Original Article

Depression in women with polycystic ovary syndrome: the role of body mass index and infertility on it

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ABSTRACT

Background & Aim: Polycystic ovary syndrome (PCOS) is related to symptoms that lead to psychological disorder. This study was aimed to compare the depression score between women with and without (controls) PCOS.

Methods & Materials: This comparative study was performed on 174 women from March to October 2014 in Rasht, Iran. Cases were 58 women who met currently recognized definitions of PCOS while the controls were 116 healthy women and groups were matched on socio-demographics and obstetrics characteristics. The universal assessment of ultrasonographic parameters, hormonal profiles, and clinical histories was used to diagnose PCOS. Depression was assessed by using the Beck Depression Inventory II. We estimated the mean scores of depression in both groups and investigated the comparison between them.

Results: The mean depression score in PCOS women (30.31 ± 8.39) was significantly more than controls (23.36 ± 12.57) (P < 0.0001), indicating greater psychological distress. Multivariate analysis revealed the age of participants as a significant predictor of depression.

Conclusion: The high prevalence of depression in PCOS indicates that initial assessment of all women with PCOS should also consist the evaluation of mental health disorders. The physicians should pay more attention to history of their patients, especially in view of the factors affecting psychological well-being.

Introduction

Polycystic ovary syndrome (PCOS) is a common endocrine disorder affecting about 5-10% of women in reproductive age (1). PCOS is characterized by both gynecological and endocrine symptoms including chronic anovulation and hyperandrogenism (2). The symptom related to PCOS is amenorrhea, oligomenorrhea, hirsutism, obesity, and infertility (3). Infertility is the most common reason for presentation of women with PCOS to a physician, followed by hirsutism and menstrual disorders (4).

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Given the clinical features of PCOS, it is not farfetched to assume that the condition might affect the psychological well-being (4). Previous preliminary studies have also suggested that 28-64% of women with PCOS shown depression symptoms (5-7). Exclusively, the social phobia and suicide indicated elevated risk in women suffered from this condition (4). The causes of the high depression symptoms in these women may be intricate. Some studies showed that physical symptoms are the possible reason for the psychological disorder (8, 9). However, the evidence is contradictory. While, some studies indicated that acne (10, 11), hirsutism and overweight and obesity (2) are associated with increased psychological disorder. In contrast, Kerchner et al. did not find any relationship between PCOS symptoms and psychological disorder (12). Several factors may cause the high prevalence of depression in women with PCOS. Furthermore, some studies investigated the relationship between socio-demographic factors such as age, marital status, educational level, occupational status, number of children, and psychological well-being and depression (13-15). Cipkala-Gaffin shown that the prevalence of depression among women with PCOS compared with normal women, was higher and educational level and parity were significant predictors for having depression (15). Given the range of effective variables on this concept in different cultures, ethnics and people and also, the importance of patient perceptions of PCOS symptoms and signs rather than physician's diagnosis, further studies is mandatory.

Since, one of the main goals of reproductive health is to promote women mental health and especially women with diseases affecting reproduction including PCOS, and to identify factors related to it. Hence, this study was done to compare the prevalence of depression in women with and without PCOS.

Methods

This was a comparative study of women with PCOS who attended gynecology clinic of Alzahra Hospital in Rasht, Iran from March to October 2014. Cases were patients with confirmed diagnosis of PCOS and compared with 116 healthy women as control group. According to the previous study (11), it was determined that 58 women were needed in each study group with 95% power at a significant level of 5%.

The women had been diagnosed with PCOS at their respective clinic and they all met the Rotterdam criteria for PCOS. Based on the criteria, diagnosis of PCOS was established when either oligomenorrhea (cycles lasting longer than 35 days) or amenorrhea (less than two menstrual cycles in the past 6 months) and either clinical signs of hyperandrogenism (hirsutism or obvious acne or alopecia) and/or an elevated testosterone (normal range: testosterone < 2.0 nmol/L) were found, and other pituitary, adrenal or ovarian diseases could be excluded (2). For each woman with PCOS, two healthy women with a similar age-range were identified from the population registry of the hospital, served as control.

Cases and controls were matched on age, body mass index (BMI), occupation, and educational level. BMI was calculated by weight/height squared (kg/m^2) in all participations. Weight and height were measured by study staffs. The weight was measured using an electronic scale to the nearest 100 g which was performed without shoes and with least clothing. The height was measured using a tape measure to the nearest 0.5 cm which was done with the women standing on a flat surface erect against a wall.

Educational level was considered as socioeconomic status and it was categorized into these levels illiterate, secondary (1-12 years), and university (more than 12 years).

Participants filled out two questionnaires administered by trained interviewer. The first questionnaire was included sociodemographic information, medical and reproductive history. The second questionnaire was the Beck Depression Inventory II (BDI II). The BDI II is a self-report questionnaire which assesses the severity of depression. Several studies indicated its reliability and validity among different populations. Its reliability and validity was determined in Iranian and it is showed a good validity and reliability. The BDI II also has 21 questions; the participations answered each question based on a 2-week time period. Each answer was scored on a scale value of 0-3. Higher total scores show higher depressive symptoms. The standardized categories were 0-13 indicates minimal depression, 14-19 indi-

cates mild depression, 20-28 indicates moderate depression, and 29-63 indicates severe depression.

Analyses were performed with Statistical Package for the Social Sciences (Version, 16.0; SPSS Inc., Chicago, IL, USA). Data were tested for normality and parametric descriptive statistics were used to analyze demographic and obstetric data. Age, BMI, occupation, educational status and other demographic parameters were compared between the two groups using t-test and chi-squared test. For comparing the mean of depression score between the PCOS and control groups, independent t-test and chi-squared test were performed. Linear regression was used to reveal multiple associations between demographic and obstetric factors and depression. The score of depression was considered as dependent variable. In all statistical analyses, the significance level was $P < 0.0500$.

Ethical Committee of Guilan University of Medical Sciences approved the study protocol. A description of the study and requirement for participation was given to all enrolled women and written informed consent was obtained, where detailed information was offered about the research and confidentially was assured.

Results

We carried out interviews and collected information for all the 58 eligible cases and the 116 matched controls enrolled in the study. The mean [standard deviation (SD)] age of PCOS group was 27.50 (5.93) years and in the healthy women was 27.61 (8.12) years. The mean (SD) BMI of PCOS was 27.58 (5.16) and in compared group was 26.12 (4.88). The majority of both groups had graduated education [PCOS (62.1%) and healthy women (51.3%)], and the majority of them were housekeeper [PCOS (86.2%) and healthy group (76.7%)]

(Table 1).

Table 1. Socio-demographic and obstetric characteristics of women with PCOS and healthy controls

Variables	PCOS N = 58	Healthy controls N = 116	P-value
Age (years) [mean (SD)]*		27.61 (8.12)	0.9290
BMI (kg/m²) [mean(SD)]*	27.58 (5.16)	26.12 (4.88)	0.0770
Educational levels [n (%)]²			
Illiterate	0 (0)	8 (6.1)	0.0790
Secondary	22 (37.9)	49 (42.6)	
University	36 (62.1)	59 (51.3)	
Occupation [n (%)]#			
Employee	8 (13.8)	27 (23.3)	0.1000
Housekeeper	50 (86.2)	89 (76.7)	
Infertility history [n (%)]#			
Yes	45 (77.6)	3 (2.6)	< 0.0001
No	13 (22.4)	113 (97.4)	

*t-test, #Chi-squared. PCOS: Polycystic ovary syndrome, SD: Standard deviation

To compare the depression scores between two groups, t-test was done. The mean (SD) of depression score in the cases (30.31 ± 8.39) was significantly higher than controls (23.36 ± 12.57). Subsequently, the depression scores were divided into four subgroups based on its standardized cutoffs. Of the cases, 51.7% showed severe depression which was significantly higher than controls (34.5%) (Table 2).

Data were further analyzed using the linear regression model, to determine the factors associated with depression (Table 3). The findings of regression analysis showed that age had a direct relationship with depression score ($\beta = 0.18$, $P = 0.0200$). However, BMI, occupation, educational level, history of infertility, and suffering from PCOS had no significant association with depression in the model.

Table 2. Comparison of depression between case and control groups

Depression	PCOS	Healthy controls	P-value
Depression score [mean (SD)]*	30.31 (8.39)	23.36 (12.57)	< 0.0001
Depression severity [n (%)]#			
Minimal (0-13)	1 (1.7)	25 (21.6)	< 0.0010
Mild (14-19)	3 (5.2)	14 (12.1)	
Moderate (20-28)	23 (39.7)	37 (31.9)	
Severe (29-63)	31 (53.4)	40 (34.5)	

*t-test, #Chi-squared. PCOS: Polycystic ovary syndrome, SD: Standard deviation

Table 3. Linear regression of association between depression and sociodemograpic and obstetric factors

Factors	Coefficient B	SE	Coefficient(β)	t	P-value
Having PCOS	2.776	2.955	0.111	0.940	0.3490
History of infertility	-5.184	3.143	-0.197	-1.650	0.1010
Age	0.284	0.122	0.180	2.328	0.0210
BMI	0.015	0.185	0.006	0.082	0.9340
Occupational status	-3.533	2.215	-0.120	-1.595	0.1130
Educational level	-0.230	1.491	-0.011	-0.145	0.8780

SE: Standard error, PCOS: Polycystic ovary syndrome, BMI: Body mass index

Discussion

This study was conducted to determine the prevalence and determinants of depression in Iranian's PCOS women. The prevalence of depression in PCOS women was found to be high. The prevalence of depression and psychological disorder differs among studies, and this might be due to the differences in methods and instruments for screening, sample differences, cultural difference, and various classification systems. This finding is confirmed with study by Mansson et al. where they found a significantly increased social phobia in PCOS women [27%; odds ratio (OR): 18.0, 95% confidence interval (CI) = 2.2-144], as well as an increased occurrence of generalized mental health disorder (13%; OR: 7.3, 95% CI = 0.86-63) (4). About 51% of our participants suffered from depression symptoms, which is in agreement with the prevalence of depressive symptoms in previous studies indicating a range of 35-67% (16-18).

Moreover, in this study, for determining the predictive effects of the variables, the linear regression model was used, and the results showed that by controlling probable confounder variables, age was the strongest predictor of depression. The highest prevalence of age group was 22-28 years old (ranged 15-48 years old, mode and median were 24 and 27 years old respectively). Based on this range of our participant's age, the observed result is plausible. Akhtar-Danesh and Landeen (19) shown that age is associated with depression and the age group of 20-24 years has the highest prevalence rate of depression. They suggested that the relation between age and depression was U-shaped with the lowest reported levels of depression at ages 45-49. The prevalence of depression increases with age to the highest level for 20-24 years. This result is consistent with some previous findings (19-21). Other socio-demographic parameters were not difference between emotional well-being in women with PCOS; therefore, occupation and educational levels had no impact on the prevalence of depression in PCOS women. Bhattacharya and Jha (5), also noted the same finding.

This study had certain limitations. The study of women with PCOS who were attending one public gynecology clinic may limit generalization of the results to the general population of PCOS. Moreover, the participations in this study were women who their gynecologist diagnose their disease currently, and some of them did not aware about their medical condition. Because previous studies confirmed that the diagnosis of PCOS clearly has an adverse effect on psychological well-being. Hence, this limited generalizability of the present results. Another limitation of this study was the sample size. There was only power to detect differences in depression that were relatively common. Therefore, the findings of this study must be interpreted with some consideration.

Another limitation is that the disease specific scale to measure depression of women with PCOS was not available. The tool used for the measurement of the depression in PCOS was various in the studies. However, we accept that this approach might not have been as sensitive for evaluating depression scores. Therefore, the comparison with the BDI II for Iranian PCOS women is mandatory for further studies.

PCOS is closely related to psychological distress and the prevalence of depression in these patients was higher than healthy women. Thus, the evaluation of psychological disorders should consider in the initial assessment of all patients with PCOS and, in the management of these women psychological support seems to have a crucial role. Consequently, the condition of patients with PCOS would be improved by a perfect collaboration between medical treatment and emotional support.

Acknowledgments

Conflict of interest

The authors declare no conflict of interest.

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