Effect of Lifestyle Changes on Symptoms of Polycystic Ovarian Syndrome in Obese Girls

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 Abstract:
Background: *Polycystic ovary syndrome (PCOS) is a complex endocrine disorder that affects 6% to 10% of women of reproductive age. Lifestyle changes, including diet, exercise, and behavioral modification, appear to improve the metabolic and reproductive abnormalities of overweight and obese girls with PCOS.*
Aim of the study*: was to evaluate of the effect of lifestyle changes on symptoms of Polycystic ovarian syndrome in obese girls.*
Design: *A quasi-experimental design was utilized.*
Setting: *The study was conducted in the Faculty of Nursing at Benha University.*
Sample: *Multistage sample (543) were included to assess the girls with polycystic ovary syndrome symptoms. All girls with polycystic ovary symptoms screened by the physician through abdominal ultrasound diagnoses (140). The girls diagnosed with polycystic ovarian syndrome for the intervention study (78).*
Tools *used for data collection consisted of (1) A self-administered questionnaire to assess the girls socio-demographic and clinical characteristics, menstrual patterns, lifestyle habits and knowledge about PCOS, (2) Two Arabic Weekly log to record regularity of diet & exercise, and (3) Follow up sheet to record the changing in symptoms pre/post intervention such as Anthropometrics measurement, The Ferriman- Gallwey scale to assess hirsutism, Global Acne Grading System (GAGS).(4) Psychological assessment tool to assess psychological health related quality of life of the studied girls.*
Results*: reveled that there was a highly statistically significant difference regarding knowledge about PCOS and a highly significant improvement of menstrual frequency, menstrual problems and weight loss post intervention (P $<$.001). Also highly significant decreases in waist circumference(P $<$.001), highly significant reduction in hirsutism total score and total acne score. Also significant difference in psychological status post intervention .*
Conclusion: *the study concluded that the lifestyle changes positively affect in reducing symptoms of PCOS .*
Recommendations*: Motivate the nurses in counseling the PCOS girls on lifestyle change. Further research with larger sample size at different institutions is recommended which focus on the optimal dietary strategies and exercise regimens for treatment of PCOS.*
Keywords: *Lifestyle changes, Polycystic ovarian syndromes symptoms, Obese Girls*

I.   Introduction

Polycystic ovarian syndrome (PCOS) is a complex condition in which a woman's ovaries are generally bigger than average. Polycystic means the ovaries have many cysts or follicles that rarely grow to maturity or produce eggs capable of being fertilized. PCOS is relatively common, especially in infertile women. [1]. PCOS occurs when an endocrine imbalance results in high levels of estrogen, testosterone, and luteinizing hormone (LH) and decrease secretion of follicle stimulating hormone (FSH). This syndrome is associated with a variety of problems in the hypothalamic- pituitary-ovarian axis and with androgen- producing tumors [2,3]. PCOS is a common condition present in 12–21% of women of reproductive age. Up to 70% of women with PCOS remain undiagnosed. [4].

Menstrual irregularity is the most common manifestation of PCOS and is present in almost 80% of patients. The usual menstrual irregularities are oligomenorrhea or secondary amenorrhea and sometimes primary amenorrhea or menorrhagia. However, 20% of women may have apparently regular cycles despite an ovulation. hirsutism is present in 50-60%, acne in 15-20%, and androgenic alopecia in 5% of patients with PCOS. Approximately 30-75%of patients with PCOS are obese, and majority of them have an android distribution of fat, with features of insulin resistance like acanthosisnigricans and skin tags. Although patients with lean PCOS lack clinical features of insulin resistance, they have biochemical evidence of insulin resistance. Rarely, women with PCOS may have features of virilization like clitoromegaly and androgenic alopecia [5,6]. The syndrome was previously called Stein- Leventhal Syndrome after the physicians who first characterized it in the 1930s [7].

PCOS has several serious complications. Estrogen levels are elevated, increasing risk of endometrial hyperplasia and, eventually, endometrial cancer. Androgen levels are often elevated, increasing the risk of metabolic syndrome and causing hirsutism. Hyperinsulinemia due to insulin resistance may be present and may contribute to increased ovarian production of androgens. Over the long term, androgen excess increases the risk of cardiovascular disorders, including hypertension. [8].

Women with PCOS are more likely to suffer from depression, anxiety, poor self-esteem, alter the coping abilities, strain relationships, decrease quality of life, disordered eating and psychosexual dysfunction [9 , 10]. The underlying etiology of PCOS is unknown, but strong evidence supports the possibility of a genetic component in disease development. Familial clustering of the disorder and noted inheritance of hyperandrogenemia and hyperinsulinemia (common findings in PCOS) strongly indicate a possible hereditary influence. Environmental risk factors such as obesity may also play a role, supporting the hypothesis that genetics and environment may be interconnected [11].

PCOS management should focus on support and education, and needs to strongly emphasis healthy lifestyle, with targeted medical therapy as required [9]. First line therapy for PCOS involves lifestyle modifications, including nutritional counseling and exercise to help stave off the threat of diabetes by promoting weight loss and improved glucose metabolism, both of which contribute to stabilization of some of the more distressing syndromes related to the condition. when efforts at lifestyle therapy are inadequate or unsuccessful, medications are selected based on the specific metabolism disorders observed in each patient , including insulin resistance and an ovulation menstrual irregularities related to high androgen level [12 , 13].

Nurses can have a positive impact on women with PCOS through counseling and education. Provide support for patient dealing with negative self- image secondary to the physical manifestation of PCOS. Through education, help the patient understand the syndrome and its associated risk factors to prevent long -term health problems. Encourage the patient to make positive life style changes. Make referrals to local support groups to help the patient build the coping skill. [14].

1.2 Significance of the study
The increasing rates of obesity, among Egyptian population, are largely attributed to their lifestyles; including unhealthy dietary habits, like consuming the widely distributed junk, fast food coupled with increasing sedentary lifestyles, seen in such reports that 63% of the Egyptian population at the age of twenty or more have sedentary lifestyles[15].

Recently, much researches investigated the impact of the lifestyle change in PCOS girls and suggested that diet, exercise and weight loss is recommended as the first line of treatment for girls with PCOS; these changes should precede pharmacological treatment. A reduction of as little as 5% of total body weight can positively affect hyperinsulinemia. As a result, it causes a decrease of androgens and normalization of menstrual cycles. Evidence supports the role of the healthcare providers in encouraging girls with PCOS to change their lifestyle [16, 17]. PCOS has always been considered as a systemic problem that carries many risks at the time of presentation and later in a woman's life. For example, infrequent menstrual flow carries 3-fold increased risks of endometrial hyperplasia and endometrial carcinoma [18,19]. This stimulates the current study to evaluate the effect of lifestyle changes on symptoms of polycystic ovarian syndrome in obese girls, where Egyptian studies which investigated this topic are so limited.

1.3 Aim of the study:
Aim of the study was to evaluate the effect of lifestyle changes on symptoms of polycystic ovarian syndrome in obese girls.

1.4 Research Hypothesis:
Obese girls with polycystic ovarian syndrome who will accept to change their lifestyle would be reduce the most these symptoms.

II. Subjects and Method
2.1 Research design:
A quasi-experimental design was utilized to fulfill the aim of this study.

2.2 Setting of the study:
This study was conducted in the Faculty of Nursing at Benha University.

2.3 Sample:
2.3.1 Sample type: Multistage sample
2.3.2 Sample size: A total of (78) girls were recruited in the study
2.3.3 Sampling technique:
 - All girls in the four grades of the faculty of nursing (543) were included to assess the girls with polycystic ovary syndrome symptoms.
- All girls with polycystic ovary symptoms screened by the physician through abdominal ultrasound diagnoses (140).
- The girls diagnosed with polycystic ovarian syndrome for the intervention study (78).

2.3.4 Inclusion criteria:
- Girls diagnosed with polycystic ovarian symptoms.
- From the same faculty, age from 18 to 25 years.
- Not married.
- A history of irregular menstrual cycles for more than 12 months.
- Their body mass index (BMI) exceeds 25.
- Taking no medications.
- Had no endocrine disease or medical conditions.
- Accept to participate in the study were included in the studied sample.

2.4 Tools of data collection:
Four tools were used in the current study to collect the necessary data
2.4.1: A self-administered questionnaire: It was developed by the researchers after reviewing the related literature ; it was consisted of main four parts:
Part I: Socio-demographic and clinical characteristics of the studied sample as (age , level of grade, residence, Height, Weight, BMI. Waist circumference (cm), Hirsutism score and Degree of Acne).
Part II: Menstrual history such as age of menarche, cycle length, duration of menstrual blood flow, and number and rhythm of menstrual cycles through the previous year. All the items of this section were self-reported by the girls, in addition to gynecological history.

Part III : This part is concerned with girls' lifestyle habits as number of meal/day, components of meal, duration and form of exercises and consumption of caffeine.

Part IV: Girls' knowledge regarding polycystic ovarian syndrome. It consisted of (4) items as (definition, causes, signs and symptoms and complications).

Scoring: Each item was assigned a score of (2) given when the answer was completely correct, a score (1) was given when the answer was incompletely correct and a score (0) was given when the answer was incorrect or unknown. The total score was calculated by summation of the scores of its items. In addition, girls' total knowledge score was converted into total percent and graded as the following; poor when total score was (0 < 3), average when total score was (3 < 6) and good when total score was (6 ≤ 8).

2.4.2 : Follow up card:
        Arabic card was constructed by the researcher to assess the outcome measures: **(1)** Changing in menstrual cycle; **(2)** Changing in anthropometric measurements (body mass index (BMI) by measuring weight and height and calculate the body mass index (BMI) according to ranges of [20]: Normal BMI= 18.5-24.9kg/ M2, overweight BMI= 25.0-29.9 Kg/M2, obesity BMI= 30.0-39.9kg/M2 and the extreme obesity BMI=40.0kg/M2 **(3)** Waist circumference was determined at the narrowest point between the lower rib and the iliac crest during expiration according to the National Health and Nutrition Examination Survey anthropometric manual [21] and recorded in centimeters to the nearest 0.1 cm.

(4) Assessment the Degree of Hirsutism:
        It was adopted from Ferriman and Gallwey,1961. To assess the grades of hair growth over nine key anatomic areas (i.e. lips, chin, hands and legs, breasts, abdomen, pubic area, lower and upper back). The degree of hirsutism of each area was scored using a 4-grade scale ranged from 0 to 4, where 0 represents no hair growth and 4 means a maximum hair growth. For each respondent the scores of the nine areas were summed up to obtain the Ferriman- Gallwey Hirsutism total score. From a maximum possible score of 36, a score of ≥8 indicates androgen excess [22] and this was an inclusion criteria, as well as outcome variable. To maintain

reliability of the collected data, hirsutism score was assessed only by the nurse investigator. This assessment was performed in a separate room and the girls' privacy was strictly maintained

5. Acne Evaluation:

Clinical assessment of current acne lesions were performed on the face and back according to the Global Acne Grading Scale (GAGS) [23]. The GAGS considers six locations on the face and chest/upper back, with a factor for each location based roughly on surface area, distribution, and density of PSUs. The borders on the face are delineated by the hairline, jaw line, and ears. No magnifying glass or skin stretching is allowed and good lighting is taken into account. The chest and upper back have been included because they are critical in order to assess the severity of the acne. Each of the six locations is graded separately on a 0–4 scale, with the most severe lesion within a location determining the local score. These grading scores are then multiplied by the factor of each location (forehead ×2, right cheek ×2, left cheek ×2, nose ×1, chin ×1, chest and upper back ×3). The global score is the summation of all the local scores (= grades × factors). The global scores are subdivided into categories: no active acne lesions (score = 0), mild active acne lesions (score = 1–18), moderate active acne lesions (score = 19–30), severe active acne lesions (score = 31–38), and very severe acne lesions (score > 39).

2.4.3 Psychological Assessment Tool was adopted from [24]

It issued to assess girls psychological health related quality of life before & after intervention. The scale used to evaluate the impact of problems associated with PCOS on psychological status. It was translated to Arabic language and reviewed by jury.(It consists of 10 statements every girls had three responses for each statement to choose from, No problem, some problem, Sever problem , the scoring was done according to the following as girls with Sever problem response were scored 1, girls with some problem response were scored 2 and girls with No problem response were scored 3. Then the total score was calculated by summation of the scores of its items (30); girls with total score from (1<10) were specified as leaving poor psychological QOL, girls with total score from (10 < 20) were specified as leaving average psychological QOL and girls with total score from (20≤ 30) were specified as leaving good psychological QOL).

2.4.4 Two Arabic Weekly log:

Two Arabic weekly log was used by researcher to follow the compliance of the studied sample to the exercise & nutritional regimen; one log to record how many minutes girls exercised per week and type of exercise. The other to record the regularity of nutritional program.

2.4.5 Tools Validity and Reliability:

Tools were reviewed for comprehensiveness, appropriateness, and legibility by an expert panel consisting of five obstetrics and woman's health nursing as well as obstetric medicine specialty experts. The panel ascertained the face and content validity of the tools. The reliability was done by Cronbach's Alpha coefficient test which revealed that each of the four tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool.

2.5 Ethical considerations

This study was conducted under the approval of the faculty of nursing Ethics Committee, Benha University. Participants were given explanations about the purpose of the study, and were informed that they could withdraw from the study at any time before the completion of the study. Participants who agreed to complete in this study were asked to sign a consent form. Confidentiality of participants information was assured and the data were accessed only by the investigators involved in the study.

2.6 Pilot Study

The pilot study was conducted on 10.0% (7girls) of the total sample to test the feasibility and the applicability of the tool, find out the possible obstacles and problems that might face the researcher and interfere with data collection, detect any problems peculiar to the statements as sequence of questions and clarity and estimate the time needed for data collection. Sample included in the pilot study were excluded from the main study sample.

2.7 Field of work

A written official letter was obtained from the Dean of the Faculty of Nursing, Benha University. At the time of data collection a verbal agreement was taken from every participant in the study after clear and proper explanation of the study purpose and its importance for them.

The study was carried out through four phases: Initial assessment, planning, implementation, and follow up and evaluation. These phases were carried out from beginning of October 2014 to the end of

September 2015, covering a long period of one year. The previous mentioned settings were visited by the researchers three days/week from 9.00 am to 2.00 pm.

Initial assessment phase

At the beginning the researchers distributed the questionnaires to find out the socio-demographic characteristics of the studied girls with PCOS in all the four grade for two weeks. Then application of the study according to the inclusion criteria. At the beginning of interviewing the researcher greeted the girls, introduced herself to all girls included in the study, Every girl was interviewed to collect socio-demographic characteristics, menstrual, and gynecological history, and lifestyle habits; in addition assess the baseline measures related to PCOS in a time ranged from 10 to 15 minute.

Full general and clinical assessment for anthropometrics measurement such as weight was measured with scale, which was calibrated "0" with the girl without shoes. height was determined by using a measuring tape, height was measured without shoes and feet were placed together with heels against the wall. Body mass index was calculated for each girl using the following formula: BMI= (weight in kilograms/ height in meters2), the hirsutism score and acne grade was performed by the investigator.

2) Planning and Implementation phase

The study participant were provided with lifestyle change program through three educational sessions in small groups (n=4- 6 girls) on three consecutive days in faculty of nursing at Benha University with duration of approximately 60 minutes for each session. PCOS definition, symptoms, and complications, in addition to the importance of weight reduction were discussed during the 1st session, while the 2nd and 3rd session concerned with instruct the girls about energy-restricted diet, eating behaviors, and physical activity. All sessions were presented in a power point presentation by the researcher. All participant was provided with an instructional brochure to be used as a guide for the permitted and forbidden foods and behaviors and physical activity. They were asked to accurately record their dietary intake daily for the week preceding the assigned visit; using the weekly log .

The Lifestyle change Program

Lifestyle changes included the caloric intake restriction to 1200 to 2000 calories per day depending on the participants' weight and was divided on small frequent meals. Caloric meal content included at least 15% derived from protein, less than 30% from fat, and the remaining calories coming from carbohydrates.[25]. Along with the energy-restricted diet, healthy balanced diet was recommended by asking the participants to consume 4-5 servings of fresh vegetables and fruits, whole grains, food rich with fibers content, A multivitamin is recommended to fill in gaps from the diet, as well as 6 to 8 glasses of water or clear fluids to promote optimal organ function. Conversely, they were instructed to limits foods that are high in saturated fats such as meats, cheeses and fried foods), (fat ≤30% daily intake, decrease saturated fat and glycaemic load, increase fibers and polyunsaturated fat). and fast food and caffeine were discouraged as a part of the healthy diet plan. Additionally, participants were instructed on change their eating behaviors (e.g. avoid eating during the times of watching television, or immediately before bedtime, avoid drinking through/immediately after meals; rather drink before meals time). Moreover, at least exercised 5 days a week, beginning at 10 minutes a day and eventually increasing to 30 minutes to 35 minutes a day for 5 days a week during a one year period [16].

3) Follow up schedule and Outcomes evaluation

Follow up was done by interviewing the girls weekly in faculty of nursing. The regularity of follow up were recorded in two weekly log; one to record the regularity of program diet and the other to record how many minutes girls exercised per week and type of exercise. After one year researchers evaluated the girls anthropometry measures, menstrual cycle and change in hirsutism total score and acne grade.

2.8 Data Analysis

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 20.0) was used for that purpose, followed by data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Test of significance (chi-square as the test of significance and independent t test were used to compare mean score pre and post intervention and to test the study hypothesis. A statistically significant difference was considered at p-value p≤0.05, and a highly statistically significant difference was considered at p-value p ≤ 0.001.

III.   Results

Table (1) Describes socio-demographic and clinical characteristics of the studied sample. It reveals that more than half (64.1%) of the studied sample were in age between (20-25) years with mean age (20.54±1.87) years. About one third of the them (34.6%) had 3rd grade, while the minority (15.4%) of them had 1st grade, more than half (52.6%) of them live at urban area, the mean Height was (160.23± 2.33cm). Mean Body Weight was (81.56±2.95kg), Mean BMI was (31.99 ± 0.79 kg/m2), Mean Waist circumference was (100.46±1.76 cm) Mean Hirsutism score was (17.44±5.18) and finally Mean Degree of Acne was (20.41± 6.36).

 Table (2) Presenting menstrual & gynecological history of the studied sample at baseline**.** It shows that the mean age of the studied sample at menarche was (13.1±1.03) years, mean duration of menstrual rhythm was (53.58 ±5.66) days, while the mean duration of menstruation was (5.0± 0.57) days, mean number of menstrual cycles in the last year was (5.46±0.84) cycles, the majority (85.9%) of them had oligomenorrhea, less than one third (23.1%) with family history of diabetes, more than one third (37.2 %) of them have PCOS cases in their families.

Table (3) Shows that, there was a statistical significant differences in studied girls' knowledge regarding definition, causes, and signs and symptoms of PCOS post intervention (p<0.05). While there was a highly statistical significant differences regarding their knowledge about complications of PCOS post intervention as compared to pre intervention (p<0.000).

Table (4) Reveals that, there was a highly statistical significant improvement regarding PCOS indicators post intervention as compared pre intervention, in which the mean score related each item decreased in post than pre. Also, there was a significant decrease in weight, BMI waist circumference post intervention as compared pre intervention (p<.001). Moreover, after one year of lifestyle changes the hirsutism total score was significantly reduced (p<.001). A significant decrease in total Acne grade(t=8.35& p<.001).

Table (5) Illustrates that, more than one half (56.4%) of the studied sample were menstruating regularly after one year of lifestyle changes compared to none at baseline, girls who were amenorrhea and oligomenorrhea (14.1% and 85.9% respectively) was approximately halved at one year (2.5% and 37.2%) respectively with statistically significant differences (p<0.04) for amenorrhea and (p<.001) for oligomenorrhea

Figure (1) Shows that there was significant improvement in psychological health related quality of life of the studied sample post intervention as compared pre intervention.

Table(1) Distribution of the studied sample according to their socio-demographic and clinical characteristics (N=78)

Variable	No (%) or M ± SD	
Age/years		
< 20 years	28	35.9
20 - 25 years	50	64.1
M ± SD	20.54 ± 1.87	
Grade		
1st grade	12	15.4
2nd grade	24	30.8
3rd grade	27	34.6
4th grade	15	19.2
Residence		
Urban	41	52.6
Rural	37	47.4
Height(cm)	160.23 ± 2.33	
Body Weight (Kg)	81.56 ± 2.95	
BMI (kg/m2)	31.99 ± 0.79	
Waist circumference (cm)	99.51 ± 2.14	
Hirsutism score	17.44 ± 5.18	
Degree of Acne		
• Mild	14	17.9
• Moderate	61	78.2
• Severe	3	3.8
Mean ± SD	20.41± 6.36	

Table (2): Distribution of the studied sample according to their menstrual & gynecological historbaseline (No =78)

Variable	No &% or M ± SD	
Menarche Mean age ± SD	13.1±1.03	
Menstrual duration Mean days ± SD	5.0 ± 0.57	
Menstrual rhythm Mean days ± SD	53.58 ±5.66	
Menstrual rhythm in last year *Number of menstrual cycles	5.46± 0.84	
*Amenorrhea	11	14.1
*Oligomenorrhea	67	85.9
Family history of diabetes	18	23.1`
Family history of PCOS	29	37.2

Table (3): Distribution of the studied sample according to their knowledge regarding PCOS pre and post intervention. (No =78)

Items	Pre intervention						Post intervention						X ^{2}	P value
	Poor		Average		Good		Poor		Average		Good			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of PCOS	59	75.6	19	24.4	0	0.0	0	0.0	5	6.4	73	93.6	20.64	0.002*
Causes of PCOS	70	89.7	8	10.3	0	0.0	0	0.0	3	3.8	75	96.2	14.55	0.016*
Signs &symptoms of PCOS	71	91.0	7	9.0	0	0.0	0	0.0	6	7.7	72	92.3	11.00	0.027*
Complications of PCOS	67	85.9	11	14.1	0	0.0	0	0.0	2	2.6	76	97.4	23.02	0.000**

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

Table (4) Distribution of the studied sample according to their Body Weight, BMI, Waist Circumference, Hirsutism Score and acne degree at baseline and after one year intervention (No =78)

Variable	At baseline	After one year	T test	P value
Body weight (kg)	81.56 ± 2.95	72.96 ± 2.65	19.15	＜.001
BMI (kg/m2)	31.99 ± 0.79	28.62 ± 1.00	23.31	＜.001
Waist circumference (cm)	99.51 ± 2.14	94.78 ±1.23	16.89	＜.001
Hirsutism score	17.44 ± 5.18	11.87 ± 1.46	9.14	＜.001
Degree of Acne	20.41± 6.36	12.79 ±4.93	8.35	＜.001

Table (5) Distribution of the studied sample according to the rhythm of menstrual cycles at baseline and after one year intervention (No =78)

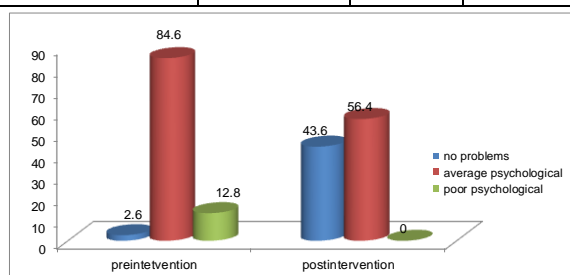| Variable	At baseline		After one year		T test or X ^{2}	P value
Menstrual rhythm: Number of menstrual cycles	5.46 ± 0.84		8.11 ±1.26		56.87	0.03
Amenorrhea	11	14.1	2	2.5	3.61	0.04
Oligomenorrhea	67	85.9	29	37.2	39.10	＜.001
Regular	0	0.0	44	56.4	61.28	＜.001

Figure (1) Distribution of the studied sample according to their psychological health related QOL pre and post intervention.

IV. Discussion

Lifestyle changes remain a concern for young women with PCOS. Lifestyle modifications geared to prevent long-term squeal remain the first-line treatment. [26]. Lifestyle changes, including diet, exercise, and behavioral modification, appear to improve the metabolic and reproductive abnormalities of overweight and obese patients with PCOS. Therefore, lifestyle changes appear to represent the first-line management for all overweight and obese patients with PCOS. [27]. Weight loss can be very effective in lessening many of the health conditions associated with PCOS, such as high blood pressure and diabetes. Sometimes weight loss alone can restore hormone levels to normal, causing many of the symptoms to disappear or become less severe. Healthy food habits and exercise is a great way to help combat the weight gain talking with other teens and women with PCOS is a great way to share information about treatment and get support. [28]. This study was carried out to evaluate the effect of lifestyle changes on symptoms of polycystic ovarian syndrome in obese girls. This aim was significantly achieved through the present study findings within the frame of previously mentioned research hypothesis which was the girls with polycystic ovarian syndrome who will accept to change their lifestyle would experience fewer symptoms than those who do not accept.

Regarding socio-demographic characteristic of the studied sample, the results of present study showed that, the mean age of the studied sample was (20.54±1.87)years. About two third of them had 3rd grade level and more than half of them live at urban area and the mean height was (160.23 ± 2.33cm), mean body weight was (81.56 ± 2.95kg), mean BMI was (31.99 ± 0.79 kg/m2), mean waist circumference was (100.46 ±1.76 cm), mean hirsutism score was (17.44± 5.18) and finally mean degree of acne was (20.41± 6.36). These findings in the same line with [16] who revealed that the mean age of subject was (20.4±1.5) years in both group and the other the general characteristics of the two groups were similar at the baseline (p>0.05). BMI for the study and control groups were almost identical (33.1±1.6 and 33.4±1.9) respectively. (90.2% and 92.7%) respectively were obese, Differences observed between the two groups for waist circumference and hirsutism score were not statistically significant.

The results of current study revealed a highly statistical significant difference of the studied sample weight and BMI, waist circumference post intervention as compared pre intervention. This finding is in congruent with [29] who found that, significant reduction in their anthropometric measures/weight loss; more than three quarter of the studied sample was obese, the intervention decreased this percent to less one half, this mean that the intervention successes to decrease the percentage of obesity by more than one third . Also similar to several studies done by [30] who attempted to establish the role of exercise in the treatment of obese PCOS patients. This may be explained by the fact that the majority of girl had a wish to good body image and conceive in the future therefore had a greater incentive to adhere to the change their life style.

Because a history of menstrual irregularity is considered normal in the first 1-2 years after menarche secondary to anovulation, the researcher decided to analyze only adolescent girls with oligomenorrhea more than 2 years post menarche, this period of time being considered a good screening indicator to diagnose PCOS. Acne, the first sign of hyperandrogenism manifested in the adolescent and hirsutism observed in our patients examined were suggestive for the clinical hyperandrogenism. The results of present study revealed a highly significant difference in hirsutism score and degree of acne post intervention as compared pre intervention P＜.001. This finding was supported by [30] who mentioned that weight reduction in obese patients diagnosed with PCOS has shown to alleviate some symptoms. It helps in reducing hirsutism and acne in patients with PCOS. Also, this findings are in agreement with [31, 32] who reported that, it is essential for females with PCOS to maintain a healthy weight and engage in regular physical activity through lifestyle changes to help reduce the symptoms of the syndrome. Conversely, disagrees with [33]who found that no significant changes of hirsutism scores by lifestyle intervention. Such disagreement may be related to younger age of studied girls in the current study. Had a mean age (20.54±1.87), compared to the Hoeger's sample who had a mean age of subject (29.4±5.7 years), post-pubertal, single, and had variable degrees of hirsutism, reflecting the exposure to the excess androgen in a relative shorter period of life.

The present study showed that the number of menstrual cycles increased from pre intervention (5.46± 0.84) to post intervention (8.11±1.26) and frequency of amenorrhea and oligomenorrhea was significantly decreased and leading to more than half of the studied girls have regular menstruation after one year of lifestyle changes. This findings are similarly with the study done by [34] who reported that weight loss alone through lifestyle changes improved menstrual frequency & ovulation. Also this finding in the same line with [35] who conducted a pilot study in New York on 24 young adult/adolescent women with PCOS, aiming to investigate the effect of weight loss on menstrual function by assigning the participants randomly into low fat or low caloric diet. The authors found that a significant increase in the average menstrual cycles over the study period from

(0.6±0.6) pre-treatment to (1.6±1.3) post-treatment (p<.003), with a weight loss of 6.5% (p<.001) in both dietary regimens groups. Also congruent with [36] who study the impact of a comprehensive lifestyle modification program on menstrual irregularities among 59 obese German girls with PCOS. After one year of lifestyle modification reported a significant decrease in the prevalence of amenorrhea and oligomenorrhea from baseline (by 42% and 19%, respectively) among the successful weight loss group .

On investigating knowledge of the studied girls regarding polycystic ovarian syndrome. The present study revealed that, there was a statistical significant differences in knowledge regarding definition, causes, and signs & symptoms of PCOS post intervention (p<0.05). While there was a highly statistical significant differences regarding their knowledge about complications of PCOS post intervention as compared to pre intervention (p<0.000). These findings are in agreement with [28] who reported that there was a significant differences between the knowledge scores regarding PCOS after structured teaching program on knowledge of polycystic ovarian syndrome among adolescent girls. Also these findings are in accordance with [37] who mentioned that, girls with PCOS felt that they had more knowledge and motivation to implement preventive health strategies after participating in a clinical research study. Education about how PCOS affects their immediate and long-term health enabled girls with PCOS to feel physical and psychological benefits and to engage more with their health care providers.

As regards psychological heath related quality of life of the studied girls, the present study findings reveled that there was significant differences in psychological heath related quality of life pre and post intervention. These finding are in the same line with [38] who reported that the psychological support is valuable in treating PCOS. Also supported by [39] who reported that lifestyle modification not only affect a woman physically, but it also influences the mental status. Various lifestyle modifications have been found to create positive changes in the many psychological aspects including mood and psychological well-being. Lifestyle modification leads to decreased levels of depression and anxiety and increased self-esteem and Health Related Quality of Life (HRQOL) scores for women with PCOS. Moreover these findings are in congruence with [40] who study the effect of exercises and body image distress in overweight and obese women with polycystic ovary syndrome and found that women who completed this program were reduced body image distress, despite changes in BMI. In summary, our results indicate that lifestyle change through exercise, stress management and sensible eating patterns can lead to improved reproductive/hormonal features in PCOS girls.

V. Conclusion
Based on the overall findings of the present study, it can be concluded that the results of the present study support its hypothesis that is to say that lifestyle changes positively affect in reduction the symptoms of polycystic ovarian syndrome.

IV. Recommendations
In the light of the findings of current study the following recommendations were be suggested:
1. As an implication for nurses to be aware of young Egyptian women's reluctance to seek help, and to actively promote the benefits of lifestyle changes and supportive follow up.
2. Replication of the present study on larger sample size at different institutions is recommended.
3. Further 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.

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Limitation of the study:
• The time for giving session for girls was difficult to be organized and coordinate between girls lecture time and practical training for the researcher; this was the main obstacle facing the researcher.
• There was some difficulty in persuading the girls for the research subject because of misconception, traditional and insufficient health awareness for them.

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