138 - EXERCISE AND HEART FAILURE: A REVIEW OF CURRENT EVIDENCE

LAIS PEREIRA BORIN
DIOGO FANFA BORDIN
RICARDO GASS
ANTÔNIO MARCOS VARGAS DA SILVA
DULCIANE NUNES PAIVA
Universidade de Santa Cruz do Sul, Santa Cruz do Sul, Rio Grande do Sul, Brasil
diogo.fanfa@hotmail.com

1 INTRODUCTION

Heart failure (HF) is now considered a serious and growing public health problem. It has a high prevalence, high cost, is often disabling and has a high mortality. Early diagnosis and effective treatment reduce morbidity/mortality and costs, so it is important to set up guidelines for its approach in primary (SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2006).

According Carvalho et al. (2011) the HF is one of the cardiovascular diseases where lifestyle habits have great influence in its appearance. It is a complex clinical syndrome characterized by the inability of the heart to generate cardiac output at levels able to meet the metabolic needs of the body, associated with metabolic and inflammatory disorders, and neurohormonal activation. Life habits interfere not only in the prevention of this important clinical condition but also determine the success of its rehabilitation. Within this context Dalal (2012) et al. explains that the current guidelines from the National Institute for Health and Clinical Excellence (NICE) and the European Society of Cardiology recommend that the Cardiac Rehabilitation (CR) through physical exercise is effective and safe as a form of complementary treatment of HF.

Although there has been progress in the treatment, Domingues (2011) et al. reports that the HF remains as one of the leading causes of hospitalization in several countries and it is associated with high morbidity and mortality, high cost to health and, particularly, poor quality of life (QoL). Some studies of meta-analysis show that the Cardiac Rehabilitation improves QoL, reduces the incidence of symptoms, re-hospitalization and may improve survival in patients with HF (BOCCHI, 2012).

In order to determine how best to care, we must evaluates the phase of heart failure according to the rating system functional New York Heart Association (NYHA) (SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2006). This system relates symptoms to everyday activities and quality of life (Table 1).

Table 1. Classification of Heart Failure.

Class I (light):	Without limitations to physical activity. Usual activity does not cause fatigue inappropriately palpitation or dyspnea.
Class II (light)	Limitation of discrete activities. Comfortable at rest but ordinary physical activity results in fatigue, palpitation, or dyspnea.
Class III (moderate)	Marked limitation of physical activity. Comfortable at rest, but activity lighter than the usual causes fatigue, palpitations and dyspnea.
C lass IV (severe)	Unable to do any physical activity without discomfort. Symptoms of heart failure at home. When is initiated any physical activity aggravates the discomfort.

Fonte: Sociedade Brasileira de Cardiologia. Diretriz de reabilitação cardiopulmonar e metabólica: aspectos práticos e responsabilidades. Arquivos Brasileiros de Cardiologia, 2006.

Physical exercise as a form of complementary treatment of HF is an issue addressed in several studies, like those performed by Bocchi et al. (2012), Nishi et al. (2011) and Gielen et al. (2012), being all paramount. Trivi et al. (2011) in their study show that physical exercise has become an important therapeutic strategy nonpharmacologic in patients with cardiovascular diseases, which being performed regularly, even when done at moderate levels, reduces the rates of morbidity caused by the disease (CIAMPI, 2012; IZAWA, 2012). Based on these assumptions, this article aims to review the literature through eletronic databases about the effects of different types and methods of achieving physical exercise in patients with heart failure.

2 METHODS

This study based on literature review about the effects of physical activity in HF patients. Was searched in the electronic databases Medline, PubMed, Lilacs, SciELO, studies published between 2009 and 2012 in English and Portuguese, using the following terms simple or crossed: Heart Failure, Physical Exercise, Cardiac Rehabilitation, Cardiovascular Disease, HF and Quality of Life, HF and Morbidity, HF and Functional Capacity. There were selected studies that had as main outcome measures, the effects of exercise on: functional capacity, quality of life and or morbidity / mortality in patients with Cardiac Failure. There were selected studies that had as main outcome measures, the effects of exercise on: functional capacity, quality of life and or morbidity / mortality in patients with Cardiac Failure. We evaluated and classified as eligible to submit relevant studies and that results have come from studies designed as randomized, blinded clinical trial. Of the total 185 articles found on the topic, 10 papers were included in this study. In Table 2 it can be observed the characteristics of papers.

3 RESULTS

We evaluated ten articles and for better visualization and understanding, studies are presented in the table below, according to exposed: author / year, periodic, objective of the study population, assessments used, instruments used for implementation of physical exercise, and effects of physical exercise on individuals with heart failure.

Table 2. Selected articles as methodological criteria for inclusion.

Author / Year and Journal	Objective	Population	Instrument for assessment of functional capacity and quality of life	Instruments used for implementing physical exercise	Effects of physical exercise on individuals with HF
Evangelista et.al. (2010) PhysSportsMed	Analyze whether a rehabilitation program through physical exercise is associated with improved clinical outcomes	Patients admitted in a hospital. n = 61. Degree of IC II e III. n = 61, age [illegible]	Cardiopulmonary exercise testing using a standard ramp protocol, MLHFQ	Low-level aerobic exercise and low-level resistance training using pedometer (Sportline, model 345) during walking	Improvements in clinical outcomes of FC and QoL for patients who adhered to the exercise protocol
Kitzman et al. (2010) Circulation Heart Failure-Journal	Test the hypothesis that supervised exercise training in older patients with HF may improve the primary outcome of peak exercise, and the secondary outcome of the disease on QoL	Patients admitted to hospitals and clinics n = 46. Degree IC II e III. n= 46. age = 70 ± 6 years	Cardiopulmonary Testing by vertical bicycle electronically locked, MLHFQ and SF36	Rehabilitation Program consisted of applying heat, hike trail, and vertical bicycle	It is safe and improves significantly FC and QoL in elderly patients with HF
Du *et al.* (2011) Trials	Conduct a Rehabilitation Program in domicile to promote adhesion to recommendations for physical activity and improve self-handling on people with HF	Patients admitted to four hospitals in Sydney. n= 116. Degree of IC II e III. n = 116. age = 53 ± 10 years	6MWT, SF- 36 and MLHFQ	6MWT	It was a new approach to self-handling of patients with HF. Being beneficial in increasing FC and improving their QoL
Caminiti et al. (2011) Reabilitation Research and Practice	Assess whether Tai Chi technique is more effective than conventional training in improving exercise tolerance in elderly patients with HF	Patients admitted to hospital (Institute Raffaele S.) in Rome. n = 60. Degree of IC: II. n = 60. age = 73 ± 6 years	6MWT and MacNew QLMI	Heat, cryotherapy, flexibility exercises, aerobic exercises with bicycle or walking, weight-bearing exercises, warm-ups and cool-down exercises	Tai Chi technique has proven to be an effective technique, bringing significant increase in functional capacity and quality of life of these individuals
Witham et al.(2012) Circulation Heart Failure Journal	Test a Rehabilitation Program through physical exercise in patients with HF	Patients admitted to the Day Hospital and a clinic for elderly. n = 107. Degree of IC: II e III. n = 107. age = 70 ± 11 years	6MWT, MLHFQ	Aerobic exercise, strength training with elastic resistance bands, hiking and walking	Improvement in CF and QoL of examined individuals, but without statistical significance
Ozasa et al. (2012) Journal STAGE	Determine the effects of two types of rehabilitation programs through physical exercise of low intensity	Patients admitted to the Department of Cardiac Rehabilitation Hospital at the University of Kyoto. n = 27. Degree of IC: I, II, III, IV. n = 27, age = 65 ± 7 years	6MWT	Stretching, low-intensity resistance exercise, assisted bicycle and gait training	The unconventional Rehabilitation Program was as effective as the conventional in increasing FC in elderly patients with HF
Asa et al. (2012) Evid. Bas. Comple. And Alter Medicine	Evaluate the effectiveness and applicability of an eight- week Rehabilitation Program through aquatic exercise in HF patients	Patients admitted to a clinic. n = 20. degree of IC: II e III. n = 20. age = 55 ± 7,1 years	6MWT, SF36 and MLFHQ	Exercises of low to moderate intensity in heated swimming pool, central circulatory exercises with water below the cervical level	It is effective to improve physical performance and metabolic functions in patients with HF, evidencing increase of FC and QoL
Smart et al.(2012) Congest Heart Fail.	Evaluate the effects of a rehabilitation program through exercise on FC , cardiac function, and QoL in patients with HF	Patients admitted to a cardiology clinic.n = 30. Degree of IC: I e II. n= 30. age = 64± 8 years	Cardiopulmonary testing and MLFHQ.	The rehabilitation program consisted of exercises through an ergometer	There were beneficial results, but not significant in relation to the increase of FC and QoL of individuals with HF

HF=Heart Failure, 6MWT= 6 minute walk test, SF-36= 36-item Short-From Healt Survey, MLHFQ= Minesota Living with Heart Failure Questionnaire, FC= Funcional Capacity, QoL= Quality of Life.

All selected studies presented as inclusion criterion individuals with HF, aged between 53 and 73 years, who were admitted to clinics and hospitals. In the analyzed articles, the sample size ranged from 20 to 116 individuals, totaling a median of 552 patients assisted. The objectives of these studies were different as it is possible to observe on the scoreboard, but they all showed the use of a Rehabilitation Program (PR) through several types of exercises. The follow-up time, the number of evaluations and the intervals among them did not follow a pattern, but following the model of randomized and blinded clinical trials, these evaluations were performed at different times to allow comparisons in an attempt to observe possible alterations that physical exercise provides in HF patients. The first assessment in all studies was performed in the hospital; the other reviews were conducted in different environments, such as at home or in clinics.

Among all selected studies highlight the IC Grade according to NYHA. The grades I and II are more frequent, which stages, according to New York Heart Association, the HF yet is so mild and of non-disabling character. Among the 10 studies, also participated patients with HF grade III and IV (Table 2).

Witham et al. (2012) e Murad et al. (2011) emphasize that, having a balance between the Quality of Life (QoL) and Functional Capactity, the morbidity and mortality rates can be reduced in this patient population. FC, QoL, morbidity and mortality appear as new paradigms in health care, being important aspects in the life of HF patients, as it has great influence throughout the

course of the disease. Currently, for the assessment of QoL in HF, the literature contains generic and specific questionnaires, of which the 36-item Short-Form Health Survey (SF-36) and the Minnesota Living with Heart Failure Questionnaire (MLHFQ) respectively. They are the most used and important for planning patient care and for making decisions about treatment. The FC can be evaluated by testing six-minute walk test (6MWT), a simple and easy to perform, which has better tolerance in patients with HF, compared to other tests (SMART, 2012).

Evaluations of QoL, of FC, and the use of strategies to reduce morbidity and mortality in patients with heart failure is, today, fundamental to establish a special attention to be given to such individuals, because the HF is classically categorized based on the severity of symptoms observed through clinical examination and according to the symptoms presented during the physical effort having as main symptoms fatigue and dyspnea, which cause decrease in FC, hampering the execution of daily activities and thereby reducing the QoL (BOCCHI, 2012).

Studies regarding the instruments used for the implementation of physical exercise in a rehabilitation program do not follow a standard protocol, and are used according to the particularities of each study. The implementation of activities at home brought new and different ways to rehabilitate, allowing greater comfort and also including the attention of family, which caused more satisfactory results with respect to the gain in FC, decrease of morbidity and mortality and increase of QoL of HF patients.

The activities developed by Asa et al. (2012) within the aquatic environment, as well as the activities performed at home by Du et al. (2011) e Babu et al. (2011) also bring important results in improved muscle performance and metabolic functions as well as an improvement in QoL and CF.

Another resource not commonly used for the treatment of HF was the use of a practical techniques inspired by Tai Chi, Chinese martial art, which according Caminiti et al. (2011) is a technique that presents no risk to these patients with IC and also contributes to the improves of QOL mood and self-esteem of the patient.

Also stands out of all the instruments used to carry out the research there is the 6MWT as most used, being easily accessible and can also use in the home environment, as demonstrated in studies by Du et al. (2011) and Babu et al. (2011). The authors of this study concluded that this new approach to self-management of HF patients was beneficial in increasing FC and improving the QoL of them, since it is an easy way to be administered by patients with professional guidance from a distance.

Age cannot be considered as an independent explanatory factor for functional decline, increase in morbidity and mortality and decrease of QoL, but a factor associated with decreased recovery potential. As Du et al. (2011) e Caminiti et al. (2011) the causes of functional impairment, decreased QoL and increased mortality and morbidity of patients with heart failure are related to their lifestyle and adherence or not to Rehabilitation Programs offered. The effects of a rehabilitation program through exercise when well accepted by patients with HF and managed by a multidisciplinary, helpful and qualified staff can reduce the symptoms of the disease, thereby reducing the mortality and morbidity rates, increasing tolerance to exercise and FC, and providing patients with heart failure a better QoL to perform their daily activities.

4 CONCLUSION

In heart failure, the living habits are crucial to its emergence, such habits affecting not only in prevention but also determines the success of their rehabilitation. Therefore exercise is a non pharmacological conduct that can effectively assist in the treatment of individuals with IC.

We could confirm through 10 manuscripts analyzed that exercise inserted in a Cardiac Rehabilitation Program and this highlights the role of the physiotherapist together a multidisciplinary team that can effectively assist in the treatment of individuals with IC inserted in a Cardiac Rehabilitation Program, when supervised by a trained professional or by a multiprofessional and helpful staff, and, if well accepted by patients with HF, may increase exercise tolerance, FC and decrease hospital readmissions, decrease mortality and morbidity rates and, with all of these, lead to increased QoL of these individuals.

5 REFERENCES

ASA, C. et al. Aquatic Exercise is effective in improving exercise performance in patients with heart failure and type 2 diabetes mellitus. Evidence- Based Complementary and Alternative Medicine, v.12, p.01- 08, 2012.

BABU, A.S. et al. Effects of Combined Early In-Patient Cardiac Rehabilitation and Structured Home-Based Program on Function among Patients with Congestive Heart Failure: A Randomized Controlled Trial. Heart Views. v.12, n:3, p.99-103, 2011.

BOCCHI, E.A. et al. Atualização da Diretriz brasileira de Insuficiência cardíaca crônica -2012. Arquivo Brasileiro de Cardiologia, v. 98, n.1, supl. 1, p. 1-33; 2012.

CAMINITI, G. et al. Tai Chi Enhances the effects of endurance training in the rehabilitation of elderly patients with chronic heart failure. Rehabilitation Research and Pratice. v. 11, n.8, p.01-06, 2011.

CARVALHO, E.E.V. et al. Heart Failure: Comparison between six – minute Walt: test and cardiopulmonary test. Arquivo Brasileiro de Cardiologia, v. 97, n.1, p. 59- 64, 2011.

CIAMPI, Q. Tissue Doppler systolic velocity change during dobutamine stress echocardiography predicts contractile reserve and exercise tolerance in patients with heart failure. European Heart Journal, v.10, p.01-08, 2012.

DALAL, H.M. et al. Why do so few patients with heart failure participate in cardiac rehabilitation? A cross-sectional survey from England Wales and northern Ireland. Acess Open, New York, v.2, p. 1-08, 2012.

DOMINGUES, F.B. et al. Educação e monitorização por telefone de pacientes com Insuficiência Cardíaca: ensaio clinico randomizado. Arquivo Brasileiro de Cardiologia, v.96, p. 233 -39, 2011.

DU, H.Y. et al. An intervention to promote physical activity and self-management in people with stable chronic heart failure The Home-Heart-Walk study: study protocol for a randomized controlled trial. Trials, v.12 n.63, p.01-06, 2011.

EVANGELISTA, L.S. et al. Is exercise adherence associate with clinical outcome in patients with advanced heart failure? Phys Sports Med, v.38 n.1, p. 28- 36, 2010.

GIELEN, S. et al. Exercise Training Attenuates MuRF-1 Expression in the Skeletal Muscle of Patients with Chronic Heart Failure Independent of Age: The Randomized Leipzig Exercise Intervention in Chronic Heart Failure and Aging (LEICA) Catabolism Study. Circulation Heart Failure, v.111, p. 01-22, 2012.

TRIVI, M. et al. Echocardiographic Predictors of Exercise Capacity in Patients With Heart Failure and Systolic Dysfunction: Role of Mitral Regurgitation. Revista Espanhola de Cardiologia, v.64, p.1096-99, 2011.

IZAWA, K.P. et al. Relation between physical activity and exercise capacity of $\geqslant$ 5 metabolic equivalents in middle- and older-aged patients with chronic heart failure. Disability & Rehabilitation, v.10, p.01-07, 2012.

KITZMAN, D.W. et al. Exercise training in alder patients with heart failure and preserved ejection fraction. Circulation Heart Failure, v. 3, p.659- 67, 2010.

OZASA, N. et al. Effects of machine – assisted cycling on exercise capacity and endothelial function in elderly patients

with heart failure. Circulation Journal STAGE, v. 2, n.5, p. 606-13, 2012.

MURAD, K. et al. Exercise Training Improves Heart Rate Variability in Older Patients With Heart Failure: A Randomized, Controlled, Single-Blinded Trial. Congestive Heart Failure, v.10, n,1, p. 01-06, 2011.

NISHI, I. et al. Effects of Exercise Training in Patients With Chronic Heart Failure and Advanced Left Ventricular Systolic Dysfunction Receiving β-Blockers. Circulation Journal, v.75, n.1, p.1649 – 55, 2011.

SACCOMANN, I.C.R. Cintra A.F, Gallani J.B.C.M. Qualidade de vida relacionada a saúde em idosos com insuficiência cardíaca: avaliação com instrumento específico. Acta Paulista de Enfermagem, São Paulo, V. 24, n2, P.179-84, 2011.

SMART, N.A. et al. Exercise Training in Heart Failure With Preserved Systolic Function: A Randomized Controlled Trial of the Effects on Cardiac Function and Functional Capacity. Congestive Heart Failure, v.10, n.1, p.01-07, 2012.

SOCIEDADE BRASILEIRA DE CARDIOLOGIA. Diretriz de Reabilitação Cardiopulmonar e Metabólica: aspectos práticos e responsabilidades. Arquivos Brasileiros de Cardiologia 2006;86 (1): 74-82.

WITHAM, M.D. et al. Efficacy and Cost of an Exercise program for functionally Impaired older patients with Heart Failure: A randomized controlled trial. Circulation Heart Failure, v.21, p. 01-09, 2012.

End. Rua João Goulart, 231, Bairro Jardim Boa Vista, Rio Pardo, Rio Grande do Sul, Brasil - CEP: 96640-000
e-mail: diogo.fanfa@hotmail.com

EXERCISE AND HEART FAILURE: A REVIEW OF CURRENT EVIDENCE

ABSTRACT

Heart failure (HF) is a complex clinical syndrome characterized by the inability of the heart to generate adequate cardiac output. For this, the National Institute for Clinical Excellence recommends that Cardiac Rehabilitation through physical exercise is safe and effective as a treatment for patients with HF. The objective of this review was to identify current evidence of the effects of physical exercise inserted into a rehabilitation program in patients with HF. This is a literature review in the electronic databases Medline, PubMed, Lilacs, and SciELO held in the period from 2009 to 2012. When evaluating 10 manuscripts, the results showed that physical exercise inserted within a Cardiac Rehabilitation Program increases functional capacity (FC), reduces hospital readmissions, and decreases mortality and morbidity of this patient population. Thereby HF patients can perform their daily activities with less difficulty, improve the socioeconomic relationship, thus providing them a better quality of life.

KEYWORDS: Heart Failure, Physical Exercise, Functional Capacity

EXERCICE PHYSIQUE ET INSUFFISANCE CARDIAQUE: UNE REVISION DE LA LITTÉRATURE DES ÉVIDENCES ACTUELLES

RÉSUMÉ

L'Insuffisance cardiaque (IC) est un syndrome clinique complexe, caractérisée par l'incapacité du cœur à générer suffisamment un débit cardiaque adéquat. Pour cette raison, l' Institut National d' Excellence Clinique recommande que la Réadaptation Cardiaque par l'exercice physique est sûr et efficace pour le traitement des patients atteints d'Insuffisance Cardiaque (IC). L'objectif de cette révision était d'identifier les données actuelles sur l'effet de l'exercice physique inseré dans un programme de Réhabilitation chez les patients atteints d'Insuffisance Cardiaque (IC). Ceci est une revue de la littérature basées sur les données électroniques Medline, PubMed, Lilacs, Scielo realisées sur une période allant de 2009 à 2012 . En évaluant les 10 manuscrits, les résultats ont montré que l'exercice physique inséré dans un Programme de Réadaptation cardiaque augmente la capacité fonctionnelle , diminue les réhospitalisations, diminue la mortalité et la morbidité de cette population de patients. Ainsi, les porteurs de IC peuvent effectuer leurs activités quotidiennes avec moins de difficulté, en améliorant les relations socio-économiques leur donnant ainsi une meilleure qualité de vie.

MOTS-CLÉS: insuffisance cardiaque, l'exercice physique, la capacité fonctionnelle.

EJERCICIO FÍSICO E INSUFICIENCIA CARDÍACA: UNA REVISIÓN DE LITERATURA DE LAS EVIDENCIAS ACTUALES

RESUMEN

La insuficiencia cardíaca (IC) se trata de un síndrome clínico complejo, caracterizado por la incapacidad del corazón en generar débito cardíaco adecuado. Para eso, el Instituto Nacional de Excelencia Clínica recomienda que La Rehabilitación Cardíaca a través del ejercicio físico sea eficaz y segura como forma de tratamiento para portadores de IC. El objetivo de esa revisión fue identificar las evidencias actuales del efecto del ejercicio físico inserido en un Programa de Rehabilitación en portadores de IC. Se trata de una revisión de literatura en las bases de datos electrónicos Medline, PubMed, Lilacs, Scielo realizada en el período de 2009 a 2012. Al evaluar 10 manuscritos, los resultados evidenciaron que el ejercicio físico inserido dentro de un Programa de Rehabilitación Cardíaca aumenta la capacidad funcional, disminuye las internaciones hospitalarias, disminuye la mortalidad y la morbidez de esa población de pacientes. De esa forma, portadores de IC consiguen realizar sus actividades de vida diaria con menores dificultades, mejoran la relación socioeconómica, proporcionándoles así una mejor calidad de vida.

PALABRAS CLAVE: Insuficiencia Cardíaca, Ejercicio físico, Capacidad Funcional.

EXERCÍCIO FÍSICO E INSUFICIÊNCIA CARDÍACA: UMA REVISÃO DE LITERATURA DAS EVIDÊNCIAS ATUAIS

RESUMO

A insuficiência cardíaca (IC) trata-se de uma síndrome clínica complexa, caracterizada pela incapacidade do coração em gerar débito cardíaco adequado. Para isso o Instituto Nacional de Excelência Clínica recomenda que a Reabilitação Cardíaca através do exercício físico (EF) é eficaz e segura como forma de tratamento para portadores de IC. O objetivo desta revisão foi identificar as evidências atuais do efeito do exercício físico inserido em um Programa de Reabilitação (PR) em portadores de IC. Trata-se de uma revisão de literatura nas bases de dados eletrônicos Medline, PubMed, Lilacs, Scielo realizada no período de 2009 a 2012. Ao avaliar 10 manuscritos, os resultados evidenciaram que o exercício físico inserido dentro de um Programa de Reabilitação Cardíaca aumenta a capacidade funcional, diminui as reinternações hospitalares, diminui a mortalidade e morbidade dessa população de pacientes. Dessa forma portadores de IC conseguem realizar suas atividades de vida diária (AVD's) com menores dificuldades, melhoram a relação socioeconômicas lhes proporcionando assim uma melhor qualidade de vida.

PALAVRAS-CHAVE: Insuficiência Cardíaca, Exercício físico, Capacidade Funcional.