

Current Status of Cardiac Rehabilitation in Argentina

Estado actual de la rehabilitación cardiovascular en Argentina

CECILIA ZEBALLOS^{1,2}, DIEGO IGLESIAS^{1,3}, IVANA PAZ^{1,4}, JULIETA BUSTAMANTE^{1,5}, ENRIQUE GONZÁLEZ NAYA^{1,6}, GUSTAVO CASTIELLO^{1,7}, IGNACIO DÁVOLOS^{1,8}

ABSTRACT

Background: Cardiac rehabilitation is a well-known strategy for secondary prevention in several heart diseases and includes a set of strategies based on education of a healthy lifestyle, management of cardiovascular risk factors, psychosocial counseling, and prescription of supervised physical exercise. Several clinical trials, systematic reviews and meta-analyses have documented its efficacy and safety. Nevertheless, cardiac rehabilitation remains underused. There is information available describing the current status of cardiac rehabilitation and the characteristics of centers in some European countries and North America. There are pooled data from South America in 2014, along with reports from Brazil, Colombia, and Uruguay, but there are few data from our country. Therefore, the aim of this study was to determine the current status of cardiac rehabilitation programs in Argentina.

Methods: We conducted a descriptive study using a virtual questionnaire to evaluate the structure and characteristics of rehabilitation programs in our country and the potential barriers to achieve efficient rehabilitation.

Results: Seventy-two centers responded. The main results show a high concentration of centers in urban areas (69.23% in AMBA), predominance of private centers (66.67%), inclusion of patients with the so-called classic cardiovascular diseases (coronary artery disease, heart failure, postoperative heart valve surgery, peripheral vascular disease, and after cardiac transplantation and device implantation), and a majority of centers with an exercise-centered strategy. The main difficulty for the inclusion of patients in the centers was poor referral of candidates.

Conclusions: The data from this survey allow for a diagnosis of the situation and can be the starting point for developing improvement strategies to implement quality standards and future accreditation programs for the centers.

Keywords: Cardiovascular rehabilitation - Secondary prevention - Cardiovascular diseases - Risk factors - Physical activity

RESUMEN

Introducción: La rehabilitación cardiovascular es una reconocida estrategia de prevención secundaria para el tratamiento de numerosas cardiopatías. Es una estrategia multicomponente donde se incluyen la educación en un estilo de vida saludable, control de los factores de riesgo, asesoramiento en aspectos psicosociales y la prescripción supervisada del ejercicio físico. Numerosos ensayos clínicos, revisiones sistemáticas y metaanálisis han demostrado su eficacia y seguridad. Sin embargo, sigue siendo una herramienta subutilizada. Existen datos descriptivos de cómo se lleva a cabo la rehabilitación cardiovascular y las características de los centros que la implementan de varios países europeos y de Norteamérica. A nivel sudamericano en su conjunto, contamos con datos reportados en el año 2014 y otros provenientes de Brasil, Colombia y Uruguay. Pero existen escasos datos provenientes de nuestro país, por ello el objetivo de este estudio se centró en conocer la situación actual de los programas de rehabilitación cardiovascular en Argentina.

Material y métodos: Se trata de un estudio descriptivo, realizado por medio de un cuestionario virtual que evalúa la estructura y características de los programas de rehabilitación de nuestro país y las potenciales barreras para una rehabilitación eficiente.

Resultados: Respondieron 72 centros. Los principales resultados muestran gran concentración de centros en áreas urbanas (69,23% en el AMBA), predominancia de centros privados (66,67%) inclusión de pacientes con patologías cardiovasculares denominadas como clásicas (enfermedad coronaria, insuficiencia cardíaca, posoperatorios valvulares, enfermedad vascular periférica, postrasplante cardíaco y poscolocación de dispositivos), y predominancia de centros con estrategia centrada en el ejercicio. La principal dificultad a la hora de la inclusión de pacientes a los centros es la escasa referencia de los candidatos.

Conclusiones: Los datos de esta encuesta permiten hacer un diagnóstico de situación, y pueden ser el punto de partida para estrategias de mejora, que permitan implementar estándares de calidad y en un futuro establecer programas de acreditación de centros.

Palabras clave: Rehabilitación cardiovascular - Prevención secundaria - Enfermedad cardiovascular - Factores de riesgo - Actividad física

REV ARGENT CARDIOL 2021;89:37-41. <http://dx.doi.org/10.7775/rac.v89.i1.19695>

Received: 11/11/2020 – Accepted: 02/03/2021

Address for reprints: Cecilia Zeballos - Rehabilitación Cardiovascular en ICBA, Buenos Aires, Argentina. Email: czeballos@icba.com.ar

¹ Member of the Exercise in Cardiology Council of the Argentine Society of Cardiology

² Cardiac Rehabilitation Service, Instituto Cardiovascular de Buenos Aires (ICBA)

³ Department of Cardiology, Hospital Italiano de Buenos Aires

⁴ Cardiac Rehabilitation Service, Instituto Cardiovascular de Buenos Aires (ICBA)

⁵ Cardiac Rehabilitation Service, Hospital Austral

⁶ Cardiac Rehabilitation Service, Instituto Argentino de Diagnóstico y Tratamiento (IADT)

⁷ Department of Cardiology, Hospital Argerich and Instituto Argentino de Diagnóstico y Tratamiento (IADT)

⁸ Department of Cardiology, Hospital de Clínicas José de San Martín and Sanatorio Juncal, Temperley

Abbreviations

CR	Cardiac rehabilitation
----	------------------------

INTRODUCTION

Cardiac rehabilitation (CR) programs include a set of long-term strategies based on education of a healthy lifestyle, nutritional counseling, management of cardiovascular risk factors, psychosocial counseling, and physical exercise prescribed according to the clinical condition of the patients. Besides the cardiovascular benefits of physical activity, CR is a well-recognized effective tool in the setting of secondary prevention for chronic coronary artery disease and other cardiac diseases. (1-11) Nevertheless, CR remains underused; few patients are referred to CR centers and the adherence of those who have entered these programs is low.

Surveys describing CR centers are a useful tool to learn about the reality of a region or country in order to implement improvement programs. (13-17) We have information of a few Latin American countries. In Brazil, available evidence shows significant asymmetries in the distribution of centers, lack of referral of eligible patients and several barriers for adherence to the programs. In Uruguay, there are very few CR centers and the referral rate is low (4%). In Colombia, CR centers are mostly private (88.6%), with different and heterogeneous use of the components of a comprehensive CR program. In general, there are few centers in Latin America with considerable heterogeneity in their interventions or components. (18-21) One of the major limitations for the use of CR centers reported was the geographic distribution within each country and the low number of CR programs at the public level. At present, we do not have data about the number and characteristics of CR centers in Argentina.

METHODS

A descriptive study of 72 CR centers that responded to a common questionnaire approved by the Exercise Cardiology Council of the Argentine Society of Cardiology was performed in 2018.

The survey was made up of multiple-choice and open-ended questions to collect quantitative and qualitative data. The topics addressed by the survey included general information, diseases of the population assisted in the center, materials and equipment used, phases of CR carried out in the center, total volume of patients and number of patients per session, components of each session, characteristics of each CR center in terms of protocol compliance, information on the evaluations carried out in the center (quality of life questionnaire, 6-minute walk test, etc.), database availability, strategies used to approach cardiovascular risk factors, information on reimbursement, human resources and potential barriers to the program. We have also considered other variables related to remote CR strategies, which have become more relevant in the current epidemiological context.

Cardiac rehabilitation programs in the country were identified from several sources, i.e., Internet searches, information provided by members of the Exercise in Cardiol-

ogy Council, respondents to the question about other CR center services in the same region, and centers referred by patients. Then, each CR center was contacted by telephone and e-mail to provide information about the implementation and objectives of the questionnaire, and invited to respond to it.

In addition, the survey was available on-line in the SAC website via the link of the Exercise Cardiology Council. At the same time, the survey was promoted on the social networks of the SAC.

The completed questionnaires were reviewed to detect inconsistencies or incomplete data; those that required checking the information were returned and the recipients were followed-up by telephone.

Statistical analysis

Categorical variables were expressed as absolute numbers and percentages. The chi-square test was used to compare discrete variables. All the statistical calculations were performed using Stata 11.1 software package.

Ethical considerations

The investigators committed themselves to following the recommendations of the Declaration of Helsinki of the World Medical Association revised in 2013 in Fortaleza, and the Argentine personal data protection law 25,326 (Habeas Data law).

The participation was voluntary, and according to the principles of good clinical practice all the participants were informed of the aim of the study and that the data provided would remain anonymous, with access only to the investigators and members of the teaching and research committee and the research ethics committee if so required.

RESULTS

The survey was responded by 72 CR centers in Argentina: 48 were private, 19 public and 5 were had other sources of funding. Most centers were in large urban areas (69.23% in the City of Buenos Aires and Province of Buenos Aires). Most survey respondents' practice (57.69%) was developed in hospitals and 42.31% (33 centers) in outpatient clinics. The mean annual volume of patients per center was 222 (range: 3-1200) and average patient participation was 10 sessions per month. The main diagnoses on admission to the program were coronary artery disease, heart failure, postoperative heart valve surgery, peripheral artery disease, after implantable cardioverter defibrillator implant and cardiac transplantation, and syncope, in order of frequency. Few centers (less than 1%) enrolled high-risk patients for primary prevention, and patients with congenital heart defects, metabolic syndrome, or Chagas' disease.

Forty-eight centers (66.67%) had private funding, 19 (26.38%) were public and 5 (6.94%) had other sources of funding (armed forces or labor unions).

When the sessions were analyzed, a low rate of use

of other components of the comprehensive CR model was observed (Figure 1).

Regarding the phases developed by the CR programs, phase I (during hospitalization) was conducted by 39.74% of the centers, phase II (outpatient) by 63.6%, phase III by 62.6% and phase IV by 48% (maintenance/throughout life). In all phases, the sessions were mostly supervised by a cardiologist. Table 1 shows the distribution of professionals in the different phases. The data collected shows that our country lacks the following disciplines during phase I and II: psychology, specialist in smoking cessation, CR nurse and social worker.

During training sessions, the following equipment was used: treadmills, stationary bicycles and stationary rowing machines (57.3%) for aerobic training, and gymnastic machines, free weights and medicine balls (52.8%) for strength training (anaerobic). According to 52 of the answers received among the 72 centers surveyed, the main barriers for patient enrollment and participation were lack of referral of eligible patients from the treating physician (26 centers/50%), lack of facilities to accommodate patients (6 centers/11%), lack of equipment (2 centers/4%), distance to the CR center (5 centers/9.5%), lack of human resources (4 centers/8%), center working hours (4 centers/8%), and health coverage-related issues (5 centers/9.5%).

In this registry only 38 centers used a database

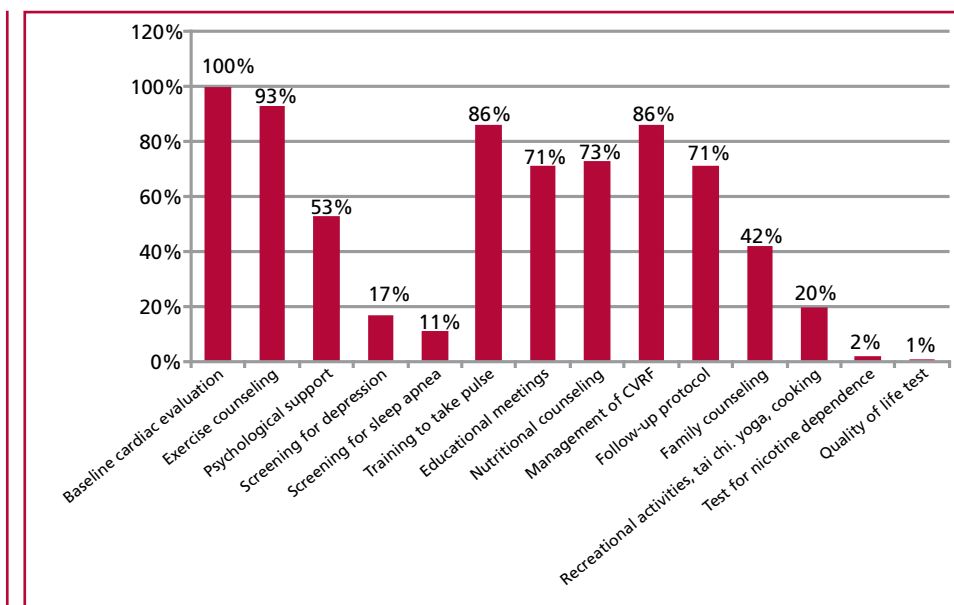
(53%), 29% were manual, 66% electronic and 5% did not respond. Forty-two percent of the centers followed up their patients, and the same percentage made telephone calls to ask about the reasons for non-attendance.

Only 18 centers (25%) provided virtual communication with participants: 14 centers via WhatsApp, 9 via e-mail, and 5 used a social network (Facebook). Only 9 centers used at least two channels of communication and only 1 center had the three channels. Finally, there were 17 centers involved in research (24%) and only 3 of them continue using a manual database.

DISCUSSION

There are several reasons that could explain the low participation of patients in CR programs in our country: the high cost of the sessions in terms of human resources and equipment (most of the session is conducted by cardiologists in all the phases); most centers are located in large urban areas complicating the access of patients from peripheral areas; most centers are private, suggesting that CR is only available for a population segment (middle class without economic difficulties) of Argentina; incompatibility between program and working schedules; economic barriers (such as patient participation in treatment costs and travel expenses); and lack of knowledge of the benefits of CR by patients and physicians. (22-25)

Fig. 1.



CR: cardiovascular rehabilitation

Table 1. Distribution of healthcare professionals in charge of the different cardiac rehabilitation phases in the centers surveyed.

	PHASE I (%)	PHASE II (%)	PHASE III (%)	PHASE IV (%)
Cardiologist	25.6	53.8	42.3	28.2
Kinesiologist	20.5	21.8	11.5	3.8
Cardiology technician	7.7	7.7	9	9
Nurse	5.1	7.7	6.4	-
Physical education teacher	-	12.8	-	16.7

In some cases, better access to CR could be achieved by implementing home-based or remote programs designed for low-risk patients. These are structured interventions with periodic monitoring of patients, including weekly, biweekly, or monthly face-to-face clinic visits and contact via telephone or the Internet. Each center should develop the most appropriate model for its situation. (26, 27)

Another way to improve access and adherence to CR programs would be through specific legislation promoting secondary prevention and CR programs, for example, by reducing or eliminating patient cost sharing, subsidizing transportation costs, or scheduling sessions to fit in with working hours. Another useful measure would be to expand the number of public centers in areas of high population density where the likelihood of candidates for the program is high.

Training in CR is also important for patients and professionals, particularly physicians. The inclusion of the fundamentals of CR in training programs for internists and cardiologists could dispel skepticism and concerns that still exist and help to include it as an essential component in the spectrum of cardiovascular disease treatments.

Although the team members may vary according to the different phases of CR, the presence of a cardiologist and a nutritionist is recommended throughout the different stages. In phases II-IV, the presence of a physiotherapist (kinesiologist), exercise physiologist or physical education teacher will be necessary to conduct the sessions. Most hospitals already have many healthcare professionals and the volume of patients required to form a multidisciplinary CR team, but they are often involved in other functions and few of them have specific training in this area.

We hope that the publication of the results of our survey will lead to establish new CR programs, especially in the province of Buenos Aires and in the inland areas of the country, which will contribute to reduce the existing asymmetry in geographical distribution.

In addition, we believe it is essential to develop a national network of CR centers. All hospitals with cardiology services should run phase I and II programs and actively participate in phase III.

A limitation of the study is the high rate of missing data (30% of incomplete surveys). Thus, some data should be taken with caution. In addition, the survey was not answered by all the CR centers currently operating in Argentina, and therefore does not provide a complete picture of the current status of CR in our country.

CONCLUSIONS

Although scientific evidence demonstrates that cardiac rehabilitation is a highly effective therapeutic tool with a significant impact on the reduction of cardiovascular events, in Argentina, as in other Latin American countries, we face the problem of poor referral by the treating physicians, low enrollment of patients

and poor adherence to CR programs.

We believe that accreditation or certification of CR centers is essential to create a standard basis for all the components of CR, in order to unify criteria for the implementation of CR programs in our country.

Government agencies in charge of decision-making in health policies should be more aware of the importance of CR programs as a cornerstone for secondary cardiovascular prevention and promote their coverage since they have been proved to be cost-effective. (28-33)

Conflicts of interest

None declared.

(See authors' conflicts of interest forms on the website/ Supplementary material)

REFERENCES

- Powell R, McGregor G, Ennis S, Kimani PK, Underwood M. Is exercise-based cardiac rehabilitation effective? A systematic review and meta-analysis to re-examine the evidence. *BMJ Open* 2018;8:e019656. <https://doi.org/10.1136/bmjopen-2017-019656>
- Anderson L, Oldridge N, Thompson DR, Zwisler AD, Riss K, Martin N, et al. Exercise-based cardiac rehabilitation for coronary heart disease. *J Am Coll Cardiol* 2016;67:1-12. <https://doi.org/10.1016/j.jacc.2015.10.044>
- West RR, Jones DA, Henderson AH. Rehabilitation after myocardial infarction trial (RAMIT): multi-centre randomised controlled trial of comprehensive cardiac rehabilitation in patients following acute myocardial infarction. *Heart* 2012;98:637-44. <https://doi.org/10.1136/heartjnl-2011-300302>
- Eijssvogels TM, Maessen MF, Bakker EA, Meindersma EP, van Gorp N, Pijnenburg N, et al. Association of cardiac rehabilitation with all-cause mortality among patients with cardiovascular disease in the Netherlands. *JAMA Network Open* 2020;3:e2011686. <https://doi.org/10.1001/jamanetworkopen.2020.11686>
- Lawler PR, Filion KB and Eisenberg MJ. Efficacy of exercise-based cardiac rehabilitation post-myocardial infarction: A systematic review and meta-analysis of randomized controlled trials. *Am Heart J* 2011;162:571-584.e2. <https://doi.org/10.1016/j.ahj.2011.07.017>
- Giannuzzi P, Temporelli PL, Marchioli R, Maggioni AP, Balstrogn G, Ceci V, et al. Global secondary prevention strategies to limit event recurrence after myocardial infarction. *Arch Intern Med* 2008;168:2194-204. <https://doi.org/10.1001/archinte.168.20.2194>
- Maroto Montero JM, Artiago Ramírez R, Morales Durán MD, de Pablo Zarzosa C. Rehabilitación cardiaca en pacientes con infarto de miocardio. Resultados tras 10 años de seguimiento. *Rev Esp Cardiol* 2005;58:1181-7. <https://doi.org/10.1157/13079912>
- Taylor RS, Brown A, Ebrahim S, Jolliffe J, Noorani H, Rees K, et al. Exercise-based rehabilitation for patients with coronary heart disease: Systematic Review and Meta-analysis of Randomized Controlled Trials. *Am J Med* 2004;116:682-92. <https://doi.org/10.1016/j.amjmed.2004.01.009>
- O'Connor GT, Buring JE, Yusuf S, Goldhaber SZ, Olmstead EM, Paffenbarger RS, et al. An overview of randomized trials of rehabilitation with exercise after myocardial infarction. *Circulation* 1989;80:234-44. <https://doi.org/10.1161/01.CIR.80.2.234>
- Oldridge NB, Guyatt GH, Fischer ME, Rimm AA. Cardiac rehabilitation after myocardial infarction. Combined experience of randomized clinical trials. *JAMA* 1988;260:945-50. <https://doi.org/10.1001/jama.1988.03410070073031>
- Eijssvogels TMH, Maessen MFH, Bakker EA, Meindersma EP, van Gorp N, Pijnenburg N, et al. Association of Cardiac Rehabilitation With All-Cause Mortality Among Patients With Cardiovascular Disease in the Netherlands. *JAMA Network Open*. 2020;3:e2011686. <https://doi.org/10.1001/jamanetworkopen.2020.11686>
- Sociedad Argentina de Cardiología. Área de Consensos Normas. Consenso Argentino de Rehabilitación Cardiovascular. *Rev Argent Cardiol* 2019;87(Supl. 3):1-58.

13. Abreu A, Pesah E, Supervia M, Turk-Adawi K, Bjarson-Wehrens B, López-Jiménez F, et al. Cardiac rehabilitation availability and delivery in Europe: How does it differ by region and compare with other high-income countries. *Eur J Prev Cardiol* 2019;26:1131-46. <https://doi.org/10.1177/2047487319827453>
14. Grace SL, Bennett S, Ardern CI, Clark AM. Cardiac Rehabilitation in Canada. *Prog Cardiovasc Dis* 2014;56:530-5. <https://doi.org/10.1016/j.pcad.2013.09.010>
15. Tran M, Pesah E, Turk-Adawi K, Supervia M, Lopez Jimenez F, Oh P, et al. Cardiac Rehabilitation availability and delivery in Canada: How does it compare with other high-income countries? *Can J Cardiol* 2018;34:S252-62. <https://doi.org/10.1016/j.cjca.2018.07.413>
16. Goto Y. Current state of Cardiac Rehabilitation in Japan. *Prog Cardiovasc Dis*. 2014;56:557-62. <https://doi.org/10.1016/j.pcad.2013.12.001>
17. Humphrey R, Guazzi M, Niebauer J. Cardiac Rehabilitation in Europe. *Prog Cardiovasc Dis* 2014;56:551-6. <https://doi.org/10.1016/j.pcad.2013.08.004>
18. Borghi-Silva A, Goncalves Mendes R, Trimer R, Cipriano Jr G. Currents trends in reducing cardiovascular disease risk factors from around the world: Focus on Cardiac Rehabilitation in Brazil. *Prog Cardiovasc Dis* 2014;56:536-42. <https://doi.org/10.1016/j.pcad.2013.09.008>
19. Burdiat G, Pérez-Terzic C, López-Jiménez F, Cortés-Bergoderi M, Santibáñez C. Situación actual de la rehabilitación cardíaca en Uruguay. *Rev Urug Cardiol* 2011;26:8-15.
20. Anchique CV, Pérez-Terzic C, López-Jiménez F, Cortés-Bergoderi. Estado actual de la rehabilitación cardiovascular en Colombia (2010). *Rev Colomb Cardiol* 2011;18:305-15. [https://doi.org/10.1016/S0120-5633\(11\)70204-2](https://doi.org/10.1016/S0120-5633(11)70204-2)
21. Anchique Santos CV, López-Jiménez F, Benain B, Burdiat G, Fernández Coronado R, González G, Zeballos C, et al. Cardiac Rehabilitation in Latin America. *Prog Cardiovasc Dis* 2014;57:268-75. <https://doi.org/10.1016/j.pcad.2014.09.006>
22. Lima de Melo Ghisi G, Zuilianello dos Santos R, Aranha EE, Nunes AD, Oh P, Benetti M, Grace SL. Perceptions of barriers to cardiac rehabilitation use in Brazil. *Vasc Health Risk Manag* 2013;9:485-91. <https://doi.org/10.2147/VHRM.S48213>
23. Cavalcante Sérgio T, Rodrigues Britto R, Lima de Melo Ghisi G, Pinto da Silva L, Novais Silva LD, et al. Barriers to cardiac rehabilitation delivery in a low-recourse setting from the perspective of healthcare administrators, rehabilitation providers, and cardiac patients. *BMC Health Serv Res* 2019;19:615. <https://doi.org/10.1186/s12913-019-4463-9>
24. Martin BJ, Hauer T, Arena R, Austford LD, Galbraith PD, Lewin AM, et al. Cardiac Rehabilitation attendance and outcomes in coronary artery disease patients. *Circulation* 2012;126:677-8. <https://doi.org/10.1161/CIRCULATIONAHA.111.066738>
25. Balady GJ, Ades PA, Bittner VA, Franklin BA, Gordon NF, Thomas RJ. Referral, enrollment, and delivery of cardiac rehabilitation/secondary prevention programs at clinical centers and beyond: A presidential advisory from the American Heart Association. *Circulation* 2011;124:2951-60. <https://doi.org/10.1161/CIR.0b013e31823b21e2>
26. Davies P, Taylor F, Beswick A, Wise F, Moxham T, Rees K and Ebrahim S. Promotion patient uptake and adherence in cardiac rehabilitation. *Cochrane Database Syst*, 2014.
27. Dunlay SM, Quin RP, Randal JT, Killian JM, L Roger V, et al. Participation in cardiac rehabilitation, readmissions, and death after acute myocardial infarction. *Am J Med* 2014;127:538-46. <https://doi.org/10.1002/14651858.CD007130>
28. Taylor RS, Dalal H, Jolly K, Zawada A, Dean S, Cowie A, Norton R, et al. Home-based versus centre-based cardiac rehabilitation. *Cochrane Database Syst Rev* 2015;8:CD007130. <https://doi.org/10.1002/14651858.CD007130.pub3>
29. Scherrenberg M, Wilhelm M, Hansen D. The future is now: a call for action for cardiac telerehabilitation in the COVID-19 pandemic from the secondary prevention and rehabilitation section of the European Association of Preventive Cardiology. *Eur J Prev Cardiol* 2020; Jul 3:2047487320939671. <https://doi.org/10.1177/2047487320939671>
30. Piepoli MF, Abreu A, Albus C, Ambrosetti M, Brotons C, Catapano A, et al. Update on cardiovascular prevention in clinical practice: A position paper of the European Association of Preventive Cardiology of the European Society of Cardiology. *Eur J Prev Cardiol* 2020;27:181-205. <https://doi.org/10.1177/2047487319893035>
31. Wong W, Feng J, Pwee KH, Lim J. A systematic review of economic evaluations of cardiac rehabilitation. *BMC Health Serv Res* 2012;12:243. <https://doi.org/10.1186/1472-6963-12-243>
32. Papadakis S, Oldridge NB, Coyle D, Mayhew A, Reid RD, Beaton L, et al. Economic evaluation of cardiac rehabilitation: a systematic review. *Eur J Cardiovasc Prevent Rehabil* 2005;12:513-20. <https://doi.org/10.1097/01.hjr.0000186624.60486.e8>
33. Oldridge N, Taylor RS. Cost-effectiveness of exercise therapy in patients with coronary heart disease, chronic heart failure and associated risk factors: A systematic review of economic evaluations of randomized clinical trials. *Eur J Prev Cardiol* 2019; 27:1045-55. <https://doi.org/10.1177/2047487319881839>