

The Association between Body Image and Eating Disorders, Anxiety and Depression in Patients with Polycystic Ovary Syndrome (PCOS) in Hamedan, Iran

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Abstract

Background: Given the various issues that Polycystic ovary syndrome (PCOS) can cause in women and the need to address its consequences and provide solutions to improve the course of the disease and alleviate its symptoms, the present study aimed to investigate the association between body image and eating disorders, anxiety, and depression in individuals with PCOS.

Methods: This observational study was conducted on 150 girls with PCOS in Hamadan, Iran in 2023. Convenience sampling method was used to select unmarried girls of reproductive age with PCOS. The participants were asked to complete certain questionnaires, including demographic questionnaires, the eating disorders examination questionnaire (EDE-QS), the hospital anxiety and depression scale (HADS), and the body shape questionnaire (BSQ). The collected data were analyzed using Stata-13 software, with a significance level of $P < 0.05$.

Results: The multivariable logistic regression analysis revealed that individuals with concerns about their body image had a significantly higher risk of disordered eating, approximately 25 times greater than those without concerns after adjusting for BMI, age, and PCO duration (Odds Ratio [OR]=29.25; 95%CI: 6.22, 137.67; $P < 0.001$). The results of the logistic regression indicated that individuals with body image concerns were 2.23 times more likely to experience depression (OR=2.23; 95%CI: 1.16, 4.30; $P = 0.02$) and two times more likely to experience anxiety (OR=2.00; 95%CI: 1.04, 3.84; $P = 0.04$) compared with those without concerns.

Conclusions: Large number of girls are concerned about their body image. This causes eating disorders, anxiety and depression in these people. These findings highlight the importance of providing timely and appropriate treatment for PCO.

Keywords: Polycystic ovary syndrome, Mental disorder, Observational study, Youth, Body image

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1. Introduction

Polycystic ovary syndrome (PCOS) is a condition that affects the endocrine glands in women and has significant adverse impacts on their lives. The prevalence of this disease among women of reproductive age is 6 to 21 percent (1). To diagnose this disease, two out of three criteria must be present: I. Chemical or clinical hyperandrogenism, II. Irregular menstrual cycles with or without ovulation, and III. Specific echogenicity of the ovaries on sonography (2). This disease can cause hormonal disturbances and various clinical symptoms in affected individuals. Some of the prominent clinical symptoms include amenorrhea, oligomenorrhea, hirsutism, acne, hair loss, infertility, and obesity. In addition to

metabolic and cosmetic concerns, this disease can also cause psychological issues in women (1).

The clinical manifestations of this disease can be psychological distress due to concerns about body image (3). The mental image of the body is a complex concept and is defined as an individual's psychological experience of their physical appearance and functioning (4). Individuals with PCOS, due to the common side effect of obesity in this disease, do not have a positive mental image of their bodies (5). Desiring an ideal and preferred physique and the disparity between the actual appearance and the mental image in individuals with PCOS negatively affect their thinking patterns and attitudes and reduce their quality of life (6). Individuals with PCOS feel dissatisfied

with their bodies. Having a negative mental image of their bodies leads to decreased self-confidence, inclination towards introversion, depression, anxiety, and psychological and eating disorders, which can contribute to social and occupational problems (7, 8).

A meta-analysis has shown that this disease increases the likelihood of moderate to severe depression and anxiety in individuals (9). Research has indicated that individuals diagnosed with PCOS face a significantly higher risk of developing depression, ranging from 3 to 8 times more likely, and experience a notable decline in their overall quality of life (10). Mood and emotional disorders, excessive growth of body hair, weight gain, leadership problems, and increased fertility issues are among the factors that contribute to depression in these patients (10). The prevalence of significant clinical symptoms of depression in individuals with PCOS is 37%, compared with 14.2% in healthy women (11).

Eating disorders are associated with low self-confidence due to problems such as obesity caused by diseases like PCOS and dissatisfaction with body image. The individuals with PCOS have a higher prevalence of eating disorders compared with normal individuals (12). Eating disorders are psychological disorders characterized by abnormal or irregular eating behaviors, with or without compensatory behaviors (12). The most common eating disorders include anorexia nervosa, bulimia nervosa, and binge eating disorder (13).

This study aimed to investigate the association between body image, eating disorders, anxiety, and depression in patients with polycystic ovary syndrome. By addressing the numerous complications caused by this syndrome and providing solutions to improve its course, it is crucial to pay attention to the problems it can cause in women.

2. Methods

This descriptive-analytical observational study was carried out on 150 individuals diagnosed with PCO in Hamadan, Iran in 2023. Before conducting the study, the researcher obtained permission from the Ethics Committee at Hamadan University of Medical Sciences, Hamadan, Iran. The researcher then visited several Comprehensive Health

Centers, women's hospitals, and gynecologists' offices to select accessible participants. Individuals who expressed their willingness to participate were included in the study after thoroughly explaining its objectives and methodology and confirming that they met the inclusion criteria. The inclusion criteria were: being unmarried women of childbearing age, not having any known mental diseases based on medical records and self-report, having a diagnosis of polycystic ovary syndrome according to the Rotterdam criteria and confirmed by a physician, no occurrence of stressful events in the past three months, no addiction to drugs or alcohol, and a minimum level of literacy. The sample size was determined using the general rule of Green ($n=50+8k$) (14), considering ten as K (a predictor variable for anxiety, depression, and eating disorders) and accounting for a 15% non-response rate, resulting in a minimum of 150 participants. Participants were asked to complete demographic questionnaires, the eating disorders examination questionnaire (EDE-QS), the hospital anxiety and depression scale (HADS), and the body shape questionnaire (BSQ).

2.1. Research Tools

- **Demographic questionnaire:** This questionnaire was used to gather information on various factors, including age, occupation, education, body mass index (BMI), income, and duration of PCO. Ten gynecology, obstetrics, and reproductive health experts reviewed the questionnaire to ensure its content validity.

- **Hospital Anxiety and Depression Scale (HADS):** The purpose of this questionnaire is to assess mood changes, specifically anxiety and depression. It consists of 14 items, with seven items focused on measuring anxiety symptoms (items 11, 9, 7, 5, 3, 1, and 13) and seven items focused on measuring depression symptoms (questions 12, 10, 8, 6, 4, 2, and 14). The questionnaire uses a Likert scale ranging from 0 to 3 for grading. Scores for the anxiety and depression scales range from zero to 21, with higher scores indicating greater levels of disturbance. A subscale score of 11 or higher indicates a significant clinical disorder. The scoring range for each subscale is as follows: normal=0-7, mild=8-11, moderate=11-14, and severe=15-21. The validity and reliability of this Scale has been confirmed by Kaviani and colleagues (15). Cronbach's alpha was used to determine the reliability of the anxiety and

depression dimensions in this study, resulting in values of 0.88 and 0.86, respectively.

- **Body shape questionnaire (BSQ):** The questionnaire consists of 34 questions designed to assess individuals' attitudes toward their body shape and appearance. The BSQ is a self-report measure of body shape concerns common in eating disorders and body dysmorphic disorders. The questions are scored on a Likert scale ranging from 1 (never) to 6 (always). The overall score range for the questionnaire is 34 to 204. The scoring categories are as follows: less than 80=no body shape concerns, 80 to 110=mild body shape concerns, 111-140=moderate body shape concerns, and more than 140=obvious body shape concerns. The validity and reliability of this questionnaire has been confirmed by Sadeghi and colleagues (16). The reliability of the questionnaire was calculated using Cronbach's alpha and resulted in a value of 0.89.

- **Eating Disorder Examination – Questionnaire Short (EDE-QS):** Gideon and co-workers

developed a 12-item questionnaire (17) to assess eating problems over the past seven days. The Likert 4-point scoring scale ranges from 0 to 3, with a score range of 0 to 36. Higher scores indicate more disturbance. The cutoff point for this tool is set at 15 (18). The validity and reliability of this Questionnaire has been confirmed by Mousavi Asl and colleagues (19). In this study, the reliability of the questionnaire was calculated using Cronbach's alpha, and a value of 0.91 was obtained.

2.2. Data Analysis Method

The statistical software Stata version 13 was used for data analysis. Various methods, including the Shapiro-Wilk test, histogram, and central and dispersion indices, were employed to evaluate the normality of the variables, such as eating disorder, body image, anxiety, depression, age, and BMI. The results indicated that all the variables displayed a distribution that was either normal or near normal. The central and dispersion indices were used to describe quantitative variables, while

Table 1: Demographic and contextual characteristics of participants

| Variables | Total | Eating Disorder | | Statistic | P value |
|------------------------------------|------------|---------------------------|-----------------------|-----------|---------|
| | | Without disorder N=106 | With disorder N=44 | | |
| Age (year), Mean±SD | 22.78±3.68 | 22.75±3.73 | 22.84±3.61 | 0.13 | 0.90 |
| ≤20, n (%) | 40 (26.7) | 32 (30.2) | 8 (18.2) | 5.31 | 0.07 |
| 21 to 24, n (%) | 77 (51.3) | 48 (45.3) | 29 (65.9) | | |
| ≥25, n (%) | 33 (22.0) | 26 (24.5) | 7 (15.9) | | |
| Education, n (%) | | | | 1.81 | 0.41 |
| Under diploma | 4 (2.7) | 2 (1.9) | 2 (4.5) | | |
| Diploma | 12 (8.0) | 10 (9.4) | 2 (4.5) | | |
| College | 134 (89.3) | 94 (88.7) | 40 (90.9) | | |
| Job status, n (%) | | | | 1.34 | 0.59 |
| Student | 109 (72.7) | 75 (70.8) | 34 (77.3) | | |
| Unemployed | 8 (5.3) | 7 (6.6) | 1 (2.3) | | |
| Employed | 33 (22.0) | 24 (22.6) | 9 (20.5) | | |
| BMI (kg/cm ²), Mean±SD | 22.36±3.92 | 22.36±3.92 | 26.69±4.37 | 5.94 | <0.001 |
| Underweight (< 18.5), n (%) | 16 (10.7) | 15 (14.2) | 1 (2.3) | 20.31 | <0.001 |
| Healthy Weight (18.5—24.9), n (%) | 85 (56.7) | 68 (64.2) | 17 (38.6) | | |
| Overweight (25.0—29.9), n (%) | 36 (24.0) | 17 (16.0) | 19 (43.2) | | |
| Obesity (≥30), n (%) | 13 (8.7) | 6 (5.7) | 7 (15.9) | | |
| Income status, n (%) | | | | | |
| Good | 35 (23.3) | 21 (19.8) | 14 (31.8) | 2.51 | 0.29 |
| Moderate | 100 (66.7) | 74 (69.8) | 26 (59.1) | | |
| Poor | 15 (10.0) | 11 (10.4) | 4 (9.1) | | |
| Duration of PCO (Month), n (%) | | | | 3.32 | 0.19 |
| < 6 | 30 (20.0) | 20 (18.9) | 10 (22.7) | | |
| 6 to 12 | 18 (12.0) | 16 (15.1) | 2 (4.5) | | |
| > 12 | 102 (68.0) | 70 (66.0) | 32 (72.7) | | |

^aBMI and age: Independent T-test, BMI category and Education: Fisher exact test and the rest: Chi square test

frequency and percentage were used to describe qualitative variables. Independent t-tests were used to compare demographic and background variables quantitatively. Chi-square or Fisher's exact test was used to compare classified variables. In this study, body dissatisfaction was considered as the independent variable, while eating disorders, anxiety, and depression were considered as the dependent variables. The correlation between body dissatisfaction and eating disorders, as well as anxiety and depression, was analyzed using the Pearson correlation. The interpretation of correlation values was as follows: a value from 0 to 0.2 indicated no association, 0.2 to 0.4 indicated a weak association, 0.4 to 0.6 indicated a moderate association, 0.6 to 0.8 indicated a strong association, and 0.8 to 1 indicated a very strong association (20). For logistic regression, the body image variable was classified into two categories: individuals with "no concern with shape" in one group and those with mild to significant dissatisfaction in "concern with shape". The cutoff point for eating disorders was set at a score of 15. Also, this variable was divided into two categories. All three outcomes were analyzed with univariable logistic regression using the Enter method. In order to perform multivariable logistic regression on eating disorder, the variables that had a P value less than 0.2 (Table 1) were entered into the multivariable analysis as potential confounders. In addition, the association between demographic variables and the state of depression and anxiety was also analyzed, but none of the P values were less than 0.2 (the results are not reported in the article); thus, multivariable regression was not performed for depression and anxiety. A significance level of less than 0.05 was considered.

3. Results

The comparison of demographic and background variables was conducted among groups related to eating disorders. The results showed that the average age in the group without eating disorders was 22.75 ± 3.73 years, while in the group with eating disorders, it was 22.84 ± 3.61 years ($P=0.90$). The average BMI in the group with eating disorders was significantly higher than the group without eating disorders ($P<0.001$) (Table 1).

Results from Table 2 indicated that approximately half of the participants were not concerned about their body image, and more than two-thirds of individuals (70.7%) did not have eating disorders.

Table 2: Descriptive characteristics of the main research variables

| Variables | Total |
|---|-------------|
| BSQ [*] score, Mean±SD | 88.60±38.00 |
| BSQ classification, n (%) | |
| No concern with shape | 72 (48.0) |
| Mild concern with shape | 37 (24.7) |
| Moderate concern with shape | 21 (14.0) |
| Marked concern with shape | 20 (13.3) |
| EDE_QS [†] score, mean±SD | 9.85±8.23 |
| EDE_QS classification, n (%) | |
| Without disorder | 106 (70.7) |
| With disorder | 44 (29.3) |
| HADS [‡] score, Mean±SD | 16.29±9.57 |
| Anxiety subscale score, mean±SD | 8.47±5.24 |
| Anxiety subscale classification, n (%) | |
| Normal | 70 (46.7) |
| Mild | 29 (19.3) |
| Moderate | 27 (18.0) |
| Sever | 24 (16.0) |
| Depression subscale score, Mean±SD | 7.83±5.00 |
| Depression subscale classification, n (%) | |
| Normal | 68 (45.3) |
| Mild | 36 (24.0) |
| Moderate | 32 (21.3) |
| Sever | 14 (9.3) |

^{*}BSQ: Body image questionnaire with range scores 34-204 (score<80: no concern, 80-110: mild concern, 111-140: moderate concern, >140: marked concern). [†]EDE_QS: Eating Disorder Examination – Questionnaire Short with range scores 0-36 (<15: Without disorder, ≥15: With disorder). [‡]HADS: Hospital Anxiety and Depression Scale with range scores 0-21 (0-7: normal, 8-10: mild, 11-14: moderate, 15-21: severe)

Additionally, more than half of the participants reported experiencing mild to severe anxiety and depression.

The correlation between body image and eating disorders, as well as depression and anxiety, was analyzed using Pearson correlation. The analysis revealed a significant and strong positive correlation between body image and eating disorder scores ($r=0.86$, $P<0.001$). However, the associations between body image and anxiety ($r=0.35$) and depression ($r=0.37$) were found to be weak ($P<0.001$).

A univariable regression analysis was used to investigate the association between eating disorders and body image concerns (Table 3). Additionally, a multivariable logistic regression was used to control the effect of BMI on the study outcome. The results of this analysis showed that with the control of this variable's effect, the chance of eating disorders in individuals with body image

Table 3: Univariable and multivariable logistic regression analysis of body image with eating disorder

| Variable | Unadjusted results | | | Adjusted results * | | | |
|-------------------------|----------------------------|----------------------|---------|---------------------|----------------------|---------|--------|
| | Odds ratio (95% CI) | Z | P value | Odds ratio (95% CI) | Z | P value | |
| Body image | No concern with shape | Reference | | Reference | | | |
| | Concern with shape | 40.83 (9.35, 178.37) | 4.93 | <0.001 | 29.25 (6.22, 137.67) | 4.27 | <0.001 |
| Age (year) | ≤20 | reference | | Reference | | | |
| | 21-24 | 2.42 (0.98, 5.95) | 1.92 | 0.06 | 1.52 (0.47, 4.98) | 0.69 | 0.49 |
| | ≥25 | 1.08 (0.34, 3.36) | 0.13 | 0.89 | 0.99 (0.22, 4.43) | 0.02 | 0.98 |
| BMI | Underweight (<18.5) | Reference | | Reference | | | |
| | Healthy Weight (18.5-24.9) | 3.75 (0.46, 30.40) | 1.24 | 0.21 | 2.07 (0.15, 29.29) | 0.54 | 0.59 |
| | Overweight (25.0-29.9) | 16.76 (2.00, 140.70) | 2.60 | 0.009 | 9.50 (0.58, 155.24) | 1.58 | 0.11 |
| | Obesity (≥30) | 17.5 (1.76, 174.42) | 2.44 | 0.01 | 5.17 (0.26, 100.86) | 1.08 | 0.28 |
| Duration of PCO (Month) | <6 | Reference | | Reference | | | |
| | 6 to 12 | 0.25 (0.05, 1.31) | 1.64 | 0.10 | 0.12 (0.01, 1.06) | 1.91 | 0.06 |
| | >12 | 0.91 (0.38, 2.18) | 0.20 | 0.83 | 0.49 (0.14, 1.71) | 1.12 | 0.26 |

* Adjusted for BMI, age, and PCO duration; BMI: Body Mass Index; PCO: Polycystic Ovary Syndrome

Table 4: Univariable logistic regression analysis of body image with HADS domains

| Variable | Anxiety | | | Depression | | |
|------------|---------------------|------|---------|---------------------|------|---------|
| | Odds ratio (95% CI) | Z | P value | Odds ratio (95% CI) | Z | P value |
| Body image | 2.00 (1.04, 3.84) | 2.09 | 0.04 | 2.23 (1.16, 4.30) | 2.40 | 0.02 |

HADS: Hospital Anxiety and Depression Scale

concerns was approximately 25 times higher than those without concerns, and this difference was statistically significant ($P < 0.001$).

The results of Table 4 demonstrated the association between different dimensions of HADS and body image. Logistic regression results indicated that individuals who were concerned about their body image had 2.23 times higher chances of experiencing depression and two times higher chances of experiencing anxiety compared with those who did not have such concerns. These differences were statistically significant ($P = 0.02$ and $P = 0.04$, respectively).

4. Discussion

The primary aim of this study was to investigate the association between body image and eating disorders in individuals with PCO. A study has shown a notable level of body image concern among people with PCO (21). However, our findings revealed that around 50% of the girls expressed no anxiety regarding their body image. On the other hand, the remaining 50% exhibited different levels of concern, with mild concern being the most common. In their study, Annagur and colleagues found no statistically significant difference between the body image of individuals with PCO and those

without (22). The average BSQ score in our study also indicated that the level of concern among the girls participating in this study is in the mild range, which may be similar to individuals without PCOS. However, since our study was cross-sectional and only focused on individuals with PCOS, we cannot have a definite and accurate opinion on this matter. Nevertheless, the association between body image concerns and eating disorders cannot be ignored. Our study results showed a significantly higher chance of eating disorders in individuals who were concerned about their body image. Considering that approximately 60% of individuals in the eating disorder group were overweight or obese (compared with approximately 22% in the non-eating disorder group), even after accounting for the influence of this variable as a potential intervention factor, there remained a significant correlation between body image and eating disorders (25.17 times increase in chance). Additionally, our study investigated the association between these two variables and found a significant correlation. Specifically, as individuals' concerns about body image increased, their eating disorders worsened. This finding aligns with the research conducted by Shamseddin-Saeed and colleagues, who also observed that individuals with eating disorders tend to have lower scores in terms of their perception of their body image. Furthermore, their study revealed that the

severity of the mental image of one's body directly corresponds to the intensity of their suffering from eating disorders (23). Misunderstandings about eating habits and body image concerns lead individuals to take compensatory measures to conform to societal ideals. This behavior is often a trigger for the development of eating disorders (24). Research on students and teenagers has consistently shown a strong and significant link between eating disorders and body image perception (25, 26). The excessive focus on body image can also contribute to the development of other disorders like anxiety and depression (21).

Our study aimed to investigate the association between body image concerns, anxiety and depression. The results revealed that individuals who had body image concerns were more than twice as likely to experience depression and anxiety compared with those who did not have such concerns. Nonetheless, previous studies on depression and anxiety in women with PCOS have reported a significant correlation between weight gain and depression (27). The severity of depressive symptoms in overweight women with PCOS was higher than in women with PCOS with normal weight (28). However, in our study, we did not find such an association, as the distribution of BMI was homogeneous in the depression/anxiety groups. Consistent with our findings, Gaskin and co-workers stated that individuals' perception of their body, rather than body weight, is more related to depression (29). Additionally, other studies have found a direct correlation between depression or anxiety and body image concerns (27, 30-33). Contrary to these findings, Joshi and colleagues demonstrated in their study in India that the prevalence of depression and anxiety in PCOS patients is higher than concerns related to body image, and there is no significant statistical association between depression and body image (34). The contradiction between the findings of Joshi and colleagues (34) and our own study could be attributed to the demographic differences. In their study conducted in India, approximately 40% of the participants were married women, and only around 12% reported experiencing body image issues. In contrast, our study included unmarried girls, among whom nearly half expressed concerns about their body image. Perhaps the higher prevalence of body image disturbance is related to being unmarried and being at a marriageable

age for these individuals. Also, these girls felt that they lacked feminine attractiveness and beauty due to hirsutism and acne, and this concern led to an increase in the occurrence of depression and anxiety disorders in these individuals.

4.1. Limitations

One limitation of the present study was its cross-sectional design, which only included girls with PCO. The changing social patterns and the growing emphasis on external attractiveness in today's society may have increased the desire for cosmetic surgeries and a beautiful appearance, which may also impact body image concerns in individuals without PCO. Additionally, we did not investigate the occurrence of acne, hirsutism, and other PCO-related changes in our participants, which could have provided valuable insights into the association between body image concerns and these factors. Another limitation of this study was that we used tools that had undergone psychometric testing in Iran; however, neither the content validity ratio (CVR) nor the content validity index (CVI) was reported for any of these instruments.

5. Conclusions

The results of this study suggested that there is a significant number of girls who experience body image concerns. Furthermore, it has been observed that an increase in these concerns is linked to higher rates of eating disorders, anxiety, and depression. These findings highlight the importance of providing timely and suitable treatment for PCO. Addressing appearance concerns should be incorporated into the treatment plans for individuals with these conditions. It is recommended to engage the expertise of psychologists and psychiatrists to effectively deal with these disorders if necessary.

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Authors' Contribution

Farideh Kazemi: Contributions to the conception

and design of the research, data collection, analysis and interpretation of data, drafting the work and reviewing it critically for important intellectual content. Sima Fazli: Contributions to the conception and design of the research, data collection, drafting the work and reviewing it critically for important intellectual content. Azita Tiznobaik: Contributions to the conception and design of the research, drafting the work and reviewing it critically for important intellectual content. Farzaneh Soltani: Contributions to the conception and design of the research, drafting the work and reviewing it critically for important intellectual content. Mohadeseh Ahmadi-Dastjerdi: Data collection, drafting the work and reviewing it critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such that the questions related to the accuracy or integrity of any part of the work.

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Ethical Approval

The study (with project number: 140204273279) was approved by the Research Council and Ethics Committee in Biological Research of Hamadan University of Medical Sciences, Hamadan, Iran with the code of IR.UMSHA.REC.1402.315. Written informed consent was obtained from all participants.

References

1. Aba YA, Şik BA. Body image and sexual function in women with polycystic ovary syndrome: a case-control study. *Rev Assoc Med Bras.* 2022;68(9):1264-1269. doi: 10.1590/1806-9282.20220367. PubMed PMID: 36134774; PubMed Central PMCID: PMC9575011.
2. Suchta K, Smolarczyk R, Czajkowski K, Rudnicka E, Kokoszka A. Binge Eating Disorder-The Point Prevalence among Polish Women with Polycystic Ovary Syndrome and Validity of Screening Tool for This Population. *Int J Environ Res Public Health.* 2022;20(1):546. doi: 10.3390/ijerph20010546. PubMed PMID: 36612867; PubMed Central PMCID: PMC9819692.
3. Hopkins CS, Kimble AP, Hodges HF, Koci AF, Mills BB. A mixed-methods study of coping and depression in adolescent girls with polycystic ovary syndrome. *J Am Assoc Nurse Pract.* 2019;31(3):189-197. doi:10.1097/jxx.000000000000125. PubMed PMID: 30681649.
4. Alur-Gupta S, Chemerinski A, Liu C, Lipson J, Allison K, Sammel MD, et al. Body-image distress is increased in women with polycystic ovary syndrome and mediates depression and anxiety. *Fertil Steril.* 2019;112(5):930-938. doi: 10.1016/j.fertnstert.2019.06.018. PubMed PMID: 31395311; PubMed Central PMCID: PMC6858949.
5. Javed H, Niazi S, Adil A, Yousaf A, Khan A, Ghayas S. Body image concern as mediator between obesity and sexual satisfaction: a comparative study of married women with and without polycystic ovarian syndrome. *RMJ.* 2022;47(2):400-402.
6. Shakil M, Ashraf F, Wajid A. Sexual functioning as predictor of depressive symptoms and life satisfaction in females with polycystic ovary syndrome (Pcos). *Pak J Med Sci.* 2020;36(7):1500-1504. doi: 10.12669/pjms.36.7.2562. PubMed PMID: 33235564; PubMed Central PMCID: PMC7674907.
7. Miri N, Nowrozi M, Zavoshi R, Mohammadpoorasl A, Khoeinia M. Association between eating disorders and body image in athletes and non-athlete students in Qazvin University of Medical Sciences. *J Qazvin Univ Med Sci.* 2016;20(2):26-33. Persian.
8. Golian S, Ghiyasvand M, Mirmohamad Ali M, Mehran A. The relationship between body image of obese adolescent girls and depression, anxiety and stress. *Payesh.* 2014;13(4):433-440. Persian.
9. Cooney LG, Lee I, Sammel MD, Dokras A. High prevalence of moderate and severe depressive and anxiety symptoms in polycystic ovary syndrome: A systematic review and meta-analysis. *Hum Reprod.* 2017;32(5):1075-1091. doi: 10.1093/humrep/dex044. PubMed PMID: 28333286.
10. Greenwood EA, Pasch LA, Cedars MI, Legro RS, Huddleston HG, Eunice Kennedy Shriver Natl Inst C. Association among depression, symptom experience, and quality of life in polycystic ovary syndrome. *Am J Obstet Gynecol.* 2018;219(3):279. doi: 10.1016/j.

- ajog.2018.06.017. PubMed PMID: 29969586; PubMed Central PMCID: PMC6758922.
11. Dybczak P, Humeniuk E, Raczkiwicz D, Krakowiak J, Wdowiak A, Bojar I. Anxiety and Depression in Women with Polycystic Ovary Syndrome. *Medicina*. 2022;58(7):942. doi: 10.3390/medicina58070942. PubMed PMID: 35888661; PubMed Central PMCID: PMC9319705.
 12. Pirotta S, Barillaro M, Brennan L, Grassi A, Jeanes YM, Joham AE, et al. Disordered Eating Behaviours and Eating Disorders in Women in Australia with and Without Polycystic Ovary Syndrome: A Cross-Sectional Study. *J Clin Med*. 2019;8(10):1682. doi: 10.3390/jcm8101682. PubMed PMID: 31615157; PubMed Central PMCID: PMC6832459.
 13. Kolnikaj TS, Herman R, Janez A, Jensterle M. Assessment of Eating Disorders and Eating Behavior to Improve Treatment Outcomes in Women with Polycystic Ovary Syndrome. *Life*. 2022;12(11):1906. doi: 10.3390/life12111906. PubMed PMID: 36431041; PubMed Central PMCID: PMC9692921.
 14. Green SB. How Many Subjects Does It Take To Do A Regression Analysis. *Multivariate Behav Res*. 1991;26(3):499-510. doi: 10.1207/s15327906mbr2603_7. PubMed PMID: 26776715.
 15. Kaviani H, Seyfourian H, Sharifi V, Ebrahimkhani N. Reliability and validity of Anxiety and Depression Hospital Scales (HADS): Iranian patients with anxiety and depression disorders Tehran Univ Med J. 2009;67(5):379-385. Persian.
 16. Sadeghi K, Ahmadi SM, Rezaei M, Veisy F, Raeesi F, Shahverdi J. Psychometric properties of the 34-item Body Shape Questionnaire in students. 2014;18(6):e74083. doi: 10.22110/jkums.v18i6.1886.
 17. Gideon N, Hawkes N, Mond J, Saunders R, Tchanturia K, Serpell L. Development and Psychometric Validation of the EDE-QS, a 12 Item Short Form of the Eating Disorder Examination Questionnaire (EDE-Q). *PLoS One*. 2016;11(5):e0152744. doi: 10.1371/journal.pone.0152744. PubMed PMID: 27138364; PubMed Central PMCID: PMC4854480.
 18. Prnjak K, Mitchison D, Griffiths S, Mond J, Gideon N, Serpell L, et al. Further development of the 12-item EDE-QS: identifying a cut-off for screening purposes. *BMC Psychiatry*. 2020;20(1):146. doi: 10.1186/s12888-020-02565-5. PubMed PMID: 32245441; PubMed Central PMCID: PMC7118929.
 19. Mousavi Asl E, Mahaki B, Khanjani S, Mohammadian Y. Assessment of eating disorder psychopathology: The psychometric properties of the Persian version of the Eating Disorder Examination Questionnaire Short Form. *J Res Med Sci*. 2021;26:71. doi: 10.4103/jrms.JRMS_230_20. PubMed PMID: 34759988; PubMed Central PMCID: PMC8548889.
 20. Salkind NJ. *Statistics for People Who (Think They) Hate Statistics*: SAGE Publications; 2010.
 21. Parvaneh M, Babaei Bonab S. Psychological Status of Adolescent Girls with Polycystic Ovary Syndrome During Coronavirus Outbreak: The Effect of 12 Weeks of Home-Based Aerobic Exercise. *sjsph*. 2021;19(1):69-84. Persian.
 22. Annagur BB, Tazegul A, Akbaba N. Body Image, Self-Esteem and Depressive Symptomatology in Women with Polycystic Ovary Syndrome. *Noro Psikiyatrs Ars*. 2014;51(2):129-132. doi: 10.4274/npa.y6778. PubMed PMID: 28360612; PubMed Central PMCID: PMC5353087.
 23. Shamseddin-Saeed N, Azizzadeh-Forouzi M, Mohammad-Alizadeh S, Haghdoost AA, Garousi B. Relationship between body image and eating disorders. *Iranian Journal of Nursing Research*. 2010;15(4):33-43. Persian.
 24. Kazemi Z, Aghamohamadi S, Khanzadeh M. Structural Model of Eating Disorders Symptoms in Women Based on the Internalization of Media Models, Eating-related Beliefs and body dysmorphic concern. *Journal of Clinical Psychology Studies*. 2022;12(46):66-92. doi: 10.22054/JCPS.2022.62337.2607. Persian.
 25. Boberová Z, Husárová D. What Role Does Body Image in Relationship between Level of Health Literacy and Symptoms of Eating Disorders in Adolescents? *Int J Environ Res Public Health*. 2021;18(7):3482. doi: 10.3390/ijerph18073482. PubMed PMID: 33801635; PubMed Central PMCID: PMC8036840.
 26. SeyyedSalehi SF, DashtBozorgi Z. The Relationship between Personality Characteristics, Body Image Concern and Alexithymia with Eating Disorder of Nursing Students. *IJNR*. 2018;13(4):1-8. doi: 10.21859/ijnr-13041. Persian.
 27. Kogure GS, Ribeiro VB, Lopes IP, Furtado CLM, Kodato S, Silva de Sá MF, et al. Body image and its relationships with sexual

- functioning, anxiety, and depression in women with polycystic ovary syndrome. *J Affect Disord.* 2019;253:385-393. doi: 10.1016/j.jad.2019.05.006. PubMed PMID: 31082731.
28. Pastore LM, Patrie JT, Morris WL, Dalal P, Bray MJ. Depression symptoms and body dissatisfaction association among polycystic ovary syndrome women. *J Psychosom Res.* 2011;71(4):270-6. doi: 10.1016/j.jpsychores.2011.02.005. PubMed PMID: 21911106; PubMed Central PMCID: PMC3172572.
 29. Gaskin JL, Pulver AJ, Branch K, Kabore A, James T, Zhang J. Perception or reality of body weight: which matters to the depressive symptoms. *J Affect Disord.* 2013;150(2):350-5. doi: 10.1016/j.jad.2013.04.017. PubMed PMID: 23706878.
 30. Brechan I, Kvaalem IL. Relationship between body dissatisfaction and disordered eating: mediating role of self-esteem and depression. *Eat Behav.* 2015;17:49-58. doi: 10.1016/j.eatbeh.2014.12.008. PubMed PMID: 25574864.
 31. Mojtahedzadeh F, Mashayekh A. Relationship between body image and physical fitness with depression, anxiety and stress in female students from Nour city. *Quarterly Journal of Educational Psychology* 2022;12(4):52-66. Persian.
 32. Pujols Y, Seal BN, Meston CM. The association between sexual satisfaction and body image in women. *J Sex Med.* 2010;7(2 Pt 2):905-16. doi: 10.1111/j.1743-6109.2009.01604.x. PubMed PMID: 19968771; PubMed Central PMCID: PMC2874628.
 33. Scheffers M, van Duijn MAJ, Beldman M, Bosscher RJ, van Busschbach JT, Schoevers RA. Body attitude, body satisfaction and body awareness in a clinical group of depressed patients: An observational study on the associations with depression severity and the influence of treatment. *J Affect Disord.* 2019;242:22-28. doi: 10.1016/j.jad.2018.08.074. PubMed PMID: 30170235.
 34. Joshi RD, Sawant N, Mayadeo NM. How Common are Depressive-Anxiety States, Body Image Concerns and Low Self-Esteem in Patients of PCOS? *J Obstet Gynaecol India.* 2022;72(1):72-77. doi: 10.1007/s13224-021-01505-x. PubMed PMID: 35125741; PubMed Central PMCID: PMC8804144.