

ASSESSMENT OF THE RISK FACTORS, EFFECTS, IRRITABILITY, AND DEPRESSION IN WOMEN WITH AND WITHOUT PCOS

¹DR.K.EHWENDAR REDDY, ²P.LOHITHA, ³VARAKALA ABHISHIKTHA, ⁴CHILUKURIN REVATHI

¹Professor, ^{2,3}Assistant Professor, ⁴UG Student, ^{1,2,3,4}Department of Pharmacy, Brilliant Grammer School Educational Society Group of Institutions-Integrated Campus, Hyderabad, India.

ABSTRACT

Background: The most common endocrine condition in women of reproductive age is polycystic ovary syndrome. Estimates of PCOS prevalence in this age group throughout the world range from 2.2% to 26%. Menstrual irregularities, indications of hyperandrogenism such as acne, hirsutism, alopecia, infertility, and acanthosis nigricans, of which hirsutism is most frequently seen, are all characteristics of PCOS.

The purpose of this study is to evaluate, contrast, and compare the risk factors, effects, anxiety, and depression in women with and without PCOS.

Techniques: - This cross-sectional study was carried out in the gynaecological outpatient clinics at a KIM'S ICON hospital between DECEMBER 2021 and MAY 2022. 70 women with PCOS were participants in the study, and 70 healthy women served as volunteers. Data were gathered from individuals using self-reported questionnaires, including sociodemographic traits, risk factors, consequences, as well as anxiety and depression, measured with the Quick Inventory of depressive symptomatology-16, Beck's anxiety inventory (BAI). The responses were entered into an excel workbook and were analyzed statistically using the Chi-square test.

Result: - Women with PCOS were slightly younger and on average had higher significant association of BMI ($p=0.001$), cravings for sweets, drinks, junk food ($p=0.000038$), weight gain ($p<0.00001$), physical activities ($p=0.01$), menstrual irregularities ($p<0.00001$), hirsutism ($p<0.00001$), alopecia ($p<0.00001$), acanthosis nigricans ($p=0.01$), anxiety ($p<0.00001$) and depression ($p=0.000098$) compared to non-PCOS women.

Conclusion: - Participants in our study had a higher BMI, cravings for sweets, drinks, junk food, weight gain, menstrual irregularities, hirsutism, alopecia, acanthosis nigricans, sleep problems, anxiety, and depression when compared to those without PCOS.

Key words: - PCOS, Risk factors, Consequences, Sleep disturbances, Anxiety and Depression.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is the commonest endocrine disorder in females of reproductive age [1].

Globally, prevalence estimates of PCOS are highly variable, ranging from 2.2% to 26% for this age group depending on how it is defined [6]. In 2012, the World Health Organization (WHO) estimated that PCOS affected 116 million women worldwide (3.4%) [7]. The Beck Anxiety Inventory BAI has been widely used in clinical research in mental health care, mainly as a measure of general anxiety [15].

METHODOLOGY

STUDY DESIGN: A Cross-Sectional Study

STUDY SITE: This study was conducted at Krishna Institute of Medical Sciences, Sheelanagar, and Visakhapatnam.

STUDY DURATION: 6 months (DECEMBER 2021 - MAY 2022).

SAMPLE SIZE: - 140 Cases.

The study included 70 gynecology outpatients between the ages of 15-40 diagnosed with PCOS according to the Rotterdam criteria and 70 healthy women without PCOS as the control group.

ETHICAL CONSIDERATION: The project was approved by the Institution of Ethical committee.

STUDY PARTICIPANT:

Inclusion criteria:

- ✓ People at the age of 15 – 40 years.
- ✓ Females.
- ✓ Both with and without PCOS population.
- ✓ People who are willing to participate in the study.
- ✓ People with ovulatory dysfunction.
- ✓ People who have signs and symptoms of PCOS.

Exclusion criteria:

- ✓ People who are not cooperative.
- ✓ People with hyperprolactemia, thyroid abnormalities, congenital adrenal hyperplasia.
- ✓ People with infertility problems.
- ✓ Co-morbidities like diabetes, cardiovascular diseases, and hypertension.
- ✓ People with other androgen excesses/ related disorders.

SAMPLING TECHNIQUE

Convenient samples.

STUDY INSTRUMENTS

To assess the risk effect in PCOS and NON-PCOS populations, we used 3 different questionnaires based on clinical features and two scales (including Anxiety and Depression).

- BECK ANXIETY INVENTORY.
- QUICK INVENTORY OF DEPRESSIVE SYMPTOMATOLOGY-SELF-REPORT-16.

BECK ANXIETY INVENTORY PURPOSE

This scale is a self-report measure of anxiety.

CONTENT: - The BAI consist of '21 ITEMS' perception of the impact on the different aspects of the people's health over the last month.

- Numbness/ tingling,
- Wobbliness in legs
- Feeling hot,
- Difficulty standing up,
- Unable to relax,
- Fear of the worst happening,
- Dizzy,
- Strong, fast heartbeat,
- Unsteady,
- Terrified (or) afraid,
- Nervous,
- Shaking hands,
- Fear of losing control,

- Difficulty in breathing,
- Fear of dying,
- Scared,
- Indigestion,
- Faint,
- Face flushed,
- Hot/ cold sweats

SCORING

	Not At All	Mildly but it didn't bother me much	Moderately -it wasn't pleasant at times	Severely -it bothered me a lot
All questions	0	1	2	3

The scoring is calculated manually by summing each question and resulting in a maximum of 36 and a minimum of 0.

INTERPRETATION

The total score is calculated by finding the sum of the 21 items. Score of 0 – 21 = low anxiety

Score of 22 – 35 = moderate anxiety

A score of 36 and above = potentially concerning levels of anxiety

RELIABILITY:

Internal consistency for the BAI = (Cranach's $\alpha=0.92$)

Test-retest reliability (1 week) for the BAI = 0.75 (Beck, Epstein, Brown, & Steer, 1988).

QUICK INVENTORY OF DEPRESSIVE SYMPTOMATOLOGY – SELF REPORT-16[18].

PURPOSE: - This scale is a self-report measure of depression.

CONTENT: - Questions in the QIDS – SR-16 correlate with the nine DSM-IV symptom criterion domains, including: Sleep disturbance (initial, middle, and late insomnia or hypersomnia) (Q 1 - 4), Sad mood (Q 5), Decrease/increase in appetite/weight (Q 6 - 9), Concentration (Q 10), Self-criticism (Q 11), Suicidal ideation (Q 12), Interest (Q 13), Energy/fatigue (Q 14), Psychomotor agitation/retardation (Q 15 - 16).

VALIDITY: The QIDS-SR16, IDS-SR30, and HAM-D24 had similar sensitivity in detecting a change in symptoms. This suggests these three scales have high concurrent validity.

SCORING:

1. Enter the highest score on any 1 of the 4 sleep items (1-4)
2. Enter score on item 5
3. Enter the highest score on any 1 of the appetite/weight items (6-9)
4. Enter score on item 10
5. Enter score on item 11
6. Enter score on item 12
7. Enter score on item 13
8. Enter score on item 14
9. Enter the highest score on either of the 2 psychomotor items (15 and 16).

The scoring is calculated manually by summing of each question and resulting maximum 27 and minimum 0.

INTERPERTATION

Severity of depression can be judged based on the total score. 1-5 = Normal/ no depression.

6-10 = Mild depression.

11-15 = Moderate depression. 16-20 = Severe depression

21-27 = Very severe depression.

RELIABILITY: Internal consistency for the QIDS-SR16 = (Cronbach’s $\alpha=0.86$) QIDS-SR16 scores correlated highly with IDS-SR30 (.96) and HAM-D24 (.86) scores.

DATA COLLECTION

In this study, the data collection begins by introducing ourselves to the patient. The aims and objectives of our research study will be clearly explained to the patient and the patients who are willing to participate will be asked to sign the “patient consent form” so that, the further procedure will be proceeded.

Collection of data is done in two phases. They are:

Phase-1: DEMOGRAPHIC DETAILS

In demographic details, we will include age, gender, marital status, BMI, family history, age of menarche.

Phase-2: CLINICAL DATA

Clinical data includes symptoms like lower abdominal pain, acne, hirsutism, alopecia, acanthosis, menstrual irregularities, duration of menstrual periods, gap of menstruation, period flow, duration of sleep, anxiety (during one month, including today) and depression (during past seven days).

Phase-3: LIFE STYLE CHANGES

We will include life style changes like physical activity, sleep pattern (during past seven days), dietary and food habits.

DATA ANALYSIS

The qualitative data was represented as frequencies and percentages. Mean and standard deviation or median and interquartile range, whichever is appropriate, was used to describe the quantitative data using the Chi-square test, the association between socio-demographic characteristics and risk factors, consequences, BAI, and QIDS-SR scale. The level of significance was considered at $p<0.05$. Jeffrey’s Amazing Statistical Programmes (JASP, version 0.16.0) was used for the analysis.

Results

There were a total of 140 females participating in the study. During the study, 70 of the participants who fulfilled the European Society for Human Reproduction and Embryology/American Society for Reproductive Medicine (ESHRE/ASRM) or the 'Rotterdam Criteria' for PCOS were categorized as PCOS, and the remaining 70 participants were classified as non-PCOS. The study found that women with PCOS were slightly younger and had higher BMIs, cravings for sweets, drinks, junk food, weight gain, menstrual irregularities, hirsutism, alopecia, and acanthosis nigricans, anxiety, and depression in comparison to women without PCOS.

Table 1: The demographic characteristics for women with and without PCOS.

S.NO	CHARACTERISTIC	PCOS	NON PCOS	P-VALUE
		Mean ± std deviation	Mean ± std deviation	
1	AGE	23.543 ± 4.66	9.300 ± 1.564	<0.00001
2	HEIGHT	158.173 ± 7.20	157.571 ± 7.607	0.483 ^a 0.385 ^b
3	WEIGHT	61.261 ± 13.30	53.577 ± 7.743	0.116 ^a 0.466 ^b

4	BMI	24.506 ± 4.804	21.594 ± 3.070	0.084 ^a 0.627 ^b
5	AGE OF MENARCHE			0.39
	11-13 YEARS	36 (51.42)	29 (41.42)	
	13-15 YEARS	27 (38.57)	35 (50.00)	
	15-18 YEARS	7 (10.00)	6 (8.57)	
6	MARITAL STATUS			<0.00001
	MARRIED	26 (37.14)	1 (1.42)	
	UNMARRIED	44 (62.85)	69 (98.57)	

a- p value of PCOS

b- p value of NON- PCOS

*Chi square test (X²) *Level of significant at P value <0.05 Table1 show that, mean age was found to be 23.543 years (SD4.665) in PCOS women and 19.300 years (SD 1.564) in non-PCOS women. Mean height was found to be 157.000 cms(SD7.202) in PCOS women and 157.571 cms (SD 7.607) in non-PCOS women. Mean weightwas found to be 61.26 kgs (SD 13.307) in PCOS women and 53.577 kgs (SD 7.743) in non-PCOSwomen.MeanBMIwasfoundtobe24.506kg/m²(SD4.804)inPCOSwomenand 21.594kg/m²(SD3.070)innon-PCOSwomen.

Table 2: Association between risk factors and PCOS vs. NON PCOS.

S.NO	RISK FACTORS	PCOS (n=70) (n) (%)	NON PCOS (n=70) (n) (%)	TOTAL (N=140)	P- VALUE
1	CRAVINGS FOR SWEETS, DRINKS, JUNK FOOD				0.000038
	YES	65 (92.85)	45 (64.28)	110	
	NO	5 (7.14)	25 (35.71)	30	
2	WEIGHT GAIN				< 0.00001
	YES	50 (71.42)	17 (24.28)	67	
	NO	20 (28.57)	53 (75.71)	73	
3	PHYSICALACTIVITY				0.01
	INACTIVE	41 (58.57)	31 (44.28)	72	
	LOW	21 (30.00)	17 (24.28)	38	
	MODERATE	6 (8.57)	21 (30.00)	27	
	HIGH	2 (2.85)	1 (1.42)	3	
4	FAMILY HISTORY				0.06
	YES	15 (21.42)	7 (10.00)	22	
	NO	55 (78.57)	63 (90.00)	118	
	SLEEP DURATION				
	<6 HOURS A DAY	31 (44.28)	20 (28.57)	51	

5	>6 HOURS A DAY	39 (55.71)	50 (71.42)	89	0.05
6	BMI				0.001
	UNDERWEIGHT	11 (15.71)	10 (14.28)	21	
	NORMAL	25 (35.71)	48 (68.57)	73	
	OVERWEIGHT	26 (37.14)	10 (14.28)	36	
	OBESE CLASS I	6 (8.57)	1 (1.42)	7	
	OBESE CLASS II	2 (2.85)	1 (1.42)	3	

*Chi square test (X²)

*Level of significant at P value <0.05

Table 2 shows a higher significant association between cravings for sweets, drinks, and junk food, weight gain, BMI with PCOS compared with non-PCOS women.

Compared with women without PCOS, PCOS women are less involved in daily physical activity.

Family history of PCOS in women showed a non-significant association between PCOS and non-PCOS with a p-value of 0.06.

Sleep duration in women showed a equal significant association between hours of sleep per day and PCOS when compared to non-PCOS

Table 3: Association between consequences and PCOS vs. NON PCOS.

S.NO	CONSEQUENCES	PCOS(n=70) (n) (%)	ON PCOS (n=70) (n) (%)	TOTAL (N=140)	P-VALUE
1	MENSTRUAL PROBLEM				< 0.00001
	REGULAR	2 (2.85)	46 (65.71)	48	
	AMENORRHEA	14 (20.00)	6 (8.57)	20	
	MENORRHAGIA	16 (22.85)	5 (7.14)	21	
	OLIGOMENORRHEA	35 (50.00)	12 (17.14)	47	
	UNUSUAL BLEEDING	3 (4.28)	1 (1.42)	4	
2	MENSTRUAL GAP				< 0.00001
	1-1.5 MONTHS	18 (25.71)	63 (90.00)	81	
	1.5-2 MONTHS	15 (21.42)	2 (2.85)	17	
	2-2.5 MONTHS	20 (28.57)	4 (5.71)	24	
	>2.5 MONTHS	17 (24.28)	1 (1.42)	18	
3	PERIOD FLOW				0.00002
	LOW	4 (5.71)	5 (7.14)	9	
	NORMAL	35 (50.00)	58 (82.85)	93	
	EXCESS	31 (44.28)	7 (10.00)	38	
4	DURATION OF MENSTRUAL PERIOD				0.0004
	<3 DAYS	9 (12.85)	6 (8.57)	15	
	3-6 DAYS	39 (55.71)	60 (85.71)	99	
	6-9 DAYS	11 (15.71)	3 (4.28)	14	
	>9 DAYS	11 (15.71)	1 (1.42)	12	
	ACANTHOSIS NIGRICANS				

5	YES	42 (60.00)	27 (38.57)	69	0.01
	NO	28 (40.00)	43 (61.42)	71	
6	ALOPECIA				< 0.00001
	YES	50 (71.42)	23 (32.85)	73	
	NO	20 (28.57)	47 (67.14)	67	
7	HIRUSTISM				< 0.00001
	YES	31 (44.28)	5 (7.14)	36	
	NO	39 (55.71)	65 (92.85)	104	
8	ACNE				0.59
	MILD	26 (37.14)	28 (40.00)	54	
	MODERATE	14 (20.00)	14 (20.00)	28	
	SEVERE	4 (5.71)	1 (1.42)	5	
	NO	26 (37.14)	27 (38.57)	53	
9	PELVIC PAIN DURING MENSTRUATION				0.05
	YES	56 (80.00)	46 (65.71)	102	
	NO	14 (20.00)	24 (34.28)	38	

*Chi square test (X²)

*Level of significant at P value <0.05

Table 3 shows that menstrual irregularities, menstrual gap, periodic flow, duration of menstrual period , hirsutism, alopecia, acanthosis nigricans have a significant association with PCOS.

Acne showed a non-significant association with PCOS and non-PCOS women with a p-value of 0.59.

Pelvic pain during menstruation has an equally significant association between PCOS and non-PCOS women (p-value0.05).

Table 4: Association between anxiety and depression and PCOS vs. NON PCOS.

S.NO	SCALES	PCOS(n=70) (n) (%)	ON PCOS(n=70) (n) (%)	TOTAL (N=140)	P-VALUE
1	BAI				< 0.00001
	MINIMAL	12 (17.14)	37 (52.85)	49	
	MILD	22 (31.42)	22 (31.42)	44	
	MODERATE	25 (35.71)	7 (10.00)	32	
	SEVERE	11 (15.71)	4 (5.71)	15	
2	QIDS-SR				0.000098
	NORMAL	8 (11.42)	31 (44.28)	39	
	MILD	21 (30.00)	22 (31.42)	43	
	MODERATE	28 (40.00)	12 (17.14)	40	
	SEVERE	10 (14.28)	4 (5.71)	14	
	VERY SEVERE	3 (4.28)	1 (1.42)	4	

*Chi square test (X²)

*Level of significant at P value <0.05

Table 4 shows that both anxiety and depression had higher association with PCOS vs. non-PCOS.

Table 5: Categorization of QIDS-SR – 16 in PCOS vs. NON PCOS

S.NO	DOMAIN	PCOS(n=70) (n) (%)	ON PCOS(n=70) (n) (%)	TOTAL (N=140)	P VALUE
1	SLEEP DISTURBANCES				0.002
	NORMAL	3 (4.28)	14 (20.00)	17	
	MILD	7 (10.00)	15 (21.42)	22	
	MODERATE	30 (42.85)	23 (32.85)	53	
	SEVERE	30 (42.85)	18 (25.71)	48	
2	SAD MOOD				0.95
	NORMAL	25 (35.71)	22 (31.42)	47	
	MILD	29 (41.42)	32 (45.71)	61	
	MODERATE	10 (14.28)	10 (14.28)	20	
	SEVERE	6 (8.57)	6 (8.57)	12	
3	APPETITE AND WEIGHT DISTURBANCES				< 0.00001
	NORMAL	10 (14.28)	30 (42.85)	40	
	MILD	21 (30.00)	30 (42.85)	51	
	MODERATE	20 (28.57)	6 (8.57)	26	
	SEVERE	19 (27.14)	4 (5.71)	23	
4	CONCENTRATION/DECISION MAKING				0.46
	NORMAL	34 (48.57)	32 (45.71)	66	
	MILD	16 (22.85)	12 (17.14)	28	
	MODERATE	16 (22.85)	17 (24.28)	33	
	SEVERE	4 (5.71)	9 (12.85)	13	
5	GUILT				0.17
	NORMAL	37 (52.85)	46 (65.71)	83	
	MILD	17 (24.28)	8 (11.42)	25	
	MODERATE	5 (7.14)	6 (8.57)	11	
6	SUICIDAL IDEATION				0.54
	NORMAL	51 (72.85)	58 (82.85)	110	
	MILD	15 (21.42)	9 (12.85)	24	
	SEVERE	1 (1.42)	1 (1.42)	2	
7	GENERAL INTEREST				
	NORMAL	37 (52.85)	41 (58.57)	78	
	MILD	19 (27.14)	19 (27.14)	38	
	MODERATE	11 (15.71)	9 (12.85)	20	

	SEVERE	3 (4.28)	1 (1.42)	4	0.70
8	ENERGY/FATIGUE				0.01
	NORMAL	25 (35.71)	39 (55.71)	64	
	MILD	33 (47.14)	29 (41.42)	62	
	MODERATE	8 (11.42)	1 (1.42)	9	
	SEVERE	4 (5.71)	1 (1.42)	5	
9	PSYCHOMOTOR CHANGES				0.03
	NORMAL	31 (44.28)	34 (48.57)	65	
	MILD	18 (25.71)	10 (14.28)	28	
	MODERATE	14 (20.00)	8 (11.42)	22	
	SEVERE	7 (10.00)	18 (25.71)	25	

*Chi square test (X^2)

*Level of significance at P value <0.05

Table 5 shows that in our study, there is a higher significant association between appetite and weight disturbances ($p < 0.00001$), a significant association with sleep disturbances, energy /fatigue, psychomotor changes ($p = 0.002, p = 0.01, p = 0.03$), not significant association with sad mood, concentration/decision making, guilt, general interest, suicidal ideation ($p = 0.95, p = 0.46, p = 0.17, p = 0.70, p = 0.54$).

DISCUSSION

In recent years, lifestyle modifications have significantly increased the prevalence of PCOS amongst women. The signs and symptoms of PCOS include irregular menstruation, hair growth problems, diabetes, weight gain, acne, skin pigmentation, stress, mood swings, and hormonal imbalance [10]. The appearance of these symptoms indicates the possibility of the presence of PCOS in the individual affected. Hence, the questionnaire was prepared based on the symptoms listed above.

140 females willingly participated and the responses were recorded and collected from them. Of those, 70 participants were from the PCOS group and 70 from the non-PCOS group.

In previous studies, only 14.67% of women consumed junk food rarely, but 27.54 % consumed junk food regularly. In addition, 57.78 % of respondents said they occasionally consume junk food [20]. A majority of participants in the PCOS [60 (86.9%)] and non-PCOS [170 (93.9%)] groups consumed fast food diet less than or equal to 3 days a week, and only 9 and 11 participants consumed fast food diet more than 3 days in a week, respectively, in the PCOS and non-PCOS groups [21].

In our study, we found that cravings for junk food are higher among women with PCOS (92.85%) than in women without PCOS (64.28%). A significant association exists between food habits and PCOS (P-value 0.000038). Researchers found that participants who ate fast food for more than three days/week had 1.7 times more risk of developing PCOS compared to those who ate fast food for less than three days/week and that this risk was statistically significant ($p = 0.044$) [21].

Earlier studies found that significantly more patients with PCOS reported low physical activity than the control group (41.67 vs. 6.06%, respectively; $p = 0.001$ and 32.79% vs. 5.71%; $p = 0.003$). In our study, we found that women with PCOS were less physically active [21 (30.00%)], moderately active [6 (8.57%)], highly active [2 (2.85%)], and physically inactive [41 (58.57%)]. Moreover, we also observed that physical activities in women without PCOS were lower active [17 (24.28%)], moderately active [21 (30.00%)], highly active [1 (1.42%)], and actually physically inactive [31 (44.28%)]. There is a significant association between physical activity and PCOS with a p-value of 0.014.

An earlier study showed that the majority of study participants in both groups exercised as little as one day per week to as much as all seven days. A statistically significant difference ($p=0.998$) does not exist between the percentages of individuals engaged in physical activity less than three days per week and those who engage in physical activity for more than three days per week. Between the two groups, the risk of developing PCOS was almost equal [21].

In our current literature, 17.2% of women are obese, and 34.5% are overweight, i.e., more than 50% of the sample had a high BMI [32].

A study of women with PCOS in this population found no increased risk of prediabetes or type 2 diabetes. According to our study, women with PCOS have normal weight [25(35.71%)], underweight [11(15.71%)], overweight [26(37.14%)], obese class-1 [6(8.57%)] and obese-2 [2(2.85%)] while non-PCOS women have no change in BMI (kg/m^2). The weight gain in women showed a higher significant association with PCOS women [50(71.42%)] than non-PCOS [17(24.28%)] women with a p -value <0.00001 .

According to a previous study, when asked about their menstrual history, the mean cycle length was 21.56 ± 3.28 days, and the majority of women had a cycle length of 21-35 days (64.37%), <21 days (8.9%), 35-60 days (23.35%) and >60 days (1.49%). Among all participants, 35.6% experienced a change in cycle length in the past six months. Around 9% of respondents reported frequent cycles (<21 days), 24.8% reported delayed cycles (>35 days), 1.5% reported scanty flow, and 0.3% reported heavy flow [20]. Another study reported that the length of periods with a gap of 2 months is most common with 30.9%, followed by 3 months with 28.2% and 1 month with 24.5%. Duration of the period flow varies, but the most common definition is 5 days for 34.5% of the patients. Among the patients, 49.1% had normal period flow, 31.8% had excess flow, and 19.1% had scanty (low) period flow. In the overall study population, 77.3% reported irregular menstrual cycles, of which 50.7% for a few months, 35.5% for 1-5 years, and 13.6% for more than 5 years. A regular menstrual cycle was experienced by 22.7% of women. In 44.5% of the patients, secondary amenorrhea was observed, while in 67.3% of the patients, oligomenorrhea was observed. As a result, patients with normal menstrual flow and excessive menstrual flow (44.6%) reported experiencing dysmenorrhea. A significant portion of study participants (34.5%) had menstrual flow lasting 5 days, whereas 23.6% had flow lasting 3 days [32]. In our study, women with PCOS typically experienced a gap of 2-2.5 months [20(28.57%)] followed by >2.5 months [17(24.28%)], 1.5-2 months [15(21.42%)] and 1-1.5 months [18(25.71%)]; in non-PCOS women, the most common gap was 1-1.5 months [63(90.00%)], followed by 1.5-2 months [2(2.85%)], 2-2.5 months [4(5.71%)] and >2.5 months [1(1.42%)]. When comparing the gap of menstrual cycle between women with and without PCOS, the gap in the menstrual cycle in women with PCOS is greater than in women without PCOS. Oligomenorrhea [35(50.00%)], menorrhagia [16(22.85%)], amenorrhea [14(20.00%)], unusual bleeding [3(4.28%)] and regular period [2(2.85%)] are observed as menstrual problems in PCOS women of our study. In non-PCOS women we observed regular period [46(65.71%)], oligomenorrhea [12(17.14%)], menorrhagia [5(7.14%)], amenorrhea [6(8.57%)], unusual bleeding [1(1.42%)]. When compared to non-PCOS women and women with PCOS, PCOS women are more likely to have irregular menstrual cycles. Comparing PCOS women with non-PCOS women, PCOS women have low 5.71%, normal 50.00% and excess period flow 44.28% than non-PCOS women. There is a higher significant association between menstrual irregularities and PCOS ($p<0.00001$).

A previous study found that 12.5% of patients had abnormal hair growth, and clinically 44.16 percent of women had hirsutism. Neither acne (20%) nor baldness (6.66%) were prevalent in the study. The presence of acne and hirsutism may be independent in some women. As a result of the study, 44.16% of patients showed signs of anovulation, a surrogate marker for insulin resistance. Acne lesions were assessed clinically on the face and neck using the Global Acne Grading Scale (GAGS) [37]. The GAGS considers six areas on the face and chest/upper back, with a factor based on the surface area, distribution, and density of the PSUs at each of these locations. The method was devised by Ferriman and Gallwey, in 1961, to assess the grades of hair

growth in nine key anatomical areas (i.e. lips, chin, hands and legs, breasts, abdomen, pubic area, lower and upper back). Using a 4 - grade scale ranging from 0 to 4, the degree of hirsutism of each area was scored, where 0 represents no hair growth and 4 means there is maximum hair growth [38]. The symptoms mentioned above during the visit were acne 59.1%, hirsutism 66.4%, hair loss 88.2%, anovulation 72.7%, stretch marks 71.8%, alopecia 11.8% and skin tags 21.8%. In our study, we found that PCOS women suffer from acanthosis nigricans [42(60.00%)], alopecia [50(71.42%)], hirsutism [31(44.28%)]. Similarly, non-PCOS women suffer from acanthosis nigricans [27(38.57%)], alopecia [23(32.85%)], hirsutism [5(7.14%)]. Based on the above results, we observed that acanthosis, hirsutism and alopecia are more common among PCOS women than non-PCOS women.

We report here a study to investigate sleep disturbances in women with and without PCOS. To date, researchers have primarily focused on OSA as a complication of PCOS. The incidence of OSA was higher in women with PCOS (1.71 vs 0.63 1000 person-years, $p < 0.001$) than in those without [39]. In our study, we found that sleep duration (<6 hrs a day) in women showed a significant association with PCOS [31(44.28%)] in comparison to non-PCOS [20(28.57%)]. P -value 0.05. Women with PCOS reported excessive daytime sleepiness 7.4% of the time. Women with PCOS also suffer from other forms of sleep disorders besides OSA [21]. To measure depression, these are taken from the QIDS-SR-16 scale. PCOS patients are more likely to experience restless sleep occasionally, as well as difficulty sleeping often and sometimes. In our study, sleep disturbances were significantly associated with PCOS with a p -value of 0.002. PCOS women are more likely than non-PCOS women to experience sleep disturbances, which are categorized as normal 4.28%, mild 10.00%, moderate 42.85%, and severe 42.85%. The presence of insufficient or disordered sleep has been associated with an increased risk of diabetes type 2 [42].

Women reporting PCOS reported higher rates of anxiety symptoms (50% vs. 39.2%) and depression (27.3% vs. 18.8%). They also reported higher perceived stress scores (1.01 ± 0.03 vs. 0.88 ± 0.01) [43]. According to a previous study, of 110 populations, women were more likely to suffer from depression (52.7%), as well as anxiety (52.7%) [32]. PSQI, ESS, ISI, BAI, BDI, and BQ scores were significantly higher in the PCOS group ($p=0.002$, $p=0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$) [17]. PCOS women are more likely to experience anxiety and/or depression symptoms and their coexistence than controls.

In the present study, the chi-square test of the BAI scale revealed a significant association between anxiety and PCOS with a p -value of <0.00001 . The results of the BAI scale among PCOS women classified them as having minimal/normal anxiety 17.14%, mild anxiety 31.42%, moderate anxiety 35.71%, and severe anxiety 15.71%. Our results confirm a previous study that found patients are categorized according to their BAI scores. There were 47.3% of patients in the normal category, 39.1% in the mild to moderate category, and 13.6% in the moderate to severe category [32]. The QIDS-SR 16 is a rating scale that assesses nine symptom domains that are used by the American Psychiatric Association's (2000) DSM-IV to diagnose a major depressive episode. There are 16 items in the adult versions of the QIDS16 measuring the nine criterion symptom domains (sleep, sad mood, appetite/weight, concentration/decision making, self-view, thoughts of death or suicide, general interest, energy level, and restlessness/agitation) that define a major depressive episode according to the DSM-IV [17]. The results of this study support those of our own study showing sleep disturbances (84.5%), psychomotor disturbances (81.8%), appetite and weight disturbances (78.1%), depressed mood (87.2%), decreased interest (59.1%), fatigue (68.3%), and self-criticism (65.5%). Concentration was impaired in (66.3%), and suicidal ideation was reported in (44.6%) [32]. In our study, we found a significant association between appetite and body weight disturbances ($p < 0.00001$), sleep disturbances, energy/fatigue, and psychomotor changes ($p=0.002$, $p=0.01$, $p=0.03$). However, no significant association was found between sad mood, concentration/decision making, guilt, and general interest, suicidal ideation ($p=0.95$, $p=0.46$, $p=0.70$, $p=0.54$). In the study of adolescents with or without PCOS, there was no difference in the prevalence of depression/anxiety (37% vs 33%, $p = 0.590$) and self-harm/suicidal ideation (17% vs 17%, $p = 0.96$) [48].

CONCLUSION

The study found that PCOS women had higher BMIs, cravings for sweets, drinks, junk food, weight gain, menstrual irregularities, hirsutism, alopecia, acanthosis nigricans, sleep disturbances, anxiety, and depression when compared to non-PCOS women. A lower level of physical activity was also observed in PCOS women compared to women without PCOS. PCOS can be better managed with proper counseling and psychological care along with pharmacological treatment and lifestyle changes. Doctors need to pay attention to factors affecting psychological well-being. The awareness of the early diagnosis of PCOS and interventions needs to be enhanced among women in order to prevent future morbidities and treatment options.

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