Review

Participation and adherence to cardiac rehabilitation programs. A systematic review

Alberto Ruano-Ravina [a,b,*], Carlos Pena-Gil [c], Emad Abu-Assi [c], Sergio Raposeiras [c], Arnoud van 't Hof [d], Esther Meindersma [d], Eva Irene Bossano Prescott [e], Jose Ramón González-Juanatey [c]

[a] Department of Preventive Medicine & Public Health, University of Santiago de Compostela, Santiago de Compostela, Spain
[b] Consortium for Biomedical Research in Epidemiology & Public Health (CIBER en Epidemiología y Salud Pública - CIBERESP), Spain
[c] Service of Cardiology, Clinical University Hospital of Santiago de Compostela, Santiago de Compostela, Spain
[d] FESC Isala Heart Center, Zwolle, Netherlands
[e] Department of Cardiology, Bispebjerg University Hospital, Copenhagen, Denmark

ARTICLE INFO

ABSTRACT

Acute myocardial infarction (AMI) is an important health problem. Cardiac rehabilitation (CR) programs following AMI have shown to be effective in reducing mortality. We aim to systematically review the existing literature that analyzes the factors that affect participation and adherence to cardiac rehabilitation programs. We reviewed Medline, EMBASE and Cochrane databases from 01/01/2004 to June 2016 using predefined inclusion and exclusion criteria. We classified the results into factors affecting participation and factors influencing adherence to CR programs. We included 29 studies, and there was a general agreement in those factors predicting participation and adherence to CR programs. These factors can be classified into person-related factors and aspects related to CR programs. Older participants, women, patients with comorbidities, unemployed and uncoupled persons, less educated people and those with lower income had a lower participation. A similar pattern was observed for CR adherence. Also, those potential participants who live farther from CR facilities, do not have transportation, or do not drive, attended less to CR programs. These factors were very similar when analyzing adherence to CR programs. These aspects were similar in Europe and the USA. These results clearly show that participation in CR programs follows a determined pattern that is very homogeneous in different settings. Health professionals should also be aware of patients reluctant to participate in CR programs and adapt their messages and redesign CR programs, to promote participation and adherence.

© 2016 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Cardiovascular diseases are the main cause of mortality and disability in developed countries [1] and acute myocardial infarction (AMI) is leading cause of cardiovascular disease mortality in certain age groups [2] [3]. Currently, survival following an AMI is relatively high. This is due to different factors. The main determinant of survival is quick access to medical assistance. Following access to medical assistance, diverse interventions are offered to patients. These interventions can be classified into pharmacologic (adequate treatment), medical (PCI or CABG), and changes in lifestyle (diet, smoking, psychosocial factors, physical inactivity), including the promotion of physical exercise.

Cardiac rehabilitation (CR) has been consistently shown to reduce coronary events and mortality in those patients who have suffered an AMI [4]. CR programs usually consist of a personal assessment of the patient, advice on physical activity, training exercises, nutritional advice, weight management, lipids and blood pressure control, tobacco cessation, and psychosocial management. CR should be offered to patients who have suffered an AMI [5].

CR following a cardiovascular event is a Class I recommendation of the European Society of Cardiology, the American Heart Association, and the American College of Cardiology [6]. CR also offers economic benefit. It has been estimated that CR can yield cost savings of €30,500 per patient in the first year (mainly due to return to work) and up to €14,500 per year in the following years [6]. Unfortunately, not all CR programs are performed adequately. A clinical trial performed in the UK compared patients in a CR program with those assigned to standard treatment. The study did not observe mortality differences at 9 year follow-up [7], raising the question of adequate program implementation [8].

There is great variability in the participation rates of these programs between different countries. In Germany, participation ranges between 49 and 65% [9], which is higher than the rate observed in the UK or USA.

In Spain, there are very few multidisciplinary CR units and these programs are usually performed in a hospital setting. There are different program types corresponding to different patients' needs and the supervision of potential complications.

Low participation rates in CR programs are a worrying concern for cardiologists and scientific societies. Some cardiologists do not recommend patients to take part in CR programs. Increasing participation rates in CR programs is therefore proves to be a challenge. Currently, participation is lower than expected, as many studies demonstrate [10,11]. There have been studies that compared CR participants with those who rejected participation, ultimately showing that they have different characteristics. There is also the issue of healthcare characteristics (public versus private healthcare coverage); it is possible that participation may differ between different healthcare systems. There are also some groups that have been underrepresented in CR programs such as women, ethnic minorities, and patients with other heart diseases different than AMI (such as patients following coronary revascularization or patients with heart failure) [12].

Another important issue relating to the success of CR programs is adherence to CR programs, and knowledge of dropout-prediction factors. The information on which factors impede adherence is scarce, although a substantial percentage of patients do not finish CR programs despite their relatively short length.

The objective of the present research is to determine which factors influence participation and adherence rates in CR programs in patients who have suffered an AMI. We will use a systematic review of the scientific literature to identify these factors.

2. Methods

We designed a systematic review of the scientific literature using the Medline (PubMed), EMBASE, and Cochrane databases. We used a combination of MeSH terms and free text words, using the following combination: (("cardiac rehabilitation program") OR ("cardiac rehabilitation")) AND ("myocardial infarction" OR "Myocardial Infarction"[Mesh]). A similar approach was used for EMBASE and Cochrane. We decided to perform an exhaustive search instead of a specific search in order to obtain all relevant papers without losing any relevant information. We followed the PRISMA recommendations in performing our systematic review [13].

We limited our search to those studies performed in humans, published after 01/01/2004, and published in English or Spanish. The initial bibliographic search was performed on May 15th, 2015 and was updated until June 10th, 2016.

2.1. Inclusion and exclusion criteria

We considered the following inclusion criteria: a) Regarding sample size we only included studies with more than 100 patients. For comparative studies, each group had to have at least 50 patients. For follow-up studies which assessed adherence, at least 100 patients had to have started a CR program; b) Regarding study design we included systematic reviews and meta-analyses (focused on the effect of patients' characteristics), observational studies (such as cohort studies), case–control studies, and cross-sectional studies. Clinical trials were excluded because adherence and participation in a trial setting is not comparable to adherence in everyday practice. Four clinical trials were excluded for this reason. These excluded studies analyzed the role of nursing staff in participation and adherence, and assessed the effect of a different session schedule on adherence; c) Regarding the type of patients included, we considered individuals who had coronary diseases, largely AMI. If the study included a mix of patients with different heart diseases (including AMI), it was also included; d) Regarding patients' characteristics we included patients of both sexes, with no age limitations and with any comorbidity; e) Regarding intervention, we included patients that were able to participate in a CR program; and, finally, f) Regarding the study hypothesis, we included papers that analyzed factors influencing participation or adherence even if the main objective of the study was different.

2.1.1. Exclusion criteria

We excluded studies with a lower sample size than that established for the present review, studies with different design (qualitative studies, narrative studies), studies which included patients without coronary events and studies performed exclusively on patients that had not suffered AMI (i.e. patients with heart failure, coronary by-pass, and so on).

We also excluded papers analyzing factors influencing indication to participate in a CR program (the so-called 'referral studies') as indication to participate is usually given by cardiologists and is influenced by patients' clinical characteristics, with older patients, women, or patients with comorbidities being less frequently referred to CR programs.

We present the results broken down by factors affecting participation and adherence and we present a description of the studies in the tables included. Meta-analysis was not

possible given the differences of the factors assessed in the available studies and also the heterogeneity of inclusion and exclusion criteria in each of the included studies.

3. Results

3.1. Studies included in the systematic review

We found 677 studies using our search criteria, and 29 were included in the final review. Most of these studies were performed in the USA, UK, Canada, Belgium, Denmark, Germany, or Australia. We excluded one systematic review because focused on assessing the effect of different healthcare interventions to raise participation [14]. A flowchart of the search strategy results appears in Fig. 1. A description of the included studies analyzing participation and adherence can be found in Tables 1 and 2, respectively. Sample size of the included studies was highly variable. Most of the included studies had a cohort or cross-sectional design. Retrospective cohort studies were based in registries and all of them contained similar information (i.e. variables collected routinely that are used to compare participants vs non participants). Some interesting variables that are not routinely collected and which may be of interest have not been analyzed in many studies. These include as civil status, depression, or living as a couple.

Studies assessing adherence to CR programs usually have a lower sample size than those assessing participation. Some clinical trials were performed to assess if different interventions had an impact on adherence to CR programs.

Below, we describe the impact of the different factors on participation and adherence. For each factor identified, we first comment on its impact on participation, and then its impact on adherence.

3.1.1. Gender

Most studies clearly demonstrate that women participate less in CR programs than men do [8–16]. None of the included studies observed higher participation in women and only one found no differences in participation between the genders [15]. Differences in age of men and women does not appear to establish differences with respect to these programs. Regarding adherence, practically no study has directly analyzed the effect of gender on dropout. Only the studies performed by Suaya et al. and Doll et al. observed a higher adherence for men [16,17].

3.1.2. Age

Most studies agree that older individuals participate less than younger ones in CR programs [10,18–22]. In fact, the peak participation age is between 50 and 65. Participation declines significantly after 70 years old [18,19]. The decline in participation is even greater after 80. Some studies have observed that participants in CR programs were, on average, 10 years younger than non-participants. Only one study observed no difference in participants' age, compared to non-participants [15]. Only one study analyzed mean age for adherence, showing that patients older than 65 were more adherent than those who were younger [23]. A study by Beckie, at al., showed that younger women had a higher adherence than older women. Only women were included in this study [24].

3.1.3. Accessibility to CR programs

Accessibility plays a key role in participation in CR programs and can be measured by different means such as distance from the nearest CR center, ownership of a car, or possession of a driving license. The included studies have observed that participation is lower for those individuals living farther from the nearest CR center [10,19,20,25,26]. Only one study observed that distance did not influence participation [15]. Regarding transportation, not owning means of transportation, or not having a driving license, were problems for participation in CR programs [18,20,22,27]. Hansen et al. observed that patients with transportation difficulties had less adherence to CR programs [28].