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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Effects of cardiac rehabilitation on quality of life and exercise capacity in patients with coronary artery disease – do women benefit equally?

Milovan Stojanović[1], Aleksa Vuković[1], Marija Stanković[1], Jelena Igrutinović-Novković[2], Igor Igić[3], Marina Deljanin-Ilić[1,4], Stevan Ilić[5]

[1]Niška Banja Institute for Treatment and Rehabilitation, Niš, Serbia;
[2]Aleksinac General Hospital, Aleksinac, Serbia;
[3]Doljevac Health Center, Doljevac, Serbia;
[4]University of Niš, Faculty of Medicine, Niš, Serbia;
[5]Cardio Point, Clinic for Cardiovascular Diseases Niš, Serbia

SUMMARY

Introduction/Objective This paper aimed to examine whether women and men benefit equally from comprehensive cardiac rehabilitation (CR) in terms of quality of life (QOL), and exercise tolerance in patients with coronary artery disease (CAD).

Methods The study involved 1603 CAD patients, 1231 (76.8%) men and 372 (23.2%) women, who were referred to a three-week CR program. All patients were tested for physical strain at the beginning and at the end of CR. The QOL was assessed at the beginning and at the end of CR by validated questionnaire Short-Form 36.

Results Improvements in physical strain tolerance were more pronounced in women compared to men (18.46% *vs*. 14.23% for level, and 19.1% *vs*. 16.34% for the duration of the test). Also, CR has led to the improvement of the QOL in both men and women. However, women had greater improvement than men in all parameters - physical functioning: 26.85% *vs*. 10.12%, limitations due to physical health: 76.39% *vs*. 28.11%, limitations due to+ emotional problems: 23.12% *vs*. 21.07%, energy/fatigue: 13.33% *vs*. 6.77%, emotional well-being: 11.19% *vs*. 6.77%, social functioning 14.48% *vs*. 4.96%, body pain 15.76% *vs*. 10.16%, general health 10.53% *vs*. 7.38%, and health change 24.06% *vs*. 12.69%.

Conclusion Women generally less participate in CR than men. Results indicated that CR improves exercise capacity and QOL in CAD patients, in both men and women. However, these positive changes were more pronounced in women. This is why CR needs improvement in the referral and participation of women.

Keywords: coronary artery disease; cardiac rehabilitation; quality of life; physical strain tolerance; gender differences

INTRODUCTION

With 17.9 million deaths per year, cardiovascular diseases (CVDs) are the leading cause of death in the world [1]. Coronary artery disease (CAD) remains the most lethal CVD in countries with all income groups as seven million people die annually due to ischemic heart disease (IHD) [2]. However, it seems that the mortality rate caused by IHD is declining over time [2]. This is probably the consequence of new diagnostic and therapeutic possibilities.

Although men have a higher incidence of CAD, the mortality rate from acute cardiovascular events is higher in women and they tend to have a worse prognosis compared to men [3]. This is probably due to the gender-related disparities in the diagnostic and therapeutic approach. Namely, women are less likely to be referred to coronary angiography or interventional procedure compared to men [4]. This is of great importance as 1/3 of female patients die due to CAD. Also, it is widely believed that premenopausal women are less likely to suffer from CAD. However, the presence of IHD among young women is increasing. This is probably the consequence of unfavorable lifestyle changes.

A well-organized cardiac rehabilitation (CR) includes exercise training, adequate patient education, management of modifiable cardiovascular risk factors, psychosocial support and dietary advice [5]. As such, CR improves the quality of life (QOL) and physical strain tolerance, leads to weight loss, and tobacco cessation, has an anti-inflammatory effect, reduces the blood pressure (BP) values, and, what is most important, reduces cardiovascular and overall morbidity and mortality [6, 7]. This is why CR is recommended by major medical societies worldwide [8, 9]. However, the utilization rate for CR is still very low [10]. Furthermore, although beneficial effects of CR are proven in both gender, women participate in CR programs in a significantly lower percentage than men [11, 12].

The aim of our paper was to examine whether women and men benefit equally from comprehensive CR in terms of QOL and exercise tolerance in patients with CAD.

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Correspondence to:
Milovan STOJANOVIĆ
Niška Banja Institute for Treatment and Rehabilitation
Srpskih junaka 2
18205 Niška Banja
Serbia
milovanstojanovic1987@gmail.com

METHODS

The study involved 1603 patients, 1231 (76.8%) men and 372 (23.2%) women. The average age of the subjects was 59.99 ± 9.58 years. All participants were referred to the CR at the Institute for Treatment and Rehabilitation Niška Banja after surviving myocardial infarction (MI), percutaneous coronary intervention (PCI) or surgical myocardial revascularization. During a three-week program of cardiovascular rehabilitation, patients were subjected to dosed and personalized aerobic physical training which included aerobic exercises, bicycle riding and walking 45 minutes per session, two sessions on a daily basis. The training was dosed according to the way revascularization was done [for example, patients with coronary artery bypass grafting (CABG) did not perform chest exercises], the condition of the locomotor system (some patients did not ride a bicycle due to problems with their knees), and the completeness of revascularization (patients with uncompleted revascularization underwent low intense training). Also, all patients were tested for physical strain at the beginning and the end of CR. The tests were done on a treadmill (Full Vision Drive Inc., Newton, KS, USA) according to the Bruce protocol. After the first exercise stress test (EST), training was modified according to the results achieved. Tests were limited by submaximal heart rate [(SHR) – calculated as 85% from the 220-age equation], symptoms and signs like chest pain, lack of air, dizziness, etc., a sudden increase of systolic BP to values ≥ 220 mmHg, or decrease in systolic BP > 10 mmHg, complex heart rhythm disorders, and/or ischemic changes on the electrocardiogram which were defined as horizontal and/or down-sloping ST depression ≥ 1 mm.

Psychological dimensions and the QOL were assessed at the beginning and at the end of CR by validated questionnaire Short-Form 36 Health Status Survey (SF-36). All data were analyzed based on gender.

The study was approved by the ethical committee of the Niška Banja Institute for Treatment and Rehabilitation. Decision number is 29074.

Statistics

Qualitative data were expressed as frequencies and percentages while quantitative data are presented as mean ± standard deviations. Normality of distribution was tested by Kolmogorov–Smirnov test. Normally distributed data were compared by Student's t test, while the Mann–Whitney test and Wilcoxon test were used for abnormally distributed data. For the comparison of frequencies, the χ^2 test was used. Statistical significance was accepted for $p < 0.05$. Data were analyzed using SPSS Statistics for Windows, Version 20.0. (IBM Corp., Armonk, NY, USA) software.

RESULTS

The age structure of patients differed significantly between genders as men were younger than women (59.68 ± 9.66 *vs.* 61.02 ± 9.25, t = 2.352, p = 0.019). MI was more common in women ($\chi^2 = 5.493$; p = 0.019). On the other hand, CABG was more common in men ($\chi^2 = 16.110$; p < 0.001). There was no difference in the incidence of PCI in relation to gender (Table 1).

Table 1. Distribution of myocardial infarction, percutaneous coronary intervention and coronary artery bypass grafting among genders

Distribution	Male n (%)	Female n (%)	χ^2	p
Myocardial infarction	971 (78.9)	314 (84.4)	5.493	0.019
Coronary artery bypass grafting	541 (43.9)	20 (32.3)	16.110	< 0.001
Percutaneous coronary intervention	686 (55.7)	213 (57.3)	0.272	0.602

The incidence of arterial hypertension was higher in women compared to men ($\chi^2 = 4.399$; p = 0.036). Other risk factors for CVDs (hyperlipidemia, diabetes mellitus, smoking status, heredity) did not differ between the groups (Table 2).

Table 2. Risk factors for cardiovascular diseases

Parameters	Male n (%)	Female n (%)	χ^2	p
Hyperlipidemia	1088 (88.4)	337 (90.6)	1.411	0.235
Arterial hypertension	1023 (83.1)	326 (87.6)	4.399	0.036
Diabetes mellitus	308 (25)	99 (26.6)	0.382	0.536
Smoking	686 (55.7)	195 (52.4)	1.263	0.261
Heredity	543 (44.1)	157 (42.3)	0.372	0.542

At the beginning and at the end of CR EST was performed. The differences between the first EST (EST1) and the second EST (EST2) are shown in Table 3. On the EST2 patients achieved a higher level of strain (Z = 16.872; p < 0.001), and the EST2 lasted longer (Z = 20.944; p < 0.001) compared to the EST1 (Table 3). Also, more patients achieved SHR on EST2 ($\chi^2 = 429{,}46$; p < 0.001).

The differences in strain tolerance on EST1 between men and women are shown in Table 4. Tests lasted longer in men (Z = 8.171; p < 0.001) and men achieved a higher level of strain compared to women (Z = 5.059; p < 0.001). Also, the double product (DP) which was defined as systolic BP x heart rate, was higher in men before (Z = 3.160; p = 0.002), and after EST1 (Z = 2.154; p = 0.031). The incidence of chest pain, ST segment depression and SHR did not differ between the genders.

EST2 was performed after a three-week rehabilitation program. The average strain level was significantly higher among men (Z = 7.366; p < 0.001), as well as the duration of the test (Z = 8.023; p < 0.001). There were no significant differences in DP before the EST2. However, the DP after the test was significantly higher in men (Z = 3.248; p = 0.001). The incidence of chest pain, ST depression and SHR did not differ between genders (Table 5).

At the end of CR, we compared the results of EST1 and EST2 in order to determine if there were differences in the effects of CR on the tolerance of physical strain in relation to the gender.

Table 3. Comparison between the first and the second exercise stress test (EST) in all patients

Parameters	EST1	EST2	Z/χ^2	p
EST level	2.29 ± 0.93	2.63 ± 0.96	16.872	< 0.001[1]
EST duration (min)	5.40 ± 2.66	6.33 ± 2.68	20.944	< 0.001[1]
Double product before	9819.28 ± 4923.61	9696.32 ± 2068.11	1.351	0.177[1]
Double product after	21427.07 ± 7583.58	21874.49 ± 3770.19	7.194	< 0.001[1]
ST depression	171 (10.7)	222 (13.9)	541.48	< 0.001[2]
Submaximal heart rate	835 (52.2)	1060 (66.5)	429.46	< 0.001[2]
Chest pain	25 (1.6)	15 (0.9)	33.29	< 0.001[2]

Z – Wilcoxon test, χ^2 – Chi squared test

Table 4. The first exercise stress test

Parameters	Male n (%)	Female n (%)	Z/χ^2	p
EST level	2.39 ± 0.93	1.95 ± 0.87	5.059	< 0.001
EST duration (min)	5.69 ± 2.67	4.45 ± 2.39	8.171	< 0.001
Double product before	9780.48 ± 5475.77	9931.12 ± 2226.04	3.160	0.002
Double product after	21609.99 ± 8380.37	20792.49 ± 3785.42	2.154	0.031
ST depression	137 (11.1)	34 (9.2)	1.110	0.291
Submaximal heart rate	653 (53.1)	182 (49.3)	1.614	0.204
Chest pain	18 (1.5)	7 (1.7)	0.345	0.557

Z – Mann–Whitney U test; EST – exercise stress test

Table 5. The second exercise stress test

Parameters	Male n (%)	Female n (%)	Z/χ^2	p
EST2 level	2.73 ± 0.94	2.31 ± 0.88	7.366	< 0.001
EST2 duration (min)	6.62 ± 2.69	5.30 ± 2.45	8.023	< 0.001
Double product before	9675.60 ± 2102.82	9765.20 ± 1949.45	1.162	0.245
Double product after	22045.47 ± 3767.56	21304.05 ± 3727.65	3.248	0.001
ST depression	176 (14.4)	46 (12.5)	0.813	0.367
Submaximal heart rate	824 (67.2)	236 (64.1)	1.205	0.272
Chest pain	11 (0.9)	4 (1.1)	0.109	0.741

Z – Mann–Whitney U test; EST – exercise stress test

Table 6. Comparison between the first and the second exercise stress test (EST) in men

Parameters	EST1	EST2	Z/χ^2	p	%
EST level	2.39 ± 0.93	2.73 ± 0.94	14.482	< 0.001	14.23
EST duration (min)	5.69 ± 2.67	6.62 ± 2.69	17.952	< 0.001	16.34
Double product before	9780.48 ± 5475.77	9675.60 ± 2102.82	2.251	0.024	-1.07
Double product after	21609.99 ± 8380.37	22045.47 ± 3767.56	6.737	0.031	2.02
ST depression	137 (11.1)	176 (14.4)	399.317	< 0.001	28.47
Submaximal heart rate	653 (53.1)	824 (67.2)	323.160	< 0.001	26.19
Chest pain	18 (1.5)	11 (0.9)	51.045	< 0.001	-38.89

Z – Wilcoxon test

The average strain level in men was significantly higher in EST2 (Z = 14.482; p < 0.001). Also, the duration of the test was significantly longer in the second test (Z = 2.251; p = 0.024). DP before the test was significantly lower on EST2 (Z = 2.251; p = 0.024), but DP after the test was significantly higher in EST2 (Z = 6.737; p = 0.031). The percentage of male patients with ST depression (χ^2 = 323.160; p < 0.001) and SHR (χ^2 = 105.652; p < 0.001) were more frequent on EST2. On the other hand, the percentage of male patients with chest pain was significantly lower in the second EST (χ^2 = 51.045; p < 0.001) (Table 6).

The average strain level in women was significantly higher in the second test (Z = 8.712; p < 0.001). Likewise, the EST2 lasted significantly longer than EST1 (Z = 10.865; p < 0.001). The DP before the test did not differ substantially between EST1 and EST2. However, the DP after the EST2 was higher compared to EST1 (Z = 2.602; p = 0.009). In the second test, the percentage of female patients with ST depression (Z = 145.635; p < 0.001) and SHR (Z = 105.652; p < 0.001) was higher. The percentage of female patients experiencing chest discomfort, on the other hand, did not differ between the tests (Table 7).

Thus, a three-week program of CR has led to the improvement of the physical strain tolerance in both men and women. Namely, in both groups of patients, EST2 lasted significantly longer than EST1, and the patients achieved a higher level of loading in the second test. Moreover, these improvements were more pronounced in women compared to men (18.46% *vs.* 14.23% for level, and 19.1% *vs.* 16.34% for the duration of EST) (Tables 5 and 6).

The effects of CR on the QOL in 360 patients (299 men and 61 women) with CAD were assessed by validated questionnaire Short-Form 36 Health Status Survey (SF-36). In Table 8 the comparison of mean scores for SF-36 subscales in all examined patients before and after CR is shown. All parameters were improved after CR: physical functioning (Z = 8.804; p < 0.001), limitations due to physical health (Z = 5.227; p < 0.001), limitations due to emotional problems (Z = 4.322; p < 0.001), energy/fatigue (Z = 7.803; p < 0.001), emotional well-being (Z = 7.731; p < 0.001), social functioning (Z = 4.541; p < 0.001), pain (Z = 6.867; p < 0.001), general health (Z = 6.417; p < 0.001) and health change (Z = 5.839; p < 0.001).

Table 9 shows the comparison of mean scores for SF-36 subscales in male patients before and after CVR. All parameters were improved after CR: physical functioning (Z = 7.171; p < 0.001), limitations due to physical health (Z = 4.539; p < 0.001), limitations due to emotional problems (Z = 3.796; p < 0.001), energy/fatigue (Z = 7.146; p < 0.001), emotional well-being (Z = 6.683; p < 0.001), social functioning (Z = 3.478; p < 0.001), pain (Z = 5.771; p < 0.001), general health (Z = 5.491; p < 0.001) and health change (Z = 4.977; p < 0.001).

Table 10 shows the comparison of mean scores for SF-36 subscales in female patients before and after CR. All parameters except limitations due to emotional problems were improved after CR: physical functioning (Z = 5.248; p < 0.001), limitations due to physical health (Z = 2.660; p = 0.008), energy/fatigue (Z = 3.113; p = 0.002), emotional well-being (Z = 3.888; p < 0.001), social func-

Table 7. Comparison between the first and the second exercise stress test (EST) in women

Parameters	EST1	EST2	Z/χ^2	p	%
EST level	1.95 ± 0.87	2.31 ± 0.88	8.712	< 0.001	18.46
EST duration (min)	4.45 ± 2.39	5.30 ± 2.45	10.865	< 0.001	19.1
Double product before	9931.12 ± 2226.04	9765.20 ± 1949.45	1.335	0.182	-1.67
Double product after	20792.49 ± 3785.42	21304.05 ± 3727.65	2.602	0.009	2.46
ST depression	34 (9.2)	46 (12.5)	145.635	< 0.001	35.29
Submaximal heart rate	182 (49.3)	236 (64.1)	105.652	< 0.001	29.67
Chest pain	7 (1.7)	4 (1.1)	0.078	0.779	-42.86

Z – Wilcoxon test

Table 8. The comparison of mean scores for Short-Form 36 Health Status Survey subscales in all patients before and after cardiovascular rehabilitation

Parameters	Before rehabilitation	After rehabilitation	Z	p
Physical functioning	61.60 ± 24.23	69.27 ± 23.66	8.804	< 0.001
Limitations due to physical health	28.16 ± 37.13	37.37 ± 40.12	5.227	< 0.001
Limitations due to emotional problems	37.64 ± 39.09	45.70 ± 40.07	4.322	< 0.001
Energy/fatigue	59.12 ± 20.74	65.29 ± 21.52	7.803	< 0.001
Emotional well-being	68.63 ± 21.97	73.79 ± 22.28	7.731	< 0.001
Social functioning	67.96 ± 24.05	72.32 ± 24.31	4.541	< 0.001
Pain	62.43 ± 25.05	69.34 ± 24.69	6.867	< 0.001
General health	53.82 ± 17.34	58.08 ± 18.96	6.417	< 0.001
Health change	51.04 ± 37.26	58.38 ± 35.77	5.839	< 0.001

Z – Wilcoxon test

Table 9. The comparison of mean scores for Short-Form 36 Health Status Survey subscales in male patients before and after cardiovascular rehabilitation

Parameters	Before rehabilitation	After rehabilitation	Z	p	%
Physical functioning	64.42 ± 23.99	70.94 ± 23.94	7.171	< 0.001	10.12
Limitations due to physical health	30.98 ± 38.29	39.69 ± 40.66	4.539	< 0.001	28.11
Limitations due to emotional problems	38.34 ± 39.18	46.42 ± 40.44	3.796	< 0.001	21.07
Energy/fatigue	60.31 ± 21.21	66.28 ± 21.68	7.146	< 0.001	9.9
Emotional well-being	69.24 ± 22.13	73.93 ± 22.92	6.683	< 0.001	6.77
Social functioning	69.98 ± 23.94	73.45 ± 24.08	3.478	< 0.001	4.96
Pain	63.56 ± 25.19	70.02 ± 25.03	5.771	< 0.001	10.16
General health	54.37 ± 17.99	58.38 ± 19.29	5.491	< 0.001	7.38
Health change	52.80 ± 37.46	59.50 ± 35.61	4.977	< 0.001	12.69

Z – Wilcoxon test

Table 10. The comparison of mean scores for Short-Form 36 Health Status Survey subscales in female patients before and after cardiovascular rehabilitation

Parameters	Before rehabilitation	After rehabilitation	Z	p	%
Physical functioning	48.49 ± 20.92	61.51 ± 20.77	5.248	< 0.001	26.85
Limitations due to physical health	15.08 ± 27.88	26.60 ± 35.87	2.660	0.008	76.39
Limitations due to emotional problems	34.39 ± 38.79	42.34 ± 38.45	1.899	0.058	23.12
Energy/fatigue	53.57 ± 17.49	60.71 ± 20.29	3.113	0.002	13.33
Emotional well-being	65.78 ± 21.14	73.14 ± 19.20	3.888	< 0.001	11.19
Social functioning	58.58 ± 22.44	67.06 ± 24.83	3.189	0.001	14.48
Pain	57.18 ± 23.86	66.19 ± 22.94	3.934	< 0.001	15.76
General health	51.27 ± 13.79	56.67 ± 17.44	3.408	0.001	10.53
Health change	42.86 ± 35.48	53.17 ± 36.34	3.084	0.002	24.06

Z – Wilcoxon test

tioning (Z = 3.189; p = 0.001), pain (Z = 3.934; p < 0.001), general health (Z =53.408; p = 0.001) and health change (Z = 3.084; p = 0.002).

A three-week program of CR has led to the improvement of the QOL in both men and women. Namely, in both groups of patients, almost all examined parameters were better after CR (Tables 8 and 9). However, compared to the baseline, and based on gender, women had greater improvement than men in all parameters - physical functioning: 26.85% *vs.* 10.12%, limitations due to physical health: 76.39% *vs.* 28.11%, limitations due to emotional problems: 23.12% *vs.* 21.07%, energy/fatigue: 13.33% *vs.* 6.77%, emotional well-being: 11.19% *vs.* 6.77%, social functioning 14.48% *vs.* 4.96%, body pain 15.76% *vs.* 10.16%, general health 10.53% *vs.* 7.38%, and health change 24.06% *vs.* 12.69%.

DISCUSSION

A well-designed CR has multiple positive effects. It leads to better control of cardiovascular risk factors, increases exercise tolerance, enhances the QOL, and reduces rehospitalization for cardiac causes [13, 14, 15]. The positive effects of CR are shown in all CAD patients, regardless of ejection fraction [16]. This is why the current European Society of Cardiology Guidelines for cardiovascular prevention strongly advises CR in CAD patients giving it an IA recommendation [17]. However, despite these positive effects of CR, it remains underutilized [18].

In our study, a three-week CR led to a significant improvement in physical strain tolerance in CAD patients. Namely, all patients achieved a higher level on the EST2. Also, the EST2 lasted significantly longer compared to EST1. This well-known beneficial effect of exercise training on physical strain tolerance is documented in previous studies [6, 11, 16].

When comparisons between gender were made, the results showed better strain tolerance in men compared to women at the beginning and et the end of CR (Tables 3 and 4). This is in concordance with previous studies which showed that exercise capacity in male

patients is higher than in female patients [19, 20]. However, in our study, a three-week CR led to improved exercise capacity in both men and women. Namely, the average strain level in men and women was significantly higher and the duration of the test was significantly longer in the EST2. Moreover, these improvements were more pronounced in women compared to men (18.46% *vs*. 14.23% for level, and 19.1% *vs*. 16.34% for the duration of EST) (Tables 5 and 6). These data suggest that women have greater benefits from CR programs compared to men. Moreover, women who participate in CR may have a greater mortality reduction compared to men [21]. However, the referral rate and attendance to CR remain lower in women than in men [22, 23]. The main reasons why women participate less in CR compared to men are lack of family and social support, and the unawareness of medical personnel about the importance of CR [24]. Our study once again showed that women generally less participate in CR than men.

CR, an essential secondary prevention tool once limited to physical activity programs only, has evolved towards the ongoing and preventive improvement of not only physical but the emotional well-being of an individual who has suffered a cardiovascular event [25, 26]. Numerous studies have discussed the bidirectional link between cardiovascular events and the emotional status of the patient [27]. However, unlike the rehabilitation benefit to physical health, research on post-rehabilitation emotional health is scarce, especially in gender-related circumstances. Moreover, on the contrary to a proven effect of CV rehabilitation on reduction of future CV events through physical activity, promotion of healthy and active lifestyle and its implementation is underutilized, especially in women [11, 12, 28], in spite of proven better functional improvement and reduction in mortality of greater magnitude when compared to men.

Given the fact that women are as twice as more prone to anxiety and depression when compared to males, due to the protective role of testosterone [28], lesser adherent to CV rehabilitation in whom they benefit greater than men [29], and without gender preference in CVD prevalence, we wanted to explore whether women benefit equally from CR, and are they on the long run, in what may be called "double jeopardy" [27]? We evaluated the impact cardiovascular rehabilitation had on the quality of mental life in the mixed-gender patient group after a cardiovascular event, using the SF-36 questionnaire.

In our study patients who completed CR reported higher levels of mental QOL and lower levels of anxiety and depression in both gender groups. These findings are consistent with Francis et al. [29], inputs on health-related QOL (HRQOL) in patients of similar (same) settings. In the male group levels of vitality, physical functioning, bodily pain, general health perceptions, physical, emotional, and social role functioning, and mental health were reported higher after the completion of rehabilitation. What is notable is that the female group is less large in a sample compared to men, but within the group women statistically benefited both physical and emotional role functioning as well in bodily pain occurrence. Literature data regarding this matter, both in worlds and especially domestic studies are scarce to compare with [28].

No matter the sample sizes of both groups positive feedback considering mental health was achieved, and this could be due to already reported dynamic relationship between one's emotional valance and physical condition and their positive interrelation [30]. This study indicates that CR in patients with CAD sets a strong relationship between improved physical QOL and mental well-being of individuals who suffered a CV event. Yet, constant failure to refer women in a timely manner to rehabilitation is a matter of great concern for both physical and mentally related QOL within women.

Study limitations

There are several limitations:

1. We did not perform echocardiographic examinations. Left ventricular ejection fraction (LVEF) may play a key role in dosing and conducting CR. However, in our previous paper, we showed that CR leads to a better strain tolerance, regardless of the LVEF [19].
2. EST were performed and not cardiopulmonary tests. We analyzed the influence of EST on strain tolerance by measuring time and levels. Some parameters like MET or VO2 max are lacking.
3. Our study included the CR program that lasted for three weeks and most Guidelines and papers suggest 4–8 weeks of CR.

CONCLUSION

CR led to a significant improvement in exercise capacity in men as well as in women. Also, results indicated that CR improves QOL in CAD patients, in both men and women. However, these positive changes in QOL were more pronounced in women. This is why CR needs improvement in the referral and participation of women.

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Ефекти кардиоваскуларне рехабилитације на толеранцију физичког напора и на квалитет живота код болесника са коронарном артеријском болешћу – да ли жене имају подједнаку корист?

Милован Стојановић[1], Алекса Вуковић[1], Марија Станковић[1], Јелена Игрутиновић-Новковић[2], Игор Игић[3], Марина Дељанин-Илић[1,4], Стеван Илић[5]

[1]Институт за лечење и рехабилитацију „Нишка Бања“, Ниш, Србија;
[2]Општа болница „Алексинац“, Алексинац, Србија;
[3]Дом здравља „Дољевац“, Дољевац, Србија;
[4]Универзитет у Нишу, Медицински факултет, Ниш, Србија;
[5]Клиника за кардиоваскуларне болести *Cardio Point*, Ниш, Србија

САЖЕТАК

Увод/Циљ Циљ рада је био испитати да ли жене и мушкарци оболели од коронарне артеријске болести имају подједнаку корист од кардиоваскуларне рехабилитације (КВР) у смислу квалитета живота и толеранције физичког напора.

Методе Студија је укључивала 1603 болесника са коронарном артеријском болешћу, 1231 (76,8%) мушкараца и 372 (23,2%) жене, који су упућени на тронедељну КВР. Сви болесници су тестирани на физички напор на почетку и на крају КВР. Квалитет живота је процењен на почетку и на крају КВР валидираним упитником *Short-Form* 36. Сви подаци су анализирани у односу на пол.

Резултати КВР је довела до побољшања толеранције физичког напора и код мушкараца и код жена. Побољшање је било израженије код жена у поређењу са мушкарцима (18,46% наспрам 14,23% за ниво оптерећења и 19,1% наспрам 16,34% за дужину трајања теста). Такође, КВР је довела до побољшања квалитета живота и мушкараца и жена. Међутим, жене су имале већи напредак у поређењу са мушкарцима у свим испитиваним параметрима – физичко функционисање: 26,85% наспрам 10,12%; ограничења због физичког здравља: 76,39% наспрам 28,11%; ограничења због емоционалних проблема: 23,12% наспрам 21,07%; енергија/умор: 13,33% наспрам 6,77%; емоционално благостање: 11,19% наспрам 6,77%; социјално функционисање: 14,48% наспрам 4,96%; бол у телу: 15,76% наспрам 10,16%; опште здравље: 10,53% наспрам 7,38%; здравствена промена: 24,06% наспрам 12,69%.

Закључак Жене мање учествују у КВР него мушкарци. Резултати су показали да КВР побољшава толеранцију физичког напора и квалитет живота и код мушкараца и код жена са коронарном артеријском болешћу. Међутим, ове позитивне промене су биле израженије код жена. Због тога КВР треба унапредити упућивањем и учешћем жена.

Кључне речи: коронарна артеријска болест; кардиоваскуларна рехабилитација; квалитет живота; толеранција физичког напора; полне разлике