery models that are low-cost and easy to access are urgently needed to address this service gap. The objective of this study is to investigate whether a smartphone and social media-based (WeChat) home CR/SP programme can facilitate risk factor monitoring and modification to improve disease self-management and health outcomes in patients with coronary heart disease (CHD), after percutaneous coronary intervention (PCI) therapy. Methods and analysis We propose a single-blind, randomised controlled trial of 300 patients post-PCI with follow-up over 12 months. The intervention group will receive a smartphone-based and WeChat-based CR/SP programme providing education and support for risk factor monitoring and modification. SMART-CR/SP incorporates core components of modern CR/SP: Physical activity tracking with interactive feedback and goal setting; education modules addressing CHD understanding and self-management; remote blood pressure monitoring and strategies to improve medication adherence. Furthermore, a dedicated data portal and a CR/SP coach will facilitate individualised supervision and counselling. The control group will receive usual care but no formal CR/SP programme. The primary outcome is change in exercise capacity measured by 6 minute walk

test distance. Secondary outcomes include knowledge and awareness of CHD, risk factor status, medication adherence, psychological well-being and quality of life, major cardiovascular events, re-hospitalisations and all-cause mortality. To assess the feasibility and patients' acceptance of the intervention, a process evaluation will be performed at the conclusion of the study. Ethics and dissemination Ethics approval was granted by both the Human Research Ethics Committee of Fudan University Zhongshan Hospital (HREC B2016-058) and Curtin University Human Research Ethics Office (HRE2016-0120). Results will be disseminated via peer-reviewed publications and presentations at conferences. Clinical trial registration number ChiCTR-INR-16009598; Pre-results.Copyright © 2018 author(s).

**Database:** EMBASE

## 32. Does feedback on daily activity level from a Smart watch during inpatient stroke rehabilitation increase physical activity levels? Study protocol for a randomized controlled trial

**Author(s):** Dong Y.; Sun S.; Li F.; Cao Y.; Steins D.; Xia Z.; Dawes H.; Izadi H.; Wade D.T.; Amor J.D.; James C.J.

Available at Trials - from BioMed Central

Available at Trials - from Europe PubMed Central - Open Access

Available at Trials - from EBSCO (MEDLINE Complete)

Available at Trials - from PubMed Central

**Abstract:**Background: Practicing activities improves recovery after stroke, but many people in hospital do little activity. Feedback on activity using an accelerometer is a potential method to increase activity in hospital inpatients. This study's goal is to investigate the effect of feedback, enabled by a Smart watch, on daily physical activity levels during inpatient stroke rehabilitation and the short-term effects on simple functional activities, primarily mobility. Methods/design: A randomized controlled trial will be undertaken within the stroke rehabilitation wards of the Second Affiliated hospital of Anhui University of Traditional Chinese Medicine, Hefei, China. The study participants will be stroke survivors who meet inclusion criteria for the study, primarily: able to participate, no more than 4 months after stroke and walking independently before stroke. Participants will all receive standard local rehabilitation and will be randomly assigned either to receive regular feedback about activity levels, relative to a daily goal tailored by the smart watch over five time periods throughout a working day, or to no feedback, but still wearing the Smart watch. The intervention will last up to 3 weeks, ending sooner if discharged. The data to be collected in all participants include measures of daily activity (Smart watch measure); mobility (Rivermead Mobility Index and 10-metre walking time); independence in personal care (Barthel Activities of Daily Living (ADL) Index); overall activities (the World Health Organization (WHO) Disability Assessment Scale, 12-item version); and quality of life (the Euro-Qol 5L5D). Data will be collected by assessors blinded to allocation of the intervention at baseline, 3 weeks or at discharge (whichever is the sooner); and a reduced data set will be collected at 12 weeks by telephone interview. The primary outcome will be change in daily accelerometer activity scores. Secondary outcomes are compliance and adherence to wearing the watch, and changes in mobility, independence in personal care activities, and health-related quality of life. Discussion: This project is being implemented in a

large city hospital with limited resources and limited research experience. There has been a pilot feasibility study using the Smart watch, which highlighted some areas needing change and these are incorporated in this protocol.Copyright © 2018 The Author(s).

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## Elderly

**33. Strategies for supporting intervention fidelity in the rehabilitation therapy in older acute heart failure patients (REHAB-HF) trial**

**Author(s):** Pastva A.M.; Mentz R.J.; Rosenberg P.B.; Duncan P.W.; Nelson M.B.; Kitzman D.W.; Reeves G.R.; Whellan D.J.; O'Connor C.M.; Eggebeen J.D.; Hewston L.A.; Taylor K.M.

**Abstract:**Introduction Acute decompensated heart failure (ADHF) is the leading cause of hospitalization in older adults. Rehabilitation Therapy in Older Acute Heart Failure Patients (REHAB-HF) trial is a multi-site clinical trial to determine if physical rehabilitation intervention in older patients with ADHF improves physical function and reduces rehospitalizations. The REHAB-HF intervention aims to improve functional performance utilizing reproducible and progressive exercises that are individually tailored to the patient's physiological and physical capabilities. Fidelity of the intervention is essential to the trial's integrity and success. Maintaining fidelity is challenged by the complex, multi-domain design of the intervention implemented across multiple sites and delivered to an older, heterogeneous participant pool with severe underlying disease and multi-morbidity. Methods/design Given the dynamic nature of the REHAB-HF intervention, rigorous fidelity strategies were formulated. In this paper we summarize the specific strategies that REHAB-HF is using to meet the National Institutes of Health (NIH) Behavior Change Consortium Treatment Fidelity Workgroup recommendations in 5 key areas: 1) ensuring the intervention dose is consistent across participants, 2) standardizing interventionist training, 3) monitoring intervention delivery, 4) evaluating participants' understanding of information provided, and 5) ensuring that participants use the skills taught in the intervention. Discussion Effective intervention fidelity strategies are essential to the reliability and validity of physical function intervention trials. The REHAB-HF trial has developed comprehensive, specific strategies to ensure intervention fidelity despite a challenging study population and a complex intervention to meet NIH recommendations. This experience provides a strong working model for future physical function intervention trials.Copyright © 2017 Elsevier Inc.

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**34. Engagement and outcomes among older adults with mobile health (mHealth) cardiac rehabilitation: Pilot study**

**Author(s):** Grant E.; Hochman J.; Summapund J.; Zhong H.; Guo Y.; Troxel A.; Whiteson J.; Sweeney G.; Blaum C.; Dodson J.A.; Estrin D.

**Publication Type(s):** Conference Abstract

Available at Journal of the American Geriatrics Society - from Wiley Online Library Medicine and Nursing Collection 2018 - NHS

**Abstract:**Introduction: Cardiac rehabilitation (CR) benefits older adults with ischemic heart disease (IHD) but use remains low. mHealth-CR offers a potential alternative, but data are limited. Accordingly, we designed a pilot feasibility study to evaluate mHealth-CR initiated at the time of hospitalization for IHD. Methods: Eligible patients with IHD (>=65 with AMI or elective PCI) were randomized in a 1:1 manner to intervention (mHealth-CR) or control (usual care) for 30 days. The intervention group received mHealth-CR software coupled with counseling by an exercise therapist. Both groups received passive activity monitoring (Fitbit). Our engagement outcome was mHealth-CR use over the study period. Our efficacy outcome was sedentary activity, classified as >10 sedentary minutes during waking hours. Results: We enrolled 15 participants (8 intervention, 7 control). Mean age was 73 years (range 65 to 90), 27% were female, 20% African American, and 7% Hispanic. Most intervention participants (7/8) used mHealth-CR software at least once. Median number of logins was 15 (IQR 9-22). We used a mixed effects model to evaluate whether sedentary activity differed between study groups over time, and found no significant treatment effect (P value = 0.3) (Figure). Conclusion: Most older adults with IHD were able to engage with mHealth-CR, at least once. We found no significant differences in mean sedentary activity between groups, although a larger study is necessary to be adequately powered for efficacy. (Figure presented) .

**Database:** EMBASE

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### 35. Application of optimized cardiac rehabilitation program in exercise tolerance and quality of life of elderly patients undergoing percutaneous coronary intervention for acute myocardial infarction

**Author(s):** Zhang Y.; Zhang L.; Wang Y.; Cao A.; Han C.; Zhang R.

**Source:** International Journal of Clinical and Experimental Medicine; Apr 2018; vol. 11 (no. 4); p. 4087-4093

**Publication Date:** Apr 2018

**Publication Type(s):** Article

**Abstract:**Objective: To analyze the application of optimized cardiac rehabilitation program (OCRP) in improving exercise tolerance (ET) and life quality (QL) of elderly patients undergoing percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI). Methods: Retrospective analysis was conducted on the clinical data of 128 cases of elderly patients undergoing PCI for AMI. Patients were divided into two groups based on whether or not they were enrolled in the cardiac rehabilitation program; the control group consisted of 57 patients who were given normal treatment and necessary health education; the observation group consisted of 71 patients, who were enrolled in cardiac rehabilitation program, received in-hospital rehabilitation training, rehabilitation training within 1 month after discharge and rehabilitation training afterwards on the basis of treatment received in control group; target heart rate (THR), metablic equivalent (METs) and 6-minute walk were taken as observation indicators of ET; SF-36 Health Questionnaire as the tool to evaluate QL; comparison of cardiac function between the two groups before and after rehabilitation was made. Results: THR of the two groups were obviously improved 1 month, 3 months and 6 months after discharge, compared with when they were admitted to hospital. The differences were of statistical significance (all P<0.05); while THR, METs and 6-minute walk of the observation group 1 month, 3 months and 6 months after discharge were better than the control group (all P<0.05); after the rehabilitation, the score of observation group on SF-36 Health Questionnaire was remarkably

improved compared with the control group (P<0.05); besides, stroke volume and left ventricular ejection fraction (LVEF) of the observation group after the rehabilitation were distinctly increased compared with before; left ventricular end systolic diameter (LVESD) and left ventricular end-diastolic dimension (LVEDD) also were significantly narrowed than before (all P<0.05). Conclusion: OCRP is beneficial to the recovery of cardiac function of elderly patients undergoing PCI for AMI. Since it helps improving ET and QL of patients after surgery, it is of high clinical application value and worth further study and application.

**Database:** EMBASE

# Mental Health

### 36. Relationship and psychological distress among cardiac rehabilitation patients and their partners: Preliminary results of the CARE study

**Author(s):** Tulloch H.; McKee K.; Lemay K.; Zhang K.; Johnson S.; Greenman P.

**Abstract:**Background: Satisfying and supportive couple relationships have been linked to improved cardiovascular outcomes. In contrast, relationship strain has been shown to predict of cardiac mortality. Little research exists, however, on relationship quality and its association with psychological health and quality of life (QoL) among cardiac rehabilitation (CR) patients and their partners. Purpose: The purpose of the present study is: 1) to assess the prevalence of relationship and psychological distress among patients attending CR and their partners; 2) to compare psychological distress levels and QoL scores between patients and partners; and, 3) to investigate if there is an association between relationship quality, psychological distress and QoL among these dyads. Methods: A cohort study was conducted at a tertiary cardiac centre in Canada; patients attending CR and their partners were recruited. Participants completed validated, selfreport questionnaires assessing relationship quality (Dyadic Adjustment Scale), psychological distress (Hospital Anxiety and Depression Scale) and quality of life (SF-36) at CR intake. Independent samples t-tests were used to investigate differences between groups. Pearson correlations were conducted to investigate the association between the above variables. Results: 175 couples (350 participants; Mean age = 65.3 years) enrolled in the study. Patients with cardiovascular disease were mainly male (78%). The reason for most recent cardiac hospitalization varied (7.3% MI, 16.8% angina, 8% Afib, 6% heart failure, 11.7% valve surgery). Results indicated that 24.5% of participants reported relationship distress; scores were similar between patients and partners (p=.44). Many participants' scores fell above cutoffs for depression (9.2%) and anxiety (19.4%); partners reported significantly higher scores on these measures than patients (ps<0.05). Quality of life scores were comparable to normative data for cardiac patients (subscales means ranged from 45-74); patients' scores did not differ significantly from their partners. Finally, we observed a association between relationship quality, mental health and aspects of QoL. Specifically, positive correlations were observed between the relationship quality scores and role-emotional (r = .16, p=.01), emotional wellbeing (r=.30, p=<.001), general health (r=.18, p=.007), while a negative relationship was found between

relationship quality and depression (r=.26,p<.001). Conclusion: This study shows that relationship distress and poor psychological health is prevalent among patients with cardiovascular disease and their partners, and that relationship distress, psychological distress and QoL are associated among these dyads. Future studies are required to determine if interventions targeting the couple enhance relationship quality, psychological health and cardiovascular outcomes.

**Database:** EMBASE

### 37. Relevance of Kinesiophobia in Relation to Changes over Time among Patients after an Acute Coronary Artery Disease Event

**Author(s):** Back M.; Cider A.; Lundberg M.; Herlitz J.; Jansson B.

**Abstract:**Purpose: To identify levels of kinesiophobia during the first 4 months after an acute episode of coronary artery disease (CAD), while controlling for gender, anxiety, depression, and personality traits. Methods: In all, 106 patients with CAD (25 women), mean age 63.1 +/- 11.5 years, were included in the study at the cardiac intensive care unit, Sahlgrenska University Hospital, Sweden. The patients completed questionnaires at 3 time points: in the cardiac intensive care unit (baseline), 2 weeks, and 4 months after baseline. The primary outcome measure was kinesiophobia. Secondary outcome measures were gender, anxiety, depression, harm avoidance, and positive and negative affect. A linear mixed model procedure was used to compare kinesiophobia across time points and gender. Secondary outcome measures were used as covariates. Results: Kinesiophobia decreased over time (P =.005) and there was a significant effect of gender (P =.045; higher values for women). The presence of a high level of kinesiophobia was 25.4% at baseline, 19% after 2 weeks, and 21.1% after 4 months. Inclusion of the covariates showed that positive and negative affect and harm avoidance increased model fit. The effects of time and gender remained significant. Conclusions: This study highlights that kinesiophobia decreased over time after an acute CAD episode. Nonetheless, a substantial part of the patients were identified with a high level of kinesiophobia across time, which emphasizes the need for screening and the design of a treatment intervention.Copyright © 2018 Lippincott Williams and Wilkins. All rights reserved.

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### 38. Enhanced psychological care in cardiac rehabilitation services for patients with new-onset depression: The CADENCE feasibility study and pilot RCT

**Author(s):** Richards S.H.; Campbell J.L.; Taylor R.S.; Davey A.; Warren F.C.; Winder R.E.; Wright C.A.; Dickens C.; Anderson R.; Richards D.A.; Gandhi M.; Knight L.; Gibson A.; Kessler D.; Turner K.; Kuyken W.; Ukoumunne O.C.

**Abstract:**Background: Around 19% of people screened by UK cardiac rehabilitation programmes report having moderate or severe symptoms of depression. These individuals are at an increased risk

of cardiac mortality and morbidity, reduced quality of life and increased use of health resources compared with their non-depressed counterparts. Maximising psychological health is a goal of cardiac rehabilitation, but psychological care is patchy. Objective(s): To examine the feasibility and acceptability of embedding enhanced psychological care (EPC) within cardiac rehabilitation, we tested the feasibility of developing/implementing EPC and documented the key uncertainties associated with undertaking a definitive evaluation. Design: A two-stage multimethods study; a feasibility study and a qualitative evaluation, followed by an external pilot cluster randomised controlled trial (RCT) with a nested qualitative study. Setting: UK comprehensive cardiac rehabilitation teams. Participants: Adults eligible for cardiac rehabilitation following an acute coronary syndrome with new-onset depressive symptoms on initial nurse assessment. Patients who had received treatment for depression in the preceding 6 months were excluded. Interventions: The EPC intervention comprised nurse-led mental health-care co-ordination and behavioural activation within cardiac rehabilitation. The comparator was usual cardiac rehabilitation care. Main outcome measures: Measures at baseline, and at the 5-(feasibility and pilot) and 8-month follow-ups (pilot only). Process measures related to cardiac team and patient recruitment, and participantretention. Outcomes included depressive symptoms, cardiac mortality and morbidity, anxiety, health-related quality of life and service resource use. Interviews explored participant and nurses' views and experiences. Results: Between September 2014 and May 2015, five nurses from four teams recruited participants into the feasibility study. Of the 203 patients screened, 30 were eligible and nine took part (the target was 20 participants). At interview, participants and nurses gave valuable insights into the EPC intervention design and delivery. Although acceptable, the EPC delivery was challenging for nurses (e.g. the ability to allocate sufficient time within existing workloads) and the intervention was modified accordingly. Between December 2014 and February 2015, 8 out of 20 teams approached agreed to participate in the pilot RCT [five were randomised to the EPC arm and three were randomised to the usual-care (UC) arm]. Of the 614 patients screened, 55 were eligible and 29 took part (the target was 43 participants). At baseline, the trial arms were well matched for sex and ethnicity, although the EPC arm participants were younger, from more deprived areas and had higher depression scores than the UC participants. A total of 27 out of 29 participants were followed up at 5 months. Interviews with 18 participants (12 in the EPC arm and six in the UC arm) and seven nurses who delivered EPC identified that both groups acknowledged the importance of receiving psychological support embedded within routine cardiac rehabilitation. For those experiencing/delivering EPC, the intervention was broadly acceptable, albeit challenging to deliver within existing care. Limitations: Both the feasibility and the pilot studies encountered significant challenges in recruiting patients, which limited the power of the pilot study analyses. Conclusions: Cardiac rehabilitation nurses can be trained to deliver EPC. Although valued by both patients and nurses, organisational and workload constraints were significant barriers to implementation in participating teams, suggesting that future research may require a modified approach to intervention delivery within current service arrangements. We obtained important data informing definitive research regarding participant recruitment and retention, and optimal methods of data collection.Copyright © Queen's Printer and Controller of HMSO 2018.

**Database:** EMBASE

**39. Assessing the effectiveness of Enhanced Psychological Care for patients with depressive symptoms attending cardiac rehabilitation compared with treatment as usual (CADENCE): A pilot cluster randomised controlled trial**

**Author(s):** Richards S.H.; Dickens C.; Anderson R.; Richards D.A.; Taylor R.S.; Davey A.; Warren F.; Winder R.; Campbell J.; Ukoumunne O.C.; Turner K.M.; Gandhi M.; Kuyken W.; Gibson A.

**Abstract:**Background: Around 17% of people attending UK cardiac rehabilitation programmes have depression. Optimising psychological wellbeing is a rehabilitation goal, but provision of psychological care is limited. We developed and piloted an Enhanced Psychological Care (EPC) intervention embedded within cardiac rehabilitation, aiming to test key areas of uncertainty to inform the design of a definitive randomised controlled trial (RCT) and economic evaluation. Methods: An external pilot randomised controlled trial (RCT) randomised eight cardiac rehabilitation teams (clusters) to either usual care of cardiac rehabilitation provision (UC), or EPC in addition to UC. EPC comprised mental health care coordination and patient-led behavioural activation with nurse support. Adults eligible for cardiac rehabilitation following an acute coronary syndrome and identified with new-onset depressive symptoms during an initial nurse assessment were eligible. Measures were performed at baseline and 5- and 8-month follow-ups and compared between EPC and UC. Team and participant recruitment and retention rates, and participant outcomes (clinical events, depression, anxiety, health-related quality of life, patient experiences, and resource use) were assessed. Results: Eight out of twenty teams were recruited and randomised. Of 614 patients screened, 55 were eligible and 29 took part (5%, 95% CI 3 to 7% of those screened), with 15 patient participants cluster randomised to EPC and 14 to UC. Nurse records revealed that 8/15 participants received the maximum number of EPC sessions offered; and 4/15 received no sessions. Seven out of fifteen EPC participants were referred to another NHS psychological service compared to none in UC. We followed up 27/29 participants at 5 months and 17/21 at 8 months. The mean difference (EPC minus UC) in depressive symptoms (Beck Depression Inventory) at follow-up (adjusting for baseline score) was 1.7 (95% CI - 3.8 to 7.3; N = 26) at 5 months and 4.4 (95% CI - 1.4 to 10.2; N = 17) at 8 months. Discussion: While valued by patients and nurses, organisational and workload constraints are significant barriers to EPC implementation. There remains a need to develop and test new models of psychological care within cardiac rehabilitation. Our study offers important data to inform the design of future trials of similar interventions.Copyright © 2018 The Author(s).

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### 40. Quality of life, anxiety and depression in patients after cardiac rehabilitation

**Author(s):** Mouine N.; Amah G.; Guiti C.; Gagey S.; Duval M.; Widad L.; Abdennbi K.

**Abstract:**Cardiac rehabilitation is the measures that allow a cardiac patient to recover functional, psychological and emotional capacity and improve the quality of life through exercise and therapeutic education programs and management of anxio-depressive disorders. The aim of study is to evaluate the benefit of cardiac rehabilitation on the quality of life and psychological state of

cardiac patients. Materials and methods: It's a retrospective study, including 403 cardiac patients admitted in cardiac rehabilitation unit, Hospital, Paris. All of them had a cardiac evaluation and a quality of life assessment by SF12 questionnaire and anxio-depression evaluation by HAD test for anxiety and depressive disorders Results: The mean age is 60.39 +/- 11.8 years, with male predominance, they have more than 3 cardiovascular risk factors, dominated by hypertension (60.2%) and dyslipidemia (52.5 %), they are all overweight with an average BMI of 27.5 +/- 4.9 kg / m2SC Coronary artery disease is the most common pathology and ejection fraction is globally conserved (52.7 +/- 12.1%) on echocardiography. After 20 cardiac rehabilitation sessions, in addition to significant improvement in maximal work load (95.63 +/- 30 to 115.5 +/- 37 watt) and VO2max (18.7 +/- 4.3 at 23.7 +/- 6.7 ml / Kg / min), there was a significant improvement in quality of life (p = 0.0001) and anxiety and depression as assessed by the HAD test (p=0.0001). Conclusion: Cardiac rehabilitation is clearly benefic in improving physical and emotional quality of life of patients as illustrated by the results of SF12 test at the end of cardiac rehabilitation but also by the improvement of anxiety and depression score of patients after their management in cardiac rehabilitation.

**Database:** EMBASE

**41. Improving the effectiveness of psychological interventions for depression and anxiety in the cardiac rehabilitation pathway using group-based metacognitive therapy (PATHWAY Group MCT): Study protocol for a randomised controlled trial**

**Author(s):** Wells A.; McNicol K.; McPhillips R.; Anderson R.; Faija C.; Capobianco L.; Reeves D.; Salmon P.; Fisher P.; Davies L.; Shields G.; Heagerty A.; Doherty P.; Morley H.; Gaffney H.

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**Abstract:**Background: Anxiety and depression are prevalent among cardiac rehabilitation patients but pharmacological and psychological treatments have limited effectiveness in this group. Furthermore, psychological interventions have not been systematically integrated into cardiac rehabilitation services despite being a strategic priority for the UK National Health Service. A promising new treatment, metacognitive therapy, may be well-suited to the needs of cardiac rehabilitation patients and has the potential to improve outcomes. It is based on the metacognitive model, which proposes that a thinking style dominated by rumination, worry and threat monitoring maintains emotional distress. Metacognitive therapy is highly effective at reducing this thinking style and alleviating anxiety and depression in mental health settings. This trial aims to evaluate the effectiveness and cost-effectiveness of group-based metacognitive therapy for cardiac rehabilitation patients with elevated anxiety and/or depressive symptoms. Methods/Design: The PATHWAY Group-MCT trial is a multicentre, two-arm, single-blind, randomised controlled trial comparing the clinical- and cost-effectiveness of group-based metacognitive therapy plus usual cardiac rehabilitation to usual cardiac rehabilitation alone. Cardiac rehabilitation patients (target sample n = 332) with elevated anxiety and/or depressive symptoms will be recruited across five UK National

Health Service Trusts. Participants randomised to the intervention arm will receive six weekly sessions of group-based metacognitive therapy delivered by either cardiac rehabilitation professionals or research nurses. The intervention and control groups will both be offered the usual cardiac rehabilitation programme within their Trust. The primary outcome is severity of anxiety and depressive symptoms at 4-month follow-up measured by the Hospital Anxiety and Depression Scale total score. Secondary outcomes are severity of anxiety/depression at 12-month follow-up, health-related quality of life, severity of post-traumatic stress symptoms and strength of metacognitive beliefs at 4- and 12-month follow-up. Qualitative interviews will help to develop an account of barriers and enablers to the effectiveness of the intervention. Discussion: This trial will evaluate the effectiveness and cost-effectiveness of group-based metacognitive therapy in alleviating anxiety and depression in cardiac rehabilitation patients. The therapy, if effective, offers the potential to improve psychological wellbeing and quality of life in this large group of patients.Copyright © 2018 The Author(s).

**Database:** EMBASE

# Disease Management

**42. Management of ST segment elevation myocardial infarction**

**Author(s):** Bulluck H.; Hoole S.P.

**Source:** Medicine (United Kingdom); 2018

**Publication Date:** 2018

**Publication Type(s):** Article In Press

Available  at Medicine -  from Elsevier Username: macchealthlibrary Password: library

**Abstract:**Mortality after acute ST elevation myocardial infarction (STEMI) has declined over past decades, partly attributed to significant improvements in patient management. In this chapter, we provide an up-to-date review of the current evidence-based management of STEMI, starting at the time of first medical contact. It is now well established that 'time is muscle' and we begin by defining the various strategic time points that are crucial to minimize the total ischaemic time, a major determinant of clinical outcomes. We then cover the salient features of the management of STEMI patients before, during and immediately after reperfusion therapy by primary percutaneous coronary intervention or thrombolytic therapy. It is important to bear in mind that the management of STEMI patients does not stop after discharge from hospital. A multidisciplinary approach is required to address a range of other physical and social aspects, ranging from lifestyle modification and exercise-based rehabilitation to assessment for primary prevention implantable cardioverter-defibrillator and advice regarding driving.Copyright © 2018

**Database:** EMBASE

**43. Clinical outcomes after acute myocardial infarction according to a novel stratification system linked to a rehabilitation program**

**Author(s):** Yamamoto K.; Sakakura K.; Akashi N.; Watanabe Y.; Noguchi M.; Taniguchi Y.; Ugata Y.; Wada H.; Momomura S.-I.; Fujita H.

**Abstract:**Background: A risk classification of acute myocardial infarction (AMI) linked to a rehabilitation program has not been established. Methods: We allocated 292 patients with AMI into the low- (L) (n = 108), intermediate- (I) (n = 72), and high- (H) (n = 112) risk groups according to our original risk classification. The primary endpoint was major adverse cardiac events (MACE), defined as the composite of cardiac death, non-fatal AMI, stent thrombosis, and ischemia-driven target vessel revascularization. The mean follow-up period was 252 days. Results: The length of coronary care unit (CCU) stay and hospital stay was shortest in the L-risk group (CCU stay, 1.0 +/- 1.0 days; hospital stay, 5.6 +/- 3.2 days), followed by the I-risk group (CCU stay, 2.3 +/- 1.8 days; hospital stay, 8.1 +/- 2.7 days), and longest in the H-risk group (CCU stay, 5.1 +/- 5.0 days; hospital stay, 14.6 +/- 12.6 days) (p < 0.001). MACE were most frequently observed in the H-risk group (26.8%), followed by the I-risk group (5.6%), and least in the L-risk group (1.9%) (p < 0.001). Conclusions: The lengths of hospital stay and CCU stay were significantly shortest in the L-risk group, followed by the I-risk group, and longest in the H-risk group. MACE were most frequently observed in the H-risk group, followed by the I-risk group, and least in the L-risk group. These results support the validity of our new classification system.Copyright © 2018 Japanese College of Cardiology

**Database:** EMBASE

## 44. Acute myocardial infarction in young women: Current perspectives

**Author(s):** Chandrasekhar J.; Gill A.; Mehran R.

Available at International Journal of Women's Health - from Europe PubMed Central - Open Access

**Abstract:**Acute myocardial infarction (AMI) is the leading cause of death in women worldwide. Every year, in the USA alone, more than 30,000 young women <55 years of age are hospitalized with AMI. In recent decades, the incidence of AMI is increasing in younger women in the context of increasing metabolic syndrome, diabetes mellitus, and non-traditional risk factors such as stress, anxiety, and depression. Although women are classically considered to present with atypical chest pain, several observational data confirm that men and women experience similar rates of chest pain, with some differences in intensity, duration, radiation, and the choice of descriptors. Women also experience more number of symptoms and more prodromal symptoms compared with men. Suboptimal awareness, sociocultural and financial reasons result in pre-hospital delays in women and lower rates of access to care with resulting undertreatment with guideline-directed therapies. Causes of AMI in young women include plaque-related MI, microvascular dysfunction or vasospasm, and spontaneous coronary artery dissection. Compared with men, women have greater in-hospital, early and late mortality, as a result of baseline comorbidities. Post-AMI women have lower referral to cardiac rehabilitation with more dropouts, lower levels of physical activity, and poorer improvements in health status compared with men, with higher inflammatory levels at 1-year from index presentation. Future strategies should focus on primary and secondary prevention, adherence, and post-AMI health-related quality of life. This review discusses the current evidence in the

epidemiology, diagnosis, and treatment of AMI in young women.Copyright © 2018 Chandrasekhar et al.

**Database:** EMBASE


**45. Changes in Oxygen Consumption and Heart Rate After Acute Myocardial Infarction During 6-Month Follow-up**

**Author(s):** Choe Y.; Han J.-Y.; Choi I.-S.; Park H.-K.

**Source:** PM and R; Jun 2018; vol. 10 (no. 6); p. 587-593

**Publication Date:** Jun 2018

**Publication Type(s):** Article

**Abstract:**Background: Exercise intensity is a particularly important determinant of physiological responses to exercise training in patients with acute myocardial infarction. Heart rate (HR) is commonly used as a practical way of prescribing and monitoring exercise as specific intensities based on a linear relationship between the percentage of maximum HR (%HRmax) and the percentage of maximum oxygen consumption (%VO2max) regardless of age, gender, or exercise mode. Objective: To examine the change in variability in the correlation between %HRmax and %VO2max after acute myocardial infarction. Design: Retrospective study. Setting: Regional cardio-cerebrovascular center at a tertiary hospital. Patients: A total of 66 patients were enrolled who were referred for cardiac rehabilitation (CR) after percutaneous intervention, and who had reached stage 3 of the modified Bruce Protocol (mBP) on an exercise tolerance test (ETT). Methods: There were 54 men and 12 women with an average age of 56.7 +/- 9.48 years, ejection fraction (EF) of 56.4% +/- 8.89%, and body mass index (BMI) of 24.73 +/- 2.86 kg/m2. All patients participated in a 4-week outpatient CR program and underwent ETT with a gas analyzer to determine maximal heart rate and maximal oxygen consumption before CR and 1 month, 3 months, and 6 months after CR. Main Outcome Measurements: VO2max and HRmax were defined as the highest values attained during the ETT. The HR and VO2 values at each stage of the mBP were expressed as percentages of their maximum. %HRmax and %VO2max were calculated at each stage of the mBP. Results: The maximum METs and VO2max significantly improved at 1 month after CR, but not significantly at 3 and 6 months after CR. The correlation between VO2max and HRmax progressively changed in a favorable manner during CR. The relationship between %HRmax and %VO2max indicated a coefficient of variation before and 1, 3, and 6 months after of 0.800, 0.826, 0.832, and 0.880, respectively. Conclusions: This study showed that the %HRmax correlates better with the %VO2max in the late-stage post-AMI than in the initial stage. We should therefore set and monitor the exercise intensity using maximal oxygen consumption in the early stage of exercise training after onset of acute myocardial infarction. Level of Evidence: IVCopyright © 2018 American Academy of Physical Medicine and Rehabilitation

**Database:** EMBASE


**46. Comprehensive heart failure self-management programme: Evaluation of a pilot group intervention**

**Author(s):** Caramlau I.; Gallagher J.; Peotta L.; Clarke S.; Pender N.; Hannon B.; O'connor L.; Mannion T.; Kennedy E.; Masterson L.; O'neill L.; Mcadam B.

**Source:** European Journal of Heart Failure; May 2018; vol. 20 ; p. 84-85

**Publication Date:** May 2018

**Abstract:**Background: Heart failure (HF) is a chronic, life-limiting condition affecting approximately 2% of people in Ireland, and is associated with frequent hospital admissions and significantly reduced quality of life. To self-manage their condition effectively, patients with HF need to engage in multiple self-care behaviours (e.g. poly-pharmacy, monitoring and responding to symptoms, maintaining a low salt diet and managing fluid intake), as well as managing the emotional impact of living with a chronic condition. Despite its importance, poor self-management remains a challenge in the treatment of HF. Purpose: This study examined the feasibility of a comprehensive HF self-management group intervention underpinned by cognitive behavioural principles. The core components of the programme included modules on understanding HF, symptom monitoring, medication adherence, healthy eating, physical exercise, managing fatigue, managing breathlessness, managing difficult emotions, and strategies to compensate for HF-associated cognitive difficulties. Methods: Participants were predominantly in NYHA class III, diagnosed with ischaemic cardiomyopathy and HF-preserved, had = 2 co-morbidities, and were attending a specialist HF service for >3 months. Patients were invited to participate in a 6-week outpatient HF self-management group programme. In addition to a consultant cardiologist, this multi-disciplinary programme comprised of input from psychologists, a pharmacist, a dietician, and two Clinical Nurse Specialists (HF & Cardiac Rehabilitation). Using a pre-post design, the impact of this HF self-management intervention on patient reported outcomes was evaluated using the following measures: the Self-Care of Heart Failure Index (SCHIFI), the Medication Adherence Report Scale (MARS), and the HeartQoL. Results: 50 eligible patients with HF were invited to participate in a screening assessment, resulting in 28 patients being referred to the HF self-management programme. Ultimately, 26 patients [88% male; mean age= 68.8 years [SD = 7.5)] attended the programme, with an overall attendance rate of 96%. Comparing Time 1 and Time 2, paired-sample T-tests showed a significant improvement in all 3 subscales of HF self-care behaviours: self-care maintenance $t(25)=-3.4$, $p<.05$, self-care management, $t(25)=-2.6$, $p<.05$, and self-care confidence, $t(25)=-5.9$, $p<.05$. An increase in medication adherence was also observed, reflected by a decrease in MARS scores [$t(25) = 1.9$, $p<.05$]. Health-related Quality of life (HeartQoL) was not significantly improved [$t(25)=-2.2$, $p=.65$]. High levels of patient satisfaction with the self-management programme were also reported. Conclusions: A comprehensive group-based HF self-management intervention was both feasible and acceptable to patients, and improved both HF self management and medication adherence. A robust and adequately powered randomized controlled trial is warranted to evaluate the effectiveness of this intervention.

**Database:** EMBASE

## 47. Prognostic implications of early monomorphic and non-monomorphic tachyarrhythmias in patients discharged with acute coronary syndrome

**Author(s):** Hai J.-J.; Un K.-C.; Wong C.-K.; Wong K.-L.; Zhang Z.-Y.; Chan P.-H.; Lau C.-P.; Siu C.-W.; Tse H.-F.

**Abstract:**Background: The prognostic implication of early ventricular tachyarrhythmias (VTs) after acute coronary syndrome (ACS) remains unclear. Objective: We sought to investigate the clinical

outcomes of early monomorphic and non-monomorphic VTs that occur within 48 hours in patients after ACS. Methods: We retrospectively reviewed the clinical outcomes of 2033 [mean age 67.0 +/- 13.4 years; 1486 (73.1%) men] consecutive patients who presented with ACS from 2004 to 2015. Results: A total of 67 (3.3%) and 90 (4.4%) patients developed early monomorphic or non-monomorphic VT, respectively. Killip class IV (odds ratio [OR] 3.05; 95% confidence interval [CI] 1.47-6.36; P <.01), creatine kinase level (OR 1.01; 95% CI 1.00-1.02 per 100 IU/L; P =.01), and left ventricular ejection fraction (OR 0.96; 95% CI 0.94-0.99; P <.01) were independently associated with early monomorphic VT, whereas age (OR 0.98; 95% CI 0.97-0.99; P =.04), ST elevated myocardial infarction (OR 3.53; 95% CI 1.71-7.27; P <.01), Killip class IV (OR 4.91; 95% CI 2.76-8.74; P <.01), diabetes mellitus (OR 0.48; 95% CI 0.28-0.81; P <.01), and left ventricular ejection fraction (OR 0.97; 95% CI 0.95-0.99; P <.01) were independently associated with early non-monomorphic VT. More patients with early monomorphic VT (n = 22 [32.8%]) died in hospital than those with non-monomorphic VT (n = 16 [17.8%]) or without early VT (n = 133 [7.1%]; P <.01). After a mean follow-up of 67.8 +/- 43.2 months, 21 patients with early monomorphic VT (46.7%), 22 patients with early non-monomorphic VT (29.7%), and 552 patients without early VT (31.7%) died. Both early monomorphic and non-monomorphic VTs were associated with a long-term increase in sudden arrhythmic deaths and recurrent VTs. Nevertheless, only early monomorphic VT was shown to independently predict overall survival (hazard ratio 1.62; 95% CI 1.03-2.55; P =.04). Conclusion: Early monomorphic VT, but not early non-monomorphic VT, independently predicted all-cause mortality in patients with ACS who survived to hospital discharge.Copyright © 2018 Heart Rhythm Society

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### 48. Remote Ischemic Preconditioning in High-risk Cardiovascular Surgery Patients: A Randomized-controlled Trial

**Author(s):** Coverdale N.S.; Hamilton A.; Petsikas D.; Zelt D.; Brown P.; Payne D.M.; McClure R.S.; Malik P.; Milne B.; Saha T.

**Abstract:**Remote ischemic preconditioning (RIPC) may reduce biomarkers of ischemic injury after cardiovascular surgery. However, it is unclear whether RIPC has a positive impact on clinical outcomes. We performed a blinded, randomized controlled trial to determine if RIPC resulted in fewer adverse clinical outcomes after cardiac or vascular surgery. The intervention consisted of 3 cycles of RIPC on the upper limb for 5 minutes alternated with 5 minutes of rest. A sham intervention was performed on the control group. Patients were recruited who were undergoing (1) high-risk cardiac or vascular surgery or (2) cardiac or vascular surgery and were at high risk of ischemic complications. The primary end point was a composite outcome of mortality, myocardial infarction, stroke, renal failure, respiratory failure, and low cardiac output syndrome, and the secondary end points included the individual outcome parameters that made up this score, as well as troponin-I values. A total of 436 patients were randomized and analysis was performed on 215 patients in the control group and on 213 patients in the RIPC group. There were no differences in the composite outcome between the 2 groups (RIPC: 67 [32%] and control: 72 [34%], relative risk [0.94 {0.72-1.24}]) or in any of the individual components that made up the composite outcome. Additionally, we did not observe any differences between the groups in troponin-I values, the length of intensive care unit stay, or the total hospital stay. RIPC did not have a beneficial effect on clinical outcomes in patients who had cardiovascular surgery.Copyright © 2017 Elsevier Inc.

### 49. Smoking Cessation in Patients With Acute Coronary Syndrome

**Author(s):** Franck C.; Filion K.B.; Eisenberg M.J.

Available at The American Journal of Cardiology - from ProQuest (Hospital Premium Collection) - NHS Version

**Abstract:**Over 30% of the nearly 1 million North Americans hospitalized annually with an acute coronary syndrome (ACS) are smokers. Despite a substantially increased risk of morbidity and mortality, 2/3 of patients who quit smoking after ACS return to smoking within 1 year. To summarize the evidence of smoking cessation in patients hospitalized after ACS, we systematically reviewed all randomized controlled trials of pharmacologic and behavioral smoking cessation therapies in patients with ACS. In addition, we reviewed the clinical considerations surrounding the use of smoking cessation therapies, including their broad mechanisms of action and possible alternative treatments, including cardiac rehabilitation programs and electronic cigarettes. A total of 7 randomized controlled trials met our inclusion criteria (4 pharmacotherapies and 3 behavioral therapies). In pharmacologic trials, only varenicline increased point prevalence abstinence at 12 months. Behavioral interventions produced significantly improved abstinence rates at 6 and 12 months. However, these studies had substantial limitations affecting their generalizability. Overall, currently available smoking cessation therapies are limited in their efficacy in patients hospitalized after ACS. Because of the relative scarcity of data and the urgency of establishing clinical guidelines, there is a critical need to continue examining the efficacy and safety of smoking cessation interventions in patients hospitalized after ACS.Copyright © 2018 Elsevier Inc.

### 50. Insufficient cardiovascular risk factor control and adherence to recommended lifestyle and medical therapies in people with coronary heart disease in 24 european countries

**Author(s):** Kotseva K.; De Bacquer D.; De Backer G.; Ryden L.; Jennings C.; Wood D.

**Abstract:**Background: EUROASPIRE IV is a cross-sectional survey undertaken in coronary patients in 24 European countries aiming to determine whether the Joint European Societies guidelines on cardiovascular prevention are being followed in everyday clinical practice. Methods: Patients <80 years with coronary disease (CABG, PCI or an acute coronary syndrome) were identifed from the hospital medical records and interviewed at least six months after their recruiting coronary event. Results: A total of 7998 coronary patients (24% females) were interviewed with a median time between the index event and interview 1.35 years (IR 0.95-1.93). Overall, the non-smoking status was 83%, and the recommended targets for body mass index (BMI<25 kg/m2) and waist circumference (WC<94 cm in men or <80 cm in women) were achieved by 18% and 18%, respectively. The prevalence of obesity (BMI>=30 kg/m2) and central obesity (WC>=102 cm in men or >=88 cm in women) was 38% and 58%. The control of blood pressure (<140/90mm Hg

(<140/80mm Hg in people with self-reported diabetes) and LDL-cholesterol (<70MG/DL), and for those with diabetes glycated haemoglobin (HbA1c<7.0mmol/L) was 57%, 19% and 53%, respectively. The use of recommended cardioprotective therapies was 94%, 83%, 75% and 86% for antiplatelets, beta-blockers, angiotensin-converting enzyme inhibitors/angiotensin receptor blockers, and lipid-lowering agents, respectively. Overall, 93%, 29%, 87%, 49% and 50% of patients were aware of their weight, waist circumference, blood pressure, total cholesterol and glucose levels, respectively. Only 51% were advised to follow a cardiac rehabilitation program and 42% attended at least half of the sessions, with enormous variation in service provision between countries. Conclusion: A signifcant gap still exists between the prevention guidelines and their adherence and control of CVD risk factors in coronary patients in Europe. Greater efforts are needed for all coronary patients in order to achieve healthier lifestyles, better risk factor control and reduce the risk of future cardiovascular events.

**Database:** EMBASE

### 51. The role of beta blocker therapy for ischemic heart disease prevention in undiagnosed obstructive sleep apnea and hypertension

**Author(s):** Farjo P.; Patel K.; Shah R.; Badami V.; Regner S.; Stansbury R.; Schmidt S.

**Source:** Journal of the American College of Cardiology; Mar 2018; vol. 71 (no. 11)

**Publication Date:** Mar 2018

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Obstructive sleep apnea (OSA) is associated with coronary artery disease (CAD) and heart failure. During apneic spells, sympathetic nerve activity increases which is thought to contribute to this association. Beta-blocker (BB) medications block this sympathetic nerve activity. We studied the role of beta blocker medication in reducing the cardiovascular events in patients with undiagnosed OSA and hypertension (HTN). Methods: We analyzed data from one academic sleep center for patients with HTN and incident OSA but no prior cardiac disease history. Patients were followed retrospectively for fve years from the date of their diagnostic polysomnography. Patients using BB medications were compared to those using another antihypertensive agent for our primary outcome of composite CAD events including unstable angina, NSTEMI, and STEMI. Secondary outcomes analyzed included new-onset atrial fibrillation, non-ischemic cardiomyopathy, left ventricular hypertrophy, chest pain hospitalization, valvular disease, and heart failure. Results: A total of 658 patients (mean age: 58.3; 65% male) with HTN and incident OSA met our inclusion criteria. Of these, 283 (43%) were placed in the BB exposure group and 375 (57%) in the non-exposure group. The primary composite endpoint occurred in 53 patients (19%) in the exposure group and 83 patients (22%) in the non-exposure group. BB medications did not decrease the risk of ischemic heart disease events in our patients (relative risk [RR]: 0.85, 95% confdence interval [CI]: 0.62 to 1.15; p-value = 0.16). Composite components, secondary outcomes, and a subgroup analysis of mild, moderate, and severe OSA groups also did not show any signifcant relative risk reduction. Conclusion: BB therapy is not associated with a risk reduction of ischemic heart disease events in patients with controlled HTN and undiagnosed OSA.

**Database:** EMBASE

### 52. Current Management and Future Directions of Heart Failure With Preserved Ejection Fraction: a Contemporary Review

**Author(s):** Krittanawong C.; Kukin M.L.

**Source:** Current Treatment Options in Cardiovascular Medicine; Apr 2018; vol. 20 (no. 4)

**Publication Date:** Apr 2018

**Publication Type(s):** Review

**Abstract:**Heart failure with preserved ejection fraction (HFpEF), a complex and debilitating syndrome, is commonly seen in elderly populations. Exacerbation of HFpEF is among the most common reasons for hospital admission in the USA. The high rate of morbidity and mortality from this condition underscores the fact that HFpEF is heterogeneous, complex, and poorly characterized. Randomized, controlled trials have been very successful at identifying treatments for HF with reduced ejection fraction (HFrEF), but effective treatment options for HFpEF are lacking. Here, we discuss (1) the pathophysiology of HFpEF, (2) a standardized diagnostic and therapeutic approach, (3) a comparison of the management of recent guidelines, and (4) challenges and future directions for HFpEF management. The authors believe that it is important to identify new subtypes of HFpEF to better classify genotypes and phenotypes of HFpEF and to develop novel targeted therapies. It is our hypothesis that big data analytics will shine new light on unique HFpEF phenotypes that better respond to treatment modalities.Copyright © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

**Database:** EMBASE

## 53. Editor's Choice - Impact of initial hospital diagnosis on mortality for acute myocardial infarction: A national cohort study

**Author(s):** Wu J.; Gale C.P.; Hall M.; Dondo T.B.; Oliver G.; Metcalfe E.; Batin P.D.; Hemingway H.; Timmis A.; West R.M.

**Source:** European Heart Journal: Acute Cardiovascular Care; Mar 2018; vol. 7 (no. 2); p. 139-148

**Publication Date:** Mar 2018

**Publication Type(s):** Article

**Abstract:**Aims: Early and accurate diagnosis of acute myocardial infarction is central to successful treatment and improved outcomes. We aimed to investigate the impact of the initial hospital diagnosis on mortality for patients with acute myocardial infarction. Methods and results: Cohort study using data from the Myocardial Ischaemia National Audit Project of patients discharged with a final diagnosis of ST-elevation myocardial infarction (STEMI, n=221,635) and non-STEMI (NSTEMI, n=342,777) between 1 April 2004 and 31 March 2013 in all acute hospitals (n = 243) in England and Wales. Overall, 168,534 (29.9%) patients had an initial diagnosis which was not the same as their final diagnosis. After multivariable adjustment, for STEMI a change from an initial diagnosis of NSTEMI (time ratio 0.97, 95% confidence interval 0.92-1.01) and chest pain of uncertain cause (0.98, 0.89-1.07) was not associated with a significant reduction in time to death, whereas for other initial diagnoses the time to death was significantly reduced by 21% (0.78, 0.74-0.83). For NSTEMI, after multivariable adjustment, a change from an initial diagnosis of STEMI was associated with a reduction in time to death of 10% (time ratio 0.90, 95% confidence interval 0.83-0.97), but not for chest pain of uncertain cause (0.99, 0.96-1.02). Patients with NSTEMI who had other initial diagnoses had a significant 14% reduction in their time to death (time ratio 0.86, 95% confidence interval 0.84-0.88). STEMI and NSTEMI with other initial diagnoses had low rates of pre-hospital electrocardiograph (24.3% and 21.5%), aspirin on hospitalisation (61.6% and 48.5%), care by a cardiologist (60.0% and 51.5%), invasive coronary procedures (38.8 % and 29.2%), cardiac

rehabilitation (68.9% and 62.6%) and guideline indicated medications at time of discharge from hospital. Had the 3.3% of patients with STEMI and 17.9% of NSTEMI who were admitted with other initial diagnoses received an initial diagnosis of STEMI and NSTEMI, then 33 and 218 deaths per year might have been prevented, respectively. Conclusion: Nearly one in three patients with acute myocardial infarction had other diagnoses at first medical contact, who less frequently received guideline indicated care and had significantly higher mortality rates. There is substantial potential, greater for NSTEMI than STEMI, to improve outcomes through earlier and more accurate diagnosis of acute myocardial infarction.Copyright © 2016, © The European Society of Cardiology 2016.

**Database:** EMBASE

## 54. Effect of hybrid treatment on rehabilitation and clinical condition of patients with multivessel coronary artery disease

**Author(s):** Foik J.; Brzek A.; Gierlotka M.J.; Gasior M.; Zembala M.O.; Zembala M.

**Source:** Polish Archives of Internal Medicine; 2018; vol. 128 (no. 2); p. 77-88

**Publication Date:** 2018

**Publication Type(s):** Article

Available at Polish Archives of Internal Medicine - from EBSCO (MEDLINE Complete)

**Abstract:**Introduction: Rehabilitation after coronary revascularization procedures is an intrinsic part of treatment during the in-hospital period. Objectives: We aimed to compare the course and effects of rehabilitation in patients receiving hybrid treatment (minimally invasive direct coronary artery bypass / percutaneous coronary intervention) or classic treatment (coronary artery bypass grafting / off-pump coronary artery bypass) during hospitalization. Patient s and methods: The study included 200 patients participating in a prospective randomized clinical trial (POLMIDES) that assessed the effect of hybrid treatment on in-hospital outcomes and long-term results in patients with multivessel coronary artery disease. Patients were divided into the classic and hybrid groups. Result s: The classic group showed a higher perioperative risk than the hybrid group (mean [SD] EuroSCORE, 3.54 [2.12] and 2.89 [1.97], respectively). During all the rehabilitation cycles, lower arterial oxygen saturation (SaO2) was reported in the hybrid group (P = 0.002). The classic group showed lower systolic blood pressure (P <0.001), lower diastolic blood pressure (P = 0.029), and a higher rate of blood pressure drops during rehabilitation (P = 0.02). Patients from the classic group were able to sit (P <0.001), assume a vertical position (P <0.001), and walk (P = 0.01) earlier than those from the hybrid group. In the hybrid group, earlier completion of rehabilitation and discharge from the hospital were noted (P = 0.001). Conclusions: Patients receiving hybrid coronary revascularization less often suffer from hypotonia events but show lower SaO2 values than patients receiving classic treatment. Mobilization of patients receiving the hybrid treatment is slower during the initial days and cycles of rehabilitation, but they achieve full self-reliance earlier, which enables a shorter hospitalization period. Copyright by Medycyna Praktyczna, Krakow 2018.Copyright © 2018 Medycyna Praktyczna. All rights reserved.

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## NICE Resources

Round up of Guidance and advice.

For the full range of Guidance please see https://www.nice.org.uk/guidance/conditions-and-diseases/cardiovascular-conditions

Guidance: Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism (NG89) published date: 21 March 2018

Guidance: Chronic heart failure in adults: diagnosis and management. NICE guideline Expected publication date 12 September 2018

Advice: Anticoagulants, including non-vitamin K antagonist oral anticoagulants (NOACs)(KTT16) – Advice, key therapeutic topic. Last updated 18 February 2018 (published date: 26 February 2016)

Advice: QAngio XA 3D/QFR imaging software for assessing coronary obstructions (MIB146) – Medtech innovation briefing. Published date: 15 May 2018

Advice: Mechanical thrombectomy devices for acute ischaemic stroke (MIB153) – Medtech innovation briefing. Published date 30 July 2018

Guidance: Peripheral arterial disease: diagnosis and management. Clinical guideline [CG147] Last updated February 2018 (published date: August 2012)

Guidance: Percutaneous balloon valvuloplasty for fetal critical aortic stenosis (IPG613) – Interventional procedures guidance. Published date: 9 May 2018

*__Please note__ that information provided in this update is collated from a variety of sources but coverage of the topic is not comprehensive.*

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