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PSYCHOLOGICAL IMPACTS ON PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME ATTENDING IVF CENTER/BAGHDAD CITY

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ABSTRACT
Background

Polycystic ovary syndrome (PCOS) can cause infertility, irregular periods and other health problems. Women with PCOS are at a higher risk of depression and anxiety compared to those without it. Lifestyle modifications can reduce the risk for hair loss, obesity status, depression, and anxiety.

Objectives: To assess the prevalence of psychological impact among females with PCOS and its correlates.

Patients and Methods: Across-sectional study was performed on patients with known history of PCOS, attending IVF center/ Baghdad since April 10th 2022 to July 20th 2022. Women aged 12-49 years with PCOS were eligible for study. A sample of 200 women were interviewed using a special questionnaire to assess their mental health status which is consists of 15 points, as well as some demographical variables.

Results: The prevalence of polycystic ovarian syndrome (PCOS) was found 77.5% which was highly prominent because women with PCOS may face psychological issues and it is widely most common problem. The obesity and overweigh status where highly increase of 74% which was very correlated to women with PCOS. The educational level was also found highly in the category of college graduates than primary and secondary level of 71% versus 57% respectively. The occupation status was also showed high prevalence in housewives which was 62% than employees.

Conclusion: Significant associations of psychological impacts on patients with polycystic ovarian syndrome included occupation, educational status, BMI, irregularity of menstrual cycle, hirsutism, hair loss and acne of the study participants and give rationality to the aspects of PCOS Psychological Scale. These result high need for assessment of women with PCOS for psychological impacts.

 Keywords: (Polycystic ovarian syndrome, depression, anxiety, obesity, infertility)

INTRODUCTION:
Polycystic ovarian syndrome (PCOS) is the most common hormonal disorder in females of reproductive age. It is characterized by two or more of the following: irregular menstrual periods, Hyperandrogenima, and polycystic ovaries (1). (PCOS) affects between 4% and 20% of females

worldwide and it is linked to that people with PCOS are more tendency to have anxiety and depression, both of which are correlated to poor physical health and literacy (2).

According to the Rotterdam consensus, polycystic ovarian syndrome (PCOS) is defined by the presence of two of three of the following criteria: oligo-anovulation, hyperandrogenism and polycystic ovaries (≥ 12 follicles measuring 2-9 mm in diameter and/or an ovarian volume > 10 mL in at least one ovary) and it may cause infertility. (3) . Further studies shown that women with PCOS are at a higher risk of depression, stress, and anxiety compared to those without it. Up to 50% of women with PCOS develop depression. Women with PCOS report lower satisfaction with various aspects of their lives such as physical appearance, health and sex life. Lifestyle modifications can reduce the risk for hair loss, Body mass index, depression, stress, anxiety and body image dissatisfaction. (4)

The main cause of anxiety and depression-like symptoms with PCOS are thought to be hormonal changes, or a combination of these factors. Increase awareness in our diagnosis of the risk of mood disorders among women with PCOS could provide new therapeutic approaches (5). Therefore, many studies showed that women with PCOS was 26.1 and 52.0%, respectively (6). A meta-analysis of 10 studies reported increased depressive symptom scores in 44% with PCOS versus 17% in controls (OR: 4.03, 95% CI: 2.96-5.5) which persisted in BMI matched studies (7). A meta-analysis of 910 women with PCOS and 1347 controls reported higher depression scores in PCOS, although these may not have been clinically significant (8). Depression and anxiety are almost three times as common in PCOS patients than in the general population (9) Additionally, people with PCOS are considerably more likely to report having severe symptoms of sadness and anxiety (10).

This study aims to assess the prevalence of psychological impact among females with PCOS and its correlates in IVF center attending Baghdad city .

Patients & Methods:

An Analytical cross-sectional study performed at Outpatient Clinic, Institute of In-vitro Fertilization and Assisted Reproductive Techniques Center at Kadhimiya City, Baghdad, Iraq, over the period from April 10th to July 20th, 2022. Female with Age group between12-49 years were eligible for study. Women with history of mental illness were excluded. Verbal consent was taken to ensure patient's privacy. Ethical committee of Kerbala Medical College approved the research work. A convenient sample of 200 women previously diagnosed with PCOS were selected. The PCOS was diagnosed based on Rotterdam consensus (oligo-anovulation, hyperandrogenism and polycystic ovaries (≥ 12 follicles measuring 2-9 mm in diameter and/or an ovarian volume > 10 mL in at least one ovary)

Women were interviewed using a special questionnaire that include socio-demographic questions, questions related to nature of menstrual cycle, sign and symptoms related to PCOS like, hirsutism, hair loss, acne, history, nature of infertility if present, and dietary habits. The weight and height were taken for each patient and the BMI was calculated. While the psychological status was assessed using the Hospital Anxiety and Depression scale (HADS, UK 2019) (11) Therefore, total

score ranged from 0-30 points as follow:0-10 = Normal case,11-14 = Borderline abnormal case and 15-30 = Abnormal case. which is consisted of 15 questions. 7 questions related to PCOS and emotions, 3 questions related to childbearing, 3 questions related to excess hair and 3 questions related to excess weight. Questions answered with yes was coded as 2, answer with probably coded as 1, and the no question coded as 0. The total estimated observed cases annually at invetro-fertilization center(IVF) center in Baghdad city is 1117 at this center. Those who refuse to participate were excluded from the study. The study was approved by the medical research bioethical committee in College of Medicine in University of Kerbala and from the research ethical committee in Kerbala health directorate.

After providing informed consent to 200 women who were known case of PCOS and above, data was collected using questionnaire. The interview was done in an open place and keeping social distance due to corona pandemic, data collected 3 days per week the interview took 10-15 minutes. The questionnaire includes demographic data (age, education, occupation of women, income, life style, food habit, having children, economic level), physiological effects (irregular cycle, number of menstrual period (per year), menstruation type, hirsutism, hair loss and acne. Life style and nutritional habits of PCOS (treatment period, number of visit to doctor, number of meals per day, have regular meals, physical activity, fatty food, sweets, eating fruits daily, soft drink and sugar, eating vegetable daily, on a diet).

Statistical analysis, the data of the present study was entered and analyzed by using the Statistical Package for the Social Sciences (SPSS version 24). Data was summarized as frequency and percentages and mean ± standard deviation (SD) in appropriate tables and graphs. The statistical tests used in the analysis were t-test and chi square test. The the logistic regression analysis was performed for significant variables and Odd's ratio (OR) was calculated. A p value of less than 0.05 was considered to be statistically significant.

Results:

The prevalence of polycystic ovarian syndrome (PCOS) was found 77.5% which was highly prominent because women with PCOS may face psychological issues and it is widely most common problem. The obesity and overweigh status where highly increased of 74% which was very correlated to women with PCOS.

The educational level was also found highly in the category of college graduates than primary and secondary level of 71% versus 57% respectively. The occupation status was also showed high prevalence in housewives which was 62% than employees. as shown in table (1)

Table (1): Socio-demographic and some related characteristics of the included participants.

Characteristics		Total=200 No. (%)
Age in years	mean ±SD	29.47±5.34
	Range	16- 42
Age groups (years)	< 20	3 (1.5)
	20- 24	34 (17)

	25-29	70 (35)
	30-34	51 (25.5)
	35-39	36 (18)
	≥40	6 (3)
Education	Primary/Read and write	23 (11.5)
	Secondary	34 (17)
	College or higher education	143 (71.5)
Occupation	Housewife	124 (62)
	Employee	76 (38)
Marital status	Married	161 (80.5)
	Unmarried	36 (18)
	Divorced	3 (1.5)
Have children	Yes	103 (51.5)
	No	97 (48.5)
BMI (kg/m^2)	mean ±SD	28.22±5.13
	Range	16.3- 44.9
BMI classification	Underweight	5 (2.5)
	Normal weight	47 (23.5)
	Overweight	68 (34)
	Obesity	80 (40)
Economic level	Weak	32 (16)
	Fair	123 (61.5)
	Good	45 (22.5)

The physiological effects of women with PCOS included irregular menstrual cycle was high as 78.5%. The menstruation type was showed highly percentage among light than heavy of 64% versus 36%respectively .The incidence of hirsutism in women with PCOS was found elevated 65.5% .The hair loss was resulted increased of 81.5% and The acne was showed higher percentage in those women with PCOS of 57.5%.as shown in table (2) as shown in tables (2).

Table (2):Physiological effects of PCOS among the study participants.

Characteristics		Total=200 No. (%)
Irregular menstrual cycle	Yes	157 (78.5)
	No	43 (21.5)
Number of menstrual period (per year)	0-1	15 (7.5)
	2-3	54 (27)
	≥4	131 (65.5)
Menstruation type	Light	128 (64)
	Heavy	72 (36)
Hirsutism	Yes	131 (65.5)
	No	69 (34.5)
Hair loss	Yes	163 (81.5)
	No	37 (18.5)
Acne	Yes	115 (57.5)
	No	85 (42.5)

The association of women with PCOS had strong relationship with psychological impact and it was highly statically significant (P<0.001).There was positive correlation between women with PCOS and occupation have found psychological impacts .There also was strong evidence that patients with PCOS had linked to occupation status .The arm of abnormal scale of housewives than employee and showed highly statistically significant .There was association of educational level among PCOS women with psychological impact and it was highly significant than those were primary and secondary graduated .Obese and overweight were also had significant importance in the abnormal psychological scale than normal patient with PCOS .The number of children was also found to be correlated with abnormal of psychological impact and it was highly statistically significant .There was strong association of irregular menstrual cycle with PCOS women of abnormal psychological impact. Hirsutism was found very elevated and correlated to abnormal of PCOS patients with psychologically highly significant. There was significant association between hair loss in abnormal psychological scale of women with PCOS and it was highly statistically significant. Acne was found highly distributed among abnormal psychological scale of patient participants as shown in table (3).

Table (3):The association of physiological effects of PCOS with PCOS psychological scale among the included study participants samples.

Variables	Categories	PCOS Psychological Scale		P value
		Normal n=31	Abnormal n=169	
Age (years)	mean ±SD	28.36±5.72	29.67±5.26	0.209
Occupation	Housewife	13 (10.5)	111 (89.5)	0.012*
	Employee	18 (23.7)	58 (76.3)	
Education	Primary	1 (4.3)	22 (95.7)	0.024*
	Secondary	10 (29.4)	24 (70.6)	
	College or higher	20 (14)	123 (86)	
Marital status	Married	23 (14.3)	138 (85.7)	0.335
	Unmarried/ Divorc	8 (20.5)	31 (79.5)	
BMI (kg/m2)	mean ±SD	25.06±4.86	28.80±4.97	< 0.001*
Have children	Yes	14 (13.6)	89 (86.4)	0.442
	No	17 (17.5)	80 (82.5)	
Irregular menstrual cycle	Yes	15 (9.6)	142 (90.4)	< 0.001*
	No	16 (37.2)	27 (62.8)	
Menstrual cycle type	Light	20 (15.6)	108 (84.4)	0.948
	Heavy	11 (15.3)	61 (84.7)	
Hirsutism	Yes	8 (6.1)	123 (93.9)	< 0.001*
	No	23 (33.3)	46 (66.7)	
Hair loss	Yes	14 (8.6)	149 (91.4)	< 0.001*
	No	17 (45.9)	20 (54.1)	
Acne	Yes	7 (6.1)	108 (93.9)	< 0.001*
	No	24 (28.2)	61 (71.8)	

Binary logistic regression was made to determine the relationship between sociodemographic, physiological effects of PCOS and psychological scale. There was association between

housewives and employee and it was highly statistically significant. Elevated BMI were significantly associated with abnormal PCOS Psychological Scale. Irregular cycle was also found higher regression among PCOS women related to psychological impact. logistic regression analysis concluded that hirsutism was significantly associated with abnormal PCOS Psychological Scale. Hair loss was also found to have psychological correlation statistically significant. Acne signs were found to have psychological correlation statistically significant as shown in table (4).

Table (4): Binary logistic regression analysis of PCOS Scale and possible socio demographic correlates of the study participants.

Independent variables	Binary logistic regression	P value
	Odds ratio (95% C.I)	
Occupation		
Employee	Reference	
Housewife	5.47(1.72-17.42)	0.004*
Education		
Primary	Reference	
Secondary	0.19(0.02-1.66)	0.132
College or higher	1.11(0.11-10.98)	0.930
BMI		
Normal weight	Reference	
Overweight/obese	1.16(1.06-1.27)	0.002*
Irregular cycle		
No	Reference	
Yes	3.72(1.39-9.97)	0.009*
Hirsutism		
No	Reference	
Yes	5.52(2.05-14.82)	0.001*
Hair loss		
No	Reference	
Yes	6.05(2.25-16.28)	< 0.001*
Acne		
No	Reference	
Yes	3.48(1.23-9.80)	0.019*

The fear for possibility of not having children was found elevated 84.8%. While women felt

depressed　　because of the delay in childbearing was increased 79.9%. This was led to women with PCOS suffering from the delay in childbearing (79.3), Where is majority of women with PCOS were crying for no reason was found (79%) this was reflecting impact on study participants who felt under psychological pressure because of PCOS and it was elevated (78%).as shown respectively in the table (5):

Table (5): Questions and answers of the study participants related to PCOS, childbearing, emotion, hirsutism ,hair loss and acne.

Variables	Yes		No		Probably	
	No.	%	No.	%	No.	%
1. Do you think that your appearance has changed due to polycystic ovaries?	128	46	47	24	25	13
2. Have you ever felt sad that you have polycystic ovaries?	144	72	36	18	20	10
3. Are you angry because you have PCOS?	137	69	45	23	18	9
4. Are you embarrassed about your appearance?	99	50	84	42	17	8.5
5. Do you feel that you are under psychological pressure because of polycystic ovaries?	156	78	25	13	19	9.5
6. Do you think that this disease had an impact on the social status of the family?	109	55	77	39	14	7
7. Are you crying for no reason?	158	79	32	16	10	5
1. Do you suffer from delay in childbearing?	130	79	51	9.1	19	12
2. Do you feel depressed because of the delay in childbearing?	131	80	21	13	12	7.3
3. Do you feel fear for the possibility of not having children?	139	85	10	6.1	15	9.1
1. Do you worried about people seeing the hair on your face?	102	51	84	42	14	7
2. Do you take a lot of time and effort to remove excess hair?	105	53	84	42	11	5.5
3. Do you feel mood swings due to excess hair?	109	55	78	39	13	6.5
1. Do you feel depressed from gaining weight?	128	64	58	29	14	7
2. Are you having difficulty in losing weight?	128	64	60	30	12	6
3. Are you suffer from psychological stress due to weight?	124	62	66	33	10	5

The mean SD of total score was found high (20.09±8.32) which is The borderline of abnormal group was
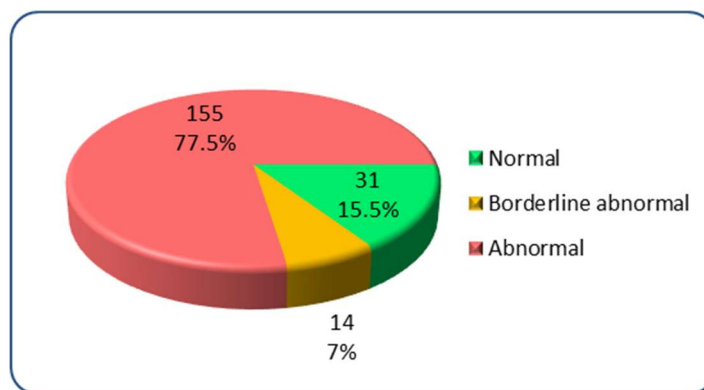summed up with abnormal group as shown in figure (1):

Figure (1) Shows PCOS Psychological Scale of the study patients.

DISCUSSION:

The PCOS is complicated endocrine disorder that was found with high prevalence rate of 77.5% and its comorbidities were found very linked to PCOS as noted obesity status was very high and women with PCOS complained from high body mass index that is compared to cohort study that done in middle east countries which found increased in prevalence. Obesity status showed higher percentage represents 80 % and 68 % in both group of obese and overweight respectively therefore, women with PCOS 38%-88%) are either overweight or obese of obese and overweight were having nearly similar findings (12) (13).

In the current study there was high percentage of women with PCOS those who have educational level in college graduated than primary and secondary levels than expected as compared to Egyptian study, the study showed high percentage than usual. The occupational status was found that housewives were having higher percentage than employees of 62% and 38% respectively it was higher than this Chinese study (14).

Under physiological status, also we have studied common symptoms and sign like, irregular menstrual cycle, by far women with PCOS have high risk of having irregular menses that is compared to Korean study found the same outcomes of women with PCOS showed high experience with irregular menses (15) for more details in this study also women with PCOS complained from hirsutism with elevated percentage of 65.5%, but not as being much elevated rates in Egyptian study (16). The symptoms were not stopped yet, reaching hair loss associated with PCOS that showed higher percentage and this was negative outcomes in Pakistani study that they found PCOS was not linked to hair loss. Another symptom was noted of women with PCOS complained from acne and this was increased in percentage as reported from Britain study that they found there was high risk of acne associated with PCOS it was around 93% of adolescents were their age between 12 and 24 years (17) (18).

Descriptive analysis revealed that life style and food habits showed high percentage and frequently appeared on the patients with PCOS as compared to Indian study there was also an increase in eating sweets, fatty food, inactive physically on regular basis so walking is rather option to make and junk food was estimated as high rates. The logistic binary regression was revealed that PCOS

scale and sociodemographic correlates of the study participants, furthermore, occupation status was statistically significant in the Italian meta-analysis study was found strong association and even housewives showed high statistically significant than employee women in association with PCOS psychological impacts as compared to various study which found the same outcomes of significantly (19) (20))23).

Independence outcome of regression was reported that PCOS scale and physiological effects of PCOS. There were taken in to account of our findings economic state was found higher percentage of women with PCOS who have weak level than good income and this is similar to Danish study they found increased abnormal scale in PCOS women there was statistically significant association of PCOS scale with psychological scale in women with obese and overweight and this led to the same Netherland study (21) (22).

In the binary regression also, there were findings of association with PCOS scale and physiological effects of PCOS among the study participants which were highly statistically significant certain symptoms like irregular menses, hirsutism, hair loss and acne appearance (P<0.05) as compared to American study that revealed the significant association of PCOS with psychological disorders. (24).

CONCLUSION:

Obesity, oligminorrhea, hair loss, hirsutism were highly prevalent among women with PCOS, majority of PCOS had abnormal psychological and psychiatric impact was positively associated with of being housewife, having lower educational status, irregularity of menstrual cycle, hirsutism, hair loss and acne of the study participants and give rationality to the aspects of PCOS Psychological Scale. It is undoubtedly one of the most perplexing disorders posing threat to women's health, that leads to increase awareness of PCOS and associated comorbidities to help in early detection and management of PCOS and avoid related mental status. Treating the pathological manifestations and clinical symptoms of the patient helps alleviate the mental effects of the patient. Adhering to good health habits helps reduce the psychological effects of the patient. Supporting the most vulnerable groups of patients can help alleviate the psychological effects.

REFERENCES:

1.   Rasquin Leon LI, Anastasopoulou C, Mayrin JV. Polycystic Ovarian Disease. [Updated 2022 May 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459251/.

2.   Deswal R, Narwal V, Dang A, Pundir C. (2020): The Prevalence of Polycystic Ovary Syndrome: A Brief Systematic Review. J Hum Reprod Sci. Oct-Dec;13(4):261-271. doi: 10.4103/jhrs.JHRS_95_18. Epub 2020 Dec 28. PMID: 33627974; PMCID: PMC7879843.

3.   Smet ME, McLennan A. Rotterdam criteria, the end. Australas J Ultrasound Med. 2018 May 17;21(2):59-60. doi: 10.1002/ajum.12096. PMID: 34760503; PMCID: PMC8409808.

4.   Chaudhari A, Mazumdar K, Mehta P (2018): Anxiety, Depression, and Quality of Life in

Women with Polycystic Ovarian Syndrome. Indian Journal of Psychological Medicine.;40(3):239-246. doi:10.4103/IJPSYM.IJPSYM_561_17.

5.   Dybciak P, Humeniuk E, Raczkiewicz D, Krakowiak J, Wdowiak A, Bojar I. Anxiety and Depression in Women with Polycystic Ovary Syndrome. Medicina (Kaunas). 2022 Jul 16;58(7):942. doi: 10.3390/medicina58070942. PMID: 35888661; PMCID: PMC9319705.

6.   Lin H, Liu M, Zhong D, Ng EHY, Liu J, Li J, Shi Y, Zhang C, Wen X, Mai Z, Ou M, Ma H. The Prevalence and Factors Associated With Anxiety-Like and Depression-Like Behaviors in Women With Polycystic Ovary Syndrome. Front Psychiatry. 2021 Oct 20;12:709674. doi: 10.3389/fpsyt.2021.709674. PMID: 34744814; PMCID: PMC8563587.

7.   Greenwood EA, Yaffe K, Wellons MF, Cedars MI, Huddleston HG. Depression Over the Lifespan in a Population-Based Cohort of Women With Polycystic Ovary Syndrome: Longitudinal Analysis. J Clin Endocrinol Metab. 2019 Jul 1;104(7):2809-2819. doi: 10.1210/jc.2019-00234. PMID: 30985868; PMCID: PMC6534493.

8.   Yin X, Ji Y, Chan CLW, Chan CHY. The mental health of women with polycystic ovary syndrome: a systematic review and meta-analysis. Arch Womens Ment Health. 2021 Feb;24(1):11-27. doi: 10.1007/s00737-020-01043-x. Epub 2020 Jun 9. PMID: 32514730.

9.   Chaudhari AP, Mazumdar K, Mehta PD. Anxiety, Depression, and Quality of Life in Women with Polycystic Ovarian Syndrome. Indian J Psychol Med. 2018 May-Jun;40(3):239-246. doi: 10.4103/IJPSYM.IJPSYM_561_17. PMID: 29875531; PMCID: PMC5968645.

10.   Sadeeqa S, Mustafa T, Latif S. Polycystic Ovarian Syndrome-Related Depression in Adolescent Girls: A Review. J Pharm Bioallied Sci. 2018 Apr-Jun;10(2):55-59. doi: 10.4103/JPBS.JPBS_1_18. PMID: 29962792; PMCID: PMC5998697. McGowan L, Quinlivan J. Polycystic ovary syndrome (PCOS): moving from characterization to interventions. Journal of Psychosomatic Obstetrics & Gynecology. 2019 Oct 2;40(4):249-.

11.   McGowan L, Quinlivan J. Polycystic ovary syndrome (PCOS): moving from characterization to interventions. Journal of Psychosomatic Obstetrics & Gynecology. 2019 Oct 2;40(4):249-.

12.   Smith KJ, Béland M, Clyde M, Gariépy G, Pagé V, Badawi G, Rabasa-Lhoret R, Schmitz N. Association of diabetes with anxiety: a systematic review and meta-analysis. Journal of psychosomatic research. 2013 Feb 1;74(2):89-99.

13.   Chaudhari AP, Mazumdar K, Mehta PD. Anxiety, Depression, and Quality of Life in Women with Polycystic Ovarian Syndrome. Indian Journal of Psychological Medicine. 2018;40(3):239-246. doi:10.4103/IJPSYM.IJPSYM_561_17.

14.   Wu Q, Gao J, Bai D, Yang Z, Liao Q. The prevalence of polycystic ovarian syndrome in Chinese women: a meta-analysis. Annals of Palliative Medicine. 2021 Jan 1;10(1):74-87.

15.   Harris HR, Titus LJ, Cramer DW, Terry KL. Long and irregular menstrual cycles, polycystic ovary syndrome, and ovarian cancer risk in a population-based case-control study. International journal of cancer. 2017 Jan 15;140(2):285-91.

16.   Hassan H, Farag D. The impact of polycystic ovary syndrome on women's quality of life: Nursing guidelines for its management. Clinical Nursing Studies. 2019;7(3):42-57.

17.   Zulfiqar S, Tahir S, Gulraiz S, Razzaq MA, Abid A, Shahid T, Babar A, Rehman B, Rafique H, Noor S, Anjum I. Investigation of Prevalence and Awareness of Polycystic Ovary Syndrome among Pakistani Females: Polycystic Ovary Syndrome in Pakistani Women. Proceedings of the Pakistan Academy of Sciences: Part B (Life and Environmental Sciences). 2022 Jun 23;59(1):77-83.

18.   Torres-Zegarra C, Sundararajan D, Benson J, Seagle H, Witten M, Walders-Abramson N, Simon SL, Huguelet P, Nokoff NJ, Cree-Green M. Care for adolescents with polycystic ovary syndrome: development and prescribing patterns of a multidisciplinary clinic. Journal of Pediatric and Adolescent Gynecology. 2021 Oct 1;34(5):617-25.

19.   Preethi Mariona, Anitha Roy, Lakshmi.T. Survey on lifestyle and food habits of patients with PCOS and obesity. J Complement Med Res. (2020), [cited November 03, 2022]; 11(5): 93-98.

20.   Hasan M, Sultana S, Sohan M, Parvin S, Rahman MA, Hossain MJ, Rahman MS, Islam MR. Prevalence and associated risk factors for mental health problems among patients with polycystic ovary syndrome in Bangladesh: A nationwide cross—Sectional study. PloS one. 2022 Jun 22;17(6):e0270102.

21.   Dybciak P, Humeniuk E, Raczkiewicz D, Krakowiak J, Wdowiak A, Bojar I. Anxiety and Depression in Women with Polycystic Ovary Syndrome. Medicina. 2022 Jul 16;58(7):942.

22.   Karsten MD, Wekker V, Groen H, Painter RC, Mol BW, Laan ET, Roseboom TJ, Hoek A. The role of PCOS in mental health and sexual function in women with obesity and a history of infertility. Human reproduction open. 2021;2021(4):hoab038.

23.   Tabassum F, Jyoti C, Sinha HH, Dhar K, Akhtar MS. Impact of polycystic ovary syndrome on quality of life of women in correlation to age, basal metabolic index, education and marriage. PloS one. 2021 Mar 10;16(3):e0247486.

24.   Alur-Gupta S, Chemerinski A, Liu C, Lipson J, Allison K, Sammel MD, Dokras A. Body-image distress is increased in women with polycystic ovary syndrome and mediates depression and anxiety. Fertility and sterility. 2019 Nov 1;112(5):930-8.