Counseling Concerning Lifestyle Modification among Polycystic Ovarian Syndrome Women

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Abstract

Background: Polycystic ovary syndrome (PCOS) is a complex heterogeneous endocrine disorder associated with reproductive morbidity, including menstrual dysfunction and infertility. A quasi experimental intervention study **aimed** at assessing the effect of lifestyle modification counseling on polycystic ovarian syndrome symptoms compared to medical treatment metoforamin only on PCOs symptoms. The study was conducted in outpatient gynecological/infertility clinic at Ain Shams Maternity University hospital. Purposive sample of 172 cases were enrolled, inclusive criteria; Women medically diagnosed with polycystic ovarian syndrome, reproductive age (18-40yrs), Married Women, overweight & obese women, Women with menstrual dysfunction. **Tools** used for data collection consisted of Arabic Structured Interviewing questionnaire, Two Arabic Weekly logs to record regularity of diet & exercise, Woman's follow up card to record measures changes pre/post intervention. **Results** revealed that there was highly statistically significant difference between post intervention of the two groups regarding Weight loss, Waist circumference (CM), Hip circumference (CM), and Waist and hip ratio, LH: FSH ratio and fasting serum insulin in (G1) lifestyle modifications. But there was insignificant difference between post interventions of the two groups regarding menstrual dysfunction. In **conclusion**, the present study drew attention to critical point that lifestyle modification with weight loss leads to improved hormonal profile, which restores ovulation resulting in improving menstrual function & relieving PCOs symptoms. The study **recommended** detect center for PCOS cases inside infertility/gynecological clinics to ensure lifestyle modification, Future research should focus on the optimal dietary strategies and exercise regimens for PCOS treatment and the relative efficacy and appropriate use of lifestyle management versus anti-obesity pharmacologic agents and surgery.

Key words: Polycystic ovarian syndrome (PCOs), lifestyle modifications

Introduction

Polycystic ovarian syndrome (PCOS) is a common endocrine system disorder among women of reproductive age. Women with PCOS may have enlarged ovaries that contain small collections of fluid called follicles located in each ovary as seen during an ultrasound exam *(AlKhalifah et al., 2016)*. Infrequent or prolonged menstrual periods, metabolic

abnormalities such as hyperinsulinaemia & obesity and/ or biochemical signs of hyperandrogenism including (hirsutism cystic acne & alopecia), can all occur in women with polycystic ovary syndrome. In adolescents, infrequent or absent menstruation may raise suspicion for the condition *(Abbott, 2017)*.

No one is quite sure what causes of PCOS, and itis likely to be the result of a number of factors (hereditary, lifestyle& environmental, hormonal, genetic and psychological factor). Women with PCOS often have a mother or sister with the condition, and researchers are examining the role that genetics or gene mutations might play in its development *(Legro et al., 2015)*.

Polycystic Ovarian Syndrome (PCOS) is common condition in women that destroys hormones and causes physical and

psychological damage. PCOS is a complex hormonal disturbance that affects entire body and has numerous implications in general health. Women with this syndrome have an increased risk of coronary disease, diabetes and endometrial cancer in any time of the life period. However, the hormonal imbalance appears in the reproductive age group and it leads to infertility *(Azziz et al., 2016).*

The impact of these symptoms on women's quality of life may be profound and can result in psychological distress that threatens for feminine identity and possible disturbances in sexual attitude and behavior. The condition may therefore result in altered self-perception, a dysfunctional family dynamic and problems at work *(Barrett et al., 2018).*

There is no cure for PCOS. Health care professionals usually address the most bothersome symptoms. Health care professionals rarely remove these benign cysts, usually opting to prescribe lifestyle modifications and medication to treat symptoms. Regular exercise, healthy foods & weight control are key treatments for PCOS. Intake of starches and grains increases the insulin content in the body thus leading to triggering of the hormone called androgen, which causes PCOS, rich proteins and healthy fats which balance the fatty acids and vitamins percentage inside the body *(Mostafa et al., 2012).*

Lifestyle modification programs with an emphasis on behavioral management and dietary and exercise interventions have been successful in improving reproductive and metabolic features in PCOS, although yet there is limited evidence for specific dietary and exercise approaches and guidelines for use in PCOS *(Benham et al., 2018).* Lifestyle modification may be best defined as a change of behavior and correction of wrong eating habits. Weight loss occurs when energy expenditure exceeds energy intake. Physical activity is an important component of any weight management program *(Pratik et al., 2014).*

Nurses need an in-depth understanding of the condition, its pathophysiology, diagnostic measures and symptom management. Women presenting with menstrual irregularities should be encouraged to monitor their symptoms, as this will help in the diagnosis of possible PCOS. Once diagnosis has been confirmed, nurses need to ensure patients receive adequate written information, such as leaflets, to clarify issues discussed on initial diagnosis *(de Zegher et al., 2018).*

Nurses can have a positive impact on women with PCOS through counseling and education. This can also provide support for women dealing with negative self-image secondary to the physical manifestation of PCOS. This kind of education helps women understand the syndrome and its associated risk factors to prevent long-term health problems. It encourages women to make positive life-style changes makes community referrals to local support groups to help women build their coping skills *(Kurth, 2013).*

Significance of the Study

Women with Polycystic ovary syndrome face serious problems and complication if they are not resolved well through early intervention for life style modification and the use of various medications and counseling program on psychological adaptation on changes associated with polycystic ovary syndrome *(Dumesic et al., 2016).* This can also provide support for women dealing with negative self-image secondary to physical manifestation of PCOS & build their coping skills *(Day et al., 2018).*

The management of PCOS is directed towards improving the women's quality of life by means of symptomatic alleviation. Obesity worsens the presentation of PCOS and weight management (weight loss, maintenance or prevention of excess weight gain) is proposed as an initial treatment strategy, best achieved through lifestyle changes incorporating diet, exercise and behavioral interventions *(Bordewijk et al., 2020).* So, this study will have done to evaluate the effect of lifestyle

modification (diet & exercise) on PCOS symptoms.

Aim of the study

To evaluate the effect of counseling concerning lifestyle modification on relieving polycystic ovarian syndrome symptoms through the following: -

1. Assessing PCOS symptoms among women.
2. Implementing counseling concerning lifestyle modification.
3. Evaluating the effect of diet and exercise program on reliving PCOS symptoms.

Hypothesis

Counseling concerning lifestyle modification will relieve polycystic ovarian syndrome symptoms.

Research design:

Quasi experimental Intervention study

Setting

The study was conducted at gynecological and infertility outpatient clinics in Ain Shams University Maternity Hospital.

Sampling

Sample type:

A purposive sample will use with the following

Inclusion criteria: -

- Women medically diagnosed with polycystic ovarian syndrome (according to specific medical criteria).
- Women with menstrual dysfunction.
- Married Women.
- At reproductive age (18-40yrs).
- Body mass index over 25kg (overweight & obese women).

Sample size

The specified sample size was 172 women that represent 10% according to sensitive test of total women **(1720)** visited outpatient clinic with PCOS at Ain shams university hospital in the year 2016 suffer from PCOS included in the study. Random assignment for groups divided into **G1 (86)** (lifestyle modification) and **G2 (86)** received medical management.

Sample technique

The researcher was attended in the outpatient of the gynecological and infertility clinics, 3 days/week started from 10 am to 2 pm.

- Patients was being obtained from hospital registration book with the previous mentioned sample criteria
- The aim of the study was being explained to gain the patients confidence and trust to participate in the study then their consent was obtained orally.
- Patients was being interviewed 2 times (first time and after 6 month followed the program) to collected needed data at the outpatient of the gynecological and infertility clinics and followed up weekly by phone.

Tools of data collection

Tool (1):(Arabic Structured interviewing questionnaire) Adapted from **(mostafa E el al, 2012** divided into three parts: **Part I**: It covered the general characteristics of the sample. **Part II:** This part is concerned with women menstrual, reproductive/ gynecological history. **Part III**: This part is concerned with women lifestyle habits; number of meal/day, components of meal, consumption of caffeine.

Tool (2): Two Arabic Weekly log was used by researcher to follow the compliance of the study subject, one log to record how many minutes' women exercised per week and type of exercise. The other to record the regularity of diet program.

Tool (3): Woman's follow up card to assess the outcome measures: change in menstrual cycle; change in anthropometric measurements (waist and hip ratio, hip waist circumference), and changes in the endocrine parameters, (fasting insulin, LH: FSH ratio).

Ethical Considerations:

An official approval was obtained from the Maternal & Neonatal Health Nursing department counsels that were approved by the Faculty of Nursing, Ain Shams University

Counsel. The aim of the study was explained to each woman before applying the tools. An oral consent was obtained from each woman to participate in the study, after ensuring that data collected will be treated confidentially. Women were informed that they have the right to withdraw from the study at any time without giving a reason.

Field Work:

Phase 1: There was introductory phase for researcher with cases to explain the aim of study and obtain the oral approval to participate in the study. Every case was interviewed to assess women personal, menstrual, reproductive and gynecological history, in addition to follow up card was used to assess baseline measures related to PCOS in a time ranged from 10 to 15 at from the first session.

Group of cases were gathered for blood sample to assess the endocrine parameters, (fasting insulin, insulin ratio) by trained nurses. The samples were transported to laboratory (Obstetric and Gynecological Hospital Lab) in coded serum containers. Then assess baseline measures related to PCOS, follow up card was used.

Phase 2: Random assignment for groups divided into **G1** (lifestyle modification) diet &exercise and **G2** received medical treatment (metformin). The **G2** (metformin group) were given the tablets at the initial dose of 500 mg, which was increased in a stepwise manner during the first 3 weeks to accommodate the side effects until the patients were taking a total of 1,500 mg/day (for 3–6 months). The session was conducted for **G1** on small groups (7-8 subjects) with an emphasis on lifestyle modifications (dietary and exercise) interventions, for a mean duration of 25 minutes' range (20-30 min).

G1were asked to follow the instructions diet and daily exercises, moderate exercise on a regular basis (≥30min/day) e.g Aerobic exercise &/or walking. Dietary modification, heart-healthy diet/an energy-restricted diet (1200-1600 kcal/day according to cases' weight) through either a low or high protein diet e.g increase vegetables, fruits, nuts, beans, and whole grains,

limits foods that are high in saturated fat, such as meats, cheeses, and fried foods. (fat ≤30% daily intake, decrease saturated fat and glycemic load, increase fibers and polyunsaturated fat). **Video tape and an educational Arabic booklet** constructed by the researcher, reviewed and modified by gynecologist and nutritionist professional was distributed after instructions to guide the women. **G2** were received medical management (metformin) described from physician.

Phase 3: Weekly follow up was done by telephone and /or meeting in outpatient clinics. The follow up regularity were recorded in Two Arabic Weekly log; one to record how many minutes' women exercised per week and type of exercise and the other to record the regularity of program diet, to ensure program diet & exercise. Reinstruction& referral for nutritionist/gynecologist if indicated. A home phone call system was used to facilitate follow up and tracing cases.

Phase 4: After 6 months, researchers evaluated the women anthropometry measures, menstrual cycle, selected hormones; fasting insulin & insulin ratio (a blood sample was taken using the same technique as in the baseline assessment).

Statistical analysis:
Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:
- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (x^2) test of significance was used in order to compare proportions between qualitative parameters.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

- Probability (P-value)

– P-value <0.05 was considered significant.

– P-value <0.001 was considered as highly significant.

– P-value >0.05 was considered insignificant.

Results:

Table (1): This table shows that, there was no statistically significant difference between socio-demographic characteristics of the two groups regarding age categories (P-value = 0.833), educational level (p-value = 0.754), as well as marital status (p-value = 0.729).

Table (2): This table shows that, there was no statistically significant difference between history of polycystic ovarian syndrome of the two groups regarding symptoms of polycystic ovarian syndrome (p-value =0.998), time symptoms of polycystic ovarian syndrome appeared (p-value =0.865), reaction when symptoms of the polycystic ovarian syndrome appear (p-value =0.876) and pervious treatment for polycystic ovarian syndrome symptoms.

Table (3): This table shows that, there was no statistically significant difference between pre intervention of the two groups regarding Menstrual cycle (p-value= 0.922 NS), Duration of the period (days) (p-value=0.885 NS), Weight loss (p-value=0.732 NS), Waist circumference (CM) (p-value=0.687 NS), Hip circumference (CM) (p-value=0.717 NS), Waist and hip ratio (p-value=0.898 NS), LH: FSH ratio (p-value=0.756 NS) and fasting serum insulin (p-value 0.692 NS).

Table (4): This table shows that, there was highly statistically significant difference between data for habits and lifestyle of the pre intervention and post intervention after 6months regarding free time activity (p-value <0.001 HS), Number of meals / day (p-value <0.001 HS), Meal components (p-value <0.001 HS), tea / coffee intake (p-value <0.001 HS), carbonated beverages (p-value <0.001 HS), a previous diet (p-value <0.001 HS) the time of meal (p-value <0.001 HS).

Table (5): This table shows that, there was highly statistically significant difference between post intervention of the two groups regarding Weight loss (p-value <0.001 HS), Waist circumference (CM) (p-value <0.001 HS), Hip circumference (CM) (p-value= 0.036 S), Waist and hip ratio (p-value <0.001 HS), LH: FSH ratio (p-value <0.001 HS) and fasting serum insulin (p-value <0.05 S). But there was insignificant difference between post interventions of the two groups regarding menstrual dysfunction.

Table (1): Socio- demographic characteristics for 2groups (I: Diet ex. And II: Medical treatment regarding) (n=172).

Socio-Demographic data	Group I: Diet ex. *(n=86)*		Group II: Medical treatment (n=86)		Chi-square test	
	No.	%	No.	%	x2	p-value
Age (years)						
18-25 years	34	39.5	32	37.2		
>25-30 years	26	30.2	24	27.9		
>30-35 years	17	19.8	20	23.3	0.436	0.833
>35-40 years	9	10.5	10	11.6		
Mean±SD	27.66±8.02		28.09±7.02			
Education level						
Read and write	7	8.1	6	7.0		
Completed primary education	23	26.7	21	24.4		
Completed preparatory education	22	25.6	24	27.9	0.675	0.754
Completed secondary education	25	29.1	28	32.6		
Higher education	9	10.5	7	8.1		
Occupation						
Housewife	62	72.1	65	75.6	0.120	0.729
Work for a fee	24	27.9	21	24.4		

Using: Chi-square test; p-value >0.05 NS

Table (2): History of polycystic ovarian syndrome for 2gropups (group I: Diet ex. And group II: Medical treatment) (n=172).

History of polycystic ovarian syndrome	Group I: Diet ex. (n=86)		Group II: Medical treatment (n=86)		Chi-square test	
	No.	%	No.	%	x2	p-value
Symptoms of polycystic ovarian syndrome.						
Uncontrolled body weight	52	60.5	50	58.1		
Skin changes (oily skin - acne)	26	30.2	28	32.6		
Hirsutism	30	34.9	29	33.7		
Severe cramps during the menstrual cycle (dysmenorrhea)	56	65.1	54	62.8	0.236	0.998
Increase the amount of menstrual cycle in the form of bleeding (polymenorrea)	34	39.5	36	41.9		
Decrease the amount of menstrual cycle (Oligomenorrhea)	70	81.4	68	79.1		
Irregular menstrual flow	39	45.3	38	44.2		
Time symptoms appeared.						
Less than one year	22	25.6	22	25.6		
1-5 years	39	45.3	36	41.9	0.290	0.865
More than 5 years	25	29.1	28	32.6		
Reaction when symptoms appeared.						
I went Eto the medical examination	43	50.0	41	47.7		
I did not do anything	6	7.0	4	4.7	0.689	0.876
Consulted relatives or friends	33	38.4	36	41.9		
Another answer	4	4.7	5	5.8		
Previous treatment						
Yes	56	65.1	54	62.8	0.025	0.874
No	30	34.9	32	37.2		

Using: Chi-square test; p-value >0.05 NS

Table (3): Comparison between 2groups (I: Diet ex. And group II: Medical treatment) regarding to their intervention (n=172) pre intervention.

Items	Group I: Diet ex. (n=86)		Group II: Medical treatment (n=86)		Chi-square test	
	No.	%	No.	%	x2	p-value
Menstrual cycle						
Regular Normal	5	5.8	6	7.0		
Severe cramps during the menstrual cycle (dysmenorrhea)	56	65.1	54	62.8		
Increase the amount of menstrual cycle in the form of bleeding (Polymenorrhea)	11	12.8	12	14.0	0.186	0.980
Decrease the amount of menstrual cycle (Oligomenorrhea)	70	81.4	68	79.1		
Duration of the period (days)						
3-5 days	11	12.8	12	14.0		
5-7 days	43	50.0	45	52.3	0.236	0.885
>7 days	32	37.2	29	33.7		
Weight loss						
Normal weight	3	3.5	5	5.8		
Overwieght	42	48.8	39	45.3	0.321	0.732
Obese	41	47.7	42	48.8		
					t test	p-value
Waist circumference (CM)						
Range	101-138		103-137		*t*= 0.403	0.687
Mean±SD	117.60±14.70		116.42±14.55			
Hip circumference (CM)						
Range	115-156		114-157		*t*= 0.365	0.717
Mean±SD	134.65±18.62		133.30±18.46			
Waist and hip ratio						
≤0.75	4	4.7	5	5.8		
>0.75-<0.85	22	25.6	20	23.3	0.215	0.898
≥0.85	60	69.8	61	70.9		
Investigations						
LH:FSH ratio						
>=2.5	52	60.5	49	57.0	0.096	0.756
<2.5	34	39.5	37	43.0		
Fasting serum insulin (μIU/ml)						
Mean±SD	29.28±10.83		28.97±9.72		1.021	0.692

Using: Chi-square test; p-value >0.05 NS

Table (4): Pre and post 6 months regarding to their lifestyle in Group I: Diet ex.

Data for habits and Lifestyle	pre (n=86)		Post after 6months (n=71)		Chi-square test	
	No.	%	No.	%	x2	p-value
Free time activity						
A. Exercise	9	10.5	73	84.9		
B. Exit from the house	30	34.9	56	65.1	25.347	<0.001**
C. Reading	13	15.1	15	17.4		
D. Sit with the family at home	26	30.2	30	34.9		
Number of meals / day:						
A. One meal	13	15.1	4	4.7		
B. 2-3 meals	39	45.3	13	15.1	29.658	<0.001**
C. More than 3 meals	34	39.5	69	80.2		
Meal components:						
A. balanced nutrients elements (carbohydrate / protein / fat / vitamins).	22	25.6	69	80.2	49.376	<0.001**
B. imbalanced nutrients elements.	64	74.4	17	19.8		
Tea / coffee intake						
A. No	7	8.1	34	39.5		
B. once a day	28	32.6	43	50.0	50.350	<0.001**
C. More than once	51	59.3	9	10.5		
Carbonated beverages						
A. No	13	15.1	65	75.6		
B. once a day	52	60.5	17	19.8	63.980	<0.001**
C. More than once	21	24.4	4	4.7		
Previous diet regimen						
A. No	64	74.4	0	0.0		
B. Yes irregularly	13	15.1	17	19.8	110.687	<0.001**
C. Yes regularly	9	10.5	69	80.2		
Regular meals						
A. Regular	17	19.8	64	74.4	49.376	<0.001**
B. Irregular	69	80.2	22	25.6		

Using: Chi-square test; p-value >0.05 NS

Table (5): Comparison between 2groups groups (I: Diet ex. And group II: Medical treatment regarding to their post-intervention (n=145).

Items	Group I: Diet ex. (n=86)		Group II: Medical treatment (n=86)		Chi-square test	
	No.	%	No.	%	x2	p-value
Menstrual cycle						
Regular Normal	5	5.8	6	7.0		
Severe cramps during the menstrual cycle (dysmenorrhea)	56	65.1	54	62.8		
Increase the amount of menstrual cycle in the form of bleeding (Polymenorrhea)	11	12.8	12	14.0	0.186	0.980
Decrease the amount of menstrual cycle (Oligomenorrhea)	70	81.4	68	79.1		
Duration of the period (days)						
3-5 days	11	12.8	12	14.0		
5-7 days	43	50.0	45	52.3	0.236	0.885
>7 days	32	37.2	29	33.7		
Weight loss						
Normal weight	3	3.5	5	5.8		
Overwieght	42	48.8	39	45.3	0.321	0.732
Obese	41	47.7	42	48.8		
					t test	p-value
Waist circumference (CM)						
Range	101-138		103-137		$t=$ 0.403	0.687
Mean±SD	117.60±14.70		116.42±14.55			
Hip circumference (CM)						
Range	115-156		114-157		$t=$ 0.365	0.717
Mean±SD	134.65±18.62		133.30±18.46			
Waist and hip ratio						
≤0.75	4	4.7	5	5.8		
>0.75-<0.85	22	25.6	20	23.3	0.215	0.898
≥0.85	60	69.8	61	70.9		
Investigations						
LH:FSH ratio						
>=2.5	52	60.5	49	57.0	0.096	0.756
<2.5	34	39.5	37	43.0		
Fasting serum insulin (μIU/ml)						
Mean±SD	29.28±10.83		28.97±9.72		1.021	0.692

Using: Chi-square test; p-value >0.05 NS

Discussion:

Lifestyle modification programs with an emphasis on behavioral management and dietary and exercise interventions have been successful in improving menstrual and reproductive features in PCOS. Keeping a healthy weight by eating healthy foods and exercising is another way women can

help manage PCOS *(Dumesic et al., 2019).* There are still research questions to be answered especially on the role of exercise and behavioral strategies to improve the feasibility and

sustainability of lifestyle change. In support to the previous concepts the research team designed the present study.

Weight loss for PCOS sufferers may be difficult, but it's not impossible. A combination of regular cardiovascular exercise and resistance training is recommended. At least three to four times per week for at least 30 minutes each session In addition to nutritional counseling will help to keep body fat low. On trial to compare the effectiveness of exercise and nutritional counseling (lifestyle modifications) versus

Medical treatment only (metoforamine) on Wight loss, hormonal, menstrual, and reproductive function on women with PCOS. Our study found highly significant difference in (**GI**) lifestyle modifications regarding Weight loss, anthropometric measures (waist and hip ratio, hip waist circumference) and endocrine parameters (LH, FSH ratio and fasting insulin) compared with (**GII**) medical treatment. Both groups showed significant improvements regarding menstrual function.

The results of this study support the hypothesis that it is possible to improve menstrual function and fertility in overweight/obese women with PCOS. By using a lifestyle program that sets realistic weight loss and exercise goals, subjects were able to sustain an improvement in carbohydrate metabolism over a 6month period and hence improve their likelihood of pregnancy 14 cases out of 86 enrolled in (**GI**) and 12 cases out of 86 enrolled in (**GII**) some of them has got pregnant and the majority difficult to contact due to changes the cell phone. Following the 6 month intervention, the instruction done at the present study showed direct positive effect on women menstrual & reproductive features. The regularity of the menstrual cycle over the time-course of the study increased; both groups (**GI& GII**) show significant improvements in menstrual frequency and significant reduction in menstrual problems.

In the current study there is no significant difference in the prevalence of PCOS symptoms between both groups. The majority of patient in both groups suffered from, uncontrolled body weight and Severe cramps during the menstrual cycle, about two third of patient tried to treat PCOs before. These results are in agreement with study done by **Biro et al. (2018),** there were no statistically significant difference between groups regarding symptoms of PCOs time symptoms of PCOs appeared and pervious treatment PCOs, symptoms. In the study done by **Gibson-Helm et al. (2017),** reported significant difference in reaction when symptoms of PCOs appear and pervious treatment PCOs, symptoms, these differences related to couture of patient.

In our study, there was no statistically significant difference pre intervention between two groups regarding menstrual regularity in term of duration and menstrual pattern, Weight loss, Waist circumference, Hip circumference, Waist and hip ratio, LH: FSH ratio and fasting serum insulin. These similarities related to select the study sample through inclusive criteria to confirm the validity of the study. This result is supported by **Sandeep et al. (2014),** there was no statistically significant difference pre intervention between groups regarding Menstrual regularity, Weight loss, endocrine parameters LH, FSH. In contrast to the study done by **Hart et al. (**2015**),** reported significant difference in menstrual regularity, these differences related to the symptoms of PCOs; in the study group the large number of women have Oligomenorrhea.

Several studies have shown that weight loss can lead to resumption of ovulation within weeks. Those studies demonstrated that even a 5% reduction in body mass restores ovulation and fertility and devised a program of exercise and sensible eating that has become a model across the world for treating PCOS. Rapid changes in body composition and fat mass can be shown during lifestyle change. **Borzan et al. (2021).** In the present study, there was highly statistically significant difference between data for habits and lifestyle modification of the pre and post intervention after 6months. High-protein diets seem to be as effective as high-carbohydrate diets, provided that fat and total calories are comparable. While lifestyle changes are difficult to maintain, women seeking pregnancy are highly motivated, making this a first-line intervention in overweight w omen with PCOS.

In two randomized control trials done by **Witchel et al. (2015) and Torres et al. (2018),** it reported significant difference regarding data for habits and lifestyle of the pre and post intervention regarding free time activity, meal components after 9month of intervention. In contrast to the results of this study, **Tokmak et al. (2015),** reported non-significant difference regarding data for habits and lifestyle of the pre and post intervention after 5 months regarding free time activity, tea and coffee intake / day, the time of meal but after 4month of intervention. These differences are culturally related to women and some believe that their increased intake of caffeine makes them more focused on their work.

Investigating other indicators of PCOS feature improvement, the present finding revealed in the current study, there was highly statistically significant difference between post intervention of the two groups regarding Weight loss, Waist circumference (CM), Hip circumference (CM), and Waist and hip ratio, LH: FSH ratio and fasting serum insulin. But there was insignificant difference between post interventions of the two groups regarding menstrual dysfunction.

Supporting the same point by *(Hackethal, 2016),* reported that, in patients with polycystic ovarian syndrome (PCOS) who are obese, endocrine-metabolic parameters markedly improve after 4-12 weeks of dietary restriction. Their sex hormone–binding globulin (SHBG) levels rise, and free testosterone levels fall by 2-fold. Serum insulin and insulin-like growth factor-1 (IGF-1) levels also decrease. In patients with PCOS who are obese, weight loss is associated with a reduction of hirsutism and a return of ovulatory cycles in 30% of women, thereby improving pregnancy rates, as well as improving glucose tolerance and lipid levels.

These results are in agreement with

(Hill et al., 2018), However, 5%–10% of body weight loss can improve nearly all abnormal reproductive, metabolic, hormonal, lipid profile, and psychological parameters in women with PCOS. However, it is understood that the diet alone cannot change or improve in short duration for above factors effectively. So, researchers might have believed on the physical activity for PCOS women, specifically reproductive hormones balance. Similar to the findings of the studies done by *(Ibáñez et al., 2017)* reported that after insulin level improvement by exercise in obese women with PCOS, the normal menstrual function has restored and fertility increased. The other thing is by using a lifestyle.

This finding was assured by *(Jamilian et al. 2016),* an elevated level of LH is the hallmark of the PCOS disease in women. LH level was decreased after Physical exercise with or without Diet. FSH is also minimal level decreased. LH and FSH hormones released by pituitary gland to stimulate follicle in ovary to mature. Hyper stimulation of FSH & LH may attach Germ line progenitors in the menstrual cycle, instead of single normal ovary to Polycystronic which leads Oligo or Non Ovulation occur.

In contrast to the results of this study *(Tang et al. 2012),* reported that Lifestyle + metformin is associated with lower BMI and subcutaneous adipose tissue and improved menstruation function in women with PCOS compared with lifestyle alone over 6 months. Metformin alone compared with lifestyle showed similar BMI at 6 months. These results suggest the combination of lifestyle modification with metformin has a role to play in weight management: a key concern for women with PCOS.

In summary, our results indicate that lifestyle modification through exercise, stress management and sensible eating patterns can lead to improved reproductive/hormonal features in PCOS women.

Conclusion

Finally, the present study drew attention to critical point that lifestyle modification with weight loss leads to improved hormonal profile, which restores ovulation resulting in improved menstrual function Accepting that study hypothesis confirm lifestyle modifications are the best initial management for overweight & obese women seeking to improve their reproductive function.

Recommendations

In the light of the study findings, the following recommendations are suggested:
1. Didactic center for PCOS cases inside infertility/gynecological clinics to ensure lifestyle modification.
2. Future research should focus on the relative efficacy of lifestyle management versus anti-obesity pharmacologic agents and surgery.
3. Study brochure dissemination in gynecological and infertility clinics to Increase PCOs women awareness about lifestyle modification.

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