

The Importance of Cardiac Rehabilitation After a Heart Attack: Treatment of the Working and Elderly Population

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Abstract

Cardiac rehabilitation (CR) is a critical component of secondary prevention for patients recovering from acute myocardial infarction and other cardiovascular events. It aims to restore the patient's functional capacity within social, familial, and work environments, promote healthy lifestyle changes, and prevent disease progression. The program emphasises the importance of a healthy lifestyle, medication management, and controlling risk factors such as hypertension, cholesterol levels, and diabetes. Patients are educated on the benefits of the Mediterranean diet, smoking cessation, and regular physical exercise. Our findings show that patients who complete the outpatient CR program report significant improvements in physical fitness, symptom reduction, and increased confidence in daily activities. These positive outcomes are crucial for the long-term maintenance of a healthy lifestyle and reducing the risk of future cardiovascular events. Continued support and development of such programs are vital for enhancing patient outcomes and quality of life.

Keywords: *rehabilitation, cardiology, heart attack, secondary prevention*

Introduction

Ischaemic heart disease (IHD) is the leading cause of death worldwide. Within five years following an initial episode of myocardial infarction (MI), approximately 15 % of men and 22 % of women aged between 45 and 64, as well as 22 % of men and women over the age of 65 years, may experience another infarction, with an increased risk of morbidity and mortality (Menezes et al., 2014). Older individuals over 65 years have a higher likelihood of complications during MI and coronary revascularisation procedures compared to younger populations, which consequently leads to longer hospital stays and higher risks in

subsequent clinical procedures. In the United States, 86 % of deaths from IHD occur in individuals over the age of 65 (Menezes et al., 2014b).

The increasing incidence of IHD reflects a greater prevalence of risk factors such as type 2 diabetes, obesity, sedentary lifestyles, hypertension, and an ageing population. Research indicates that a sedentary lifestyle is a significant modifiable risk factor. More than 60 % of adults in the United States do not engage in regular physical activity, and 25 % are completely inactive. This sedentary lifestyle, combined with a hypercaloric diet, contributes to the metabolic syndrome (Menezes et al., 2014).

Cardiac rehabilitation (CR) is an individualised, multidisciplinary treatment approach for patients with IHD. CR is designed to optimise the patient's physical, psychological, and social function, aiming to slow down or even improve the progression of IHD (Servey and Stephens, 2016).

Essentially, CR begins during hospitalisation in the first phase, involving early mobilisation of stable patients to enable them to perform light daily activities. Due to increasingly shorter hospital stays, it is challenging to prepare a detailed exercise programme within a few days, so the treatment is limited to a brief explanation of the disease and motivation for continued treatment. The second phase of CR is the most crucial, which will be discussed further in the following sections. The third phase is vital as it represents a true lifestyle change that patients are encouraged to maintain over time. The quality of services provided during the second phase of CR is critical, with coronary associations offering additional support to patients (Mampuya, 2012).

CR represents a structured and supervised process of secondary prevention and rehabilitation for cardiovascular patients. While acute hospital treatment durations have decreased, rehabilitation programmes have been extended. Short-term spa programmes are being replaced by long-term outpatient rehabilitation (Jug, 2024). Numerous studies highlight the long-term effectiveness of rehabilitation, which reduces symptoms such as chest pain, dyspnea, fatigue, and the risk of recurrent MI. It has been proven that regular and appropriately prescribed physical activity extends life and reduces mortality by 20–25 %. For coronary patients, it is crucial to incorporate regular, planned, and structured physical activity into their lifestyle to improve aerobic and muscular capacity and maintain or enhance health (Vižintin Cuderman, 2017).

In foreign CR programmes, patients are referred for MI, bypass surgery, stent placement, chronic stable angina pectoris, heart failure, pacemaker implantation, and defibrillator insertion. Common components include: physical exercise, dietary counselling, behavioural counselling, smoking cessation programmes, and health monitoring of blood pressure, lipid levels, and blood sugar. The positive effects of CR include reduced mortality, decreased incidence of depression (by approximately 40 %), improved functional capacity, increased exercise tolerance, weight loss, lipid control, reduced hospitalisations, and improved quality of life (Servey and Stephens, 2016).

Studies indicate that distance from home to CR facilities is the primary reason for non-participation or dropout (Servey and Stephens, 2016). Women (due to fewer financial resources, transportation issues, and lack of social and emotional support), the elderly (despite being most in need of CR), racial and ethnic minorities are less likely to participate (Mampuya, 2012). In some larger countries, remote home-based CR has been implemented. It has been found that, compared to outpatient CR, there are no differences in effectiveness, and a higher percentage of patients complete the programme (Anderson et al., 2017).

Rehabilitation after acute myocardial infarction involves a comprehensive approach, including individual risk assessment, prescribed physical activity, education and support, and psychological assistance. The main goals of cardiac rehabilitation (Ivanuša et al., 2015) are:

- restoring the patient's functioning within social, family, and work environments;
- encouraging patients to adopt lifestyle changes and take responsibility for their health;
- preventing disease progression.

Therapeutic education is the most effective approach in cardiac rehabilitation, as it educates the patient about their condition with the aim of enabling them to take responsibility and autonomy in their own treatment and lifestyle changes. Cardiac patients need help in dealing with psychosocial and professional challenges. Psychiatric conditions such as anxiety and depression are very common after coronary events and are associated with reduced exercise capacity, fatigue, and decreased quality of life (Mampuya, 2012).

Overview of Cardiac Rehabilitation at Izola General Hospital

In 2017, a new healthcare programme, »Ambulantna kardiološka rehabilitacija« (»Outpatient Cardiac Rehabilitation«) was introduced, based on the professional collaboration between the Univerzitetni klinični center Ljubljana (UKC Ljubljana) and the Zavod za zdravstveno zavarovanje Slovenije (ZZZS). The introduction of this new programme followed advancements in medicine and pharmacotherapy, particularly in the management of coronary patients. Instead of stationary treatment at a spa resort, extended outpatient rehabilitation is now required for patients following the successful completion of acute myocardial infarction treatment in the hospital (Kos, 2020). The goal in Slovenia is to establish outpatient cardiac rehabilitation in every regional hospital. Thus, between 2017 and 2020, cardiovascular rehabilitation programmes were established at UKC Maribor and the general hospitals in Izola, Celje, Ptuj, Šmarješke Toplice, and Slovenj Gradec (Jug, 2024).

Staff Composition

To monitor, record, and account for the services performed within the new programme, ZZZS, in collaboration with the Internal Clinic of UKC Ljubljana, has defined a new list of outpatient cardiac rehabilitation services and a new calculation for planning and financing the new team, consisting of 5.30 full-time equivalents (FTEs). This includes 1.20 FTEs for a specialist doctor, 1.50 FTEs for a registered nurse or senior nurse, and 1.50 FTEs for a physiotherapist (Kos, 2020).

Rehabilitation Process

After an examination by a specialist doctor and a stress test, candidates are invited to the outpatient cardiac rehabilitation. An initial assessment is conducted, including measurements of height, weight (to calculate BMI), and waist circumference. At the end of the rehabilitation, these measurements are repeated, with the exception of body weight which is monitored weekly.

Blood pressure management is crucial for cardiac patients. Patients are taught to measure their blood pressure at home twice daily and as needed. Blood pressure is measured before and after exercise during rehabilitation. If the blood pressure is too high or too low, or if there is nausea, chest tightness, or any other discomfort, exercise is contraindicated. Blood pressure usually drops by about 10 mmHg after physical exertion.

It is recommended that patients with myocardial infarction warm up thoroughly before exercise, starting with approximately 10 minutes of whole-body warm-up. The warm-up also aims to introduce patients to various flexibility and strength exercises they can continue at home after completing rehabilitation. To enhance motivation, we use various aids such as elastic bands, hand weights or wrist and ankle weights, sticks, and balls. Stretching and breathing exercises are also included to teach patients to perform exercises correctly on their own.

Global studies have shown that 36 visits or more are required to achieve the desired effects, equating to 12 weeks of rehabilitation, three times a week (Servey and Stephens, 2016). Patients who complete 36 sessions of cardiac rehabilitation have a 14 % lower risk of death compared to those who only complete 24 sessions, and a 47 % lower risk compared to those who only attend one session (Menezes et al., 2014). It is recommended that patients start physical exercise after a heart attack by participating in CR, which provides appropriate safety and supervision during exercise (Vižintin Cuderman, 2019).

At General hospital Izola (SBI), we also follow these global standards. Patients typically attend rehabilitation 24 or 36 times, usually three times a week, occasionally twice. The patient's heart function is monitored throughout the exercise with a monitor (Servey and Stephens, 2016). Each patient wears an elastic strap around the chest with an ECG monitor attached, which is connected to a computer via a Bluetooth system.

Research has shown greater efficacy and progress with interval training on a cycle ergometer (Mampuya, 2012). Current guidelines recommend dynamic aerobic exercise, as it effectively and safely strengthens the heart and blood vessels. Larger muscle groups are gradually activated and the exercise is performed for 30 minutes or longer, with heart rate ranging from 50 to 90 % of maximum heart rate, or until the patient can no longer speak five words in a row without becoming breathless (Vižintin Cuderman, 2019).

At SBI, we also use this form of exercise. Participants cycle for 180 to 240 seconds at higher intensity (80–90 % maximum heart rate) and 120 seconds at lower intensity (50–60 % heart rate), for a total of 45 minutes. An alternative is a combination of 20 minutes of interval training and 20 minutes of continuous exercise on a treadmill. Here, the incline and walking speed can be set for the patient and remain unchanged. The patient's progress is continuously monitored throughout rehabilitation, and the exercise load is adjusted individually. As part of cardiac rehabilitation, there are three different lectures for patients, including topics such as Healthy Eating by a dietitian, Coronary Disease by a specialist doctor, and Physical Exercise by a physiotherapist.

Conclusions

An important emphasis is placed on secondary prevention to prevent or slow the progression of cardiovascular complications. This includes the following measures: adopting a healthy lifestyle, pharmacological treatment, and managing risk factors. Essential steps include quitting smoking and alcohol consumption, following a Mediterranean diet, maintaining a healthy body weight, and engaging in regular physical exercise. Risk factor management involves controlling blood pressure below 140/90 mmHg, lowering LDL cholesterol to less than 1.8 mmol/L, and treating diabetes. Pharmacological treatment focuses on the introduction and adjustment of medications to prevent blood clots, manage heart rhythm disturbances, heart failure, and the progression of atherosclerosis (Jug, 2017).

CR after a heart attack is crucial for the working population. Research shows that CR is an effective secondary prevention approach (Fras, 2017 and Jug, 2017). We must not overlook the psychosocial aspect, as anxiety with panic attacks (present in 60 % of people within six months post-heart attack) and depression (20 %) are common. Additionally, mood disorders and stress responses are frequently observed as these events represent a turning point for patients. Group exercises provide support for patients with similar life experiences, encouraging each other in recovery. Empowering patients to successfully cope with their illness and helping them achieve as much independence as possible is essential (Jug, 2017).

Studies confirm that cardiac rehabilitation contributes to improved physical fitness and significantly enhances the psychosocial aspects of quality of life. Cardiac rehabilitation programmes increase life satisfaction and reduce

anxiety and depression. It is important to continue supporting and developing these programmes, as they are crucial for maintaining the health and quality of life of patients who have experienced cardiovascular events (Anderson et al., 2016).

Secondary prevention within cardiac rehabilitation plays a crucial role in improving the quality of life and functional capacity of both the working and older populations. Our results show that patients are highly satisfied with the progress achieved after completing outpatient cardiac rehabilitation. In addition to noticeable improvements in physical condition, such as better fitness and symptom reduction, patients also report greater confidence in performing daily activities. These positive outcomes are key to the long-term maintenance of a healthy lifestyle and reduced risk of recurrent cardiovascular events.

References

- ANDERSON, L., OLDRIDGE, N., THOMPSON, D. R., ZWISLER, A. D., REES, K., MARTIN, N. and TAYLOR, R.R. 2016. Exercise-based cardiac rehabilitation for coronary heart disease: Cochrane systematic review and meta-analysis [online]. *Journal of the American College of Cardiology*, vol. 67, no. 1, pp. 1-12. [viewed 12 June 2024]. Available from: <https://pubmed.ncbi.nlm.nih.gov/26764059/>
- ANDERSON, L., SHARP, G.A., NORTON, R.J., DALAL, H., DEAN, S.G., JOLLY, K., COWIE, A., ZAWADA, A. and TAYLOR, R.S., 2017. Home-based versus centre-based cardiac rehabilitation [online]. *Cochrane Database of Systematic Reviews*, n. 6. [viewed 12 June 2024]. Available from: <http://dx.doi.org/10.1002/14651858.CD007130>
- FRAS, F. 2024. Preventiva bolezni srca in žilja v Sloveniji. In: FRAS, Z. and JUG, B. ed. 25. slovenski forum o preventivi bolezni srca in žilja 2024: zbornik prispevkov [online]. Ljubljana: Združenje kardiologov Slovenije, Slovenska hiša srca, pp. 7-13. [viewed 17 July 2024]. Available from: <https://www.sicardio.org/wp-content/uploads/25-slovenski-forum-o-preventivi-bolezni-srca-in-zilja-zbornik.pdf>
- FRAS, Z. 2017. Za preprečevanje napredovanja in zapletov ateroskleroze moramo živeti ... [online]. [viewed 17 July 2024]. Available from: <https://zkdks.si/za-preprecevanje-napredovanja-in-zapletov-ateroskleroze-moramo-ziveti/>
- IVANUŠA, M., NARANČIĆ SKORIĆ, K., GLAVAŠ VRAŽIĆ, S., KRUHEK LEONTIĆ, D. HEINRICH, N. MAŽURAN BRKLJAČIĆ, L., ČURIĆ, G. and KRSTAČIĆ, G. 2015. Ambulantna kardiovaskularna rehabilitacija u Hrvatskoj [online]. [viewed 17 July 2024]. Available from: https://www.kardio.hr/pdf/Cardiologia%20Croatica%2010_1-2_28-42.pdf
- JUG, B. 2017. Rehabilitacija koronarnih bolnikov - aktualne smernice po posameznih fazah. In: BABIČ, A ed. Vseživljenjska rehabilitacija koronarnega bolnika: Priročnik za bolnike [online]. Novo mesto: Zveza

koronarnih društev in klubov Slovenije, pp. 17–21. [viewed 17 July 2024]. Available from: <https://zkdks.si/wp-content/uploads/2019/05/Priro%C4%8Dnik-za-koronarne-bolnike.pdf>

- JUG, B. 2024. Dve desetletji sistematične preventive bolezni srca in žilja v Sloveniji: sekundarna preventiva in rehabilitacija. In: FRAS, Z. Sodobna kardiologija 2024 = Contemporary cardiology 2024: zbornik prispevkov = book of papers [online]. Ljubljana: Združenje kardiologov Slovenije, pp. 9. [viewed 17 July 2024]. Available from: <https://www.sicardio.org/wp-content/uploads/sodobna-kardiologija-2024-zbornik.pdf#page=31>
- KOS, D. 2020. Postopno uvajanje novega programa ambulantne kardiološke rehabilitacije [online]. [viewed 17 July 2024]. Available from: <https://zkdks.si/postopno-uvajanje-novega-programa-ambulantne-kardioloske-rehabilitacije/>
- MAMPUYA, W.M., 2012. Cardiac rehabilitation past, present and future: an overview [online]. Cardiovascular Diagnosis and Therapy, vol. 2, no. 1, pp. 38–49. [viewed 23 July 2024]. Available from: <http://dx.doi.org/10.3978/j.issn.2223-3652.2012.01.02>
- MENEZES, A.R., LAVIE, C.J., FORMAN, D.E., ARENA, R., MILANI, R.V. and FRANKLIN, B.A., 2014. Cardiac Rehabilitation in the Elderly [online]. Progress in Cardiovascular Diseases, vol. 57, no. 2, pp. 152–159. [viewed 23 July 2024]. Available from: <https://doi.org/10.1016/j.pcad.2014.01.002>
- MENEZES, A.R., LAVIE, C.J., MILANI, R.V., FORMAN, D.E., KING, M. and WILLIAMS, M.A., 2014. Cardiac Rehabilitation in the United States [online]. Progress in Cardiovascular Diseases, vol. 56, no. 5, pp. 522–529. [viewed 23 July 2024]. Available from: <https://doi.org/10.1016/j.pcad.2013.09.018>
- SERVEY, J.T., STEPHENS, M., 2016. Cardiac Rehabilitation: Improving Function and Reducing Risk [online]. American Family Physician, vol. 94, no. 2, pp. 37–43. [viewed 23 July 2024]. Available from: <http://aafp.org/pubs/afp/issues/2016/0701/p37.html>
- VIŽINTIN CUDERMAN, T., 2017. Telesna vadba in koronarni bolniki. In: BABIČ, A ed. Vseživljenjska rehabilitacija koronarnega bolnika: Priročnik za bolnike [online]. Novo mesto: Zveza koronarnih društev in klubov Slovenije, pp. 26–30. [viewed 17 July 2024]. Available from: <https://zkdks.si/wp-content/uploads/2019/05/Priro%C4%8Dnik-za-koronarne-bolnike.pdf>