Prevalence of polycystic ovarian syndrome (PCOS) among infertile women

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Abstract
Background: Polycystic ovarian syndrome (PCOS) is a common endocrine disorder that affects reproductive-aged women and is one of the leading causes of infertility. Early diagnosis and appropriate management can improve the chances of conception in infertile women. The purpose of this study was to determine the prevalence of PCOS among infertile women and identify demographic and clinical factors associated with PCOS and infertility. **Materials and Methods:** This cross-sectional study was conducted at a tertiary care hospital in which 300 women diagnosed with infertility were included using convenience sampling. A structured questionnaire was used to collect demographic and clinical data, and the Rotterdam criteria were used to diagnose PCOS. Statistical analysis was done using SPSS software. **Results:** The study found that 40% of infertile women were diagnosed with PCOS. Among these women, the most common clinical features were menstrual irregularities, hirsutism, and acne. Women with PCOS were more likely to have a higher BMI, a family history of diabetes, and a longer duration of infertility. **Conclusion:** This study highlights the need for increased awareness, early diagnosis, and appropriate management of PCOS in infertile women to improve fertility outcomes. The high prevalence of PCOS among infertile women underscores the importance of screening for PCOS in all women presenting with infertility. Further research is needed to identify effective strategies for screening, diagnosis, and management of PCOS among infertile women. Overall, this study contributes to our understanding of the prevalence and associated factors of PCOS among infertile women, providing insights into the management of infertility in this population.
Keywords: polycystic ovarian syndrome, infertile women.
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Introduction
Polycystic ovarian syndrome (PCOS) is a common endocrine disorder that affects reproductive-aged women and is one of the leading causes of infertility. According to a meta-analysis, the worldwide prevalence of PCOS is estimated to be 10%, with variations based on ethnicity and diagnostic criteria.[1] PCOS is characterized by the presence of hyperandrogenism, menstrual irregularities, and polycystic ovaries on ultrasound. The diagnosis of PCOS can be challenging due to the heterogeneity of the condition and the lack of consensus on diagnostic criteria.[2]

Infertility is defined as the inability to conceive after 12 months of regular unprotected intercourse and affects approximately 10-15% of couples worldwide.[3] PCOS is a well-known cause of female infertility, with up to 70% of women with PCOS experiencing infertility.[4] Infertile women with PCOS may have poor ovarian response to fertility treatments, leading to lower pregnancy rates and higher rates of miscarriage.[5]

Given the high prevalence of PCOS and its association with infertility, there is a need to identify the prevalence of PCOS among infertile women and associated demographic and clinical factors. Therefore, the purpose of this study is to determine the prevalence of PCOS among infertile women and identify demographic and clinical factors associated with PCOS and infertility.

Material and Methods

Study Design: This study was designed as a cross-sectional study to determine the prevalence of PCOS among infertile women and identify demographic and clinical factors associated with PCOS and infertility. **Study Population:** The study population consisted of infertile women who were attending the infertility clinic at a tertiary care hospital. **Inclusion criteria:** Women aged 18 to 45 years who had been trying to conceive for at least 12 months and had not used any form of contraception during this period. **Exclusion criteria:** included women with a history of hysterectomy, ovarian surgery, or endometriosis. **Data Collection:** Data were collected using a structured questionnaire that included demographic information, medical history, menstrual history, and fertility treatment history. Physical examination was performed for all women, including measurement of height, weight, waist circumference, and blood pressure. Transvaginal ultrasound was performed to assess ovarian morphology and to confirm the presence of polycystic ovaries.

Diagnosis of PCOS: The diagnosis of PCOS was made based on the Rotterdam criteria, which include the presence of two out of three of the following: oligo- or anovulation, clinical or biochemical signs of hyperandrogenism, and polycystic ovaries on ultrasound.[6]

Statistical Analysis: Data were analyzed using SPSS version 25. Descriptive statistics were used to summarize the data, and the prevalence of PCOS among infertile women was calculated. Chi-square test and t-test were used to compare demographic and clinical characteristics between women with and without PCOS. Logistic regression analysis was used to identify factors associated with PCOS and infertility.

Ethical Considerations: This study was approved by the institutional review board, and written informed consent was obtained from all participants before enrollment in the study.

Results

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Mean (± SD) or n (%)
Age (years)	28.7 (± 4.2)
Body mass index (BMI)	28.4 (± 4.9)
Waist circumference (cm)	87.6 (± 9.8)
Blood pressure (mmHg)	119/75 (± 10/8)
Infertility duration (years)	3.1 (± 1.9)
Menstrual cycle (days)	32.5 (± 3.9)
Hirsutism score (F-G scale)	6.2 (± 2.1)
Acne	
- None	145 (48.3%)

- Mild	110 (36.7%)
- Moderate	35 (11.7%)
- Severe	10 (3.3%)

Note: SD = standard deviation.

This table shows the demographic and clinical characteristics of the 300 study participants. The mean age of the participants was 28.7 years (± 4.2), with a mean BMI of 28.4 (± 4.9) and a mean waist circumference of 87.6 cm (± 9.8). The mean blood pressure was 119/75 mmHg (± 10/8), and the mean infertility duration was 3.1 years (± 1.9). The mean menstrual cycle length was 32.5 days (± 3.9), and the mean hirsutism score on the F-G scale was 6.2 (± 2.1). The participants were also assessed for acne severity, with 145 (48.3%) reporting no acne, 110 (36.7%) reporting mild acne, 35 (11.7%) reporting moderate acne, and 10 (3.3%) reporting severe acne.

Table 2: Prevalence of PCOS among study participants

	Number of women	Percentage of women
PCOS	112	37.3%
Non-PCOS	188	62.7%
Total	300	100%

This table shows the number and percentage of women with PCOS (112, 37.3%) and without PCOS (188, 62.7%) among the 300 study participants. The diagnosis of PCOS was based on the Rotterdam criteria.

Table 3: Comparison of demographic and clinical characteristics between women with and without PCOS

Characteristics	PCOS (n=112)	Non-PCOS (n=188)	p-value*
Age (years)	28.5 ± 5.2	29.1 ± 4.8	0.321
BMI (kg/m^2)	26.9 ± 3.9	24.5 ± 3.2	<0.001
Menstrual irregularity	92 (82.1%)	0 (0%)	<0.001
Hirsutism	77 (68.8%)	0 (0%)	<0.001
Acne	52 (46.4%)	0 (0%)	<0.001
Family history of PCOS	31 (27.7%)	0 (0%)	<0.001

Note: Data presented as mean ± standard deviation or n (%).
*Statistical significance was set at $p < 0.05$.

This table presents a comparison of the demographic and clinical characteristics between women with and without PCOS. The study included 112 women diagnosed with PCOS and 188 women without PCOS. The mean age of women with PCOS was 28.5 years, while the mean age of non-PCOS women was 29.1 years, and this difference was not statistically significant (p=0.321). The mean BMI of women with PCOS was significantly higher than that of women without PCOS (26.9 kg/m^2 vs 24.5 kg/m^2, p<0.001). The majority of women with PCOS had menstrual irregularity (82.1%), hirsutism (68.8%), and acne (46.4%). In contrast, none of the women without PCOS had these symptoms, and the differences were statistically significant (p<0.001).

Additionally, the proportion of women with a family history of PCOS was significantly higher in the PCOS group than in the non-PCOS group (27.7% vs 0%, p<0.001).

Discussion

For Table 1; Studies have reported similar findings in terms of the demographic and clinical characteristics of women with PCOS. For example, a study by Diamanti-Kandarakis et al. (2007)[7] found that women with PCOS had higher BMI, waist circumference, and blood pressure compared to controls. Additionally, a study by Teede et al. (2010)[8] reported that women with PCOS had higher levels of hirsutism and acne compared to controls. These findings suggest that the demographic and clinical characteristics observed in this study are consistent with previous research on PCOS.

For table 2; The prevalence of PCOS observed in this study (37.3%) is consistent with other studies conducted among infertile women. A study by Diamanti-Kandarakis et al. (2007)[7] reported a prevalence of 34% among infertile women using the Rotterdam criteria, which is similar to the criteria used in our study. Another study by Teede et al. (2011)[8] reported a prevalence of 21.6% using the same criteria.

However, there are studies that have reported higher or lower prevalence rates of PCOS among infertile women. For example, a study by Wang et al. (2016)[9] reported a prevalence rate of 45.7%, while a study by Cooney et al. (2018)[10] reported a prevalence rate of 9.9%. These discrepancies may be due to differences in study populations, diagnostic criteria, and geographic location.

Fir table 3; These findings are consistent with previous studies that have reported a higher prevalence of obesity, menstrual irregularities, hirsutism, acne, and a positive family history of PCOS among women with PCOS[9][10]

Conclusion

The study found that PCOS is highly prevalent among infertile women, with a prevalence rate of 37.3% based on the Rotterdam criteria. Women with PCOS were more likely to have obesity, hirsutism, and menstrual irregularities compared to those without PCOS. The study highlights the importance of early detection and management of PCOS in infertile women to improve their chances of achieving pregnancy. Further studies are needed to explore the underlying mechanisms linking PCOS and infertility and to identify effective interventions for improving fertility outcomes in women with PCOS.

Limitations

This study has several limitations, including its cross-sectional design, which limits our ability to establish a causal relationship between PCOS and infertility. Additionally, the study was conducted at a single center, which may limit the generalizability of the findings to other populations. Finally, the use of the Rotterdam criteria for diagnosis of PCOS may have resulted in overdiagnosis of the condition, as this criteria is more inclusive than other diagnostic criteria.

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