

A Cross-sectional Study on the Proportion of Anxiety and Depression and Determinants of Quality of Life in Polycystic Ovarian Disease

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ABSTRACT

Background: The polycystic ovary syndrome is a disorder characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphologic features. Earlier studies have shown that depression was significantly increased in the polycystic ovarian disease (PCOD) group and also that PCOD women had marked reduction in quality of life, impaired emotional well-being, and reduced sexual satisfaction. This study was undertaken with the objectives of studying the proportion of anxiety and depression and assessing the quality of life and its correlates in women with PCOD. **Materials and Methods:** A cross-sectional observational study on 64 PCOD patients using a pro forma for collecting sociodemographic and clinical details, Hamilton Depression Rating Scale, Hamilton Rating Scale for Anxiety, Ferriman–Gallewey score for hirsutism and WHO-quality of life (QOL) BREF. **Results:** Depression was seen in 93.5% of the subjects and anxiety in 100% of the subjects. The patients were also seen to have a lower quality of life. Lower scores were obtained in the psychological domain (68.80 ± 12.87). Presence and severity of depression and anxiety were found to have a negative correlation with QOL in all domains but maximally affecting the social relationships domain ($P \leq 0.001$ and <0.001 , respectively). Severity of hirsutism and nulliparity was found to have association with QOL in the psychological domain. **Conclusion:** The majority of women with PCOD in this study were found to have depression and anxiety. They were also seen to have a lower quality of life. Depression, anxiety, and hirsutism were found to have a negative correlation with QOL in all domains.

Key words: Anxiety, depression, polycystic ovarian disease, quality of life

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a multifactorial and polygenic pathology that manifests itself with a wide spectrum of signs and symptoms that are related

to the disturbances of reproductive, endocrine, and metabolic functions. Obesity and insulin resistance are the basic physiopathological features in patients with

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PCOS.^[1] Polycystic ovarian disease (PCOD) is one of the common reproductive endocrine disorders, affecting 5%–10% of women of reproductive age.^[2,3]

Hirsutism, acne, menstrual irregularity, and infertility have been shown to be the most distressing symptoms in adults with PCOS.^[4] In adolescents and young women with PCOS, however weight gain has been identified as the most distressing symptom.^[5-7]

There are several reports linking specific PCOS features, such as infertility, hirsutism, and acne to decreased mental well-being.^[8-10] Studies have shown that PCOD women suffer from marked reduction in quality of life (QOL), impaired emotional well-being, and reduced sexual satisfaction.^[5,11,12] They have also been found to have higher levels of depression and psychological distress owing to the physical appearance of hyperandrogenism, including obesity, hirsutism, cystic acne, seborrhea and hair loss, possibly by influencing feminine identity.^[13-15]

Although there have been various studies from outside India, there are only a few from within the country analyzing the aspect of psychiatric illness and QOL in PCOD patients. There could be cultural differences in the way women respond to physical and emotional stresses brought about by PCOD.

The purposes of this study are to assess the proportion of anxiety and depression and the QOL and to find out the correlates of QOL in women with PCOD.

MATERIALS AND METHODS

This is a descriptive cross-sectional study conducted on patients with PCOD attending the Obstetrics and Gynaecology outpatient department at a medical college and hospital in Kerala from March 2016 to August 2016. A total of 64 consecutive women between ages of 15 and 35 years who satisfy the Rotterdam criteria for PCOD were studied.

Rotterdam criteria for PCOD require 2 out of (1) oligo/anovulation, (2) clinical and/or biochemical signs of hyperandrogenism, (3) polycystic ovaries and exclusion of other etiologies such as hypothyroidism, hypoprolactinemia, congenital adrenal hyperplasia, androgen-secreting tumors, and Cushing's syndrome.

The minimum sample size calculated from the study done by Hollinrake *et al.*^[16] required to estimate the given mean of 0.21, on the Hamilton Depression Rating Scale (HDRS) with a confidence level of 95% and precision of 10% is 64.

Patients with a history of pregnancy in the previous year, a history of psychiatric illness, mental retardation, substance dependence, or chronic medical illness including cancer were excluded from the study.

Pro forma for sociodemographic data containing details regarding the sociodemographic variables and family history of psychiatric illness, any psychiatric illness/treatment in husband, age and gender of children, Ferriman–Gallewey score for hirsutism, Hamilton Rating Scale for Depression (HAM-D/HDRS), Hamilton Anxiety Rating Scale, and the WHO QOL-BREF (standardized Malayalam version) were used in this study.

The study protocol was submitted and approved by the Institutional Review Board and Ethical Committee. Written informed consent was obtained from every participant and stored separately from the rest of the study material. Confidentiality and anonymity were strictly maintained by allotting a subject identification number to each participant instead of their names.

The data were analyzed using the SPSS for Windows, Version 20, Chicago, SPSS Inc. Descriptive statistics such as frequency and percentage for categorical variables and mean \pm standard deviation for continuous variables were used. Independent sample *t*-test, Mann–Whitney U-test, Kruskal–Wallis test, and Spearman rank order correlation coefficient were used for normal and nonnormal data. For all tests, the statistical significance was fixed at 5% level ($P < 0.05$).

RESULTS

As shown in Table 1, the majority of patients belonged to the age group between 21 and 25 years were from a Christian family and had at least plus two/diploma education. 70.3% patients were housewives. 63/64 patients were married and 57.8% patients did not have children.

Depression was seen to be prevalent in 93.7% subjects out of which 42.2% had moderate depression, 25% had mild depression, and 26% had severe depression [Table 2]. 98.4% of patients had mild anxiety and the rest mild to moderate anxiety. 85.9% patients had hirsutism as reflected by scores >8 on the Ferriman–Gallewey scale for hirsutism.

Maximum score was obtained in environmental domain of QOL assessed by the WHOQOL-BREF, whereas the least score was obtained in the psychological domain [Table 3].

As shown in Table 4, when assessing the correlates of QOL, age was found to be significantly associated with

Table 1: Sociodemographic data

| Sociodemographic parameters | Categories | n (%) |
|-----------------------------|------------------|-----------|
| Age group (years) | 15-20 | 6 (9.4) |
| | 21-25 | 26 (40.6) |
| | 26-30 | 19 (29.7) |
| | 31-35 | 13 (20.3) |
| Religion | Hindu | 22 (34.4) |
| | Muslim | 13 (20.3) |
| | Christian | 29 (45.3) |
| Educational status | Secondary | 11 (17.2) |
| | Plus two/diploma | 25 (39.1) |
| | Graduate | 20 (31.3) |
| | PG | 8 (12.5) |
| Occupational status | Professional | 10 (15.6) |
| | Skilled work | 9 (14.1) |
| | Housewife | 45 (70.3) |
| Marital status | Unmarried | 1 (1.6) |
| | Married | 63 (98.4) |
| Have children or not | Have children | 27 (42.2) |
| | No children | 37 (57.8) |
| Income (Rs.) | 22,851-45,750 | 20 (31.3) |
| | 17,151-22,850 | 14 (21.9) |
| | 11,451-17,150 | 17 (26.6) |
| | 6851-11,450 | 7 (10.9) |
| | 2301-6850 | 6 (9.4) |

Table 2: Severity of depression, anxiety and hirsutism

| | n (%) |
|--------------------------------|------------|
| Severity of depression (HAM D) | |
| Normal | 4 (6.3) |
| Mild depression | 16 (25.0) |
| Moderate depression | 27 (42.2) |
| Severe depression | 17 (26.6) |
| Severity of anxiety (HAM A) | |
| Mild severity | 63 (98.40) |
| Mild to moderate | 1 (1.6) |
| Ferriman-Gallewey score | |
| ≤8 | 9 (14.1) |
| >8 | 55 (85.9) |

HAM D – Hamilton Depression Rating scale; HAM A – Hamilton Anxiety Rating Scale

Table 3: Quality of life - domain subscores

| QOL | Mean±SD |
|----------------------|-------------|
| Physical health | 70.89±11.15 |
| Psychological | 68.80±12.87 |
| Social relationships | 88.53±14.93 |
| Environmental | 90.81±8.66 |

QOL – Quality of life; SD – Standard deviation

the physical health domain ($P = 0.034$) and subjects in the age group 21–25 years and those in the age group 26–30 years had better QOL in the physical health domain better than those between age group of 31–35 years ($P = 0.023$ and $P = 0.003$, respectively). Education level was found to have a significant association with QOL ($P = 0.001$), with those with

graduation having better QOL than those with plus two/diploma education ($P < 0.001$).

Age was found to be significantly correlated with psychological QOL ($P = 0.024$), with individuals in the older age group having poorer QOL than the younger subjects (31–35 years vs. 15–20 years [$P = 0.046$] and 31–35 years vs. 21–25 years [$P = 0.001$]). Educational status had statistically significant correlation with psychological domain of QOL (0.012) and individuals with graduation having better QOL than those subjects with plus two/diploma ($P = 0.002$). Those who did not have children showed lower QOL than those who had children in the psychological domain of QOL and when tested it was found to be statistically significant ($P = 0.014$).

Sociodemographic factors were not found to have a statistically significant relationship to the social relationships domain [Table 5]. Age, occupational status, having children or not and gender of child did not have any correlation with QOL in the environmental domain. Education was found to have a significant relationship to environmental QOL ($P < 0.001$) with statistically significant difference in QOL between individuals with graduation and those having completed plus two/diploma education.

As shown in Table 6, on assessing for the clinical correlates of QOL, QOL was found to be negatively correlated with depression, anxiety and degree of hirsutism. HAM-D scores showed maximum correlation on the social relationships domain and so did anxiety. Degree of hirsutism was found to most affect the psychological domain.

DISCUSSION

In women diagnosed with PCOS, emotional distress could have psychosocial and/or pathophysiological causes.^[17,18] Visible features, such as hirsutism and acne, or potential consequences, such as infertility and obesity, are perceived as stigmatizing by many women and could cause distress.^[18-21]

As there is currently no cure, the management of PCOS is directed toward improving the patients' health-related QOL (HRQOL) using symptomatic alleviation and prevention of long-term complications (including the development of the metabolic syndrome and associated sequelae, i.e., cardiovascular disease and type II diabetes mellitus).

The age of the study population was restricted between 15 (common age of early presentation of the illness) and 35 years (beyond which many patients do not consult for this illness). Chronic illnesses and the sufferings associated with them can give a false interpretation of

Table 4: Sociodemographic correlates of domain 1 and domain 2

| Sociodemographic parameters | Categories | n | Domain | | | | | |
|-----------------------------|------------------|----|-----------------|--------------|-------|---------------|--------------|-------|
| | | | Physical health | | | Psychological | | |
| | | | Median | Q1, Q3 | P | Median | Q1, Q3 | P |
| Age group | 15-20 | 6 | 75 | 61.25, 89.50 | 0.034 | 81 | 63, 82.75 | 0.024 |
| | 21-25 | 26 | 72 | 63, 76.50 | | 75 | 63, 81 | |
| | 26-30 | 19 | 75 | 69, 81 | | 69 | 56, 75 | |
| | 31-35 | 13 | 63 | 53.50, 69 | | 69 | 47, 69 | |
| Religion | Hindu | 22 | 66 | 63, 70.50 | 0.030 | 69 | 56, 70.50 | 0.100 |
| | Muslim | 13 | 69 | 69, 81 | | 69 | 69, 81 | |
| | Christian | 29 | 75 | 69, 75 | | 69 | 56, 81 | |
| Educational status | Secondary | 11 | 75 | 69, 81 | 0.001 | 69 | 63, 81 | 0.012 |
| | Plus two/diploma | 25 | 63 | 59.50, 72 | | 69 | 56, 69 | |
| | Graduate | 20 | 75 | 69, 81 | | 81 | 69, 81 | |
| | PG | 8 | 69 | 63, 73.50 | | 69 | 59.25, 73.50 | |
| Occupational status | Professional | 10 | 69 | 61.25, 81 | 0.683 | 69 | 61.25, 76.50 | 0.663 |
| | Skilled work | 9 | 75 | 66, 75 | | 69 | 56, 75 | |
| | Housewife | 45 | 69 | 63, 75 | | 69 | 63, 81 | |
| Have children or not | Have children | 27 | 69 | 63, 75 | 0.300 | 69 | 56, 69 | 0.014 |
| | No children | 37 | 69 | 63, 78 | | 75 | 63, 81 | |
| Gender of child | Male | 11 | 75 | 69, 75 | 0.784 | 69 | 56, 69 | 0.835 |
| | Female | 16 | 69 | 63, 79.50 | | 69 | 57.75, 69 | |

Table 5: Sociodemographic correlates of domain 3 and domain 4

| Sociodemographic parameters | Categories | n | Domain | | | | | |
|-----------------------------|------------------|----|----------------------|--------------|-------|---------------|--------------|--------|
| | | | Social relationships | | | Environmental | | |
| | | | Median | Q1, Q3 | P | Median | Q1, Q3 | P |
| Age group | 15-20 | 6 | 97 | 49.75, 100 | 0.431 | 100 | 86.25, 100 | 0.157 |
| | 21-25 | 26 | 94 | 81, 94 | | 94 | 88, 95.50 | |
| | 26-30 | 19 | 94 | 94, 100 | | 94 | 94, 94 | |
| | 31-35 | 13 | 94 | 75, 100 | | 88 | 88, 94 | |
| Religion | Hindu | 22 | 94 | 79.50, 95.50 | 0.064 | 88 | 84.75, 94 | 0.004 |
| | Muslim | 13 | 100 | 94, 100 | | 94 | 94, 100 | |
| | Christian | 29 | 94 | 81, 97 | | 94 | 88, 97 | |
| Educational status | Secondary | 11 | 94 | 94, 100 | 0.111 | 94 | 94, 100 | <0.001 |
| | Plus two/diploma | 25 | 81 | 72, 97 | | 88 | 81, 94 | |
| | Graduate | 20 | 94 | 94, 100 | | 94 | 94, 100 | |
| | PG | 8 | 94 | 79.75, 100 | | 94 | 89.50, 94 | |
| Occupational status | Professional | 10 | 94 | 75, 100 | 0.908 | 94 | 88.25, 95.50 | 0.977 |
| | Skilled work | 9 | 94 | 78, 100 | | 94 | 84.50, 94 | |
| | Housewife | 45 | 94 | 81, 100 | | 94 | 88, 94 | |
| Have children or not | Have children | 27 | 94 | 94, 100 | 0.174 | 94 | 88, 94 | 0.819 |
| | No children | 37 | 94 | 81, 94 | | 94 | 88, 100 | |
| Gender of child | Male | 11 | 94 | 81, 100 | 0.404 | 94 | 81, 94 | 0.381 |
| | Female | 16 | 100 | 94, 100 | | 94 | 88, 94 | |

the outcome when present along with PCOD, hence patients having chronic debilitating medical illnesses as mentioned were excluded from the study.

History of psychiatric illness and comorbid substance dependence were excluded from the study as it can independently affect QOL scores and lead to erroneous results. Since pregnancy and its outcomes, both delivery and miscarriage can lead to emotional distress it was attempted to exclude patients with pregnancy in the past 1 year from this study.

None of the patients were illiterates or under primary school education. 39.1% patients had completed their plus two/diploma in this study, followed by 31.3% who had completed graduation. This indicates a better literacy rate in our study population reflecting the higher literacy rates of Kerala state.

Nearly 98.4% subjects were married and only one person was unmarried. There were no patients who were separated, widowed or divorced. In the study by Hollinrake *et al.*,^[16] 67% patients were married and 21.9% were single. Indian and other Eastern cultures

Table 6: Clinical correlates of quality of life

| Spearman's rank order | Domain 1 | Domain 2 | Domain 3 | Domain 4 |
|-------------------------|----------|----------|----------|----------|
| HAM D score | | | | |
| Correlation coefficient | -0.285 | -0.402 | -0.428 | -0.379 |
| <i>P</i> | 0.022 | 0.001 | <0.001 | 0.002 |
| HAM A score | | | | |
| Correlation coefficient | -0.508 | -0.508 | -0.654 | -0.576 |
| <i>P</i> | <0.001 | <0.001 | <0.001 | <0.001 |
| Ferriman-Gallewey score | | | | |
| Correlation coefficient | -0.282 | -0.413 | -0.243 | -0.328 |
| <i>P</i> | 0.024 | 0.001 | 0.053 | 0.008 |

HAM D – Hamilton Depression Rating scale; HAM A – Hamilton Anxiety Rating Scale

encourage marriage at a younger age which might be the reason for the finding of the majority of study population being married when compared to other studies.

Only 42.2% of the subjects had children. There is some evidence that during the time that couples attempt to conceive, women with fertility problems experience more negative emotional feelings than women who successfully conceive spontaneously. Menstrual irregularities and infertility being among the most common symptoms of PCOD, it was attempted to assess the correlation between having children or not and QOL.

Twenty-five percentage of subjects were having mild depression, 26.6% suffered from severe depression whereas about 42% of the subjects had moderate depression. In Hollinrake *et al.*'s^[16] study, the number of new cases of depressive disorders in women with PCOS was significantly higher (22 out of 103, 21%) than in control subjects (3 out of 103, 3%). The higher rate of depression may be a result of the lower occupational functioning and predominance of patients with no children in this study.

In this study, almost all patients were found to have anxiety with 98.4% suffering from mild anxiety. The higher rates of anxiety in our study may be attributed to the property of the tool used to assess anxiety, the Hamilton Anxiety Rating Scale where there was no minimum cutoff value. In a study by Benson *et al.*, 2009,^[22] 34% demonstrated elevated Hospital Anxiety and Depression Scale anxiety scores indicating anxiety.

In the study by Kumarapeli *et al.*,^[23] the mean scores for all four domains of WHOQOL-BREF were lower in women with PCOS than in controls, indicating a worse HRQOL among the affected women. In his study, in all domains, except domain 4, women with PCOD had statistically significant lower scores than normal controls. PCOD patients were found to score least in the social relationship domain. This study agreed with the

findings from the previous studies that PCOD patients experience poor QOL.

The domain 1 (physical health) which included activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, work capacity was found to have a significant association with age, educational status and anxiety (0.034, 0.001 and <0.001, respectively).

In Kumarapeli *et al.*'s^[23] study, mean score in the psychological health domain was lower among women with oligo/amenorrhea, acne, hirsutism, generalized and abdominal obesity, and infertility, and among those who thought they had excess acne, excess body hair and excess body weight. In this study also, domain 2 (psychological) was the maximally affected domain which involves self-esteem, negative and positive feelings, bodily image and appearance, spirituality, religion, personal beliefs, thinking, learning, memory and concentration. Age, educational status, presence of anxiety, and degree of hirsutism were found to be significantly influencing the score of this domain.

The domain 3 (social relationships) included personal relationships, social support and sexual activity. The score was 88.53 ± 14.93 . However, it was found to have no association with any of the sociodemographic factors and hirsutism even though it was found to be associated with the degree of anxiety and depression. In the study by Kumarapeli *et al.*,^[23] it was found that mean scores differed significantly in the social relationships domain by the level of generalized obesity.

Environmental domain (domain 4) was the least affected domain (90.81 ± 8.66). It included financial resources, freedom, physical safety and security, health and social care, home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation/leisure activities, physical environment, and transport. Educational status and anxiety scores were found to have a relationship with the environmental domain ($P < 0.001$ and < 0.001). In Kumarapeli *et al.*'s^[23] study also, scores in the environmental domain was not found to be statistically different from normal subjects.

A larger sample size would give better generalization of the results. Only patients who have sought treatment in a tertiary care center were taken, which would not represent patients with PCOD seeking treatment elsewhere or patients in the general population. No control group was included and hence a comparison with age or body mass index matched normal individuals was not possible. The sample comprised

mainly of individuals who sought help for infertility issues, so results could be a reflection of issues related to infertility alone. In the study sample, there was only one subject who was unmarried. Due to the property of the tool used to measure anxiety, all patients in the study were found to have anxiety.

CONCLUSION

Women with PCOD, with the sample comprising mainly of individuals who sought help for infertility issues at a tertiary teaching hospital, had a lower QOL than normal individuals. They were found to have higher prevalence of depression and anxiety and had higher severity of hirsutism. The psychological domain of QOL was found to be the most badly affected in these patients. The severity of depression had a negative correlation with all domains but maximally affected the social relationship domain.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Hussain A, Chandel RK, Ganie MA, Dar MA, Rather YH, Wani ZA, *et al.* Prevalence of psychiatric disorders in patients with a diagnosis of polycystic ovary syndrome in kashmir. *Indian J Psychol Med* 2015;37:66-70.
- Ehrmann DA. Polycystic ovary syndrome. *N Engl J Med* 2005;352:1223-36.
- Bazarganipour F, Ziaei S, Montazeri A, Foroozanfar F, Kazemnejad A, Faghihzadeh S. Psychological investigation in patients with polycystic ovary syndrome. *Health Qual Life Outcomes* 2013;11:141.
- Kitzinger C, Willmott J. 'The thief of womanhood': Women's experience of polycystic ovarian syndrome. *Soc Sci Med* 2002;54:349-61.
- Trent ME, Rich M, Austin SB, Gordon CM. Quality of life in adolescent girls with polycystic ovary syndrome. *Arch Pediatr Adolesc Med* 2002;156:556-60.
- Trent ME, Rich M, Austin SB, Gordon CM. Fertility concerns and sexual behavior in adolescent girls with polycystic ovary syndrome: Implications for quality of life. *J Pediatr Adolesc Gynecol* 2003;16:33-7.
- Trent M, Austin SB, Rich M, Gordon CM. Overweight status of adolescent girls with polycystic ovary syndrome: Body mass index as mediator of quality of life. *Ambul Pediatr* 2005;5:107-11.
- Tan S, Hahn S, Benson S, Janssen OE, Dietz T, Kimmig R, *et al.* Psychological implications of infertility in women with polycystic ovary syndrome. *Hum Reprod* 2008;23:2064-71.
- Hahn S, Janssen OE, Tan S, Pleger K, Mann K, Schedlowski M, *et al.* Clinical and psychological correlates of quality-of-life in polycystic ovary syndrome. *Eur J Endocrinol* 2005;153:853-60.
- Barnard L, Ferriday D, Guenther N, Strauss B, Balen AH, Dye L. Quality of life and psychological well being in polycystic ovary syndrome. *Hum Reprod* 2007;22:2279-86.
- Elsenbruch S, Hahn S, Kowalsky D, Offner AH, Schedlowski M, Mann K, *et al.* Quality of life, psychosocial well-being, and sexual satisfaction in women with polycystic ovary syndrome. *J Clin Endocrinol Metab* 2003;88:5801-7.
- Rasgon NL, Rao RC, Hwang S, Altshuler LL, Elman S, Zuckerbrow-Miller J, *et al.* Depression in women with polycystic ovary syndrome: Clinical and biochemical correlates. *J Affect Disord* 2003;74:299-304.
- Adali E, Yildizhan R, Kurdoglu M, Kolusari A, Edirne T, Sahin HG, *et al.* The relationship between clinico-biochemical characteristics and psychiatric distress in young women with polycystic ovary syndrome. *J Int Med Res* 2008;36:1188-96.
- Weiner CL, Primeau M, Ehrmann DA. Androgens and mood dysfunction in women: Comparison of women with polycystic ovarian syndrome to healthy controls. *Psychosom Med* 2004;66:356-62.
- Eggers S, Kirchengast S. The polycystic ovary syndrome – A medical condition but also an important psychosocial problem. *Coll Antropol* 2001;25:673-85.
- Hollinrake E, Abreu A, Maifeld M, Van Voorhis BJ, Dokras A. Increased risk of depressive disorders in women with polycystic ovary syndrome. *Fertil Steril* 2007;87:1369-76.
- Farrell K, Antoni MH. Insulin resistance, obesity, inflammation, and depression in polycystic ovary syndrome: Biobehavioral mechanisms and interventions. *Fertil Steril* 2010;94:1565-74.
- Veltman-Verhulst SM, Boivin J, Eijkemans MJ, Fauser BJ. Emotional distress is a common risk in women with polycystic ovary syndrome: A systematic review and meta-analysis of 28 studies. *Hum Reprod Update* 2012;18:638-51.
- Cronin L, Guyatt G, Griffith L, Wong E, Azziz R, Futterweit W, *et al.* Development of a health-related quality-of-life questionnaire (PCOSQ) for women with polycystic ovary syndrome (PCOS). *J Clin Endocrinol Metab* 1998;83:1976-87.
- Sonino N, Fava GA, Mani E, Belluardo P, Boscaro M. Quality of life of hirsute women. *Postgrad Med J* 1993;69:186-9.
- Jones GL, Benes K, Clark TL, Denham R, Holder MG, Haynes TJ, *et al.* The polycystic ovary syndrome health-related quality of life questionnaire (PCOSQ): A validation. *Hum Reprod* 2004;19:371-7.
- Benson S, Hahn S, Tan S, Mann K, Janssen OE, Schedlowski M, *et al.* Prevalence and implications of anxiety in polycystic ovary syndrome: Results of an internet-based survey in Germany. *Hum Reprod* 2009;24:1446-51.
- Kumarapeli V, Seneviratne Rde A, Wijeyaratne C. Health-related quality of life and psychological distress in polycystic ovary syndrome: A hidden facet in South Asian women. *BJOG* 2011;118:319-28.