Determinants of emotional distress in women with polycystic ovary syndrome

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BACKGROUND: The goals were to analyse the incidence of mental distress in women with untreated polycystic ovary syndrome (PCOS) using self-report measures, to characterize PCOS patients at risk for psychiatric disease with regard to sociodemographic and clinical characteristics, and to assess the impact of emotional distress on quality of life. METHODS AND RESULTS: Complete metabolic, hormonal, clinical and self-report psychological data [emotional distress, Symptom Check List 90 (SCL-90-R); quality of life, Short-Form Health Survey 36 (SF-36); sexual satisfaction, visual analogue scales; sociodemographic data] were obtained from n = 143 untreated women with PCOS. Prior psychiatric diagnoses were exclusionary. Twenty-two patients (15.4%) had a possible psychological disorder, based on SCL-90-R global severity index (GSI) scores ≥63 (SCL cases). SCL cases had significantly elevated body mass index (BMI), but did not differ from SCL non-cases in other clinical, endocrine, metabolic or sociodemographic variables. Stepwise multiple regression analyses identified GSI as a significant predictor of SF-36 Psychological Sum score, along with age and current wish to conceive (R² = 0.27); the SF-36 Physical Sum score was predicted by BMI and education (R² = 0.47); the SF-36 Physical Sum score was predicted by BMI and education (R² = 0.07), but not GSI. CONCLUSIONS: Psychiatric illness may go undetected in a proportion of PCOS patients. Although the majority of patients exhibit subclinical levels of psychological disturbances, emotional distress together with obesity lead to large decrements in quality of life in PCOS.

Key words: distress/infertility/PCOS/SCL-90-R/quality of life

Introduction

Polycystic ovary syndrome (PCOS) affects >5% of women of reproductive age (Knochenhauer et al., 1998; Asuncion et al., 2000; Azziz et al., 2004). It is characterized by both gynaecological and endocrine symptoms, including chronic anovulation, hyperandrogenism, insulin resistance, and the metabolic syndrome (Carmina, 2003; Azziz, 2004; Chang, 2004; Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, 2004). PCOS is also one of the leading causes of infertility and involuntary childlessness (Franks, 2003; Homburg, 2003), which represent major stress factors in female life (Greil, 1997; Guerra et al., 1998; Oddens et al., 1999). Effects on physical appearance, including obesity, hirsutism, cystic acne, seborrhoea and hair loss can also cause psychological distress and decrease quality of life, possibly by influencing feminine identity (Kitzinger and Willmott, 2002). Further, it is conceivable that the long-term health risks associated with the diagnosis (the metabolic syndrome and its sequelae, e.g. type 2 diabetes mellitus, hypertension, lipid disorders, atherosclerosis) have a negative impact on psychosocial well-being. Indeed, several studies have shown that PCOS women suffer from marked reductions in quality of life, impaired emotional well-being, and reduced sexual satisfaction (Bruce-Jones et al., 1993; Eggers and Kirchengast, 2001; Sills et al., 2001; Trent et al., 2002; Coffey and Mason, 2003; Elsenbruch et al., 2003; Hashimoto et al., 2003; Rasgon et al., 2003; Trent et al., 2003; Schmid et al., 2004; Weiner et al., 2004; McCook et al., 2005). However, the determinants of psychological problems in these patients remain elusive, as does the question whether or not adequate treatment ameliorates women’s psychosocial problems. This, as well as the fact that it is not until fairly recently that evidence on the prevalence and extent of psychological problems in women with PCOS exists, may explain why psychological aspects have neither been consistently integrated as outcome parameters in treatment studies, nor are they included in diagnostic procedures or individual treatment recommendations. The goals of this study were to investigate the incidence of mental distress in women with untreated PCOS using self-report measures, to characterize PCOS patients at risk for psychiatric disease with regard to sociodemographic and clinical characteristics, and to assess the impact of emotional distress on quality of life in affected patients.
Materials and methods

Recruitment of patients
Consecutive patients were recruited from January 2002 to June 2004 from the outpatient clinics of the Department of Medicine, Division of Endocrinology, University Hospital of Essen Medical School, Germany, based on referrals from gynaecologists in the surrounding area or patients attracted by the clinic’s homepage. Diagnosis was established based on the criteria derived from the 1990 NIH conference, diagnosis of PCOS when oligomenorrhoea (cycles lasting >35 days) or amenorrhoea (<3 cycles in the past 6 months) and either clinical signs of hyperandrogenism [hirsutism with a Ferriman–Gallwey score of ≥6 (Ferriman and Gallwey, 1961) or obvious acne or pronounced alopecia] or an elevated total testosterone (>2.0 nmol/l) were found, and other pituitary, adrenal, ovarian, thyroid or metabolic diseases could be excluded. Exclusion criteria also included a prior psychiatric diagnosis (when established prior to the initial evaluation at our clinic) or current use of psychiatric medications including antidepressants because such medications may affect psychosocial variables. However, only one patient was excluded due to a diagnosed depressive disorder. PCOS patients were not taking any prescription medication (except allergy medications and occasional pain medications) for ≥3 months before entering the study. The study protocol was approved by the Ethics Committee of the University of Duisburg, Essen. All participants gave informed written consent.

Instruments and measures

Psychological distress
The German version (Franke, 1995; Schmitz et al., 2000) of the Symptom Check List 90 (SCL-90-R) (Derogatis, 1983) was used to assess mental well-being. This widely used screening tool, which can be used for screening against putative cases of psychiatric/psychological illness, contains 90 items with a 5-point scale (0 = not at all, 4 = extremely), and assesses symptomatology in nine areas (Somatization, Obsessive–Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Aggression, Phobia, Paranoid Ideation, Psychoticism). The average score of all 90 items yields the global severity index (GSI), which represents the overall level of distress. GSI t scores ≥63 identify cases with possible mental disorder (SCL cases) (Derogatis, 1983; Jacobson et al., 1997; de Groot et al., 1999; Schmitz et al., 2000; Bulow et al., 2002; Beutel et al., 2005). In addition, two additional global scores are calculated, the Positive Symptom Distress Index (PSDI) which indicates the intensity of distress, and the Positive Symptom Total (PST), which is the total number of distress-inducing symptoms. Higher scores on the scales of the SCL-90-R indicate higher distress; it should be noted that individual scales cannot be interpreted in diagnostic categories.

Health-related quality of life
Quality of life was assessed with the German version of Short-Form Health Survey 36 (SF-36) (Ware et al., 1998), a widely used and validated instrument containing a total of eight subscales, namely Physical Function, Physical Role Function, Bodily Pain, General Health, Vitality, Social Function, Emotional Role Function, and Mental Health. In addition, the subscales are combined to yield two summary health status measures, the Physical Sum scale and the Psychological Sum scale (Ware and Sherbourne, 1992; McHorney et al., 1993, 1994).

Sexual satisfaction and sexual self-worth
Sexual satisfaction was assessed using 100 mm visual analogue scales (VAS) ranging from ‘not at all’ at the 0 mm mark to ‘very much’ at the 100 mm mark as previously described (Elsenbruch et al., 2003). Included were items regarding the impact of hirsutism on sexuality and on the ability to make social contacts, the importance of a satisfying sex life, satisfaction with the sex life during the past month, sexual thoughts and fantasies during the past month, frequency of pain during sexual intercourse, and the feeling of being sexually attractive. Women were instructed to place a mark at the point that best corresponded with their feelings. In this context, there were also items documenting the partnership situation of the subjects, including information about marital status as well as number and duration of relationships. The frequency of sexual intercourse during the past month was also recorded.

Laboratory and clinical parameters
For biochemical analyses, automated chemiluminescence immunoassay systems were used for the determination of LH, FSH, testosterone and blood glucose (ADVIA Centaur, Bayer Vital, Fernwald, Germany), and insulin (Immulite 2000; DPC Biermann, Bad Nauheim, Germany). Intra-assay variation was <5% and inter-assay variation was <8% for all parameters. Parameters of insulin resistance and hyperinsulinaemia were evaluated using a 2 h oral glucose tolerance test (OGTT). Insulin resistance was defined by the homeostasis model assessment (HOMA) model (Matthews et al., 1985) and hyperinsulinaemia by calculating the area under the insulin response curve (AUC-I). Except for amenorrhoeic women, all laboratory parameters were determined in the early follicular phase of the menstrual cycle.

Clinical parameters were assessed by physical examination, including a subjective determination of the presence or absence of acne and the degree of hirsutism by evaluating the Ferriman–Gallwey score (FG) and anthropometric measurements including body weight in kg and body mass index (BMI) calculated as weight/height² (kg/m²). FG scores were routinely evaluated by two physicians independently and never differed by more than two and when not identical, were re-evaluated by a third physician and the median value used. Metabolic syndrome was diagnosed according to the IDF criteria (http://idf.org/webdata/docs/IDF_Metasyndrome_definition.pdf).

Analyses
The SCL-90-R and SF-36 were scored and analysed according to the published guidelines (Franke, 1995; Ware et al., 1998; Schmitz et al., 2000). For VAS scales, the distance from 0 mm to the patient’s mark was measured in millimetres.

Patients were allocated into two groups based on the SCL-90-R GSI t-scores consisting of: (i) patients with possible psychological disorder (SCL cases with GSI ≥63); and (ii) patients with levels of psychological distress in the normal range (SCL non-cases with GSI <63). Two types of analyses were subsequently carried out.

(A) To explore possible differences between SCL cases and SCL non-cases in sociodemographic, clinical, or psychological variables, these two patient groups were statistically compared using independent sample t-tests for comparisons of means of the different questionnaire scales, and using χ²-tests for analyses of frequency distributions (i.e. sociodemographic and clinical parameters shown in Table I). Group means on the scales of the SCL-90-R and SF-36 were also compared to the female German reference population (German norm) using independent-sample t tests. All questionnaire results are reported both without and with adjustment of α for multiple comparisons. To avoid inflation of the risk of Type I error, α levels were adjusted using the conservative Bonferroni method, which applies an adjusted α level that is calculated based on the number of scales in each questionnaire (Dunn, 1961). Data are presented as mean ± SE of the mean (SEM), unless otherwise indicated.
Sociodemographic and clinical characteristics of PCOS cases and PCOS non-cases

All patients who came to our clinic for evaluation had symptoms suggestive of the diagnosis (usually menstrual irregularities and difficulties conceiving), and although some were referred with a suspected diagnosis, in all cases, definite confirmation of the diagnosis was accomplished in our clinic. Therefore, we do not have exact information on the duration of symptomatology prior to the confirmation of the diagnosis. However, patients typically report symptoms since the beginning of puberty, which often go undiagnosed until several years later.

Complete metabolic, hormonal, clinical and psychosocial data were available from a total of n = 143 PCOS patients. The present sample represents a subset of patients which we have previously described in detail with regard to clinical and biochemical characteristics (Hahn et al., 2005). Out of all 143 patients, 22 (15.4%) had a GSI ≥63, indicating marked psychological distress and probable psychological/psychiatric illness (SCL cases). The distribution of GSI data is shown in Figure 1. When compared to SCL non-cases as well as the German norm, SCL cases demonstrated significant elevation on all SCL-90-R dimensions (Figure 2). Scores of PCOS patients in the SCL non-cases group did not differ from the German norm, except for the dimensions Interpersonal Sensitivity, Depression, Phobia, and the PSDI (Figure 2). Following α adjustment,
only differences in Interpersonal Sensitivity and Phobia remained statistically significant.

SCL cases did not differ from SCL non-cases in sociodemographic characteristics such as age, marital status, and education (Table I). With regard to clinical parameters, a significantly greater proportion of SCL cases was clinically obese (Table I). No additional group differences were found for other clinical, endocrine or metabolic variables, including hirsutism score, LH/FSH ratio, serum testosterone, HOMA-IR, AUC-I, or the percentage of patients with metabolic syndrome (Table I). Although a significantly greater proportion of SCL cases had children, the groups did not differ significantly with regard to either the proportion of patients with a currently unfulfilled wish to conceive or with the proportion of patients with anxiety to remain without child (Table I).

Figure 2. Emotional distress, measured with the Symptom Check List 90 (SCL-90-R) in polycystic ovary syndrome (PCOS) patients at psychiatric risk (SCL cases) versus PCOS patients with normal levels of psychological distress (SCL non-cases) and versus the German female reference population (German norm). All data are shown as mean ± SEM. Reported $P$-values are results of independent sample $t$-tests; $**P < 0.001$; $*P < 0.01$. (*)Comparisons between SCL non-cases and German norm do not remain significant following $\alpha$ adjustment. (A) SCL cases had significantly higher scores, indicating greater psychological distress, on all dimensions compared to both PCOS non-cases and the German norm. SOM = Somatization; O-C = Obsessive–Compulsive; IS = Interpersonal Sensitivity; DEP = Depression; ANX = Anxiety; AGR = Aggression; PHOB = Phobia; PAR = Paranoid Ideation; PSY = Psychoticism. (B) SCL cases had significantly higher scores, indicating greater psychological distress, on SCL-90-R global scores compared to SCL non-cases and the German norm. GSI = global severity index; PSDI = positive symptom distress index; PST = positive symptom total, not shown.
Health-related quality of life (SF-36)
SCL cases demonstrated profound reductions in health-related quality of life, measured with the SF-36 scales. Compared to both SCL non-cases as well as the German norm, SCL cases had significantly lower scores, indicating reduced quality of life, on all scales of the SF-36 (Figure 3). Comparisons of SCL non-cases with the German norm revealed decreased scores on all SF-36 scales, except for the scale Physical Role Function, and the Physical Sum score (Figure 3), indicating reduced quality of life despite normal levels of psychological distress.

Sexual satisfaction and sexual self-worth (VAS scales)
Whereas there were no group differences in either the reported frequency of sexual intercourse or the amount of sexual thoughts and fantasies, SCL cases were significantly less satisfied with their sex life (Table I). In addition, SCL cases found themselves significantly less sexually attractive compared to SCL non-cases, and tended to report more difficulties forming social contacts due to their outer appearance (Table II).
In general:

During the past month:

<table>
<thead>
<tr>
<th>Frequency of sexual intercourse, % (n)</th>
<th>GSI ≥63</th>
<th>GSI &lt;63</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 times</td>
<td>28.6 (6)</td>
<td>22.4 (26)</td>
<td>NS</td>
</tr>
<tr>
<td>1–5 times</td>
<td>42.9 (9)</td>
<td>38.8 (45)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>5–10 times</td>
<td>14.3 (3)</td>
<td>23.3 (27)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt;10 times</td>
<td>14.3 (3)</td>
<td>15.5 (18)</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Satisfaction with sex life, mean (SEM):

| (n) | 30.6 (6.1) | 53.6 (2.8) | <0.01 |

Amount of sexual thoughts and fantasies:

| (n) | 51.9 (6.1) | 52.2 (2.6) | 0.60 |

NS = not significant.

Regression analyses

Given the existence of large differences in health-related quality of life between SCL cases and SCL non-cases, we addressed the contribution of psychological distress, measured with the GSI, to health-related quality of life using stepwise multiple regression analyses. Criteria were the SF-36 Physical Sum score and the SF-36 Psychological Sum score. Excluding GSI, predictors for the SF-36 Physical Sum score were BMI ($\beta$ = –0.314, $P < 0.001$) and education ($\beta$ = 0.292, $P < 0.001$). This model explained 22% of the Physical Sum score variability (adjusted $R^2 = 0.22$). Including the GSI did not appreciably change the outcome ($R^2 = 0.27$), with education ($\beta = 0.335$, $P < 0.001$) and BMI ($\beta = –0.319$, $P < 0.01$) again entering the model.

On the other hand, including GSI had a large impact on the results for the Psychological Sum score. Without GSI, current wish to conceive ($\beta = –0.265$, $P < 0.01$) and age ($\beta = 0.194$, $P < 0.05$) entered the model, which explained merely 10% of the variance in Psychological Sum score ($R^2 = 0.1$). However, when GSI was included, GSI entered the model ($\beta = –0.674$, $P < 0.01$), as did education ($\beta = –0.172$, $P < 0.05$). The model with GSI explained 47% of the variance ($R^2 = 0.474$).

Discussion

Since PCOS is a very common disease encountered by both gynaecologists and endocrinologists, a more refined psychosocial comprehension of this disease has important clinical and research implications. Despite increasing evidence of decreased quality of life, mood disturbances, and problems with female identity in women with PCOS (Bruce-Jones et al., 1993; Eggers and Kirchengast, 2001; Sills et al., 2001; Kitzinger and Willmott, 2002; Trent et al., 2002; Coffey and Mason, 2003; Elsenbruch et al., 2003; Hashimoto et al., 2003; Rasgon et al., 2003; Trent et al., 2003; Schmid et al., 2004; Weiner et al., 2004; McCook et al., 2005), the determinants and implications of psychological distress in PCOS deserve further study. Therefore, we assessed the incidence of mental distress in a sample of untreated PCOS patients using self-report measures, and characterized these patients with regard to sociodemographic and clinical characteristics, and quality of life. To identify putative cases of psychiatric/psychological illness, the German version of a widely used screening questionnaire, the SCL-90-R, was utilized (Derogatis, 1983; Franke, 1995; Schmitz et al., 2000). The average of all items, which describe various dimensions of psychosomatic and emotional distress, yields the global severity index (GSI). GSI t-scores ≥63 indicate markedly increased levels of psychological distress and identify cases with probable mental disorder (SCL cases) (Derogatis, 1983; Jacobson et al., 1997; de Groot et al., 1999; Schmitz et al., 2000; Bulow et al., 2002; Beutel et al., 2005). In our sample of 143 untreated PCOS patients, 15.4% (n = 22) patients were identified as SCL cases. A recent study by Sonino et al. (2004) in a heterogeneous population of an endocrine outpatient clinic in Italy reported that 81% of treated patients presented with at least one psychiatric diagnosis upon diagnostic interview. Another report among 33 Swedish treated hypopituitary women and 33 healthy women, revealed that 14 patients but only four controls were identified as cases using the SCL-90-R GSI, corresponding to 42.4% of patients versus 12% of controls (Bulow et al., 2002). Compared to these results, the proportion of 15% of patients with probable psychological/pyschiatric disorder in our sample is relatively low. However, we included only PCOS patients without prior psychiatric diagnoses and without use of psychotropic medications such as antidepressants. Hence, our data cannot be directly compared to other patient samples, and describe patients with thus far undetected psychological problems. It should also be pointed out that more definite conclusions on the frequency and type of psychiatric diagnoses in PCOS would require clinical interviews, which may be more sensitive to assess psychiatric diagnoses. Furthermore, even in PCOS patients below the SCL-based threshold, levels of emotional distress were significantly higher compared to the German reference population, confirming that the diagnosis of PCOS has a negative impact on psychosocial and emotional well-being. Even though this leads to clinically significant psychiatric distress only in a proportion of patients, subclinical levels of distress are very common in PCOS patients and can have profound effects on quality of life. In addition to quality of life, the link between obesity, emotional distress, and decreased sexual self-worth and sexual satisfaction, may also have clinical implications in the treatment of infertility.

In our sample, SCL cases did not differ from patients with normal levels of distress (SCL non-cases) with regard to age, marital status, education, or current wish to conceive. Out of all clinical and metabolic measures, only BMI was identified as being significantly greater in SCL cases. These findings suggest that obesity may represent a risk factor for psychological distress, decreased quality of life, as well as sexual dissatisfaction in patients with PCOS, which is supported by previous
studies (Elsenbruch et al., 2003; Hashimoto et al., 2003; Rasgon et al., 2003; Trent et al., 2005; McCook et al., 2005). Consistent with findings in other endocrinological patient populations, emotional distress was found to have a profound and negative impact on quality of life as well as on sexual satisfaction and sexual self-worth in our sample of PCOS patients. SCL cases were characterized by marked and significant reductions in quality of life, which were particularly pronounced in areas of quality of life concerning mental and social well-being. We subsequently aimed to address the contribution of emotional distress to the observed reductions in quality of life in patients with PCOS using stepwise multiple regression analyses. Our model identified GSI as a significant predictor of decreased quality of life in areas representing emotional and social functioning, along with age and current wish to conceive. With this model, a substantial amount of variance (47%) in the SF-36 Psychological Sum score could be explained. Interestingly, excluding GSI from entering this model reduced the amount of explained variance to 10%, a finding which clearly underscores the pivotal role of GSI in psychosocial aspects of quality of life. On the other hand, psychological distress did not contribute to the prediction of physical quality of life (i.e. the SF-36 Physical Sum score), which was predicted by BMI and education. These data strongly support the notion that emotional distress and psychiatric morbidity are the major factors in explaining the decrements in psychosocial areas of quality of life in PCOS. On the other hand, obesity clearly contributes to decrements in the physical aspects of quality of life, in women with PCOS. In addition, obesity may also have a negative impact on sexual self-worth, body image, and sexual satisfaction. We did not statistically address the role of obesity in sexual dissatisfaction in PCOS, since almost all patients in our sample of SCL cases were overweight, but the importance of obesity in PCOS-related sexuality problems should be further explored.

These findings have important implications for clinicians who should be aware of possible psychological/psychiatric disorders in patients with PCOS. Except for obesity, which appears to be a risk factor, our data suggest that the degree of emotional problems and reduced quality of life can neither be predicted by the presence or absence of clinical symptoms, nor can psychosocial well-being be expected to be proportional to symptom severity. Hence, it would be important to pay attention to the psychosocial dimension of PCOS on an individual basis, regardless of symptom severity. It remains to be determined whether or not the psychosocial problems of PCOS can be ameliorated with the treatment of clinical symptoms alone. Based on recent data from other endocrine patient populations which clearly show persisting psychosocial distress and reduced quality of life even following treatment (Bulow et al., 2002; Sonino et al., 2004), one may speculate that the treatment of PCOS may require more than attention to medical symptoms alone. In order to enhance our understanding of the undoubtedly complex interactions between psychosocial and medical aspects of PCOS, an interdisciplinary approach not only involving gynaecologists and endocrinologists, but also psychologists and psychiatrists, is warranted.

References


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