Psychological well-being and sexarche in women with polycystic ovary syndrome

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BACKGROUND: The characteristics of polycystic ovary syndrome (PCOS) such as hyperandrogenism and anovulation can be highly stressful and might negatively affect psychological well-being and sexuality. The objective of this study was to evaluate the association between PCOS characteristics and psychological well-being as well as sexarche.

METHODS: Patients (n = 1148) underwent standardized clinical evaluation. Psychological well-being was investigated in 480 patients with the Rosenberg self-esteem scale (RSES), the body cathexis scale (BCS) and the fear of negative appearance evaluation scale (FNAES). Sexarche was also assessed.

RESULTS: Amenorrhoea was associated with lower self-esteem (P = 0.03), greater fear of negative appearance evaluation (P = 0.01) and earlier sexarche (P = 0.004). Hyperandrogenism and acne were associated with poorer body satisfaction (P = 0.03, 0.02, respectively). Hirsutism and BMI were negatively associated with all psychological variables (RSES, P = 0.01; BCS, P = 0.05; FNAES, P = 0.02 and RSES, P = 0.03; BCS, P = 0.001; FNAES, P = 0.03, respectively).

CONCLUSIONS: Our results suggest that menstrual irregularities might be related to sexarche. Moreover, this study stresses that the treatment of women with PCOS should notably focus on physical but also on psychological and sexual characteristics.

Key words: PCOS / sexarche / self-esteem / body satisfaction / negative appearance

Introduction

The polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of reproductive age. It is estimated that 5–10% of the women have this disease (Ehrmann, 2005). The major characteristics of PCOS are enlarged ovaries with a polycystic appearance along with menstrual irregularities such as amenorrhoea or oligoamenorrhoea, excessive growth of body hair (hirsutism) or biochemical hyperandrogenism and to a lesser extent acne. PCOS is associated with anovulatory infertility, obesity, insulin resistance and lipid disorders (Laven et al., 2002; Valkenburg et al., 2008). Moreover, women with PCOS are at increased risk of developing type 2 diabetes (Legro, 2007) and may have an increased risk of cardiovascular disease (Hoeger, 2007) and endometrial cancer (Hardiman et al., 2003).

In the clinic, the treatment of women with PCOS is mainly focused on the physical consequences. The negative associations that women with PCOS might experience in daily life besides the physical consequences, e.g. social contacts, sexual relationships and self-esteem, are rarely discussed with PCOS patients during treatment. Studies addressing to what extent the above-mentioned characteristics of PCOS do influence sexuality and psychosocial well-being are scarce. The existing studies indicate that women with PCOS may experience the characteristics of PCOS as stressful and are at increased risk for depression (Himelein and Thatcher, 2006b) and anxiety disorder (Benson et al., 2009). In one study of Kitzinger and Willmott (2002), interviews were conducted in women with PCOS to explore women’s own experience of the syndrome. The women reported feeling less feminine. This feeling was associated with hirsutism,
menstrual irregularities (amenorrhoea versus oligoamenorrhoea) and infertility. Menstrual irregularities (Elsenbruch et al., 2006) and concerns about infertility (Trent et al., 2003; Elsenbruch et al., 2006; Pekhlivanov et al., 2006) have also been found to decrease quality of life (QOL). Overweight has been found to be one of the most important contributors that reduces QOL in women with PCOS (Elsenbruch et al., 2003; Hahn et al., 2005b; Barnard et al., 2007). Furthermore, it has been shown that women with PCOS and clinical symptoms of hirsutism and acne have greater body dissatisfaction than healthy control women with regular cycles, even after adjustment for body mass index (BMI) (Weiner et al., 2004; Himelein and Thatcher, 2006a). Acne might also be a risk factor for clinically relevant anxiety in women with PCOS (Benson et al., 2009).

Sexuality in women with PCOS has been studied incidentally. The results of these studies showed that women with PCOS were less satisfied with their sex life than healthy control women and they also thought their partners were less satisfied with their sex life (Elsenbruch et al., 2003). Furthermore, PCOS women did find themselves sexually less attractive and had the idea that their partners found them sexually less attractive. It has been found that women with PCOS believed that their body hair negatively influences their sexuality (Elsenbruch et al., 2003) and that their general appearance made it difficult to make social contacts (Elsenbruch et al., 2003; Tan et al., 2008). Hahn et al. (2005a) found that BMI and hirsutism were associated with physical aspects of QOL and sexual satisfaction. Even though women with PCOS are less satisfied with their sex life, they do not seem to differ from controls in respect of partner status and the frequency of sexual intercourse (Elsenbruch et al., 2003). Still, another study showed that adolescent girls with PCOS were less likely to be sexually active than healthy adolescent controls (Trent et al., 2003), which might suggest that adolescents with PCOS have their sexarche later in life than the general population.

Most previous research has focused on PCOS characteristics and their association with psychological disorders, such as anxiety and depression. In the present study, the principal focus was to study whether PCOS characteristics are associated with several aspects of psychological well-being namely self-esteem, body satisfaction and fear of negative appearance evaluation. We hypothesized that all clinical characteristics except polycystic ovaries are associated with psychological well-being. As far as we know, there is no literature available on the association between PCOS characteristics and sexarche. Therefore, our second objective was to explore whether PCOS characteristics are associated with sexarche.

Materials and Methods

Patients

We included 1148 women with normogonadotropic anovulation (WHO II), who attended our fertility clinic between 1991 and 2006, with oligoamenorrhoea or amenorrhoea. The diagnosis of PCOS was established on the basis of the revised Rotterdam criteria (Rotterdam ESHRE, 2004). Patients underwent a standardized evaluation that included cycle history, anthropomorphic measurements (height and weight, Ferriman–Gallwey score), the presence or absence of acne and transvaginal ultrasonography to assess the ovarian volume and follicle count for both ovaries.Exclusion criteria were the presence of related disorders with similar clinical presentation, such as congenital adrenal hyperplasia and Cushing’s syndrome.

The study was approved by the local institutional medical ethics review board of the Erasmus University Medical Centre, Rotterdam. All patients gave informed consent prior to their inclusion in the study.

Procedure

Patients who underwent clinical and endocrine evaluation in the period between 1991 and 2006 were approached in 2007 by posting a 72-item questionnaire with an accompanying letter. Two months after posting the questionnaire, non-respondents were sent a reminder together with the questionnaire.

Clinical and laboratory measures

Oligoamenorrhoea was defined as an interval between menstrual periods >35 days and amenorrhoea as the absence of vaginal bleeding for at least 6 months i.e. >199 days. In accordance with the Rotterdam criteria, hyperandrogenism was defined as having either biochemical or clinical signs of androgen excess. Biochemical hyperandrogenism was defined by a free androgen index (FAI) >4.5. Clinical hyperandrogenism (hirsutism) was assessed by the Ferriman–Gallwey score where patients estimated their hair growth on nine different body parts from 0 (no terminal hair) to 4 (maximal growth) with a maximum score of 36. A score of 8 or more indicates the presence of hirsutism (Ferriman and Garry, 1961). The presence or absence of acne was evaluated by the physician. The presence of PC ovaries (PCO) was detected by vaginal ultrasound examination. PCO were defined as the presence of 12 follicles or more in one or both ovaries and/or increased ovarian volume (>10 ml).

Blood samples were obtained by venipuncture. Serum was isolated after centrifugation at 2163 g for 10 min at 20°C and subsequently stored at −20°C. Endocrine evaluation included serum levels of gonadotrophic hormones [luteinizing hormone (LH), follicle-stimulating hormone (FSH)] and estradiol (E2), androgens [T, androstenedione (AD), dehydroepiandrosterone and dehydroepiandrosterone sulphate], progesterone, sex hormone-binding globulin levels (SHBG), fasting glucose and insulin, thyroid-stimulating hormone (TSH) and prolactin. Immunofluorometric assays were used for the LH, FSH, TSH, prolactin and insulin, whereas serum E2, T, AD and SHBG were measured by RIA provided by Diagnostic Products Corp. (Los Angeles, CA, USA). Intra- and inter-assay coefficients of variation were <5 and <15% for LH, <3 and <5% for T, <8 and <11% for AD, <5 and <7% for E2, <4 and <5% for SHBG, respectively (Valkenburg et al., 2008).

Demographical and psychological measures

Demographics

Information on women’s demographics such as age and ethnicity and the use of contraceptives was gathered from medical records and from the questionnaire.

Rosenberg self-esteem scale

The Rosenberg self-esteem scale (RSES) consists of 10 items that measure the level of self-esteem. Responses are recorded on a four-point-Likert scale from ‘strongly disagree’ to ‘strongly agree’, with five positively worded items and five negatively worded items. Higher scores reflect a higher level of self-esteem. The Dutch version of the RSES was shown to have good validity and reliability with good internal consistency (Chronbach’s α = 0.87). We used norm scores of a Dutch control population of college students and adults of the general population (Schmitt and Allik, 2005).
Body cathexis scale
The body cathexis scale (BCS) is a self-report questionnaire to measure body satisfaction (Second and Jourard, 1953). The questionnaire consists of 52 items about a person’s satisfaction with their body parts and body functions, such as hips and respiration. Body satisfaction is measured on a five-point Likert scale from the most negative attitude towards a body part or function to the most positive attitude towards the body part or function. The Dutch version of the questionnaire has good test–retest reliability (Pearson product-moment correlation coefficient = 0.91). We used norm scores of a Dutch control student population (Baardman and de Jong, 1984).

Fear of negative appearance evaluation scale
The brief version of the fear of negative appearance evaluation scale (FNAES) was used to assess the apprehension related to a negative appearance evaluative experience. The items are answered on five-point Likert scales from ‘not at all’ to ‘enormously’. The higher the score, the more experienced fear of negative evaluation by others. This six-item questionnaire was shown to be valid and reliable with a high internal consistency (Chronbach’s α = 0.87) (Leary, 1983). For this study, we have used a Dutch version that has not yet been validated. We used norm scores of a Dutch control population of women (Versnel et al., 2009).

Sexarche
Subjects completed the two items ‘Have you ever had intercourse?’ and ‘How old were you when you had your first intercourse?’ of a Dutch questionnaire about sexual functioning (Graaf de Jong, 1984).

Statistical analyses
As measures for central tendency, the means (for continuous data) and medians were estimated, while as a measure for dispersion, standard deviation was used. The observed score range was also presented. To test the demographical and clinical differences between PCOS responders and PCOS non-responders, Student’s t-test was used in case of continuous variables and Fisher’s exact test was used in case of categorical variables. Student’s t-test for one sample was used to test differences between the study population and norm scores. To explore the association between the PCOS characteristics, sexarche and the psychological variables, the method of multiple linear regression analysis was applied and the independent variables were entered into the regression analysis separately, albeit together with the confounding variables. Variables included the variable sexarche and all psychological variables. Independent variables included the PCOS characteristics that were divided into the dichotomous variables: oligoamenorrhea (0) versus amenorrhea (1); normandrogenism (0) versus hyperandrogenism (1) (FAI) > 4.5; no or doubtful hirsutism (0) versus hirsutism (1); few or no acne (0) versus acne (1); no PCO (0) versus PCO (1) and the continuous variable BMI, which is associated with PCOS. Because sexarche might have been prior to the clinical investigation, we entered years between sexarche and clinical investigation as a confounding variable in the regression analyses, besides ethnicity. For the time interval between the clinical investigation and the psychological measures in 2007, we entered the years between the clinical investigation and the psychological measures as a confounding variable in the regression analyses. Ethnicity was entered as a confounding variable because non-Caucasian women appeared to have sexarche later in life compared with Caucasian women and a higher percentage of non-Caucasian women had high clinical scores such as hirsutism. Finally, age was entered as a confounding variable. As a measure of performance of the relevant individual independent variables, the standardized regression coefficient (β) was estimated, including the corresponding P-values. As a measure of discrimination on the psychological measures, Cohen’s d was used. All analyses were performed using the Statistical Package for the Social Sciences (SPSS version 15.0). All statistical testing took place at 0.05 level of significance (two-tailed).

Results
Patients
Data were obtained from a total of 1148 WHO II patients, of whom 480 women with PCOS returned the questionnaire and were analyzed in this study. Participation overall was 51% and 42% had PCOS. Table I shows the demographical, clinical and endocrine characteristics of the responders and non-responders with PCOS in our study. Of the non-responders, 41% were Caucasian compared with 72% of the responders. Moreover, the responders with PCOS were slightly but significantly older than the non-responders. In the non-responding group, a higher percentage of the women with PCOS were overweight or obese and had hyperandrogenism compared with the responders (Table I). Table II shows that PCOS women had lower self-esteem and poorer body satisfaction compared with norm scores, with Cohen’s d scores of −0.12 and −0.17, respectively. We did not find a significant difference for fear of negative appearance between PCOS women and norm scores.

Clinical characteristics and psychological well-being in women with PCOS
Table III shows the standardized regression coefficients (β) and the corresponding P-values of PCOS characteristics and their association with psychological variables of self-esteem, body satisfaction and fear of negative appearance. We adjusted for age and the time interval in years between the endocrine evaluation and the psychological measures in the regression analyses for all factors besides ethnicity.

Women with amenorrhea had lower self-esteem as well as greater fear of negative appearance evaluation than women with oligoamenorrhea. Menstrual irregularities were not associated with body satisfaction.

Furthermore, women with biochemical hyperandrogenism experienced poorer body satisfaction than women with normandrogenism. Even after adjustment for years between endocrine evaluation and psychological measures, age and ethnicity, this association remained significant. No association was found with self-esteem or fear of negative appearance.

Multiple linear regression analysis indicated that hirsute women had lower levels of self esteem, poorer body satisfaction and greater fear of negative appearance evaluation compared with PCOS women without hirsutism.

Acne was associated with poorer body satisfaction but was not associated with self-esteem or fear of negative appearance.

The results in Table III indicate that no association between PCO and any of the psychological variables could be established. On the other hand, women with higher BMI scores had lower self-esteem, poorer body satisfaction and greater fear of negative appearance evaluation. Again after adjustment for years between clinical investigation and psychological measures as well as age and ethnicity, this association remained significant.
Clinical characteristics of PCOS and sexarche in women with PCOS

We did find a significant association between sexarche and menstrual irregularities (Table IV). Women with PCOS and amenorrhoea had their sexarche at younger age compared with women with PCOS and oligoamenorrhoea. This significant difference was also established after adjustment for the time interval between sexarche and the age at endocrine investigation as well as for ethnicity. [exploratory analyses within our study population showed that hirutism occurred in a higher percentage of non-Caucasian women with PCOS (47.1%) compared with Caucasian women with PCOS (26.2%), \( P = 0.01 \).]

We did not establish any association between sexarche and bio-chemical hyperandrogenism, hirsutism, acne, PCO or BMI.

Discussion

The main objective of this study was to explore which PCOS characteristics were associated with self-esteem, body satisfaction and fear of negative appearance evaluation. Women with PCOS and amenorrhoea had lower levels of self-esteem, greater fear of negative appearance evaluation and had their sexarche at an earlier age. Furthermore, clinical characteristics such as hyperandrogenism and acne were associated with poorer body satisfaction, whereas hirsutism and BMI unfavourably affects all measured psychological variables.

First of all, our results showed that women with PCOS and amenorrhoea seem to have lower levels of self-esteem and greater fear of negative appearance evaluation compared with women with oligoamenorrhoea. It is imaginable that the absence of vaginal bleeding for a long period of time makes women feel insecure about their fertility as well as their femininity. Indeed, Keegan et al. (2003) showed that women with PCOS associated regular menstruation and the capacity to bear children with femininity. In contrast, the results of Hahn et al. (2005a) revealed no differences in QOL and psychological disturbances between patients with amenorrhoea compared with those with oligoamenorrhoea.

We also found that hyperandrogenism and acne were associated with poorer body satisfaction. In contrast, in the study of Hahn et al. (2005a) the occurrence of acne versus the absence of it or hyperandrogenism versus normadrogenism were neither associated with QOL nor with psychological distress. However, this study was examining different aspects of psychological distress to that in the present study, namely psychological disturbances.

Furthermore, the current study established that hirsutism was negatively associated with all psychological variables. Firstly, women with PCOS and hirsutism were found to have lower levels of self-esteem than PCOS women without hirsutism. Likewise, Hahn et al. (2005a) found that hirsutism was negatively associated with sexual self-esteem and Benson et al. (2009) indicated that the risk for clinically relevant depression was enhanced in patients who reported hirsutism. In the

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**Table I** Demographical and (bio)clinical characteristics of PCOS (non) responders.

<table>
<thead>
<tr>
<th></th>
<th>PCOS responders (N = 480)</th>
<th>PCOS non-responders (N = 463)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographical characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years at date of endocrine investigation</td>
<td>28.8 (4.3), 14.2–40.0 (480)</td>
<td>28.0 (4.8), 18.3–43.3 (463)</td>
<td>0.01</td>
</tr>
<tr>
<td>Caucasian</td>
<td>72.1% (346/480)</td>
<td>41.6% (192/461)</td>
<td>0.00</td>
</tr>
<tr>
<td>Clinical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligoamenorrhoea</td>
<td>71.7% (344/480)</td>
<td>75.2% (348/463)</td>
<td>0.24</td>
</tr>
<tr>
<td>Amenorrhea</td>
<td>28.3% (136/480)</td>
<td>24.8% (115/463)</td>
<td>0.24</td>
</tr>
<tr>
<td>Presence of hirsutism</td>
<td>31.9% (99/310)</td>
<td>39.9% (109/279)</td>
<td>0.08</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>26.4 (6.0), 16.8–50.6 (479)</td>
<td>28.2 (6.6), 15.8–59.8 (479)</td>
<td>0.45</td>
</tr>
<tr>
<td>BMI ≥ 25 (kg/m²)</td>
<td>48.6% (233/479)</td>
<td>63.0% (290/460)</td>
<td>0.00</td>
</tr>
<tr>
<td>Endocrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperandrogenism (FAI &gt; 4.5)</td>
<td>53.1% (255/480)</td>
<td>67.4% (312/463)</td>
<td>0.00</td>
</tr>
<tr>
<td>LH</td>
<td>7.2 (1.0–37.9) (480)</td>
<td>8.0 (0.5–76.4) (463)</td>
<td>0.11</td>
</tr>
<tr>
<td>FSH</td>
<td>4.9 (1.1–10.5) (480)</td>
<td>4.7 (1.0–9.8) (463)</td>
<td>0.13</td>
</tr>
</tbody>
</table>

1Values are mean (SD), median (range), range, n (n/total N), or number (%) of patients.
2Correlation coefficient different at 0.05 level of significance (two-tailed).

**Table II** Psychological measure scores distinguished by study population and norm group.

<table>
<thead>
<tr>
<th></th>
<th>Study population, mean (SD)</th>
<th>Normative data, mean (SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem (RSES)</td>
<td>31.0 (5.4)</td>
<td>31.6 (4.5)</td>
<td>0.03</td>
</tr>
<tr>
<td>Body satisfaction (BCS)</td>
<td>3.6 (0.6)</td>
<td>3.7 (0.6)</td>
<td>0.03</td>
</tr>
<tr>
<td>Fear of negative appearance evaluation (FNAES)</td>
<td>13.8 (5.9)</td>
<td>14.1 (6.1)</td>
<td>0.23</td>
</tr>
</tbody>
</table>

1Correlation coefficient different at 0.05 level of significance (two tailed).
same line with our results, half of the women with suspected PCOS in the study of Lipton et al. (2006) felt that facial hair was greatly affecting their self-confidence and making them worry about their appearance. Contrastingly, Keegan et al. (2003) did not report a difference in self-esteem between self-perceived hirsute and self-perceived non-hirsute women. These contradictory results might be explained by the fact that the RSES is a general self-esteem questionnaire, which might not always be sensitive enough to measure fluctuations in self-esteem related to physical appearance. In the present study, we also found that women with hirsutism experienced poorer body satisfaction than women without hirsutism. In contrast, other reports did not find a relationship between body satisfaction and self-perceived hirsutism in women with PCOS (Keegan et al., 2003). This difference in results might be explained by the fact that we used different criteria for hirsutism and different questionnaires to measure body satisfaction. Finally, we found that women with hirsutism had greater fear of negative appearance evaluation than women without hirsutism. Likewise, Barth et al. (1993) found that two-thirds of women with hirsutism avoided some social situations. Benson et al. (2009) evaluated anxiety in PCOS women and did not establish a relationship...
between hirsutism and anxiety. Women with excessive hair growth might experience feelings of discomfort in social contacts and fear for the evaluation of others concerning their appearance, rather than general anxiety.

Our results also indicate that BMI unfavourably affects all measured psychological variables self-esteem, body satisfaction and fear of negative appearance. These findings support other studies of PCOS women that have shown that obesity decreases QOL (Coffey et al., 2006) and may be a risk factor for psychological distress (Elsenbruch et al., 2006).

Comparisons between our study population and normal groups showed that PCOS women had lower self-esteem and poorer body satisfaction. However, the group differences were very small.

Furthermore, we explored whether in our study population sexarche was associated with the clinical PCOS characteristics. Surprisingly, we found that women with PCOS and amenorrhoea have sexarche earlier in life than women with oligoamenorrhoea. Women with PCOS and amenorrhoea might feel much safer during intercourse because they might believe that they are not fertile. Research is needed to further explore this relationship. We found no association between bio and clinical hyperandrogenism or BMI and sexarche. As expected, we revealed no association between PCO and sexarche. This finding might be explained by the fact that PCO is not a visible, readily detectable characteristic.

It is important to consider some drawbacks of our study. First of all, the PCOS patients in our study completed the questionnaires later in time than the laboratory and clinical tests were performed. Patients reasonably would have scored the psychological questionnaires differently at the time when laboratory and clinical parameters were measured and reported to them. Therefore, we also adjusted for the time interval in years between the endocrine evaluation and the psychological measures. Secondly, we did not include a matched control group. The current results therefore particularly apply to differences within the PCOS population. Furthermore, we do not know whether the sexarche results of this Dutch study may be generalized to other countries, because of possible differences in sexual morality and cultural backgrounds in different countries. Finally, the non-responding rate in our study was high. This might be due to a high percentage of non-Caucasian patients in the non-responding group. A possible explanation is that the Caucasian non-responders had trouble filling in the questionnaires due to insufficient command of the Dutch language. Therefore, the results could not be generalized to all women with PCOS. Furthermore, it might be that those women returning the questionnaire were those PCOS women whose psychological well-being was the least affected by their disease. In the latter case, the impact of PCOS on psychological well-being might even be underestimated. The impact of PCOS on self-esteem, body satisfaction and fear of negative appearance established in the current study might also be underestimated because the non-responders may have harboured the more pronounced phenotypes.

Our results suggest that amenorrhoea might be associated with sexarche and that amenorrhoea, hyperandrogenism, hirsutism, acne and BMI might be negatively associated with self-esteem, body satisfaction and/or fear of negative appearance evaluation. Future research should study these associations further against control populations, as well as other aspects of sexuality, such as the number of sexual relations, the relation between endocrine variables and libido or the time span between different relations. It is important for physicians to pay attention to the physical aspects of PCOS as well as to the psychological aspects. Previous researchers have suggested that clinicians should screen women with PCOS for psychological disorders (e.g. anxiety and depression). Our results suggest that clinicians should also be aware of other psychological distress that women with PCOS may face, such as low self-esteem and body dissatisfaction. In cases of impaired sexual and psychological health, patients can be referred to a psychologist or sexologist. BMI as well as hirsutism and amenorrhoea seem to be important factors that influence psychological domains in PCOS patients. About 50% of all women with PCOS are overweight, compared with 30% of women in the general European population (Laven et al., 2002). We recommend that physicians encourage overweight women with PCOS to lose weight and to provide a proper advice concerning reproductive lifestyle.

**Author’s roles**


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