

An Educational Program for Females Regarding Polycystic Ovarian Syndrome Based on the Health Belief Model

Eslam Lotfy Ali Ahmed ⁽¹⁾, Prof. Dr. Afaf Salah Abd El-Mohsen ⁽²⁾,
Dr. Sahar Mahmoud S. El Awady ⁽³⁾

Clinical Instructor at Minia Health Nursing Institute ⁽¹⁾

Professor of Community Health Nursing -Faculty of Nursing -Helwan University ⁽²⁾

Assist. Professor of Community Health Nursing, - Faculty of Nursing -Helwan University ⁽³⁾

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Abstract: **Background:** Polycystic Ovary Syndrome (PCOS) is a common hormonal condition that affects females at reproductive age. It starts during adolescence, but symptoms may fluctuate over time. Polycystic ovary syndrome can cause hormonal imbalances, irregular periods, excess androgen levels and cysts in the ovaries which are enlarged ovaries containing multiple small cysts. **Aim:** This study aimed to evaluate an educational program for females regarding polycystic ovarian syndrome based on the health belief model. **Research design:** A quasi-experimental research design was used in this study. **Sample:** Purposive sample include 157 females with polycystic ovary syndrome. **Setting:** It was conducted at obstetric & gynecological outpatient clinics at the health insurance hospital in Minya governorate. **Tools:** One tool included five parts: 1st part: Demographic characteristics of female, 2nd part: Medical history of female, 3rd part: Females' knowledge, 4th part: Females' reported practice, 5th part: Health belief model of female about polycystic ovary syndrome. **Results:** The study result revealed that, 5.3 % of studied females had good total knowledge pre apply education program, become 77.2 % of them had good total knowledge post apply education program. While 90.5 % of studied females had unsatisfactory with total reported practices pre apply educational program. While 86.8 % of studied females had negative with health belief model pre apply education program, become 92.0 % of them had satisfactory total reported practices post apply educational program. While 80.2 % of them had positive health belief model post apply education program. **Conclusion:** The females' knowledge, and reported practices about polycystic ovary syndrome improved post apply health educational program based on the health belief model. **Recommendations:** Continuous health education program for female regarding polycystic ovarian syndrome-based health belief model in another place.

Keywords: Educational Program, Females, Health Belief Model and Polycystic Ovarian Syndrome.

1. INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is a condition in which the ovaries produce an abnormal amount of androgens, male sex hormones that are usually present in females in small amounts. The name polycystic ovary syndrome describes the numerous small cysts (fluid-filled sacs) that form in the ovaries. Common symptoms include irregular or absent menstrual periods, which result from ovulatory dysfunction (*Urbanetz et al., 2024*). Many females with PCOS experience hirsutism, or excessive hair growth, particularly on the face, chest, and back, due to elevated androgen levels. Acne and oily skin are

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frequent, along with male-pattern baldness or thinning hair. Weight gain and difficulty losing weight are prevalent, often accompanied by obesity, which can exacerbate other symptoms (*Mukfemajeje et al., 2024*).

Prevalence of affected female remain undiagnosed worldwide over 70 % of. In Egypt, PCOS affects an estimated 8–13 % of reproductive-aged female. PCOS is the commonest cause of anovulation and a leading cause of infertility. PCOS is associated with a variety of long-term health problems that affect physical and emotional wellbeing (*Tay et al., 2023*). The exact cause of PCOS is not clear. Many females with PCOS have insulin resistance, type 2 diabetes, hypertension, high cholesterol, heart disease, and endometrial cancer (cancer of the inner lining of the uterus). PCOS can cause anxiety, depression and a negative body image. Some symptoms as infertility, obesity and unwanted hair growth can lead to social stigma. This can affect other life areas as family, relationships, work and involvement in the community (*Di Lorenzo et al., 2023*).

Diagnosis typically involves a combination of clinical, laboratory, and imaging studies. Clinically, females may present with symptoms such as irregular menstrual cycles, hirsutism, acne, and obesity. Blood tests found elevated levels of androgens, as testosterone, and sometimes elevated insulin levels. An ultrasound can show the presence of multiple small cysts on the ovaries. Early diagnosis and management of PCOS are essential to reduce the female with PCOS are more likely to develop certain serious health problems. These include type 2 diabetes, high blood pressure, problems with the heart and blood vessels, and uterine cancer. Females with PCOS often have problems with their ability to get pregnant as infertility (*Mohan et al., 2023*).

Treatment of PCOS is multifaceted and tailored to address symptoms and goals of the female as managing menstrual irregularities, reducing androgen levels, improving insulin resistance, and addressing fertility concerns. Lifestyle modifications, including diet and exercise. Pharmacological treatments include oral contraceptives, anti-androgen medications, as spironolactone, prescribed to address excess hair growth and acne (*Hadidi et al., 2023*).

Health Belief Model (HBM) provides a useful framework for understanding how female with PCOS perceive health and make decisions about managing female's condition. This model posits that females' health-related behaviors are influenced by their perceptions of susceptibility to a health problem, the severity of the problem, the benefits of taking action, and the barriers to taking that action. Female's perception of female susceptibility to long-term complications like diabetes, cardiovascular disease, or infertility can drive motivation to adhere to treatment and lifestyle modifications (*Nisa et al., 2024*).

A health education program for PCOS aims to empower female with knowledge and strategies to manage their condition effectively. The program typically includes comprehensive information on the nature of PCOS, its symptoms, and associated health risks. It emphasizes the importance of lifestyle modifications, such as a balanced diet and regular physical activity, in managing symptoms and improving overall health. Nutritional counseling is often a key component, helping females make informed dietary choices that support weight management and metabolic health. The program covers the various medical treatments available, including their benefits and potential side effects, to help females make informed decisions in collaboration with their healthcare providers (*Kim et al., 2024*).

Community Health Nursing (CHN) plays a crucial role in the management and support of females with PCOS. CHN focuses on health promotion, disease prevention, and the provision of care in community settings, making it well-suited to address the complex needs of female with PCOS. CHN work to increase awareness and understanding of PCOS through educational programs and outreach initiatives, helping females recognize symptoms and seek timely medical advice (*Sengupta et al., 2024*). Nurses provide personalized care plans that incorporate lifestyle modifications, as nutrition and exercise guidance, to manage symptoms and reduce the risk of complications. By facilitating access to healthcare services, CHN help females navigate the healthcare system and connect with specialists as needed (*Benham et al., 2024*).

Significance of the study

Polycystic ovarian syndrome (PCOS) effects upward of 10% of reproductive-aged female, estimated at over 200 million females worldwide. PCOS is thought to be increasing in incidence in both developing and developed nations as a result of

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lifestyle-related changes in diet quality, reduced physical activity, ubiquitous environmental Endocrine-Disrupting Chemicals (EDC), and altered light exposures, sleep disturbance, heightened levels of stress and other environmental factors. These factors, and the high prevalence of PCOS, suggest that there could be an evolutionary basis for the syndrome (*Jingjing et al., 2021*).

PCOS the major endocrinopathy among reproductive-aged female, is not yet perceived as an important health problem in the world. It affects 4 %–20 % of female (nearly of 2.9 million at reproductive age), it is estimated that between five to 10 percent of United States (US) female of childbearing age have PCOS, one of the most common hormonal endocrine disorders among female of reproductive age. In Egypt, it is estimated that the prevalence of PCOS is 13 % in fertile and 37.5 % in secondary infertile female. Large number of females affected with PCOS in Minya governorate 16 % of females (*World Health Organization (WHO), 2023*).

Community health nurses play a vital role in managing and supporting females to manage PCOS successfully and reducing the severity of symptoms includes eating a balanced and nutritious diet, maintaining a healthy weight, being as active as possible, and minimizing harmful habits such as smoking and excessive drinking. A healthy diet will ensure get an adequate intake of nutrients, vitamins and minerals. The types of treatments and remedies used in natural and complementary therapies often depend on the female's main concern(s). For example, the treatment for excess hair growth might be different from a treatment used to improve fertility (*Rao et al., 2023*).

Aim of the Study:

This study aimed to evaluate the effect of an educational program for females regarding polycystic ovarian syndrome based on the health belief model thorough the following:

- 1-Assessing the knowledge and reported practices of the females about polycystic ovarian syndrome.
- 2-Planning health education program for females based on the health belief model about polycystic ovarian syndrome.
- 3-Implementing health education program for females based on the health belief model about polycystic ovarian syndrome.
- 4-Evaluating the effect of educational program for knowledge and reported practices of females based on the health belief model about polycystic ovarian syndrome.

Research hypothesis:

The female's knowledge and reported practices will be improved after applying an educational program for females regarding polycystic ovarian syndrome based on the health belief model.

2. SUBJECTS & METHODS**1. Technical Item:**

The technical item includes (research design, setting, sample and tools for data collection).

Research design:

A quasi-experimental research design was conducted to achieve the study.

Setting:

This study was conducted at Obstetric & Gynecological Outpatient clinics at the Health Insurance Hospital in Minya governorate.

Sample:

Purposive sample was used in this study.

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Sample size: The study conducted in obstetric & gynecological outpatient clinics at the health insurance hospital in Minya governorate, used to choose 157 females' total number of females in one year begin, of August 2020 to end of July 2021 were 250 females.

Sample size was calculated by the following equation:

$$n = N (1 + N \times (e))$$

n= sample size

N= Population size =250

E= (, 00025) level of perception

n=250(1+250) x (, 00025) = 157 it is actual size of sample were outpatient clinics at the Health Insurance Hospital in Minya governorate.

Tool for data collection:

Data was collected using the one tool as the following:

Tool (I): Interview questionnaire

A Structure interview questionnaire developed by researcher after reviewing the national and international related literature and approved by supervision. It was written in Arabic language and consists of five parts as the following:

Part (I): Demographic characteristics of females consisted of 6 items as: age, marital status, level of education, occupation.

Part (II): Medical history: It divided to 2 sub-items:

1st:Past medical history for females consisted of 6 closed ended questions as: suffer from a menstrual disorder, date of the last menstrual period, have a history of certain diseases, if the answer is yes, what is the disease, have a family history of polycystic ovary syndrome.

2nd :Current health status for females consisted of 11 closed ended questions as as: suffer from pelvic pain before the start of period or after it ends, suffer from interrupted or irregular menstrual cycles, suffer from hair growth in the facial areas and on the body in general.

Part (III): Knowledge of females about poly cystic ovarian syndrome (pre – post format) based on health belief model: It consisted of 4 sub items:

A- Females' knowledge about polycystic ovarian syndrome included 6 closed ended questions as: meaning of polycystic ovarian syndrome, polycystic ovary syndrome occurs with age, causes of polycystic ovary syndrome.

B- Females' knowledge about treatment of polycystic ovarian syndrome included 8 closed ended questions as: pharmacological treatment used to reduce the symptoms of polycystic ovary syndrome, birth control pills are used to reduce the risk of cancer, clomiphene is used to treat type 2 diabetes.

C- Females' knowledge about complication & effects of polycystic ovarian syndrome included 11 closed ended questions as: early complications of polycystic ovary syndrome, long-term complications of polycystic ovary syndrome, heart disease and strokes are complications of PCOS caused by, difficulty and interruption of breathing during sleep are complications of PCOS caused by.

D- Females' knowledge about diet & exercises for polycystic ovarian syndrome included 9 closed ended questions as: foods that reduce symptoms of polycystic ovary syndrome, foods that increase the symptoms of polycystic ovary syndrome, cigarette smoking increases the symptoms of polycystic ovary syndrome, intake alcohol increases the symptoms of PCOS.

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Scoring system, it included 34 questions; the answer score 2 point for correct answer and complete, 1 point for correct answer and not complete and zero point to wrong or no answer. The total scores of females 68 points knowledge regarding polycystic ovarian syndrome divided into three levels as the following:

- Poor knowledge < 50 % (< 34 score)
- Average knowledge 50 -70 % (34:48 score)
- Good knowledge > 75% (> 48 score).

Part (IV) Reported practices of females with poly cystic ovarian syndrome (pre – post format): It consisted of 7 sub items:

A- Females’ reported practices regarding aerobic exercise included 4 closed ended questions as: make sure bladder is empty, then sit or lie down, tighten pelvic floor muscles. Hold firmly and count 3 to 5 seconds.

B- Females’ reported practices regarding jogging exercise included 6 closed ended questions as: prepare for 10-15 minutes of slow running, mix periods. Run for two minutes at high intervals.

C- Females’ reported practices regarding high intensity interval exercise included 5 closed ended questions as: space the feet and knees at an appropriate distance, place the legs outward and do not change the direction of their movement.

D- Females’ reported practices regarding core strength exercise included 6 closed ended questions as: stand with feet apart from each other, hold a light medicine ball in front of in both hands, and squat down, move back and keep your knees over ankles, lowering the ball to the floor.

E- Female’s reported practices regarding cardio exercise included 5 closed ended questions as: star shaped jump, two sets of 15 to 24 times, stand up straight, place hands at sides, and bend knees slightly.

F- Female’s reported practices regarding diets intake for polycystic ovarian syndrome included 20 closed ended questions as: eat oatmeal, eat vegetables, eat nuts, eat buckwheat, eat kale, eat spinach.

G- Female’s reported practices regarding diets avoided for polycystic ovarian syndrome included 15 closed ended questions as: avoid eating salt, avoid eating milk and dairy products, avoid eating soy products, avoid eating cakes, avoid eating sweets, avoid eating red meat, avoid eating sausage.

Scoring system, it included 61 questions; 2 points for done, 1 point for sometimes answer and zero point to not done answer. The total scores of females 122 points reported practices about polycystic ovarian syndrome classified into two levels:

- Satisfactory practices $\geq 60\%$ (≥ 73 point).
- Unsatisfactory practices < 60 % (< 73 point).

Part (V): Health belief model of female about poly cystic ovarian syndrome, it consists of 6 sub items (pre – post format):

A- Females’ health belief model about perceived susceptibility included 6 closed ended questions as: not worried about developing polycystic ovary syndrome, PCOS is a complex condition that affects every female differently, females who have relatives with PCOS see females as being more susceptible due to the genetic component of the condition.

B- Females’ health belief model about perceived severity included 5 closed ended questions as: having symptoms of PCOS without treatment can cause serious health problems, having polycystic ovary syndrome can cause me to be infertile, having polycystic ovary syndrome can cause gestational diabetes.

C- Females’ health belief model about cause action included 4 closed ended questions as: get advice on how to reduce the symptoms of polycystic ovary syndrome from physician or nurse, get advice on how to reduce the symptoms of polycystic ovary syndrome from friends or family members.

D- Females’ health belief model about self-efficacy included 8 closed ended questions as: reducing fat in foods, weight loss, walk daily for an hour or practice sports activity, eat large amounts of vegetables and fruits.

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E- Females' health belief model about perceived benefits included 5 closed ended questions as: doing these things helps me stay healthy, doing these things helps reduce excess androgen levels in PCOS (excessive hair growth, usually on the face, chest, and back) and acne.

F- Females' health belief model about perceived barriers included 5 closed ended questions as: following steps that reduce the symptoms of polycystic ovary syndrome does not make you need a lot of money, following the steps that reduce the symptoms of PCOS makes it very easy to perform.

Scoring system: it included 33 questions of females' health belief model about PCOS classified into two levels: The answers scored as 2 points for agree answer, 1 point for neutral answer and zero point to disagree answer. The total scores equal 66 points for females' health belief model about PCOS classified into two levels:

- **Negative attitude $\geq 60\%$ (≥ 40 points).**
- **Positive attitude $< 60\%$ (< 40 points).**

Tool validity and Reliability:**A) Content Validity:**

The revision of the tool for clarity, relevance, comprehensiveness, understanding and applicability was done by a panel of five experts all of them from Faculty of Nursing from Community Health department to measure the content validity of the tool and the necessary modification was done accordingly.

B) Tool Reliability:

Reliability was applied for testing the internal consistency of the tool, by administration of the same tool to the same subjects under similar conditions two times. Answers from the repeated testing were compared (Test- re- test reliability was 0.89 for knowledge), Cronbach's Alpha reliability was 0.880 for reported practices and reliability was 0.899 for health belief model.

Ethical consideration:

An official permission to conduct the proposed study obtained from the Scientific Research Ethics Committee. Participation in the study is voluntary and subjects will be given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs respected.

II) Operational item:**1) Preparatory phase:**

It included reviewing of related literature and theoretical knowledge of various aspect of the study using books, articles, internet and magazines to develop tool for data collection.

2) Pilot study:

A pilot study conducted on 10 % of the females equal 16 females under study to assess the feasibility, practicability, clarity and objectivity of the tools. Based on the results, no modification was done. Females in the pilot study were included in the main study sample because no modifications were done.

Field work:

After attaining the approval to conduct the study, sample collected during the Obstetric & Gynecological Outpatient clinics at the Health Insurance Hospital in Minya governorate. After establishing a trustful relation, every female interviewed only by the researchers to explain the study purpose then study tool completed by female. Teaching method used as group discussion, brainstorming, demonstration and re-demonstration, also media picture and handout. Booklet prepared by the researchers.

The study implemented through three phases preparatory, implementation and evaluation item.

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An education program conducted in following phases:

Assessment phase: by using pre-testing questionnaire to assess the females' knowledge, reported practices and health belief models items about PCOS. The researchers first introduced herself and explained the purpose of the study briefly to the female. Every female was met and informed consent for participation was obtained. Females were assured that the obtained information confidentially, and used only for the purpose of the study.

Planning phase:

- Actual field work carried out in the period from first of October 2022 up June 2023 years, two days per week Tuesday and Thursday from 9 am -1pm and interview females in obstetric & gynecological outpatient clinics at the Health Insurance Hospital in Minya governorate.

- An education program was improved females' knowledge, reported practices and health belief model about PCOS and explained to all participants. Based on the result of the pre-test questionnaire the researcher utilized 5 sessions each session needs from 30 - 45 minutes and the education program conducted through 3 theoretical sessions and 2 practical sessions.

- Post-test done after applies sessions. The study sample equal 157 females divided to 7 groups, as 6 groups of them contained about 22 females and 1 group contained about 25 females.

Implementation phase:

Based on the result obtained from the assessment phase, the researcher designed the health education program sessions contents according to the female's needs. Detected needs, requirements and were clarified and discussed in the form of booklet. Contents of the booklet were selected on the base of identified needs. The booklet consisted of knowledge about PCOS as meaning, age occurrence, causes, symptoms, types, diagnosis, pharmacological treatment, females resort to a surgical procedure, surgical procedure, complications, effect of polycystic ovary syndrome, reported practices as food intake and avoided, exercises, health belief models for PCOS. Teaching methods used as lecture, open discussion, brain storming, demonstration and re-demonstrations were frequently applied during sessions. Media as PowerPoint, data show, pictures, video and booklet prepared by researcher.

Evaluation phase:

This phase utilized to evaluate the effect of an educational program for females regarding polycystic ovarian syndrome based on the health belief model. It conducted pre-intervention and post intervention after an educational program, utilizing the same format utilized pre intervention.

III) Administrative Item:

After explanation of the study aim and objectives, an approval to carry out this study was obtained from Dean of Faculty of Nursing, Helwan University and official permission was obtained from the director of obstetric & gynecological Outpatient clinics at the Health Insurance Hospital in Minya governorate.

IV) Statistical Item:

Upon completion of data collection, data computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. The P value set at 0.05. Descriptive statistics tests as numbers, percentage, mean standard deviation (\pm SD), was used to describe the results. Appropriate inferential statistics such as "F" test or "t" test used as well.

- Degrees of Significance of the results were:

- Non-significant (NS) if $p > 0.05$.

- Significant (S) if $p < 0.05$.

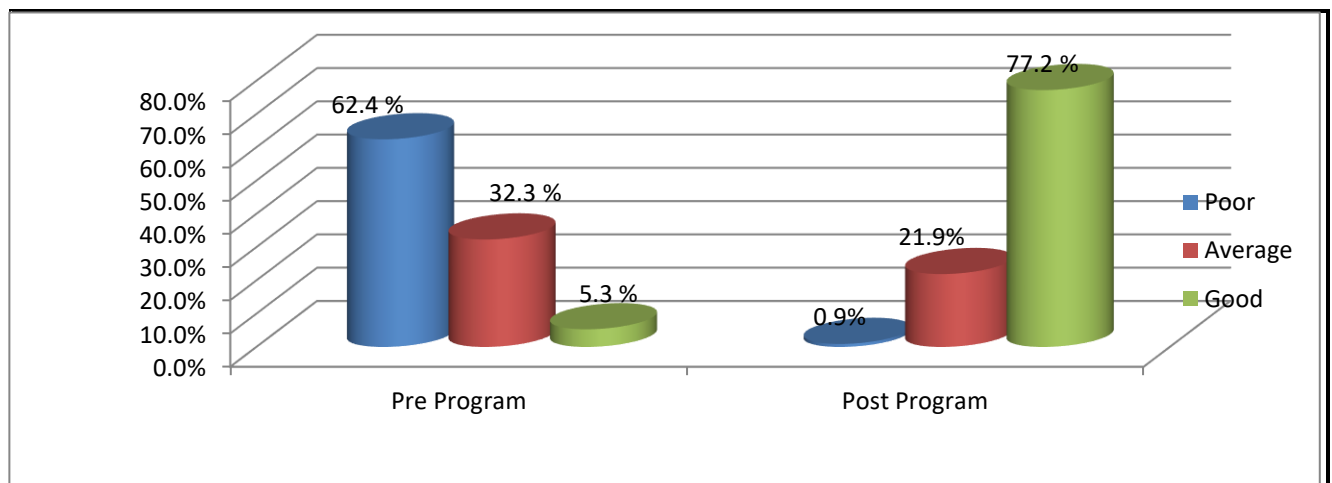
- Highly significant (HS) if $p < 0.01$.

3. RESULTS

Table (1): Frequency Distribution of the Studied Females' Demographic Characteristics (N=157).

Item	No.	%
Age		
15 -25 years	49	31.2
26 - 35 years	88	56.1
36 - 45 years	20	12.7
Mean ± SD		32.4 ± 7.8 years
Marital status		
Single	91	58.0
Married	40	25.5
Divorced	10	6.4
Widow	16	10.1
Level of education		
Read and write	20	12.7
Basic education	65	41.4
Postgraduate	72	45.9
Occupation		
Employee	88	56.1
Student	40	25.5
Housewife	29	18.4
Monthly Income		
Sufficient basic needs only	75	47.8
Not sufficient for basic needs	60	38.2
Sufficient for basic needs and savings	22	14.0

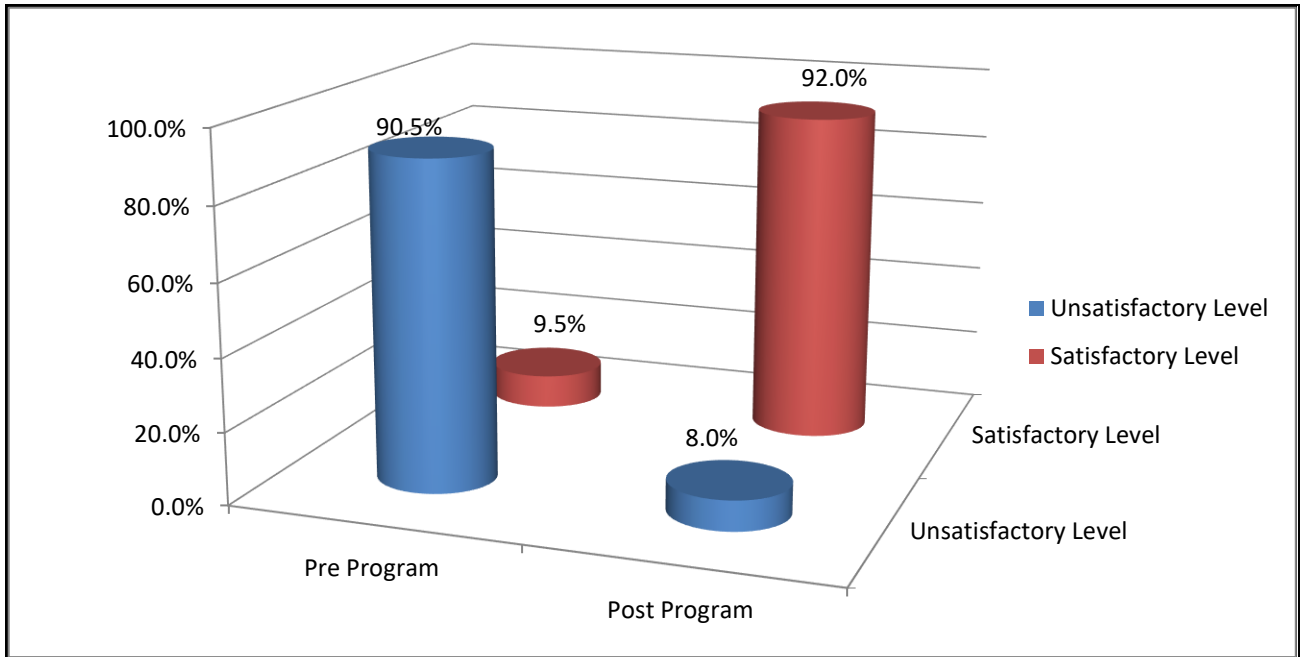
Table (1): Shows that, the mean age of studied females was 32.4 ± 7.8 years & 58.0 % of studied females was married. Also, 45.9 % of the studied females had postgraduate in education level. Additionally, 56.1 % of the studied females' employees, and 47.8 % of the studied females' monthly income is sufficient basic needs only.



**χ²=31.2 **P value=0.000

Figure (1): Percentage Distribution of Total Knowledge among Studied Females regarding Polycystic Ovarian Syndrome Pre & Post Applying Health Educational Program (N=157).

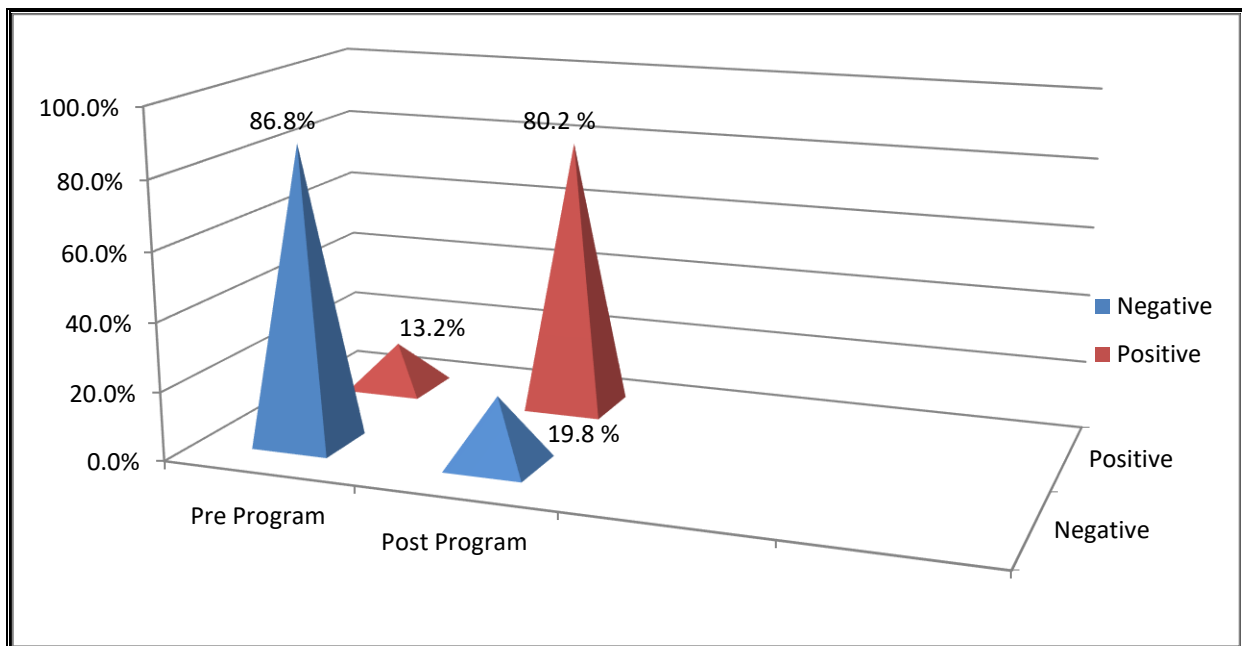
Figure (1): Shows that, 77.2 % of studied females had good total knowledge post apply educational program. While, 21.9 % of studied females had average total knowledge post apply educational program. While, 0.9 % of studied females had poor total knowledge post applied education program where P value 0.000 and paired t test = 31.2.



** $\chi^2=29.22$ ** P value=0.000

Figure (2): Percentage Distribution of Total Reported Practices among Studied Females regarding Polycystic Ovarian Syndrome Pre and Post Applying Health Educational Program (N=157).

Figure (2): Illustrate that, 90.5 % of studied females had unsatisfactory with total reported practices pre apply health educational program. While, 92.0 % of studied females had satisfactory total reported practices post apply health educational program where P value 0.000 and paired t test =29.22.



** $\chi^2=30.42$ ** P value=0.000

Figure (3): Percentage Distribution of Total Health Belief Model among Studied Females regarding Polycystic Ovarian Syndrome Pre and Post Applying Health Educational Program (N=157).

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Figure (3): Shows that, 86.8 % of studied females had negative with total health belief model pre apply health education program. While, 80.2 % of them had positive total health belief model post apply education program where P value 0.000 and paired t test =30.42.

Table (2): Correlation between Total Score Knowledge and Total Reported Practices of Studied Females Pre & Post Applying Health Education Program (N= 157).

Item	Total reported practices			
	Pre- program		Post -program	
	R	P value	R	P value
Total Knowledge	- 0.028	0.763	0.353	0.000

(*) statistically significant & (**) high statistically significant $P \leq 0.00$.

Table (2): Shows that, there was positive correlation between studied females’ total knowledge regarding polycystic ovarian syndrome and their total reported practices. Moreover, there was highly significance improvement in studied females’ total knowledge and total reported practices.

Table (3): Relation between Demographic Characteristics and Total Knowledge of Studied Females Post - Educational Program (N=157).

Items	The studied female						χ^2	P value
	Post -Educational Program							
	Poor (n=1)		Average (n=34)		Good (n=122)			
	No.	%	No.	%	No.	%		
*Females’ age								
15 -25 years	1	100.0	30	88.2	19	15.6	13.220	0.012
26 - 35 years	0	0.0	4	11.8	84	68.9	16.551	0.002
36 - 45 years	0	0.0	0	0.0	20	16.4	17.002	0.001
*Females’ marital status								
Single	1	100.0	20	58.8	70	57.4	19.011	0.002
Married	0	0.0	10	29.4	30	24.6	14.552	0.012
Divorced	0	0.0	4	11.8	6	4.9	15.887	0.001
Widow	0	0.0	0	0.0	16	13.1	23.221	0.000
* Place of residence								
Rural	1	100.0	20	23.0	66	54.1	18.221	0.002
Urban	0	0.0	14	41.2	56	45.9	24.551	0.000
*Females’ education levels								
Read and write	1	100.0	6	17.6	13	10.7	18.542	0.002
Basic education	0	0.0	20	58.8	45	36.9	19.669	0.002
Postgraduate	0	0.0	8	23.5	64	52.5	23.412	0.000
*Females’ occupation								
Employee	1	100.0	15	44.1	73	59.8	16.102	0.002
Student	0	0.0	10	29.4	30	24.6	19.669	0.002
Housewife	0	0.0	9	26.5	20	16.4	12.110	0.002
Female monthly income								
Sufficient basic needs only	1	100.0	20	58.8	54	44.3	18.445	0.001
Not sufficient for basic needs	0	0.0	10	29.4	50	41.0	20.110	0.002
Sufficient for basic needs and savings	0	0.0	4	11.8	18	14.7	18.442	0.002

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Table (3): Shows that, there was highly statistically significant relation between studied females' total knowledge about polycystic ovarian syndrome post- educational program with educational level and age. Moreover, there was statistically significant relation between studied females' total knowledge about polycystic ovarian syndrome post- educational program with their age and educational level where p value = 0.005 respectively.

4. DISCUSSION

Polycystic ovary syndrome (PCOS) is one of the most common heterogeneous conditions of the endocrine reproductive system in female of childbearing age. Hyperandrogenism and oligomenorrhea are the two core characteristics of PCOS, a complicated and multifaceted illness. The condition is linked to several major side effects, which include type 2 diabetes, early atherosclerosis, infertility, and endometrial cancer. The global prevalence of PCOS varies from 5 to 18 %, with an average prevalence of 276.4 cases per 100,000 females in Europe. In Egypt, 50 % of females are not aware that have PCOS or have a delayed diagnosis (*Wang et al., 2024*).

Health Belief Model (HBM) can be a valuable framework for understanding and addressing PCOS. This model suggests that female's health-related behaviors are influenced by perceptions of the severity of a health condition, susceptibility to it, the benefits of taking action to avoid it, and the barriers to taking action. HBM can help health care providers and females with PCOS understand the perceived severity of the condition, the female's susceptibility to its complications, the benefits of adopting a healthier lifestyle, and the barriers to making changes (*Chen et al., 2024*).

The present study finding concerning females' age, more than half of studied females had aged from 26 to 35 years, this finding was in agreement with **Bhattacharya et al., (2024)** who conducted published study at Philippine entitled as "Polycystic ovary syndrome and its management: In view of oxidative stress in Bacolod City" who reported that, 55.1 % of studied subjects were aged from 26 to 35 years. From researchers' point view, this might be due to this age range encompasses a significant portion of a female's reproductive years. Hormonal changes and imbalances are more noticeable and can lead to the symptoms associated with PCOS. Lifestyle factors as diet, physical activity, and body weight can influence the development and severity of PCOS symptoms. Females in their late 25s and early 35s often face lifestyle changes that can exacerbate these issues.

Concerning to female's level of education, less than half of studied female's education levels were postgraduate and more than half of them were employee. This result was in accordance with **Stephens, (2023)** who conducted published study at Minneapolis entitled as " Quality of Life in Menopausal Women with Polycystic Ovarian Syndrome", who reported that 43.2 % and 57.5 % of studied women's education levels were postgraduate or more and employee, respectively. From researchers' point view, this might be due to both postgraduate studies and professional employment can be highly demanding and stressful. Chronic stress can lead to hormonal imbalances, which can exacerbate PCOS symptoms. Many postgraduate students and employees have sedentary lifestyles, spending long hours studying or working at a desk. Lack of physical activity can contribute to weight gain and insulin resistance, which are associated with PCOS.

Regarding to female's monthly income of the present study revealed that less than half of studied female had sufficient basic needs only, this finding was in agreement with **Amirshahi et al., (2024)** who conducted a published study at Kaduna State in Nigeria entitled in " Comparing the Effectiveness of Emotionally Focused Therapy and Cognitive-Behavioral Therapy on Sexual Function and Health-Promoting Behaviors in Women with PCOS, Kaduna State, Nigeria. ", who stated that 44.6 % of studied women monthly income were sufficient basic needs only. From researchers' point of view, this might be due to the cost of living, especially in urban areas where job opportunities are often concentrated, can be high. Housing, transportation, and childcare costs can consume a significant portion of their income. Even with higher education, females may find themselves in positions that do not fully utilize their skills and qualifications, leading to lower earnings.

Concerning to female's place of residence, the present study finding revealed that more than half of studied female were residence in rural area. This result was in accordance with **Ibrahim & Ahmed, (2024)** who conducted published study at Egypt entitled in " Information Motivation Behavior Skill Model: It's Effect on Knowledge and self-Efficacy of Women with Ovarian Hyperstimulation Syndrome", reported that 54.1 % of studied women were residence in rural area. From researchers' point view, this might be due to strong social networks and community ties in rural areas can influence females

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to remain in or return to their hometowns and economic limitations might prevent females from relocating to urban areas, where living costs are higher.

Regarding to female's marital status of the present study revealed that more than half of studied female had single, this finding was in agreement with **Naz et al., (2023)** who conducted a published study in Iran entitled in " Possible cognition changes in women with polycystic ovary syndrome ", who stated that 57.6 % of studied women marital status were single. From researchers' point of view, this might be due to PCOS often causes symptoms like acne, hirsutism (excessive hair growth), and weight gain, which can affect a female's self-esteem and body image. These changes might make some females feel less confident in social or romantic settings. Negative self-perception due to these physical symptoms can lead to social withdrawal or reluctance to engage in dating.

Enhancing research hypothesis, that the female's knowledge and reported practices will be improved after applying an educational program for females regarding polycystic ovarian syndrome based on the health belief model.

Regarding the effective of the program on total knowledge studied females, the present study revealed that there was statistical significant difference between pre and post program apply in all knowledge items this finding was supported with **Melin et al., (2024)** whose conducted published study in Nigeria under title of "Effects of different insulin sensitizers in the management of polycystic ovary syndrome in Nigeria " who reported that, there statistical significant difference between pre and post implementation program in the knowledge of studied subjects and recommended with PCOS. From researchers' point of view, this might be due to provide clear and accurate information about what PCOS is, its symptoms, and how it affects reproductive health, hormones, metabolism, and overall well-being that help to improve knowledge post educational program. Knowledge for effectively manage their condition, make informed decisions about their health, and improve their overall quality of life.

Regarding the effective of the program on total reported practices studied females, the present study revealed that there was statistical significant difference between pre and post program apply in all reported practices items this finding was supported with **Atiomo et al., (2024)** whose conducted published study in Thailand under title of " Prevalence and Diagnosis of PCOS Using Electronic Health Records" who reported that, there statistical significant difference between pre and post implementation program in the reported practices of studied subjects and recommended with PCOS. From researchers' point of view, this might be due to engaging in regular exercise can improve insulin sensitivity and help manage blood sugar levels. This is particularly beneficial for females with PCOS who often experience insulin resistance. Practicing mindful eating and choosing nutrient-dense foods can help in maintaining a healthy weight. Weight loss, even modest, can significantly reduce PCOS symptoms.

Concerning the effective of the program on total scores of health belief model studied females, the present study revealed that there was statistical significant difference between pre and post program apply in all items for health belief model this finding was supported with **Lin et al., (2024)** whose conducted published study in Tunis under title of " Health-related knowledge, beliefs and self-efficacy in women with polycystic ovary syndrome "who reported that, there statistical significant difference between pre and post implementation program in items for health belief model of studied subjects. From researchers' point of view, this might be due to apply the HBM, healthcare providers can better understand the motivations and challenges faced by females with PCOS and develop tailored interventions that encourage proactive management of the condition. This model emphasizes the importance of education, support, and personalized care in empowering females with PCOS to make informed decisions about their health and treatment options.

Regarding relationship between total knowledge and female's demographic characteristics post apply health education program, the present study showed significant relation between them and this finding was in agreement with **Asad et al., (2024)** who published study at Argentine under title "Polycystic ovary syndrome and mental health", who reported that, statically significant relation between total knowledge and demographic characteristics post apply health education program. In addition, this finding in accordance with **Khan et al., (2024)**, who published study at Western Asia under title "Situation analysis of polycystic ovary syndrome in Western Asia" who reported significant relation between total knowledge level among the studied subjects and demographic characteristics. From researchers' point view, this might be when females are knowledgeable about their condition, females can communicate more effectively with healthcare providers. This leads to better collaboration, personalized treatment plans, and improved adherence to prescribed therapies.

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5. CONCLUSION

On the light of the current study, it could be concluded that:

Less two third of studied female had poor total knowledge pre apply education program which improved and become more than two third of them had good total knowledge post apply education program. Also, most of studied females had unsatisfactory with total reported practices pre apply educational program which improve and become most of them had satisfactory total reported practices post apply educational program. While, majority of studied females had negative total health belief model pre apply education program which improve and become more than two third of them had positive total health belief model post apply education program. There was statistically significant relation between females' demographic data and their total knowledge, total reported practices and total health belief model regarding polycystic ovarian syndrome.

6. RECOMMENDATIONS

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

- 1- Continuous health education program for female regarding polycystic ovarian syndrome-based health belief model.
- 2- Provide females with polycystic ovarian syndrome by booklet about methods to reduced symptoms.
- 3- Make posters or banners about reported practices of polycystic ovarian syndrome and put Obstetric & Gynecological Outpatient clinics at the Health Insurance Hospital in Minya governorate under observation of community health nurse.
- 4- Encourage group discussion peer for females with polycystic ovarian syndrome under supervision of community health nurse.
- 5- Apply further research in large sample and other setting for generalization.

REFERENCES

- [1] **Amirshahi, M., Saremi, A. A., Nouri, R., Karbalaee, M. H., & Hosseini-Sadat, R. (2024).** Comparing the Effectiveness of Emotionally Focused Therapy and Cognitive-Behavioral Therapy on Sexual Function and Health-Promoting Behaviors in Women with PCOS. *International Journal of Behavioral Sciences*, 18(1), 29-36.
- [2] **Asad, N., Nadeem, T., & Noorullah, A. (2024).** Polycystic ovary syndrome and mental health. In *Polycystic Ovary Syndrome* (pp. 87-91).
- [3] **Atiomo, W., Rizwan, M. N. H., Bajwa, M. H., Furniturewala, H. J., Hazari, K. S., Harab, D., ... & Mirza, F. G. (2024).** Prevalence and Diagnosis of PCOS Using Electronic Health Records: A Scoping Review and a Database Analysis. *International Journal of Environmental Research and Public Health*, 21(3), 354.
- [4] **Benham, J. L., Goldberg, A., Teede, H., & Tay, C. T. (2024).** Polycystic ovary syndrome: associations with cardiovascular disease. *Climacteric*, 27(1), 47-52.
- [5] **Bhattacharya, K., Dey, R., Sen, D., Paul, N., Basak, A. K., Purkait, M. P., ... & Syamal, A. K. (2024).** Polycystic ovary syndrome and its management: In view of oxidative stress. *Biomolecular Concepts*, 15(1), 20220038.
- [6] **Chen, S. H., Chen, S. C., Lai, Y. P., & Yeh, K. Y. (2024).** Relationships among Vitamin D Insufficiency, Health belief, Quality of Life and Metabolic Syndrome in Northeastern Taiwanese Adults: A Cross-sectional Community-based Cohort Study.
- [7] **Di Lorenzo, M., Cacciapuoti, N., Lonardo, M. S., Nasti, G., Gautiero, C., Belfiore, A., ... & Chiurazzi, M. (2023).** Pathophysiology and Nutritional Approaches in Polycystic Ovary Syndrome (PCOS): A Comprehensive Review. *Current Nutrition Reports*, 12(3), 527-544.
- [8] **Hadidi, M., Karimabadi, K., Ghanbari, E., Rezakhani, L., & Khazaei, M. (2023).** Stem cells and exosomes: as biological agents in the diagnosis and treatment of polycystic ovary syndrome (PCOS). *Frontiers in endocrinology*, 14, 1269266.
- [9] **Ibrahim, W. K., & Ahmed, A. F. M. (2024).** Information Motivation Behavior Skill Model: It's Effect on Knowledge and self-Efficacy of Women with Ovarian Hyperstimulation Syndrome. *International Egyptian Journal of Nursing Sciences and Research*, 5(1), 91-107.

International Journal of Novel Research in Healthcare and NursingVol. 11, Issue 2, pp: (213-226), Month: May - August 2024, Available at: www.noveltyjournals.com

- [10] **Jingjing Liu, Qunhong Wu, Yanhua Hao, Mingli Jiao, Xing Wang, Shengchao Jiang, Liyuan Han (2021).** Measuring the global disease burden of polycystic ovary syndrome in 1945 countries: Global Burden of Disease Study 2017 Human Reproduction, Volume 36, Issue 4, April 2021, Pages 1108–1119.
- [11] **Khan, R., Rehman, R., & Alam, F. (2024).** Situation analysis of polycystic ovary syndrome in Western Asia. In *Polycystic Ovary Syndrome* (pp. 207-215).
- [12] **Kim, J. J., Hwang, K. R., Lee, D., Kim, S., & Choi, Y. M. (2024).** Adolescents diagnosed with polycystic ovary syndrome under the Rotterdam criteria but not meeting the diagnosis under the updated guideline. *Human Reproduction*, 39(5), 1072-1077.
- [13] **Lin, A. W., Dollahite, J. S., Sobal, J., & Lujan, M. E. (2024).** Health-related knowledge, beliefs and self-efficacy in women with polycystic ovary syndrome. *Human Reproduction*, 33(1), 91-100.
- [14] **Melin, J., Forslund, M., Alesi, S., Piltonen, T., Romualdi, D., Spritzer, P. M., & Teede, H. (2024).** Metformin and combined oral contraceptive pills in the management of polycystic ovary syndrome: a systematic review and meta-analysis. *The Journal of Clinical Endocrinology & Metabolism*, 109(2), e817-e836.
- [15] **Mohan, A., Haider, R., Fakhor, H., Hina, F., Kumar, V., Jawed, A., & Kazeem, S. (2023).** Vitamin D and polycystic ovary syndrome (PCOS): A review. *Annals of Medicine and Surgery*, 85(7), 3506-3511.
- [16] **Mukfemajejee, P., Sanyal, S., Chadha, S., & Mukfemajejee, S. (2024).** The impact of polycystic ovary syndrome (PCOS) on the risk of developing ovarian cancer and thyroid disorders: a comprehensive review. *Endocrine, Metabolic & Immune Disorders-Drug Targets (Formerly Current Drug Targets-Immune, Endocrine & Metabolic Disorders)*, 24(5), 562-572.
- [17] **Naz, M. S. G., Rahnemaei, F. A., Tehrani, F. R., Sayehmiri, F., Ghasemi, V., Banaei, M., & Ozgoli, G. (2023).** Possible cognition changes in women with polycystic ovary syndrome: a narrative review. *Obstetrics & Gynecology Science*, 66(5), 347-363.
- [18] **Nisa, K. U., Tarfeen, N., Mir, S. A., Waza, A. A., Ahmad, M. B., & Ganai, B. A. (2024).** Molecular mechanisms in the etiology of polycystic ovary syndrome (PCOS): a multifaceted hypothesis towards the disease with potential tfemaleapeutics. *Indian Journal of Clinical Biochemistry*, 39(1), 18-36.
- [19] **Rao, Manisha MSA; Broughton, K. Shane PhD; LeMieux, Monique J. PhD(June 2023).** “Cross-sectional Study on the Knowledge and Prevalence of PCOS at a Multiethnic University” *Progress in Preventive Medicine: June 2023 - Volume - Issue - p e0028.*
- [20] **Sengupta, P., Dutta, S., & Hassan, M. F. (2024).** Polycystic ovary syndrome (PCOS) and oxidative stress. *Journal of Integrated Science and Technology*, 12(3), 752-752.
- [21] **Stephens, G. (2023).** *Quality of Life in Menopausal Women with Polycystic Ovarian Syndrome* (Doctoral dissertation, Walden University).
- [22] **Tay, C. T., Garrad, R., Mousa, A., Bahri, M., Joham, A., & Teede, H. (2023).** Polycystic ovary syndrome (PCOS): international collaboration to translate evidence and guide future research. *Journal of Endocrinology*, 257(3).
- [23] **Urbanetz, L. A. M. L., Soares Junior, J. M., Maciel, G. A. R., Simões, R. D. S., Baracat, M. C. P., & Baracat, E. C. (2024).** Does bisphenol A (BPA) participate in the pathogenesis of Polycystic Ovary Syndrome (PCOS). *Clinics*, 78, 100310.
- [24] **Wang, G., Liu, X., Zhu, S., & Lei, J. (2024).** Regulatory emotional self-efficacy and self-compassion mediate anxiety, depression, body image distress and subjective well-being in women with polycystic ovary syndrome: A cross-sectional study. *Journal of Advanced Nursing*.
- [25] **Worldwide organization (WHO), 2023** Prevalence of Poly cystic ovarian syndrome fertile and secondary infertile women.