EFFECT OF AEROBIC EXERCISE ON QUALITY OF LIFE AND HORMONE IN WOMEN WITH POLYCYSTIC OVARY SYNDROME: A NARRATIVE REVIEW

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Abstract- **Hyperandrogenism and persistent anovulation are the hallmarks of the diverse condition known as polycystic ovarian syndrome (PCOS). Menstrual cycle disruption, hirsutism, acne, obesity, and psychological problems are among the signs and symptoms of PCOS. Type II diabetes mellitus, dyslipidaemia, hypertension, cardiovascular disease, and endometrial cancer are potential late consequences of PCOS. Rotterdam criteria are used in the diagnosis of PCOS Numerous effective pharmacological and non-pharmacological treatments for PCOS are currently available. Additionally, there are surgical options like bariatric surgery and laparoscopic ovarian drilling. Aerobic exercise is beneficial strategy to improve quality of life and endocrine parameter in women with PCOS. In PCOS, aerobic exercise is recommended for reducing weight and improving quality of life and endocrine parameter. Objective: To find out the effect of aerobic exercise on quality of life and endocrine parameter in women with PCOS. Study selection: This narrative review is conducted on databases from Pub med, Google scholar and ResearchGate. This review included 8 studies on the effect of aerobic exercise on quality of life and endocrine parameter in women with PCOS. Conclusion: it is concluded that aerobic exercise training effective in improving quality of life and endocrine parameter in women with PCOS. But some studies show some limitations. so further studies of higher methodological quality are needed to determine the optimal type of exercise, optimal dosage and timing.**

Keywords: **Aerobic exercise, quality of life, endocrine parameter, PCOS.**

Introduction

Chronic anovulation and hyperandrogenism are two of the diverse symptoms of PCOS, or polycystic ovarian syndrome.[1] The most common reproductive condition, polycystic ovarian syndrome (PCOS), affects women's health significantly, decreases quality of life, and raising morbidity.[2] Based on the diagnostic standards, between 6% and 20% of women in their reproductive years are impacted[1]. Menstrual cycle irregularities, hirsutism, acne, obesity, and psychological problems are the signs and symptoms of PCOS. Type-II diabetes mellitus, dyslipidemia, hypertension, cardiovascular disease, and endometrial cancer are potential late consequences of PCOS. Psychological health is directly impacted by PCOS symptoms. Rotterdam criteria are used in the diagnosis of PCOS and PCOS is diagnosed when two out of the three criteria are satisfied: 1.) clinical or biochemical signs of hyperandrogenism; 2.) oligo-ovulation or anovulation (i.e., irregular menstrual cycles); and 3.) polycystic ovaries on ultrasonography, once the necessary tests have been carried out to rule out other potential sources of excess androgen production and monthly disorders.[3]There exist numerous efficacious pharmaceutical and non-pharmacological interventions for PCOS. For women with PCOS, combined oral contraceptive pills (COCPs) are advised as the first line of medical treatment for controlling hyperandrogenism and menstrual cycle regulation. PCOS is characterised by metabolic abnormalities that include insulin resistance and hyperinsulinemia. As a result, insulin-sensitizing medications, particularly metformin, have been employed as a therapeutic alternative. Additionally, there are surgical options like bariatric surgery and laparoscopic ovarian drilling.[4] For obese women with PCOS, a lifestyle change is seen to be the most effective non-pharmacological treatment. Increased social engagement and physical activity both promote bio-psychophysical well-being and quality of life. Resistance training raises basal metabolism, enhances lean mass, enhances insulin sensitivity, lowers cholesterol, lowers blood pressure, and improves glucose metabolism.[5] Patients with PCOS may benefit from aerobic exercise if it is started early in the course of the illness. Weight loss by exercise and diet control improves pregnancy rates and normalizes hyperandrogenaemia in women with PCOS and obesity. Weight loss by diet and exercise is a key goal in

lifestyle modification programs that can improve reproductive function in obese women with PCOS.[6] Aerobic activity enhances the quality of life for PCOS-affected women.[7]

Methods

Studies are searched from the following search engines PubMed and Google Scholar to review the literature. Studies include quality of life, hormones, and aerobic exercise. Keywords used to search studies are aerobic exercise, quality of life, hormones, and PCOS.

Authors, Journal, Year	Objectives	Design & characteristics of participants sample size	Material and Methods	Outcomes Measures	Results
Kumara et al.2022[8]	To determine the effectiveness of aerobic training on obese PCOS women to improve the quality of life	An Experimental Study 30 obese women with age ranged from 18-35 years	Group A (n=15) aerobic training and HIIT training for alternate days. Group B (n=15) diet counselling and lifestyle modification with mild exercises.	BMI, WHR and quality of life by PCOSQ, vo2max.	Novel management strategies given to the obese PCOS women improved cardiovascular fitness, weight loss and quality of life.
RIBEIRO et al.2019[9]	Compare the effects of continuous aerobic exercise and intermittent aerobic exercise protocols on the QoL of women with PCOS	Randomized controlled trial 126 women diagnosed with PCOS Age ranged from 18-39 years	continuous aerobic training (CAT; n=28), intermittent aerobic training (IAT; n=29), and control group without training (CG; n=30) 3 sessions per week for 16 weeks training protocol included 5-minute warm up and 5-minute cool down 1-3 weeks (30 min.) 4-6 weeks (35 min.) 7-10 weeks (40 min.) 11-13 weeks (45 min.) 14-16 weeks (50 min.)	Waist circumference (WC), hip circumference (HC), waist to hip ratio (WHR), Testosterone Prolactin, thyroid stimulating hormone (TSH), and 17-hydroxyprogesterone (17- OHP) and quality of life (MOS SF-36)	Continuous and intermittent aerobic exercise equally effective in reducing anthropometric indices and hyperandrogenism, and improvement in QoL in women with PCOS.
Wu Xia et ai.2020[10]	to investigate effect of aerobic exercise on AMH levels and oxidative stress in Chinese PCOS women.	Randomized controlled trial 50 women, with age ranged from18-40 years	Exercise group (4 times per week for 12 weeks each session included 1-h training, 15-min warm-up period, 30-min aerobic phase (bicycle ergometer), and a 15-min cool-down period) control group (maintain their	Anthropometric assessment Age (years) BMI (kg/m2) SBP DBP (mmHg) HR (b/min) FBG (mmol/L) HDL-C (mmol/L) LDL-C (mmol/L) TG (mmol/L) Cr (μmol/L) Hormonal assessment FSH (mUI/mL) LH (mUI/mL) 0.185 TT (ng/dL) DHEAS (μg/dL) AMH (ng/mL) oxidative stress biomarkers MDA SOD and TAC	12 weeks of aerobic exercise produced beneficial effects on BMI, cardiovascular fitness, AMH, and oxidative stress in PCOS women

			normal lifestyles)	and cardiovascular fitness (CPET)	
Ribeiro et al.2020[11]	To evaluate the effects of continuous (CA) and intermittent (IA) aerobic training on hormonal and metabolic parameters and body composition of women with polycystic ovary syndrome (PCOS)	Randomized controlled trial 110 women with age ranged from 18 - 39 years, sedentary lifestyles, and BMIs 18- 39.9kg/m2	CAT (n = 28) IAT (n = 29) aerobic training and [control (CG), n = 30] no training aerobic training performed on a treadmill 3 times per week, lasting equally and progressively from 30 minutes in the first wk, to 50 minutes in the last wk	Sexual hormones Testosterone Androstenedione SHBG (nmol/L) FAI, E2 (pg/m) LH (uUI/mL) FSH (uIU/mL) Metabolic parameters Total cholesterol mg/dL Triglycerides mg/dL HDL mg/dL LDL mg/dL Fasting glycaemia mg/dL Fasting insulin mg/dL HOMA-IR Anthropometric indices BMI (Kg/m2) WC (cm) HC (cm) WHR Body composition indices (DXA) Android/gynoid ratio FM/height2 (Kg/m2) Fat trunk/% Fat legs LM/height2 (Kg/m2) Body composition (DXA) TM arms (g) TF arms (%)TM trunk (g) TF trunk (%)TM legs (g) TF legs (%)TM head (g) TF head (%)TM whole body (g) TF whole body (%) TM android (g) TF androi TM android (g) TF android (%) TM gynoid (g) TF gynoid (%)	Both CAT and IAT physical training prevents the increase of body fat and decreases the high levels of testosterone related to PCOS. CAT was effective in improving the lipid profile, and IAT reduced the FAI and anthropometric indices

Bonab et al.2021[12]	Investigated the condition of female students' hormone levels and lipid profiles with PCOS polycystic ovary syndrome during the coronavirus COVID-19 pandemic	Quasi-experimental design with pre- and post-test 88 female students, age ranged from 14-18 years	Exercise group (aerobics such as warm-up -10 minutes, cool down - 10 minutes and basic aerobic moves 12 weeks 3 sessions/week under the supervision of Aerobic instructor and each session lasted 45 minutes) and control group.	Anthropometric and blood samples (e.g., testosterone, estrogen, prolactin, and lipid profile)	home-based aerobic exercise can address and eliminate the most significant concern of single women that is the detrimental effects of this syndrome on their physical beauty and infertility in the future.
COSTA et al.2018[7]	To investigate the effects of a supervised aerobic exercise training intervention on health-related quality of life (HRQL), cardiorespiratory fitness, cardiometabolic profile, and affective response in overweight/obese women with polycystic ovary syndrome (PCOS)	Randomized controlled trial 27overweight/obese inactive women with PCOS Age ranged from 18 to 34 year	exercise group, n = 14 (Progressive aerobic exercise training 3 times per week (~150 minIwkj1) over 16 wk.) and a control group (n = 13)	Cardiorespiratory fitness, HRQL, and cardiometabolic profile	supervised aerobic exercise training intervention improved HRQL, cardiorespiratory fitness, and cardiometabolic health of overweight/obese women with PCOS
Jakhar R et al.[13]	To develop a management strategy which can improve health related quality of life (QOL) in PCOS females	Randomized controlled trial 114 PCOS females age ranged from 18-45 years	experimental group (n=57, exercise, diet counselling and Rajyoga meditation) and control group (n=57, diet counselling and Rajyoga meditation)	Quality of life by Polycystic Ovary Syndrome Questionnaire (PCOS-Q)	significant improvement in all domains of PCOS-Q in both groups

Jing Zhao et al.2022[14]	To evaluate the comparative efectiveness of aerobic exercise versus Yi Jin Jing on ovarian function in young overweight/obese women with PCOD.	controlled randomized superiority trial 90 women with age ranged from 18-35 years	intervention groups undergo either Yi Jin Jing (Yi Jin Jing practice 30 min, 5 times a week, 5-min warm-up and cool down or aerobic exercise (stationary 5-min warm-up, cool down and bikes 50 min with an intensity level of 65–75% maximum heart rate, 3 times a week for 12 weeks) and the control group (no training intervention but take oral contraceptives)	AMH level Menstrual frequency, Biochemical profile including FSH, LH, T, E2, SHBG, DHEA-S, FAI., Antral follicle count and ovarian volume, BMI, HOMA-IR	Yi Jin Jing may offer an easy and inexpensive alternative management for younger women with PCOS, to further avoid long-term complications

DISCUSSION

Aerobic exercises improve quality of life and hormonal level in women with PCOS. The main objective of this review is to find out the effect of aerobic exercise on quality of life and hormone level in women with PCOS. Menstrual disturbance, hirsutism and acne are major clinical features in women with PCOS. Kumara et al. proven that Novel management strategies given to the obese PCOS women improved cardiovascular fitness, weight loss and quality of life. Ribeiro et al. proven that Continuous and intermittent aerobic exercise equally effective in reducing anthropometric indices and hyperandrogenism, and improvement in QoL in women with PCOS. Xia Wu et al. proved that 12 weeks of aerobic exercise produced beneficial effects on BMI, cardiovascular fitness, AMH, and oxidative stress in PCOS women. Ribeiro et al. proved that Both CAT and IAT physical training prevent the increase of body fat and decrease the high levels of testosterone related to PCOS. CAT was effective in improving the lipid profile, and IAT reduced the FAI and anthropometric indices. Bonab et al. proved that home-based aerobic exercise can address and eliminate the most significant concern of single women which is the detrimental effects of this syndrome on their physical beauty and infertility in the future. Costa et al. proved that supervised aerobic exercise training intervention improved HRQL, cardiorespiratory fitness, and cardiometabolic health of overweight/obese women with PCOS. Jakhar et al. proved that significant improvement in all domains of PCOS-Q in both groups. Jing Zhao et al. proved that Yi Jin Jing may offer an easy and inexpensive alternative management for younger women with PCOS, to further avoid long-term complications.

Through the above studies, it is found that the aerobic quality of life and hormone level in women with PCOS.

Conclusion

Aerobic exercise training is effective method for improvement of quality of life and hormone level in women with PCOS. All the above mention studies have multiple limitations such as inadequate sample size, short intervention period, the lack of descriptions of side effects and absence of a validated Brazilian–Portuguese version of HRQL questionnaire for PCOS patients, lack of menstrual cycle control and hirsutism observed in some participants after train.

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