

## Burden of Polycystic Ovarian Syndrome and its determinants among Female Doctors at a tertiary care hospital of Dakshin Kannada District, Karnataka: A Cross-Sectional Study

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### ABSTRACT

**Background:** In India, the prevalence of PCOS ranges from 3.7% to 22.5%. Despite doctor's medical knowledge, they may ignore the symptoms, highlighting the need for increased awareness and support. **Aim & Objective:** To assess the prevalence of PCOS and its risk factors among female doctors. **Settings and Design:** Cross-sectional study conducted in a tertiary care hospital in Dakshina Kannada District, Karnataka. **Methods and Material:** The present study was conducted among 160 female doctors aged 21–50 years for a period of 1 year. Data was collected on sociodemographic characteristics, menstrual history, working conditions, lifestyle and personal habits, and family history. **Statistical analysis used:** Chi-square test to analyse the association between PCOS and various risk factors. **Results:** The prevalence of PCOS was 21.25%. Irregular menses was the most common symptom (21.25%). Marital status was found to be significantly associated with PCOS in female doctors. No significant difference in mean working hours, mean daytime working hours, and mean night time working hours was observed. **Conclusions:** Higher prevalence of PCOS among female doctors in Karnataka compared to the average prevalence of PCOS in India highlights the need to address its prevalence and management among healthcare professionals for promoting their overall health and wellness.

### KEYWORDS

Polycystic Ovary Syndrome, Health Personnel, Working Women, Life Style

### INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is a common endocrine disorder characterized by irregular menstrual cycles, hyperandrogenism, and polycystic ovaries. (1) It is associated with several metabolic and psychological comorbidities, including obesity, insulin resistance, type 2 diabetes, and mental health issues like anxiety and depression. According to the World Health Organization, around 116 million women worldwide were affected by PCOS in 2012. (2-4)

In India, the prevalence of PCOS ranges from 3.7% to 22.5%. Despite its widespread occurrence, the diagnosis and management of PCOS in India remain challenging. Many women remain undiagnosed, leading to delayed treatment and worsening of symptoms and associated conditions. (5)

Female healthcare professionals, especially doctors, are not immune to PCOS. Their high-stress work environments and irregular schedule may increase their risk of developing PCOS which may be ignored,

highlighting the need for increased awareness and support, even among medical practitioners. (6-8)

The research on prevalence of PCOS among doctors is significant as it not only highlights the health challenges faced by female doctors but also contributes to the literature on PCOS in India. (9,10) Understanding the prevalence of PCOS in this demographic is essential for improving healthcare strategies and promoting better health outcomes for women in India.

**Aim & Objective(s):** To assess the prevalence of PCOS and its risk factors among female doctors working in a tertiary care hospital attached to a medical college in Dakshina Kannada District, Karnataka.

### MATERIAL & METHODS

**Study type & Design:** Cross-sectional study

**Study Setting:** The present study was conducted among female doctors working at the tertiary care hospital attached to a medical college in Dakshina Kannada District, Karnataka

**Study Population:** The study population comprised female medical professionals aged between 21 and 50 years who were engaged in clinical, academic, or administrative duties at the time of the study.

**Study Duration:** 1 year

**Sample size calculation and Sampling method:** A total of 160 participants were included in the study using a convenient sampling method after obtaining informed consent from the participants.

**Inclusion criteria:** Female doctors aged 21–50 years who were working at the hospital attached to the medical college and who provided written informed consent were included in the study.

**Exclusion criteria:** Female doctors who were pregnant, had menopause, had known endocrine disorders that could confound the diagnosis of PCOS, were on hormonal therapy in the preceding three months, unavailable during data collection, or did not consent to participate were excluded from the study.

**Data collection:** Data were collected using a pre-structured and pretested questionnaire which obtained information on sociodemographic characteristics, menstrual history, working conditions, lifestyle and personal habits, and risk factors associated with PCOS. The questionnaire was administered through interviews for data collection. Prior to data collection, participants were informed about the purpose of the study, and confidentiality of the information provided was strictly maintained throughout the study period.

**Clinical diagnosis of PCOS:** According to the Rotterdam criteria, polycystic ovarian syndrome (PCOS) is defined as the presence of two of three of the following criteria: oligo-anovulation (indicated by irregular or infrequent menstrual cycles), hyperandrogenism such as hirsutism, acne, or androgenic alopecia and polycystic ovaries ( $\geq 12$  follicles measuring 2-9 mm in diameter and/or an ovarian volume  $> 10$  mL in at least one ovary). For the purpose of this study, a diagnosis of PCOS was made using only the clinical criteria of oligo-anovulation and hyperandrogenism.

Other causes of menstrual irregularity and hyperandrogenism were excluded based on history.

**Ethical considerations:** Ethical approval for the study was obtained from the Institutional Ethics Committee of the Kasturba Medical College, Mangalore (Ref. No. March/2023 dated 15/03/2023). Written informed consent was obtained from all participants prior to their inclusion in the study.

**Data analysis:** The collected data were entered and analyzed using SPSS statistical software version 26. Descriptive statistics were used to calculate the

prevalence of PCOS among the study participants. The association between PCOS and various factors such as working conditions, personal habits, and other potential risk factors was assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

The present study was conducted on 160 female doctors who were working at our institute at the time of the study. Out of 160 study participants in the study, majority (91.25%) belonged to 21-30 years of age group, were residing in urban area (95%) and were Hindu by religion (91.25%).

The prevalence of PCOS in our study was 21.25%.

Table 1 shows the sociodemographic profile of the participants and their association with PCOS. Only females in the age group of 21 – 30 years had PCOS. Similarly, women residing in urban area, of Hindu religion and having no children had PCOS. Except for marital status, statistically significant association was not found between age, residence, religion, educational level or BMI and the prevalence of PCOS.

The symptom profile observed in our study indicates that irregular menses was the most common symptom, reported by 21.25% of participants. Other prevalent symptoms included excessive hair growth (17.5%), excess weight (13.75%), mood swings (13.75%), acne (10%), alopecia (6.25%), skin tags (6.25%), skin discoloration (5%) and infertility (1.25%).

On studying the risk factors for PCOS, it was observed that majority of the women with family history of PCOS, ovarian tumour or breast cancer did not have PCOS. Also, women with history of hypertension or diabetes did not report to have PCOS. None of the studied risk factors showed statistically significant association with PCOS. (Table 2)

Our study also emphasized on the association of working conditions of female doctors with PCOS. It was found that that mean working hours, mean daytime working hours, mean night time working hours and mean working duration as health care worker were higher in doctors having PCOS as compared to doctors who didn't have PCOS. However, there was no significant difference in working conditions of doctors with and without PCOS. (Table 3)

On studying the association of personal habits of female doctors, no significant association was observed between the variables frequency of meals, duration of exercise and sleep hours with PCOS. (Table 4)

**Table 1: Sociodemographic profile of the participants and their association with PCOS**

Demographic factor	PCOS		Total	p value
	Yes n (%)	No n (%)		
<b>Age group (years)</b>				
21 – 30	34 (23.3)	112 (76.7)	146	0.557
31 – 40	0 (0)	12 (100)	12	
41 – 50	0 (0)	2 (100)	2	
<b>Residence</b>				
Urban	34 (22.4)	118 (77.6)	152	0.573
Rural	0 (0)	8 (100)	8	

<b>Religion</b>				
Hindu	34 (23.3)	112 (76.7)	146	0.789
Muslim	0 (0)	4 (100)	4	
Christian	0 (0)	10 (100)	10	
<b>Education</b>				
Intern	2 (12.5)	14 (87.5)	16	0.759
Junior Resident/ Tutor	8 (25)	24 (75)	32	
Post graduate Resident	24 (27.3)	64 (72.7)	88	
Senior Resident	0 (0)	14 (100)	14	
Faculty/ Practitioner	0 (0)	10 (100)	10	
<b>Marital status</b>				
Married	0 (0)	38 (100)	38	0.008 (FE)
Unmarried	34 (27.9)	88 (72.1)	122	
<b>Number of children</b>				
None	34 (23.3)	112 (76.7)	146	0.557
1	0 (0)	12 (100)	12	
2	0 (0)	2 (100)	2	
<b>BMI (kg/m<sup>2</sup>)</b>				
< 18.5	0 (0)	16 (100)	16	0.088
18.5 – 22.9	12 (21.4)	44 (78.6)	56	
23 – 24.9	2 (5.6)	34 (94.4)	36	
≥ 25	20 (38.5)	32 (61.5)	52	

Table 2: Risk factors for PCOS

Risk factor	PCOS		Total	p value
	Yes n (%)	No n (%)		
<b>Family history of PCOS</b>				
Yes	4 (28.57)	10 (71.43)	14	0.990
No	30 (20.55)	116 (79.45)	146	
<b>Family history of Ovarian cancer</b>				
Yes	0 (0.00)	4 (100)	4	1.000
No	34 (21.79)	61 (78.21)	122	
<b>Family history of Breast cancer</b>				
Yes	2 (12.5)	14 (87.5)	16	0.855
No	32 (22.22)	112 (77.78)	144	
<b>Hypertension</b>				
Yes	0 (0.00)	2 (100)	2	1.000
No	34 (21.52)	124 (78.48)	158	
<b>Diabetes mellitus</b>				
Yes	0 (0.00)	2 (100)	2	1.000
No	34 (21.52)	124 (78.48)	158	

Table 3: Association of PCOS with working condition

Working hours	PCOS		p value
	Yes	No	
Mean working hours	10.31 ± 3.17	9.65 ± 2.57	0.430
Mean Daytime working hours	8.95 ± 3.17	8.41 ± 1.37	0.497
Mean Night time working hours	17.71 ± 15.37	13.41 ± 17.94	0.326
Mean working duration as Health Care Worker (years)	3.92 ± 4.05	3.01 ± 2.48	0.383

Table 4: Association of PCOS with personal habits

Personal habits	PCOS		Total	p value
	Yes n (%)	No n (%)		
<b>Frequency of meals</b>				
≤ 3	26 (20.3)	102 (79.7)	128	0.736 (FE)
> 3	8 (25)	24 (75)	32	
<b>Duration of exercise</b>				
No exercise	12 (17.6)	56 (82.4)	68	0.536
< 30 Minutes	4 (15.4)	22 (84.6)	26	
≥ 30 Minutes	18 (27.3)	48 (72.7)	66	
<b>Sleep hours</b>				

< 8	30 (21.1)	112 (78.9)	142	1.000
≥ 8	4 (22.2)	14 (77.8)	18	

## DISCUSSION

The present study aimed to evaluate the prevalence, symptomatology, and associated sociodemographic and lifestyle factors of polycystic ovarian syndrome (PCOS) among female healthcare workers. A total of 160 participants were analyzed, and 34 (21.25%) were found to have PCOS based on the Rotterdam criteria. Sociodemographic and lifestyle-related variables were assessed for their association with PCOS.

The present study found that the prevalence of Polycystic Ovarian Syndrome (PCOS) among female doctors working in the hospital was 21.25%. A 2019 study of 456 medical students in Navi Mumbai by Aggarwal et al(9) found a similar prevalence rate of 21.05%. But, a study in South India by Joseph et al(10) revealed a lower prevalence of 8.1%.

Sociodemographic factors such as age, residence, religion, educational status, marital status, number of children, and BMI were examined. Our study reported that 23.3% of females aged 21–30 years were affected by PCOS, while no cases were observed above the age of 30. Marital status showed a statistically significant association ( $p = 0.008$ ), with all PCOS cases being unmarried (27.9%). The BMI association showed that 38.5% of women with BMI  $\geq 25$  kg/m<sup>2</sup> had PCOS, indicating a trend though not statistically significant ( $p = 0.088$ ). These findings contrast with the study by Ganie et al(1), which found a higher PCOS prevalence of 35.3% (Rotterdam criteria), but similarly highlighted age 20–30 as the dominant group affected. Singh et al(2) found a prevalence of 11.96% in adolescent girls aged 15–19, supporting our study's indication that PCOS commonly initiates in younger age groups. Kalavathi et al(6) also reported that 76.2% of PCOS cases occurred in late adolescence, aligning with the younger demographic profile observed in our study. Nidhi et al(5) reported a prevalence of 9.13%, slightly lower than our findings but still indicating the adolescent-to-young-adult age group as the most susceptible. Ganie et al(1) also observed increased prevalence in urban areas, which is consistent with our urban-to-rural ratio (22.4% vs 0%). However, the association was not statistically significant. This is comparable to the findings by Singh et al(2) and Kalavathi et al(6), where urban prevalence exceeded rural but without conclusive association. Regarding BMI, our findings are in agreement with multiple Indian studies that suggest higher BMI correlates with PCOS, such as Ganie et al(1), who found metabolic abnormalities in over 60% of PCOS subjects.

In our study, irregular menses (21.25%) and excessive hair growth (17.5%) were dominant symptoms. Mood swings and excess weight were each seen in 13.75%. These findings are supported by Ganie et al(1), where menstrual irregularities and hirsutism were the most frequently reported clinical complaints. Singh et al(2) similarly reported oligomenorrhea and hirsutism in adolescent girls as the most common presenting features. Kalavathi et al(6) also documented oligomenorrhea in over 70% of PCOS adolescents. Ganie

et al(1), emphasized clinical hyperandrogenism in 52% of patients, which includes acne and hirsutism, supporting our findings of acne in 10% and alopecia in 6.25%. Nidhi et al(5) also documented menstrual irregularities in 75% of PCOS-positive participants. Additionally, Kahsar-Miller et al(7) noted familial aggregation and symptoms including hirsutism and menstrual irregularities, reinforcing our observation that these features are predominant across studies.

Our study showed no association risk factors like family history of PCOS, ovarian cancer, breast cancer, hypertension, and diabetes mellitus with PCOS. This contrasts with findings from Kahsar-Miller et al(7), who observed PCOS in 24% of mothers and 32% of sisters, suggesting a strong genetic predisposition. Ganie et al(1) also acknowledged familial trends but did not quantify them. The low frequency in our cohort may reflect underreporting or lack of diagnosis in first-degree relatives. Singh et al(2) and Kalavathi et al(6) did not explore familial factors extensively, though genetic factors were recognized as a background element.

The mean working hours were  $10.31 \pm 3.17$  in PCOS cases and  $9.65 \pm 2.57$  in non-PCOS study participants. No significant differences were observed in mean working hours, daytime and nighttime work durations, and years as healthcare workers between women with PCOS and women without PCOS. Ganie et al(1) and Singh et al(2) did not evaluate working hours directly; however, both studies implied that modern sedentary lifestyles and occupational stress might contribute to PCOS manifestation. Kalavathi et al(6) alluded to academic and lifestyle pressures in adolescents as a potential trigger for symptom exacerbation. Although our study found no direct correlation, the trend supports the need for lifestyle assessment in risk profiling.

Regarding personal habits, PCOS prevalence was 20.3% in those eating  $\leq 3$  meals/day and 25% in those with  $> 3$  meals/day ( $p = 0.736$ ). Exercise duration and sleep hours also showed no significant association. However, 27.3% of those who exercised  $\geq 30$  min/day had PCOS, while 17.6% of those who did not exercise had PCOS. Though not statistically significant, this suggests a trend where those with PCOS may adopt lifestyle modifications post-diagnosis. Ganie et al(1) and Singh et al(2) similarly identified lifestyle modification as critical in management. Kalavathi et al(6) emphasized sedentary habits as contributing to PCOS symptomatology. Nidhi et al(5) also promoted dietary and physical activity adjustments to mitigate PCOS effects.

In conclusion, the comparative findings of our study validate the age-related vulnerability, dominant clinical symptoms like irregular menses and hirsutism, and the importance of early lifestyle interventions. Although no significant associations were established with familial or working condition factors in our study, other literature suggests a multifactorial etiology encompassing genetic, metabolic, and lifestyle components. These comparative insights emphasize the heterogeneity and regional variability in PCOS expression and advocate for individualized diagnostic and management approaches.

### CONCLUSION

The study revealed a higher prevalence of PCOS among female doctors in Karnataka compared to the average prevalence of PCOS in India. This highlights an urgent need for increased awareness and screening for this condition within the medical community. As PCOS can have profound long-term health implications, addressing its prevalence and management among healthcare professionals is essential for promoting overall health and wellness in this critical workforce.

### RECOMMENDATION

Regular screening for PCOS should be encouraged among healthcare workers. Lifestyle modifications including healthy diet, physical activity and stress reducing activities should be promoted at the workplace.

### LIMITATION OF THE STUDY

The relatively small sample size may limit the generalizability of our study findings. Additionally, the cross-sectional nature of the study restricts our ability to infer causality. Future studies with larger, more diverse populations and longitudinal designs are needed to better understand the complex interplay of factors contributing to PCOS.

### RELEVANCE OF THE STUDY

Addressing PCOS among healthcare workers can improve their well-being, their productivity, and serve as a model for preventive health strategies targeting working women.

### AUTHORS CONTRIBUTION

All authors have contributed equally.

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Nil

### CONFLICT OF INTEREST

There are no conflicts of interest.

### DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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