

## ORIGINAL RESEARCH ARTICLE

# Gender approach in cardiac rehabilitation

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### ABSTRACT

**Introduction:** cardiovascular disease in women is underestimated as a health problem. Among the therapeutic options is cardiac rehabilitation, which contributes to the reduction of morbimortality and hospitalization in both genders. **Objective:** to evaluate the initial behavior and results of a cardiac rehabilitation program in patients attended in the Cardiac Rehabilitation department of the Cardiology service of the General Teaching Hospital "Dr. Agostinho Neto", Guantánamo, during the period 2015–2019. **Method:** a descriptive, prospective and longitudinal study was carried out. The universe was constituted by 667 patients incorporated to the Cardiac Rehabilitation Program. Risk factors, ergometric parameters given by exercise time, heart rate, blood pressure and functional class were studied. A rehabilitation program was applied that included physical-aerobic and resistance exercises, ergometric tests and serum lipids at the beginning and at 6 months. **Results:** there is a different risk profile between both genders, obesity is the most prevalent risk factor in the female gender (62.9%) and active smoking in the male gender (78.0%). The improvement of physical capacity was greater in men than in women. The parameters used to improve women's participation and adherence to the program are presented. **Conclusions:** women have great barriers for incorporation to cardiac rehabilitation programs. It is necessary to provide them with information on the benefits to improve access and permanence in the program.

**Keywords:** cardiac rehabilitation; cardiovascular disease; gender

## 1. Introduction

Cardiovascular diseases (CVD) are among the leading causes of death in the world<sup>(1)</sup> and in Cuba.<sup>(2)</sup> They were considered more prevalent in men, but evidence shows that they are a major health problem in women.<sup>(3)</sup> Beyond the biological differences according to sex, studies by Cuban<sup>(4, 5)</sup> and foreign<sup>(6, 7)</sup> researchers on the influence of social roles and responsibilities on their epidemiology now indicate the

social relevance of their study from a gender perspective.

The theoretical systematization made it possible to establish that there are controversies regarding the problem of CVD according to gender, including the following:<sup>(8, 9, 10)</sup> they are undervalued as a health problem affecting women and the factors that determine delays in their demands or limit the quality of medical care in the face of an acute cardiac condition,

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the differences in clinical symptoms and in the profile of CVD risk factors between men and women are not recognized, insufficient vigilance is given to the efficacy of certain therapeutic interventions in them.

Among the options for the management of patients with CVD, cardiac rehabilitation (CR) is available<sup>(11, 12, 13)</sup>, which contributes to the reduction of morbidity, mortality and hospitalization for this cause, in men and women.<sup>(11)</sup> However, differences in the results of CR according to gender are recognized<sup>(14, 15)</sup>, for which reason the Interamerican and South American Society of CR,<sup>(16)</sup> respectively, urge the strengthening of actions to ensure the participation and permanence of women with CVD in programs directed to this end.

In this sense, in the General Teaching Hospital "Dr. Agostinho Neto" of Guantánamo, Cuba, there is no study that allows a reflection on the influence of gender on the results of a Cardiac Rehabilitation Program (CRP) in the patients attended. Therefore, the aim of this article is to evaluate the initial behavior and the results of a cardiac rehabilitation program in patients attended in the RHC department of the Cardiology service of the General Teaching Hospital "Dr. Agostinho Neto" during the period 2015–2019.

## **2. Method**

A descriptive, prospective and longitudinal study was performed. The procedures followed were carried out with ethical rigor, according to the principles of the Declaration of Helsinki, respecting individuality.

The universe consisted of the 667 patients, 194 women and 473 men who attended the cardiac rehabilitation consultation in the study period (2015–2019) and who met the inclusion and exclusion criteria.

**Inclusion criteria:** patients of both genders who attended the CRP during the period 2015–2019, maintaining adherence of at least 6 months.

**Exclusion criteria:** patients with recent acute

coronary syndrome, acute unstable angina, severe valvular heart disease, decompensated arterial hypertension (TAS>190 mmHg and/or TAD>120 mmHg), orthopedic or neurological disease preventing physical exercise, presence of uncontrolled tachyarrhythmias, severe pulmonary hypertension (pulmonary artery systolic pressure  $\geq$  60 mmHg), pulmonary thromboembolism and thrombophlebitis, obstructive cardiomyopathy or symptomatic aortic stenosis, decompensated heart failure, presence of left main coronary artery lesion, infective endocarditis, acute aortic dissection, decompensated diabetes, any acute infectious condition.

The CRP was limited to the convalescence phase (II) and included control and modification of coronary risk factors, physical training, treatment, and medical-surgical evaluation. Upon entering the program, the patient was first contacted, preferably accompanied by a family member, where the objectives, goals and components were explained, the needs and perspectives of the patient and family were inquired, and supervised mixed group training sessions were held 3 to 5 times a week, with a minimum duration of 6 months. Each session had stretching and warm-up stages, free active exercises and soft resistance and cool down. The aerobic exercise was progressive, moderate at 70% or 80% of the maximum heart rate.

In the initial assessment, the cardiovascular diagnosis, comorbidity, body weight, risk factors, symptomatology, the stress test was reviewed or indicated to determine the functional capacity calculated in metabolic equivalents (MET) according to the criteria of the New York Heart Association (NYHA)<sup>(17)</sup>, and the ergometric variables: exercise time (T. of exercise), maximum heart rate (HRF), systolic blood pressure (SBT), diastolic blood pressure (DBT) and double product (DP), before starting and at the sixth month of the program.

The ergometric test was performed with a treadmill and was extended until the patients reached the predicted maximum heart rate or signs or symptoms appeared that constituted criteria for discontinuation.

Patients were evaluated every month.

A review of the literature on cardiac rehabilitation and gender was carried out to analyze the characteristics and behavior of both variables.

The information on the patients under study was obtained through the Cardiac Rehabilitation consultation, where the pertinent information, clinical and humoral parameters, and ergometric test results were evaluated. An emptying form was prepared and the information was transcribed.

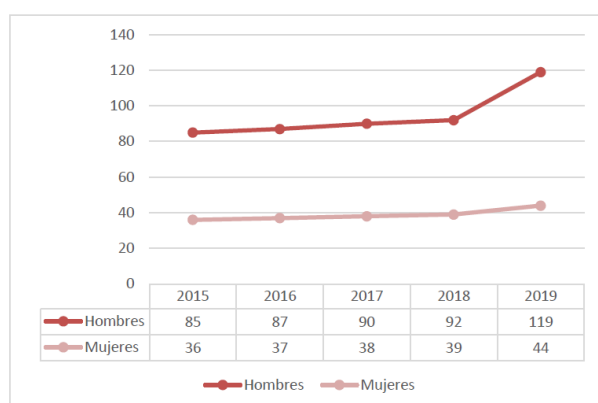
The results are presented in tables and graphs. A contrast statistical analysis was performed to compare the effects of rehabilitation in both genders, at 2 points in time, at the beginning and at 6 months after the program; related samples tests were applied.

Data processing was performed using a database in Microsoft Excel 2013 and using the SPSS version 21.0 statistical package.

### 3. Results

Figure 1 shows the incorporation of patients into the CRP according to gender during each year of the study.

Females accounted for 29% of the total number of new recruits during the study period.



**Figure 1.** Patients enrolled in the CRP by year according to gender

The presence of risk factors at the onset of CRP, expressed as a percentage, is shown in the table. Smoking ranked first (64.6%), followed by dyslipidemia (57.4%). A different risk profile was

observed between the two genders, with obesity being the most prevalent risk factor in females (62.9%) and active smoking in males (78.0%). The rest of the risk factors presented a similar distribution.

**Table 1.** Risk factors according to gender at the beginning of CRP

Risk Factors	Genre				Total	
	Female		Male		No.	%
	No.	%	No.	%		
Arterial hypertension	106	54,6	265	56,0	371	55,6
Obesity and overweight	122	62,9	147	31,1	269	40,3
Smoking	91	46,9	340	78,0	431	64,6
Diabetes mellitus	40	20,6	85	18,0	125	18,7
Dyslipoproteinemia	90	46,4	293	61,9	383	57,4

Table 2 shows the mean values of the ergometric variables at baseline and at 6 months of participation in the program in all patients. There was an upward trend in exercise T, maximum HR and PD in both genders, and a decrease in blood pressure on exercise, more noticeable in the male gender.

**Table 2.** Behavior of ergometric variables according to gender at the beginning and at 6 months of participation in the CRP

Variables ergometric	Genre			
	Female Cardiovascular rehabilitation		Male Cardiovascular rehabilitation	
	Formerly	Then	Formerly	Then
Exercise T.	7,4	7,6	9,1	9,4
Maximum HR	124,8	129,4	130,0	138,4
TAS	147,2	147,0	161,7	158,9
TAD	93,2	92,6	99,0	97,9
DP	18	19	198,4	22
	559,7	198,4	212	243,3
				069,7

Legend: Exercise T: exercise time (determined in minutes), MHR: maximum heart rate (determined in beats per minute), SBP: systolic blood pressure (measured in mmHg), DB: diastolic blood pressure (measured in mmHg), DP: double product (product of maximum systolic blood pressure and MHR).

Females started training with lower functional capacity than male patients (see Table 3); 10.8% of women started in CF I NYHA compared to 48% of men. In the female gender, a greater decrease was observed in CF III NYHA than in the male gender, with CF II NYHA prevailing after CRP.

**Table 3.** Patients according to functional class and gender, before and after participation in the Cardiac Rehabilitation Program

Functional class (NYHA)	Genre							
	Female Cardiovascular rehabilitation				Male Cardiovascular rehabilitation			
	Formerly		Then		Formerly		Then	
	No.	%	No.	%	No.	%	No.	%
I	21	10,8	57	29,4	227	48,0	304	64,3
II	105	54,1	90	46,4	194	41,0	141	29,8
III	69	35,6	47	24,2	52	11,0	28	5,9

#### 4. Discussion

In terms of gender, women have particular traits and needs beyond the physiological and psychological conditions of their sex-related phenotype; there is a specific historical scheme of sociocultural relations that give rise to aspects that undermine the quality of life of women, on which their health depends. Being a man or a woman obeys roles defined by society and they differ in quality, not quantity.

From a gender perspective, there is a marked difference in terms of participation in the PRC; women are underrepresented in all the years studied, behaving in a stable manner in each of them; the same occurs in international research, where the female gender constitutes a small proportion, approximately 30% of the total number of patients in rehabilitation.<sup>(14, 15)</sup>

The number of female patients who are referred to a CRP is much lower than that of male patients. Physicians refer only 32% of females with this indication.<sup>(16)</sup> Of those referred, 36% fewer attend the program, and of those who do attend, 27% fewer complete it.<sup>(16)</sup>

There are predictors of non-referral to the RHC, among the main ones being female sex, accompanied by advanced age, comorbidities, sedentary lifestyle, smoking and depressive symptoms<sup>(18)</sup>, the latter being very frequent in women. This means that being male and young is an important reference point for participation in a CRP.

To the PRC of the General Teaching Hospital "Dr. Agostinho Neto" of Guantánamo, all patients

are automatically and actively sent, regardless of their gender. Agostinho Neto" of Guantánamo are automatically and actively sent all patients who require it regardless of their gender, although in many cases women do not join, or if they do, they do not complete the program, this is due to the multiple roles they assume in the socio-labor, family and home environment, which make it difficult to take care of themselves, to which is added less support and quality of life compared to men, and the appearance of situations such as divorce, retirement, intra-family problems, schedules, death of a partner, and illnesses of their own or of a family member, which force women to place their life and health in the background, with inadequate behaviors, including non-incorporation and poor adherence to the CRP.<sup>(19)</sup>

The average age of the patients included in the study was 55.7 years, middle-aged women. This is in agreement with research where advanced age is considered a barrier to incorporation into the programs<sup>(20)</sup>, together with the fact that ischemic heart disease (the main cause of admission to the PRC of the Hospital General Docente "Agostinho Neto" in both genders) appears later in women, approximately ten years later than in men, and they do not see a doctor until the symptoms are very intense or limiting. They do not go to the doctor until the symptoms are very intense or limiting, since they consider themselves indispensable in household chores and in their role as caregivers, which is why they receive cardiology care later than men. In many cases, advanced age is associated with musculoskeletal limitations and other comorbidities that easily lead to patient absenteeism and abandonment of programs.

The classic cardiovascular risk factors are different in men and women. There are biological principles, female sex hormones protect against heart disease in childbearing age, whereas in menopause there is a decrease in estrogens and the risk increases exponentially.<sup>(16)</sup> Nowadays, women are more sedentary, more smokers and obese, which leads to earlier development of diabetes mellitus (DM), arterial hypertension (AHT), and blood lipid disorders, which

antagonizes the protection that estrogens confer on pre-menopausal women, and promotes the appearance of coronary heart disease and peripheral arterial disease at increasingly younger ages.

In relation to risk factors in general, active smoking appears as the most prevalent, followed by lipid disorders and HT in third place, results that differ in order of frequency from those found by Cuellar Gallardo, et al<sup>(21)</sup> in patients with ischemic heart disease incorporated into a cardiac rehabilitation program, where the most predominant risk factor was HT (73.3%), followed by smoking (43.3%).

In the female gender, the most prevalent risk factor was obesity, which does not coincide with the results obtained by Rivas Pérez, et al<sup>(22)</sup>, where active smoking was the most prevalent, although in their case the female study population was under 50 years of age.

The prevalence of obesity and overweight was not significantly reduced at the end of the program; weight loss of between 0.5 kg and 1.5 kg was observed in only 24.2% of women with this risk factor who joined the CRP. Similar behavior was observed in the study by Prado Díaz, et al<sup>(23)</sup>, where despite the reduction in abdominal circumference in the patients, weight loss was discreet.

It is considered that 25% of cases of cardiovascular disease in female populations are due to excess weight, with each kilogram of weight gained increasing coronary risk by 3%<sup>(24)</sup>, despite physical activity. In the Framingham study<sup>(25)</sup>, obesity increased cardiovascular risk by 64% in women compared to 46% in men.

The prevalence of lipid profile alterations increases in middle-aged women, the age group that prevailed in the study, due to estrogen deprivation that raises cholesterol, triglycerides and lipoproteins, which favors atherogenesis, mainly when associated with other risk factors.<sup>(26)</sup> There was a decrease in traditional lipids in all patients included in the study, achieving normalization of the figures in 91.2%.

Simultaneously with the programmed physical activity, dietary interventions were carried out and pharmacological treatment was used.

Although the presence of smoking is more notable in the male gender, similar to the results obtained in research carried out in Latin American populations<sup>(25)</sup>, a significant percentage (46.9%) of female patients in the study were active smokers. This may be due to the psychosocial stress that daily life imposes on women, the double workday and the responsibility to the people under their care, and they consider it as a means of relaxation and to reduce fatigue. It has been shown that the classic cardiovascular risk factors influence the development of ischemic cardiovascular disease with different intensity in both genders. Smoking increases the risk of ischemic heart disease in women by 60%<sup>(26)</sup>.

At the end of the CRP, smoking cessation was higher in men, about 20% more than in women. Eighty-one percent of smokers and 61.9% of smokers quit smoking, which is consistent with the results obtained in a Cuban population that after receiving smoking cessation treatment achieved greater abstinence in men<sup>(27)</sup> and with data from international surveys<sup>(28)</sup> carried out in four industrialized countries where women were 31% less likely to quit smoking. 100% of patients of both genders controlled their AHT and DM.

Women have lower aerobic capacity compared to men (from 15% to 25% less), lower physical capacity (between 9% and 26% less) and 20% less total strength, to which is added a lower degree of training with a rapid increase in heart rate and greater difficulty in adapting to the rolling mat, which is evident in the initial stress tests where women showed lower functional and exercise capacity and lower levels of physical activity than men, coinciding with the literature consulted.<sup>(26)</sup>

The female population of the study exhibits initial results in terms of exercise duration and PD higher than those found by Moreno Hernandez, et al<sup>(29)</sup>, however, at the conclusion of the CRP, these variables were slightly lower than those reported by

these authors.

In the ergometric evaluation performed after 6 months of programmed physical activity, similar for both genders, improvement was evidenced in all parameters. In all patients there was an increase in exercise time, maximum FC reached, double product and tolerated METS. Results were more evident in men than in women, this is due to the greater sympathetic activity, vascular resistance, and lower cardio-vagal baroreflex sensitivity after exercise in female patients.<sup>(26)</sup> To achieve similar results in both genders, it is necessary to perform an initial exercise prescription in women with lower intensity than in men and more time to increase the loads, in order to facilitate a better adjustment to them.

When comparing patients in CF I NYHA, at 6 months after CRP, there was little difference between the two genders, less than 3 percentage points. At the beginning of CRP in CF III NYHA, there was a predominance of the female gender over the male, which was the same at 6 months, although there was a greater decrease in women (11.4%) compared to men (5.1%).

NYHA CF II prevails in the female gender both at baseline and in the final ergometric evaluation, and decreased by a lower percentage compared to the male gender. Considering the initial physical capacity, the results show benefits in both genders, however, the percentage of women who improved functional capacity was lower than in men, this result does not agree with authors who suggest that in women there is a greater impact on functional class, physical capacity and quality of life.<sup>(30)</sup>

Women who exercise 90 minutes per week have a 30% to 40% lower risk of developing ischemic heart disease associated with an additional 17% reduction for each METS increase in cardiorespiratory fitness<sup>(30)</sup>.

In the 5 years of the study, no patient died of cardiovascular causes and only 3 required admission for non-fatal cardiac events, unstable angina. Two of these patients had not quit smoking, for 1.5%,

demonstrating that RHC significantly improves symptom severity (30% angina), mortality and risk factor control in women, as reported by Asbury, et al.

The reduction in mortality in women who complete a CRP is 76% at 12 years<sup>(32)</sup>, a benefit that, together with the improvement in quality of life, many women are deprived of because they consider that they do enough physical activity at home<sup>(33)</sup>, because of marital or family dysfunction, work overload and/or household responsibilities, depression, deterioration in quality of life and their role as caregivers, which interferes with self-care and generates difficulties in achieving empowerment.<sup>(33)</sup> When women achieve empowerment, there is a positive change in heart-healthy lifestyles and health care, both in themselves and in those around them.<sup>(34)</sup>

From a gender perspective, there is a clear need for the RHC team to set objectives to achieve equity in the approach of the PRC.

The following is a strategy to improve women's participation and adherence to the PRC at the "Dr. Agostinho Neto" General Teaching Hospital in Guantánamo:<sup>(35, 36)</sup>

- Automatically send women to the PRC.
- To promote patients' knowledge about the disease, risk factors, prevention and treatment.
- Explain the content of the program (objectives, goals and components) in a way that is easily understood by patients and families.
- Identify personal difficulties and motivations for joining the PRC.
- Emphasize education and motivation towards meeting goals.
- Promote a bidirectional doctor-patient relationship (health team-patient and family members).
- Actively involve the family and have them

participate in the programmed activities.

- Perform personalized intervention.
- Detect patients who motivate the group.
- To promote communication between patients.
- Flexibility in the hours of attendance at the gym.
- Improve autonomy, self-confidence, self-control and self-care to achieve empowerment.
- Create female groups in joint training sessions by adjusting the intensity of the loads depending on their requirements.

Approaching RHC from a gender perspective is an essential tool for understanding and contextualizing it, as it contributes to changing established structures and increases women's active participation in decision-making regarding their health.

The limitations of this study include the fact that it was carried out in a single health care center, with limited follow-up time.

## 5. Conclusions

Women face major barriers to incorporation into CRPs, ranging from excessive household and work responsibilities, lack of family and social support, underestimation of the risk of cardiovascular disease by health personnel, to lack of knowledge of risk factors and personal risk. They are experts in caring for others and not in caring for themselves, so it is essential to provide them with information on cardiovascular disease, how to prevent, recognize and treat it, discover their needs and preferences, motivate them to change, explain the benefits of RHC, and improve access to and permanence in the program, as a means of achieving their goals in order to achieve full empowerment through equity.

Incorporating a gender approach to cardiac re-

habilitation increases the effectiveness of the intervention, and contributes to more equitable care for women with cardiovascular disease.

## References

1. Townsend N, Wilson L, Bhatnagar P, Wickramasinghe K, Rayner M, Nichols M. Cardiovascular disease in Europe 2016: an epidemiological update. *Eur Heart J* 2016; 37(42):3232–45.
2. Directorate of Medical Records and Health Statistics. Anuario Estadístico de Salud 2018. Havana: Ministry of Public Health; 2019. [cited 5 Jan 2021]. Available from: <https://files.sld.cu/bvscuba/files/2019/04/Anuario-Electr%C3%B3nico-Espa%C3%B1ol-2018-ed-2019-compressed.pdf>.
3. Martínez CM. Differences between men and women in the incidence of heart disease [Internet]. Madrid: 2017. Chapter 73. Cardiovascular health [cited 5 Jan 2021]; p:637–642. Available from: [https://www.fbbva.es/microsites/salud\\_cardio/mult/fbbva\\_libroCorazon\\_cap73.pdf](https://www.fbbva.es/microsites/salud_cardio/mult/fbbva_libroCorazon_cap73.pdf).
4. United Nations Children's Fund. Communication, childhood and adolescence: Guidelines for journalists. 1ed. CODAJIC; 2017 May [cited 5 Jan 2021]. Available from: <http://www.codajic.org/node/2612>
5. Esquenazi Borrego A, Rosales Vázquez S, Velarde Hernández Y. Gender Inequality Index in Cuba: a territorial approach. *Rev Est Desor Soc: Cuba and Latin America* [Internet]. 2017 May-Aug [cited 5 Jan 2021]; 5(2):108–129. Available from: [http://scielo.sld.cu/pdf/reds/v5n2/reds1121\\_7.pdf](http://scielo.sld.cu/pdf/reds/v5n2/reds1121_7.pdf).
6. Perelman J, Fernandes A, Mateus C. Gender Disparities in Health and Healthcare: Results from the Portuguese National Health Interview Survey. *Cuad Saúde Púb* [Internet]. 2017 [cited 10 Jan 2021]; 28(12). Available from: [http://www.scielosp.org/scielo.php?script=sci\\_arttext&pid=S0102-311X2012002001400012](http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0102-311X2012002001400012).
7. Campos-Serna J, Ronda-Pérez E, Lucía Artazcoz L, Benavides FG. Gender inequalities in occupational health in Spain. *Gac Sanit* [Internet]. 2017 [cited 10 Jan 2021]; 26(4). Available from: [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S0213-91112012000400009&lang=pt](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0213-91112012000400009&lang=pt)
8. Maffei S, Guiducci L, Cugusi L, Cadeddu C, Deidda M, Gallina S, et al. Women-specific predictors of cardiovascular disease risk new paradigms. *Int J Cardiol*. 2019; 286:1907.
9. Lee JJ, Cook-Wiens G, Johnson BD, Braunstein GD, Berga SL, Stanczyk FZ, et al. Age at menarche and risk of cardiovascular disease outcomes: findings from the National Heart Lung and Blood Institute-sponsored Women's Ischemia Syndrome Evaluation. *J Am Heart Assoc* [Internet]. 2019 [cited 10 Jan 2021]; 8(12):e012406. Available from: <https://www.ahajournals.org/doi/10.1161/JAHA.119.012406>.

10. Aggarwal NR, Patel HN, Mehta LS, Sanghani RM, Lundberg GP, Lewis SP, et al. Sex differences in ischemic heart disease: Advances, obstacles, and next steps. *Circ Cardiovasc* [Internet]. 2018 [cited 10 Jan 2021]; 11(2):e004437. Available from: <https://www.ahajournals.org/doi/10.1161/CIRCOUTCOMES.117.004437>.
11. Supervía M, Medina-Inijosa JR, Yeung C, López Jimenez F, Squires R W, Pérez Terzic C, et al. Cardiac rehabilitation for women: A systematic review of barriers and solutions. *Mayo Clin Proc* [Internet]. 2017 Apr [cited 10 Jan 2021]; 92(4):565–577. DOI:<https://doi.org/10.1016/j.mayocp.2017.01.002>
12. Argentine Society of Cardiology. Argentine Consensus on Cardiovascular Rehabilitation. *Rev Arg Cardiol* [Internet]. 2019 [cited 10 Jan 2021]; 87(3):58. Available from: <https://www.sac.org.ar/wp-content/uploads/2019/08/consenso-87-3.pdf>.
13. Sabo D. Understanding men's health. A relational and gender-sensitive approach. Harvard: PAHO; 2000 [cited 19 Jan 2021]. Available from: <https://iris.paho.org/handle/10665.2/804>
14. Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, Johnson MN, et al. Acute Myocardial Infarction in Women: a scientific statement from the American Heart Association. *Circulation* [Internet]. 2016 [cited 19 Jan 2021]; 133(9):916–47. Available from: <https://www.ahajournals.org/doi/10.1161/CIR.000000000000000351>
15. Anderson L, Thompson DR, Oldridge N, Zwisler AD, Rees K, Martin N, et al. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev* [Internet]. 2016 Jan [cited 11 Jan 2022]; 2016(1):CD001800. DOI:<https://doi.org/10.1002/14651858.CD001800.pub3>
16. Garcia M, Mulvagh SL, Bairey Merz CN, Buring JE, Manson JE. Cardiovascular Disease in Women Clinical Perspectives. Review. *Circ Res* [Internet]. 2016 [cited 11 Jan 2022]; 118:1273–93. DOI: <http://dx.doi.org/10.1161/CIRCRESAHA.116.307547>
17. Yancy CW, Jessup M, Bozkurt B, Butler J, Donald E, et al. "2013 ACCF/AHA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines" *Circulation* [Internet]. 2013 Oct 15 [cited 11 Jan 2022]; 62(16):e147–239. DOI:<https://doi.org/10.1016/j.jacc.2013.05.019>
18. Molina DI, Chacón JA, Esparza AS, Botero SM. Depression and cardiovascular risk in women. *Rev Colomb Cardiol* [Internet]. 2016 May-Jun [cited 11 Jan 2022]; 23(3):159–252. DOI: <http://dx.doi.org/10.1016/j.rccar.2015.11.004>
19. Gaalema DE, Savage PD, Jason R, Cutler AY, Elliott RJ, Priest JS, et al. Patient Characteristics predictive of Cardiac Rehabilitation Adherence. *J Cardiopulm Reh Prev* [Internet]. 2017 Mar [cited 11 Jan 2022]; 37(2):103–10. Available from: <https://pubmed.ncbi.nlm.nih.gov/28033166/>
20. Warburton DE, Bredin SS. Reflections on physical activity and health: what should we recommend? *Can J Cardiol*. 2016; 32:495–504.
21. Cuellar Gallardo A, Gómez García Y, CastroTorres Y, Triana Díaz A, et al. Cardiovascular rehabilitation in patients with ST-segment elevation acute myocardial infarction and percutaneous coronary intervention. *CorSalud* [Internet]. 2019 [cited 11 Jan 2022]; 11(4):278–286. Available from: <http://www.revcor-salud.sld.cu/index.php/cors/article/view/387/1057>.
22. Rivas Pérez, A, Vélez Salas, A, Dalmau González-Gallarza R, Castro Conde, A and López Sendón JL. Cardiac rehabilitation in young women: Does it adapt to their needs? *Rev Esp Cardiol*. 2017; 70(Suppl 1):271.
23. Prado Díaz S del, Montoro López M, Dalmau González-Gallarza R, Castro Conde A, et al. Benefits of cardiac rehabilitation in women after acute coronary syndrome. *Rev Esp Cardiol* [Internet]. 2015 [cited 11 Jan 2022]; 68 (Suppl 1):1119. Available from: <https://www.revvespcardiol.org/es-congresos-sec-2015-el-congreso-19-sesion-rehabilitacion-1652-beneficios-rehabilitacion-cardiaca-mujeres-despues-18935-pdf>.
24. Piché ME, Poirier P, Lemieux I, Deprés JP. Overview of epidemiology and contribution of obesity and body fat distribution to cardiovascular disease: an update. *Prog Cardiovasc Dis*. 2018; 61:103–113. 2017.
25. Lee JJ, Pedley A, Hoffman U, Massaro JM, Levy D, Long MT. Visceral and intrahepatic fat are associated with cardiometabolic risk factors above other ectopic fat depots: the Framingham Heart Study. *Am J Med* [Internet]. 2018 [cited 11 Jan 2022]; 131:684–692. e12. DOI:<https://doi.org/10.1016/j.amjmed.2018.02.002>
26. Quiros Fallas R. Update on cardiovascular risk factors. *Rev Méd Sinergia* [Internet]. 2017 Jan [cited 11 Jan 2022]; 2(1):3–7. Available from: <https://revistamedicasinergia.com/index.php/rms/article/view/57>
27. Puentes Valle D, Rodríguez Pérez LA, Pupo Ávila NL, Sit Pacheco R. The multicomponent group treatment: an effective method against smoking. *Rev Cubana Salud Púb* [Internet]. 2019 [cited 11 Jan 2022]; 42(2):e1288. Available from: <http://scielo.sld.cu/pdf/rcsp/v45n2/1561-3127-rcsp-45-02-e1288.pdf>.
28. Smith PH, Kasza KA, Hyland A, et al. Gender differences in medication use and cigarette smoking cessation: results from the international Tobacco control four country. *Nicotine tob res Off. J Soc Res Nicotine Tob*. 2015; 17(4):463–472.
29. Moreno Hernández M, Gonzalvo Ortega M, Olague Baño C, de la Cierva Delicado A, López Cubero T, et al. Effect of cardiac rehabilitation on improving exercise capacity. *Rev Clin Esp*. 2018; 218: 905.
30. Santiago de Araújo Pio C, Marzolini S, Pakosh M,



- Grace SL. Effect of Cardiac Rehabilitation Dose on Mortality and Morbidity: A Systematic Review and Meta-regression Analysis. *Mayo Clin Proc.* 2017; 92(11):1644–1659.
31. Asbury EA, Slattery C, Grant A, Evans L, Barbir M, and Collins P. Cardiac rehabilitation for the treatment of women with chest pain and normal coronary arteries. *Menopause.* 2008; 15(3):454–460.
  32. Darren ER, Warburton DE, Bredin SS. Reflections on physical activity and health: what should we recommend? *Can J Cardiol [Internet].* 2016 [cited 11 Jan 2022]; 32(4):495–504. DOI:<https://doi.org/10.1016/j.cjca.2016.01.024>
  33. Sanchez-Delgado JC, Betty LM, Angarita Fonseca A, et al. Reliability of the barriers scale for cardiac rehabilitation. *Rev Colom Cardiol.* 2018; 25(1):84–91.
  34. Ros Sanchez T, Lindon Cerezuela B. The experience of empowerment in women over 65 years old. A qualitative study. *Gerokomos.* 2018; 29(1):3–8.
  35. National Ministry of Health. Manual for the care of people with chronic noncommunicable diseases: comprehensive management at the first level of care. Geneva: WHO; 2017.
  36. Anchique CV, Fernández RO, Zeballos C. Cardiovascular rehabilitation in women. *Rev Colom Cardiol.* 2018; 25(S1):99–105.