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Original Research Article

Prevalence of depression, anxiety and quality of life among North Indian polycystic ovary syndrome women: evidence from a prospective observational study

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common heterogeneous gynaecological endocrine disorder characterized by clinical features including oligo-amenorrhea/ovulatory dysfunction, hyperandrogenism and polycystic ovarian morphology. PCOS increases the risk of depression and anxiety which leads to poor quality of life. Aim of the study were to determine the prevalence of anxiety and depression among women suffering from PCOS and to determine the quality of life (QOL) in PCOS women.

Methods: The study was prospective, observational, non-interventional and questionnaire-based. 192 women with PCOS voluntarily helped in filling the questionnaires consisting of questions using PHQ-9 for depression, GAD-7 for anxiety, SF-12 for general health and PCOSQ-50 for disease-specific domains. All data were recorded in pre-designed case record forms and analysis of data was done using different statistical methods.

Results: Majority of PCOS women were either overweight or obese. Based on PHQ-9 20% of women was suffering with major depression and based on GAD-7, 25% with major anxiety. It is found that psychosocial and emotional domain and coping domain of PCOSQ-50 is significant in patients with major depression and major anxiety. Significant effects were seen on their general health as per SF-12 domain. Lack of physical exercise was found in 83% of women.

Conclusions: PCOS is a complex disease which decreases the overall quality of life. Therefore, treatment of PCOS women should include psychological counselling along-with with medication, especially in obese PCOS women. Women should be educated with the benefits of lifestyle modification in PCOS.

Keyword: PCOS, Anxiety, Depression, QOL

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a complex endocrine disorder of genetic origin, which is usually characterized by disorders in the menstrual cycle, infertility, metabolic syndrome and high level of male hormones. This change in hormones also leads to hirsutism, acne and alopecia.¹⁻³ In the western world, PCOS is a common endocrine disorder and tends to affect 5-10% of women.⁴ In India, 3.7%-22.5% of women are

affected by it as per Indian infertility society.⁵ Several health risks are associated with PCOS, among which the most common are obesity, insulin resistance, type 2 diabetes and changes in lipid profile.⁶⁻⁸ Possible health risks include cardiovascular disease (CVD) and associated risk factors.^{9,10}

Women with PCOS have also been reported to have a higher psychological burden. They experience high rates of anxiety and depression as compared women in the general population.¹¹ It is thus suggested that, by both

international and Indian authorities, women with PCOS must undergo a psychological evaluation, especially for anxiety and depression.⁵ PCOS is not only associated with metabolic consequences but may also influence the quality of life and mental health due to psychological consequences of infertility and other symptoms may also have a negative impact on the quality of life.^{12,13} The incidence of depression in the general population is comparatively lesser (4-6%) than PCOS women, which is much higher (14-67%).⁷ Additionally, PCOS women are also characterized by a higher incidence of other psychological disorders like anxiety, eating disorders and substance abuse.⁹ Two such studies on Indian population investigated the prevalence of anxiety and depression among women with PCOS. The study reported that 28% and 39% anxiety was prevalent in the two studies respectively. And 11% and 25% of women were found to have depression.^{14,15}

Despite these available data, there are no current recommendations for the need of psychological consultation in women with PCOS. There is a lack of data available from Indian settings, regarding the depression and anxiety affecting the quality of life in the patient having PCOS with or without co-morbidity/metabolic disorders.

METHODS

Study design

The study was prospective, observational and questionnaire-based. Single-center study was carried out in the OPD of gynecology and obstetrics department of HAH-C hospital, Jamia Hamdard, New Delhi, India from 15 December, 2017 to 14 April, 2018. Clinical evaluation and diagnosis of PCOS was done as per Rotterdam criteria 2003, which is two out of a) oligo/anovulation and b) clinical and/or biochemical signs of hyperandrogenism and c) Polycystic ovaries.¹⁹

The study protocol was approved by Jamia Hamdard institutional ethics committee (JHIEC), New Delhi, India. This study was carried out in full compliance with the declaration of Helsinki.²⁰ Written informed consent was obtained from all of the participants voluntarily. All participants were assured of their confidentiality and the anonymity of their identity.

Study population

Patient selection was carried out on the basis of pre-defined inclusion and exclusion criteria. Only participants those meeting all the following criteria were included in the study a) Female patients suffering from PCOS with or without co-morbidity between aged grouped 18-40 years and b) Patients who provided written and signed informed consent prior to initiation of the study. In our study we excluded who were not suffering from PCOS, pregnant

women, and those women who were not willing to provide signed informed consent form.

We used modified Kuppaswamy's socioeconomic scale to assess the economic status of the patients. According to this scale, socioeconomic status was categorised into five subscales (upper, upper middle, lower middle, upper lower, and lower) on the basis of education, occupation of head of family, and monthly income of family.

Questionnaire used

PHQ-9: It is a standard questionnaire which assesses depression amongst the patient. It contains 9 questions which related the signs and symptoms of depression.

GAD-7: It is a standard questionnaire which assesses anxiety amongst the patient. It contains 7 questions related to signs and symptoms of anxiety.

SF-12: It is a standard version 2 questionnaire. It is used to assess general health of the patient having PCOS. It contains 12 questions related to both physical and mental health.

PCOSQ-50: It is a disease specific pre-validated questionnaire which assesses the disease specific problems affecting quality of life of patients. It contains 6 domains in it containing psychological and emotional, fertility, sexual function, obesity and menstrual disorders, hirsutism disorders and coping, among which Fertility and sexual dysfunction domains was administered to married patients only.

Data collection

Data were collected based on standardized interviews performed by the research team which was supported by qualified nurses. A written informed consent was obtained, and the participants were informed that they were free to refuse, participate or withdraw at any time without any disadvantage or prejudice. Parents or legal guardians of participants younger than 18 years provided written informed consent on behalf of the participants.

Statistical analysis

The data were pooled and statistically analysed using IBM SPSS 20 software. The sociodemographic profile and the prevalence of the different symptoms of PCOS, anxiety, and depression have been expressed in terms of frequency and percentages. Chi-square test was used to evaluate the statistical significance of differences among proportions of categorical data.

RESULTS

One hundred and eighty two women diagnosed with PCOS from the gynecology and obstetrics department of HAH-C hospital, Jamia Hamdard, New Delhi, India were included

in the study for evaluation. These females belonged in the age group of 18–40 years. The sociodemographic profile of the population is presented in Table 1. The 99 (51.56%) of 192 women were found to be obese, waist hip ratio (WHR) ratio was found to be more than 0.85 in 75.65% of the population. 104 patients were evaluable for fertility and 27 of them were assessed to be infertile. The 190 patients were found with polycystic ovary, after undergoing ultrasound and have irregular menses. Other prevalent symptoms were hirsutism (in 82 patients) and acne (in 49 patients). More characteristic attributes of the disease in the population are presented in Table 2.

Amongst the enrolled population, a lack of physical exercise (159 of 192) was also observed. The 58 patients were found to have more of a junk diet and 74 patients experience disturbed and/or late-night sleep. More lifestyle-related attributes are presented in Table 3.

Prevalence of anxiety and depression

Of the 192 women enrolled in study 39 (20%) were found to be in major depression according to the PHQ-9 scale (PHQ score ≥ 10 for major depression). It was observed that 61.5% (24 women) of the women with major depression were obese while 49% (n=74) of the women without major

depression was obese (Table 4). 53.8% (21 women) were found to be at the risk of developing a behavioural eating disorder in women with major depression, while 42.4% (65 women) were at the same risk in the population without major depression. Major anxiety (according to PHQ-9) was also found to be more, 71.7% (28 women), in women with major depression than women without major depression (7.1%).

About 25% (47 women) of the population were found to have major anxiety, according to GAD 7 scale (GAD score ≥ 10 corresponds to major anxiety). It was observed that 53.1% (25 women) of women with major anxiety was obese while 51% (n=74) of women without major anxiety were obese (Table 5). 51% (24 women) were found to be at the risk of developing a behavioural eating disorder in women with major anxiety, while 42.7% (62 women) were at the same risk in the population without major anxiety. Major depression (according to GAD-7) was also found to be more, 60% (28 women), in women with major depression than women without the major depression (7.5%).

Quality of life of women with PCOS, analysing general, psychological and sexual health, shows in the Table 4 and 5.

Table 1: Socio-demographic characters of the study population, (n=192).

Distribution of patients	No. of patients	Percentage (%)
Age distribution (years)		
18-20	32	16.67
21-25	95	49.48
26-30	49	25.52
31-35	12	6.25
36-40	4	2.08
Education		
Illiterate	7	3.65
Middle school	9	4.68
High school	33	17.19
Higher secondary school	41	21.35
Graduate degree	69	35.94
Post graduate degree	33	17.19
Socioeconomic status		
Lower	11	5.73
Upper lower	55	28.65
Lower middle	40	20.83
Upper middle	71	36.98
Upper	15	7.81
Category of BMI (kg/m²)		
Lean (BMI<18)	7	3.65
Normal weight (BMI=18-22.99)	86	44.79
Overweight (BMI=23-27.4)	47	24.48
Obese (BMI=27.5-37.5)	49	25.52
Extremely obese (BMI>37.5)	3	1.56
Marital status		
Single	88	45.83
Married	104	54.17

Table 2: Anthropometric measurement of the patients.

Anthropometric measurements	Mean \pm SD
Height (m)	1.54 \pm 0.05
Weight (kg)	59.5 \pm 11.9
BMI (kg/m²)	24.88 \pm 4.55
Waist circumference (cm)	81.68 \pm 11.70
Hip circumference (cm)	35.6 \pm 3.69
WHR	0.90 \pm 0.006

Table 3: Characters of patients attributing to the diseases, (n=192).

Distribution of characters	No. of patients	Percentage (%)	Mean \pm SD	P value
BMI (kg/m²)				
Less than 23 (non-obese)	93	44.44	24.88 \pm 4.53	<0.0001
23 and more (Obese)	99	51.56		
Waist circumference (cm)				
Less than 88	144	75	81.68 \pm 11.70	<0.0001
88 and more	48	25		
WHR				
Less than 0.85	45	23.44	0.90 \pm 0.66	<0.0001
0.85 and more	147	76.56		
BP (mmHg)				
Systole			115.55 \pm 9.611	
Diastole			77.34 \pm 5.70	
Menarche				
Early menarche	63	32.81	13.35 \pm 1.40	
Normal menarche	119	61.98		
Late menarche	10	5.21		
Infertility status, (n=104)				
Yes	77	74.04		
No	27	25.96		
PCOD status				
Polycystic ovary in USG	190	98.95		
Oligomenorrhoea/ Irregular menses	190	98.95		
Hirsutism	82	42.17		
Acne	49	25.52		
Presence of comorbid	99	51.56		

Table 4: Characters attributing impact to lifestyle of patients, (n=192).

Distribution of characters	No. of patients	Percentage (%)
Exercise		
Yes	33	17.19
No	159	82.81
Diet		
Normal diet	103	53.65
Junk diet	58	30.21
Dieting behaviour	31	16.14
Sleep pattern		
Normal	118	61.46
Disturbed/ Late night	74	38.54
Sleep duration (Hours)		
Less than 6	25	13.02
6-8	161	83.85
More than 8	6	3.13

Table 5: Comparison of clinical features between women with major depression (PHQ-9 score \geq 10) and without major depression (PHQ-9 score $<$ 10).

Variables	With major depression, (n ₁ =39)	Without major depression, (n ₂ =153)	P value
BMI (kg/m²)			
Non-obese	15	78	0.1
Obese	24	75	
Marital status			
Single	15	73	0.3
Married	24	80	
Infertility	19	58	0.4
Hirsutism	21	61	0.1
Have eating disorder			
At risk of eating disorder	13	10	0.05
At risk of behavioral eating disorder	21	65	0.2
At risk of dementia	16	51	0.3
Have comorbidities	26	73	0.05
Major anxiety	28	11	0.001
SF-12	Mean\pmSD	Mean\pmSD	
Physical functioning (PF)	45.51 \pm 30.81	76.14 \pm 29.01	0.001
Role physical (RP)	41.34 \pm 31.56	69.52 \pm 26.04	0.001
Body pain (BP)	61.53 \pm 31.33	79.90 \pm 24.17	0.001
General health (GH)	32.05 \pm 25.22	53.82 \pm 21.57	0.001
Vitality (VT)	34.61 \pm 22.66	55.22 \pm 22.14	0.001
Social functioning (SF)	58.33 \pm 27.10	88.23 \pm 18.81	0.001
Role emotional (RE)	31.73 \pm 26.41	61.84 \pm 26.96	0.001
Mental health (MH)	41.67 \pm 19.09	65.19 \pm 21.60	0.001
Physical health (PCS)	43.34 \pm 10.95	50.30 \pm 7.74	0.001
Mental health (MCS)	33.47 \pm 9.13	45.05 \pm 10.06	0.001
PCOSQ-50			
Psychosocial and emotional	2.85 \pm 0.67	3.57 \pm 0.53	0.001
Fertility, (n=104)	1.74 \pm 1.57	1.74 \pm 1.81	0.9
Sexual function, (n=104)	2.01 \pm 1.79	2.21 \pm 2.20	0.5
Obesity and menstrual disorders	2.93 \pm 0.91	3.38 \pm 0.82	0.001
Hirsutism disorders	3.33 \pm 1.44	3.80 \pm 1.29	0.05
Coping	3.19 \pm 0.75	3.64 \pm 0.79	0.001

Table 6: Comparison of clinical features between women with major anxiety (GAD score \geq 10) and without major anxiety (GAD score $<$ 10).

Variables	With major anxiety, (n ₁ =47)	Without major anxiety, (n ₂ =145)	P value
BMI (kg/m²)			
Non-obese	22	71	0.7
Obese	25	74	
Marital status			
Single	18	70	0.2
Married	29	75	
Infertility	4	23	0.07
Hirsutism	22	60	0.5
Have eating disorder			
At risk of eating disorder	7	16	0.4
At risk of behavioral eating disorder	24	62	0.3
At risk of dementia	17	50	0.8
Have comorbidities	26	73	0.5
Major depression	28	11	0.001

Continued.

Variables	With major anxiety, (n ₁ =47)	Without major anxiety, (n ₂ =145)	P value
SF-12	Mean±SD	Mean±SD	
Physical functioning (PF)	55.85±32.64	74.48±30.25	0.001
Role physical (RP)	51.06±32.95	67.93±27.07	0.001
Body pain (BP)	65.95±30.58	79.48±24.59	0.002
General health (GH)	35±24.78	54.06±1.81	0.001
Vitality (VT)	42.02±25.05	53.96±22.56	0.002
Social functioning (SF)	61.17±26.99	88.96±18.37	0.001
Role emotional (RE)	32.44±23.26	63.27±27.21	0.001
Mental health (MH)	42.02±18.13	66.37±21.37	0.001
Physical health (PCS)	46.67±11.56	49.61±7.78	0.05
Mental health (MCS)	33.27±8.27	45.75±9.87	0.001
PCOSQ-50			
Psychosocial and emotional	2.88±0.61	3.60±0.53	0.001
Fertility, (n=104)	1.53±1.37	1.81±1.87	0.3
Sexual function, (n=104)	1.99±1.76	2.22±2.23	0.5
Obesity and menstrual disorders	3.02±0.86	3.37±0.83	0.01
Hirsutism disorders	3.57±1.41	3.74±1.31	0.4
Coping	3.10±0.65	3.70±0.79	0.001

*p<0.05=significant, **p<0.01=more significant, ***p<0.001=highly significant

DISCUSSION

The results of our study suggest that the majority of women with PCOS are obese (51.56%) and have abdominal obesity (76.56%). Menstrual irregularities (98.95%), acne (25.52%) and hirsutism (42.17%) were the important issues reported by women with PCOS. Similar finding was also seen in the study done by Cronin et al reported that the main problems for the women affected by PCOS were hirsutism (90%), obesity (84%), menstrual disorders (82%), and difficulty maintaining their body weight (80%).²¹

In this study, women with PCOS are at high risk of mental disorders and reduced QOL as more than half of the study population experienced depression and anxiety scored from mild to severe. Approximately 20% and 25% women are having major depression and major anxiety respectively which forms the cut-off for consulting psychological and psychiatric professionals. This study found strong association between depression and anxiety as the result is highly significant (p<0.001). This finding is similar to another recent study carried out in by Stapinska-Syniec et al and Sulaiman et al.^{3,12} Our findings correspond with the other literature also, where the prevalence of depressive symptoms in women with PCOS ranges from 14% to 67%.¹⁸ The most common mental problem that affected half of the study group was depression. Several other studies have also confirmed the increased incidence of depression in women with PCOS compared to age-adjusted controls.^{22,23} Women with PCOS with major depression in our study population had excess body weight that is either they are overweight or obese. Similar is the result for anxiety in this study that only 25 (13.02%) obese women correspond with major anxiety.

Prevalence of infertility status was found higher amongst women who lead to psychological problems at some stage of their life.²⁴ Infertility causes family tensions and problems at work, while obesity in PCOS women is responsible for a general state of depression and dissatisfaction.^{25,26} Infertility is a frequently encountered problem in patients with PCOS that could contribute to an increase in the incidence of depression. Deeks et al showed that 64% of fertile and 81% of infertile women with PCOS reported moodiness. The ratios of clinically confirmed depression diagnosis were significantly lower (28% vs. 40%, respectively).²⁷ In a population of 1741 women with PCOS, primary infertility occurred in one in two, whereas secondary infertility in every fourth participant.²⁸ Similar findings were present in this study also but majority of them were having primary infertility. Studies indicate that women with PCOS who have been unable to get pregnant or have experienced recurrent miscarriages often complained of reduced libido, which constituted additional source of sexual stress.¹² However, the effect of infertility on mood impairment remains undetermined. Dokras et al. did not find any significant discrepancies in the BDI scores between women with and without infertility.⁶ Similarly, in a study carried out by Stapinska-Syniec et al infertility was identified in one-third of depressed women and the same proportion was observed in respondents with normal BDI scores, which suggest that infertility is not an isolated risk factor for depression in women with PCOS.²⁹

The reduced quality of sexual life in women with PCOS is gaining recognition among researchers.^{30,31} In this study average score of sexual function do not indicate poor or negative result. In a study by Stapinska-Syniec et al approximately a third of all respondents assessed the level of their sexual satisfaction as low and no relationship between the presence of hirsutism and low sexual

satisfaction was found.²⁹ In this study, no significant result is seen for sexual function domain of PCOSQ-50.

In this study population, majority of women have anxiety scored as mild, moderate or severe and 24.48% of the respondents reported with major anxiety disorders. Dokras et al reported similar results and stressed a significantly higher incidence of anxiety disorders in women with PCOS compared to the general population (14% vs. 1%).⁶ In case of depression, majority of women were found to have mild to severe anxiety. Obesity and menstrual disorder domain of PCOSQ-50 was found highly related to major depressive women. Similarly, in this study also, women reported eating disorder association with depression but not anxiety. Risk of eating disorder and risk of behavioral eating disorder was more in patients having major depression. Therefore, it is suggested that these patients should consult professional help for further confirmation of eating disorder.

Obese women with PCOS, as well as women lacking adequate family support and dissatisfied with their sexual life may be the group that would benefit the most from such an intervention.³² Moreover, repeated evaluations of the patient's QOL and coping mechanisms over a long period of time could facilitate early diagnosis of psychological disturbances.³³ Therefore, we would like to emphasize that the therapy of women with PCOS should be comprehensive and ideally include psychological and in some cases psychiatric consultations.

Study strength

Strength of the current study was absence of protocol violations and objectively measured primary outcome. Although this study contributes valuable evidence to the literature. Additionally, data gathered from this study will be useful for health policy maker and in formulation of national guidelines.

Limitations

Firstly, this is a prospective observation study without a single follow up. Secondly, actual correlation with anxiety and depression were not been identified.

CONCLUSION

In conclusion, our study found high prevalence of PCOS among patients visiting outpatient department. PCOS are increasing day by day which may have serious negative impact on women's health and affecting overall QoL. In order to combat this situation, promotion on large-scale involving women health educational interventions should be undertaken. High prevalence of depression, anxiety, dementia and eating disorder were found amongst the patients. Thus, an appropriate multidisciplinary approach towards psychological management, safety and efficacy of the treatment through health education and counselling should be implemented.

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