World Journal of Current Medical and Pharmaceutical Research
Content available at www.saap.org.in ISSN: 2582-0222

A CASE STUDY ON POLYCYSTIC OVARIAN DISEASE (PCOD) AND ITS RELATIONSHIP WITH AGE, SLEEP, AND DIETARY PATTERNS IN BARGARH, ODISHA, INDIA

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ARTICLE HISTORY
Received on: 16-03-2026
Revised on: 19-04-2026
Accepted on: 26-05-2026

ABSTRACT

Polycystic Ovarian Disease (PCOD) is one of the most prevalent endocrine and metabolic disorders affecting women of reproductive age and has emerged as a major public health concern worldwide. The disorder is characterized by hormonal imbalance, irregular ovulation, ovarian cyst formation, insulin resistance, obesity, infertility, and psychological disturbances. Lifestyle-related factors such as poor dietary habits, inadequate sleep, stress, and sedentary behaviour have been increasingly associated with the occurrence and severity of PCOD. The present study aimed to evaluate the prevalence of PCOD and examine its relationship with age, sleep patterns, and dietary habits among women in the Bargarh area of Odisha, India. A survey-based prospective study was conducted for four months from December 2025 to March 2026 at Kishori Nursing Home, Bargarh, Odisha. Data were collected from both indoor and outdoor patients, and a total of 250 individuals were assessed, among whom 29 individuals were diagnosed with PCOD. Age-related analysis indicated that the highest number of PCOD cases was observed in the 21–24 years age group. Sleep assessment revealed that moderate to severe sleep disturbances were common among participants, whereas dietary analysis showed that unhealthy and moderately balanced diets were associated with increased PCOD prevalence. Irregular menstruation, weight gain, hair fall, acne, and mood disturbances were the major symptoms observed among affected individuals. The findings indicate that age, sleep quality, and dietary behaviour significantly influence the occurrence and progression of PCOD. Early diagnosis, lifestyle modification, proper sleep management, and balanced nutrition may contribute substantially to reducing disease severity and improving reproductive health outcomes among women.

Keywords: Polycystic Ovarian Disease, PCOD, Dietary Pattern, Sleep Quality, Reproductive Health, Hormonal Imbalance.

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DOI: https://doi.org/10.37022/wjcmpr.v8i2.398

1. INTRODUCTION

Polycystic Ovarian Disease (PCOD) is a common endocrine and metabolic disorder affecting women during their reproductive years and is characterized by ovarian dysfunction, hormonal imbalance, and metabolic abnormalities. The condition develops when the ovaries produce immature or partially mature follicles that fail to undergo normal ovulation and instead accumulate within the ovaries, resulting in cyst formation. Women affected by PCOD commonly experience irregular menstrual cycles, infertility, obesity, acne, hirsutism, and metabolic disturbances due to elevated androgen levels and insulin resistance [1, 2]. Although PCOD is not considered a life-threatening disorder, its long-term implications on reproductive, metabolic, and psychological health make it a significant medical concern requiring timely intervention [3]. Globally, PCOD affects approximately 8–13% of women of reproductive age, although prevalence estimates vary depending on diagnostic criteria and population characteristics [4]. In developing countries such as India, the prevalence appears considerably higher, ranging between 9% and 22%, particularly among adolescents and young women [5, 6]. Urbanization, unhealthy dietary practices, increased consumption of processed foods, physical inactivity, obesity, and chronic stress are considered major contributing factors to the growing burden of PCOD [7, 8]. Recent epidemiological evidence suggests that changing lifestyle patterns have accelerated the incidence of hormonal and reproductive disorders among young women, making PCOD an emerging healthcare challenge. The pathophysiology of PCOD is multifactorial and involves interactions among genetic, hormonal, metabolic, and environmental factors. Hyperinsulinemia and insulin resistance play an important role

in disease progression by stimulating excessive androgen production from ovarian theca cells, thereby disrupting follicular maturation and ovulation [2]. Genetic predisposition has also been implicated in the disorder, with several candidate genes such as *CYP17A1*, *FSHR*, *INSR*, and *DENND1A* contributing to altered ovarian physiology and endocrine regulation [1]. Furthermore, chronic low-grade inflammation and environmental influences may aggravate hormonal disturbances and metabolic dysfunction associated with the disease [7].

Among the numerous determinants of PCOD, age, sleep quality, and dietary patterns have emerged as particularly important modifiable factors influencing disease onset and progression. Age influences reproductive physiology and hormonal regulation, with symptoms often beginning during adolescence and becoming more pronounced during early adulthood [8]. Sleep disturbances are increasingly recognized as an important contributor to hormonal dysregulation, elevated cortisol levels, insulin resistance, and menstrual irregularities in women with PCOD [9]. Similarly, dietary habits strongly influence body weight, glucose metabolism, and endocrine function. Diets rich in processed foods, refined carbohydrates, and unhealthy fats may exacerbate insulin resistance and obesity, thereby worsening PCOD symptoms, whereas balanced nutritional intake can improve reproductive and metabolic outcomes [10].

PCOD is also associated with several long-term complications, including infertility, type 2 diabetes mellitus, metabolic syndrome, cardiovascular diseases, hypertension, endometrial abnormalities, and psychological disorders such as anxiety and depression [11, 12]. These complications significantly affect the quality of life of affected individuals and impose substantial social, emotional, and economic burdens. Therefore, early diagnosis and comprehensive management strategies involving lifestyle modification, dietary intervention, physical activity, and medical support are essential for minimizing long-term complications and improving patient outcomes [8].

Despite the growing prevalence of PCOD, limited studies have specifically evaluated the influence of lifestyle-related factors such as sleep and diet across different age groups in smaller semi-urban populations of India, particularly in Odisha. Therefore, the present study was undertaken to evaluate the occurrence of PCOD among women in the Bargarh area of Odisha and to investigate the relationship between PCOD and selected factors such as age, sleep patterns, and dietary habits. Understanding the influence of these modifiable factors is important for developing preventive strategies, improving awareness, and supporting effective management of PCOD, thereby contributing to better reproductive and overall health among women.

2. MATERIALS AND METHODS

2.1 Study Area

The present study was conducted in the Bargarh district of Odisha, India. Bargarh is situated in the western region of Odisha between 20°43′ and 21°41′ North latitude and 82°39′ and 83°58′ East longitude. The district shares boundaries with the state of Chhattisgarh in the north, Sambalpur district in the east, Balangir and Subarnapur districts in the south, and Nuapada district in the west. The region comprises both urban and semi-urban populations and provides a suitable setting for investigating reproductive health conditions such as Polycystic Ovarian Disease (PCOD) among women of different age groups.

2.2 Study Design and Duration

The study was designed as a prospective survey-based observational study and was carried out over a period of four months, from December 2025 to March 2026. The study aimed to evaluate the occurrence of PCOD and its relationship with selected factors such as age, sleep patterns, and dietary habits among women residing in the Bargarh region of Odisha.

2.3 Study Population and Sample Size

A total of 250 individuals attending Kishori Nursing Home, Bargarh, Odisha, were included in the study. Data were collected from both inpatient and outpatient departments during the study period. Among the total participants, 29 individuals were diagnosed with PCOD. Women of different age groups presenting with symptoms suggestive of hormonal imbalance, menstrual irregularities, or reproductive health concerns were considered for evaluation.

2.4 Inclusion and Exclusion Criteria

2.4.1 Inclusion Criteria

The study included:

1) Women diagnosed with PCOD through clinical evaluation and ultrasonographic assessment.
2) Women seeking treatment or medical consultation at Kishori Nursing Home during the study period.
3) Women belonging to reproductive age groups and willing to participate in the study.

2.4.2 Exclusion Criteria

The following participants were excluded from the study:

1) Women with incomplete medical information or insufficient clinical records.
2) Individuals diagnosed with reproductive disorders unrelated to PCOD.
3) Women who were not willing to participate or provide relevant information.

2.5 Data Collection

Data collection was carried out through clinical observations, patient records, and survey-based assessments at Kishori Nursing Home. Weekly data regarding PCOD patients were recorded and systematically organized. Information related to demographic characteristics, age, menstrual irregularities, dietary behaviour, sleep quality, body weight changes, associated symptoms, and reproductive health complications was documented.

Special attention was given to major symptoms associated with PCOD, including irregular menstrual cycles, weight gain, acne, excessive facial hair growth (hirsutism), hair fall, pelvic discomfort, infertility-related concerns, and mood disturbances. Information regarding lifestyle characteristics, exercise habits, and adherence to recommended dietary practices was also collected.

2.6 Diagnosis of PCOD

Diagnosis of PCOD was primarily based on clinical symptoms and ultrasonographic examination. Most participants underwent pelvic ultrasound scanning, which was used to identify the presence of multiple immature follicles, ovarian enlargement, and polycystic ovarian morphology. In selected cases, additional investigations such as hormonal assessment

and thyroid evaluation were considered based on clinical presentation.

Furthermore, the occurrence of unilateral and bilateral PCOD among diagnosed individuals was recorded. Assessment of insulin resistance was limited and conducted only in a few patients depending on clinical recommendations.

2.7 Assessment of Study Variables

2.7.1 Age-wise Distribution

Participants diagnosed with PCOD were categorized into different age groups to evaluate the relationship between reproductive age and disease occurrence.

2.7.2 Sleep Pattern Assessment

Sleep quality among participants was categorized into three groups:

- ✓ Good sleep
- ✓ Moderate sleep
- ✓ Severe sleep disturbance

This classification was used to evaluate the possible influence of sleep quality on PCOD occurrence and symptom severity.

2.7.3 Dietary Pattern Assessment

Dietary habits of participants were categorized into:

- ✓ Healthy diet
- ✓ Moderate diet
- ✓ Poor diet

Dietary categorization was based on food habits, nutritional balance, and adherence to recommended dietary practices. The relationship between diet quality and PCOD prevalence was subsequently evaluated.

2.8 Ethical Considerations

Ethical approval for conducting the study was obtained from the ethical committee of Kishori Nursing Home, Odisha. Confidentiality of patient information was maintained throughout the study period. Data were collected strictly for academic and research purposes, and personal details of participants were not disclosed.

2.9 Statistical Analysis

The collected data were systematically compiled, tabulated, and interpreted using descriptive statistical methods. Results were represented in the form of tables to facilitate comparative interpretation of age distribution, sleep quality, dietary patterns, and PCOD occurrence among participants. Frequency distribution and percentage-based observations were used to summarize findings and identify trends associated with disease prevalence.

3. RESULTS

3.1 Occurrence of PCOD among the Study Population

A total of 250 individuals were assessed during the study period to evaluate the occurrence of Polycystic Ovarian Disease (PCOD) in the Bargarh area of Odisha. Among the total individuals examined, 29 participants (11.6%) were diagnosed with PCOD, while 221 individuals (88.4%) did not exhibit symptoms or diagnostic evidence of the condition (Table 01). The findings indicate that PCOD was present among a noticeable proportion of women in the study population, reflecting its growing occurrence among reproductive-age women.

Table 01: Occurrence of PCOD among the study population.

Category	Number of Individuals
Individuals diagnosed with PCOD	29
Individuals without PCOD	221
Total	**250**

The diagnosed individuals belonged to different occupational backgrounds, including students, homemakers, and working women. Most of the affected participants were students and young adults, indicating a relatively higher occurrence of PCOD among younger reproductive-age groups.

3.2 Clinical Characteristics and Symptoms Observed in PCOD Patients

Women diagnosed with PCOD exhibited a wide range of symptoms associated with hormonal imbalance and ovarian dysfunction. The most frequently reported symptoms included irregular menstrual cycles, weight gain, hair fall, acne, and excessive facial or body hair growth (hirsutism). Darkened patches around the neck and underarm region, suggestive of insulin resistance, were also observed among several participants.

A majority of the diagnosed individuals were found to be overweight, whereas diabetes mellitus was not observed among the assessed participants. However, a small number of individuals were reported to have thyroid-related disorders, indicating possible endocrine associations. Psychological symptoms such as stress, anxiety, mood disturbances, and emotional instability were commonly reported among affected women. In addition, some participants experienced infertility-related complications and irregular ovulation patterns, which affected reproductive health outcomes.

Most participants had undergone ultrasonographic assessment for diagnosis, which revealed the presence of either unilateral or bilateral polycystic ovarian morphology. Assessment of insulin resistance was conducted only in a limited number of patients depending on medical recommendations.

3.3 Case Study Observation

A detailed case study was documented to better understand the progression and management of PCOD. A 21-year-old female patient diagnosed with both hypothyroidism and PCOD demonstrated long-term hormonal and metabolic complications associated with the disorder. The patient had experienced menstrual irregularities and obesity from adolescence and had undergone ultrasonographic confirmation showing multiple immature ovarian follicles.

The patient received both allopathic and homoeopathic interventions during different periods of treatment. Temporary use of hormonal medication reportedly resulted in undesirable effects, particularly weight gain, whereas later adoption of structured dietary modifications, regular physical activity, and supportive therapy contributed to symptom improvement and reduction in body weight. Although this observation represents an individual clinical case, it highlights the complexity of long-term PCOD management and the importance of personalized therapeutic strategies.

3.4 Relationship between Age and PCOD

Age-wise analysis demonstrated variation in the occurrence of PCOD across different reproductive age groups (Table 2). The highest number of diagnosed cases was observed in the 21–24 years age group (10 individuals), followed by the 30–33 years

age group (5 individuals). Lower frequencies were observed among women aged 18–21 years (2 individuals) and 36–39 years (1 individual).

Table 02:Age-wise distribution of individuals diagnosed with PCOD

Age Group (Years)	Number of Individuals
18–21	2
21–24	10
24–27	4
27–30	4
30–33	5
33–36	3
36–39	1

The findings suggest that young adult women between 21 and 24 years of age were comparatively more affected by PCOD, indicating that hormonal fluctuations and reproductive-age physiological changes may contribute to greater disease occurrence during early adulthood.

3.5 Relationship between Sleep Patterns and PCOD

Sleep quality assessment revealed variations in sleeping patterns among study participants (Table 03). Out of 250 individuals, 110 participants exhibited moderate sleep quality, followed by 90 participants with good sleep patterns, while 50 individuals experienced severe sleep disturbances.

Table 03: Sleep pattern among study participants

Sleep Type	Number of Individuals
Good sleep	90
Moderate sleep	110
Severe sleep disturbance	50

The results indicate that sleep disturbances were relatively common among participants, and moderate to severe sleep irregularities were frequently associated with women exhibiting PCOD symptoms. Poor sleep quality may contribute to hormonal imbalance and increased metabolic stress, thereby aggravating disease severity.

3.6 Relationship between Dietary Pattern and PCOD

Dietary assessment demonstrated considerable variation in nutritional practices among the study population (Table 04). Among the participants, 105 individuals followed a moderate dietary pattern, whereas 95 individuals adhered to a healthy diet, and 50 individuals maintained poor dietary habits.

Table 04: Dietary pattern among study participants

Diet Type	Number of Individuals
Healthy diet	95
Moderate diet	105
Poor diet	50

The findings suggest that moderate and poor dietary practices were more common among the study population, which may contribute to hormonal disturbances and metabolic dysfunction associated with PCOD. In contrast, healthier dietary patterns may support better hormonal regulation and reduced disease severity.

4. DISCUSSION

Polycystic Ovarian Disease (PCOD) is a multifactorial endocrine disorder influenced by interactions among hormonal, metabolic, genetic, and environmental determinants. The present study assessed the occurrence of PCOD and examined its relationship with age, sleep quality, and dietary patterns among women in the Bargarh region of Odisha. Out of 250 individuals evaluated, 29 participants (11.6%) were diagnosed with PCOD, indicating a notable occurrence of the disorder among reproductive-age women. The observed prevalence is consistent with previous studies reporting that PCOD affects approximately 8–13% of women globally, while prevalence in India ranges from 9% to 22%, particularly among adolescents and young adults [4, 5, 6]. Increasing urbanization, sedentary lifestyles, obesity, dietary transitions, and psychosocial stress are believed to contribute substantially to the growing burden of PCOD in developing countries [7, 8].

The present findings demonstrated that the highest number of PCOD cases occurred in the 21–24 years age group, suggesting that early adulthood represents a vulnerable period for disease manifestation. Similar observations have been reported in previous epidemiological studies indicating that PCOD commonly develops during adolescence and early reproductive years due to hormonal fluctuations, ovarian maturation disturbances, and endocrine imbalance [1, 5]. During this phase, irregular ovulation and altered gonadotropin secretion may predispose women to menstrual abnormalities and androgen excess. Furthermore, metabolic dysfunction becomes increasingly evident with age, potentially increasing the risk of insulin resistance, infertility, and obesity-related complications in later reproductive years [3].

Irregular menstrual cycles, weight gain, hair fall, acne, excessive facial hair growth, and mood disturbances were among the commonly observed symptoms in the present study. These findings align with earlier reports identifying menstrual irregularities, obesity, hirsutism, acne, and reproductive dysfunction as major clinical manifestations of PCOD [2, 13]. Excess androgen production and impaired follicular maturation are known to contribute to these symptoms by disrupting ovarian physiology and normal endocrine functioning [1]. A few participants in the present study were also diagnosed with thyroid abnormalities, supporting evidence that endocrine disorders such as hypothyroidism may coexist with PCOD and potentially aggravate reproductive complications [14].

Sleep quality emerged as an important factor potentially influencing PCOD severity in the present investigation. A substantial proportion of participants reported moderate to severe sleep disturbances, which may negatively affect hormonal homeostasis and metabolic regulation. Sleep deprivation or poor sleep quality can increase cortisol secretion and disrupt the normal balance of reproductive hormones, including luteinizing hormone (LH), follicle-stimulating hormone (FSH), estrogen, and progesterone [9]. Inadequate sleep has also been strongly associated with insulin resistance and obesity, both of which are considered major contributors to PCOD pathogenesis [8]. Therefore, maintaining proper sleep hygiene may play a significant role in minimizing disease severity and improving reproductive outcomes.

Dietary behaviour was another important determinant observed in the study. Most participants followed either moderate or poor dietary practices, whereas comparatively fewer individuals maintained healthy nutritional habits. Unhealthy dietary patterns characterized by excessive calorie

intake, refined carbohydrates, and processed foods have been associated with obesity and impaired insulin sensitivity, both of which contribute significantly to the progression of PCOD [7, 10]. Conversely, balanced diets rich in fibre, proteins, fruits, vegetables, and low glycaemic foods have been shown to improve hormonal regulation and insulin metabolism [8]. These findings emphasize the importance of nutritional counselling and dietary modifications as essential components of PCOD management.

Psychological disturbances such as stress, anxiety, emotional instability, and mood swings were frequently observed among participants in the present study. Previous studies have similarly reported a strong association between PCOD and mental health disturbances, largely due to concerns regarding body image, infertility, menstrual irregularities, and social stigma [9]. Chronic stress may further aggravate endocrine imbalance by elevating cortisol levels and interfering with ovarian function. Consequently, comprehensive management of PCOD should include psychological support in addition to medical and lifestyle interventions.

A notable observation in the present study was the preference among several participants for homoeopathic treatment over conventional hormonal therapy, mainly due to concerns regarding side effects and long-term medication use. However, although some individuals reported symptomatic improvement, evidence regarding the effectiveness of homoeopathic treatment in PCOD remains scientifically limited and requires further controlled clinical investigation. Current evidence-based clinical guidelines continue to recommend lifestyle modification, weight management, dietary regulation, exercise, and pharmacological treatment as the standard approaches for managing PCOD symptoms and associated complications [8, 12].

The present study highlights that age, sleep quality, and dietary patterns are important modifiable determinants influencing PCOD occurrence and severity. The interaction among these factors appears to affect hormonal balance, metabolic functioning, and reproductive health. Therefore, early screening, increased awareness, healthy dietary practices, adequate sleep, stress reduction, and timely medical intervention are crucial for reducing disease progression and improving the quality of life among women affected by PCOD.

5. CONCLUSION

The present study investigated the occurrence of Polycystic Ovarian Disease (PCOD) and its association with age, sleep quality, and dietary patterns among women in the Bargarh region of Odisha, India. Out of 250 individuals examined, 29 women were diagnosed with PCOD, indicating that the disorder is increasingly prevalent among reproductive-age women. The findings demonstrated that women in the 21–24 years age group were comparatively more affected, suggesting that hormonal fluctuations during early adulthood may increase susceptibility to the disorder.

The study further revealed that sleep disturbances and unhealthy dietary practices were commonly observed among participants, potentially contributing to hormonal imbalance and worsening disease severity. Irregular menstrual cycles, obesity, acne, hair fall, and emotional disturbances emerged as major clinical manifestations among diagnosed individuals. Since age, sleep quality, and diet are modifiable lifestyle-related factors, improving these variables through proper health education, balanced nutrition, regular physical activity, and adequate sleep may substantially reduce the burden of PCOD.

In conclusion, early diagnosis and a multidisciplinary management approach involving lifestyle modification, medical intervention, and psychological support are essential for effective disease management. Greater awareness regarding reproductive health and preventive strategies may help improve long-term reproductive and metabolic outcomes among women affected by PCOD.

6.ACKNOWLEDGEMENT

The authors express their sincere thanks to the Head, Department of Zoology, Andhra University, Visakhapatnam, for providing the necessary facilities and support to carry out this study. The authors also express their sincere gratitude to the Management and Medical Staff of Kishori Nursing Home, Bargarh, Odisha, and all study participants for their cooperation and support.

7. ETHICAL APPROVAL

Ethical approval for the study was obtained from the Ethics Committee of Kishori Nursing Home, Bargarh, Odisha, India.

8. INFORMED CONSENT

Written informed consent was obtained from all participants prior to their inclusion in the study.

9. CONSENT FOR PUBLICATION

The authors have read and approved the manuscript and consent to its publication.

10. CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

11. FUNDING

This research received no external funding.

12. DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

13. AUTHOR CONTRIBUTIONS

Both authors contributed to the study conception, data collection, analysis, manuscript preparation, and approved the final manuscript.

14. INSTITUTIONAL REVIEW BOARD STATEMENT

The study protocol was reviewed and approved by the Ethics Committee of Kishori Nursing Home, Bargarh, Odisha, India.

15. CONFIDENTIALITY STATEMENT

Participant confidentiality and privacy were maintained throughout the study, and no personal identifying information was disclosed.

16. REFERENCES

1. Azziz R, Carmina E, Chen Z, Dunaif A, Laven JS, Legro RS, Lizneva D, Natterson-Horowtiz B, Teede HJ, Yildiz BO. Polycystic ovary syndrome. Nature Reviews Disease Primers. 2016 Aug 11;2(1):1-8.
2. Goodarzi MO, Dumesic DA, Chazenbalk G, Azziz R. Polycystic ovary syndrome: etiology, pathogenesis and diagnosis. Nature Reviews Endocrinology. 2011 Apr;7(4):219-31.
3. Escobar-Morreale HF. Polycystic ovary syndrome: definition, aetiology, diagnosis and treatment. Nature Reviews Endocrinology. 2018 May;14(5):270-84.
4. Bozdag G, Mumusoglu S, Zengin D, Karabulut E, Yildiz BO. The prevalence and phenotypic features of polycystic ovary syndrome: a systematic review and meta-analysis. Human Reproduction. 2016 Dec 1;31(12):2841-55.
5. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Prevalence of polycystic ovarian syndrome in Indian adolescents. Journal of Pediatric and Adolescent Gynecology. 2011 Aug 1;24(4):223-7.
6. Joshi B, Mukherjee S, Patil A, Purandare A, Chauhan S, Vaidya R. A cross-sectional study of polycystic ovarian syndrome among adolescent and young girls in Mumbai, India. Indian Journal of Endocrinology and Metabolism. 2014 May 1;18(3):317-24.
7. Patel S. Polycystic ovary syndrome (PCOS), an inflammatory, systemic, lifestyle endocrinopathy. The Journal of Steroid Biochemistry and Molecular Biology. 2018 Sep 1;182:27-36.
8. Teede HJ, Misso ML, Costello MF, Dokras A, Laven J, Moran L, Piltonen T, Norman RJ. Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome. Human Reproduction. 2018 Sep 1;33(9):1602-18.
9. Singh A, Sharma P, Gupta R. Psychological and emotional disturbances among women with polycystic ovarian syndrome: A clinical review. Journal of Women's Health and Reproductive Medicine. 2021;5(2):45-53.
10. Jain R, Varma M. Lifestyle modification as a management strategy for polycystic ovarian disease. International Journal of Reproductive Medicine. 2017;2017:1-8.
11. World Health Organization. Polycystic ovary syndrome (PCOS) [Internet]. Geneva: World Health Organization; 2023 Available from: https://www.who.int
12. Endocrine Society. Clinical practice guidelines for the assessment and management of polycystic ovary syndrome. Endocrine Society; 2018.
13. Li R, Zhang Q, Yang D, Li S, Lu S, Wu X, Wei Z, Song X, Wang X, Fu S, Lin J, Zhu Y, Jiang Y, Feng H, Qu F, Wang H, Qiao J. Prevalence of polycystic ovary syndrome in women in China: a large community-based study. Human Reproduction, 2016;28(9):2562-2569.
14. Fritz MA, Speroff L. *Clinical gynecologic endocrinology and infertility*. 9th ed. Philadelphia: Lippincott Williams & Wilkins; 2018.