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ORIGINAL ARTICLE

A Study to Assess the Prevalence of Psychiatric Co-Morbidities in Women Suffering from Polycystic Ovarian Syndrome (PCOS)

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ABSTRACT

The Polycystic Ovarian Syndrome may impact the quality of life and can lead to anxiety or depression either due to the features of PCOS or due to the diagnosis of a chronic disease. The current study is done to determine the psychological issues in women who are suffering from polycystic ovarian syndrome. It assessed the prevalence of psychiatric co-morbidities among suffering from Polycystic Ovarian Syndrome. The prevalence in current study was about 56.6% the prevalence of psychosocial stressors presenting in women suffering from Polycystic Ovarian Syndrome was accessed. The prevalence of anxiety is 10% in the study population. Presence of psychosocial stress in women with pcos significantly correlated with depression. The quality of life in women suffering from Polycystic Ovarian Syndrome was accessed and women with pcos have lower quantity of life which is significant.
Keywords: Polycystic Ovarian Syndrome (PCOS), Androgen, Hyperandrogenic anovulation

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INTRODUCTION

Polycystic ovarian syndrome is a disorder of abnormal ovarian function and abnormally increased androgen levels. Woman with PCOS does not ovulate hence they do not release an egg every month which is characterized by irregular menstrual cycles. Polycystic Ovarian Syndrome (PCOS), also referred to as hyperandrogenic anovulation (HA) or Stein–Leventhal syndrome and it was describedin 1935 [1]. It is a heterogeneous disorder that affects at least 7% of adult women. Research studies suggest that 5% to 10% of females from 18 to 44 years of age are affected by PCOS, making it the most common endocrine abnormality among females of reproductive age [2]. PCOS is a heterogeneous condition with multiple factors playing a role in the causation of the illness. It occurs due to a serious interaction between the genetic, dietary and environmental factors. This complex interaction determines the heterogeneous, clinical, an d biochemical phenotype in polycystic ovarian syndrome [3]. Women whose first degree relatives had PCOS are more likely to have it. Singh A et al found that 43% had positive family history of PCOS in first degree relative [4]. Several theories have been proposed to explain the pathogenesis of PCOS, Primary defects in the hypothalamic–pituitary axis, Hyperinsulinemia and insulin resistance or A defect in synthesis of androgen results in enhanced ovarian androgen production [5]. The endocrine features include increased androgens, luteinizing hormone, oestrogen & prolactin levels. Various studies discussed the cluster of symptoms of polycysticovarian syndrome [8][9][6][10].

➢ **Menstrual Irregularities**- The most common presentation in the PCOS group. It may be Oligomenorrhoea, Menorrhagia and Amenorrhoea.
➢ **Obesity**- PCOS women had higher waist to hip ratio & elevated BMI

➢ **Acne, Hirsutism, Alopecia**- Acne or oily skin, facial hair growth, loss of hair are sugges tive of excessive androgenic activity.
➢ **Acanthosis nigricans**- Higher levels of insulin can cause hyperpigmentation of skin on the back of the neck, under the arms and in the groin area.
➢ **Galactorrhea-** Persistently elevated estradiol levels are often found in women with PCOS & could result in prolactin elevation which may cause galactorrhea.
➢ **Infertility-** Due to inappropriate production of follicle-stimulating hormone (FSH) and Luteinizing hormone (LH). As a result, with limited follicular development, egg development may not occur which may lead to irregular ovulation or anovulation [11].

It is very well understood from the nature of symptoms of PCOS viz. hyperandrogenism, cystic acne, seborrhoea and hair loss can cause significant distress possibly by influencing feminine identity [12] and it can significantly impact the quality of life of the women during her reproductive years. It has also been suggested that women with PCOS have a more negative self-image, body dissatisfaction, lower self-esteem impaired sexual functioning and marital maladjustment which can lead to various psychological disturbances like depression and anxiety [10, 12].

Among the various symptoms of women with PCOS, studies have identified that mood swings, increased body hair, weight gain, menstrual problems and infertility are among their top concerns and especially women with menstrual irregularities are more likely to develop psychological distress.

MATERIAL AND METHODS
SETTING OF STUDY:
The study was conducted in Obstetrics & Gynaecology OPD in Sree Balaji Medical College & Hospital.
The study was conducted from July 2019 to June 2020.
SAMPLE SIZE: 60
TYPE OF STUDY:
The study was a Cross sectional study
INCLUSION CRITERIA:
• Both Married & Unmarried women diagnosed with PCOS confirmed by Ultrasound Abdomen by Gynaecologist aged (18years-40years)
• Clinically stable for interview
• Patient who have given their consent to participate in the study.
EXCLUSION CRITERIA:
• Aged >40years
• Clinically unstable or uncooperative
• Known case of Psychiatric illness & on treatment
• Intellectual disability.
Methods
Women attending the Obstetrics and Gynaecology OPD who fulfil the inclusion and the exclusion criteria after obtaining written informed consent were included in the study. Information was gathered from patients about demographic and clinical data using a semi structured proforma. Current mental health was assessed using GHQ (General Health Questionnaire). Depression and anxiety were assessed using HAM-D (Hamilton Depression Rating Scale), HAM- A (Hamilton Anxiety Rating Scale) respectively. Quality of life was assessed by WHOQOL-BREF Scale.
Statistical Methods
Descriptive analysis was carried out and the continuous variables were described in terms of mean and standard deviation, whereas frequency and proportion were used to describe categorical variables. Non normally distributed quantitative variables were summarized by interquartile range and median. Data was also represented using appropriate diagrams like bar diagram, pie charts and box plots. The association between categorical explanatory variables and quantitative outcome was assessed by comparing the mean values. P value <0.05 was considered statistically significant. Statistical analysis was done using IBM SPSS software.

RESULTS

Sample Characteristics:

A total of 60 subjects in the age group of 18–45 years were included in the final analysis.

Table 1: Descriptive analysis of age in study population (N=60)

Parameter	Mean ± SD	Median	Minimum	Maximum	95% C.I	
					Lower	Upper
Age	25.05 ± 4.52	24.00	18.00	37.00	23.88	26.22

The mean age of the sample was 25.05 ± 4.52 years in the study population, minimum age was 18 and maximum age was 37 in the study population (95% CI 23.88 to 26.22).

Table 2: Descriptive analysis of age group in the studypopulation (N=60)

Age Group	Frequency	Percentages
18-22	20	33.33%
23-27	24	40.00%
>28	16	26.67%

In the study population, 20 women (33.33%) were between 18-22 years, 24 women (40%) were between 23-27 years and 16 women (26.67%) were above 28 years.

Table 3: Reasons for consultation in the study population (N=60)

Reason for Consultation	Frequency	Percentages
Anxious to conceive	17	28.33%
Irregular menstrual cycle	31	51.7%
Abdominal pain	2	3.3%
Amenorrhea	7	11.7%
Menorrhagia	1	1.7%
Bleeding per vagina	1	1.7%
Weight gain	1	1.7%

In the study group, 28.33% (17) were anxious to conceive, 51.7% (31) reported of Irregular menstrual cycle, 3.3% (2) complained of abdominal pain, 11.7% (7) reported with amenorrhea, 1.7% (1) had menorrhagia, 1.7% (1) had bleeding per vagina, 1.7% (1) reported with weight gain.

Table 4: Descriptive analysis of psychosocial stressor in thestudy population (N=60)

Psychosocial Stressor	Frequency	Percentages
Positive	26	43.33%
Negative	34	56.67%

In the study population, 26 (43.33%) women had psychosocial stressors while 34 (56.67%) had no psychosocial stressors

Symptoms of PCOS:

Table 5: Descriptive analysis of symptoms of polycystic ovariansyndrome in the study population (N=60)

Parameters	Frequency	Percentages
Amenorrhea/Oligomenorrhoea	16	26.67%
Acne	23	38.33%
Acanthosis Nigricans	12	20.00%
Alopecia	18	30.00%
Galactorrhea	2	3.33%
Hirsutism	18	30.00%
Weight Gain	36	60.00%
Infertility	21	35.00%

Among the study population, 16 (26.67%) had Amenorrhea, 23(38.33%) had Acne, 12 (20%) had *Acanthosis nigricans*, 18 (30%) had Alopecia, 2 (3.33%) had Galactorrhea , 18 (30%) had Hirsutism, 36 (60%) had Weight gain and 21 (35%) reported of Infertility

Psychological disturbances in PCOS Women:

Table 6: Descriptive analysis of interpretation of GHQ-12 inthe study population (N=60)

Interpretation	Frequency	Percentages
Normal	36	60.00%
Evidence of distress	16	26.67%
Severe psychological distress	8	13.33%

During the interview, 3 (5%) had anxious mood, 9 (15%) had dull mood and 48 (80%) had euthymic mood.

Among the study population, 36 (60%) had normal GHQ, 16 (26.67%) had evidence of distress and 8 (13.33%) had severe psychological distress.

Table 7: Correlation between symptoms of PCOS and GHQ(N=60)

Parameters	GHQ-12		Chi square	P value
	Yes (N=35)	No (N=25)		
Amenorrhoea				
Yes	6 (17.14%)	10 (40%)	3.896	0.048
No	29 (82.86%)	15 (60%)		
Acne				
Yes	13 (37.14%)	10 (40%)	0.050	0.822
No	22 (62.86%)	15 (60%)		
Acanthosis Nigricans				
Yes	9 (25.71%)	3 (12%)	1.714	0.190
No	26 (74.29%)	22 (88%)		
Alopecia				
Yes	10 (28.57%)	8 (32%)	0.082	0.775
No	25 (71.43%)	17 (68%)		
Galactorrhea				
Yes	1 (2.86%)	1 (4%)	0.059	1.000
No	34 (97.14%)	24 (96%)		
Hirsutism				
Yes	15 (42.86%)	3 (12%)	6.612	0.010
No	20 (57.14%)	22 (88%)		
Weight gain				
Yes	23 (65.71%)	13 (52%)	1.143	0.285
No	12 (34.29%)	12 (48%)		
Infertility				
Yes	13 (37.14%)	8 (32%)	0.170	0.681
No	22 (62.86%)	17 (68%)		

Women with Amenorrhea and Hirsutism had significant correlationwith GHQ-12. (P value=0.048, P value=0.010)

Table 8: Descriptive analysis of subjective psychologicaldisturbance in the study population (N=60)

Parameters	Frequency	Percentages
Psychiatric Symptoms		
Low Mood	42	70.00%
Crying Spells	23	38.33%
Sleep Disturbance	22	36.70%
Anxiety	10	16.67%
Anger Outbursts	16	26.67%
Irritability	27	45.00%
Increased/Decreased Appetite		
Normal	51	85.00%
Increased	4	6.67%
Decreased	5	8.33%

Among the study population, 42 (70%) had low mood, 23 (38.33%) had crying spells, 22 (36.70%) had sleep disturbance, 10 (16.67%) had anxiety, 16 (26.67%) had anger outbursts, 27 (45%) had irritability. 51 (85%) had normal appetite while 4 (6.67%) had increased appetite and 5 (8.33%) had decreased appetite

Table 9: Descriptive analysis of severity of depression in thestudy population (N=60)

Parameter	Frequency	Percentages
Normal	26	43.33%
Mild depression	25	41.7%
Moderate depression	8	13.33%
Severe depression	1	1.7%

The Hamilton rating scales for depression was used. Depression was more prevalent in the study population, about 56.6% (n=34) had depression of which 25 (41.7%) had mild depression, 8 (13.33%) had moderate depression, and 1 (1.7%) had severe depression.

Table 10: Correlation between quality of life and women with *Acanthosis nigricans* (N=60)

Parameters	*Acanthosis nigricans* Median (IQR)		Mann Whitney U test (P value)
	Yes (N=12)	No (N=48)	
Domain 1	14 (11.5,15.75)	14 (13,15)	0.666
Domain 2	13 (11,13.75)	13 (12,15)	0.286
Domain 3	12.5 (8.25,15.75)	13 (11.25,16)	0.412
Domain 4	14.5 (14,16)	16.5 (15,17.75)	0.014

Women with complaints of *Acanthosis nigricans* scored significantly low scores on Domain of environmental and financial resources (P = <0.014). This was found to be statistically significant. Women with *Acanthosis nigricans* also had lower scores on Domain 3, however not found to be significant statistically.

Table 11: Correlation between number of symptoms of PCOSwith quality of life:

Number of PCOS Symptoms	Mean	SD	P- VALUE
0-3	94.0208	9.21259	0.701
>3	92.8333	10.83625	0.732

Number of PCOS symptoms were compared with mean scores of WHOQOL. Women with more than 3 symptoms of PCOS had lower scores of quality of life and but was not statistically significant.

Table 12: Comparison between QOL and women with pasttreatment history(N=35)

Parameter	TREATMENT HISTORY (Mean± SD)		P-value
	Treatment forinfertility (N=21)	Treatmentfor PCOS (N=14)	
Domain 1	13.57±1.94	14.21±1.81	0.331
Domain 2	12.57±1.75	13.57±2.34	0.158
Domain 3	14.81±1.75	12.71±3.54	0.026
Domain 4	14.67±2.58	16.07±1.73	0.083

QOL scores of patients who had undertaken treatment for infertility& other symptoms of PCOS were assessed. It was found that those patients scored low in domain 3, suggesting they had lower QOL in social domain (P= 0.026)

Table 13: Comparison between QOL and women withpsychiatric co-morbidities

	Psychiatric Co-morbidities	N	Mean Rank	P Value
Domain 1	Absent	25	32.02	0.562
	Present	35	29.41	
Domain 2	Absent	25	35.22	0.071
	Present	35	27.13	
Domain 3	Absent	25	34.98	0.090
	Present	35	27.30	
Domain 4	Absent	25	34.90	0.095
	Present	35	27.36	

Mean scores of WHOQOL was compared between patients with and without psychiatric co-morbidity. People with psychiatric co- morbidities scored low quality of life when compared to people who had no psychiatric comorbidities. However, it was not statistically significant.

DISCUSSION

The mean age of the study population was 25.05 ± 4.52 years, minimum age was 18 and maximum age was 37 (95% CI 23.88 to 26.22). Majority of women belonged to the age group 23 -27 years. When GHQ -12 was administered to assess the psychological well-being of the subjects, 60% were normal. In our study population, 70% women had subjective experience of low mood. On administering HAM-D, 56.6% had depression of which 25 (41.7%) had mild depression, 8 (13.33%) had moderate depression, and 1 (1.7%) had severe depression. Hollinrake *et al* also found higher prevalence of depression (35%) than in controls in his study[22] .Another study done by Kerchner et al also showed higher prevalence of depression (40%).[5] Among the study population, women above 28 years in the study group scored more for depression compared to other age groups, though not statistically significant. This could be due to changes in hormone levels that occurs in a women's life throughout. In our study, although marital status had no significance with depression among women with PCOS (x 2 = .848, P= 0.357), married women were more depressed when compared to unmarried women. When the symptoms of PCOS were assessed, women with hirsutism had more depression compared to other symptoms of PCOS, which was statistically significant (P= 0.013). Barnard et al also found similar results in his study. (P= 0.001) But, the number of PCOS symptoms did not have a bearing on the total scores of HAM -$_{D.}$ [10] Presence of psychosocial stressors in women with PCOS significantly correlated with Depression (x2=10.855, P= <0.001). However socioeconomic status had no significant association with depression (x2 =1.110, P=0.775). Sayyah-Melli *et al* in his study has also found that psychosocial factors play a significant role in women with PCOS and most of the women with PCOS were from lower socioeconomic status[6]. Merkin *et al* also found that women who belong to low socioeconomic status during their childhood are at an increased risk of developing PCOS [7]. There are very less number of studies showing relation between *Acanthosis nigricans*

& QOL. Women with infertility have significantly lower scores in Domain of social & personal relationships (r = .494**, P= <0.01). Similarly, those who underwent treatment for infertility and other symptom of PCOS scored low in domain 3 and was found to be statistically significant (P= 0.026). Women with more than 3 symptoms of PCOS had lower quality of life and but the difference was not statistically significant. When each domain was assessed separately, patients scored relatively lower in Domain 4 however was not statistically significant (P= 0.072). WHOQOL had negative correlation with depression(r =− .320, P = 0.013). Hence, PCOS women with no depression had better quality of life. Barnard et al also found that PCOS high -depressed women had significantly lower QOL than PCOS low-depressed women (P= <0.001).[34] People with psychiatric co-morbidities scored low quality of life when compared to people who had no psychiatric comorbidities. However, it was not statistically significant. Chaudhari *et al*, who has also compared QOL scores with and without psychiatric comorbidity and found significant positive correlation in domain 1,2 and 3 but not in domain 4.[8]

CONCLUSION
The most common presenting complaints of the women were irregular menstrual cycle (51.7%), followed by anxiety to conceive (28.33%). 60% of women had weight gain, 38.3% had Acne, 30% had Hirsutism & 30% had Alopecia in the study sample. Among married women, 21 (60%) had Infertility issues. The prevalence of depression in the study population was about 56.6% and women above 28 years scored more for depression. Presence of psychosocial stressors in women with PCOS significantly correlated with Depression. There was strong correlation between depression and women who had past treatment history for infertility and other symptoms of PCOS. The prevalence of anxiety in 10% in the study population & there was a strong correlation between anxiety and PCOS women who had alopecia. Women with complaints of *Acanthosis nigricans* scored significantly low on WHOQOL-BREF Domain of environmental and financial resources. Women with infertility had significantly lower in WHOQOL-BREF Domain of social & personal relationships. Women with had past history of treatment obtained for infertility & other symptoms of PCOS had low scores in WHOQOL-BREF Domain of social & personal relationships and it was found to be statistically significant.

REFERENCES
1. El Hayek S, Bitar L, Hamdar LH, Mirza FG, Daoud G. (2016).Poly cystic ovarian syndrome: an updated overview. Frontiers in physiology. Apr 5;7:124.
2. Hung JH, Hu LY, Tsai SJ, Yang AC, Huang MW, Chen PM, Wang SL, Lu T, Shen CC. (2014). Risk of psychiatric disorders following polycystic ovary syndrome: a nationwide population - based cohort study. PloS one. May 9;9(5):e97041.
3. Ndefo UA, Eaton A, Green MR.(2013). Polycystic ovary syndrome: a review of treatment options with a focus on pharmacological approaches. Pharmacy and therapeutics. 2013 Jun;38(6):336.
4. Singh A, Vijaya K, Laxmi KS. (2018). Prevalence of polycystic ovarian syndrome among adolescent girls: a prospective stud y. Int J Reprod Contracept Obstet Gynecol. 2018;7(11):4375-8.
5. Tsilchorozidou T, Overton C, Conway GS.(2004) The pathophysiology of polycystic ovary syndrome. Clinical endocrinology. 2004Jan;60(1):1-7.
6. Carmina E, Lobo RA.(1999) Polycystic ovary syndrome (PCOS): arguably the most common endocrinopathy is associated with significant morbidity in women. The journal of clinical endocrinology & metabolism. 1999 Jun 1;84(6):1897-9.
7. Chatterjee M, Bandyopadhyay SA.(2020) Assessment of the prevalence of polycystic ovary syndrome among the collegestudents: A case–control study from Kolkata. Journal of Mahatma Gandhi Institute of Medical Sciences. 2020 Jan 1;25(1):28.
8. Lee I, Cooney LG, Saini S, Smith ME, Sammel MD, Allison KC, Dokras A. (2017) Increased risk of disordered eating in polycystic ovary syndrome. Fertility and sterility. 2017 Mar 1;107(3):796 - 802.
9. Azizi M, Elyasi F. (2017) Psychosomatic aspects of polycystic ovarian syndrome: a review. Iran J Psychiatry Behav Sci. 2017 Jun 1;11(2):e6595.
10. Qadri S, Hussain A, Bhat MH, Baba AA. (2018) Polycystic ovary syndrome in bipolar affective disorder: A hospital-based study. Indian Journal of Psychological Medicine. 2018 Apr;40(2):121 - 8.
11. Scaruffi E, Gambineri A, Cattaneo S, Turra J, Vettor R, Mioni R.(2014). Personality and

psychiatric disorders in women affected by polycystic ovary syndrome. Frontiers in endocrinology. 2014 Nov 12;5:185.

12. Kahal H, Kyrou I, Uthman OA, Brown A, Johnson S, Wall PD, Metcalfe A, Parr DG, Tahrani AA, Randeva HS. (2020) The prevalence of obstructive sleep apnoea in women with polycystic ovary syndrome: a systematic review and meta-analysis. Sleep and Breathing. 2020 Mar;24(1):339-50.

13. Barnard L, Ferriday D, Guenther N, Strauss B, Balen AH, Dye L.(2007). Quality of life and psychological well-being in polycystic ovary syndrome. Human reproduction. 2007 Aug 1;22(8):2279 - 86.