

Prevalence and Symptomatology of Polycystic Ovarian Syndrome in Libyan Women: A Cross-Sectional Study

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Abstract

Polycystic ovarian syndrome (PCOS) is a complicated, poorly understood hormonal condition that causes a variety of symptoms, including irregularity, which is the most common symptom, such as hyperandrogenism, metabolic abnormalities, and infertility, affecting 8 to 13% of women of reproductive age and 21% in high-risk groups. It also affects changing lifestyles and growing obesity rates throughout the world, which have contributed to an increase in PCOS occurrence. Aims: to investigate the frequency and symptoms of polycystic ovarian syndrome among Libyan women in our community. Method: A cross-sectional observational study was conducted using a structured interview technique administered via an electronic form. Over 130 participants who had a history of abnormal symptoms during their menstrual cycle in Benghazi participated in the four-month study period. The research used a pre-validated questionnaire that was adopted and modified based on the updated literature review; responses to each question were coded and entered into the Statistical Package for the Social Sciences (SPSS) version 20. Result: In this research, we discovered that the most common age group for PCOS was between 18 and 22, in contrast to the age group between 38 and 42, which was the least common, while the most common symptoms were pain (56.9%) and irregular menstruation (50%). In addition, the number of hours of sleep showed a noticeable relationship: approximately 40% of cases involved people getting less than 8 hours of sleep, which is why we recommend changing your lifestyle and losing weight. Conclusion: According to the study, there is an increase in the risk factors for chronic illnesses like PCOS, which calls for immediate action to lower their incidence and treat the underlying chronic illnesses.

Keywords: Polycystic Ovary Syndrome; PCOS; Prevalence; Symptomatology; Libya; Cross-Sectional Study; Women's Health; Menstrual Irregularities; Lifestyle.

1. Introduction

Polycystic ovary syndrome (PCOS), the major endocrinopathy among reproductive-aged women, affects 8 to 13% of women of reproductive age and 21% in high-risk groups. PCOS is the most prevalent reproductive disorder causing significant health consequences for women, impairing quality of life and increasing morbidity. In 2017, 1.55 million incident cases of PCOS among women of reproductive age (15-49 years) were reported globally, representing an increase of 4.47% from 2007 to 2017. The global age-standardized incidence rate of PCOS among women of reproductive age was 82.44 per 100,000 population in 2017, an increase of 1.45% from 2007 to 2017. There is no clear cause of PCOS, but exposure to lifestyle, occupational, and environmental factors may enhance or exaggerate its occurrence. Some differences in the prevalence of PCOS were reported across geographic areas; high-income countries (e.g., Europe and North America) generally showed higher rates than Asian countries. However, a lower frequency of hirsutism was

observed in studies conducted in East Asia. Differences in lifestyle habits and in the prevalence of obesity and metabolic syndrome may partially explain this variability. The cause-and-effect relationship of these aspects with PCOS remains inadequately studied, particularly regarding occupational and lifestyle exposures. The hallmark features of PCOS include anovulation, hyperandrogenism, and polycystic ovaries. Other major manifestations include luteinizing hormone hypersecretion, metabolic disturbances, hyperinsulinemia, insulin resistance, glucose intolerance, dyslipidemia, hirsutism, acne, obesity, type II diabetes mellitus, and infertility. There is also increasing evidence that women with PCOS are more likely to suffer from mood disorders; the underlying mechanisms remain unclear, though obesity, insulin resistance, elevated androgens, and distress related to hirsutism, weight gain, acne, and infertility are contributing factors. If left untreated, PCOS can worsen fertility and obstetric outcomes and increase cardiovascular, metabolic, and oncological risks, as well as psychological disorders such as stress and depression. Unfortunately there is no cure for PCOS, but treatments can improve symptoms. Management combines lifestyle alteration with medical management: a healthy, balanced diet and regular exercise to prevent excessive weight gain and reduce PCOS-related complications; metformin to improve insulin resistance; combined oral contraceptives for menstrual cycle regulation and hyperandrogenism; and, when needed, anti-androgens for refractory hyperandrogenism. For infertility due to PCOS, management includes lifestyle changes, medicines, or surgery to stimulate regular ovulation, and in vitro fertilization (IVF) may be used.

2. Method

This section describes the study setting and design for assessing the prevalence and symptoms of polycystic ovary syndrome. The study was conducted on a sample of the Libyan population who had a history of abnormal symptoms during their menstrual cycle.

Description of the research setting

A cross-sectional observational study was conducted in Benghazi between 19th January and 19th April 2024. Participants were asked to consent to participate in the study verbally and were interviewed using a pre-validated questionnaire, which took 5 to 7 minutes to complete.

Study design

Quantitative research was conducted using a structured interview methodology. A total of 130 questionnaires were recorded using an electronic technique. The advantages of this approach include the ability to provide clarifications, a better response rate, the possibility of exploring the problem in depth, gaining participant confidence, and the opportunity for further investigation. Participants were informed that the researchers were university students in the Faculty of Pharmacy at the Libyan International Medical University.

Selection and exclusion criteria

Inclusion criteria: Participants allowed to take part were Libyans, aged 18 to 42 years, with a history of symptoms during their menstrual cycle.

Exclusion criteria: Participants excluded from this study were those aged under 18 or over 42 years, who had no recurrent symptoms during the cycle, or who were of a different nationality.

Research tool

The questionnaire was piloted using a snowball sampling technique with 5% (n=8) of the target sample. Following piloting, further modifications were made to enhance its comprehensiveness based on various literature reviews. Data from the pilot test were excluded from the final analysis. The final questionnaire consisted of 16 closed-ended questions, distributed across Part A and Part B.

Part A: Demographic data (such as age, height, weight).

Part B: Daily activity, lifestyle, and information about the menstrual period.

Ethical consideration

The researchers obtained written permission from the research center to apply the questionnaire.

Statistical Analysis

Responses to each question were coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 20 for Windows (SPSS Inc., Chicago, Illinois). The analysis included frequencies of discrete variables.

3. Results

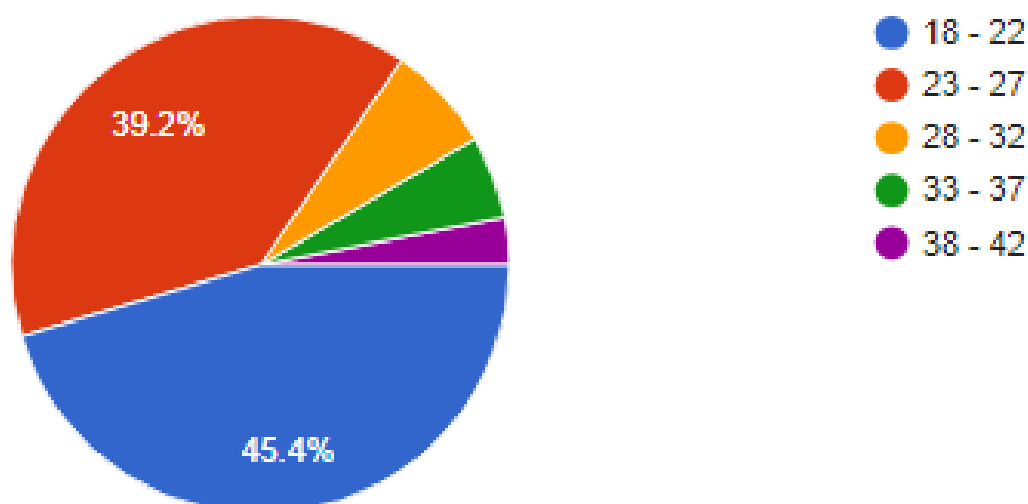


Figure 1. Age distribution.

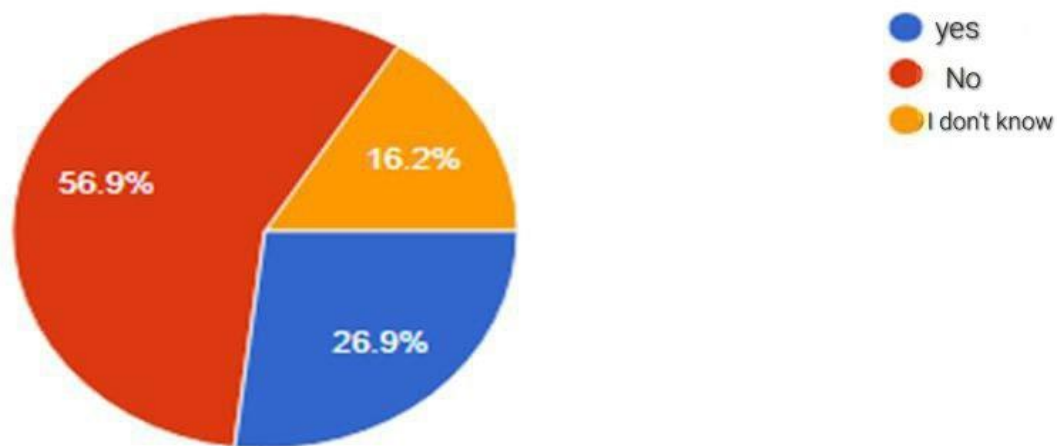


Figure 2. Are you affected by this disease?

Table 1. The symptoms considered with this disease.

Symptoms	Percentage of each symptom
Weight gain	50 (38.5%)
Irregular menstrual cycle	65 (50%)
Excessive hair growth around the face, abdomen, and back	42 (31.5%)
Thinning hair	34 (24.2%)
Acne	58 (44.6%)
Absence of menstrual cycle	32 (24.6%)
Infertility	5 (3.8%)
Ovarian cysts diagnosed by ultrasound	21 (16.2%)
Hormonal disorders detected by blood test	19 (14.6%)
Painful menstrual cycle	74 (56.9%)
Bleeding between menstrual cycles	11 (8.5%)
Diabetes/insulin resistance	10 (7.7%)
Total (n=120)	Total percentage (100%)

Table 2. The line of treatment followed by the participants' doctors.

Treatment	Percentage of use of each treatment
Description of oral contraceptives	15 (26.8%)
Description of forms of contraception	3 (5.4%)
Description of metformin, a drug that lowers blood sugar	9 (16.1%)
Description of clomiphene or other drugs that stimulate ovulation	5 (8.9%)
Description of statins, which are drugs that lower cholesterol	2 (3.6%)
Description of other drugs	19 (33.9%)
Surgery	7 (12.5%)
Advice to change lifestyle, i.e., lose weight, follow a diet, and exercise	20 (35.7%)

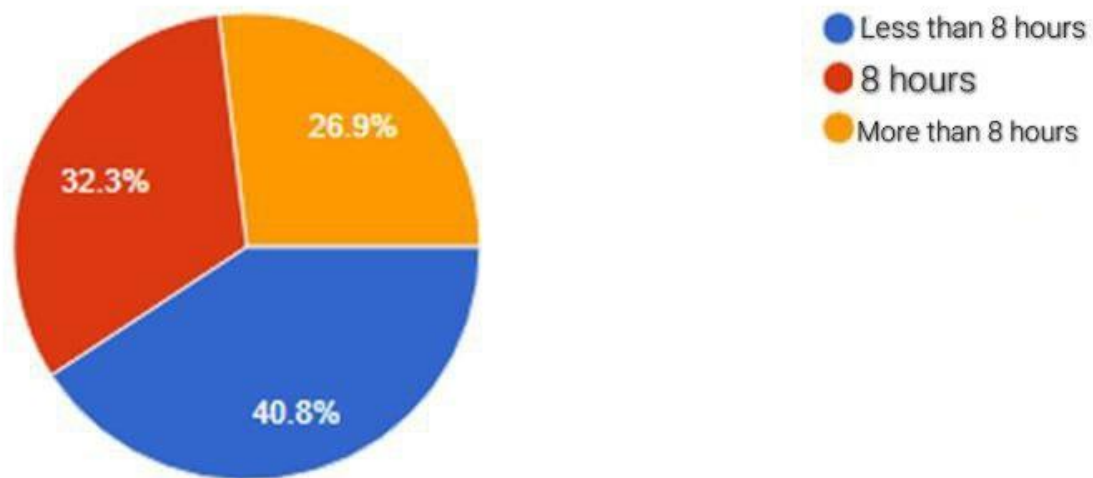


Figure 3. Average sleeping hours at night.

4. Discussion

When we studied PCOS in 130 participants, we found that it was most diffuse between the ages of 18 and 22, accounting for 45.5% of cases. While the cause of polycystic ovaries is unknown, changes in hormones during adulthood appear to play a significant role. PCOS is linked to multiple reproductive and psychological complications that are of serious concern in a patient's life; however, in population-based research including individuals participating in a health plan in Northern California, 0.81% of teenagers aged 15 to 19 had been diagnosed with PCOS. The prevalence of PCOS, regardless of diagnosis, was found to be 3% in an Iranian study that examined schoolgirls based on a questionnaire assessing PCOS symptoms.

As a result, when we conducted our study on the diagnosis of polycystic ovary syndrome (PCOS), the results showed that a large percentage of people, up to 59.9%, were not diagnosed with the disease. This is likely due to national culture, particularly since many women experience symptoms but are not diagnosed. For this reason, raising awareness and obtaining an accurate diagnosis are the first steps in managing PCOS, as they improve the patient's quality of life.

According to our results, most participants were not diagnosed with the syndrome despite having symptoms; a large percentage answered "I don't know" (66%), and the second largest percentage (4.5%) were participants aged 20 years, which further explains why the majority of affected participants in this research were aged 18-22. This underscores the importance of awareness of PCOS and the need for early diagnosis so that patients can avoid its serious complications.

Since the purpose of this research was to identify the symptoms of PCOS, this was one of the questionnaire questions. Among the 130 patients who answered, the most common symptom was pain during the menstrual cycle (dysmenorrhea), reported at 56%, likely due to increased levels of prostaglandins, which cause increased contractions of the myometrium and uterine blood vessels, producing a relative uterine ischemic state. This is consistent with the finding that the second most

common symptom in the current study was menstrual irregularity, at 50%. In contrast, a study by fourth-year medical students in Tripoli, Libya, found that among 21 patients with PCOS, the most common symptom was menstrual irregularity, at a rate of 9.5% .

The high incidence of polycystic ovary syndrome has become an international health concern due to the serious complications that can occur if the syndrome is left untreated, such as infertility. Fortunately, there are many treatment options, which were addressed in the questionnaire. The most recommended treatment by specialist doctors was lifestyle change. Although the exact cause of PCOS is unknown, obesity affects 50% of patients with the syndrome. Insulin resistance is found in many women with PCOS even if they are not overweight; Huber-Buchholz et al. found that reducing central fat and improving insulin sensitivity through lifestyle changes leads to normal ovulation in women with PCOS, even without significant weight loss.

Although the cause of PCOS is unknown, some factors may contribute to its development. When asked “Are you exposed to a lot of stress?”, 50% of participants answered “often.” Another study found that stress plays an important role in the development of PCOS, and additional studies should consider evaluating and managing stress in PCOS as it may be relevant to understanding its pathogenesis.

When asked “Do you follow a healthy eating system?”, more than 50% of participants answered “never.” Some studies found that frequent consumption of fast food was associated with a 1.7 times greater risk of developing PCOS, likely because fast food is typically high in saturated fat; irregular eating habits lead to fluctuations in glucose levels, insulin resistance, and increased hormonal imbalance such as hyperandrogenism, increasing the risk of developing PCOS.

Overall, 40.8% of participants reported sleeping less than 8 hours, and more than 40% reported not having a fixed sleep schedule, indicating a relationship between sleep schedule and PCOS. Sleep is a beneficial factor in lifestyle that is necessary for women's well-being; women with PCOS have been shown to have more diverse sleep disturbance symptoms (16.14%, 402/2,491).

5. Conclusion

The current study shows that the prevalence of many risk factors for chronic diseases, such as PCOS, is increasing and urgently requires interventions to reduce their prevalence and address the chronic diseases they contribute to.

6. Limitation of the Study

This study was conducted on a relatively small sample of people, but it provides useful information regarding the risk factors in the community setting. The findings need to be interpreted within the context of the following potential limitations:

1. The quality of non-responders was not evaluated; thus, the true dispensing patterns of drugs may deviate to some extent from the current results.
2. Recent statistical information about Benghazi was not available.

3. A sound comparison of our data with other reports was difficult because of differing age groups, methodologies, drug classifications, and health systems.
4. Since this study was conducted in one city with a relatively small sample size, it is difficult to generalize the data to the whole Libyan population.
5. Poor internet access, combined with a short research period.
6. Subjects were randomly approached, implying some lack of rigor in the recruitment method.

7. Recommendation

We hope the following recommendations will receive due consideration:

1. Strengthen political commitment to non-communicable disease (NCD) prevention at all levels of government.
2. Integrate the delivery of basic health care for NCD prevention and management into primary health care systems.
3. Expand the package of essential NCD-related interventions available at the primary healthcare level, including a prioritized and realistic set of high-impact, cost-effective interventions to detect and treat common conditions.
4. Address health system gaps by strengthening surveillance systems, the capacity of the health workforce, and access to essential medicines and technology.
5. Remove financial barriers to essential health-care interventions, such as user fees, and reduce out-of-pocket payments.
6. Increase health promotion activities targeting schools, institutions, and workplaces, advocating a healthy lifestyle and educating the public on the harmful effects of smoking, secondhand smoke, excessive alcohol consumption, excess fat and salt intake, and lack of physical activity.
7. Strengthen physical education programs in schools from kindergarten to the tertiary level.
8. Implement recommendations from expert consultation reports, such as the WHO/FAO recommendations on diet, nutrition, and prevention of chronic diseases.
9. Set population nutrient goals and recommend a minimum intake of 400 g of fruits and vegetables per day for the prevention of chronic diseases such as heart disease, cancer, diabetes, and obesity.

References

- [1]. Deswal R, Narwal V, Dang A, Pundir CS. The prevalence of polycystic ovary syndrome: a brief systematic review. *J Hum Reprod Sci.* 2020;13(4):261-271.
- [2]. Neven ACH, Laven J, Teede HJ, Boyle JA. A summary on polycystic ovary syndrome: diagnostic criteria, prevalence, clinical manifestations, and management according to the latest international guidelines. *Semin Reprod Med.* 2018;36(1):005-012.
- [3]. Liu J, Wu Q, Hao Y, Jiao M, Wang X, Jiang S, Han L. Measuring the global disease burden of polycystic ovary syndrome in 194 countries: Global Burden of Disease Study 2017. *Hum Reprod.* 2021;36(4):1108-1119.

- [4]. Chiaffarino F, Cipriani S, Dalmartello M, Ricci E, Esposito G, Fedele F, Parazzini F. Prevalence of polycystic ovary syndrome in European countries and USA: a systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2022;279:159-170.
- [5]. Palomba S, Santagni S, Falbo A, La Sala GB. Complications and challenges associated with polycystic ovary syndrome: current perspectives. *Int J Womens Health.* 2015:745-763.
- [6]. Brennan L, Teede H, Skouteris H, Linardon J, Hill B, Moran L. Lifestyle and behavioral management of polycystic ovary syndrome. *J Womens Health.* 2017;26(8):836-848.
- [7]. Anju EJ, Robert JN, Richard SL, Stephen F, Lisa JM, Jacqueline B, Helena JT. Polycystic ovary syndrome. *Lancet Diabetes Endocrinol.* 2022.
- [8]. Christensen SB, Black MH, Smith N, Martinez MM, Jacobsen SJ, Porter AH, Koebnick C. Prevalence of polycystic ovary syndrome in adolescents. *Fertil Steril.* 2013;100(2):470-477.
- [9]. Upadhye JJ, Shembekar CA. Awareness of PCOS (polycystic ovarian syndrome) in adolescent and young girls. *Int J Reprod Contracept Obstet Gynecol.* 2017;6(6):2297-2301.
- [10]. Jeong JY, Kim MK, Lee I, Yun J, Won YB, Yun BH, et al. Polycystic ovarian morphology is associated with primary dysmenorrhea in young Korean women. *Obstet Gynecol Sci.* 2019;62(5):329.
- [11]. Abdalla H, Osman N, Morgham A, Sultan M. Prevalence of polycystic ovary syndrome in fourth year medical students of University of Tripoli. *AlQalam J Med Appl Sci.* 2021:151-154.
- [12]. Zehravi M, Maqbool M, Ara I. Healthy lifestyle and dietary approaches to treating polycystic ovary syndrome: a review. *Open Health.* 2022;3(1):60-65.
- [13]. Damone AL, Joham AE, Loxton D, Earnest A, Teede HJ, Moran LJ. Depression, anxiety and perceived stress in women with and without PCOS: a community-based study. *Psychol Med.* 2019;49(9):1510-1520.
- [14]. Begum GS, Shariff A, Ayman G, Mohammad B, Housam R, Khaled N. Assessment of risk factors for development of polycystic ovarian syndrome. *Diabetes.* 2017;1(2).
- [15]. Zhang J, Ye J, Tao X, Lu W, Chen X, Liu C. Sleep disturbances, sleep quality, and cardiovascular risk factors in women with polycystic ovary syndrome: systematic review and meta-analysis. *Front Endocrinol.* 2022;13:971604.