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Psychosocial Factors Associated with Polycystic Ovary Syndrome: a Case Control Study

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ABSTRACT

Introduction: Polycystic ovary syndrome (PCOS) is a disorder in women of reproductive age. Psychosocial factors can play a role in PCOS.

Methods: To determine the psychosocial factors associated with PCOS in a case control study, 742 PCOS cases were compared to 798 women without PCOS for psychiatric disorders and social conditions. The data were collected using a validated questionnaire of the Minnesota Multiphasic Personality Inventory (MMPI). The Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire (DSM-IV) was used to diagnose major psychopathological disorders and other depressive and anxiety syndromes. The suspected psychopathology was evaluated by a clinical psychiatrist.

Results: There was a significant difference between cases and controls in education level (71.8% vs. 80.4%; $P<0.001$), and employment status (60% vs. 53%; $P=0.01$) (respectively). Chronic anxiety (35.7% vs. 26.8%; $P<0.001$), depression (18.9% vs. 7.9%; $P<0.001$), anxiety disorders (7.7% vs. 3.3%; $P<0.001$), and personality disorders (2.9% vs. 1.7%; $P=0.01$), were higher in the PCOS patients compared controls, respectively.

Conclusion: The results showed that chronic anxiety and depression were the most psychological pattern in PCO patients. Lower educational level and unemployment were higher in the cases than controls.

Introduction

Affecting between 6.5 to 8 percent of women, PCOS is one of the most common disorders interrupting the homeostasis of the female endocrine system.¹ This heterogeneous endocrinopathy begins at puberty and ends at menopause, with adverse sequel both in its clinical presentation and in its laboratory findings.²⁻⁶ Despite decades of research, there is no comprehensive explanation for the pathogenesis of this disorder. Most studies on PCOS focus on the endocrinopathy among affected women, and the underlying basis for

the altered reproductive physiology is not sufficiently evaluated. Although there are a few related reviews that show the etiologic factors, the fundamental pathophysiologic defect still remains unknown.⁷⁻¹⁰ Recently, the relationship between PCOS and psychosocial problems has come to the attention of the medical community.^{11,12} Several reports have linked specific features of PCOS, such as infertility,¹³ hirsutism¹⁴ and acne,¹⁵ to decreased mental well-being.

Neuroendocrine dysfunction has also been suggested, but the results are

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inconclusive.^{16,17} According to the literature, anxiety levels, psychological distress, including feelings of depression, and social fears are markedly higher in women with PCOS.¹⁸⁻²³ Furthermore, several studies suggest that a proportion of the PCOS patients may present with clinically relevant psychopathology and impaired emotional well-being.^{17,19,24,25} Sonino and colleagues showed that anxiety disorders in PCOS patients are common and that noticeable impairment of mental function may occur in these patients.²⁶ These women are at an increased risk of psychological ill health which may markedly reduce their quality of life.^{18-22,27,28} Why these women are vulnerable to psychiatric disorders remains unclear; the contributing mechanisms for psychological disorders have not been completely understood, but they likely involve several pathways. Stress can be one of the mechanisms that induce psychological disorders via the hypothalamic-pituitary-adrenal (HPA) axis and circadian pattern.

Under the influence of stress, this pattern is altered and homeostasis of stress-related neuroendocrine function is disrupted, with adverse impact on health.^{17,24,25,29,30} Furthermore, there are reports about an increased rate of eating disorders and suicidal behavior among these women.¹⁷

Other authors have attributed psychological morbidity to disturbed androgen metabolism.^{12,31,32} The data on psychological disorders and emotional function in women with PCOS, especially in different societies such as our society is inconclusive. There is still considerable controversy and continuing debate on the social and psychological determinants of PCOS in the literature.

As most of the social determinants of health and disease are different across countries and cultures, this study was designed to compare the psychopathology and social variables between PCOS patients and a population-based control group without PCOS.

Materials and methods

In a case control study, which was conducted in the clinics of Tabriz University of Medical Sciences in Iran from February 2008 to December 2012, 742 participants with established PCOS with no history of psychotropic medication, along with 798 participants with no history of PCOS as a control group, whom had no signs and symptoms and diagnostic criteria for PCOS were evaluated by a psychology consultant.

To avoid the potential effects of confounding factors, we matched the cases and controls by body mass index (BMI) (kg/m²) and the day of menstruation (mid follicular phase). Diagnosis of PCOS was made according to the Rotterdam criteria (Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome, 2004). The data were collected using a validated questionnaire of the Minnesota Multiphasic Personality Inventory (MMPI). The questionnaire consisted of 72 items that addressed various aspects of clinically relevant psychopathology and social factors such as age, marital status and job. After completion of the questionnaire, the suspected psychopathology was determined and the patient was referred to the clinical psychiatrist. The Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (DSM-IV) was used to diagnose major psychopathological disorders and other depressive and anxiety syndromes.

The psychology consultant and clinical psychiatrist were not aware of the grouping of the study. All the participants were given adequate information, and informed consent was obtained. The following statistical analyses were used in the study: descriptive statistics for the variables of interest, a Chi-squared test to compare categorical variables and the difference between means, and an independent t-test to compare continuous variables. We used the Wilcoxon-Mann-Whitney-U tests to rank the anxiety levels,

depression scores, and other psychological disorders between groups. The severity of coefficient association for psychopathologic disorders was obtained by Cramer's V. All statistical analyses were carried out using the SPSS, version 13.0, for Windows. Data were expressed as the mean (SD) & N (%). A p value of less than 0.05 was considered statistically significant. The Research Ethics Committee of Tabriz University of Medical Sciences approved the research study under the number of 52445. All participants were given adequate information regarding the study, and informed consent was obtained from each one.

Results

Overall, 1,540 participants were included in the study (742 PCOS patients and 798 control group). The characteristics of the participants are illustrated in Table 1. There was a significant difference in the mean age ($P<0.001$) and marital status of the studied groups ($P<0.001$). The rate of high school and higher education in the cases and controls were significant ($P<0.001$). Sixty percent of the PCOS group and 53 % of controls had a job. The rate of the university education in cases and controls was also significant ($P<0.001$). There was no difference in the BMI of the studied groups ($P=0.43$).

There was a significant difference between disorder type and education ($\chi^2=477.08$, $V=0.19$, $P=0.001$) and disorder type and occupation ($\chi^2=237.96$, $V=0.39$, $P=0.001$) in the two groups. The results of psychiatrist consultation were evaluated according to the DSM-IV criteria. Chronic anxiety was the most common disorder in the PCOS group.

In total, 35.7% of the PCOS group and 26.8% of the control group were positive for chronic anxiety ($P<0.001$). The PCOS group experienced depression in 18.9% vs. 7.9%, of controls ($P<0.001$). Anxiety disorders were also higher in the PCOS patients [7.7% vs. 3.3% ($P<0.001$)]. The mean scores of anxiety for the PCOS patients and controls were 802.44 and 735.16, respectively, which was

significant ($V=0.27$, $P=0.002$). The results of psychopathological evaluations are shown in table 2. There was a significant difference in the incidence of psychological disorders between two groups ($\chi^2=237.96$, Cramer's $V=0.39$, $P=0.001$). In addition, in patients with psychological disorders there was a significant difference between marital status (23.9% married vs 28.0% unmarried, $P=0.001$), education (39.9% low educated vs 0.1% high educated, $P=0.001$), and socioeconomic status [91.2% low status vs 59.5% high status, $P<0.001$]; unmarried subjects, who had lower education, and lower socioeconomic status, had more psychological disorders.

Discussion

In the present study, we compared the psychosocial determinants in women with and without the diagnosis of PCOS. The data shows that having PCOS increases the probability of anxiety disorders, depression, personality and other psychological disorders (Cramer's $V=0.39$).

The burden of symptoms of chronic anxiety, anxiety disorders, and depression was greater in women with PCOS than in controls without PCOS ($P<0.001$).

Accumulated evidences^{20,22,23,28} suggest that women with PCOS may have higher levels of psychopathologic disorders, as shown in our study.

Our results are in agreement with the studies of Bhattacharya et al.,²⁸ who found higher rate of depression in women with PCOS. Patients with PCOS do not have a good quality of life. These patients experience a higher number of stressful life events that can give rise to psychological difficulties, and these women demonstrate depression, greater anxiety and affective disorders.¹⁸⁻²⁰ Additionally, the presence of obesity, eating disorders, hirsutism, poor self-image, and higher suicide rate in women suffering from PCOS may make the evaluation of their emotional state difficult.²⁹

Table 1. The characteristics of participants

	Groups		P*
	PCO	Controls	
Age mean (SD)	23.5(5.2)	27.1(5.9)	<0.001
Marital status (%)	20.9	37.3	<0.001
High school and higher education (%)	71.8	80.4	<0.001
University education (%)	14.5	6.5	<0.001
BMI (kg/m ²), mean (SD)	27.4 (8.2)	26.8 (7.1)	0.43

* P-value<0.05, considered to be significant

Table 2. Comparison of psychological disorders between cases and control

	Groups		P
	PCO %	Controls %	
Anxiety disorder	7.7	3.3	<0.001
Mood disorder	18.2	8.1	<0.001
Depressive disorder	18.9	7.9	<0.001
Adjustment disorder	1.1	-	-
Personality disorder	2.9	1.7	0.01
Schizoaffective disorder	1.7	2.3	0.04
Somatoform disorder	0.9	0.4	0.08
Bipolar disorder	0.1	-	-
Without pathology	67.5	84.2	0.001

Herbert and colleagues reported that in infertile PCOS women, self-reported depression is higher than fertile women (odds ratio=1.20, 95% confidence interval=1.01-1.43).³⁰ This study was concerned with the infertile PCOS patients; other confounding factors and/or all levels of depression were not evaluated.

It is not clear that reproductive dysfunction can be attributed to psychological disorders or vice-versa. Benson et al., investigated the associations between active and passive coping, psychiatric symptoms of depression and anxiety, and the quality of life in women with PCOS.

The effects of stress on the HPA axis and immune function^{5,17,24} and the peripheral and central dysregulation of the opioid system and its effects on carbohydrate metabolism are other mechanisms by which psychological stress contributes to PCOS-related pathophysiology.

Our results were in line with the findings of the study of Kerchner et al., who found that depression was frequently noted to diminish mental well-being, and affect the self-worth in these patients.¹⁵ In our study, chronic anxiety (35.7% vs. 26.8%), depression (18.9% vs. 7.9%), mood disorders (18.2% vs. 8.1%) and personality disorders (2.9% vs. 1.7%) were higher in the PCOS group, whereas Schizoaffective disorders were more common in the control patients.

This difference may be related to the chronic course of PCOS and the increased number of predisposing factors compared to the control group. Mansson et al., reported a lifetime history of social phobia in 27% of the women with PCOS who were recruited at departments of gynecology and internal medicine.¹⁷ With respect to the above works, women with polycystic ovary syndrome have higher risk for depression and affective disorders, which may impair their quality of life. The presence of obesity, eating disorders, hirsutism, poor self-image,

and a significant suicide rate makes evaluation of their emotional state an integral part of their assessment and treatment. It has not yet been elucidated if PCOS affects long-term emotional well-being or if psychological disorders affect PCOS. Therefore, before any intervention, it is necessary to consider all aspects of the patient's mental status by psychiatric consultation. Transposition in a case control study cannot be achieved for dependent and independent variables. Only possible hypotheses about their relationship can be made.³³

There were some limitations to our study. First, participation in the study was voluntary, which may have led to selection bias. Second, we had limitations to equal access to the subjects. In addition, after recognition of the suspected psychopathology, some of the participants did not want to be referred to the clinical psychiatrist, both resulted in an extension of the duration of study.

Conclusion

The results demonstrate that chronic anxiety, depression and anxiety disorders were the most common psychological disorders in the PCOS patients. Most of the PCOS patients were less educated and in lower socioeconomic state than the control group. All aspects of the patient's mental and social status should be considered before implementation of an optimal intervention. To promote long-term emotional well-being among these patients, it is suggested that counseling by a psychiatrist or another health care professional be provided for their treatment and care. If the relationship between the PCOS and psychosocial disorders can be determined, psychological consultation and psychotherapy can reverse undesirable aspects of PCOS in these patients. Finally, follow-up studies are recommend in girls to determine the basic pathology of PCOS.

The data on psychological disorders and emotional function in women with PCOS, especially in different societies with different cultures is inconclusive. There is still considerable controversy and continuing debate on the social and psychological determinants of PCOS in the literature.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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