Lifestyle and Reproductive Health in Female Nursing Students about Polycystic Ovary Syndrome: Teaching Program

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Abstract

Background: Lack of knowledge regarding polycystic ovary syndrome and poor lifestyle is considered to be the major factor leading to polycystic ovary syndrome. **Aim:** To evaluate lifestyle and reproductive health in female nursing students about polycystic ovary syndrome: teaching program. **Study design:** A Quasi- experimental design was utilized in the present study. **Setting:** The study was carried at Faquos nursing technical institute the study was carried at Faquos Nursing Technical Institute from the first of November 2022 to the end of March 2023. **Subjects:** A Convenient sample was used in the study (200 females nursing students). **Tools:** A structured interview tool, lifestyle assessment tool and reproductive health knowledge assessment tool were used for data collection. **Results:** There was a marked improvement in all subscales of students' lifestyle and knowledge post implementation of educational program with a highly statistically significant difference at (P= < 0.001). There was high a significant statistical positive correlation between female nursing students' lifestyle and knowledge during pre (r=0.514), post (r=0.641) and follow up phase (r=0.688) of educational program. **Conclusions:** The educational program significantly improved the lifestyle for students concerning diet, physical activity, body mass index, leisure time, sleeping and emotional status. Educational program was effective in improving the knowledge of female nursing students regarding PCOS. **Recommendations:** Implementation of an educational program about main items of PCOS and negative effects on the reproductive health for all students (medical and non-medical).

Keywords: Polycystic ovary syndrome, Knowledge, Educational program and Lifestyle.

Introduction

Polycystic Ovary Syndrome (PCOS) is a multisystem disorder with reproductive, metabolic, and psychological manifestations. A woman is diagnosed with PCOS if she has any two of these criteria: hyperandrogenism (biochemical or clinical); irregular cycles (>35 days or <21 days); and polycystic ovarian morphology (PCOM) ***(Maghadam et al., 2018)*** [(1)].

The Rotterdam Consensus Workshop (2003) concluded that PCOS is a syndrome of ovarian dysfunction along with the cardinal features of hyperandrogenism and PCOM. PCOS remains a syndrome and, as such, no single diagnostic criterion (such as hyperandrogenism or PCO) is sufficient for clinical diagnosis. Its clinical manifestation may include menstrual irregularities, signs

of androgen excess and obesity, insulin resistance and elevated serum LH. Levels are also common features in PCOS. PCOS is associated with increased risk of type II diabetes and cardiovascular events (**Capozzi et al., 2020) [(2)].**

There is significant variation between the results of the epidemiological studies investigating the prevalence of PCOS. The reported prevalence of PCOS in different studies defined by National Institutes of Health (NIH) criteria is mostly consistent varying between 5 and 10%, whereas, with Rotterdam and Androgen Excess Society (AES) criteria, prevalence of PCOS is between the range of 2–21%, and 2–17%, respectively. The variation might be due to study population characteristics and selection ***(Deswal et al., 2020) [(3)]***.

However, the etiology of PCOS remains unknown. There is experimental evidence that androgen administration, increasing GnRH or LH release, or inducing insulin resistance (IR) can produce phenocopies of the syndrome. Having a risk factor as (Hereditary factor, hormonal factor, lifestyle factors environmental factor or psychological stress) for polycystic ovary syndrome makes the chances of getting a condition higher ***(Stener-Victorin et al., 2020) [(4)]***.

Kalyanaraman & Pal (2021)[(5)] indicated that insulin resistance and hyperandrogenemia is a key player in the pathogenesis of this complex disorder. Hyperandrogenemia is also a known consequence to hepatic and systemic insulin resistance. Hyperinsulinemia resulting from insulin resistance inhibits the hepatic synthesis of sex hormone binding globulin (SHBG) resulting in excess of circulating free androgens.

PCOS is a syndrome occurs in women of childbearing age. PCOS causes symptoms like irregular or no periods, acne, hirsutism, and male pattern baldness. Women with PCOS possess higher levels of androgen and lower levels of progesterone. This leads to undesirable complications such as infertility, ovarian dysfunction, hormonal imbalance, gestational diabetes, neonatal complications and first-trimester spontaneous abortion ***(Teede et al., 2018)[(6)].***

Tay et al., (2020)[(7)] stated that diagnosis of PCOS is usually based on collection of objective and subjective data through, physical examination, and laboratory tests. Conditions that can cause similar symptoms (e.g., hypothyroidism, ovarian cancer, adrenal cancer) must often be ruled out before a definitive diagnosis can be made.

Recent research shows that women with PCOS are at higher risk than women who don't have PCOS for a variety of health concerns, and many don't occur until later through life. These conditions are not yet considered "symptoms" of PCOS, but they occur in a high number of women with PCOS. These problems include Infertility Type II (adult-onset) diabetes Cardiovascular diseases Endometrial cancer Metabolic Syndrome Psychological complications ***(Zehravi, Maqbool & Ara 2021)[(8)].***

There is no cure for PCOS till now. So the focus of treatment is directed toward the needs of the patient, decreasing androgen levels to improve hirsutism, protecting the endometrium, optimizing reproductive function in those desiring fertility and to help prevent long-term complications of the syndrome. The treatment includes pharmacological and non- pharmacological treatment. The initial therapeutic strategy in PCOS should be directed at management of the patient's presenting symptoms ***(Rollene, 2020) [(9)]***.

As there is currently no cure for PCOS, it has a negative impact on lifestyle.

However, sometimes physical and psychological consequences of the disease are difficult to cope with and may eventually lead to sever problems. For women with PCOS, lifestyle has primarily focused on its symptoms, such as hirsutism, acne, irregular menses, infertility and recently obesity ***(Szczuko et al., 2021)[10]*.**

Hassan et al., (2019)[11] indicated that, the nurses can have a positive effect on women with PCOS. To avoid long-term health problems, education helps women understand the syndrome, and its associated risk factors, and encourages women to make positive lifestyle changes.

Significance of the study:

Polycystic ovary syndrome is a common condition associated with serious physiological and psycho-logical health consequences can affects negatively on females across their reproductive lifespan such as anxiety, depression, poor self-esteem, decrease quality of life, insulin resistance, obesity, and cardiovascular disease ***(Sha et al., 2019)[12] . James et al., (2019[13])*** stated that awareness of females about PCOS is important for therapy and to avoid extra severe consequences of it by providing health education to the client for better health by creating a positive attitude toward healthy life style, good balanced and high vitamin diet and maintain daily exercise or any health promotion activities.

The researcher works clinical instructor at Faquos Nursing Technical institute. The researcher observed that, eating fast food became a common phenomenon between students so that the researcher decided to conduct this study.

Aim of the study:

Was to evaluate lifestyle and reproductive health in female nursing students about polycystic ovary syndrome: teaching program

The previous aim was fulfilled through the following objectives: -

1-Determine female nursing students lifestyle regarding polycystic ovary syndrome.

2-Identify reproductive health knowledge of female nursing students about polycystic ovary syndrome and effect of PCOS on reproductive health.

3-Design and implement teaching program about lifestyle and reproductive health knowledge regarding polycystic ovary syndrome for female nursing students.

4-Evaluate the effect of teaching program on lifestyle and reproductive health knowledge about polycystic ovary syndrome for female nursing students.

Research hypothesis:

Lifestyle and reproductive health knowledge in female nursing students about polycystic ovary syndrome suspected to be improved after implementation of teaching program.

Subjects and Methods:

I- Technical design:

Technical design of this study includes description of research design, the study setting, subjects and tools of data collection.

Research design

Quasi-experimental design was used to accomplish the objectives of the present study.

Setting

The present study was conducted at Faquos Nursing Technical Institute, Sharqia government affiliated to faculty of nursing at Zagazig University.

Subjects:

Tools for data collection:

Data collection was done through the use of the following tools:

Tool I: **Structured Interview Questionnaire :**

It was developed by the researcher after reviewing related literature as **(Devi et al., 2017)[14], (Jayshree et al., 2017)[15] and (Patel, 2021)[16]** to collect the basic data about the following

Part 1: Demographic data of female nursing students

Part 2: Medical history of diseases, family history of diseases and family history of PCOS.

Part 3: Menstrual history and presence of signs of ovulation

Tool II: Lifestyle Assessment Questionnaire:

It included the following parts:

Part1: Dietary habits: it was developed by **(Al kurdi, 2021)[17]** and modified by the researcher

Part 2: physical activity: it was developed by **(Al kurdi, 2021)[17]** and modified by the researcher

Part 3: Body Mass Index (kg/m2): it was developed by the researcher according to **(Zhao et al., 2020)[18]** it included data as: weight by kg, height by m and classification of Body Mass Index according to the following formula: BMI= Weight (kg) / {Height(m)}^{2}.

Part4: leisure time: it was developed by **(Al kurdi, 2021)**[17] and it was added some items by the researcher**.**

Part 5: Sleeping pattern: it was developed by **(Al kurdi, 2021)**[17] and modified by the researcher**.**

Part 6: Emotional status: it is a part of Health promoting lifestyle profile (HPLP) which was developed by **(Walker et al., 1987)[19]** . The nursing students' responses were measured on a five- point Likert scales ranging from always (5) to never (1).

Scoring system of total lifestyle:

- The nursing student's score was considered healthy lifestyle if it is (≥60).
- The nursing student's score was considered unhealthy lifestyle if it is (<60).

Tool III: Reproductive Health Knowledge Assessment Questionnaire: to collect data about the following:

Part 1: Anatomy and physiology of female reproductive system: it was developed by the researcher after reviewing literature as **(Pramodh, 2020)[20]** and **(John, 2021)[21].** It included open and closed end questions about organs of internal female reproductive system and anatomy and physiology of these organs.

Part 2: Menstruation: it was developed by the researcher after reviewing literature as **(Kirthika et al., 2019)[22].** It included open question about the meaning of menstruation and closed end questions about menarche and physiology of menstruation.

Part 3: Infertility: it was developed by the researcher after reviewing literature as **(Pramodh, 2020**[20]**).** It included open questions about the meaning of infertility, types ,causes of it and relationship between infertility and PCOS.

Part 4: Polycystic ovary syndrome PCOS: it was developed by the researcher after reviewing literature as **(Abu-Taha et al., 2020)[23]** and **(Mohamed et al., 2022)[24]** to collect data as: previous information about polycystic ovary syndrome and source of it and it included open question about the meaning of polycystic ovary syndrome and closed end

questions about risk factors ,clinical picture, diagnosis, complications and management of PCOS.

Scoring system of knowledge:

In open questions, the nursing students' responses were measured on a two points: complete correct (was given 1 scores), and incorrect (was given 0 score).

In closed end questions, the nursing students' responses were measured on three- points: yes (was given 1 scores), no (was given 0 score) and do not know (was given 0 score).

Scores (≥60%) indicates satisfactory knowledge.

Scores (<60%) indicates unsatisfactory knowledge.

II- Operational design:

The operational design includes: validity, reliability, pilot study, field work and ethical considerations.

Preparatory phase:

During this phase, the researcher reviewed local and international literature to get more knowledge about the study through text books, articles and scientific magazines. This also helped in designing the study tools and educational program booklet.

Validity:

The questionnaire was reviewed by a panel of three experts in obstetrics and gynecological nursing ,faculty of nursing, Zagazig University. Experts were requested to express their opinions and comments on the tool and provide any suggestions for any additions or omissions of items. According to their opinions, recommended modifications were performed by the researcher.

Reliability:

The reliability of the data collections tools was measured through Alpha Cronbach reliability analysis. It was 0.817 for lifestyle assessment tool, 0.795 and for Knowledge assessment tool.

Pilot study:

A pilot study was carried out on 10 % of study subjects (20 female nursing students) to test applicability, feasibility, practicability of the tool. In addition, to estimate the time required for filling in the questionnaire sheets. Female nursing students were selected randomly and excluded from the main study sample and the necessary modifications were done according to the results of the pilot study.

Field work:

The following phases were used to achieve the study's objectives: assessment, planning, implementation, and evaluation. These phases were completed over 5 months period from the first of November, 2022 to the end of March, 2023.

1-Assessment Phase:

At the beginning of the interview, the researcher greeted each student and provided them with information about the study's purpose, duration, instructions for completing the questionnaire, and activities. This phase involved interviewing the study's participants for the first time to gather baseline data.

This was done in the educational lecture hall during the participants' free time. They have been informed that their participation is entirely voluntary and that they have the opportunity to end it whenever they choose. All students gave their approval orally and they have been told that their participation and their right to discontinue at any time are optional. Each student was given a self-administered questionnaire. Average time for the completion of each studied student self-administered questionnaire was around (30 minutes).

2-Planning Phase:

Based on the findings from the assessment phase and a pertinent literature study, the researcher created the intervention program and session materials and **Self-learning booklet** which was prepared in the light of the literature of the subject and was revised by the supervisors. **Booklet outlines,** anatomy and physiology of internal female reproductive system, menstruation and physiology of it, meaning of hormones and types of female hormones, meaning of infertility, types and causes of it, PCOS (definition, risk factors, signs & symptoms, complications and management) and components of healthy lifestyle. Before implementing the educational sessions, the students were divided into two groups (each group specific to a different academic year), according to their availability and free time, to make it easier for them to attend the sessions. For a month, the material was broken up into eight interactive sessions that were held "once a week" for each group of students. The length of each session was half hour. Lessons were delivered to the students utilizing audiovisual aids (PowerPoint presentations, films, graphics, and printed Arabic booklets) in the form of lectures and group discussions.

3-Implementation phase:

Implementation of an educational sessions took two months. These students were divided into two groups. This allocation is made in accordance with their free time, theoretical lectures, and practical portions to make it easier for them to attend the sessions and complete their academic obligations.

At Faquos Nursing Technical Institute, these sessions were conducted in the instructional lecture hall. For eight weeks straight, each set of students participated in one interactive session of the divided topic. Each session lasted around 30 min, during which a PowerPoint presentation was made and backed with videos and pictures, then a group discussion was conducted.

To grasp students and hold their interest, simple explanation language, modern teaching strategies and media, instructional brochure, and supplies of pencils and notes were given to the students for gathering feedback. The educational pamphlet offers all the most recent data on PCOS.

To make sure the student understood the material and to re-explain any incomprehensible material, feedback was given at the conclusion of each session and at the start of each one on the previous one.

4 -Evaluation and follow up Phase:

In this phase, the researcher asked the students to complete a post-test at the end of the final session to compare their knowledge and lifestyle toward PCOS before and after the educational sessions. Then after three months another post-test was introduced to students to evaluate continuous effect of educational program. This allowed students to see how the educational program had an impact on the their knowledge and lifestyle toward PCOS.

III-Administrative design:

To carry out this study in the selected setting, Official permission was obtained from the director of Technical Institute of Nursing. The researcher obtained lists of female students' number of each grade in the Institute, after an explanation of study objectives, as well as an individual oral consent was obtained from each participant in the study.

Ethical consideration:

The study was approved by the ethics committee and dean of Faculty of Nursing, Zagazig University and director of Technical Institute of Nursing. Likewise, an individual Oral consent was received from each student after explaining the purpose of the study. Nursing students were given an opportunity to refuse or to participate and they were assured that the information would be used confidentially and used for the research purpose only. Confidentiality was confirmed by maintaining anonymity of subject's data.

IV Statistical design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X2) between the group during the two visits and during the three visits were assessed by Friedman test. In addition, R-test were used to identify the correlation between the study variables.

Level of significance:

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)
- P-value < 0.05 Significant (S)
- P-value ≤ 0.001 Highly Significant (HS).

Results:

Table (1): showed the demographic characteristics of female nursing students. It clarifies that, 49.0% of the female nursing students their age was 19 years, the mean ± SD of student's age was 18.57± 0.572 years. Also, 75.5% of them were residing in rural areas. As regard to marital status, 96.5% of them were single. Moreover, 42.0% of female nursing students, whose father have university education, and 55.5% of them were government employee. Furthermore, 48.5% of female nursing students, whose mother have secondary education, and 52.5% of them were housewife.

Table (2): showed the distribution of female nursing students according to their menstruation history. It was observed that, 76.5% of female nursing students, their age at menarche was 12 - 16 years, with a mean SD of 13.01 ± 1.74 years. Also, 76.5% of them have menstruation every 21-35 days. Moreover, 71.0% of them change 2-3 pads daily. And, 75.5% of them menstruate 3 - 7days. Moreover, 72.0% of them have regular menstruation. While, 43.5% of them don't observe the exact time of their ovulation. As well as, 74.0% and 43.5% of them have excessive, thin, clear, stretched mid-cycle vaginal discharge and mild change in body temperature during mid-cycle period, respectively. Moreover, 80.0% of them have signs of premenstrual syndrome as breast tenderness, muscle pain, mood swings and sleep disturbance.

Figure (1) showed the distribution of female nursing students according to presence of signs of ovulation. It was detected that, 74.0% of female nursing students have signs of ovulation.

Table (3): showed the distribution of female nursing students according to reported anthropometric measurements. It was noticed that, there is a marked improvement in all items of students' anthropometric measurements post implementation of educational program with a highly statistically significant difference at (P= < 0.05). As evidence, 52.0% of female nursing students have normal weight before implementing the educational program. While, changed to

(57.5% and 59.0%, respectively) during post and follow up phase of educational program.

Table (4): showed the distribution of female nursing students according to total lifestyle. It was revealed that, there is a marked improvement in all subscales of students' lifestyle post implementation of educational program with a highly statistically significant difference at (P= < 0.001). As evidence, 35.0% of female nursing students have healthy lifestyle before implementing the educational program. While, changed to 80.0% after implementation of educational program and 77.5% during follow up phase of educational program.

Figure (2): Prevalence of signs and symptoms may be associated with polycystic ovary syndrome. It showed that, 37.0% of female nursing students have excessive acne. Also, 20.0% of them have patches of dark skin.

Figure (3): Distribution of female nursing students according to their total knowledge during pre, post and follow up phase of educational program. It showed that, 22.5% of female nursing students have satisfactory level of total knowledge before implementing the educational program. While, changed to 83.0% after implementing the educational program and 79.0% during follow up phase of educational program.

Table (5): explained that, there is high a significant statistical positive correlation between female nursing students' lifestyle and knowledge during pre (r=0.514), post (r=0.641) and follow up phase (r=0.688) of educational program.

Discussion:

PCOS represents a major stress factor in the lives of females with this syndrome. The effect of physical appearance, including hirsutism, acne and seborrhea and hair loss cause psychological distress, in particular their feminine identity according to body image problems making the women less attractive and less satisfied with her physical appearance leading to changes in life style **(Matevossian & Carpinello 2020)[25]**. Therefore, the present study aimed to evaluate lifestyle and reproductive health in female nursing students about polycystic ovary syndrome: teaching program.

Regarding demographic characteristics of the studied female nursing students, the current study revealed that the age of nearly half of study subject was 19 years, the mean ± SD was 18.57± 0.572 years. This result is similar to a study conducted in Egypt at Banha university by **Mohamed et al., (2022)[23]** that was done to assess "Knowledge and Attitude of Late Adolescent Girls regarding Polycystic Ovarian Syndrome" found that more than half of the late adolescent girls (58.6%) were 19 years old with the mean ± SD 18.47 ± 0.52 years.

The finding of current study regarding marital status revealed that the majority of female nursing students were single. This result goes in the same direction with a study in Pakistan to assess "prevalence and knowledge of polycystic ovary syndrome (PCOS) among female science students of different public universities of Quetta" that carried out by **Haq et al., (2017)[27]** indicated that majority of respondents, 427 (94.7%) were single, and 120 (26.6%) were married.

In the contrast of this result a study in Jordan conducted by **Abu-Taha et al., (2020)[23]** reported that almost half of the participants were married (n = 110, 48.5%) and half were single (n = 110, 48.5%. in relation to this difference, this study was applied in science private university while

the current study was done in technical institute.

Regarding menstrual history, the present study indicated that three quarter of female nursing students, their age at menarche was 12 - 16 years, with a mean SD of 13.01 ± 1.74 years. Also, nearly two third of them had regular menstruation (every 21-35 days). Moreover, majority of them had moderate menstrual bleeding. And, three quarter of them menstruate 3 - 7days.

These results were supported by **Chauhan et al., (2021)[28]** who indicated in their study that around 43.3% of the samples attained menarche at 13-14 years whereas 41.6% attained at 11-12 years Majority of the samples (96%) had no menstrual irregularities.

On the other hand, a study conducted in Turkey to assess "Anxiety and depression states of adolescents with polycystic ovary syndrome" by **Emeksiz et al., (2018)[29]** indicated that majority of adolescents attained menarche in between 15-16 years.

Also **Alfanob et al., (2022)[30]** in Sudan stated that distribution of the sample by their menstrual cycle characteristic, regarding to age of menarche, (52.8%) of the students were the age group range from 9-12 years. From the researcher point of view, this difference in age of menarche may be related to variation in geographical area and climate changes.

The current study showed that there was a marked improvement in all subscales of students' lifestyle post implementation of educational program with a highly statistically significant difference at (P= < 0.001). As evidence, third of female nursing students had healthy lifestyle before implementing the educational program. While, changed to more than three quarter after implementation of educational program and three quarter during follow up phase of educational program.

In agreement with this result, a study was carried out by **Hoeger (2020)[31]** in a study entitled "Role of life style modification in the management of polycystic ovary syndrome" indicated that as regard to quality of life, the majority of studied nursing students (33.7%) had high quality of life before, while almost three quarter (75.7%) of them had high quality of life with statistically significant (t= 43.040, p =<0.001) after implementation of the educational guidelines.

In the contrast of this study, **Ekramzadeh et al., (2020)[32]** in Iran who reported that the total quality of life pre- and post-intervention among the studied sample, high quality of life was 20.00% before and 59.20% after intervention. From the researcher's point of view this difference in results may be related to, the current study was done on adolescent and the other study was on older women so that changing lifestyle is easier in young age.

The present study reported that there was a marked improvement in students' knowledge regarding polycystic ovary syndrome post implementation of educational program with a highly statistically significant difference at (P= < 0.001). As evidence, few of female nursing students had correct answer regarding the meaning, risk factors, clinical picture, diagnosis, complications and management of polycystic ovary syndrome before implementing the educational program. While majority of them had correct answer regarding these items during post and follow up phase of educational program.

This result was supported by **Mohamed et al.,(2022)[24]** in a study entitled "Knowledge and Attitude of Late

Adolescent Girls regarding Polycystic Ovarian Syndrome" showed that, majority (94.69%, 95.85%, 94.79%, 97.31%, 95.42%) of the students' had correct knowledge regarding to diagnosis, causes, risk factors, complications, and management respectively after education program.

The current study indicated that there was a marked improvement in all subscales of students' knowledge post implementation of educational program with a highly statistically significant difference at (P= < 0.001). As evidence, one quarter of female nursing students had satisfactory level of total knowledge before implementing the educational program. While, more than three quarters of them had satisfactory level of total knowledge after implementing the educational program.

This result in agreement with **Shrivastava and Jagdev (2019)[33]** who indicated in their study about "Effect of Self Instructional Module on awareness of Polycystic Ovarian Syndrome among Adolescent Students" majority of respondents (82.9%) were not aware of PCOS and provided education and after educational intervention most of the respondents (90.2%) were have adequate knowledge about PCOS.

The present study concluded that there was highly statistically significant relation between total students' knowledge at pre-intervention and their demographic characteristics as level of father's and mothers' education at (P= < 0.001). Also, there was statistically significant relation with their age, educational grade, marital status and family income at (P= < 0.05). While, there was no statistically significant relation with their location of residence and occupation of father's and mothers' at (P= > 0.05).

These results were supported by **Rawat et al., (2017)[34]** who reported that there was a highly statistical significant relation between late adolescent girls' level of knowledge about polycystic ovarian syndrome and demographic characteristics (age, educational class, mother's education, mother's job, and father's education) ($P \leq 0.05$). Meanwhile, there was no statistical significant relation between level of knowledge and father's job.

In addition, the results indicated that, there was statistically significant relation between total students' lifestyle during post and follow up phase of educational program and their educational grade, marital status, level of father's and mothers' education and family income at (P= < 0.05). While, there was no statistically significant relation with age, location of residence and occupation of father's and mothers' at (P= > 0.05).

This result nearly matched with **Arentz et al., (2021)[35]** in their study about "Perceptions and experiences of lifestyle interventions in women with polycystic ovary syndrome (PCOS), as a management strategy for symptoms of PCOS" demonstrated that there was high a significant statistical positive correlation between female nursing students' lifestyle and knowledge during pre (r=0.514), post (r=0.641) and follow up phase (r=0.688) of educational program.

Conclusion:

According to the findings of the present study, it can be concluded that:

- The present study revealed that there was a marked improvement in all subscales of students' lifestyle post implementation of educational program with a highly statistically significant difference at (P= < 0.001).

- There was a marked improvement in all subscales of students' knowledge post implementation of educational program with a highly statistically significant difference at (P= < 0.001).
- Educational program was effective in improving the knowledge of female nursing students regarding PCOS. The conclusion of the present study has supported the hypothesis of the study and aim.

Recommendation:

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

- Creation of a screening program for PCOS in young students is a very important item regarding general health and lifestyle.
- Implementation of an educational program about main items of PCOS and negative effects on the reproductive health for all students (medical and non-medical).

Table (1): Distribution of female nursing students according to demographic characteristics (n=200).

Items	No.	%
Age (Years)		
18	94	47.0
19	98	49.0
20	8	4.0
Mean ± SD	**18.57± 0.572**	
Location of residence		
Rural	151	75.5
Urban	49	24.5
Marital status		
Single	193	96.5
Married	7	3.5
Level of father's education		
Illiterate, read and write	48	24.0
Primary	10	5.0
Secondary	49	24.5
University	84	42.0
Postgraduate	9	4.5
Level of mother's education		
Illiterate	12	6.0
Read and write	25	12.5
Primary	9	4.5
Secondary	97	48.5
University	52	26.0

Postgraduate	5	11.5
Occupation of student's father		
Government employee	111	55.5
Self-employee	65	32.5
Not working	24	12.0
Occupation of student's mother		
Government employee	71	35.5
Self-employee	24	12.0
Housewife	105	52.5

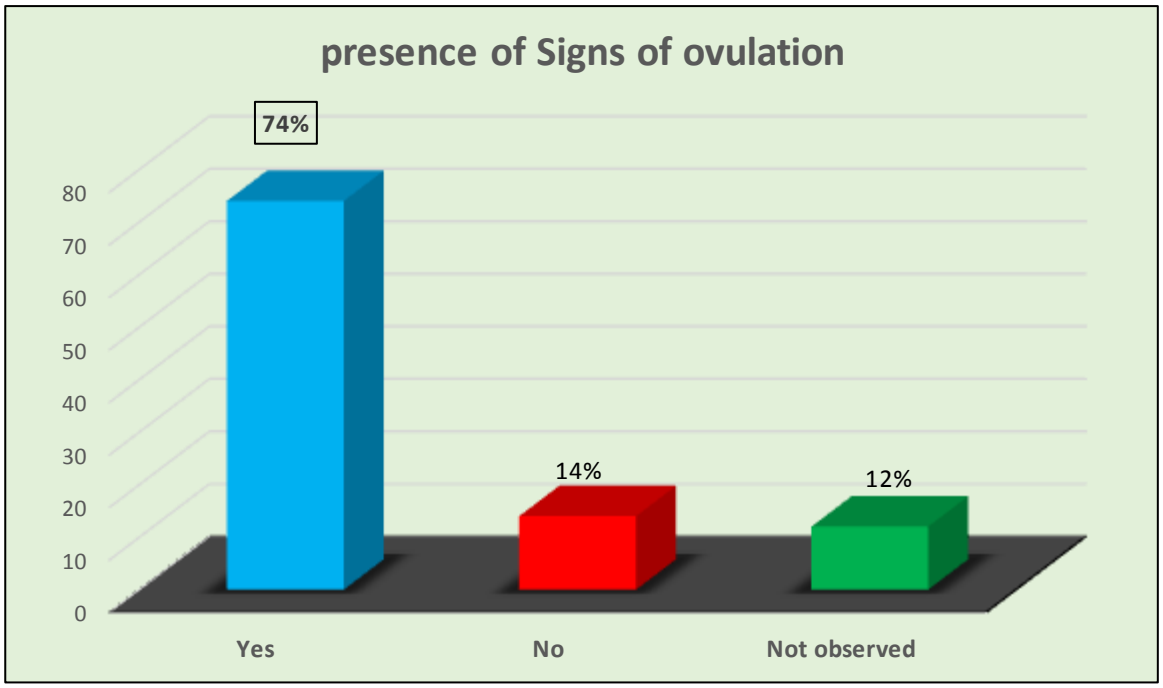

Figure (1): Distribution of female nursing students according to signs of ovulation (n=200).

Table (2): Distribution of female nursing students according to menstrual history and characteristics (n=200).

Items	**No.**	**%**
Age of menarche (years)		
< 12	36	18.0
12 - 16	153	76.5
> 16	11	5.5
Mean ± SD 13.01 ± 1.74		
Frequency of menstruation		
Less than 21 days	42	21.0
21-35 days	153	76.5
More than 35 days	5	2.5
Number of saturated pad are changed/ day		
1pad	16	8.0
2-3pads	142	71.0
More than 3pads	42	21.0
Duration of menstruation		
Less than 3 days	24	12.0
3days - 7days	151	75.5
More than 7 days	25	12.5
Regularity of menstruation		
Regular	144	72.0
Irregular	56	28.0
Know the exact time of ovulation		
Yes	49	24.5
No	64	32.0
Not observed	87	43.5
Have excessive, thin, clear and Stretched mid-cycle vaginal discharge		
Yes	148	74.0
No	29	14.5
Not observed	23	11.5
Have mild change in body temperature during Mid-cycle period		
Yes	87	43.5
No	28	14.0
Not observed	85	42.5
Have signs of premenstrual syndrome as breast tenderness, muscle pain, mood swings and sleep disturbance		
Yes	160	80.0
No	22	11.0
Not observed	18	9.0

(*) Responses not mutually exclusive

Table (3): Distribution of female nursing students according to their reported anthropometric measurements during pre, post and follow up phase of educational program (n=200).

Items	Pre- program		Post- program		Follow-up		Test of Sig. (p_1)	Test of Sig. (p_2)	Test of Sig. (p3)
	No.	%	No.	%	No.	%			
Weight by kg									
45-<55	24	12.0	20	10.0	18	9.0	X^2=9.004 P=0.046*	X^2=0.514 p=1.000	Fr=10.00 P=0.044*
55-<65	60	30.0	65	32.5	66	33.0			
65-<75	76	38.0	78	39.0	79	39.5			
≥ 75	40	20.0	37	18.5	37	18.5			
Height by cm									
150-<160	65	32.5	65	32.5	64	32.0	0	X^2=0.098 p=1.000	Fr=0.124 P=1.000
160-<170	111	55.5	111	55.5	112	56.0			
≥ 170	24	12.0	24	12.0	24	12.0			
Body Mass Index (kg/m2)									
less than 18.5 (underweight)	20	10.0	16	8.0	15	7.5	X^2=8.978 P=0.048*	X^2=0.115 p=1.000	Fr=9.500 P=0.047*
18.5 to <25 (normal weight)	104	52.0	115	57.5	118	59.0			
25.0 to <30 (overweight)	50	25.0	49	24.5	48	24.0			
30.0 or higher (obesity)	26	13.0	20	10.0	19	9.5			

X^2: Chi-square test. Fr= Friedman test P= p-value.

No significant at p >0.05. * Significant at p ‹ 0.05.

P_1: p value for comparing between pre and post program.

P_2: p value for comparing between the in post and Follow-up program

P_3: p value for comparing between the three sessions.

Table (4): Distribution of female nursing students according to their total lifestyle during pre, post and follow up phase of educational program (n=200).

Items	Pre- program				Post- program				Follow-up				Test of Sig. (p_1)	Test of Sig. (p_2)	Test of Sig. (p_3)
	Healthy lifestyle		Unhealthy lifestyle		Healthy lifestyle		Unhealthy lifestyle		Healthy lifestyle		Unhealthy lifestyle				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Dietary habits	68	34.0	132	66.0	160	80.0	40	20.0	153	76.5	47	23.5	X^2=22.09 P=.000**	**X^2=1.015 p=0.440**	**Fr=39.40 P=.000****
Physical activity	56	28.0	144	72.0	149	74.5	51	25.5	141	70.5	59	29.5	X^2=21.24 P=.000**	**X^2=1.112 p=0.354**	**Fr=38.06 P=.000****
Leisure time	72	36.0	128	64.0	162	81.0	38	19.0	155	77.5	45	22.5	X2=25.40 P=.000**	**X2=1.001 P=0.429**	**Fr=39.08 P=.000****
Sleeping pattern	75	37.5	125	62.5	165	82.5	35	17.5	160	80.0	40	20.0	X2=21.11 P=.000**	**X2=1.050 P=0.441**	**Fr=35.89 P=.000****
Emotional status	82	41.0	118	59.0	168	84.0	32	16.0	163	81.5	37	18.5	X2=21.05 P=.000**	**X2=0.992 P=0.500**	**Fr=34.10 P=.000****
Total lifestyle	70	35.0	130	65.0	160	80.0	40	20.0	155	77.5	45	22.5	X^2=21.46 P=.000**	**X2=0.966 P=0.520**	**Fr=41.01 P=.000****

X^2: Chi-square test. Fr= Friedman test p= p-value No significant at p >0.05. * Significant at p ‹ 0.05. **Highly significant at p ‹ 0.01.

P_1: p value for comparing between pre and post program. P_2: p value for comparing between the in post and Follow-up program

P_3: p value for comparing between the three sessions.

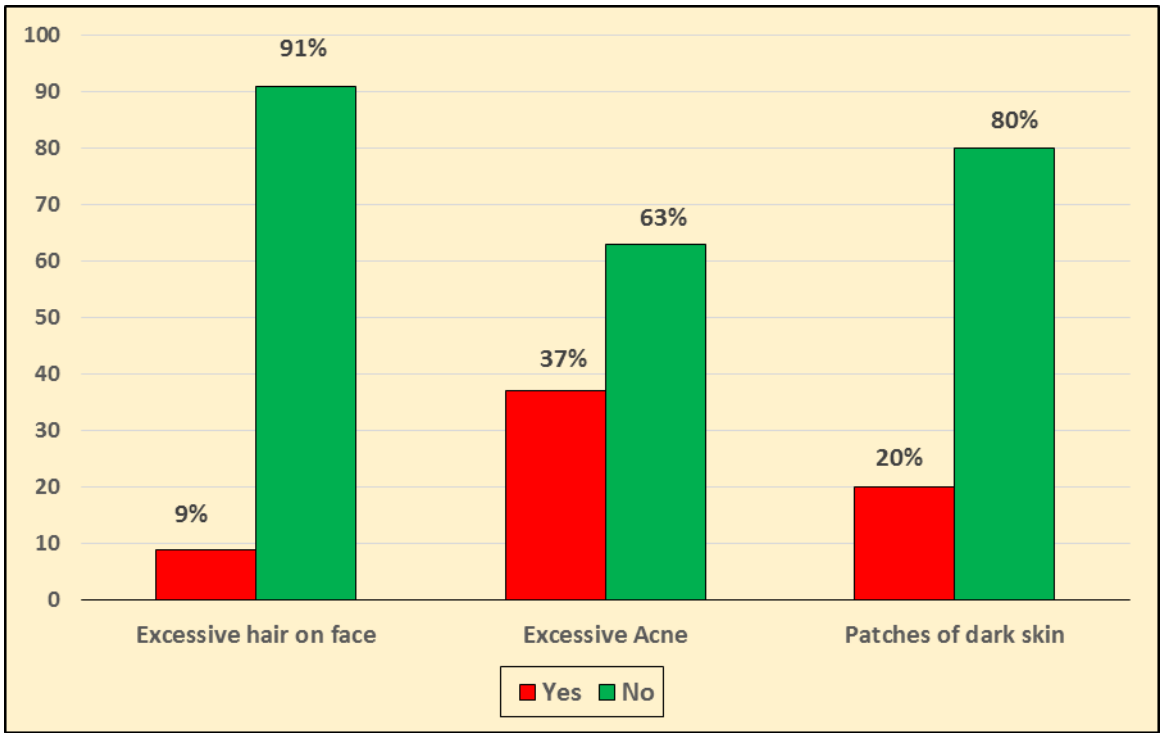

Figure (2): Prevalence of signs and symptoms may be associated with polycystic ovary syndrome **(n=200).**

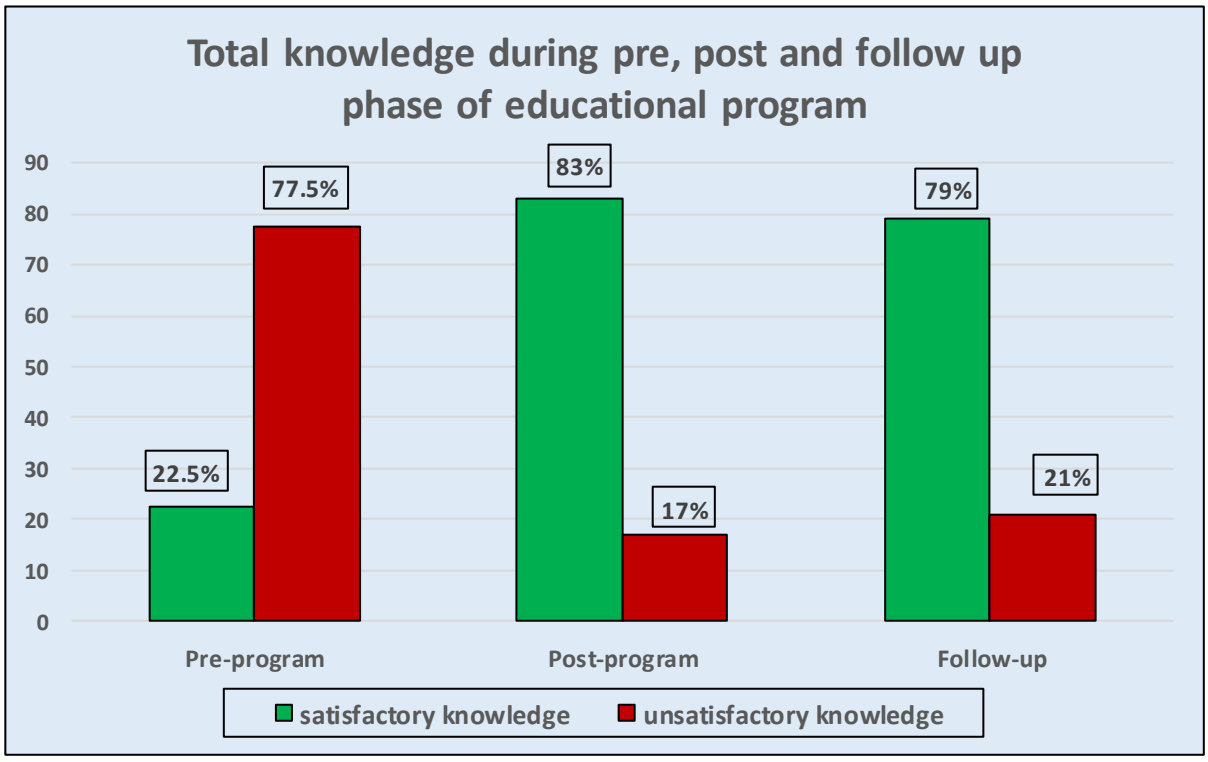

Figure (3): Distribution of female nursing students according to their total knowledge during pre, post and follow up phase of educational program (n=200).

Table (5): Correlation between total female nursing students' lifestyle and knowledge during pre, post and follow up phase of educational program (n=200).

Variables		**Total students' lifestyle**		
		Pre	Post	Follow-up
Total students' knowledge	R	0.514	0.641	0.688
	p	0.000**	.000**	.000**

R= coefficient correlation test p= p-value **highly significant at p ‹ 0.001.

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