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RISK OF DEVELOPING DEPRESSION AND ITS IMPACT ON QUALITY OF LIFE IN PATIENTS WITH POLYCYSTIC OVARY SYNDROME - A SOUTH INDIAN SCENARIO

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ABSTRACT: Polycystic ovary syndrome (PCOS) is one of the most common reproductive endocrine disorders, affecting the patient's psychological functioning and satisfaction with life. **Settings and Design:** Tertiary care hospital based case-control study was conducted. **Material and Methods:** the study was effectuated in 372 patients in total, including an equal number of cases and controls. PHQ-9 was used to determine the depression based DSM-IV directly diagnostic criteria for depression and PCOSQS was used to assess the quality of life. **Statistical analysis used:** Data was examined using descriptive statistics, spearman co-relation, Chi-square test, and odds ratios (OR) with 95% confidence intervals (95% CI). **Results:** The study shows an increased risk of depression in PCOS (76.96% of cases compared to 20.03% of controls), Odd's ratio 5.95 (95% confidence interval [3.818 to 9.351]) and the depression was found to be having an impact on patient's quality of life. **Conclusions:** The care of individuals with PCOS should include the screening and possible treatment for depression in order to achieve and sustain treatment goals considering the fact that Identifying depression early will further improve the quality of life of PCOS patients and also reduce the overall treatment cost, which are generally unaffordable by most individuals with this disease in India.

INTRODUCTION: Polycystic ovary syndrome (PCOS) is a genetically complex endocrine disorder with a broad spectrum of signs and symptoms, affecting approximately 5-10% of women in the western world. In Indian population reported a prevalence of 3.7-22.5%^{1,2}. It is mainly characterized by the presence of hyperandrogenism and chronic anovulation in the absence of peculiar adrenal and/or pituitary disease³.

It has definite and diverse clinical features including reproductive (infertility), hyperandrogenism (hirsutism, acne, alopecia), metabolic disturbances (insulin resistance, impaired glucose tolerance, increased risk of developing cardiovascular diseases and type 2 diabetes mellitus) and also psychological burden^{4,5}.

Women with PCOS are more likely to have psychological disturbances, including depression generalized anxiety disorder and bring disorder, with a prevalence of 28%^{6,7,8}. Although, the exact association between PCOS and depression is unclear it is believed to be because of changes in physical features like hirsutism, alopecia, obesity, and acne, which influences the feminine identity and self-esteem^{9,10}.

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And studies have shown that depression in PCOS women reduces the quality of life among them^{11, 12}.

The study aims to evaluate the risk of depressive disorders and their impact on the quality of life of patients with polycystic ovary syndrome. The primary objective is to study the risk of depression, and its determinants among polycystic ovary syndrome patients, and Secondary objective is to determine the impact of depressive disorders on quality of life of polycystic ovary syndrome patients using a representative population sample.

MATERIALS AND METHODS: A case-control study was carried out in 186 patients with PCOS, and 186 no BMI matched control group **Fig. 1**. The study was carried out in the Gynecology and Obstetrics Department of Employees State Insurance Corporation (ESIC) Hospital, Aynavaram, Chennai, Tamil Nadu from August 2017 to May 2018. The protocol of the study was submitted to the IEC for review and approval. The IEC clearance number of the study was VISTAS-SPS/IEC/VI/2017/08.

Inclusion Criteria:

- Clinical signs of hyperandrogenism.
- Menstrual irregularity: >35 days interval between menstrual periods and amenorrhea defined as the absence of vaginal bleeding for at least 3 months. Oligomenorrhea: <21 days frequent.
- Visualization of polycystic ovaries on ultrasound.

Exclusion Criteria:

- Patients diagnosed with psychological problems, family history of psychiatric diseases, Adrenal hyperplasia, subclinical hyperthyroidism, hyperprolactinemia, and pituitary dysfunction.
- Patient with more than 80% of missing data for the study in their medical records.

Past and present complaints, menstrual history, comorbidities, clinical investigations, and drug chart was obtained and noted in a structured case report form. Administered the questionnaires (PHQ-9), for assessing depression and Polycystic ovary syndrome quality of life Scale (PCOSQS), for estimating the quality of life in PCOS patients. The Primary Care Evaluation of Mental Disorders Patient Health Questionnaire 9 (PHQ-9) is a self-administered scale and is very useful for the clinical diagnosis of depression in a primary care setting. The PHQ-9 is based directly on the Diagnostic and Statistical Manual IV (DSM-IV) diagnostic criteria for depression. It scores each of the nine DSM-IV criteria from 0 (not at all) to 3 (nearly every day). A self-structured and validated questionnaire (PCOSQS) is used to assess the quality of life in patients with polycystic ovary syndrome. It contains 12 binary questions which can be answered by the patient within a minute. Data analysis was done with the help of Microsoft Excel, Graph pad prism version 7.0 and SPSS. Clinical justification of the collected data was done by compiling the data in the Excel sheet and later interpreting the results in the form of tables and graphs.

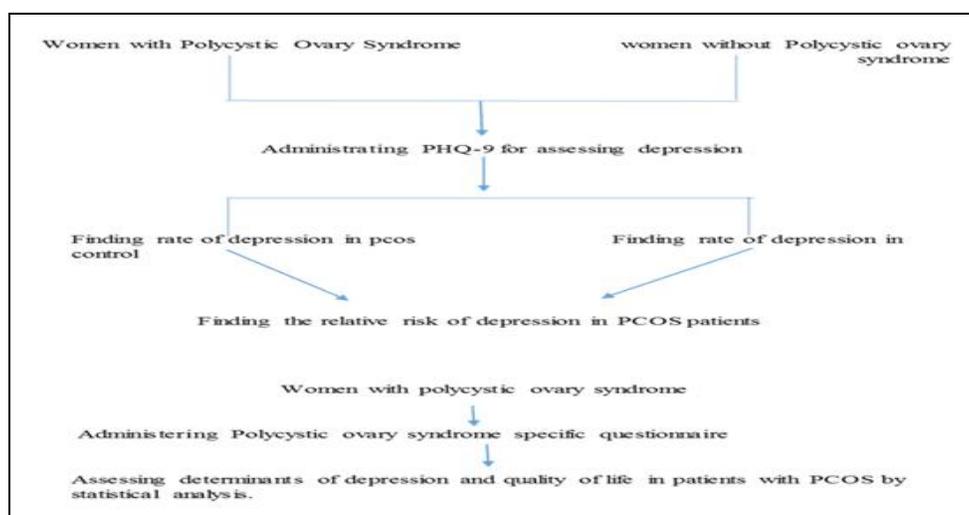


FIG. 1: PLAN OF WORK

RESULTS: Around 372 women were enrolled in the study, including an equal number of women with PCOS (case) and women without PCOS (control), according to the inclusion and exclusion criteria. The study involved patients for whom the case reports were collected; depression was assessed and determinants. Also, the quality of life has been checked, where as in women without PCOS, the depression was the only parameter assessed along with basic demographic parameters.

In the present study, about 76.96% of cases (women with PCOS) had depression compared to 20.03% of controls, Odd's ratio 5.95 (95% confidence interval [3.818 to 9.351]) (shown in **Table 1**). In them about 30.64% had minimal symptoms compared to 22.58%, 19.35% had minor depression compared to 3.225%, 16.12% had major depression compared to 1.61, and 4.83% had severe

depression compared to 1.61% of control respectively (Shown in **Fig. 2**).

Mean \pm SD of age of the study population were $25.19 \pm$ for cases (Median 24) and 23.38 ± 4.14 for control (Median 23) respectively, there was a significant correlation between age and development of depression in women with PCOS, and r-value was found to be 0.5396 (95% confidence interval [0.328-0.699]).

The mean \pm SD of BMI of the study population was found to be 23.72 ± 2.96 (Median 23) in the PCOS patients, which indicates most of the patients are in a healthy weight. And it shows a significant correlation between BMI and depression, and the r-value was found to be 0.0715 (95% confidence interval [-0.188-0.322]).

TABLE 1: RELATIVE RISK OF DEPRESSION

	PCOS		No PCOS		Total	P Value
	No	%	No	%		
Depression	132	70.96	54	29.03	186	<0.0001*
No Depression	54	29.03	132	70.96	186	

*The variable is statistically significant when P<0.05 using Chi-square test.

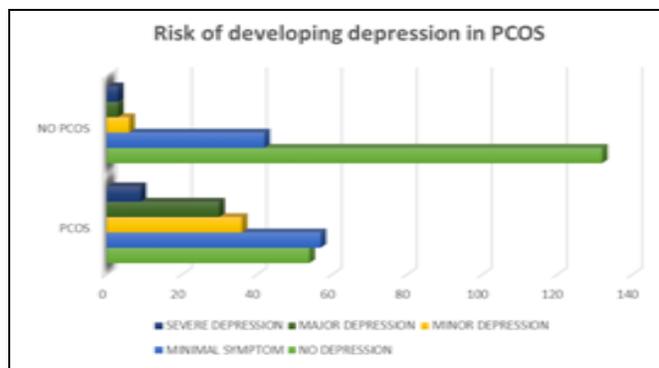


FIG. 2: RISK OF DEVELOPING DEPRESSION IN PCOS

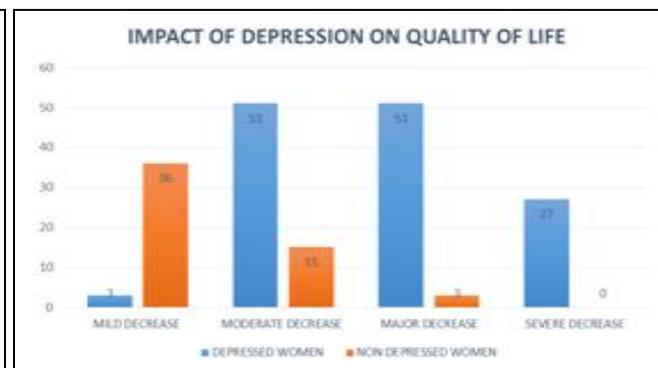


FIG. 3: IMPACT OF DEPRESSION ON QUALITY OF LIFE

In the present study, most of the women shown depression were married (86.48%), and it was found to be having significantly associated with depression. Hirsutism was not found to be having an association with depression in PCOS and found anemia also doesn't have a significant association with depression.

Having comorbidities like Diabetes Mellitus (80.01%) and Hypothyroidism (47.61%) found to be not significantly associated with depression. Most of the women with PCOS involved in the present study were found to be having infertility problems (93.33%), and it is having a significant

association with developing depression in the study population (shown in **Table 2**).

In the present study, depression was found to be less in the patients who were treating with OCP (56.66%) when compared with patients who are not treating with OCP (84.3%), and found to had an association with depression (Shown in **Table 2**).

Treatment with metformin was not significantly associated with depression in PCOS patients. Being an earning member was found to be having a significant association with depression in PCOS patients (as shown in **Table 2**).

In the present study, depression was found to be having an impact on patient's quality of life. About 3 of depressed patients had a mild decrease in quality of life compared to 36 of non-depressed patients, 51 of the depressed patients have a moderate decrease in quality of life and major

decrease in quality of life compared to 15 and 3 of non-depressed patients respectively. 27 of the depressed patients had a severe decrease in quality of life whereas no non-depressed patients affected with severe decrease in QOL (Shown in Fig. 3).

TABLE 2: INCIDENCE OF DEPRESSION (PHQ-9) ACCORDING TO SELECTED PARAMETER

Parameters	Incidence among the exposed group			Incidence among non-exposed group			Odd's ratio	95% confidence interval	P value
	N	Total	%	N	Total	%			
Married	96	111	86.48	36	75	48.0	6.933	3.415-14.08	0.0001*
Hirsutism	54	69	78.2	78	117	66.6	1.800	0.903-3.586	0.0924
Anemia	53	102	51.96	39	84	46.4	1.248	0.699-2.226	0.4527
Diabetes Mellitus	12	15	80.01	117	171	68.4	1.846	0.502-6.814	0.3510
Hypothyroidism	40	84	47.61	52	102	50.9	0.874	0.490-1.55	0.648
Infertility problems	84	90	93.33	42	96	43.7	18.00	7.163-45.23	<0.0001*
Treatment with OCP ¹	51	90	56.66	81	96	84.3	0.242	0.213-0.48	<0.0001*
Treatment with MF ²	117	171	68.42	12	15	80.1	0.541	0.146-1.99	0.351
Being an earning member	63	72	87.50	69	114	60.5	45.65	2.06-10.09	<0.0001*
¹ Oral contraceptives		² Metformin							

These variables were statistically significant when $P < 0.05$ using the Chi-square test.

*Parameter is significantly associated with depression.

DISCUSSION: PCOS is a common reproductive and cosmetic disorder of women in reproductive age that also have adverse physiological manifestations¹³. Many studies which were prosecuted in American or European populations had perceived a greater risk of developing depression in PCOS patients. The present study was carried out owing of the fact that no study was being orchestrated on this population; considering the importance of computing depression and its determinants and thus presuming possible treatment choices to be add on to the regular treatment chart in PCOS to increase the quality of life in them. Depression has been associated with increased cortisol levels, increased sympathetic activity, and also due to decreased serotonin levels in the central nervous system, and also it is associated with hyperandrogenism and insulin resistance.

The present study exhibits an increased risk of depression compared with controls (70.96% vs. 29.03%), which was higher than the detection of other studies, ranging from 21% to 54%. Odds ratio 5.975 (95% confidence interval {3.818 to 9.351}), which was also higher than the values obtained in researches which were undergone previously (ranging from 1.54 to 5.11)^{5, 7, 9}.

Most of the women analyzed were in the age period of 15 to 35 and found a positive correlation with

developing depression, which is mainly homogeneous to the findings in prior studies. It can be mainly because increasing age can lead to an increased risk of comorbidities and complications in PCOS further. The study exhibit women affected with PCOS are mostly unsatisfied with their BMI and was similar to the previous studies^{6, 14}. In fact, body image was a strong component in depression, as many women cited it as a personal struggle. The married women have been found to have a higher risk of depression in PCOS, the positive association can be mainly explained as most of the married women experiences infertility problems, and that can be a reason for the increased rate of depression in them^{1, 11, 15}.

The study showed only a few are readily affected by hirsutism and found to be not affecting depression directly in them, unless the previous studies. Many of the studies advised for laser therapy to get rid of unwanted body hairs (hirsutism), which can reduce depressive symptoms on some women. Comorbidities mainly diabetes mellitus and hypothyroidism were found to be striking patients with PCOS,^{10, 11, 13, 16} but here study fail to found an association between these and depression, unlike the previous investigations. As the precursory works been demonstrating infertility problems are a major concern in women with PCOS. In addition to the emotional burden from infertility, the Indian women also feels grater

pressure within their family, marriage and even from the society; which can lead them to lower their self-esteem and feel unworthy which can be a higher reason for depression in them^{15, 17, 18}.

The study indicates that women on OCP treatment have less depression compared to those who are not treating with OCP. This may be because treatment with OCP helps in a correction in menstrual irregularities and also hirsutism. Similar to the results suggested by previous works,¹⁹. The present study found to be having an impact on patient's quality of life questionnaire self-made and validated, which was approving the results that were found out in previous literature^{1, 2, 17, 18}.

CONCLUSION: The study display significance of affixing both physical and psychological complaints in PCOS patients. Overall, the study shows an increased risk of depression in patients with PCOS and age, BMI, marital status, infertility problems, being an earning member and use of OCP was found to be having a significant association with depression. So, the correction of these physical complaints and correction of these factors can help the patients to reduce depression in them as well as to improve quality of life.

The care of individuals with PCOS should include the screening and possible treatment for depression to achieve and sustain treatment goals because the only 1/4th of a patient with depression were aware of their depressive status. Identifying depression early will further improve the quality of life of PCOS patients and also reduce the overall treatment cost, which is generally unaffordable by most individuals with this disease in India.

Limitations of the Study: In this study, all the patients were recruited from one hospital instead of multicentre population, and the patients were from a low economic and educational background. These can influence the results. Secondly, do not have the information on the severity of hirsutism and hence were unable to correlate this with the PHQ score. FSH and LH hormone levels and also the glucose and serum androgen levels are not added to the studies which can furthermore implement more accurate results and can be studied in the future.

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CONFLICT OF INTEREST: Non-declared.

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