

EFFICACY OF LIFESTYLE MODIFICATION IN PCOS PATIENTS WITH OBESITY

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Abstract

Polycystic Ovarian Syndrome (PCOS) is an endocrine dysfunction that often occurs in women of reproductive age. The causes of PCOS are still not fully understood. Diagnosis and management of PCOS are still a challenge. The management of PCOS patients so far has only focused on medical treatment. Lifestyle changes including nutrition interventions, exercise, and elimination of psychosexual stressors are recommended as line therapy in PCOS patients with obesity. This study aims to evaluate the efficacy of lifestyle modification in patients diagnosed with PCOS with obesity in Demak. This interventional study recruited PCOS women in Demak who met the inclusion requirements after being informed. Then, the patient is given education on lifestyle modification, including exercise and monitoring of diet for sixteen weeks through direct meetings or through WhatsApp groups. The variables measured in this study were body mass index, menstrual cycle regularity, waist circumference, ovulation phase, and fertility. The result of this study showed that there was a significant improvement in menstrual regularity ($p < 0.005$), waist circumference ($p < 0.005$), fertility ($p < 0.005$), and dominant follicle ($p < 0.005$) after lifestyle modification. However, the body mass index of the patients does not show any significant improvement ($p > 0.005$). Lifestyle modification may improve menstrual regularity, waist circumference, ovulation phase, and fertility with PCOS. We are uncertain of the effect of lifestyle intervention on BMI

Keywords: PCOS , Obesity, Fertility, Follicle, Gynaecology

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is an endocrine dysfunction that often occurs during reproductive age. The most common reasons why patients with this syndrome come to the doctor are disturbances in the menstrual cycle (85-90% with oligomenorrhea and 30-40% with secondary amenorrhea), infertility (90-95%), and other abnormalities such as hirsutism (70%), and acne (15-30%)(Ndefo et al., 2013). According to the POGI consensus and previous studies, the most common cause of PCOS is the accumulation of visceral fat which can occur in women with obesity and thin women, where in previous studies it was explained that thin women have worse

metabolic cycles and have more visceral fat stores. It can also be a factor that triggers PCOS. The accumulation of visceral fat in the body can trigger insulin resistance and hyperinsulinemia (P. & A., 2017). Excessive accumulation of androgens and testosterone in the body can also trigger an increase in visceral fat levels which will further aggravate the condition of PCOS.

There are three broad reasons why PCOS patients seek medical care 1) menstrual cycle disturbance and infertility 2) problems of appearance and self-esteem arising from obesity and excessive hair growth, and 3) metabolic derangements, including abnormalities in blood fat (lipid) levels, insulin / glucose impairment and for hypertension (P. & A., 2017). Treatment for PCOS patients so far has only focused on medical treatment. Based on previous case studies, first-line therapy for PCOS patients includes dietary interventions and physical activity (Aryani, 2020). Dietary modifications in patients with PCOS have the effect of improving hormonal and metabolic profiles. Lifestyle modification (physical activity and dietary control) will decrease glucose levels and the risk of cardiovascular disorders. Based on previous research, the results of the combination of exercise and calorie restriction, will improve the efficacy of therapy in patients with PCOS (Aryani, 2019). So far, first-line therapy has often been neglected due to the low discipline, motivation, and knowledge of PCOS patients regarding the impact of dietary interventions and physical exercise on the success of therapy. This study aimed to evaluate the efficacy of lifestyle modification in patients diagnosed with PCOS and obesity. The objective of the study was to evaluate the effect of lifestyle modification in reducing BMI, waist circumference, menstrual regularity, dominant follicle, and fertility in PCOS patients with obesity.

RESEARCH METHODS

This interventional prospective study conducted at Demak, Central Java. After obtaining informed consent, twenty women with poly-cystic ovary syndrome and obesity between 20 – 29 years old were recruited. Our inclusion criteria were women with PCOS between 20-35 years, USG criteria for PCOS. Our exclusion criteria were women with thyroid disorder, diabetes, athletes, taking oral contraceptives / any hormonal drugs within last one month, which is found from anamnesis and physical examination.

The tools and materials used in this study were a letter of informed consent, weight scale, height meter, tape measure, and ultrasonography machine. After clinical and USG diagnosis of PCOS was made, BMI, waist circumference was checked and USG was done – the number of ovarian follicles in the periphery, the diameter of follicles were noted, and USG was repeated after 16 weeks. Aerobic exercise was first trained by the expert, then performed 15 minutes per day by the patients at their home. The patients report their exercise daily into WhatsApp group. The dietary intervention is conducted by doing a consultation session with the expert, so that the patients became well informed about the type of foods they should or should not take.

The data was processed, coded, and entered into computer for analysis and hypothesis testing. The data normality was analysed by using Saphiro-Wilk test. The data of BMI and waist circumference was analysed by using paired T-test. Meanwhile, the data of fertility, menstrual regularity, and dormant follicle were analysed with Wilcoxon test.

RESULTS AND DISCUSSION

The paired t-test was used for statistical analysis at CI of 95 and p-value calculated shows the significant result on the and post test for the following parameters. Table 1 shows the distribution of age in our study. 95% of them are less than 30 years. Table 2 reveals the common complaints in our study. 90% was infertile. 85% had menstrual regularity problem. 40% abnormal hair pattern (hirsutism). Table 3 shows the effect of exercise and dietary intervention on BMI and waist circumference analysed by parametric method. Meanwhile, table 4 shows the effect of exercise and dietary intervention on dominant follicles, menstrual regularity, and fertility, which analysed by nonparametric method.

Table 1. Age distribution

Age	No	Percentage
20-25	14	70%
25-30	5	25%
>30	1	5%

Distribution of age in our study. 95% of them are young women less than 30 years.

Table 2. Common complaints in PCOS

Particulars	No	Percentage
Obesity / overweight	14	70%
Hirsutism	8	40%
Acne	3	15%
Menstrual irregularity	17	85%
Infertility	18	90%

The common complaints in our study. 90% had infertility problem, 85% had menstrual regularity problem, 70% had obesity problem, and 40% had hirsutism problem.

Table 3. Effect of Lifestyle modification on BMI and Waist circumference

Parameters	Pre test-mean	Post test-mean	p-value
BMI	27.3	27.6	0.647
Waist circumference	90.85	88.25	0.003

The effect of lifestyle modification on BMI and waist circumference. There was statistically significant reduction in waist circumference with a p-value of 0.003. Meanwhile, the reduction of BMI was not significantly proved, with p-value of 0.647. Exercise helps in reducing abdominal obesity, although the body mass index is not proven to be decreased significantly.

Table 4. Effect of Lifestyle modification on Dominant follicles, menstrual regularity, and fertility.

Parameters	p-value
Dominant follicle	0.000
Menstrual regularity	0.000

The effect of lifestyle modification on dominant follicle, menstrual regularity, and fertility. There was a statistically significant improvement. Improvement in the three parameters was p-value < 0.005. Dominant follicle had p-value of 0.000; menstrual regularity had p value of 0.000; and fertility had p-value of 0.014.

Polycystic ovary syndrome (PCOS) is a complex endocrinopathy affecting both the metabolism and reproductive system of women of reproductive age. This disease is considered a chronic inflammatory condition caused (among others) by abdominal obesity or general obesity. Furthermore, the inflammatory effect of nutrients, such as glucose or saturated fat promotes atherosclerotic lesions, which is emphasized in this condition (González, 2012). Therefore, it is believed that PCOS is an autoimmune, multigene, multifactorial, systemic, inflammatory, steroid regulation-related disease, largely associated with lifestyle errors, e.g., with inappropriate eating habits (Patel, 2018). In the case of PCOS, a wide variety of balanced therapies correcting the lifestyle of patients is suggested, e.g., with the implementation of appropriate diets followed by increasing physical activity as a second step to minimize exposure to inflammatory factors and prevent abnormal immune system stimulation. The physical exercise reduces the abdominal obesity and it restores the ovulation due to the increase of insulin sensitivity. Several studies have examined the impact of exercise interventions on reproductive function, with results indicating improvements in menstrual frequency following exercise (Patel, 2018). Some studies have proved that weight loss improves the fertility in the women with PCOS. Norman et al., stated in his study that association between obesity and hyperandrogenism was observed (Clark et al., 1995). Furthermore, Elinas El-Eisa stated that there was improvements in ovarian cycle and restoration of menstrual cycle after 12 weeks of supervised physical exercise significantly with p-value of <0.008; reduction of number of follicles and ovarian volume (p value of 0.0001), restoration (P<0.002) (Al-Eisa, Einas & Alghadir, 2017). This is in line with the result of this study, which shows that menstrual regularity improves significantly after lifestyle modification.

The analyses performed by Moran et al. comparing the effects of different diets on anthropometric, reproductive, metabolic, and psychological outcomes in women with PCOS showed promising results depending on the diet composition. Although, regardless of the composition of the diet, the use of healthy eating habits and reduced caloric intake, especially in overweight PCOS women, improve the clinical picture through weight loss (Moran et al., 2013). Moreover, literature reports indicate the importance of lowering the proportion of saturated and trans fatty acids in the diet and the share of possible deficiencies in vitamin D, as well as chromium and omega-3 (Moran et al., 2013). The important role of maintaining the balance of macronutrients and omega-6 and omega-3 fatty acids in the diet, which may lead to a change in the expression of inflammatory genes, is indicated (Sears, 2015). It is indicated that the role of lipids in the diet influences the development of a pro-inflammatory state in the course of PCOS as its consequence (Sears, 2015). The impact of obesity, which happens on PCOS patients, are mainly attributable to endocrine mechanisms, which interfere with neuroendocrine and ovarian functions, and reduce the ovulation homeostatic (Sears, 2015). In obese women, gonadotropin secretion is affected as effect of the increased peripheral aromatization of androgens

to oestrogens while the insulin resistance and hyperinsulinemia lead to hyperandrogenemia. Furthermore, the sex hormone-binding globulin (SHBG), growth hormone (GH), and insulin-like growth factor binding proteins (IGFBP) are decreased and leptin levels are increased. Furthermore, obese women have higher levels of circulating free fatty acids, which damage non adipose cells by increasing reactive oxygen species (ROS) that, in turn, induce mitochondrial and ER stress resulting in apoptosis of multiple cell types including oocytes (Sears, 2015). Weight loss has been shown to improve reproductive outcomes by ameliorating fertility, as well as by regularizing menstrual cycles and increasing the chance of spontaneous ovulation and conception in anovulatory overweight and obese women. Available data also suggest that the weight loss equal to 5%–10% of the body weight may definitely improve the fertility rate (Sears, 2015), whereas other studies prove that 5% of weight loss results in significant improvement of endocrine parameters, such as decrease of free testosterone, and LH and insulin levels, with the improvement of ovulation frequency (Sears, 2015). Sim et al. investigated the effects of weight loss in overweight and/or obese women undergoing assisted reproductive procedures on their subsequent pregnancy outcome (Sim et al., 2016). It is consequent with the result of this study that the fertility outcome after 16 weeks lifestyle modification on PCOS patient improves significantly (p-value of 0.014), and also dominant follicle in this study, as one of parameters which indicates the improvement of ovulation, shows significantly improved (p-value of 0.000).

CONCLUSION

lifestyle modification may improve menstrual regularity, waist circumference, ovulation phase, and fertility with PCOS. Exercise programs were found to be equally effective in reducing waist circumference. Exercise program to improve clinical parameters to this population.

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