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Is physical training important for women with polycystic ovary syndrome?

Abstract

Polycystic Ovary Syndrome (PCOS) is an endocrine disorder 5 to 16% present in of women of reproductive age, which can suffer alterations in reproductive, cardiometabolic, hormonal and cardiovascular functions that can culminate in the development of other diseases. One of the treatments consists of improving life habits like physical exercise practice. Systematic reviews and studies in recent years have pointed out that the training protocols performed on women with PCOS were mostly conducted without control, randomization and personalization for this disease. Thus, the present study aims to investigate Pubmed database on the last year (between 05/31/2019 and 05/31/2020) if there are recent publications of randomized controlled trials (RCTs) that investigate the effects of physical training in women with PCOS.

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Introduction

Polycystic ovary syndrome (PCOS) is an endocrine disorder present in 5 to 16% of reproductive age women, depending on the region and ethnicity.[1] According to the Rotterdam Consensus criteria, PCOS is diagnosed in the presence of at least two of the three factors:

A. A. Clinical or biochemical hyperandrogenism.

B. B. Oligomenorrhea or amenorrhea and

C. C. Polycystic ovary.[2]

PCOS women can present important changes in reproductive function, metabolic, anthropometric, hormonal and cardiovascular parameters, which can be mediated by different mechanisms.[2–4] In general, hyperandrogenism and high levels of insulin have been considered key factors in triggering most of these changes.[5] In a system with maintenance of a feedback cycle, these hormones may experience elevated levels due to the increase in central fat and obesity, just as the reverse can also occur, as well as the positive interaction between them.[2,6–8] Additionally, PCOS when associated with obesity presents an even more complex scenario, increasing the risk factors for the clinical and biochemical disease manifestations.[9]

In general, women with PCOS are more likely to develop metabolic syndrome, which is associated with obesity.[10] Lifestyle changes have been described as primordial measures for prevention and treatment.[11] In addition to changes in food habits, another conduct has been the physical exercise systematization.[4] For this, some care must be taken into account, since there are reports that different aspects appear as a barrier to its practice in PCOS women, such as increased levels of anxiety, depression and low self-esteem in relation to body image.[12] Thus, individual sessions or small groups in private facilities have been recommended, the explanation of the real benefit of physical training to improve mental, physical and general well-being, and especially the use of tests to assess individual physical fitness, aiming to define the best intensity, training volume and type of training, which are extremely relevant.[12,13]

According to Stepto et al.[14] Until May 2019, there was low evidence from high quality randomized controlled clinical trials (RCTs) on the recommendation of physical exercise in women with PCOS, with general population management being adopted. This present review study aims to identify RCT involving physical training performed in the last year and to assess its main effects on PCOS.

Methods

This study is a systematic review carried out at PubMed between 05/31/2019 and 05/31/2020, using the terms "polycystic ovary" AND exercise. For the study selection, the following criteria were adopted: being a registered RCT with already published results, which evaluated the exclusive chronic effect of physical training on PCOS and with basic information for physical training prescription: intensity, frequency and duration. These variables are recommended by the physical training protocols and are well described by the American College of Sports Medicine.[13]

Results

In the search realized with the terms "polycystic ovary" and exercise, a total of 53 studies were identified. Of these, three articles were selected, containing the clinical record, description of the physical training protocol and its main outcomes and results, which are available in Table 1. All studies are linked to the International Standard Randomized Controlled Trial Registry (ISRCTN10416750). Additionally, articles were found that described RCT protocols in progress, but do not yet have published articles, under the records (Clinical trial gov NCT02419482) and (Clinical trial gov NCT3678714).

Table 1 Physical training effects on PCOS women

Study	Sample	Protocol	Results
			- CG: No significant diferences found when compared with baseline scores.
	3 groups:		
	CG without PCOS (30);	- Secondary Study	- CAT: ↑ Physical Functioning; ↑ Physical Role Functioning; ↑ General Health
Ribeiro et al.,[16]	CAT (28);	- Aerobic (60-90% max.HR), 40 to	Perception; ↑ Vitality; ↑ Social Role Functioning and ↑ Mental Health.
	IAT (29).	60 minutes, 3 times per week	
	Age: 18-39 years	- Main outcome: Quality of life	- IAT: ↑ Physical Functioning; ↑ Physical Role Functioning; ↑ General Health
	BMI: 18-39,9 Kg/m^2		Perception; ↑ Vitality; ↑ Social Role Functioning; ↑ Emotional Role Functioning
			and ↑Mental Health The dis (satisfaction).
	3 groups:		- CG: No significant diferences found when compared with baseline.
	CG without PCOS (30);	- Secondary Study	
Kogure et al.,[15]	CAT (28);	- Aerobic (60-90% max.HR), 40 to	- CAT: The dis (satisfaction) grade improved after exercise
	IAT (29).	60 minutes, 3 times per week	
	Age: 18-39 years		- IAT: The dis (satisfaction) grade improved after exercise
	BMI: 18-39,9 Kg/m^2		
	3 groups:	- Aerobic (60-90% max.HR), 40 to	- CG: ↓ TC; ↑ WC; ↑ arm fat (TM); ↑ trunk fat (%);↑ leg fat (%); body fat (%) and
	CG without PCOS (30);	60 minutes, 3 times per week	↑ total gynoid (TM.
Ribeiro et al.,[4]	CAT (28);	- Main outcome: Metabolic and	
	IAT (29).	endocrine parameters; anthropometric	- CAT: ↓ testosterone; ↓ TC; ↓ LDL-C; ↓ WC; ↓ HC.
	Age: 18-39 years	índices and body composition.	
	BMI: 18-39,9 Kg/m^2		- IAT: ↓ testosterone; ↓ FAI; ↓ WC; ↓ WHR.

Discussion

This review identified publications related to the registered RCT code ISRCTN10416750. In previous publications,[4,15,16] it was demonstrated through a protocol of continuous aerobic physical training (CAT) and intermittent aerobic training (IAT), that both were able to promote improvement in quality of life and reduction of dissatisfaction with body image. In addition to the reduction of hyperandrogenism, anthropometric indices and lipid levels, in this case, exclusively for the CAT group. In addition, it was identified that the control group (CG), which did not perform physical training, obtained body fat gain after the observation period.

The findings reinforce the importance of changing lifestyle and, above all, performing aerobic physical training as a way to assist in the treatment of PCOS women.[4,15,16] Woodward, Klonizakis and Broom,[12] suggested that this care may allow greater adherence by PCOS women that may have higher anxiety levels and problems related to body image. The increase in adherence consequently allows biological, psychological and social effects induced by physical training to reduce depression and improve the quality of life of these women.[4,12,17]

The study also points to a benefit regarding the central fat reduction, indicated by anthropometric and hyperandrogenism index.[4] Previous investigations have demonstrated the negative effects of hyperandrogenism and the central fat increasing in PCOS, indicating that they can interfere with hyperinsulinemia, which through a feedback, can increase central fat and hyperandrogenism, favoring the early development of insulin resistance and diabetes, in addition to other diseases such as metabolic syndrome.[2,6–8] On the RCT realized by Ribeiro et al.,[4] the group was heterogeneous (BMI between 18 and 39.9kg/m^2), making it difficult to identify possible changes in hyperinsulinemia. Although insulin levels have been described in thin

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women with PCOS, in general, the changes are more pronounced in obese women.[18]

A positive point of the founded RCT results consider the importance of the progression of physical training, as recommended by ACSM (2014).[13] The intensity and duration were lower at the beginning of the protocol, both in the CAT and IAT groups, and they increased as the training weeks progressed, as published in figure 2 of Ribeiro et al.[4] This allows a body adjustment to the training, avoiding undue overloads. On the other hand, an imitation of this RCT was regarding the division of groups. It is important that new RCTs involving physical training be realized with a sample number that allows a detailed assessment of both women with BMI or fat percentage considered thin, as well as overweight and obese women level I, II and III.

Conclusion

In view of these findings, it is possible to conclude that there is clear evidence that aerobic physical training promotes improvement in quality of life, reduces body image dissatisfaction, and improves anthropometric index and biochemical parameters by reducing hyperandrogenism. In addition, in particular, the proposed protocol of continuous aerobic physical training was also able to improve lipid levels.

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Conflicts of interest

The authors declare no conflict of interest.

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