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## Original Research Article

# Prevalence of depression and quality of life in polycystic ovary syndrome patients at a tertiary care hospital: a cross-sectional study

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## ABSTRACT

**Background:** Polycystic ovary syndrome (PCOS) is one of the most common endocrinopathy among women of reproductive age. Physical symptoms in PCOS cause depression and decrease the Quality of Life (QoL). The objective was to study the prevalence of depression in women suffering from PCOS and to assess its correlation with QoL.

**Methods:** This was a cross sectional study conducted among one hundred patients diagnosed with PCOS. Women 18-40 years of age diagnosed with PCOS were included in the study. Patients with known psychiatric illness were excluded. Depression severity was assessed with Hamilton depression (HAM-D) scale. The quality of life (QoL) was assessed with Polycystic ovary syndrome questionnaire (PCOSQ). The data was analyzed using the SPSS for Windows, Version 25.0; Chicago, SPSS Inc.

**Results:** The mean age and BMI was  $25.64 \pm 3.25$  years and  $26.78 \pm 2.72$  kg/m<sup>2</sup> respectively. The mean depression score was  $12.46 \pm 6.18$ . QoL domains showed that the lowest score was in the menstrual problem with a mean of  $12.48 \pm 4.44$  and the highest was in the emotional domain with a mean of  $28.07 \pm 11.17$ . The negative correlations were between age and Hamilton score ( $p < 0.05$ ). The Hamilton score was negatively correlated with the emotional score ( $p < 0.01$ ) and weight score was positively correlated with infertility score ( $p < 0.01$ ).

**Conclusions:** PCOS was clearly associated with depression and reduced QoL. This should warrant health professionals to consider routine screening for depression and assess the impact of symptoms on their QoL to improve patient outcomes.

**Keywords:** Depression, HAM-D, PCOS, PCOSQ, Quality of life

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy among women of reproductive age and is associated with metabolic disorder and reproductive dysfunction.<sup>1-3</sup> Stein and Leventhal first reported PCOS in 1935. PCOS has a prevalence of around 11.2% in women of reproductive age group.<sup>4</sup> In India, the

prevalence is about 3.7%-22.5% as reported by the Indian Fertility Society in 2014.<sup>5</sup> The pathophysiology of PCOS is completely not understood. Several theories have been proposed to explain the pathogenesis of PCOS.<sup>6</sup>

- An alteration in gonadotropin-releasing hormone secretion results in increased luteinizing hormone (LH) secretion.

- An alteration in insulin secretion and insulin action results in hyperinsulinemia and insulin resistance.
- A defect in androgen synthesis that results in increased ovarian androgen production.

Majority of women present with irregular periods but women with regular menses may have anovulation which makes PCOS the major cause of anovulation-associated infertility.<sup>7</sup> The other common symptoms are menorrhagia, hirsutism, acne, skin pigmentation, alopecia and ovarian cysts. Moreover, symptoms like anxiety, depression, thyroid problems and galactorrhea, may exist. Obesity or propensity to weight gain is a common feature, though it is not uncommon in non-obese women. Physical symptoms associated with PCOS are associated with reduced psychosocial well-being and sexual satisfaction. A systematic review reported a negative effect of PCOS on health-related quality of life measures.<sup>8</sup> Moreover, International as well as Indian guidelines suggest the need for screening psychological factors such as anxiety and depression, which need to be considered in managing all women with PCOS.<sup>9</sup>

Global research has shown that PCOS has an negative impact on the quality of life (QoL) in patients with PCOS.<sup>9</sup> Hence, there has been an increasing focus on this aspect. However, there are very few studies done in India with a perspective on depression and its correlation with different factors of QoL in PCOS. Hence, this study was undertaken to study the prevalence of depression in females suffering from PCOS and to assess its correlation with QoL.

## METHODS

This was a non-comparative cross sectional study conducted among one hundred patients diagnosed with PCOS at Department of Obstetrics and Gynecology, Nizam's Institute of Medical Sciences (NIMS), Hyderabad, India. The NIMS Institutional Ethics Committee approved the study. Voluntary written informed consent was given by all the patients prior to participation into the study.

### Inclusion criteria

The Women 18 - 40 years of age diagnosed with PCOS as per Rotterdam criteria were included in the study. As per Rotterdam criteria, any 2 of the following 3 criteria has to be fulfilled for diagnosis of PCOS;

- Polycystic ovaries on ultrasound scan
- Clinical/biochemical hyperandrogenism
- Oligomenorrhoea.

The other inclusion criteria were patients who could read and write in English, willing to give informed consent and agree to comply with the study procedures.

### Exclusion criteria

- Patients with known psychiatric illness, having adrenal hyperplasia, thyroid dysfunction, and hyperprolactinemia or having a concurrent significant medical illness were excluded from the study.

The sociodemographic variables were captured in a specially designed proforma. Depression severity was assessed using the Hamilton depression (HAM-D) rating scale. This scale has two versions with either 17 or 21 items scored between 0 and 4 points. We used the 17-item scale in this study. Scores of 0-7 are considered as being normal, 8-16 suggest mild depression, 17-23 moderate depression and scores over 24 are indicative of severe depression; the maximum score being 52 on the 17-point scale.

The quality of life was assessed using the Cronin's PCOS questionnaire (PCOSQ) which has been validated.<sup>10,11</sup> It is a 26-item questionnaire, which examines five domains specifically targeted to quality of life (QoL) in PCOS: emotional disturbance, body hair, weight, infertility and menstrual problems. Items query the severity and frequency of symptomatic distress related to PCOS. Responses are numbered from 1 to 7. Scoring of PCOSQ provides separate domain scores for each of the five domains, as the numeric mean of items in that domain, as well as a global score, as the mean of the five domain scores. Scores range from 1 to 7, with 1 indicating poorest function and highest distress, and 7 indicating optimal function and minimal distress. The patients were given ample time to complete the questionnaires.

### Statistical analysis

The data was analyzed using the SPSS for Windows, Version 25.0; Chicago, SPSS Inc. Descriptive statistics such as frequency and percentage for categorical variables and mean  $\pm$  standard deviation for continuous variables were used. Pearson's correlation coefficient was used for correlation between variables as the data was found to be normally distributed as evaluated by Shapiro Wilk test. For all tests, the statistical significance was fixed at 5% level ( $p < 0.05$ ).

## RESULTS

Of 126 women screened, one hundred patients met all eligibility criteria for inclusion into the study. The mean age of participants was  $25.64 \pm 3.25$  years; 3% were less than 20 years, 88% were aged between 20-30 years and 9% were more than 30 years (Table 1). Mean BMI was  $26.78 \pm 2.72$  kg/m<sup>2</sup>; 26% were with normal BMI, whereas, 64% and 10% of the participating women were overweight and obese, respectively (Table 1). Amongst the participants, 16% were married and the rest were unmarried (Table 1).

**Table 1: Characteristics of PCOS women.**

	Mean±SD	95% CI
Age	25.64±3.25	24.99-26.28
BMI (in Kg/m <sup>2</sup> )	26.78±2.72	26.24-27.32
Marital status (%)	<b>Married</b>	<b>Unmarried</b>
	16	84
Hamilton depression score (Mean±SD)	<b>Mean±SD</b>	<b>95% CI</b>
	12.46±6.18	11.23-13.68
Depression categories based on HAM-D Score (%)		
Normal	27	
Mild depression	32	
Moderate depression	23	
Severe depression	12	
Very severe depression	6	
Cronin's PCOSQ factors	<b>Mean±SD</b>	<b>95% CI</b>
Emotional score	28.07±11.17	25.85-30.28
Body hair score	19.70±6.77	18.35-21.04
Weight score	17.84±6.02	16.64-19.03
Infertility score	16.16±4.38	15.29-17.02
Menstrual score	12.48± 4.44	11.59-13.36

**Table 2: Correlations between age, BMI, depression and PCOSQ factors.**

	BMI	Hamilton score	Emotional score	Body hair score	Weight score	Infertility score	Menstrual score
Age	0.154	-0.245 <sup>#</sup>	0.070	-0.181	-0.157	-0.061	-0.063
BMI		0.027	0.002	-0.045	-0.465 <sup>*</sup>	-0.357 <sup>*</sup>	-0.035
Hamilton score			-0.277 <sup>\$</sup>	0.006	0.190	0.065	-0.025
Emotional score				0.073	-0.030	-0.127	0.014
Body hair score					-0.032	0.013	-0.170
Weight score						0.275 <sup>\$</sup>	-0.058
Infertility score							-0.122

\*:p <0.001, \$: p <0.01, #: p <0.05.

The mean depression score was 12.46±6.18 (95% CI: 11.23-13.68). Depression was prevalent in 73% subjects out of whom 32% had mild depression, 23% had moderate depression, 12% had severe depression and only 6% had very severe depression (Table 1).

The mean scores for the QoL domains obtained from the Cronin's questionnaire showed that the lowest score provided by the participants was in the menstrual problem domain with a mean of 12.48±4.44 (95% CI: 11.59-13.36) and the highest score was in the emotional domain with a mean of 28.07±11.17 (95% CI: 25.85-30.28) (Table 1). The scores for each question ranged from 1-7 in each category mentioned as PCOSQ factors (Table 1).

As shown in Table 2, while assessing the correlates of different demographic factors, depression and QoL, it was observed that there was positive correlation between age and BMI as seen similarly with emotional score. However, the correlates were not statistically significant.

On the other hand, it was observed that there was a significant negative correlation between age and Hamilton score (p <0.05). There were negative correlates with age and other variables. However, they were not statistically significant. There was significant negative correlation between BMI and PCOSQ factors, weight and infertility (p <0.001) (Table 2). However, other correlates with BMI were not statistically significant.

The Hamilton score was significantly negatively correlated with the emotional score (p <0.01) only (Table 2), whereas, the negative correlation with menstrual score was not statistically significant. The positive correlations between Hamilton score and body hair, weight and infertility scores were not statistically significant.

With regard to the PCOSQ factors, emotional score was positively correlated with body hair and menstrual score; negatively correlated with weight and infertility score (Table 2). However, none of the correlates were statistically significant. The body hair score was

positively correlated with infertility score; negatively correlated with weight and menstrual score. However, none of the correlates were statistically significant. There was a positive correlation between weight score and infertility score ( $p < 0.01$ ) (Table 2), and negatively correlated with menstrual score. The negative correlation was not statistically significant. Lastly, there was negative correlation between infertility and menstrual scores, which was not statistically significant.

## DISCUSSION

The objective of this study was to assess prevalence of depression in PCOS patients and to assess their quality of life. There was high prevalence of depression in PCOS in the participants of this study. More than fifty percent of the participants in this study had mild to moderate depression as assessed by the HAM-D severity score (Table 1). Moreover, the depression score was negatively correlated with the emotional score (Table 2) in the participants of this study which clearly shows that depression has a negative impact on QoL.

A systematic review and meta-analysis on depression in PCOS concluded that women with PCOS tend to experience mild depression, which concurs with the findings of the present study.<sup>12</sup> Similar findings were reported by Rassi et al, and Hollinrake et al, who observed prevalence of depression in 26% and 21% of patients with PCOS respectively.<sup>13,14</sup> Other studies have reported depression prevalence as high as 40-45%.<sup>15,16</sup> The underlying reason(s) for depression in women with PCOS remains unclear. Genetic and environmental factors may contribute.<sup>17</sup> In addition, there is published literature regarding involvement of corticotrophin-releasing hormone, serotonin, and gamma-aminobutyric acid.<sup>18</sup> In general, depression in PCOS may also be related to change in physical appearance as obesity, acne, and hirsutism lead to negative perception of self and social withdrawal.

In our study, we identified a global reduction in QoL in women with PCOS. Reduced scores were noted in each of the five queried domains (emotions, body hair, weight, infertility and menstruation). Menstrual cycle domain was largest contributor to reduced QoL in PCOS followed by infertility, weight, body weight and emotional factors. The results are in contrast with a meta-analysis, which concluded that that key domains were hirsutism, menstruation and infertility.<sup>19</sup> However, in other studies weight gain had the greatest negative influence on QoL in PCOS with mean PCOSQ weight scores reported as low as 2.85.<sup>20</sup> Similar results were observed in our study where BMI had negative impact on weight and infertility domains of PCOSQ (Table 2). In other studies hirsutism was associated with a poorer QoL.<sup>21,22</sup> However, the published literature has heterogeneous results depending on the population studied.

There are certain limitations to this study. It is a cross sectional study done in patients visiting the out-patient of department of obstetrics and gynecology at NIMS. There is no control group for comparison with the study population and the sample size is small.

The strengths of this study were that authors used validated questionnaires to assess severity of depression and QoL in women with PCOS. Moreover, all the study participants were literate and able to read and write English.

## CONCLUSION

In this study, PCOS was clearly associated with depression and reduced QoL. This would warrant health professionals and women to be aware of the adverse impact of PCOS on quality of life. Health professionals should consider routine screening for depression and the impact of symptoms on their QoL to improve patient outcomes. Psychological therapy and/or pharmacological treatment should be offered to women with PCOS when necessary.

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