# Effect of Educational Programme on Lifestyle among Paramedical Students with Polycystic Ovarian Syndrome

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## Abstract

**Background:** Polycystic Ovarian Syndrome (PCOS) is one of the most common female endocrine disorders, which affect about 5%-10% of women worldwide during their reproductive age. **Aim:** To evaluate the effect of educational program on lifestyle for paramedical students with polycystic ovarian syndrome. **Setting:** The study conducted at two government colleges in Jordan. **Study Design:** A Quasi- experimental (pre-test & post-test) design was utilized in this study. **Sample type:** A purposive sample. **Sample size:** 68 students. **Tools of Data Collection:** Identification of students with PCOS tool, Assessment of lifestyle habits tool, POCS structured interviewing questionnaire tool, Follow up sheet, and Psychological assessment tool. **Results:** The present study findings revealed that a highly significant difference regarding the student's knowledge about the PCOS as compared pre, post, and follow-up program results. Also, there was a significant improvement in the student's lifestyle habits after applying to the educational program compared to before applying them. **Conclusion:** The results of the study supported the study hypothesis which students who attendance the educational program regarding polycystic ovarian syndrome, will be improve their knowledge scores and their lifestyles. **Recommendations:** Applying screening program for PCOS in young students is a very important to reduce the long-term health complications associated with PCOS.

**Keywords:** Polycystic Ovary Syndrome, Lifestyle, Educational program.

## Introduction

Polycystic Ovarian Syndrome (PCOS) or Stein-Leventhal is one of the most common endocrine disorders which affect about 5%-10% of women worldwide during their reproductive age ***(Hassan & Said Farag, 2019).***

However, POCS is usually characterized by features of ovulation irregularities, a combination of hyperandrogenism (either clinical or biochemical), and polycystic ovaries. It is frequently associated with insulin resistance and obesity ***(Kriedt et al., 2019)***.

Globally, the prevalence of PCOS is highly variable, ranging from 2.2% to as high as 26%. While up to 70 % of women who suffer from PCOS remain undiagnosed. However, there have been numerous diagnostic criteria for PCOS, which include the National Institutes of Health (NIH) criteria, Rotterdam criteria, and the Androgen Excess Society (AES) criteria ***(Sulaiman et al., 2017).***

While the exact cause of PCOS is still unclear, there are many suggested hypotheses showed that the pathophysiology of PCOS due to a combination of hyperandrogenism and/or

insulin resistance, genetic and environmental factors contributing to hormone disturbances combine with other factors, including obesity, ovarian dysfunction, and hypo-thalamic-pituitary abnormalities ***(Batool et al., 2018).***

Moreover, PCOS treatment typically involves medication and lifestyle modification. Lifestyle modifications are the first-line treatment of PCOS. So, several guidelines recommend exercise therapy and a calorie-restricted diet as a significant part of the management of women with PCOS ***(Shermin et al., 2019).*** For this reason, educational program play important role in increase awareness women among PCOS by improving their understanding of their condition and can address the expressed needs during change lifestyle such as increase physical activity ***(Mani et al., 2018).***

**Significance of the Study**:

Polycystic ovary syndrome is a common condition associated with serious physiological and psycho-logical health consequences can affects negatively on women's across their reproductive lifespan in worldwide such as anxiety, depression, poor self-esteem, alters the coping abilities, and decrease quality of life, insulin resistance, obesity, and cardiovascular disease ***(Sha et al., 2019).***

**Aim of the Study**:

To evaluate the effect of educational programme on lifestyle for paramedical students with polycystic ovarian syndrome.

**Research Hypothesis:**

Students who attendance the educational program regarding polycystic ovarian syndrome, will be improve their knowledge scores and their lifestyles.

**Subject and Methods**:

**Study Design:**

A Quasi- experimental pre-test & post-test was utilized to achieve the aim of the current study.

**Setting:**

The study was conducted in two government colleges in Jordan:

1. Rafidah Al-Aslamia College of Nursing/Midwifery and Paramedical.
2. Nusaiba Al-Maznieh College for Nursing /Midwifery & Paramedical.

**Sampling:**

**Sample size and Technique:**

- All students in the all grades of both colleges (745) were included to assess with polycystic ovary symptoms.
- The students diagnosed with the polycystic ovarian syndrome for the intervention study (68).
- A total number (68) of was a participant from Rufaida College (n= 48) and the (n= 20) was a participant from Nusaiba College.

**Sample type:** Purposive sample

**Tools of Data Collection:** A data collection tools were developed by the researcher after reviewing the related literature and written in simple clear Arabic language, its including the following:-

**Tool (I): Identification of student with PCOS**. : This tool was designed by the researcher to identify the students with PCOS. It encompassed two main parts including:-

Part (1): Clinical parameters of PCOS, which included hirsutism, acne, and acanthosis nigricans, and it included 5 questions.

Part (2): Biochemical parameters of PCOS, which included (17-Alpha hydroxyprogesterone, serum testosterone,

follicular stimulating hormone (FSH), luteinizing hormone (LH), prolactine, and fasting insulin) for students not diagnosed with PCOS.

**Tool (II): POCS Structured Interviewing Questionnaire**. This tool was designed by the researcher to collects data. It encompassed three main parts:-

**Part (1):** General characteristics and physical characteristics of the students. It involved personal data such as age, residence, grade, family type, level of father's and mother's education, family history of the PCOS, and physical characteristics such as height, weight, body mass index and waist circumference.

**Part (2):** This part was designed to assess the menstrual history of the students such as the age of menarche, cycle length.

**Part (3):** This part was used to assess students' knowledge regarding polycystic ovarian syndrome such as definition, causes, signs and symptoms risk factors, complications, and treatment.

❖ **Scoring system:**

This scoring system was used to assess the student's knowledge would be checked with a model key answer, the score range will be assigned to each answer as follows:
1- Correct = 2 marks.
2- Incorrect = 1 mark.
* Level of satisfaction: -
> 60% = Satisfaction level.
< 60% = Un Satisfaction level.

**Tool (III): Assessment of Lifestyle Habits Tool.** This tool was designed by the researcher in the Arabic language to assess the student's lifestyles habits. It encompassed four main parts: -

**Part (1):** This part was designed to assess the student's food habits such as types of food intake, frequency, components of meal.

**Part (2):** This part was designed to assess the student's physical activity such as type of exercise, times of exercise.

**Part (3):** This part was designed to assess the student's leisure time such as watch TV, frequency, use of computer.

**Part (4):** This part was designed to assess the student's sleep pattern such as sleep hour's daily, nap time.

**Tool (IV): Follow up sheet**. Was constructed by the researcher to assess the outcome measures and was filled by the students.

**Tool (V): Psychological Assessment Tool**. This tool was developed by the researcher to assess psychological health It included items; anxiety, depression, and mood fluctuation for students related to lifestyle before & after the intervention.

❖ **Scoring system:**

The score range between 3, 2, or 1 was assigned to each answer representing no problem, some problem, severe problem. Then the total score was calculated by summation of the scores of its items (30); students with a total score from (1≤10) were specified as leaving poor psychological lifestyle, students with a total score from (10 ≤ 20) were specified as leaving average psychological lifestyle and students with a total score from (20≤ 30) were specified as leaving good psychological lifestyle.

**Validity and Reliability of Tools:**

All tools of data collections were developed and sent to three experts at gynecological department to assess the content Also, assess reliability of tool through Cronbach's Alpha Test (0.826).

**1- Preparatory Phase:**

The researcher was reviewed the current advanced and past relevant

literature related by using the available local and international books, magazines, periodicals, and computer search, then design and prepare tools for data collection.

**2-Implementation phase:**

In this phase, the researcher provided an educational program for each diagnosed students.

**Field work:**

At the beginning of the interview, the researcher greeted the students, introduced herself to all students and explained the purpose of the current study; the researcher distributed the identification students with PCOS tool for all students and analyzed it to exclude the students without PCOS.

The researcher took the students included in the study who suffer from PCOS in another session. Oral approval of the student was obtained after explaining the purpose of the study. Then distribute all tools of research to all the years as (pre-test). The average time needed for the completion of each questionnaire was (30-50) minutes.

The study group was divided into subgroups (10 groups) and every group contained (5) students. The researcher has implemented 5 sessions for each group (5 days / week), 1 hour for each session according to the students' schedule. In the first session, the researcher was distributed the educational program for the students based on their needs and baseline data obtained from pre-test.

PCOS definition, anatomy and physiology of ovaries were discussed during the 1st session. Also, the anthropometric measurements for every student were measured and documented. While the 2nd and 3rd session concerned with causes, signs & symptoms, complications, and treatments of PCOS. While fourth and fifth session concerned with instructs the girls about energy-restricted diet, and physical activity.

After the final session, the post-test was conducted by using the same tool used in the pre-test. The researcher was repeated the post-test after three months of the conduction first post-test. The researcher has applied the follow-up after six months. The same previous fieldwork steps were applied to all subgroups in other college.

**3- Follow-up Phase**: Follow up throughout nine months for students after receiving the educational program, the researcher followed up with the students through regular meetings and phone calling or using social media like WhatsApp messages for assuring that they followed the diet and exercise program.

**4- Evaluation phase:**

This phase was started post-intervention with an educational program to evaluate the effect of this program on lifestyle for paramedical students with polycystic ovarian syndrome by using the same questionnaire used before the implementation of the program. In the six month, the follow up test was conducted to evaluate the students' knowledge level and their lifestyles.

**Administrative Design:**

Approval was obtained from the Ministry of Health of Jordan for conducting the study in the designed setting. A written letter was issued from the ministry of health to the Deans of colleges to facilitate the current study.

**Statistical Design:**

The collected data were organized, categorized, tabulated, and analyzed using the appropriate statistical methods. Data were analyzed using Statistical Program for Social Science (SPSS) version 22.0.Tests were used for coding and analyzing the

results that were presented in tables, figures, and graphics as required.

**Results:**

**Table (1):** reveals that more than two third of the studied sample (73.5%) had age ranged between 18-20 years, more than half of the studied sample was midwifery students (51.4%) ,more than one third grade had 2nd grade, more than half of students' lives in city ,and the majority of the studied sample (80.9%) lives in the nucleolus family.

**Table (2):** shows that there was a highly significant difference in all items related to the studied students' lifestyle about diet pattern as compared pre, post, and follow-up intervention (P≤0.001) except the place of daily meals there was no statistical differences between pre, post, and follow up applying to the educational program.

**Table (3):** clears that there was a highly significant difference in studied students' lifestyle regarding their exercise as compared pre, post, and follow-up applying to the educational program (P≤0.001).While there was no significant differences in times of exercise as compared pre, post, and follow-up applying to educational program (P>0.05).

**Table (4):** clears that, there was a highly significant difference in the studied sample according to their psychological status compared to pre, post, and follow-up applying the educational program (P≤0.001).

**Figure (1):** shows that, 745 of the studied sample students were screened for PCOS, using Identification of student with PCOS tool. 90.87% of them were free from the symptom of PCOS, while 9.12% of them diagnosed of PCOS.

**Figure (2):** shows that, there was a highly significant improvement in all items clinical features of PCOS related to the studied students' as compared pre, post, and follow-up applying the educational program.

**Table (1):** Frequency distribution of the students diagnosed with PCOS according to their general characteristics (n=68).

| General characteristics | No. | % |
|---|---|---|
| **Age** | | |
| 18-20 years | 50 | 73.5 |
| 21-23 years | 15 | 22.1 |
| 24 -25 years | 3 | 4.4 |
| **Mean ± SD** | **19.89±1.7** | |
| **Specialization** | | |
| Technology of Radiology | 6 | 8.8 |
| Anesthesia and Resuscitation | 8 | 11.8 |
| Sanitation | 9 | 13.2 |
| Midwifery | 35 | 51.5 |
| Medical Records | 7 | 10.3 |
| Sterilization | 3 | 4.4 |
| **Grade** | | |
| 1st grade | 21 | 30.9 |
| 2nd grade | 24 | 35.3 |
| 3rd grade | 23 | 33.8 |
| **Residence** | | |
| City | 35 | 51.5 |
| Village | 33 | 48.5 |
| **Family type** | | |
| Nucleolus | 55 | 80.9 |
| Extended | 13 | 19.1 |

**Table (2):** Frequency distribution of the students diagnosed with PCOS according to their diet pattern pre, post, and follow up applying for the educational program (n=68).

| Items | Pre intervention | | Post intervention | | Follow up | | $X^2$ | P-value |
|---|---|---|---|---|---|---|---|---|
| **Number of meals daily** | **No.** | **%** | **No.** | **%** | **No.** | **%** | | |
| One meal/day | 5 | 7.4 | 4 | 5.9 | 3 | 4.4 | | |
| Two meals/day | 35 | 51.4 | 16 | 23.5 | 14 | 20.6 | 33.18 | 0.001** |
| Three meals/day | 11 | 16.2 | 33 | 48.5 | 42 | 61.8 | | |
| Four meals or more/day | 17 | 25.0 | 15 | 22.1 | 9 | 13.2 | | |
| **Place of daily meals** | | | | | | | | |
| Inside the house | 13 | 19.1 | 16 | 23.5 | 22 | 32.4 | | |
| Outside the house | 41 | 60.3 | 35 | 51.5 | 30 | 44.1 | 4.903 | 0.297 |
| The college housing | 14 | 20.6 | 17 | 25.0 | 16 | 23.5 | | |
| **Eat meals from outside the home/week** | | | | | | | | |
| Rarely | 8 | 11.8 | 21 | 30.9 | 33 | 48.5 | | |
| Once a week | 14 | 20.6 | 10 | 14.7 | 10 | 14.7 | 7.543 | 0.05* |
| 2-3 times a week | 25 | 36.8 | 19 | 27.9 | 13 | 19.2 | | |
| 4 or more | 21 | 30.9 | 18 | 26.5 | 12 | 17.6 | | |
| **Type of highly used food/day** | | | | | | | | |
| Meat | 8 | 11.8 | 7 | 10.3 | 5 | 7.4 | | |
| Fish | 4 | 5.9 | 6 | 8.8 | 8 | 11.8 | | |
| Vegetables and fruits | 10 | 14.7 | 13 | 19.1 | 13 | 19.1 | | |
| Carbohydrate | 25 | 41.2 | 13 | 19.1 | 8 | 11.8 | 39.544 | 0.001** |
| Sugar food | 16 | 16.2 | 10 | 14.7 | 5 | 7.4 | | |
| Legumes | 3 | 10.3 | 3 | 4.4 | 2 | 2.9 | | |
| All of them | 2 | 2.9 | 16 | 23.5 | 27 | 39.7 | | |
| **Meals skip/day** | | | | | | | | |
| Rarely | 9 | 13.2 | 10 | 14.7 | 15 | 22.1 | | |
| Once a week | 12 | 17.6 | 22 | 32.4 | 34 | 50.0 | 26.039 | 0.001** |
| 2-3 times a week | 34 | 50.0 | 25 | 36.8 | 10 | 14.7 | | |
| 4 or more | 13 | 19.1 | 11 | 16.2 | 9 | 13.2 | | |
| **Eat fast food/week** | | | | | | | | |
| Rarely | 11 | 16.2 | 16 | 23.5 | 32 | 47.1 | 33.398 | 0.001** |
| Once a week | 10 | 14.7 | 25 | 36.8 | 18 | 26.5 | | |
| 2-3 times a week | 37 | 54.4 | 20 | 29.4 | 15 | 22.1 | | |
| 4 or more | 10 | 14.7 | 7 | 10.3 | 3 | 4.4 | | |
| **Eat sweets, chocolate, cake** | | | | | | | | |
| Once a week | 11 | 16.2 | 30 | 44.1 | 49 | 72.1 | 43.745 | 0.001** |
| 2-3 times a week | 20 | 29.4 | 13 | 19.1 | 9 | 13.2 | | |
| 4 or more | 37 | 54.4 | 25 | 36.8 | 10 | 14.7 | | |
| **Freq. eating fruits/day** | | | | | | | | |
| Sometimes | 34 | 50.0 | 16 | 23.5 | 7 | 10.3 | 30.464 | 0.001** |
| Once | 25 | 36.8 | 31 | 45.6 | 34 | 50.0 | | |
| Twice | 7 | 10.3 | 15 | 22.1 | 2 | 2.9 | | |
| Three more times | 2 | 2.9 | 6 | 8.8 | 6 | 8.8 | | |
| **Freq. eating meat/day** | | | | | | | | |
| Sometimes | 43 | 63.2 | 20 | 29.4 | 11 | 16.2 | 35.200 | 0.001** |
| Once | 22 | 32.4 | 40 | 58.8 | 50 | 73.5 | | |
| Twice | 3 | 4.4 | 8 | 11.8 | 7 | 10.3 | | |
| **Amount of water consumed daily in cups** | | | | | | | | |
| 2 Cups | 29 | 42.6 | 10 | 14.7 | 6 | 8.8 | 31.018 | 0.001** |
| 3-4 Cups | 18 | 26.5 | 25 | 36.8 | 20 | 29.4 | | |
| 5-6 Cups | 13 | 19.1 | 14 | 20.6 | 16 | 23.5 | | |
| 7-8 Cups | 8 | 11.8 | 19 | 27.9 | 26 | 38.2 | | |

****highly significant (P≤0.001)**

**Table (3):** Frequency distribution of the students diagnosed with PCOS according to their exercise pattern pre, post, and follow up applying for the educational program (n=68).

| Items | Pre intervention | | Post intervention | | Follow up | | $X^2$ | P-value |
|---|---|---|---|---|---|---|---|---|
| **Practice Exercise regularly** | **No.** | **%** | **No.** | **%** | **No.** | **%** | | |
| No | 43 | 63.2 | 21 | 30.9 | 8 | 11.8 | 49.095 | 0.001** |
| Sometimes | 9 | 13.2 | 14 | 20.6 | 13 | 19.1 | | |
| 1-2 a week | 11 | 16.2 | 19 | 27.9 | 17 | 25.0 | | |
| 3-4 a week | 5 | 7.4 | 14 | 20.6 | 30 | 44.1 | | |
| **Kind of sport practiced** | | | | | | | | |
| Walking | 7 | 25.0 | 20 | 29.4 | 25 | 36.8 | 57.145 | 0.001** |
| Running | 1 | 1.5 | 1 | 1.5 | 1 | 1.5 | | |
| Aerobics exercise | 6 | 8.8 | 13 | 19.1 | 12 | 17.6 | | |
| Swimming | 1 | 1.5 | 1 | 1.5 | 1 | 1.5 | | |
| House sports machines | 10 | 41.7 | 33 | 48.5 | 29 | 42.6 | | |
| **Times of Exercise** | | | | | | | | |
| Morning | 25 | 36.8 | 30 | 44.1 | 26 | 38.2 | 3.005 | 0.557 |
| Afternoon | 6 | 8.8 | 4 | 5.9 | 2 | 2.9 | | |
| Evening | 37 | 54.4 | 34 | 50.0 | 40 | 58.8 | | |

****highly significant (P≤0.001)**

**Table (4):** Comparison of the studied sample according to their total psychological status compared to pre, post and follow up applying the educational program.

| Items | Pre intervention | Post intervention | Follow up | ANOVA | |
|---|---|---|---|---|---|
| **Psychological status** | **Mean ± SD** | **Mean ± SD** | **Mean ± SD** | **f** | **p-value** |
| | **20.89 ± 3.22** | **13.82 ± 5.59** | **12.22 ± 1.59** | **98.35** | **0.001**** |

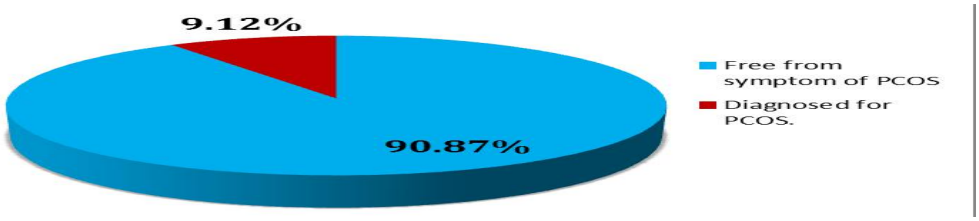


**Fig (1):** Percentage distribution of the students regarding the diagnosed of PCOS (n=745).

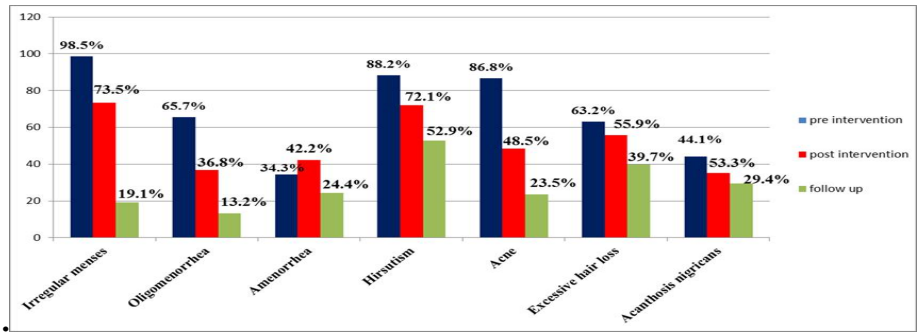


**Fig (2):** Percentage distribution of the diagnosed studied sample regarding their clinical features of PCOS as compared pre, post, and follow up applying the educational program (n=68).

## Discussion:

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of childbearing age. This syndrome is characterized by ovulation irregularities, clinical with or without biochemical hyper-androgenism, and polycystic ovaries. In addition to the clinical and hormonal features ***(Abdolahian et al., 2020).***

The results of the current study aimed to test the research hypothesis "students who attendance the educational program regarding polycystic ovarian syndrome, will be improve their knowledge scores and their lifestyle". This study conducted in two government colleges in Jordan by using a quasi-experimental (pre-test and post-test) design.

Globally, prevalence estimates of PCOS are highly variable, ranging from 2.2% to as high as 26%. Moreover, the prevalence of adverse obstetric and neonatal outcomes differed by geographical continent ***(Bahri, et al., 2019).***

Regarding the distribution of the total studied sample, the finding of the current study revealed that, the prevalence of PCOS was found to be 9.12% among the total study sample.

The finding in the current study is congruent with the study conducted by ***Ibrahim (2018),*** who studied screening polycystic ovarian syndrome-diet, exercise program in Egypt, and reported that the prevalence of PCOS was 6.6 %. On the contrary, the finding of the current study does not match with the finding of the study conducted by ***Biradar & Shamanaewodi, (2015),*** who reported that, the prevalence of PCOS was 23.8%. From the researcher's point of view, the prevalence of PCOS in the current study was within the worldwide range (5%-10%) according to the National Institute of Health (NIH, 2012), but in the reality, the Jordanian community denies this problem and believed it is stigma.

Regarding distribution of the subjects diagnosed according to their general characteristics data, the current study reveals that more than two third of the studied sample had age ranged between 18-20 years, more than half of the studied sample was midwifery students, more than one third grade had 2nd grade, more than half of students' lives in city, and the majority of the

studied sample lives in the nucleolus family.

The findings in the current study are congruent with the study conducted by ***Shrivastava & Jagdev, (2019),*** who studied the effectiveness of self-instructional module on knowledge regarding polycystic ovarian syndrome among B.Sc. nursing students of selected nursing college and stated that, the age of the majority of the participated students was between 17 to 20 years and more than half of them lived in the city.

Similarly, this result is congruent with the study done by ***Salama, et al, (2019)*** who studied the effect of self-instructional module on awareness of polycystic ovarian syndrome among adolescent students and reported that, the majority of the study sample live in nucleolus family.

Lifestyle management is recommended for all patients with PCOS emphasis on controlled eating patterns by reduced fat intake and increased fiber and regular aerobic exercise to achieve weight control. In addition to lifestyle intervention helps to improve body composition, cardiorespiratory fitness, and insulin resistance ***(Scott et al., 2017).***

Regarding the subjects diagnosed with PCOS according to their diet pattern, the current study revealed that there was a highly significant difference in all items related to the studied students' lifestyle about diet pattern as compared pre, post, and follow-up intervention ($P \leq 0.001$) except the place of daily meals and frequency daily drinking caffeine, there was no statistical differences between pre, post, and follow up applying to the educational program. While there was significant differences in the studied students' lifestyle about diet pattern in frequency times eat meals from outside the home as compared pre, post, and follow-up applying to educational program ($p < 0.05$).

This finding is in agreement with ***Pitchai, et al., (2016),*** who studied the awareness of lifestyle modification in females diagnosed with polycystic ovarian syndrome in India and reported that, the majority of the studied sample altered their diet primarily in diet composition after intervention.

In the same line, this result is supported by ***Szczuko, et al., (2017),*** who studied the qualitative assessment of components of diets of women with PCOS as one of the major factor contributing to the disease in Poland and found that, correct diet and maintenance of proper nutritional status should be the basis of the therapy for women with PCOS. From the researcher's point of view, this result may be due to the majority of students had a wish to good body image and conceive in the future, therefore, had a greater motivation to adhere to the change in their lifestyle.

Physical activity is considered important for women with PCOS, but evidence suggests exercise conjunction with low carbohydrate diet has a greater ability to increase weight loss. ***(Blackshaw et al., 2019).***

Regarding distribution of the study sample according to exercise pattern, the current study revealed that there was a highly significant difference in studied students' lifestyle regarding their exercise as compared pre, post, and follow-up applying to the educational program ($P \leq 0.001$).While there was no significant differences in times of exercise as compared pre, post, and follow-up applying to educational program ($P > 0.05$).

This finding is in agreement with study done by ***Abdolahian, et al., (2020),*** who studied the effect of lifestyle modifications on anthropometric, clinical, and biochemical parameters in adolescent girls with PCOS in Iran and revealed that, exercise interventions were associated with significant changes in the menstrual cycles, also improvement in metabolic and hormonal findings.

Psychological health is related to the management of PCOS and is an essential component of self-efficacy and enjoying a healthy lifestyle. ***(ZareMobini et al., 2018).***

Regarding of the psychological status of studied sample, the current study revealed that, there was a highly significant difference in all items related to the studied students' psychological status as compared pre, post, and follow-up applying the educational program.

This result is congruent with ***Abd Elmenim & Emam, (2016),*** who studied the effect of lifestyle changes on symptoms of polycystic ovarian syndrome in obese girls in Benha University, Egypt, and indicated the presence of significant differences in psychological health related quality of life pre and post-intervention.

Similarly, the result of the current study congruent with ***Mani, et al., (2018),*** who studied the effectiveness of structured education programs in women with polycystic ovary syndrome and reported that, the education program improved participants' illness perception, emotions, and general mental well-being.

Weight loss and increased physical activity in combination with a change in diet reduce the risk complication of PCOS. This approach is better than treatment with medication and hence be held the first-line treatment in managing women with PCOS **(Patterson, 2017).**

Regarding physical char characteristics of the studied sample, the current study revealed that, there was a highly significant difference in all items concerning the studied students' anthropometric measures (weight, body mass index, and waist circumference) as compared pre, post, and follow-up applying the educational program.

This finding is in agreement with study conducted by ***Almukhtar, (2019),*** who studied the effect of an educational program about polycystic ovarian syndrome on knowledge of adolescent female students in Iraq and indicated that, presence of significant improvement in adolescent female students' weight and their body mass index. In addition, this result is in agreement with study done by ***Marzouk et al., (2015),*** who studied the impact of a lifestyle modification program on menstrual irregularity among overweight or obese women with polycystic ovarian syndrome and concluded that, significant improvement in body mass index, and waist circumference post intervention.

From the researcher's point of view, this result may be due to adherence to the instructions and diet system that affect their anthropometric measures positively.

## Conclusion

Based on the results of the present study the following can be concluded:-

- Students with polycystic ovarian syndrome had a major deficiency of knowledge of PCOS before applying the educational program with a

significant improvement in the student's knowledge level after receiving the educational program.

- The educational program significantly improved the lifestyle for students concerning diet and exercise, which positive affected their clinical features of PCOS.
- The educational program significantly improved the student's psychological status after applying the educational program. The conclusion of the present study has supported the hypothesis of the study and aim.

## Recommendations:

In the light of the current study findings, the following recommendations are suggested:

- The creation of a screening program for PCOS in young students is a very important item regarding general health and lifestyle.
- Provide an educational program about main items of PCOS and negative effects on the reproductive health in the paramedical students & non paramedical students.
- Further researches are required to evaluate the impact of this study on a large sample size in another setting about students suffering from PCOS to improve their knowledge and lifestyle through continuous counseling, support, and encouragement.

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