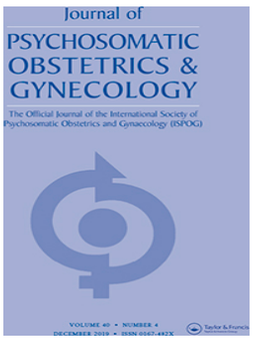

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ORIGINAL ARTICLE



# Body image, personality profiles and alexithymia in patients with polycystic ovary syndrome (PCOS)

Elisabetta Scaruffi[a], Isabella Giulia Franzoi[b], Cristina Civilotti[b], Fanny Guglielmucci[b], Luana La Marca[c], Michela Tomelini[d], Fabio Veglia[b] and Antonella Granieri[b]

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**ABSTRACT**

**Aim:** Polycystic ovary syndrome (PCOS) is a common endocrine-metabolic disorder. It affects women's physical well-being and leads to great psychological distress. Indeed, women with PCOS show a compromised quality of life as well as impaired emotional well-being. The aim of this study is to assess personality characteristics, body image and alexithymia in women with PCOS.

**Materials and methods:** A total of 59 women with PCOS and 38 healthy controls were administered the Toronto Alexithymia Scale (TAS), the Body Uneasiness Test (BUT) and the Minnesota Multiphasic Personality Inventory-2 (MMPI-2).

**Results:** The PCOS group showed higher values of alexithymia and a higher body uneasiness. They also showed higher values on many clinical, content and supplementary scales of the MMPI-2.

**Discussion:** It seems that physical appearance and bodily function have a central place in the minds of women with PCOS, as well as in their relationships. However, it is a body they find it hard to feel and with which they mostly feel uncomfortable. Their approach to the outside world seems to be characterized by a certain degree of immaturity, anger, hostility and distrust. Low self-esteem also seems to be connected to a certain tendency toward introversion and withdrawal. This leads to problems in social, professional and intimate relationships.

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Polycystic ovary syndrome; personality; alexithymia; body image; MMPI-2

## Introduction

Polycystic ovary syndrome (PCOS) is a common endocrine-metabolic disorder affecting reproductive-age women. Its estimated prevalence ranges from 5 to 10% of adult female population [1–3], but can be up to 20% depending on the diagnostic criteria used [4]. The National Institute of Health criteria include only hyperandrogenism and anovulation [5], whereas the Rotterdam consensus workshop of the European Society for Human Reproduction and Embryology/American Society for Reproductive Medicine added as a third criterion the ultrasonographic evidence of polycystic ovaries, stating that any 2 of the 3 criteria are sufficient for diagnosis [6]. This leads to an increased prevalence of the syndrome [7].

Symptoms include anovulation, irregular menstrual cycles, micropolycystic ovaries and clinical and/or biochemical hyperandrogenism (e.g. hirsutism, acne and alopecia) [8–10]. PCOS is also associated with obesity, and it is the leading cause of female infertility [11]. Long-term health risks associated with PCOS include type 2 diabetes [12,13], uterine and endometrial cancer [14,15], irritable bowel syndrome [16], thyroid disorders [17,18] and metabolic disturbances (i.e. cardiovascular disease [19], dyslipidemia and hypertension [15,20]).

The causes of PCOS are still unknown, although some studies suggest that a combination of insulin resistance and an increase in androgens contribute to its development [21], as well as genetics [22,23].

PCOS affects women's physical well-being and leads to great psychological distress, compromising their quality of life [24–26]. It was found to be co-morbid with several mental disorders (Table 1). Depending on the disorder and the criteria used for the assessment, its comorbidity with mood disorders ranges from 18.2 to 81%, while its comorbidity with anxiety disorders ranges from 2.8 to 35.7% [27–34]. Women with PCOS not only seem to be more depressed than controls, but their level of depression tends to be

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Table 1. Most common co-morbidities.

| Co-morbidities | Prevalences (%) |
|---|---|
| Mood disorders | 18.2–81 |
| Self-reported moodiness | 81 |
| Depression | 5–40 |
| Bipolar disorder | 7.7–11.1 |
| Dysthymia | 4.2 |
| Chronic anxiety | 35.7 |
| Anxiety | 18–34 |
| Self-reported anxiety | 27 |
| Generalized anxiety disorder | 13–9.7 |
| Anxiety + depression | 15 |
| Social phobia | 4.2–27 |
| Agoraphobia | 2.8 |
| Personality disorders | 2.9 |
| Schizoaffective disorder | 1.7 |
| PTSD | 1.4 |
| BED | 1.4 |
| Schizophrenia | 1.4 |
| Somatoform disorder | 0.9 |

more severe [31–33]. Studies have shown that PCOS seems to be comorbid with other mental disorders such as bipolar and posttraumatic stress disorders, somatization and obsessive–compulsive functioning [35,36]. Moreover, women with PCOS are approximately twice as likely to be hospitalized for stress, anxiety, depression, illicit drug use and self-harm behaviors [37].

The low level of quality of life in women with PCOS has been related to anxiety and depression. However, it is difficult to determine whether depression and/or anxiety influence lower perceived quality of life or whether poor perception of quality of life increases depression and/or anxiety [27].

It has also been suggested that PCOS symptoms contribute to decreasing women's quality of life [38,39]. Hirsutism, acne and obesity deeply undermine women's self-esteem, self-image and self-worth due to a lower perception of the feminine identity, with a great impact on their social life as well as intimate and sexual relationships [40–42]. Body image is also compromised by infertility and sterility, and the pressure that women with PCOS feel to have children early in life has been identified as an additional source of stress [33,43].

The relationship between PCOS and psychological distress, psychiatric disorders and quality of life has been extensively studied, as well as the body image of women with PCOS. However, psychological aspects such as personality, attachment style and emotion regulation are deeply understudied in relation to this disorder, even though they have a great importance for the clinical management of the disease.

Indeed, as far as we know, only two studies have explored the relationship between PCOS and personality profiles: one through the Rorschach test [44] and one through the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) [45], underlining that patients with PCOS show higher rates of clinical elevations on depression, hysteria, psychasthenia and hypomania, as well as higher absolute scores on the same scales.

Only one study has investigated emotion regulation strategies in women with PCOS [46], and no study has investigated attachment related to this syndrome.

The overall rationale of our study was to assess (1a) personality characteristics, (1b) emotional awareness, (1c) emotion regulation strategies, (1d) attachment and (1e) body image in a group of women with PCOS by comparing them to a control group of healthy women. At the same time, we wanted to explore (2a) whether psychological variables such as attachment, emotion dysregulation and body uneasiness were associated with an impaired quality of life and (2b) whether such associations differ in women with PCOS and in the controls.

We hypothesized that compared to controls, women with PCOS are characterized by (1a) more dysfunctional personality characteristics, (1b) lower emotional awareness, (1c) more dysfunctional emotion regulation strategies, (1d) more insecure attachment and (1e) worse body image. We also hypothesized that (2a) emotion dysregulation, insecure attachment and body uneasiness are connected to a lower quality of life, and that (2b) the association between quality of life and psychological variables differs between women with PCOS and in the controls, with a stronger association between physical quality of life, emotion dysregulation and insecure attachment in women with PCOS than in the controls.

Since the study has taken into account a number of different variables concerning psychological functioning in women with PCOS, in this article we would like to focus on hypotheses 1a, 1b and 1e. Results concerning our other hypotheses are presented elsewhere [47].

## Materials and methods

### *Participants*

We progressively enrolled a convenience sample of 59 outpatients at the two gynecological endocrinology services of the University Hospital Città della Scienza e della Salute in Turin. Inclusion criteria for PCOS patients were defined according to the revised criteria of the Rotterdam Consensus Workshop [6]. As stated before, these criteria require 2 out of 3 between oligo- and/or anovulation, clinical and/or biochemical signs of hyperandrogenism and polycystic ovaries, with the exclusion of other etiologies. Oligomenorrhoea was

defined as an interval between two menstruations of at least 35 d, whereas amenorrhea was defined as the absence of vaginal bleeding for at least 3 months. Data on menstrual patterns were self-reported. Clinical hyperandrogenism was defined as the presence of hirsutism (Ferriman–Gallwey total score >5), acne and/or androgenic alopecia. Biochemical hyperandrogenism was determined by total testosterone, dehydroepiandrosterone (DHEAS) and sex hormone-binding globulin (SHBG) on fasting blood samples. Women with other causes of androgen excess or related disorders, such as congenital adrenal hyperplasia, cushing syndrome or an androgen-secreting tumor were excluded. All the patients underwent a transvaginal ultrasonography to assess ovarian morphology. Polycystic ovarian morphology was diagnosed according to the presence of 12 or more follicles in each ovary measuring 2–9 mm in diameter and/or the presence of increased ovarian volume (>10 ml) in 1 or both ovaries [48].

The control group of 38 healthy age-matched women was enrolled through local general practitioners. Inclusion criteria for the control group were (1) absence of severe gynecological diseases and (2) history of a regular menstrual cycle.

Exclusion criteria for both the PCOS and the control groups were (1) having a poor knowledge of the Italian language, (2) having a certified psychiatric diagnosis, (3) having a certified diagnosis of a neurogenerative disease (i.e. Alzheimer disease, Parkinson disease, etc.), (4) having a certified medical disease, (5) being pregnant and (6) having been in psychiatric or psychological therapy in the last 6 months. Criterion 1 was set in order to ensure a correct understanding of the questionnaires; Criteria 2–6 were set in order to exclude the influence of other psychological, neurological or physical variables on our data.

## Ethical approval

The study protocol was approved by the Hospital Ethical Committee. All participants were given a complete description of the study and gave informed written consent before entering the study. All research procedures were conducted in accordance with the ethical standards of the committees responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

## Measures

This research is part of a wider study aimed at assessing psychological variables in women with PCOS compared to a control group [47]. The complete study included the administration of the Short-Form Health Survey (SF-36), the Attachment Style Questionnaire (ASQ), the Difficulties in Emotion Regulation Scale (DERS), the Toronto Alexithymia Scale (TAS-20), the Body Uneasiness Test (BUT) and the MMPI-2.

The administration was conducted at the clinic in the presence of a psychologist. Because of the number of measures and the number of items in the MMPI-2, the questionnaires were completed in two sessions: one in which the MMPI-2 was administered, and one for the other measures. Half of the sample completed the MMPI-2 in the first session, and the other half in the second one. The average time to completion was 84 min for the MMPI-2 (range 53–101 min) and 46 min for the other questionnaires (range 23–65 min).

For the purposes of the present research, we consider only the scores obtained from the TAS-20, the BUT and the MMPI-2.

The TAS-20 [49,50] is a frequently used 20-item self-reported measure of alexithymia. The psychometric properties of the scale have been validated across cultures. A score of ≥61 is considered to be indicative of alexithymia, whereas scores between 51 and 60 indicate borderline alexithymia. It has a 3-factor structure: Difficulty in Identifying Feelings (TAS-DIF); Difficulty in Describing Feelings (TAS-DDF) and Externally Oriented Thinking (TAS-EOT). Cronbach's alpha coefficients were 0.89 for TAS-DIF, 0.83 for TAS-DDF and 0.81 for TAS-EOT.

The BUT [51] is a 71-item self-administered questionnaire for the clinical assessment of body image disorders and related psychopathologies. It consists of 2 different scales: the BUT-A is a 34-item scale assessing body shape, weight dissatisfaction, avoidance, compulsive control behaviors, detachment and estrangement feelings toward one's own body; the BUT-B is a 37-item scale assessing specific worries about particular body parts, shapes or functions such as buttocks, odor and blushing. For the purpose of this study, analyses were performed on the Global Severity Index (BUT-GSI), which is computed as the average of the scores observed on the 34 items comprising the BUT-A section, and the Positive Symptom Total Index (BUT-PST), which represents the total number of BUT-B items rated higher than zero. In this study, the internal consistency reliability coefficients were 0.91 for the BUT-A and 0.88 for the BUT-B.

The MMPI-2 [52,53] is a standardized psycho-diagnostic instrument that consists in 567 dichotomous questions (true or false) designed to provide psychopathological information in different scales: 3 validity

**Table 2.** Descriptive statistics.

| | PCOS | | | Controls | | | |
|---|---|---|---|---|---|---|---|
| | *N* | *M* | SD | *N* | *M* | SD | *t* test (*p* Values) |
| Age | 59 | 25.64 | 5.09 | 38 | 25.08 | 4.81 | −0.545 (.587) |
| BMI | 59 | 25.85 | 6.17 | 38 | 21.81 | 4.32 | −3.782 (≤.001) |
| School years | 59 | 15.93 | 3.62 | 38 | 16.24 | 2.68 | −0.446 (.657) |

**Table 3.** *t*-Test results comparing the PCOS and the control groups at the TAS-20.

| | PCOS | | Controls | | |
|---|---|---|---|---|---|
| | *M* | SD | *M* | SD | *t* test (*p* Values) |
| TAS-DIF | 50.56 | 18.49 | 42.10 | 16.93 | −2.270 (.025) |
| TAS-DDF | 54.37 | 20.33 | 51.89 | 21.11 | −0.577 (.565) |
| TAS-EOT | 42.08 | 10.44 | 38.29 | 11.44 | −1.679 (.096) |
| TAS TOT | 48.12 | 12.07 | 43.03 | 10.52 | −2.131 (.036) |

TAS-DIF: difficulty in identifying feelings; TAS-DDF: difficulty in describing feelings; TAS-EOT: externally oriented thinking; TAS TOT: total score of alexithymia

scales, 10 clinical scales, 16 supplementary scales and 15 content scales. The results on the MMPI-2 test are expressed in standardized *t* scores. Thus, a scale score is considered indicative of psychological dysfunction when the *t* value is ≥65. We dichotomously classified each individual in terms of whether or not each scale was in the clinically elevated range. The internal consistency reliability coefficients in our sample ranged between 0.23 and 0.91 for the clinical scales (masculinity/femininity vs. social introversion); between 0.72 and 0.88 for the content scales (Type A vs. Depression) and between 0.65 and 0.91 for the supplementary scales (addiction potential scale vs. post-traumatic stress disorder).

### *Statistical analyses*

All statistical analyses were conducted using the Statistical Package version 24 for the Social Sciences (IBM Corp., Armonk, NY). All tests were 2-tailed, and we set the statistical significance at $p \leq .05$. We performed descriptive statistics to describe demographic and clinical features in the two samples. The existence of mean differences across the PCOS and control groups on the demographic and clinical data was investigated using *t* tests and Pearson Chi-squares.

## Results

Descriptive statistics for the demographic and clinical data for the PCOS and the control groups are reported in Table 2. As expected, women with PCOS show a higher mean value on body mass index (BMI; $p \leq .000$).

Tables 3 to 5 present the clinical data for the PCOS and the control groups. Concerning the TAS-20 (Table 3), the PCOS group shows higher values than the control group on the Difficulty in Identifying Feelings scale ($p = .025$) and in the Total scale ($p = .036$). On the BUT (Table 4), PCOS patients show higher values compared to the controls in both the Positive Symptom Total Index ($p = .015$) and the

**Table 4.** *t*-Test results comparing the PCOS and the control groups at the BUT.

| | PCOS | | Controls | | |
|---|---|---|---|---|---|
| | *M* | SD | *M* | SD | *t* test (*p* Values) |
| PST | 19.59 | 9.99 | 14.66 | 8.82 | −2.483 (.015) |
| GSI | 1.68 | 1.03 | 1.05 | 0.81 | −3.201 (.002) |

PST: positive symptom total index; GSI: global severity index

**Table 5.** *t*-Test results comparing the PCOS and the control groups at the MMPI-2.

| | PCOS | | Controls | | |
|---|---|---|---|---|---|
| | *M* | DS | *M* | DS | *t* test (*p* Values) |
| L | 51.00 | 8.73 | 53.16 | 7.06 | 1.277 (.205) |
| F | 57.49 | 12.13 | 48.97 | 7.39 | −3.884 (≤.001) |
| K | 46.83 | 10.39 | 52.42 | 10.47 | 2.579 (.011) |
| Hs | 60.91 | 11.91 | 53.42 | 11.05 | −3.111 (.002) |
| D | 58.39 | 13.22 | 50.45 | 10.18 | −3.330 (.001) |
| Hy | 54.85 | 10.62 | 50.50 | 8.81 | −2.099 (.038) |
| Pd | 59.78 | 8.38 | 55.92 | 4.40 | −2.969 (.004) |
| Mf | 46.24 | 9.36 | 47.87 | 7.65 | 0.898 (.371) |
| Pa | 55.98 | 10.93 | 50.37 | 9.49 | −2.596 (.011) |
| Pt | 57.19 | 11.24 | 51 | 8.75 | −3.034 (.003) |
| Sc | 59.12 | 9.26 | 54.55 | 5.44 | −3.055 (.003) |
| Ma | 50.76 | 10.18 | 51.47 | 9.59 | 0.343 (.732) |
| Si | 54.30 | 10.36 | 48.16 | 10.23 | −2.867 (.005) |
| ANX | 57.88 | 12.34 | 49.53 | 9.79 | −3.698 (≤.001) |
| FRS | 52.17 | 10.21 | 47.76 | 7.61 | −2.429 (.017) |
| OBS | 55.53 | 11.82 | 48.47 | 8.11 | −3.382 (.001) |
| DEP | 55.75 | 10.11 | 47.68 | 7.95 | −4.153 (≤.001) |
| HEA | 60.36 | 12.28 | 51.55 | 10.53 | −3.639 (≤.001) |
| BIZ | 53.92 | 10.31 | 51.40 | 7.49 | −1.301 (.196) |
| ANG | 50.76 | 10.85 | 49.42 | 9.63 | −0.621 (.536) |
| CYN | 53.58 | 11.36 | 49.87 | 10.19 | −1.633 (.106) |
| ASP | 49.03 | 7.58 | 46.84 | 7.07 | −1.427 (.157) |
| TPA | 52.56 | 12.19 | 51.32 | 10.77 | −0.513 (.609) |
| LSE | 54.31 | 11.35 | 47.63 | 8.46 | −3.309 (.001) |
| SOD | 53.39 | 11.82 | 48.13 | 9.73 | −2.287 (.024) |
| FAM | 53.68 | 11.01 | 47.63 | 7.78 | −3.167 (.002) |
| WRK | 55.92 | 11.23 | 48.63 | 8.05 | −3.716 (≤.001) |
| TRT | 54.73 | 10.90 | 48.45 | 9.22 | −2.938 (.004) |
| Fb | 55.54 | 13.12 | 46.84 | 6.64 | −4.309 (≤.001) |
| TRIN | 65.44 | 10.19 | 64.32 | 8.23 | −0.571 (.569) |
| VRIN | 52.29 | 10.37 | 48.47 | 8.70 | −1.881 (.063) |
| MAC | 48.76 | 10.29 | 49.11 | 9.70 | 0.184 (.870) |
| APS | 48.17 | 8.56 | 47.61 | 8.08 | −0.324 (.747) |
| AAS | 55.29 | 10.32 | 54.58 | 11.30 | −0.318 (.751) |
| PK | 58.07 | 13.00 | 48.74 | 8.98 | −4.179 (≤.001) |
| OH | 48.88 | 9.38 | 51.58 | 8.57 | 1.429 (.156) |
| MDS | 53.97 | 12.61 | 49.21 | 8.15 | −2.256 (.026) |

L: lie; F: frequency; K: defensiveness; Hs: hypochondriasis; D: depression; Hy: hysteria; Pd: psychopathic deviation; Mf: masculinity/femininity; Pa: paranoia; Pt: psychasthenia; Sc: schizophrenia; Ma: hypomania; Si: social introversion; ANX: anxiety; FRS: fears; OBS: obsessiveness; DEP: depression; HEA: health concerns; BIZ: bizarre mentation; ANG: anger; CYN: cynicism; ASP: antisocial practices; TPA: type A; LSE: low self-esteem; SOD: social discomfort; FAM: family problems; Fb: back F; TRIN: true response inconsistency; VRIN: variable response inconsistency; MAC: MacAndrew scale; APS: addiction potential scale; AAS: addiction admission scale; PK: post-traumatic stress disorder; OH: over-controlled hostility; MDS: marital distress scale

Table 6. Percentage of elevations in MMPI-2 scales.

| | PCOS (%) | Controls(%) | Chi squares (*p* Values) |
|---|---|---|---|
| L | 1.7 | 2.6 | 0.100 (.751) |
| F | 20.3 | 5.3 | 4.254 (.039) |
| K | 5.1 | 13.2 | 1.991 (.158) |
| Hs | 39.0 | 18.4 | 4.574 (.032) |
| D | 30.5 | 7.9 | 6.968 (.008) |
| Hy | 16.9 | 7.9 | 1.633 (.201) |
| Pd | 22.0 | 2.6 | 7.045 (.008) |
| Mf | 0 | 0 | Constant |
| Pa | 16.9 | 2.6 | 4.713 (.030) |
| Pt | 22.0 | 7.9 | 3.355 (.067) |
| Sc | 23.7 | 2.6 | 7.870 (.005) |
| Ma | 10.2 | 10.5 | 0.003 (.955) |
| Si | 16.9 | 7.9 | 1.633 (.201) |
| ANX | 32.2 | 10.5 | 6.004 (.014) |
| FRS | 11.9 | 2.6 | 2.604 (.107) |
| OBS | 16.9 | 5.3 | 2.912 (.088) |
| DEP | 20.3 | 0.0 | 8.820 (.003) |
| HEA | 28.8 | 15.8 | 2.167 (.141) |
| BIZ | 11.9 | 2.6 | 2.604 (.107) |
| ANG | 10.2 | 7.9 | 0.142 (.706) |
| CYN | 15.3 | 10.5 | 0.445 (.505) |
| ASP | 3.4 | 2.6 | 0.044 (.833) |
| TPA | 13.6 | 13.2 | 0.003 (.955) |
| LSE | 18.6 | 5.3 | 3.566 (.059) |
| SOD | 11.9 | 5.3 | 1.197 (.274) |
| FAM | 15.3 | 2.6 | 3.983 (.046) |
| WRK | 20.3 | 2.6 | 6.244 (.012) |
| TRT | 13.6 | 5.3 | 1.720 (.190) |
| Fb | 18.6 | 0 | 7.991 (.005) |
| TRIN | 35.6 | 36.8 | 0.016 (.901) |
| VRIN | 6.8 | 2.6 | 0.813 (.367) |
| MAC | 3.4 | 7.9 | 0.959 (.327) |
| APS | 0 | 2.6 | 1.569 (.210) |
| AAS | 15.3 | 18.4 | 0.168 (.682) |
| PK | 32.2 | 7.9 | 7.788 (.005) |
| OH | 1.7 | 5.3 | 0.982 (.322) |
| MDS | 23.7 | 5.3 | 5.722 (.017) |

Global Severity Index ($p = .002$) scales. On the MMPI-2 (Table 5), patients with PCOS show significantly higher values in the Frequency Validity Scale ($p \leq .001$) and lower values in the Defensiveness Scale ($p \leq .011$). Patients show higher values in 8 out of 10 Clinical Scales: hypochondriasis ($p \leq .002$), depression ($p = .001$), hysteria ($p = .038$), psychopathic deviation ($p = .004$), paranoia ($p = .011$), psychasthenia ($p = .003$), schizophrenia ($p = .003$) and social introversion ($p = .005$). On the content scales, women with PCOS show higher values on the following scales: anxiety ($p \leq .001$), fears ($p = .017$), obsessiveness ($p = .001$), depression ($p \leq .001$), health concerns ($p \leq .001$), low self-esteem ($p = .001$), social discomfort ($p = .024$), family problems ($p = .002$), work interference ($55.92 \pm 11.23$ vs. $48.63 \pm 8.05$, $p \leq .001$) and negative treatment indicators ($p = .001$). On supplementary scales, PCOS patients show higher values on the following scales: Back F ($p \leq .001$), posttraumatic stress disorder ($p \leq .001$) and marital distress ($p \leq .026$).

As shown in Table 6, PCOS patients have significantly higher percentages of clinical elevation on the following scales: frequency ($p = .039$), hypochondriasis ($p = .032$), depression ($p = .008$), psychopathic deviation ($p = .008$), paranoia ($p = .030$), schizophrenia ($p = .005$), anxiety ($p = .014$), depression ($p = .003$), family problems ($p = .046$), work interference ($p = .012$), posttraumatic stress disorder ($p = .005$) and marital distress ($p = .017$).

## Discussion

This study is part of more complex research aimed at assessing the psychological characteristics of women with PCOS compared to a control group of healthy women and exploring potential correlations between some of these characteristics [47]. However, with the number of different variables taken into account, in this article we chose to focus on the assessment of personality characteristics, emotional awareness and body image in the group of women with PCOS compared to controls. It was hypothesized that women with PCOS exhibit worse body image, lower emotional awareness and more dysfunctional personality characteristics.

Results confirm all of our hypotheses.

Consistent with previous literature [1], this study shows a higher BMI in women with PCOS. Moreover, results confirm our first hypothesis, indicating that PCOS patients are characterized by a higher body uneasiness than healthy controls. Disease-related body appearance (e.g. obesity, hirsutism and acne) may contribute to reducing the feminine identity of patients, compromising their body image. Women with PCOS tend not to see themselves as fitting social and media standards for body appearance, and this can give rise to depression and impairment in their emotional well-being.

Concerning our second hypothesis, a higher overall alexithymia score emerged as well as a greater difficulty in identifying feelings. From a psychoanalytic perspective, we can hypothesize that not only do PCOS patients feel unease with their own bodies – perceived as inadequate, wrong or somehow bad – but they also struggle with the subsymbolic messages that arise from their hatred body. In other words, their difficulties at a somatopsychic level seem to be connected to both the looking–seeing domain and the feeling–sensing one [47]. When it comes to our last hypothesis, differences emerged in many scales, much more than the ones that were found statistically significant in the only other study that has investigated the relationship between PCOS and personality domains through the MMPI-2 [45]. We found significant differences in the mean scores on frequency (F) and defensiveness (K) validity scales. Among clinical

scales, we found significant differences in the mean scores of hypochondriasis (Hs), depression (D), hysteria (Hy), psychopathic deviation (Pd), paranoia (Pa), psychasthenia (Pt), schizophrenia (Sc) and social introversion (Si). On the content scales, women with PCOS show higher values of anxiety (ANX), fears (FRS), obsessiveness (OBS), depression (DEP), health concerns (HEA), low self-esteem (LSE), social discomfort (SOD), family problems (FAM), work interference (WRK) and negative treatment indicators (TRT). On supplementary scales, PCOS patients show higher values on Back F (Fb), posttraumatic stress disorder (PK) and marital distress scale (MDS). Moreover, PCOS patients showed significantly higher percentages of clinical elevation on frequency (F), hypochondriasis (Hs), depression (D), psychopathic deviation (Pd), paranoia (Pa), schizophrenia (Sc), anxiety (ANX), depression (DEP), family problems (FAM), work interference (WRK), posttraumatic stress disorder (PK) and marital distress (MD).

Women with PCOS seem to experience greater psychological distress (F; Fb) than healthy controls, as well as fewer defenses against their mental suffering (K), affecting their internal lives with intense feelings of anguish and despair.

Consistent with previous research [27,30,44], PCOS patients seem to experience higher levels of anxiety and depression (D, ANX, FRS and DEP).

The relationship between PCOS, anxiety and depression has been widely debated. Indeed, many studies support the idea that PCOS clinical facets (e.g. obesity, testosterone levels, hirsutism and menstrual irregularities) may be risk factors for psychological distress and depression in patients with and without PCOS [54–57]. However, other studies have pointed out that depression and anxiety are independent from PCOS symptoms, such as obesity, hirsutism or acne [30,58]. From our psychoanalytical perspective, since the perception of self-worth has been found to influence mood [59,60], it would be interesting to further research the connection between depression levels and impaired body image.

Scores on the somatic scales (Hs and Hy) were higher in women with PCOS than in the controls. It seems that body appearance and body functioning have a central place in the minds of women with PCOS as well as in their relationships. However, it is a body they find it hard to feel and with which they mostly feel uncomfortable, as suggested by the results obtained with the BUT. This, together with alexithymia, can have a great impact on illness perception [61] and can exacerbate their worries about their health (HEA).

Women with PCOS show higher levels of posttraumatic symptomatology (PK). We can assume that living with a gynecological disease can be in itself a traumatic condition that gives rise to dysregulated emotions. Moreover, traumatic conditions during development can increase women's somatopsychic vulnerability and their risk for physical health problems [62], leading to more dysfunctional emotion regulation strategies [63,64].

The constant preoccupation with a body they found it difficult to feel, together with a distorted body image, can be traced to the root of some obsessions (Pt and OBS), which could be explained by fixation on the idea that there is something strange in them they need to fix. This is consistent with previous literature showing that PCOS patients exhibit an exaggerated introspective behavior that could lead to pathological self-criticism and ruminative thinking [44].

Moreover, women with PCOS seem to be sometimes immature in dealing with the external world, so that they cannot pursue their desires and fantasies with reality-anchored intentionality and fulfilling behaviors (Sc).

Hatred of the body and its limits is often projected on the outside world (Pa), giving rise to intense anger, hostility and distrust (Pd; TRT). These results are consistent with previous research in underlining that women with PCOS seem to use more psychic energy than needed, to express their anger outwardly, and to have difficulty tolerating frustration [65,66].

The result is higher introversion and withdrawal from others (Si), connected to low self-esteem (LSE) and leading to problems in social, professional and intimate relationships (MDS; SOD; FAM; WRK).

These results are consistent with previous research [9,67–69] in underlining that PCOS strongly impacts the social lives of women, adversely affecting their leisure time as well as their relationships with their families and friends, mostly because of their perceived unattractiveness. It also compromises marital relationships; women with PCOS often indicate lower satisfaction with their sex lives and a lower perception of their own sexual attractiveness.

## Limitations and clinical implications

This study has some critical limitations. First of all, the generalizability of the results is limited by our small, Italian-only convenience sample, collected in only one center. Second, the cross-sectional design does not allow for causal inferences or following the development of the variables over time. Further longitudinal

studies are needed. Psychological variables were assessed through self-report measures; further studies should also take into account clinical and observational data. In addition, variables likely to influence psychological factors, such as hormonal levels, different symptoms (such as hirsutism, infertility, etc.) or gravity of symptoms were not examined in our study. Future research should take these aspects into account.

Despite these limitations, this study gives a more comprehensive evaluation of the psychological functions of women with PCOS. In particular, it sheds light on body image, emotional awareness and specific dysfunctional personality characteristics in women with PCOS.

These results are of great importance for both psychologists and gynecologists that take care of PCOS women and may have relevant clinical implications for planning psychological interventions for this population.

In fact, psychological variables are often inconspicuously and marginally taken into account in the clinical management of physical disorders such as PCOS. However, underlining specific dysfunctional psychological profiles in women with PCOS highlights the need for integrated health care protocols that also take women's mental functioning in to account, in both the assessment and the treatment phase.

Moreover, our preliminary results may help clinicians pay attention to quality of life, depression and anxiety in women with PCOS, as well as the personality characteristics of these women, an aspect that has been widely understudied and underestimated in previous research and in clinical practice.

This may improve patients' psychological and physical well-being as well as their compliance and the quality of the clinical management of the disease [70–72], benefitting the societal costs of the health care system [73].

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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## ➢ Current knowledge on the subject

- Women with PCOS show impaired emotional well-being (in particular, anxiety and depression).
- Women with PCOS show body dissatisfaction and compromised quality of life.
- On the MMPI-2 clinical scales, patients with PCOS show higher rates of clinical elevations on depression, hysteria, psychasthenia and hypomania, as well as higher absolute scores on the same scales.

## ➢ What this study adds

- In our research, women with PCOS seem to be characterized by a dysfunctional body image and a compromised emotional awareness.
- They show significant differences compared to our sample of healthy women in the mean scores of many validity, clinical, content and supplementary scales of the MMPI-2. In particular, they seem to have fewer defenses against mental suffering. Moreover, it seems that body appearance and bodily function have a central place in their mind as well as in their relationships. However, it is a body they find it hard to feel and with which they mostly feel uncomfortable.
- Their approach to the outside world seems to be conflictual, and they seem to be characterized by introversion and withdrawal. This may lead to problems in social, professional and intimate relationships.