

## Effect of Educational Guidelines on Knowledge, Self-Protective Behavior and Quality of Life of Female Nursing Students regarding Polycystic Ovary Syndrome

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### Abstract:

**Background:** Worldwide, polycystic ovary syndrome (PCOS) affects 12%-21% of reproductive age women including nursing students. In this regard, female nursing students should have accurate knowledge and be aware of their self-protective behavior, as the disease can interfere with their overall health and quality of life. Limited studies exist on this area. **Aim** of this study was to evaluate the effect of educational guidelines on knowledge, self-protective behavior, and quality of life of female nursing students regarding polycystic ovary syndrome. **Subjects and Method: Design:** A quasi experimental research design was used to conduct this study. **Setting:** The study was conducted at Faculty of Nursing Tanta University Tanta Egypt. **Subjects:** A purposive sample of 108 female nursing students who met the inclusion criteria was included. **Tools of data collection:** Tool (I): Structured interview schedule of Bio-socio-demographic data, and family history. Tool (II): The Ferriman-Gallwey Hirsutism Scale. Tool (III): Structured interview schedule of nursing students' knowledge, and self-protective behavior regarding polycystic ovary syndrome. Tool (IV): Modified Arabic Version of Quality of Life of Polycystic Ovary Syndrome Scale of Unmarried Women. **Results:** A statistically significant relation was found between knowledge, self-protective behavior, and quality of life of female nursing students' regarding polycystic ovary syndrome ( $r = 0.551$ ,  $p < 0.001$ ,  $r = -0.506$ ,  $p < 0.001$  and  $r = -0.620$ ,  $p < 0.001$ ) respectively) after implementation of the educational guidelines. **Conclusion:** Implementation the educational guidelines resulted in significant improvements of knowledge, self-protective behavior and quality of life of female nursing students' who have polycystic ovary syndrome. **Recommendations:** This study recommends implementation of evidence-based up-to-date educational guidelines and programs regarding polycystic ovary syndrome, as well as further research should be done in order to improve quality of life of women who have polycystic ovary syndrome

### Key words:

**Polycystic Ovary Syndrome, Knowledge, Self-Protective Behavior, Quality of Life.**

### Introduction:

**Polycystic ovary syndrome (PCOS)** is an incurable, complex heterogeneous most common endocrinal and metabolic disease in women of reproductive age. <sup>[1,2,3]</sup> Worldwide, it affects **12%-21%** of women during the age (15-49 years); in the absence of any other medical disease. <sup>[4]</sup>

Many **risk factors** can lead to polycystic ovary syndrome, such as genetic family history; endocrine, metabolic, and environmental factors, as well lifestyle. Unhealthy lifestyle is a major problem that can contribute to at least 60% of the diseases worldwide. <sup>[5]</sup> It includes activities such as

smoking, excess alcohol and fat consumption, lack of exercise, and chronic exposure to environment pollutants. The exact **causes** of PCOS is still unknown, but previous studies indicated that it is related to insulin resistance (IR). The disease can also result from many complex multigenic, epigenetic and environmental disorders.<sup>[6,7]</sup>

**Clinical manifestation** of PCOS includes signs and symptoms of androgen, and ovarian and reproductive abnormalities. These include hirsutism; acne; hyperandrogenism; acanthosis nigricans (dry, dark patches of skin usually appear in the armpits, neck or groin) and male pattern alopecia; anovulatory cycles, amenorrhea, oligomenorrhea, infertility, pregnancy complication, as well as first trimester miscarriage.<sup>[8,9,10]</sup>

As women' age increases, many metabolic disturbances occur such as insulin resistance and abnormalities of energy expenditure that can lead to obesity and development of type 2 diabetes (T2D) and cardiovascular disease.<sup>[11]</sup>

Women who have PCOS also suffer from sexual and psychological problems such as decreased sexual satisfaction, problems with feminine identity, mood disturbances, deterioration in self-esteem and self-image, depression and anxiety.<sup>[3,12]</sup> All of these manifestations can impair their quality of life (QoL).<sup>[10,13,14,15]</sup>

Polycystic ovary syndrome can be treated carefully and efficiently to aid adolescent female nursing student to restore their fertility and live healthy.<sup>[16]</sup> **Management** of PCOS includes, identification of current symptoms, proper self-protective behavior (lifestyle changes that incorporates weight management, diet, exercise and behavioral interventions), treatment of the metabolic complaints, and of androgen excess, providing endometrial protection based on

women' specific concerns and needs, as well as prevention of related future health and psychosocial problems.<sup>[2,10,12, 17]</sup>

**Maternity nurses have a vital role** in improving screening and referral rates. They can also participate in appropriate diagnosis and management measures to delay or prevent negative physical and psychological consequences of this syndrome.<sup>[18]</sup> Maternity nurses can also educate females nursing students who have PCOS regarding the importance of their **self-protective behavior**, because they have double role toward themselves and toward the women who will take care of them in the future to minimize and successfully manage the disease.<sup>[19]</sup>

Self-protective behavior is a complementary multi-dimensional component of healthy lifestyle that includes both health protective and health promoting behaviors.<sup>[20]</sup> Health protective behavior (HPB) is any behavior performed by persons, regardless of their perceived or actual health status, to protect, promote, or maintain their health. It includes exercising, stress management, health responsibility, and healthy eating habits. Unhealthy behavior includes lack of exercise and bad eating habits that predispose to obesity (consumption of large amount of sugar, fat, fast food, and soft drinks). Personal self-protective behavior does not include genetic factors, and it can be influenced by culture.<sup>[18,21,22]</sup>

Following a proper self-protective behavior as changing unhealthy lifestyle can prevent or decrease many diseases including polycystic ovary syndrome, as well as improve **quality of life** of women during different phases of their life including female nursing students.<sup>[2,3,18, 22]</sup>

Previous studies knowledge and attitude of late adolescent girls regarding polycystic ovarian syndrome recommended that they should have the most advanced knowledge. It is also reported that women who have polycystic ovary syndrome were dissatisfied

due to lack of information around their condition. They stressed the need for conduction of educational program and guidelines to increase patients' understanding of their condition. [19,20,23]

### **Significance of the problem**

Polycystic ovary syndrome can affect female nursing students during their reproductive age. Previous studies [1,5,10] addressed that women with PCOS lacked information about their conditions, and verified that PCOS guidelines can increase understanding of their condition, improve their self-protective behavior for example change lifestyle as increasing physical activity, and consequently improve their quality of life. Limited studies exist on this area.

### **Aim of the study**

The aim of this study was to determine the effect of educational guidelines on knowledge, self-protective behavior and quality of life of female nursing students regarding polycystic ovary syndrome.

### **Research Hypothesis**

Female nursing students are expected to have better knowledge; self-protective behavior and quality of life after implementation of the educational guidelines regarding polycystic ovary syndrome.

### **Subjects and Method**

#### **Study design:**

A quasi experimental research design was used to conduct this study.

#### **Setting:**

The study was conducted at Faculty of Nursing Tanta University, Tanta Egypt.

#### **Subjects:**

The sample size and power analysis were calculated using Epi-Info software statistical package created by World Health organization and Center for Disease Control and Prevention, Atlanta, Georgia, USA version

2002. The criteria used for sample size calculation were as follows: 95% confidence limit, 80% power of the study, expected good level of knowledge among 60% of participants (the studied nursing students) before intervention (the educational guidelines) that will increase to 80% after intervention.

The sample size is based on the previously mentioned criteria was found at N= 83. The researchers increased the sample size to 108 cases to compensate for incomplete results and for those who refuse to be involved in the study. The study subjects were selected according to the following inclusion criteria: First and second academic year female nursing students, age ranged from 18-25 years, single, were diagnosed with polycystic ovary syndrome, medically free from any chronic disease, and willing to participate in the study.

They were selected from the total students of the first (505) and second (1065) academic year 2021-2022 after exclusion of male students (197 and 308 respectively) and distribution of the pre designed tool I to all of female students (1034) of the first (308) and second (726) academic year, in order to select female students who were diagnosed with polycystic ovary syndrome (108). The comparison was done between the same group pre and post implementation of the educational guidelines.

#### **Tools of data collection:**

To achieve the aim of this study, the following four tools were used to collect the necessary data:

#### **Tool (I): A structured interview schedule of bio-socio-demographic data:**

This tool was developed by the researchers after reviewing recent related literatures [24,25] and used to collect bio-socio-demographic data of the studied female nursing students

such as age (years), residence, marital status, family monthly income, body mass index (BMI), diagnostic measures for polycystic ovary syndrome, received treatment, and family members who have polycystic ovary syndrome.

### **Tool II: The Ferriman-Gallwey Evaluation of Hirsutism**

This tool was adapted from Ferriman et al and Lumezi et al [8,9] and used to score the degree of excess male pattern body terminal hair growth on a woman shown in four different degrees of severity in 11 different body parts: Namely upper lip, chin, chest, upper and lower abdomen, upper and lower back, arm and forearm, and thigh and the lower leg. It was measured in a Likert scale of 0–4 with as total score of 44. Ferriman-Gallwey Evaluation of Hirsutism was used to confirm diagnosis of polycystic ovary syndrome among the first and second academic year female nursing students. The total scoring system of Ferriman-Gallwey hirsutism was as follows: A score < 8 means no hirsutism, a score of 8-14 is a diagnostic of hirsutism, and a score > 14 indicates severe hirsutism.

### **Tool III: Structured interview schedule of knowledge and self-protective behavior regarding polycystic ovary syndrome.**

This tool included two parts as follows:

**Part (I) knowledge regarding polycystic ovary syndrome:** It was developed by the researchers after reviewing recent related literatures [1,3,18,26] and used to collect data related to knowledge of female nursing students regarding anatomy of the female reproductive system, as well as knowledge regarding polycystic ovary syndrome. **Scoring system was as follows:** Correct and complete answer was scored as (2), correct and incomplete answer was scored as (1), and incorrect answer or didn't know was scored as

(0). **The total scoring system was as follows:** High level of knowledge  $\geq 75\%$ , moderate level of knowledge  $60 - < 75\%$ , and low level of knowledge  $< 60\%$ .

**Part II: Self-protected behavior regarding polycystic ovary syndrome.** It was developed by the researchers after reviewing recent related literatures [20,23,27] and used to assess female nursing students' self-protective behavior regarding polycystic ovary syndrome. It included 15 sub items that were measured in a Likert Scale ranged from 0 – 2. The total score ranged from 0 – 30. **Scoring system was as follows:** Usually/always self-protected behavior was scored as (2), sometimes was scored as (1), and never/rarely was scored as (0). **The total scoring system was as follows:** Satisfactory self-protected behavior  $\geq 65\%$ , slightly satisfactory self-protected behavior  $50 - < 65\%$ , and unsatisfactory self-protected behavior  $< 50\%$ .

**Tool (IV): Adapted First Health-Related Quality of Life Questionnaires in Arabic for Unmarried Women with Polycystic Ovary Syndrome.** This tool was adapted from by the researchers from Odhaib et al. (2021), and Rzońca et al (2018) [14,28] and used to collect data about quality of life of female nursing students regarding polycystic ovary syndrome. It included 5 main domains with 42 sub domains measured in a Likert Scale ranged from 0 – 2. The total score ranged from 0 – 84. **Scoring system was as follows:** Usually/always was scored as (0), sometimes was scored as (1), and never/rarely was scored as (2). **The total scoring system was as follows:** High quality of life  $< 50\%$ , moderate quality of life  $50 - < 65\%$ , and low quality of life  $\geq 65\%$ . The quality of life was estimated oppositely; when the total score is high this means low quality of life and vice versa.

## Method

### 1. Administrative approval:

Official permission for carrying out the study was obtained from Faculty of Nursing Tanta University Tanta Egypt.

### 2. Ethical consideration:

- The study was approved by the ethical committee of the Faculty of Nursing Tanta University.
- Additionally, all female nursing students who had polycystic ovary syndrome were invited to participate in the study.
- Those who agreed to participate were informed about the purpose of the study, confidentiality of information and the right to withdraw from the study at any time if desired.

### 3. Tools of data collection

**Tool I:** The structured interview schedule of bio-socio-demographic data, and **Tool III:** The structured interview schedule of knowledge and self-protective behavior regarding polycystic ovary syndrome were developed by the researchers after reviewing recent related literatures.

**Tool II:** The Ferriman-Gallwey Evaluation of Hirsutism and **Tool (IV):** Adapted First Health-Related Quality of Life Questionnaires in Arabic for Unmarried Women with Polycystic Ovary Syndrome were adapted by the researchers from related literatures.

Tools validity and reliability: The four study tools were translated into Arabic language for better understanding of the studied female nursing students in their mother language. Then, they were evaluated by five experts in Maternal and Neonatal Health Nursing field and modifications were done accordingly based on their judgment. The tools' reliability was assessed by the pilot study and measuring the related Cronbach Alpha.

### 4. The pilot study:

A pilot study to test the clarity, feasibility and applicability of different items of the study tools was carried out before the actual study on 10% (11) female nursing students. The necessary modifications were done by the researchers before the actual study. Data obtained from the pilot study were included in the current study data, because there were no major changes in the developed tools.

### 5. The actual study (field work):

The study was conducted through four phases: **(Assessment, planning, implementation and evaluation) as follow:**

#### Phase I: Assessment phase (Pre-test):

- The researchers introduced themselves and explained the aim of the study to female nursing students who were gave their informed consent to participate in the study.
- Then, the female nursing students' knowledge, self-protective behavior and quality of life regarding polycystic ovary syndrome were assessed pre implementation of the educational guidelines using the four previously developed tools for data collection.

#### Phase II: Planning phase:

- Educational guidelines development phase: It was developed by the researcher based on results of assessment phase (pre-test) and after a thorough review of literature.
- **The objectives** of the educational guidelines were to improve female nursing students' knowledge, self-protective behavior, and quality of life regarding PCOS.
- The **content** of educational guidelines was developed by the researchers based on results of assessment phase (pre-test) and review of literature. **It entailed two main parts:**

- **Theoretical part**, which comprised knowledge regarding female reproductive system, polycystic ovary syndrome, components of self-protective behavior life styles, as well as effect of polycystic ovary syndrome on quality of life.

- **Practical part**, which included illustration of skin care for hirsutism, and acne, examples of exercises, and personal care during menstruation.

#### **Phase III: Implementation phase:**

- The first and second academic year female nursing students with polycystic ovary syndrome were assigned randomly into 11 subgroups; each subgroup contained 8-10 students for the purpose of demonstration.
- The educational guidelines theoretical and practical parts were implemented by the researchers through four sessions (two sessions for the theoretical part and two sessions for the practical part) two days/week. Each day encountered (two sessions one theoretical and one practical). The time of each session ranged between 30 to 45 minutes.
- The educational guidelines sessions were as the following:
  - **Session (1) (Theoretical session):** An orientation and overview of knowledge regarding female reproductive system and polycystic ovary syndrome.
  - **Session (2) (Practical session):** Illustration of skin care for hirsutism, and acne.
  - **Session (3) (Theoretical session):** An overview of knowledge regarding components of self-protective behavior life styles, and effect of polycystic ovary syndrome on quality of life.
  - **Session (4) (Practical session):** Illustration of examples of exercises, and personal care during menstruation.

#### **Evaluation phase:**

- Evaluation of the educational guidelines was done three times for knowledge using tool III: part one (pre, immediately, and three months after), for hirsutism, self-protective behavior and quality of life two times using tool II, tool III part II and tool IV (pre, and three months after) implementation of the educational guidelines.

#### **Data collection:**

Data were collected over a period of six months from the beginning of August 2021 to the end of January 2022 from first and second academic year female nursing students to find out the effect of educational guidelines on knowledge, self-protective behavior and quality of life of female nursing students regarding polycystic ovary syndrome

#### **Statistical analysis:**

The collected data were organized, tabulated and statistically analyzed using SPSS version 19 (Statistical Package for Social Studies) created by IBM, Illinois, Chicago, USA. For numerical variables, the range mean and standard deviations were calculated. The differences between mean values before and after intervention were tested using paired t test. The correlation between two variables was calculated using Pearson's correlation coefficient. The level of significant was adopted at  $p < 0.05$ .

#### **Result**

The aim of this study was to find out the effect of educational guidelines on knowledge, self-protective behavior and quality of life of female nursing students regarding polycystic ovary syndrome. Its results are presented into seven tables and two figures as follows:

**Table (1):** Donates bio-socio-demographic characteristics of the studied nursing students. It was observed that students' age ranged from 18-25 years, with a mean age of

20.88+1.84.

In relation to their residence, more than half of them (54.6%) were urban. As regards to their marital status, the majority (90.7%) was single, and 52.8% of them have enough monthly income. The range of their BMI ranged was 16.37, with a Mean + SD 25.84+4.32. It was also found that more than one half (54.6%) of their mothers had history of polycystic ovary syndrome.

Moreover, this table clarifies that three quarters (75.9%) of the studied nursing students complained from pelvic pain and nearly two thirds (64.8 and 55.5% respectively) complained from hirsutism and oligomenorrhea. Concerning diagnostic measures of polycystic ovary syndrome, that the majority (94.4% and 87.3% respectively) of them reported that they had medical examination and ultrasonography. As regard to received treatment, (53.7%, 51.9% respectively) of them stated that they received analgesic and hormonal treatment.

**Figure (1):** Reveals prevalence of polycystic ovary syndrome among the studied nursing students. It was observed that one tenth (10%) of them had polycystic ovary syndrome.

**Figure (2):** Exhibits distribution of studied nursing students in relation to hirsutism score. It revealed that (47.0% and 63.0% respectively) of the studied nursing students had hirsutism, and severe hirsutism before the educational guidelines compared to (41.70% and 58.30% respectively) after the educational guidelines.

**Table (2):** Shows distribution of the studied nursing students according to their total score level of knowledge regarding polycystic ovary syndrome before and after the educational guidelines. It illustrated that all of them had low level of knowledge before the educational guidelines, compared to the

majority (89.8%) of them had high level knowledge immediately after and (68.5 %) three months after compared to pre the educational guidelines with a statistically significant difference ( $t=18.306$ ,  $p<0.001$ ).

**Table (3):** Presents distribution of the studied nursing students according to their self-protective behavior regarding polycystic ovary syndrome before and after the educational guidelines. It was evident that (0.9%, 2.8%, 0.0%, 5.6%, 0.9% respectively) of them Usually/always had a healthy diet regimen, take high vegetables, avoid high calcium and milk products, fruits, take high protein diet and fast food pre-the educational guidelines compared to (75.0%, 85.2%, 80.6%, 77.8 and 76.9 respectively) three months post, with a highly statistical significant difference ( $P<0.001$ ).

Meanwhile, the studied nursing students usually/always self-protective behavior modifications, stable life style, regular exercising, losing weight, managing hirsutism, and acne and take treatment of irregular menstruation increased from (0.0%, 0.9%, 0.0%, and 0.9%, 0.0% respectively) pre to (92.6%, 89.8%, 88.0%, and 85.2, 75.0 %, 83.3%, and 83.3% respectively) post the educational guidelines with a statistically significant differences ( $P<0.001^*$ ).

**Table (4):** Illustrates distribution of the studied nursing students according to their quality of life (menstrual irregularity and fertility domains) before and after the educational guidelines. It was obvious that (10.2%, 93.5%, 90.7%, 88.9% and 83.3% respectively) of the studied nursing students usually/always feeling (need to lose weight to control of PCOS, worry about menstrual irregularity, not getting pregnant later on, complete cessation of menstruation, and fear of getting cancer due to PCOS) before

implementation of the educational guidelines, compared to (74.1%, 12.0%, 0.0%, 0.9 and 0.9% respectively) after educational guidelines with statistically significant differences ( $P < 0.001$ ).

**Table (5):** Displays distribution of the studied female nursing students according to their total percentages scores of self-protective behaviors and quality of life before and after the educational guidelines. It was observed that the majority (88.9%) had low self-protective behaviors before that changed to (81.5%) of them had high self-protective behaviors with effect size (mean + SD 67.86+13.03) and statistically significant ( $t=54.114$ ,  $p < 0.001$ ).

As regard to quality of life, table (5) also demonstrates that the majority of studied nursing students (91.7%) had low quality of life before, while almost two thirds (66.7%) of them had high quality of life with effect size (mean + SD-80.57+19.45), and statistically significant ( $t= 43.040$ ,  $p < 0.001$ ) after implementation of the educational guidelines.

**Table (6):** Shows correlation between knowledge, self-protective behaviors and quality of life before and after with effect size implementation of the educational guidelines. It proves that there was a statistically significant positive correlated with effect size between knowledge and self-protective ( $r= 0.551$ ,  $p < 0.001$ ). On the other hand, there were statistically significant negative correlation effect size between quality of life, and both knowledge and self-protective behavior ( $r= 0.506$ ,  $p < 0.001$  and  $r= -0.620$ ,  $p < 0.001$  respectively).

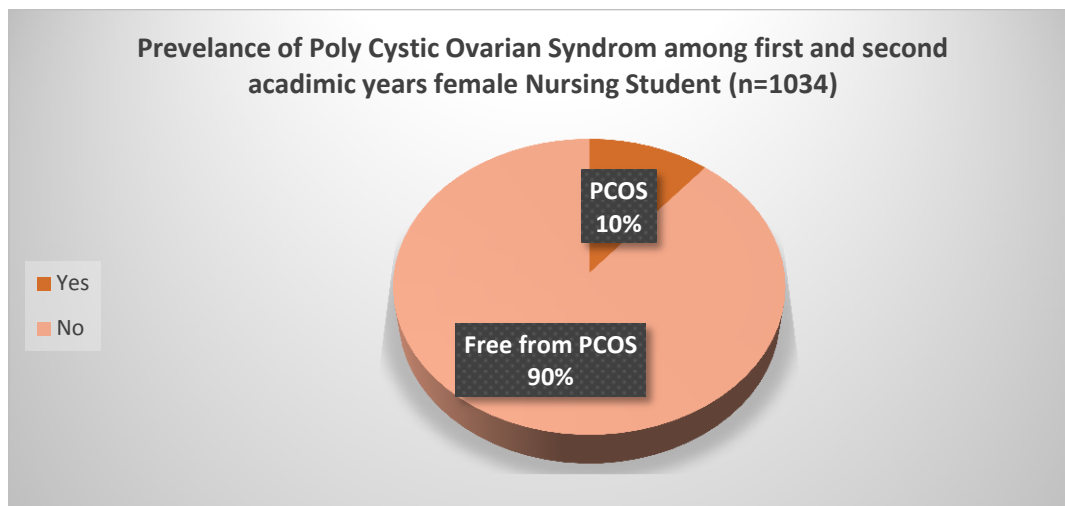
**Table (7):** Shows correlation between knowledge, self-protective behavior and quality of life scores and selected bio-socio-demographic (Age in years, monthly income, BMI, and Hirsutism). It reveals that significant good negative correlation ( $r= -0.321$ ,  $p= 0.001^*$ ) existed between the body mass index and self-protective behavior score, as well as between hirsutism and monthly income ( $r= -0.210$ ,  $p= 0.030^*$ ).



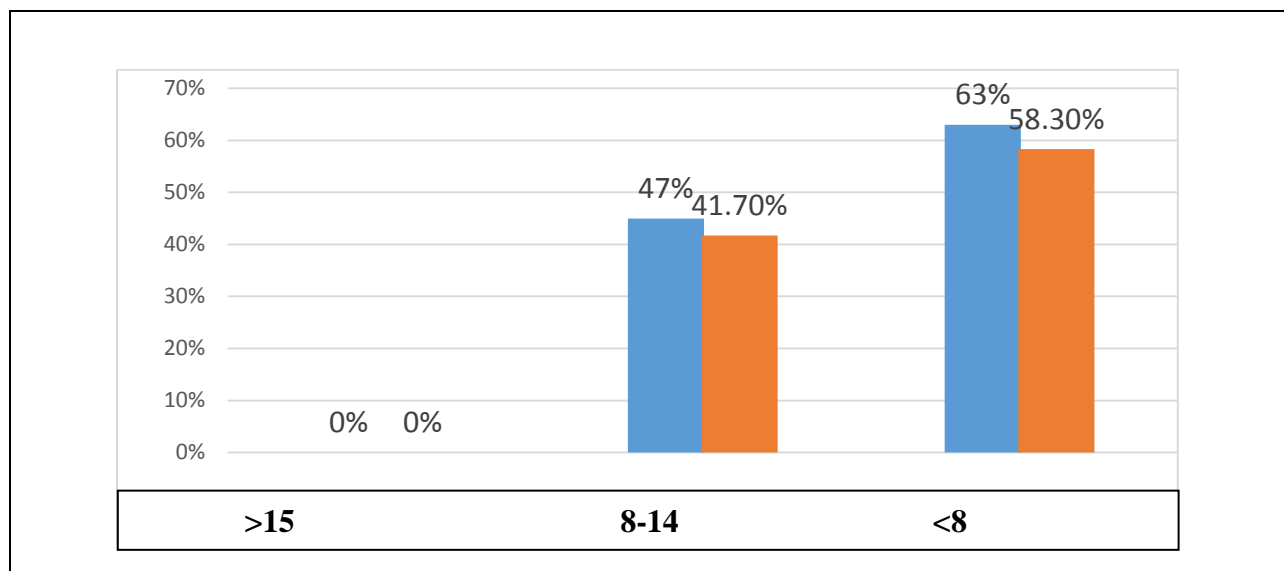
**Table (1): Bio-socio-demographic characteristics of the studied nursing students (n= 108).**

<b>Variables</b>	<b>Number (108)</b>	<b>%</b>
<b>Age in years:</b>		
<b>Range</b>		18-25
<b>Mean + SD</b>		20.88±1.84
<b>Residence:</b>		
<b>Rural</b>	49	45.4
<b>Urban</b>	59	54.6
<b>Marital status:</b>		
<b>Single</b>	98	90.7
<b>Married</b>	10	9.3
<b>Monthly income:</b>		
<b>Not enough</b>	28	25.9
<b>Enough</b>	57	52.8
<b>Enough and saving</b>	23	21.3
<b>BMI</b>		
<b>&lt;25</b>	47	43.5
<b>≥25</b>	61	56.5
<b>Range</b>		16.37
<b>Mean + SD</b>		25.84±4.32
<b>Family members with polycystic ovaries:**</b>		
<b>Mother</b>	59	54.6
<b>Sister</b>	32	29.6
<b>Ante</b>	37	34.3
<b>Cousin</b>	37	34.2
<b>Grandmother</b>	46	42.6
<b>Symptoms:**</b>		
<b>Pelvic pains</b>	82	75.9
<b>Acne</b>	40	37.0
<b>Oligo menorrhea</b>	60	55.5
<b>Amenorrhea</b>	27	25.0
<b>Hirsutism</b>	70	64.8
<b>Their reported diagnostic measures of polycystic ovary syndrome:**</b>		
<b>Medical examination</b>	102	94.4
<b>Ultrasonography</b>	94	87.3
<b>Lab investigations (hormonal essay)</b>	58	53.7
<b>Received treatment:**</b>		
<b>Hormonal</b>	56	51.9
<b>Analgesic</b>	58	53.7
<b>Weight reduction</b>	35	32.4
<b>Traditional therapies (diet, vitamins, herbs, physical activity)</b>	35	32.4

\*\* More than one answer



**Figure (1): Prevalence of Polycystic Ovary Syndrome among Studied Nursing Students (n= 108).**



**Figure (2): Distribution of Studied Participants in Relation to Hirsutism Score (n= 108).**

**Table (2): Distribution of the studied nursing students according to their total score level of knowledge regarding polycystic ovary syndrome before and after the educational guidelines (n= 108).**

Level of knowledge	Before		Immediately after		After three months	
	N	%	N	%	n	%
Low level of knowledge (<50%)	108	100.0	3	2.8	7	6.5
Moderate level of knowledge (50-75%)	0	0.0	8	7.4	27	25.0
High level of knowledge (>75%)	0	0.0	97	89.8	74	68.5
Range	0-46		73-100		54-100	
Mean + SD	7.37±11.06		94.76±6.51		79.95±11.27	
t			63.846		41.116	
p			<0.001		<0.001	

Paired t test comparing immediately and after three months = 18.306, p<0.001

**Table (3): Distribution of the studied nursing students according to their self-protective behavior subscales regarding polycystic ovary syndrome before and after the educational guidelines (n= 108).**

Variables	Before		After		X <sup>2</sup>	P
	n	%	n	%		
Healthy diet regimens.					9.422	<0.001*
Never/rarely	106	98.2	2	1.9		
Sometimes	1	0.9	25	23.1		
Usually/always	1	0.9	81	75.0		
Avoid fast food					8.987	<0.001*
Never/rarely	88	81.5	4	3.7		
Sometimes	19	17.6	21	19.4		
Usually/always	1	0.9	83	76.9		
Avoid sugar and carbohydrates					9.187	<0.001*
Never/rarely	100	92.6	2	1.9		
Sometimes	6	5.6	34	31.5		
Usually/always	2	1.9	72	66.7		
Take high vegetables, fruits, and fluids.					9.539	<0.001*
Never/rarely	75	69.4	7	6.5		
Sometimes	30	27.8	9	8.3		
Usually/always	3	2.8	92	85.2		
Take high protein diet					8.607	<0.001*
Never/rarely	81	75.0	1	0.9		
Sometimes	21	19.4	23	21.3		
Usually/always	6	5.6	84	77.8		
Avoid high calcium and milk products					9.284	<0.001*
Never/rarely	94	87.0	4	3.7		
Sometimes	14	13.0	17	15.7		
Usually/always	0	0.0	87	80.6		

**Table (3) Continue: Distribution of the studied nursing students according to their self-protective behavior subscales regarding polycystic ovary syndrome before and after the educational guidelines (n= 108).**

Variables	Before		After		X <sup>2</sup>	P
	n	%	n	%		
<b>Behavior modifications</b>					9.955	<0.001*
Never/rarely	105	105	0	0.0		
Sometimes	3	2.8	8	7.4		
Usually/always	0	0.0	100	92.6		
<b>Losing weight</b>					9.539	<0.001*
Never/rarely	104	96.3	6	5.6		
Sometimes	3	2.8	10	9.3		
Usually/always	1	0.9	92	85.2		
<b>Regular exercising</b>					9.504	<0.001*
Never/rarely	96	88.9	3	2.8		
Sometimes	12	11.1	10	9.3		
Usually/always	0	0.0	95	88.0		
<b>Stable life style</b>					9.806	<0.001*
Never/rarely	103	95.4	0	0.0		
Sometimes	4	3.7	11	10.2		
Usually/always	1	0.9	97	89.8		
<b>Avoid caffeine</b>					9.273	<0.001*
Never/rarely	95	88.0	2	1.9		
Sometimes	13	12.0	28	25.9		
Usually/always	0	0.0	78	72.2		
<b>Treatment of irregular menstruation</b>					9.369	<0.001*
Never/rarely	103	95.4	3	2.8		
Sometimes	5	4.6	24	22.2		
Usually/always	0	0.0	81	75.0		
<b>Herbal therapy</b>					9.285	<0.001*
Never/rarely	8	7.4	88	81.5		
Sometimes	12	11.1	19	17.6		
Usually/always	88	81.5	1	0.9		
<b>Manage acne</b>					9.530	<0.001*
Never/rarely	105	97.2	6	5.6		
Sometimes	3	2.8	12	11.1		
Usually/always	0	0.0	90	83.3		
<b>Manage hirsutism</b>					9.399	<0.001*
Never/rarely	100	92.6	6	5.6		
Sometimes	8	7.4	12	11.1		
Usually/always	0	0.0	90	83.3		

\*Significant

**Table (4): Distribution of the studied nursing students according to their quality of life (menstrual irregularity and fertility domains) before and after the educational guidelines (n= 108).**

Variables	Before		After		X <sup>2</sup>	P
	N	%	N	%		
<b>Feeling need to lose weight to control of PCO</b>					7.716	<0.001*
Never/rarely	93	86.1	11	10.2		
Sometimes	4	3.7	17	15.7		
Usually/always	11	10.2	80	74.1		
<b>Feeling worry for not getting pregnant later on</b>					9.732	<0.001*
Never/rarely	2	1.9	101	93.5		
Sometimes	8	7.4	7	6.5		
Usually/always	98	90.7	0	0.0		
<b>Feeling worry about complete cessation of menstruation</b>					9.632	<0.001*
Never/rarely	3	2.8	101	93.5		
Sometimes	9	8.3	6	5.6		
Usually/always	96	88.9	1	0.9		
<b>Feeling worry about menstrual irregularity</b>					9.553	<0.001*
Never/rarely	3	2.8	84	77.8		
Sometimes	4	3.7	11	10.2		
Usually/always	101	93.5	13	12.0		
<b>Feeling need to use contraceptive medication to control of PCO</b>					6.776	<0.001*
Never/rarely	84	77.8	13	12.0		
Sometimes	11	10.2	17	15.7		
Usually/always	13	12.0	78	72.2		
<b>Accept all symptoms of polycystic ovary if pregnancy is guaranteed</b>					6.625	<0.001*
Never/rarely	84	77.7	16	14.8		
Sometimes	10	9.3	13	12.0		
Usually/always	14	13.0	79	73.1		
<b>Fear of getting cancer due to PCO.</b>					9.576	<0.001
Never/rarely	1	0.9	103	95.4		
Sometimes	17	15.7	4	3.7		
Usually/always	90	83.3	1	0.9		

\*Significant

**Table (5): Distribution of the studied nursing students according to their total percentages scores of self-protective behaviors and quality of life before and after the educational guidelines (n= 108).**

Variables	Before		After three months	
	N	%	N	%
<b>Self-protective behaviors:</b>				
<b>Low &lt;50%</b>	96	88.9	7	6.5
<b>Moderate 50-75%</b>	12	11.1	13	12.0
<b>High &gt;75%</b>	0	0.0	88	81.5
<b>Range</b>	26-58		77-122	
<b>Mean <math>\pm</math> SD</b>	39.71 $\pm$ 7.70		107.57 $\pm$ 8.50	
<b>Effect size (range)</b>	23-86			
<b>Effect size (mean<math>\pm</math>SD)</b>	67.86 $\pm$ 13.03			
<b>T</b>	54.114			
<b>P</b>	<0.001			
<b>Quality of life:</b>				
<b>Low (&lt;50%)</b>	99	91.7	12	11.1
<b>Moderate (50-75%)</b>	9	8.3	24	22.2
<b>High (&gt;75%)</b>	0	0.0	72	66.7
<b>Range</b>	131-189		60-126	
<b>Mean<math>\pm</math>SD</b>	160.10 $\pm$ 13.06		79.53 $\pm$ 14.46	
<b>Effect size (range)</b>	(-119)-(-22)			
<b>Effect size (mean<math>\pm</math>SD)</b>	-80.57 $\pm$ 19.45			
<b>T</b>	43.040			
<b>P</b>	<0.001			

\*Statistically significant (P&lt;0.05)

r=Correlation Coefficient

**Table (6): Correlation between total score of knowledge, self-protection behavior and quality of life before and effect size after three months of intervention before and after the educational guidelines (n= 108).**

Variables	Knowledge				Self-protection behaviors			
	Before		Effect size		Before		Effect size	
	r	P	r	P	r	p	r	p
<b>Knowledge</b>								
<b>Self-protection behaviors</b>	0.342	<0.001	0.551	<0.001				
<b>Quality of life</b>	-0.098	0.311	-0.506	<0.001	-0.126	0.194	-0.620	<0.001

\*Statistically significant (P&lt;0.05)

r=Correlation Coefficient

**Table (7): Correlation between, knowledge, protection behavior and quality of life in relation to age in years, monthly income, body mass index and hirsutism (n= 108)**

Variables	Age in years		Monthly income		BMI		Hirsutism score	
	R	P	rho	P	r	P	r	P
Knowledge score	0.006	0.947	-0.177	0.068	0.134	0.166	-0.123	0.205
Protection behaviors score effect size	0.137	0.156	-0.120	0.217	-0.321	0.001*	0.165	0.087
Quality of life score effect size	0.137	0.108	-0.164	0.091	0.164	0.090	0.098	0.315
Monthly income							-0.210	0.030*

\*Statistically significant (P&lt;0.05)

r=Correlation Coefficient

**Discussion:**

Polycystic Ovarian Syndrome (PCOS) is a complex reproductive, metabolic, female endocrine, and psychological disorders that affects women' health and quality of life. The aim of this study was to find out the effect of educational guidelines on nursing students' knowledge, self-protective behavior and quality of life regarding polycystic ovary syndrome.

The results of the study revealed that concerning the prevalence of PCOS among female studied nursing students, 10 % of them had PCOS. This result is in agreement with **Azziz et al. (2009)** [29] who found that the prevalence was 11.0% in Australian women. It is also, partially agreeing with **Fauser (2012)** [30], **Carmina et al. (2006)** [31], and **Haq et al. (2017)** [17] who posed that the prevalence of PCOS among the studied women was (7.0%, 6.0% to 8.0%, 6.5% to 8.0% respectively). From the researchers' point of view, this may be due to different inclusion criteria of the study subjects and location.

In relation to bio-socio-demographic characteristics of the studied nursing student in the current study, the findings of the present study revealed that students' age ranged from 18-25 years. This finding is relatively in agreement with **AL Kurdi et al., (2021)** [27], and **Sunanda et al., (2013)** [32]. They reported that more than two thirds of the studied sample were in the age group (18-20 and 21-25 years respectively). As regards to their marital status and residence, the majority of the studied students were single, and from urban communities. These results correspond with **Alessa et al (2017)** [33], who declared that more than one third of the studied population were single and the majority of them were from urban back ground. On other hand, they contradict with the findings of **Jaber, (2022)** [34] who stated that the majority of the study sample were married. This difference may be due to the different characteristics of the studied sample.

Regarding BMI of the studied nursing students in this study, the range was 16.37, with Mean + SD 25.84+4.32. These findings are in line with **Rzońca et al (2018)** <sup>[28]</sup> who demonstrated that 33 patients presented with a BMI #24.9 kg/m<sup>2</sup>, 24 patients with a BMI between 25 and 29.9 kg/m<sup>2</sup> and 63 patients with a BMI #30 kg/m<sup>2</sup>.

As regards to the studied nursing students' family history of polycystic ovary syndrome, this study found that more than one half of their mothers had PCOS and they had enough monthly income. These findings are not in agreement with **Mohamed (2015)** <sup>[20]</sup> who illustrated that the majority of the participant in his study hadn't family history of PCOS and no enough monthly income. In agreement with the current study **Hassan and Farage (2019)** <sup>[35]</sup> who tailed that the majority of the study participants' mothers had family history of PCOS.

Additionally, three quarters of the studied nursing students in the present study reported that they had pelvic pains and nearly two thirds complained from hirsutism and oligomenorrhea. These finding are supported by **Abu-Taha, (2022)** <sup>[36]</sup>, **Thabet et al. 2021** <sup>[37]</sup>, and **Hassan and Farage (2019)** <sup>[35]</sup>. They noted that the majority of the participants had irregular or absence of menstrual cycle and more than one half of them had unusual amount of hair growth on the upper lip, chin, abdomen, breast, thighs, and they also had acne, obesity/overweight.

Concerning the studied nursing student reported diagnostic measures of polycystic ovary syndrome, it was noticed that the majority of them were diagnosed with PCOS by medical examination, ultrasonography and lab investigations (hormonal essay). These findings are in consistence with **Abu-Taha, (2022)** <sup>[36]</sup> **Hahn et al (2005)** <sup>[38]</sup>, and **Hassan and Farage (2019)** <sup>[35]</sup>. They stated that the majority of the participants had diagnosis with PCOS from

physician examination, ultrasonography, elevated ratio of hirsutism; LH/FSH; serum testosterone; and parameters of insulin resistance, as well as menstrual cycle disturbances and infertility.

In relation to the studied nursing student's hirsutism score, less than one half of them had hirsutism score >8, before the educational guidelines, but almost two fifth of them had hirsutism score 8-14, while more than three fifth of them had hirsutism score 15 before implementation of the educational guidelines which declined to more than half of them after three months. This decline may be due to that more than three quarters of the studied nursing students usually/always managed hirsutism, acne and take treatment of irregular menstruation after implementation of the educational guidelines.

These findings are in accordance with **Hahn et al (2005)** <sup>[38]</sup> who found that women with PCOS had significantly elevated in hirsutism score and clinicians should pay attention to management of hirsutism to improve their psychosocial dimensions.

Furthermore, as regards to the studied nursing students' knowledge about PCOS, it was observed that all of them had low level of knowledge about PCOS before implementation of the educational guidelines, while and majority of them had high level of knowledge immediately after and two thirds three month after the educational guidelines; with a statistically significant differences ( $t=18.306$ ,  $p<0.001$ ). This enhancement replicates the effect of the implementation of educational guidelines. The progress of knowledge's score may be attributed to wide varieties of educational methods used by the researchers as booklet, group discussion, audiovisual materials, pamphlets, lectures, and videos. This result strongly agrees with **Hassan and Farag**



(2019)<sup>[35]</sup>, and **Mohamed et al (2015)**<sup>[20]</sup> who demonstrated improvement the studied subjects' total score level of knowledge.

In contrast with the findings of the current study, **Thabet (2021)**<sup>[37]</sup> who clarified that the majority of the participants had insufficient knowledge about PCOS. From the researchers' point of view, this may be due to the different socio-demographic criteria of studied sample and the nature of the study.

The present study identified that referring to self-protective behavior regarding PCOS, it was evident that following a healthy diet regimen had significantly increased after the educational guidelines. In this regard, the majority of the studied nursing students were dedicated to take diet rich in vegetables, fruits, and protein diet. On the other hand, they avoided fast food, as well as avoided high calcium and milk products diet after implementation of educational guidelines. These results are consistent with **Thomas and Stephen (2021)**<sup>[39]</sup>, and **Lin et al (2019)**<sup>[40]</sup> who clarified that the best dietary advice for women with PCOS is to have balanced diet, which is rich in protein and fibers, and low in carbohydrate to reduce insulin resistance and depression, as well as to improve self-esteem and lipid profile.

The current study also revealed that concerning in relation to behavior modifications of studied nursing student regarding PCOS, it was evident that they modified their behavior to reduce PCOS complication after implementation of educational guidelines. They followed a stable life style, regularly exercised, and lost weight. These findings are in agreement with **Thomas and Stephen (2021)**<sup>[39]</sup> who clarified that the studied subjects in their study significantly modified their lifestyle to loss their weight, which resulted in a reduction of hyperinsulinaemia and improvement in the hyperandrogenic and reproductive features of

PCOS (including restoration of ovulation, menstrual cyclicity and fertility).

**Jiskoot et al. (2022)**<sup>[23]</sup> added that treatment by a three-component lifestyle program that combined nutritional advice, exercise and cognitive behavioral therapy resulted in a medium to large effect size and significant improvements in eating disorders behavior in women with PCOS.

In relation to the studied nursing students' quality of life in the present study regarding menstrual irregularity and fertility domain before and after the educational guidelines, there is a statistically significant improvement in their positive behaviors (losing body weight and using contraceptive method for treatment of PCOS. Additionally, their negative behaviors as feeling worry about menstrual irregularity, not getting pregnant later on, complete cessation of menstruation, and fear of getting cancer significantly decreased after the educational guidelines, with statistically significant differences  $P < 0.001$ .

In this regard, **Kolahi et al (2015)**<sup>[41]</sup> mentioned that there was a significant relationship between the quality of life and coping strategies as they improved psychological status and decreased their negative feelings regarding PCOS, and consequently, improved their quality of life.

Moreover, the present study clarified that there is a positive correlation between total knowledge score and total self-protective behaviors and quality of life among the studied nursing students before and after three months of implantation of the educational guidelines. These findings are in accordance with **Hassan and Farag (2019)**<sup>[35]</sup> who reported that implemented nursing guideline had a crucial role in the improvement of women's knowledge and health behavior regarding PCOS.

The present study also addressed that as regard to correlation between knowledge, self-protective behavior and quality of life scores and selected bio-socio-demographic, only the body mass index showed significant good negative correlation with self-protective behavior score. As regard to correlation between hirsutism and monthly income, the present study clarified that there was a significant correlation between monthly income and hirsutism score.

These findings are supported by who reported **Hassan and Farag (2019)** <sup>[35]</sup> and **Thabet (2021)** <sup>[37]</sup> who reported that a significant association between the PCOS guidelines and the BMI and QOL as well. On the other hand, the finding of the present study is not consistent with **Mohamed et al (2015)** <sup>[20]</sup> There was a statistically significant difference between pretest students' knowledge score in relation to student's age, while there were no statistically significant differences between pretest students' knowledge score in relation to monthly income. Thus, utilization of educational sessions was found to be effective to increase the knowledge level of late adolescent girls about polycystic ovarian syndrome self-protective measures.

All in all, implementation of the educational guidelines significantly affected nursing student's knowledge, self-protective behavior and quality of life and research hypothesis is met.

### **Conclusion:**

Polycystic ovary syndrome can interfere with overall health and quality of life of female nursing students. Based on the results of this study, the research hypothesis is met and there was a significant improvement in knowledge, self-protective behavior, and quality of life of female nursing students' who have polycystic ovary syndrome after implementation of the educational guidelines.

### **Recommendations:**

It is crucial to implement educational guidelines to enhance knowledge, self-protective behavior and quality of life of female nursing students regarding polycystic ovary syndrome using the most advanced teaching methods and tools. Based on the results of this study, it is recommended to implement this study on a larger sample size and at different locations in Egypt. It is also important to identify gaps in PCOS management, and to implement evidence-based most up-to-date educational guidelines and programs. It is also very important to conduct further research to improve quality of life for women with polycystic ovary syndrome.

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