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. The primary markers of the syndrome are irregular or absent menstrual cycles, increased androgen production, male-pattern hair growth, and abnormal ovarian morphology.

Aim of the study: Aim of the study was to evaluate the effect of lifestyle change on symptoms of Polycystic Ovarian Syndrome in Obese Girls.

Design: A prospective intervention was adopted in the current study.

Setting: The study was conducted in the Faculty of Nursing at Benha University from 1st October 2014 to end of September 2015.

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) Structured Interviewing Questionnaire Sheet to assess the girls general 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 measures changes prepost intervention such as Anthropometrics measurement, The Ferriman- Gallwey scale to assess hirsutism, Global Acne Grading System (GAGS). And Psychological assessment tool to assess psychological Health of girls.

Results of the study showed highly significant difference in knowledge about PCOS and a highly significant improvements of menstrual frequency, problems and weight loss(P <.001). Also highly significant decreases in waist circumference(P <.001) and highly significant reduction in hirsutism total score and total acne score. Also significant difference in psychological status.

Conclusion: In conclusion the present study drew attention that lifestyle change with weight loss was effective in reducing symptoms of PCOS.

Recommendations: The study recommended to motivate the nurses in counseling the PCOS girls on lifestyle change. Future 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 change, 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]. Polycystic ovary syndrome (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]. Polycystic ovary syndrome (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 psychological 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 her 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 irregular menses 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 an endometrial carcinoma [18]. This stimulates the current study to evaluate the impact of a lifestyle change on irregular menses among girls with PCOS, 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:

Girls with polycystic ovarian syndrome who will accept to change their lifestyle will experience fewer symptoms than those who do not accept.

II. Material and Methods

2.1 Research design:

An a prospective intervention design was followed 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.
- 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 Structured Interviewing Questionnaire Sheet: It was developed by the research team after reviewing the related literature; it was consisted of four parts:
Part I: It covered the general characteristics of the girls as age, level of grade, residence .... etc.
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; number of meal/day, components of meal, duration and form of exercise consumption of caffeine.
Part IV: General knowledge related to polycystic ovarian syndrome. It consisted of (4) items (definition, causes, signs and symptoms, complication... etc). Scoring system of the girls has been scaled according to summation of knowledge. The scale was ranged between 0 and 6 and is divided into 3 grades; Poor (0), average (1) and good (2).

2.4.2 Follow up card:
Research team constructed Arabic card to assess the outcome measures: (1) change in menstrual cycle; (2) change in anthropometric measurements (body mass index (BMI) by measuring weight and height and calculate the body mass index (BMI) according to ranges of [19]: 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 [20] and recorded in centimeters to the nearest 0.1 cm.

4. Assessment of degree of hirsutism:
This was done by means of Ferriman and Gallwey scoring system,1961. This system grades 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- GallweyHirsutism total score. From a maximum possible score of 36, a score of ≥8 indicates androgen excess [21] 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 client’s privacy was strictly maintained.

5. Acne Evaluation:
Clinical assessments of current acne lesions were performed on the face and back of subjects according to the Global Acne Grading Scale (GAGS) [22]. The GAGS considers six locations on the face and chest/upper
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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 [23]:
It issued to assess girls’ psychological health before & after intervention. The scale used to evaluate the impact of problems associated with PCOS. It was translated to Arabic language and reviewed by jury. (It consists of 10 statements every girl 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 Total girls calculated the score ranged from (10-30); 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 study subject 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 program diet

2.4.5 Lifestyle change program it was designed as a comprehensive approach based on instruct the girls about energy-restricted diet, eating behaviors, and physical activity through instructional brochure and also included the concept, symptoms, diagnosis, long-term health risks of PCOS.

2.4.6 Tools Validity and Reliability:
The tools and the life style change program were reviewed for comprehensiveness, appropriateness, and legibility by an expert panel consisting of five obstetrics and woman 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 they were also 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% (7 girls) 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. The samples of the girls 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 (Sunday, Monday and Wednesday) from 9.00 am to 2.00 pm.
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Initial assessment phase

At the beginning the researcher distributed the questionnaires to find out the general characteristics of the girls with PCOS in all the four years for two weeks. Then application of the study according to the inclusion criteria. Then at the beginning of interview the researcher greeted the girls, introduced herself to all girls included in the study. Every girl was interviewed to collect general characteristics, menstrual, and gynecological history, and lifestyle habits; in addition to sheet was used to assess baseline measures related to PCOS in a time ranged from 10 to 15 minute at from the first session.

Full general and clinical assessment for anthropometry 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 nurse 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 research team. 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 change 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.[24]. 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 [25].

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. Result

Table (1) General and Clinical Characteristics of the study subject at baseline.

This table reveals the socio-demographic characteristics of the subjects under study. More than half (64.1%) of subject were between (20 –25 years) with mean age 20.54(±1.87), about one thirds of the studied girls (34.6 %) had 3rd grade, while the minority (15.4%) had 1st grade, nearly one half (52.6) of them live at urban area, 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 ).

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Table (2): Menstrual & gynecological history of the study sample at baseline

This table shows that the mean sample age of menarche is 13.1 (±1.03), their mean duration of menstrual rhythm is 53.58 (±5.66) days, while the menstrual duration has a mean of 5.0 (± 0.57) days, their mean number of menstrual cycles in the last year 5.46 (± 0.84), 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 the studied sample have PCOS cases in their families.

Table (3): Comparison of the study sample knowledge regarding PCOS

This table reveals that, there was a significant difference in studied girls knowledge regarding definition, causes, and signs & symptoms of PCOS (p<0.05). While there was a high significant difference regarding their knowledge about complication of PCOS as compared before and after intervention (p<0.000).

Table (4) Comparison of Body Weight, BMI, Waist Circumference, Hirsutism Score and acne degree at baseline and after application of life style change program

This table reveals at the end of the study period, highly significant improvement post intervention than pre intervention regarding PCOS indicators, in which the mean score related each item decreased in post than pre. There is a significant decrease in weight loss where (t=19.15 & p<.001), BMI (t=23.31 & p<.001), a significant decrease in waist circumference than at baseline (t=16.89 & p<.001), after one year of lifestyle change the hirsutism total score was significantly reduced in the study subject (t=9.14 p<.001), a significant decrease in total Acne grade(t=8.35 & p<.001).

Table (5) Comparison of Rhythm of Menstrual Cycles at baseline and after application of life style change program

This table reveals that after one year of lifestyle change, 44 girls (56.4%) were menstruating regularly 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 ($X^2 = 3.61, p = 0.04$) for amenorrhea;$X^2 = 39.10, p < .001$) for oligomenorrhea.

Figure (1) This figure revealed pre intervention girls poor psychological status 12.8% with significant improvement post intervention also showed no problem (good psychological status) 43.6% post intervention.

Table (1) General and Clinical Characteristics of the Study Sample at Baseline (N=78)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No (%) or M ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>28 (35.9)</td>
</tr>
<tr>
<td>20 - 25 years</td>
<td>50 (64.1)</td>
</tr>
<tr>
<td>M ± SD</td>
<td>20.54 ± 1.87</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>1st grade</td>
<td>12 (15.4)</td>
</tr>
<tr>
<td>2nd grade</td>
<td>24 (30.8)</td>
</tr>
<tr>
<td>3rd grade</td>
<td>27 (34.6)</td>
</tr>
<tr>
<td>4th grade</td>
<td>15 (19.2)</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>41 (52.6)</td>
</tr>
<tr>
<td>Rural</td>
<td>37 (47.4)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>160.23 ± 2.33</td>
</tr>
<tr>
<td>Body Weight (Kg)</td>
<td>81.56 ± 2.95</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>31.99 ± 0.79</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>99.51 ± 2.14</td>
</tr>
<tr>
<td>Hirsutism score</td>
<td>17.44 ± 5.18</td>
</tr>
<tr>
<td>Degree of Acne</td>
<td></td>
</tr>
<tr>
<td>• Mild</td>
<td>14 (17.9)</td>
</tr>
<tr>
<td>• Moderate</td>
<td>61 (78.2)</td>
</tr>
<tr>
<td>• Severe</td>
<td>3 (3.8)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>20.41 ± 6.36</td>
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</table>
## Table (2): Menstrual & gynecological history of the study sample at baseline (No =78)

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<thead>
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<th>Variable</th>
<th>No &amp;% or M ± SD</th>
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</thead>
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<td>Menarche</td>
<td>13.1±1.03</td>
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<td>Mean age ± SD</td>
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<tr>
<td>Menstrual duration</td>
<td>5.0 ± 0.57</td>
</tr>
<tr>
<td>Mean days ± SD</td>
<td></td>
</tr>
<tr>
<td>Menstrual rhythm</td>
<td>53.58 ±5.66</td>
</tr>
<tr>
<td>Mean days ± SD</td>
<td></td>
</tr>
<tr>
<td>Menstrual rhythm in last year</td>
<td>5.46± 0.84</td>
</tr>
<tr>
<td>*Number of menstrual cycles</td>
<td></td>
</tr>
<tr>
<td>*Amenorrhea</td>
<td>11</td>
</tr>
<tr>
<td>*Oligomenorrhea</td>
<td>67</td>
</tr>
<tr>
<td>Family history of diabetes</td>
<td>18</td>
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<tr>
<td>Family history of PCOS</td>
<td>29</td>
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## Table (3): Comparison of the study sample knowledge regarding PCOS.

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of PCOS</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td></td>
</tr>
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<td>No %</td>
<td>No %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>75.6</td>
<td>19</td>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>Causes of PCOS</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>No %</td>
<td>No %</td>
<td>No %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>89.7</td>
<td>8</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>Signs &amp; symptoms of PCOS</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>No %</td>
<td>No %</td>
<td>No %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>91.0</td>
<td>7</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>Complications of PCOS</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>No %</td>
<td>No %</td>
<td>No %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>67</td>
<td>85.9</td>
<td>11</td>
<td>14.1</td>
<td></td>
</tr>
</tbody>
</table>

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

## Table (4) Comparison of Body Weight, BMI, Waist Circumference, Hirsutism Score and acne degree at baseline and after application of life style change program (No =78)

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

## Table (5) Comparison of Rhythm of Menstrual Cycles at baseline and after application of life style change program (No =78)

<table>
<thead>
<tr>
<th>Variable</th>
<th>At baseline</th>
<th>After one year</th>
<th>T test or X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menstrual rhythm:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of menstrual cycles</td>
<td>5.46 ± 0.84</td>
<td>8.11 ±1.26</td>
<td>56.87</td>
<td>0.03</td>
</tr>
<tr>
<td>Amenorrhea</td>
<td>11</td>
<td>14.1</td>
<td>2</td>
<td>3.61</td>
</tr>
<tr>
<td>Oligomenorrhea</td>
<td>67</td>
<td>85.9</td>
<td>29</td>
<td>37.2</td>
</tr>
<tr>
<td>Regular</td>
<td>0</td>
<td>0.0</td>
<td>44</td>
<td>56.4</td>
</tr>
</tbody>
</table>
Lifestyle changes remain a concern for young women with PCOS. Lifestyle modifications geared to prevent long-term sequel 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].

Regarding Socio-demographic characteristic of the studied girls with PCOS, the study showed that, the mean girls’ age was 20.54 ± 1.87. While about two thirds of the studied girls had 2nd and 3rd grade and nearly half of them live at urban area and the mean score of girls’ height was 160.23 ± 2.33 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 1).

The current study revealed a highly significant difference about the weight and BMI, Waist circumference, between pre and post intervention (table 2). This is in congruent with [29]; they found that, significant reduction in their anthropometric measures/weight loss; 78 % of the study sample was obese, the intervention decreased this percent to 44 %, this means that the intervention successes to decrease the percentage of obesity by 34 percentage point. Also Similar to several studies have attempted to establish the role of exercise [30] 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 have had a greater incentive to adhere to the protocol.

Because a history of menstrual irregularity is considered normal in the first 1-2 years after menarche secondary to anovulation, we 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 result of present study revealed a highly significant difference about Hirsutism score and degree acne from pre to post intervention P value <.001. This Supporting by [30] who mentioned weight reduction in obese patients diagnosed with PCOS has shown to alleviate some symptoms. It helps in reducing hirsutism and acne in patients that have PCOS. Also agreed with [31 , 32 ]they 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], mentioned did not find significant changes of hirsutism scores by lifestyle intervention and/or metformin use. Such disagreement may be related to younger age of studied clients in the current study. Had a mean age (20.54 ± 1.87), compared to the Hoeger’s sample who had a mean age of 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 $5.46 \pm 0.84$ to post intervention $8.11 \pm 1.26$ and frequency of amenorrhea and oligomenorrhea was significantly decreased and led more than half of the participants to have regular menstruation after one year of lifestyle intervention due to instruction done about lifestyle changes at the present study. This similarly, the study done by [34], who reported that weight loss alone through lifestyle changes improves menstrual frequency & ovulation. The present study results agreed with the findings also in the same line with [35] They had 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 had found a significant increase in the average menstrual cycles over the study period from $0.6 \pm 0.6$-pre-treatment to $1.6 \pm 1.3$ post-treatment ($p = 0.003$), with a weight loss of $6.5\%$ ($p < 0.001$) in both dietary regimens groups. Also congruent with [36] reported that a previous study had analyzed the impact of a comprehensive lifestyle modification program on menstrual irregularities among 59 obese German girls with PCOS. After one year of lifestyle modification the reported a significant decrease in the prevalence of amenorrhea and oligomenorrhea from baseline (by 42% and 19%, respectively) among the successful weight loss group.

Concerning girls’ knowledge about polycystic ovarian syndrome. The present study revealed that, there was significant improvement of girl's knowledge after intervention compared to before guidelines in relation to definition, causes, symptoms & signs and complications of PCOS (table 3). This is in agreement with [28], they reported that, significant difference between the mean pre-test and post-test knowledge scores regarding PCOS after structured teaching programed on knowledge of polycystic ovarian syndrome among adolescent girls in this respect [37], 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 girl's psychological and emotional quality of life, there was significant difference before and after application intervention (figure 2). This agrees with [38] reported that, psychological support is valuable in treating PCOS, also in the same line with [39] reported that, lifestyle modification not only affect a woman physically, but it also influences her mentally. Various lifestyle modifications have been found to create positive changes in regards to 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 [40] they stated that, one program, that involved a brisk-walking regimen, found that women who completed the program had 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.

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.

V. Conclusion and Recommendation

Based on the study findings the researchers conclude that lifestyle changes results in a significant reduction of menstrual irregularity, weight reduction from the baseline value. Such findings stimulate the following recommendations:
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 change and supportive follow up.
2- 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.
3- Future research with larger sample size at different institutions is recommended.

Reference

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Effect of Lifestyle changes on symptoms of Polycystic Ovary Syndrome in Obese Girls


[40] Liu, L. M., Nesic, J., Chadwick, P. M., Brooke-Wavell, K., & Prelevic, G. M. (2008): Exercise and body image distress in overweight and obese women with polycystic ovary syndrome: A pilot investigation. Gynecological Endocrinology, 24(10), 555-56