DOI: https://doi.org/10.17921/2447-8938.2022v24n4p260-264

Risk of Coronary Heart Disease in Middle-Aged Women Practitioners and Non-Practitioners of Resistance Training

Risco de Coronariopatias em Mulheres de Meia Idade Praticantes e não Praticantes de Treinamento Resistido

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Abstract

Coronary heart diseases are among the leading causes of mortality in middle-aged women. In this sense, resistance training (RT) has been gaining prominence for promoting important adaptations for health. The present study aimed to determine the risk factor for the development of coronary heart disease in middle-aged women who practice and do not practice RT. For this purpose, fifty women aged between 40-55 years (47 ± 7 years) participated in this experiment and were divided according to their usual practice of physical activity. Twenty-five participants were RT practitioners (GTR), while another 25 women, not physically active, were used as controls (CON). The questionnaire called "Coronary Disease Risk Profile" was applied to determine the risk of coronary heart disease. The total score for risk of coronary heart disease was lower in the GTR compared to the CON (11.8 ± 2.9 vs. 20.1 ± 4.4). In the dichotomous risk analysis, 77.4% of the participants in the RTG were at low risk, while only 22.6% in the CON were at low risk. There was an association between RT and risk for coronary artery disease, and the odds ratio was 0.02 (95% CI 0.002 – 0.144). The results observed in the present study suggest that the practice of RT reduces the risk of developing coronary heart disease in middle-aged women.

Keywords: Exercise. Health. Noncommunicable Diseases.

Resumo

As coronariopatias estão entre as principais causas de mortalidade em mulheres de meia idade. Nesse sentido, a prática do treinamento resistido (TR) vem ganhando destaque por promover adaptações importantes para a saúde. O objetivo do presente estudo foi determinar o fator de risco para o desenvolvimento de coronariopatias em mulheres de meia idade praticantes e não praticantes de TR. Para tanto, cinquenta mulheres na faixa etária entre 40-55 anos (47 ± 7 anos) participaram desse experimento, e foram divididas de acordo com sua prática habitual de atividade física. Vinte e cinco participantes eram praticantes de TR (GTR), enquanto outras 25 mulheres, não ativas fisicamente, foram utilizadas como controle (CON). Para determinar o risco de coronariopatias foi aplicado o questionário denominado "Perfil de Risco de Coronariopatia". O escore total de pontuação para o risco de coronariopatias foi menor no GTR em comparação ao CON (11,8 ± 2,9 vs. 20.1 ± 4.4). Na análise dicotômica de risco, 77,4% das participantes do GTR apresentaram baixo risco enquanto somente 22,6% do CON apresentaram baixo risco. Foi observada associação entre o TR e o risco para coronariopatia, e a razão de chance foi de 0,02 (95% IC 0,002 – 0,144). Os resultados observados no presente trabalho sugerem que a prática de TR reduz o risco para desenvolvimento de coronariopatias em mulheres de meia idade.

Palavras-chave: *Exercício Físico. Saúde. Doenças não Transmissíveis.*

1 Introduction

Coronary diseases are among the most prevalent diseases in the population, being one of the main causes of mortality due to cardiovascular diseases [1]. In this sense, pharmacological and non-pharmacological strategies are used to prevent and treat coronary heart disease. Among the main non-pharmacological strategies used to prevent and mitigate the prevalence of coronary heart disease, exercise has been recommended[2].

Among the different modalities of physical exercise, regular practice of resistance training (RT) has been gaining prominence because it promotes important adaptations for health[3,4], including improvement in cardiorespiratory fitness of adults with coronary diseases[5,6]. In addition, studies indicate that regular practice of RT has a positive effect on health indicators that are related to coronary diseases, such as lowering blood pressure[7], improvement in lipid profile[8], reduction of glycemia[8], reduction of risk for metabolic syndrome[9], improvement of inflammatory profile and oxidative stress[10].

Nevertheless, high levels of muscle strength are also associated with improved survival prognosis and functional performance[11-13], and the improvement of physical function in patients with coronary disease by improving cardiorespiratory fitness and muscle strength is necessary to improve the performance of daily activities[14,15].

In this sense, it is plausible to speculate that the improvement of muscle strength by the addition of RT allows

practitioners to have a lower risk for the development of coronary heart diseases. Previous studies indicate that RT is a conduct that promotes improvement in health indicators in individuals with coronary diseases[5, 16-20]. However, most studies were conducted with young adult and elderly men, so middle-aged women are less represented in the scientific literature[5]. Thus, the present study aimed to determine the risk factor for the development of coronary heart disease in middle-aged women who practice and do not practice RT.

2 Material and Methods

2.1 participants

Fifty women from the cities of Andradina – SP and Mirandópolis – SP were selected to participate in this experiment. The participants were aged between 40-55 years (47 ± 7 years), and were divided according to their usual practice of RT. Twenty-five participants were practitioners of RT (GRT) with a minimum frequency of two weekly sessions, for at least one year. Whereas another 25 women did not perform RT for at least one year prior to the study, and were used as control (CON).

All the participants completed a questionnaire to verify the health history. After receiving information about the purpose and procedures of the study, all of them selected signed a Free and Informed Consent Form, emphasizing that this study was submitted for analysis and approved by the Committee of Ethics in Local Research, in accordance with the norms of Resolution number 466/2012, of the National Health Council, on research involving human beings.

2.2 Risk of coronary diseases

To determine the risk of coronary heart disease, the questionnaire "Profile Risk of Coronary Heart Disease was applied". The structure of the questionnaire used is to identify the aspects of the profile of the investigated population (age, heredity, weight, smoking, exercise, cholesterol or percentage of fat, blood pressure, sex), and at the end of the survey of all information related to risk factors, the sum of the risk factors of coronary artery disease is performed. The sum of risk factors starts with a minimum score of 6-11 (risk below average) up to a maximum of 41-62 (urgent danger). From the sum of the risk factors scores, the questionnaire offers six categories, namely: Category 1: 6-11 points = risk below average; Category 2: 12-17 points = risk below average; Category 3: 18-24 points = medium usual risk ; Category 4: 25-35 points = mild risk ; Category 5: 36-40 points = dangerous risk ; Category 6: 41-62 points = urgent danger. Additionally, a dichotomous analysis was performed grouping categories 1 and 2 as low risk, and the other categories as high risk.

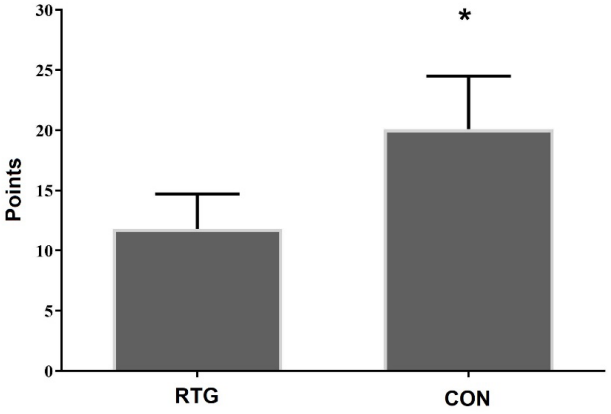
2.3 Statistical analysis

The Shapiro-Wilk test was used to verify the data distribution. The Mann-Whitney test was used to compare score scores for the risk of coronary heart diseases. The chi square test was performed to compare the proportion of individuals in the different risk strata for the development of coronary heart diseases. For all analyzes, the statistical significance was *set* at $P < 0.05$. The data were analyzed using the statistical *software* SPSS version 20.0.

3 Results and Discussion

The mean age for the GTR and CONT groups was 48 ± 5 years and 46 ± 8 years, respectively, with no statistically significant difference between the groups. Figure 1 shows the total score for risk of coronary heart disease according to the group. The total score was lower ($P < 0.05$) in the GTR group compared to the CON control group (11.8 ± 2.9 vs. 20.1 ± 4.4).

Figure 1 – Risk of coronary heart diseases according to the group. RTG = Resistance training group. CON = Control group. * $P < 0.05$ vs. RTG



Source: Resource data.

In the analysis of relative frequencies, significant differences were observed ($P < 0.05$) between the groups (Table 1). In category one, 92.9% of the participants were GTR. For category two, 64.7% of GTR were observed. For category three, the GTR presented 7.1% of the participants. In category four, 100% of the participants were CON. No participant was classified in categories five and six.

Table 1 – Distribution of risk of coronary heart diseases according to the group.

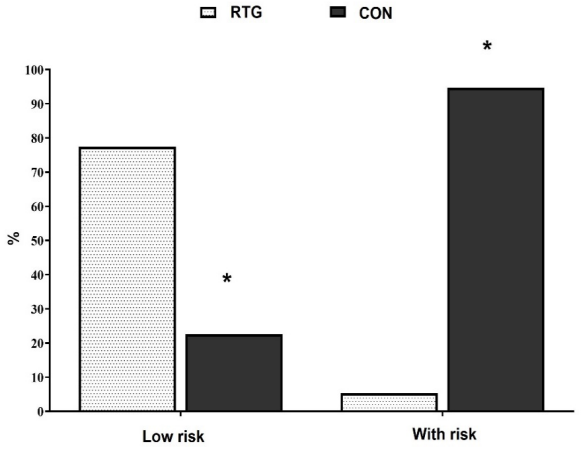
Risk	CON	GTR
	% (n)	% (n)
Way below the mean	7.1 (1)	92.9 (13)*
Below the mean	35.3 (6)	64.7 (11)*
Usual medium	92.9 (13)	7.1 (1)*
Mild	100 (5)	0 (0)
Dangerous	0 (0)	0 (0)
Urgent danger	0 (0)	0 (0)

Note: * $P < 0.05$ vs. CON.
Source: Resource data.

Figure 2 presents the dichotomous analysis between low risk and with risk according to the group. In the dichotomous analysis, 31 participants were at low risk, 77.4% of the

participants in the GTR while only 22.6% of the CON presented low risk. There was an association between RT and risk for coronary artery disease, and the odds ratio was 0.02 (95% CI 0.002 – 0.144).

Figure 2 – Risk of coronary heart diseases according to the group. RTG = Resistance training group. CON = Control group. * $P < 0.05$ vs. RTG



Source: Resource data.

The present study aimed to determine the risk factor for the development of coronary heart disease in middle-aged women who practice and do not practice RT. Our hypothesis was that middle-aged women practicing RT would present a lower risk for the development of coronary heart disease. This hypothesis was based on the positive impact that the RT has on the risk factors for the development of heart disease. The hypothesis was confirmed since the group of women practicing RT presented a lower risk for the development of coronary heart diseases compared to non-practitioners of RT.

The mechanism by which regular practice of RT reduces the risk for coronary heart disease development may be associated with the fact that RT promotes improvement in functional, morphological and metabolic parameters, which have a close relationship with cardiovascular diseases, such as, for example, improvement in cardiorespiratory fitness[5,6,16,19,22], reduction in the risk of type two diabetes[23], reduction in blood pressure[24], improvement in lipid profile[8.25], reduction in body fat[26], improvement in inflammatory profile and oxidative stress[9,25,27]. Therefore, reducing the chances of coronary disease involvement.

In addition, RT promotes increased muscle strength, and neuromuscular fitness is a key component of physical fitness for health maintenance, since reduced levels of strength and muscle mass are associated with increased likelihood of adverse outcomes, including cardiovascular diseases, diabetes mellitus, respiratory disease[28], metabolic syndrome[29], inflammatory profile[25], oxidative stress[25], physical disability[30,31]. Specifically after cardiac events, strength is important for daily activities, increase in gait speed[11,32]. Therefore, the improvement of physical function in patients with coronary disease by improving muscle strength is necessary to improve the performance of daily activities[14,15]. Thus, considering that RT is a modality of physical exercise that promotes a great increase in muscle strength levels, therefore, the improvement of muscle strength by the addition of RT promotes improvement in factors that are associated with the development of coronary diseases.

Previous studies have indicated that the practice of RT reduces the risk of coronary disease[33] and promotes improvement of cardiorespiratory fitness in individuals with coronary diseases[5,16-20]. One study reported a 23% reduction in mortality risk in men who perform 30 min of RT per week[33]. A 19% reduction in mortality is also observed in older adults who reported participating in RT at least twice in week [34]. In addition to the efficacy of RT in reducing the chances of developing cardiovascular diseases, evidence also suggests that RT is safe for patients with cardiovascular diseases[5,35,36].

The present study has some limitations. The information is based on an observational experiment, limiting the determination of causality. Also, the number of participants can be considered low, and the results should not be generalized to other populations such as men, elderly people and practitioners of other modalities of physical exercise. On the other hand, our findings highlight the importance of including RT in physical exercise programs and guidelines for prevention and rehabilitation of cardiac events[37.38].

4 Conclusion

The results observed in the present study suggest that the practice of RT reduces the risk of developing coronary heart disease in middle-aged women These findings reinforce the importance of RT for health promotion in middle-aged women, and that RT be integrated into physical exercise programs for health maintenance and/or improvement, especially providing protection against the development of coronary heart diseases.

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