Original article

Impact of Mental health and Blood Pressure in Polycystic Ovarian Syndrome Women, Aljouf Saudi Arabia

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Abstract

The polycystic ovarian syndrome, also referred to as is a female endocrine reproductive condition. Currently, PCOS women are more likely to experience mental illness because of their psychological, physiological, and social difficulties. This questionnaire cross sectional study involved 60 PCOS patients who visited the Gynecology Department of the Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia, between December 2021 and November 2022 to obtain therapy. The questions were created using characteristics of depression, anxiety, and loneliness disorders. In addition, we used these inquiries to learn more about the patient and their lifestyle habits. The use of these questions to assess patients' psychological health. In the end, we calculated the frequency of mental issues that were linked to PCOS women's characteristics. Data were analyzed using SPSS 22. According to our research, PCOS women have an estimated 30% loneliness, 36.6% anxiety, and 33.3% depressive disorder. The current data indicate that among females with PCOS in the Aljouf area, mental health disorders are more likely to occur when there is obesity, employment, physical activity, and dietary habits. We also discovered that PCOS had an impact on their blood pressure, indicating a connection between PCOS and high blood pressure. Based on our research, PCOS women in the Aljouf region have a history of mental problems. The deprived mental health of PCOS women was associated with lifestyle-related and sociodemographic factors, yet PCOS is a state which contributes to both poor physical and mental well-being. In order to assist the mental health of women with PCOS, we therefore suggested proper care, community education, and a healthy lifestyle.

***Keywords:** PCOS, Mental Health, Blood Pressure.*

Introduction

A complex heterogeneous endocrine problem associated with female reproductive illness is called polycystic ovary syndrome (PCOS) [1,2]. Three signs, such as hyperandrogenism, ovulation issues, or PCOS, can be evaluated to determine the prognosis for PCOS [3]. Growing size, subcutaneous fat, facial and body hair, hair loss, clitoris growth, deep voice, oily complexion, acne, etc. are some overt signs of hyperandrogenism [4]. Insulin resistance (IR) is one of the main signs of PCOS. It is in charge of the hyperinsulinemia that causes type II diabetes [5]. Sleep apnea, which is a key symptom of PCOS and is brought on by an imbalance in sex steroid levels, is another problem [5]. The origins of PCOS and its pathological connection have been extensively discussed [6]. There are numerous factors that might lead to PCOS. PCOS may be brought on by genetics, an unhealthy lifestyle, or a mix of the two [1,2]. According to diagnostic standards, it is discovered that PCOS affects 21.27% of women [7]. PCOS is prevalent in affluent nations at a rate of 6–10% [8]. PCOS has adverse social, physical, emotional, and psychological impacts that have lowered the health-related quality of life for women with the condition [9]. Their social and interpersonal interactions suffer as a result. Additionally, their physical health was impacted by obesity, hirsutism, hair loss, menstruation irregularities, and facial acne. They feel humiliated and less confident as a result of their impaired infertility [10]. Frequently, PCOS-afflicted women report feeling reduced sexual interest [9]. Among those with PCOS, anxious and depressive symptoms are very common [11]. Numerous research has shown that PCOS has a negative effect on patients' mental health. In PCOS patients, a link between physical obesity and depression symptoms has been discovered [11,12]. Additionally, women with PCOS, anxiety is the most prevalent psychological ailment [12]. The quality of life can suffer, the chance of acquiring another mental illness increases, and social isolation can result from anxiety [13].

Patients with PCOS frequently experience anxiety symptoms [11]. Anxiety rises concurrently with the emergence of hyperinsulinemia and hyperandrogenism, the two hallmark signs of PCOS. We therefore set out to evaluate the mental health of women in the Aljouf region who have PCOS. We also looked into potential risk factors for the poor mental health of PCOS patients. According to our opinion, the results of the current study should lead to an improvement in PCOS patients' quality of life.

Methods
Study design with participants
Data were gathered between December 2021 and November 2022 using a cross-sectional pre-design questionnaire sent to patients who visited the Gynecology department of the Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia. The margin of error, response rate, and confidence level of roughly 5%, 50%, and 95% were all carefully taken into account. A total of 244 replies were sent, and we began evaluating them using the data from our requirement scoring. Due to insufficient or incomplete information, we choose to eliminated 184 respondents after data analysis. Finally, we choose 60 respondents whose responses accurately reflected all pertinent information and whose ages ranged from 17 to 45 years, in accordance with the study's methodology. At the time of data collection, 60 respondents, all of Saudi nationality, were living in Saudi Arabia. We validate their medical histories, assess the clinical diagnosis of PCOS in Table 2 and Figure 1, and incorporate all PCOS diagnoses in our study. We didn't include anyone above 45 or younger than 17 because we wanted to focus on ages between 17 and 45 in the current study. In the end, all study-related data was willingly submitted by all participants.

Valuation of data
The current study gathered all survey data in an effort to establish a connection between the current demographic profile and PCOS patients' lifestyle factors that are linked to poor mental health and high blood pressure. Subsequently, we check for and evaluate the severity of depression, anxiety, and loneliness. We created pertinent, pre-structured questionnaires, and researchers retrieved all of the patients' responses. To determine the format of the questionaries, we first modify the English-language versions that were previously translated into Arabic. Two authors independently combined the two versions of the questionnaires for the current study. We choose the replies at random and initially assessed each response to determine whether it provided clear explanations and the pertinent data needed for our investigation.

Socio-demographic details
Information about a person's age, BMI, occupation, whether they lived alone or with family, and PCOS in the family was acquired.

Health-related questionnaire for the patient
The questions relevant nine distinct types for calculation of depression symptoms from patients responded, based on greater accepted health question (PHQ-9), of patients [14]. Assigned self-administered questions for calculate the total scores variable from 0 to 27. Against the questions scores depend on the range is 0–3 (0=not at all, 1–a few days, 2–more than a week, and 3–almost every day). As well, susceptible on the expression of different levels of depression, the scoring was done as follows: mild, moderate, moderately severe, severe 9;10-14, 10-14, 15-19, and 20, respectively [15,16].

Assessment of Grade for anxiety disorder and loneliness
The anxiety (generalized anxiety disorder scale, GAD-7) is a reliable and well-organized tool for identifying the symptoms. It comprises seven items and can be completed in as little as two weeks. It consists of seven different types of symptom evaluation questionnaires. For each question, there are four extra scores ranging from 0 to 3, each representing the following: "not at all," "a few days," "more than half the days," and "almost every day." However, the total number of GAD-7 items is restricted to 0 to 27, and four different sections indicate the specific level of anxiety, with a score of ≤4 denoting no anxiety and scores of 5–9, 10–14, and 15 denoting mild–moderate and severe anxiety, respectively [17].
In order to calculate the degree, we used the UCLA scale for loneliness, version 3. Its design creates a simple response style for easier comprehension. On the other hand, there are a total of twenty questions in it, and we fixed the beginning of each question to a line like "How often do you feel". Version 3 was used, and it makes a comment on nine positive (non-

lonely) and eleven negative (lonely) questions. Four options—scores 1, 2, 3, and 4 for "never," "rarely," "sometimes," and "always"—were provided to responders. Finally, we total together the results to determine the level of loneliness [18].

Taking blood pressure readings
We carefully selected the questions (Table1) in order to learn more about those who experience hypertension, such as how long the condition has persisted after a PCOS diagnosis and when it was initially diagnosed, as well as what is the current systolic and diastolic blood pressure (SBP) (DBP), did you take the anti-hypertensive drug, which group of anti-hypertensive drug taking, and how long taking the anti-hypertensive drug, history of any condition connected to high blood pressure. Additionally, and any additional illnesses connected to PCOS. Finally, we determine how many participants have a history of hypertension.

Data statistical analysis
We used IBM SPSS Statistics 22 to examine the data on a Microsoft Excel sheet. We performed data processing in the Excel sheet, including coding, tabulation, and categorization. Descriptive statistics were used to produce the demographic profile, and the chi-square test was used to compare the two groups. Finally, we examined the individuals' risk ratio for poor mental health as a result of lifestyle decisions and sociodemographic traits using binary logistic regression

Results
Respondents' characteristic
The demographic information for all participants is shown in Table 2. Out of a total of sixty PCOS women, ten were discovered to be between the ages of 17 and 25, five were between the ages of 26 and 35, and just three were found to be between the ages of 36 and 45. According to our study, 3, 7, and 8 of the women were housewives, students, and workers, respectively. 5, 7, and 6 were underweight, normal weight, and overweight, respectively. However, 15 women living with her family and 3 without family, as well as 11 women has no family history of hypertension.

Assessed of loneliness, anxiety and depression
Our study assessed the 30% loneliness, 36.6% anxiety, and 33.3% depression which represented in figure 2. Table 3 displayed the respondent's related factors to their lifestyle. We estimated only 6 women have a daily follow routine of physical activity, 6 and 3women exercised around thirty minutes or less than thirty minutes in a day. While 9 women were vegetarian food habits out of 60 participants.

Table 1. Measurement of blood pressure among participants.

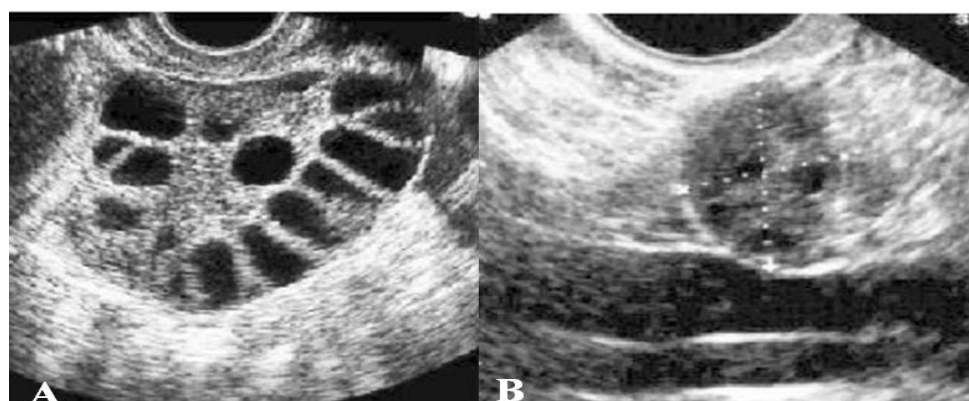| Questions	Yes (%)	No (%)	P value
Hypertension occurs after diagnosis of PCOS	34	26	0.003
Did you take medicine for hypertension?	17	14	-
Current Mean systolic blood pressure	140±3	-	-
Current Mean diastolic blood pressure	90± 5	-	-

Figure 1. Polycystic ovarian syndrome by ultrasonography images [19].

Table 2. Analyzing the relationship between PCOS women's demographic traits and mental health issues.

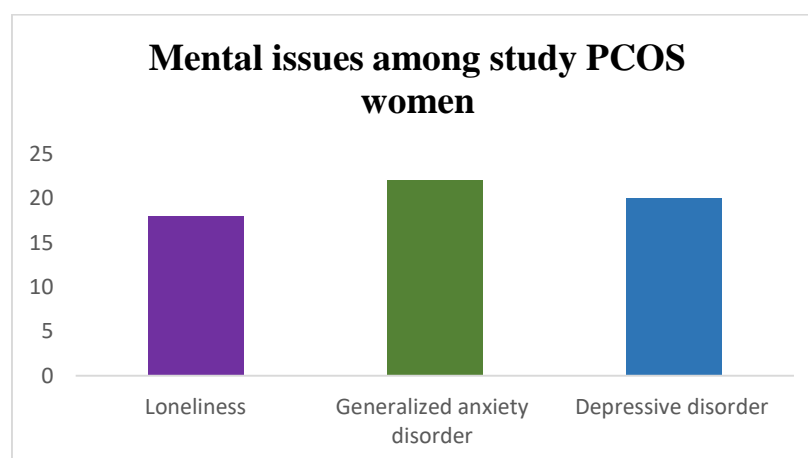| Variables	Loneliness (n=18)					Anxiety (n=22)					Depression (n=20)				
	N	%	X^2	df	p-value	N	%	X^2	df	p-value	N	%	X^2	df	p-value
Age (year)															
17-25	10	55.5	0.047	2	0.749	13	59	0.917	2	0.519	11	55	1.265	2	0.303
26-35	5	27				5	22.7				6	30			
36-45	3	16.6				4	18.1				3	13.6			
Body mass index (BMI) kg /m^2															
Below 18.5	5	27.7	1.655	2	0.326	4	18.1	1.741	2	0.343	3	15	1.585	2	0.004
18.5-25	7	38.8				8	36.3				6	30			
Over 25	6	33.3				6	27.2				11	55			
Occupation															
Student	3	16.6	1.257	3	0.534	5	22.7	3.319	3	0.346	6	30	1.762	3	0.477
Services	7	38.8				10	45.4				10	50			
Housewife	8	44.4				7	31.8				4	20			
Living condition															
Live with family	15	83.3	0.107	1	0.629	16	72.7	3.027	1	0.055	14	70	1.314	1	0.213
Live without family	3	16.6				6	27.2				6	30			
Family history of hypertension															
Yes	7	38.8	0.000	1	0.857	12	55.5	0.554	1	0.417	13	65	0.761	1	0.315
No	11	61.1				10	45.4				7	35			

Figure 2. Types of mental issues among study PCOS women.

Table 3. Factor associated with lifestyle among all participants.

Variables	Loneliness (n=18)					Anxiety (n=22)					Depression (n=20)				
	N	%	X²	df	p-value	N	%	X²	df	p-value	N	%	X²	df	p-value
Routinely regular physical activity															
Yes	6	33.3	0.344	1	0.433	8	36.6	1.362	1	0.319	9	45	0.352	1	0.435
No	18	66.6				272	63.6				11	55			
Time duration of exercise per day															
30 minutes	6	33.3	0.033	1	0.749	8	36.3	0.123	1	0.530	13	65	5.64	1	0.007
Less than 30 minutes	3	16.6				7	31.8				2	10			
More than 30 minutes	9	50				7	31.8				5	25			
Exercise per week															
3 days	4	22.2	0.034	1	0.765	14	63.6	2.765	1	0.093	7	35	0.005		0.867
Less than 3 days	9	50				8	36.6				8	40			
More than 3 days	5	27.7				-					5	25			
Food diet															
Vegetarian	4	22.2	0.45	2	0.243	2	9	2.022	2	0.432	3	15	0.343	2	0.105
Vegetarian and Non – vegetarian	14	77.7				20	9				17	85			

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Discussion

Obesity, acne, and hirsutism are just a few of the physical anomalies that women with PCOS have experienced, in addition to the common monthly issues. Along with many physical challenges, this illness has a number of psychosocial components [20]. Depression, generalized anxiety disorder, personality disorders, social phobia, attention deficit hyperactivity disorder (ADHD), bipolar affective disorder, schizophrenia, and eating disorders are among the many psychiatric illnesses. The goal of the current study was to examine how PCOS-affected women with regard to mental health issues such depression, anxiety, and loneliness. Our analysis revealed that age, BMI, living situation, occupation, and family history of PCOS may all have a role in the development of mental health difficulties in our participants from the standpoint of their sociodemographic profile. As a result, a prior study claimed that altering one's lifestyle may be a viable alternative for the effective management of PCOS [21]. Another study found that PCOS patients' poor mental health is caused by environmental and lifestyle variables. Nearly all of our respondents, who made up the majority of our sample, reported having such mental health issues when living with their relatives.

In considering lifestyle-related variables, we came to the conclusion that physical activity and length of physical activity habits may contribute to the emergence of mental health

problems in our respondents. Higher mental health was observed in the study's female participants who exercised for at least 30 minutes each day, at least three days a week. Women with PCOS were shown to be significantly more at risk than the general population for depression and anxiety disorders in a study of psychiatric illnesses in PCOS patients [22]. Patients with PCOS face higher levels of mental stress as a result of the clinical manifestations of the menstrual condition, and as a result, they require more supplemental therapy for their symptoms than other patients. This elevated mental stress may lead to anxiety and depression [22]. One study found that PCOS-related symptoms of anxiety and depression are more closely linked to obesity [23]. We also discovered that PCOS had an impact on their blood pressure, indicating a connection between PCOS and high blood pressure. According to a different study, PCOS women with BMIs over 30 have higher rates of depression than those with BMIs under 30 [24]. Yet, in women with PCOS, our research revealed little correlation between obesity and depression and anxiety. We found some important sociodemographic profile elements, such occupation and family history of PCOS, as well as important lifestyle-related elements, like the quantity of physical activity and eating habits that may foster loneliness, anxiety, and depression. The findings of this study will help executives of healthcare systems and other healthcare professionals involved in designing a therapeutic approach for assisting women with PCOS. Additionally, the results may contribute to greater public knowledge of the effects of PCOS and its preventative strategies.

Conclusion

The findings of the current study indicate that many PCOS-affected women also struggle with a variety of mental health issues. Because of their demographics, physical health, lifestyle choices, psychological illnesses, and social circumstances, PCOS patients are more likely to have mental health issues. We recommend suitable treatment approaches, community education, and a healthy lifestyle to assist the mental health of PCOS-affected women in light of the findings revealed here.

References

1. Ajmal N, Khan SZ, Shaikh R. Polycystic ovary syndrome (PCOS) and genetic predisposition: A review article. Eur J Obstet Gynecol Reprod Biol X. 2019; 3:100060. https://doi.org/10.1016/j.eurox.2019. 100060 PMID: 31403134
2. Patel S. Polycystic ovary syndrome (PCOS), an inflammatory, systemic, lifestyle endocrinopathy. J Steroid Biochem Mol Biol. 2018; 182:27–36. https://doi.org/10.1016/j.jsbmb.2018.04.008 PMID: 29678491.
3. Wojciechowska A, Osowski A, Jo´źwik M, Go´recki R, Rynkiewicz A, Wojtkiewicz J. Inositols' Importance in the Improvement of the Endocrine-Metabolic Profile in PCOS. Int J Mol Sci. 2019; 20(22):5787. https://doi.org/10.3390/ijms20225787 PMID: 31752081
4. Madnani N, Khan K, Chauhan P, Parmar G. Polycystic ovarian syndrome. Indian J Dermatol Venereol Leprol. 2013; 79(3):310–321. https://doi.org/10.4103/0378-6323.110759 PMID: 23619436
5. Teede H, Deeks A, Moran L. Polycystic ovary syndrome: a complex condition with psychological, reproductive and metabolic manifestations that impacts on health across the lifespan. BMC Med. 2010; 8:41. https://doi.org/10.1186/1741-7015-8-41 PMID: 20591140.
6. Barthelmess EK, Naz RK. Polycystic ovary syndrome: current status and future perspective. Front Biosci (Elite Ed). 2014; 6:104–119.
7. Broekmans FJ, Knauff EA, Valkenburg O, Laven JS, Eijkemans MJ, Fauser BC. PCOS according to the Rotterdam consensus criteria: Change in prevalence among WHO-II anovulation and association with metabolic factors. BJOG. 2006; 113(10):1210–1217.
8. Behboodi Moghadam Z, Fereidooni B, Saffari M, Montazeri A. Measures of health-related quality of life in PCOS women: a systematic review. Int J Womens Health. 2018; 10:397–408.
9. Hoeger KM, Dokras A, Piltonen T. Update on PCOS: Consequences, Challenges, and Guiding Treatment. J Clin Endocrinol Metab. 2021; 106(3):e1071–e10
10. Chaudhari AP, Mazumdar K, Mehta PD. Anxiety, Depression, and Quality of Life in Women with Polycystic Ovarian Syndrome. Indian J Psychol Med. 2018; 40(3):239–246. https://doi.org/10.4103/ IJPSYM.IJPSYM_561_17 PMID: 29875531 27.
11. 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; 24(1):11–27.
12. Dokras A. Mood and anxiety disorders in women with PCOS. Steroids. 2012; 77(4):338–341. https:// doi.org/10.1016/j.steroids.2011.12.008 PMID: 22178257 29.
13. Livadas S, Chaskou S, Kandaraki AA, et al. Anxiety is associated with hormonal and metabolic profile in women with polycystic ovarian syndrome. Clin Endocrinol (Oxf). 2011; 75(5):698–703.
14. Ganguly S, Samanta M, Roy P, Chatterjee S, Kaplan DW, Basu B. Patient health questionnaire-9 as an effective tool for screening of depression among Indian adolescents. J Adolesc Health. 2013; 52 (5):546–551.

15. Sun Y, Fu Z, Bo Q, Mao Z, Ma X, Wang C. The reliability and validity of PHQ-9 in patients with major depressive disorder in psychiatric hospital. BMC Psychiatry. 2020.
16. Maurer DM. Screening for depression. Am Fam Physician. 2012; 85(2):139–144. PMID: 22335214 41. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001; 16(9):606–613.
17. Trikudanathan S. Polycystic ovarian syndrome. Med Clin North Am. 2015; 99(1):221–235.
18. Russell DW. UCLA Loneliness Scale (Version 3): reliability, validity, and factor structure. J Pers Assess. 1996; 66(1):20–40.
19. SaymaAlam Suha & Muhammad Nazrul Islam. An extended machine learning technique for polycystic ovary syndrome detection using ovary ultrasound image. Scientifc Reports | (2022) 12:17123
20. Ekramzadeh M, Hajivandi L, Noroozi M, Mostafavi F. Psychological Experiences of Adolescent Girls with Polycystic Ovary Syndrome: A Qualitative Study. Iran J Nurs Midwifery Res. 2020; 25(4):341–347.
21. Ee C, Pirotta S, Mousa A, Moran L, Lim S. Providing lifestyle advice to women with PCOS: an overview of practical issues affecting success. BMC Endocr Disord. 2021; 21(1):234.
22. Brutocao C, Zaiem F, Alsawas M, Morrow AS, Murad MH, Javed A. Psychiatric disorders in women with polycystic ovary syndrome: a systematic review and meta-analysis. Endocrine. 2018; 62(2):318– 325.
23. Veltman-Verhulst SM, Boivin J, Eijkemans MJ, Fauser BJ. Emotional distress is a common risk in women with polycystic ovary syndrome: a systematic review and meta-analysis of 28 studies. Hum Reprod Update. 2012; 18(6):638–651.
24. Karsten MDA, Wekker V, Groen H, et al. The role of PCOS in mental health and sexual function in women with obesity and a history of infertility. Hum Reprod Open. 2021; 2021(4):hoab038.