

# Sexuality in women with polycystic ovary syndrome

## Seksualność kobiet z zespołem policystycznych jajników

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### Abstract

**Objectives:** This study aimed to compare sexual function and sexual response, attitude toward sexuality, and relationships with sexual partners in women diagnosed with PCOS and healthy controls.

**Material and methods:** The study included 73 women (aged 23–42 years) diagnosed with PCOS using the Rotterdam criteria and 45 healthy controls. All participants completed a questionnaire assessing socioepidemiological parameters and sexual behavior. Validated instruments were used to assess hirsutism (Ferriman-Gallwey Scale), mental health status (General Health Questionnaire 12 [GHQ 12]), sexuality (Sexuality Scale [SS], Sexual Awareness Questionnaire [SAQ], Multidimensional Sexuality Questionnaire [MSQ], Multidimensional Sexual Self-Concept Questionnaire [MSSCQ]), and sexual function (Polish version of the Mell-Krat Scale [SFK/K Scale]).

**Results:** There were no statistically significant differences in the importance of sexual activity in both groups. Mean scores for the SFK/K Scale, SS, SAQ, MSQ, and MSSQ were similar among women with PCOS and controls, regardless of age. Similarly, sexual needs and reactions were perceived in the same way by both groups. In contrast, women with PCOS rated themselves negatively as sexual partners more frequently than controls.

**Conclusions:** Sexual function and sexual response, attitude toward sexuality, as well as relationships with sexual partners were similar in PCOS subjects and healthy women. However, changes in physical appearance typically associated with PCOS result in deterioration of sexual function. Therefore, it is recommended that all PCOS patients should be referred to a sexual medicine specialist for consultation.

Key words: **polycystic ovary syndrome / sexuality / sexual function / sexual reactions / attitudes /**

### Streszczenie

**Cel pracy:** Celem pracy było porównanie funkcji seksualnych i reakcji seksualnych, postawy wobec seksualności, oraz relacje z partnerem seksualnym u kobiet, u których zdiagnozowano zespołem jajników policystycznych (PCOS) i kobiet zdrowych.

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**Materiał i metody:** *Badaniami objęto grupę 73 kobiet w wieku 23-42 lat, u których zdiagnozowano PCOS wg kryteriów Rotterdamskich oraz grupę kontrolną – 45 zdrowych kobiet. Wszyscy uczestnicy badania wypełnili kwestionariusz zawierający pytania dotyczące parametrów demograficznych, społeczno-kulturowych oraz zachowań seksualnych. Ponadto zastosowano walidowane narzędzia do oceny: hirsutyzmu (Skala Ferriman-Gallwey), stanu zdrowia psychicznego (Kwestionariusze Ogólnego Stanu Zdrowia – GHQ 12), seksualności: Test Postaw Wobec Seksualności – SS, Test Seksualnej Samoświadomości – SAQ, Wielowymiarowy Test Seksualności – MSQ, Wielowymiarowy Test Seksualnego „Ja” – MSSCQ oraz funkcji seksualnych (polska wersja Mell-Krat Scale – SFK/K).*

**Wyniki:** *Nie stwierdzono statystycznie istotnych różnic w znaczeniu aktywności seksualnej dla badanych kobiet w obu grupach. Średnie uzyskanych wyników dla skal: SFK/K, SS, SAQ, MSQ i MSSCQ były podobne u kobiet z PCOS i tych z grupy kontrolnej niezależnie od wieku. Podobnie, potrzeby seksualne i reakcje były postrzegane w taki sam sposób w obu grupach. Natomiast kobiety z PCOS oceniały siebie gorzej w roli partnerek seksualnych w porównaniu do zdrowych.*

**Wnioski:** *Funkcje seksualne i reakcje seksualne, postawy wobec seksualności, a także relacje z partnerem seksualnym były podobne u osób z PCOS i zdrowych kobiet. Jednakże zmiany w wyglądzie fizycznym występujące u kobiet z PCOS mogą powodować pogorszenie funkcji seksualnych. Dlatego też zaleca się, aby wszyscy pacjenci z PCOS byli kierowani na konsultacje do specjalistów z dziedziny medycyny seksualnej.*

Słowa kluczowe: **zespół jajników policystycznych / seksualność / funkcje seksualne / reakcje seksualne / postawy /**

## Introduction

Female sexuality is a multisystem construct rooted in biologic, psychosexual, and context-related factors. A physiological response to sexual stimuli requires an integrity of the hormonal, vascular, nervous, muscular, connective, and immune systems. Three major dimensions of female sexuality, i.e. sexual identity and function, as well as sexual relationships, interact to ensure women's sexual health. Recent studies have shown that female sexuality varies over the life cycles and depends on biological (including hormonal), personal, contextual, and relationship factors [1-3].

Polycystic ovary syndrome (PCOS) is characterized by a variety of hormonal and body changes, including obesity, hirsutism, acne, insulin resistance, hyperinsulinemia, hyperprolactinemia, inadequate gonadotropin secretion, and hyperandrogenism [4, 5].

These alterations can affect the sexuality of women with PCOS. However, data on sexual function and the sexuality of women with PCOS are scant and contradictory. Although testosterone levels increase in PCOS, which would suggest a high libido, hyperandrogenism and hirsutism have been found to decrease sexual desire [6, 7]. Similar results were presented by Drosdzol et al., who observed a negative effect of hirsutism on general well-being and marital sexual life, and concluded that PCOS decreased the quality of life and marital sexual functioning of the affected women [8]. Hahn et al., used the visual analogue scale (VAS) to assess sexual satisfaction and showed that although patients with PCOS and healthy women had the same partner status and frequency of sexual intercourse, women with PCOS were significantly less satisfied with their sex life and found themselves less attractive than their healthy peers [9, 10].

In contrast, the same authors published a paper in which they reported no clear effect of androgens on sexual satisfaction, whereas changes in physical appearance, particularly obesity and excessive body hair, but not acne, were the most important determinants of psychological problems associated with PCOS [11].

Although the diagnosis of PCOS may have a negative impact on sexual self-worth and sexual satisfaction, the correlation between hormonal/body changes and psychological stress or sexual life seems to be weak and might decrease if pertinent information is provided to the patient and proper treatment options are used [12]. Furthermore, a recent study has demonstrated sexual function to be similar between women with PCOS and healthy controls, except with respect to orgasms/completion – PCOS women were more likely to report problems in this area [13]. Further research is necessary to evaluate the sexuality and sexual function of women with PCOS. However, current data indicate that women with PCOS feel stigmatized due to the sense of losing 'feminine identity' resulting from masculine appearance and infertility [12]. Therefore, they require psychological additional support and an interdisciplinary approach to the treatment.

Owing to the fact that little is known about the effect of PCOS on sexual function, we assessed different aspects of sexuality by using sophisticated and validated instruments. The purpose of our study was not to evaluate the prevalence of sexual dysfunction but rather to determine the characteristics of sexual function, sexual response and attitude toward sexuality in women with PCOS.

## Objectives

The study aimed to compare women diagnosed with PCOS and healthy controls with respect to sexual function, sexual response, attitude toward sexuality, and relationships with sexual partners.

## Materials and methods

### *Study population and recruitment*

In total, 178 women were enrolled in this cross-sectional study, conducted between March 2009 and September 2009. The study was approved by the Bioethical Committee of the Medical University of Silesia (approval no.: L. dz. NN-6501-192/4; September 29, 2004). All participants signed an informed consent for the study.

The investigated group initially consisted of 128 women, aged 23–42 years, diagnosed with PCOS using the Rotterdam criteria [10]. Patients were recruited and selected from among women who were diagnosed and hospitalized at the Department of Gynecologic Endocrinology, Medical University of Silesia. The inclusion criteria were as follows: diagnosis of PCOS according to the Rotterdam criteria, age of 23–42 years, absence of psychological disorders (based on the score  $>32$  on the General Health Questionnaire 12 [GHQ12]), and consent for participation. Patients receiving drugs that affect the libido (sedatives, psychoactive drugs, contraceptives, and antihistamines) or after major gynecological operations (hysterectomy, oophorectomy, or mastectomy) were excluded from the study ( $n = 28$ ). Eleven patients refused to participate in the study. Women who scored  $>32$  points in GHQ12 were also excluded as such a result suggests a need for further diagnosis of the existing psychological disturbances and the presence of psychological disorders could confound the results of the study. Finally, 73 women with PCOS were included in the study group.

The control group consisted of 50 healthy women, matched by sociodemographic profiles, who did not meet the criteria for PCOS and were recruited from gynecological outpatient clinics of the Women's Health Diagnostic Center in Katowice, Poland, at the time of their yearly routine gynecological check-up. The following exclusion criteria were applied: history of psychological disorders or current psychiatric disorders (based on a GHQ12 score  $>32$ ), age  $<23$  or  $>42$  years, severe somatic diseases, thyroid dysfunction, diabetes mellitus, liver dysfunction, history of major gynecological operations (hysterectomy, oophorectomy, or mastectomy), use of medications affecting sexual function (antipsychotics, antihypertensives, antidepressants, antihistamines, benzodiazepines, or oral contraceptives), pregnancy or within 3 months postpartum, and lack of sexual initiation (defined as the first engagement in an anal or vaginal sexual intercourse in an individual's life). Five women failed to complete the questionnaire reliably and were excluded from the study. Finally, 45 healthy women were included in the control group.

## Methods

All participants completed a 102-item questionnaire, designed especially for the purpose of the study, assessing socio-epidemiological parameters and sexual behavior, including age at first sexual intercourse, total number of sexual partners, a regular partner, sexual activity over the 4 weeks before the study, sexual orientation, and types of sexual activities performed. Validated instruments were used to assess hirsutism (Ferriman-Gallwey Scale), mental health status (GHQ 12), sexuality (Sexuality Scale [SS], Sexual Awareness Questionnaire [SAQ], Multidimensional Sexuality Questionnaire [MSQ], and Multidimensional Sexual Self-Concept Questionnaire [MSSCQ]), and sexual function (Polish version of the Mell-Krat Scale [SFK/K Scale]).

## Instruments

The Ferriman-Gallwey scale was used for evaluating and quantifying hirsutism in the following 9 locations: the upper lip, chin, breast, upper back, lower back, upper abdomen, lower abdomen, upper arms, and thighs [14], with the score  $<7$  as 'normal', 8–14 as 'moderate', and 14–36 as 'severe' hirsutism [14,15].

The GHQ 12 was used to assess adult mental health status and to identify those with mental state collapse as a consequence of difficulties, problems, or mental illness, as well as those at risk of developing psychiatric disorders. A score  $>32$  indicates that additional diagnostic procedures are necessary to confirm or

exclude the presence of psychiatric disorders [16]. The procedure consists of answering 12 questions using a 4-point scale. A modified version of the questionnaire, which has a number of satisfactory psychometric properties, was developed at the Center of Occupational Psychology of the Institute of Occupational Medicine in Lodz [16].

The SFK/K Scale was used to evaluate sexual reactions and needs. The questionnaire consists of 20 items, scored from 0 to 4. The minimal and maximal total scores are 0 and 80, respectively, with higher scores corresponding to better sexual function. A score  $>55$  is perceived as 'optimal'. The scale has satisfactory reliability with Cronbach's  $\alpha = 0.69$  [17, 18].

The SS is an objective self-report instrument designed to measure three aspects of human sexuality: sexual esteem – defined as positive regard for and confidence in the capacity to experience one's sexuality in a satisfying and enjoyable way; sexual depression – defined by feelings of sadness, unhappiness, and depression regarding one's sex life; and sexual preoccupation – defined as the tendency to think about sex to an excessive degree. The questionnaire consists of 30 items arranged in a format that allows respondents to indicate how much they agree (or disagree) with that statement. A 5-point Likert scale is used and responses are scored from 0 (agree) to 4 (disagree). Higher positive scores indicate greater agreement with the statements, whereas more negative scores indicate greater disagreement with the statements. The scale shows satisfactory reliability with Cronbach's  $\alpha = 0.88$ – $0.91$  for women's samples [19–21].

The SAQ is an objective self-report questionnaire, consisting of 36 items, designed to measure personality tendencies associated with sexual awareness and sexual assertiveness. Higher scores correspond to greater amounts of the relevant tendency. This scale and all its subscales have been shown to have acceptable reliability with Cronbach's  $\alpha = 0.83$ – $0.92$  for women's samples [21, 22].

The MSQ is an objective self-report instrument designed to measure twelve aspects of human sexuality. The questionnaire consists of 60 items scored using a 5-point Likert scale. Higher scores in the MSQ correspond to a greater degree of the relevant tendency. The MSQ has been demonstrated to have acceptable reliability with Cronbach's  $\alpha = 0.71$ – $0.94$  for women's samples [21, 23].

The MSSCQ is an objective self-report instrument designed to measure twenty psychological aspects of human sexuality. The questionnaire consists of 100 items scored using a 5-point Likert scale. The Cronbach's  $\alpha$  for the 20 subscales ranges from 0.72 to 0.94, indicating adequate internal consistency [21, 24].

All instruments have been validated for use in the Polish population.

## Demographic and sexual activity measurements

Body mass index (BMI) ( $\text{kg}/\text{m}^2$ ) was calculated in terms of body mass/height<sup>2</sup>. Sexual activity was defined as any of the following: caressing, foreplay, masturbation, vaginal or anal intercourse, or oral sex. Sexual function was defined as the constellation of mental aspects of sexuality, both objective and subjective, including sexual arousal, sexual desire, orgasms, satisfaction, and sexual fantasies [1–3].

Attitude toward sexuality and relationship with a sexual partner may vary in different age groups. Recent studies have revealed that women under 30 years of age are mainly concentrated on their own sexual needs whereas women over 30 are more concentrated on the family and motherhood [25].

**Table I.** General characteristic of the studied population – sociodemographic and sexuality-related factors.

Variable	PCOS 1 (n=51)	Controls 1 (n=15)	p*	PCOS 2 (n=22)	Controls 2 (n=30)	p*
Age - years (mean, SD, range)	26.2±2.3 (23-30)	25.5±1.9 (23-29)	NS	36.8±3.3 (31-42)	36.7±2.8 (32-42)	NS
BMI (mean, SD, range)	24.2±5.6 (15.8-44.6)	21.6±3.9 (16.4-33.9)	NS	26.1±5.6 (19.6-38.1)	24.0±4.1 (18.5-38.9)	NS
F-G scale (mean, SD, range)	6.7±6.2 (0-20)	4.7±4.3 (0-12)	0.01	7.5±7.0 (0-20)	3.3±3.9 (0-13)	0.001
GHQ-12 (mean, SD, range)	14.6±6.8 (0-32)	13.4±6.5 (4-25)	NS	15.5±8.0 (6-35)	12.4±5.9 (0-24)	NS
<b>Marital status (N,%)</b>						
Married/Partnership	23 (45.1)	5 (33.3)	NS	16 (72.7)	19 (63.3)	NS
Single	27 (52.9)	10 (66.7)	NS	6 (27.3)	11 (36.7)	NS
<b>Education (N,%)</b>						
Primary	3 (5.9)	0 (0.0)	NS	2 (9.1)	0 (0.0)	NS
Secondary	20 (39.2)	5(33.3)	NS	7 (31.8)	14 (46.7)	NS
Tertiary	28 (54.9)	10 (66.7)	NS	13 (59.1)	16 (53.3)	NS
Age at first intercourse – years (mean, SD, range)	18.9±18 (15-21)	18.6±1.6 (16-21)	NS	19.4±1.8 (15-21)	19.4±1.4 (17-21)	NS
Sexually active during the last 4 weeks † (N,%)	46 (90.2)	14 (93.3)	NS	20 (90.9)	28 (93.3)	NS
No. of sexual partners in their lifetime (median, upper/lower quartile)	1.0 (1.0-3.0)	2.0 (1.0-4.0)	NS	2.0 (1.0-4.0)	2.0 (1.0-4.0)	NS
Having a regular sexual partner (N,%)	36 (70.6)	12 (80.0)	NS	17 (77.7)	24 (80.0)	NS
<b>Type of performed sexual activity (N,%)</b>						
Penile-vaginal	43 (93.5)	13 (92.8)	NS	19 (86.4)	27(93.1)	NS
Oral	26 (56.9)	10 (73.3)	0.01	10 (50.0)	12 (41.4)	NS
Anal	4 (8.7)	1 (7.1)	NS	0 (0.0)	1 (3,4)	NS
Masturbation	20 (43.5)	4 (28.6)	0.02	7 (35.0)	12 (41.4)	NS

\*  $\chi^2$  test/Fisher's exact test for the qualitative variables; Mann-Whitney U test for the quantitative variables

† Sexual activity defined as any of the following: caressing, foreplay, masturbation and vaginal intercourse; F-G scale – Ferriman-Gallwey scale; SD – standard deviation

Therefore, PCOS patients and controls were subdivided into 2 age-dependent groups, PCOS 1 (23–30 years) and PCOS 2 (31–42 years), controls 1 (23–30 years) and controls 2 (31–42 years).

### Statistical analysis

The obtained results were analyzed statistically with Statistica 8.0 (Stat-Soft, Krakow, Poland). Despite normal distribution of the sample population, nonparametric Mann–Whitney U-test was used for the analysis of quantitative variables due to lack of homogeneity of variance. The following tests were used for the qualitative variables: chi-square, and Fisher's exact test (for the sample size less than or equal to 20). The accepted level of confidence was <0.05.

### Results

Mean age of the participants was 27.6±6.3 and 33.0±5.9 years for PCOS subjects and controls, respectively. There were no statistically significant differences between the two groups with respect to socioeconomic variables and general health status. The Ferriman-Gallwey scores were statistically significantly higher in women with PCOS than controls, in both age groups (Table I).

Sexual activity was important or extremely important to the majority of respondents in both, PCOS and control groups – no statistically important differences were observed. Same-sex sexual activity was reported by 9 women in the PCOS group and 4 in controls. There were no differences in the perception of own sexuality between PCOS and controls, except that women with PCOS rated themselves negatively as sexual partners more frequently than controls, but only in the subgroup of <30 years of age (Table II). An inverse correlation was also observed in women >30 years of age, but it did not reach statistical significance. Similarly, women <30 showed differences in types of sexual activities between the groups: patients with PCOS were more likely to engage in masturbation, whereas oral sex was more frequent in the control group. These differences were not observed in women >30 (Table II).

Mean scores for the subscales of the SS were similar between women with PCOS and controls, with the exception of (1) sexual depression in women <30 and (2) sexual preoccupation in women >30. In the former group, patients with PCOS had statistically higher levels of sexual depression, whereas in the latter group, PCOS patients had statistically higher levels of sexual preoccupation than age-matched controls (Table II).

**Table II.** Sexual functions, sexual response and attitude towards sexuality in the studied population.

Variable	PCOS 1 (n=51)	Controls 1 (n=15)	p*	PCOS 2 (n=22)	Controls 2 (n=30)	p*
SFK/K (mean, SD, range)	49.3±10.7 (20-76)	52.2±7.1 (37-61)	NS	50.2±11.8 (25-67)	50.6±8.3 (29-62)	NS
<b>Sexuality scale (mean, SD, range)</b>						
Sexual Esteem	32.8±7.1 (16-64)	36.1±5.1 (25-42)	NS	34.8±5.9 (19-45)	33.7±6.1 (18-45)	NS
Sexual Depression	18.4±6.2 (8-31)	14.0±4.9 (8-25)	0.02	17.2±6.5 (8-30)	16.3±6.4 (8-33)	NS
Sexual Preoccupation	26.9±5.5 (18-43)	29.4±5.1 (19-39)	NS	29.3±6.8 (14-40)	23.3±6.1 (16-40)	0,02
<b>Sexual Awareness Questionnaire (mean, SD, range)</b>						
sexual-consciousness	20.9±4.2 (12-29)	22.7±4.4 (14-28)	NS	20.2±5.3 (7-30)	21.5±3.8 (13-29)	NS
sexual-monitoring	22.3±3.4(16-32)	22.5±3.8 (14-28)	NS	22.9±1.9 (19-27)	21.1±3.4 (14-27)	NS
sexual-assertiveness	17.7±3.6(9-26)	19.3±4.5 (13-27)	NS	18.2±4.0 (10-26)	16.8±3.7 (10-25)	NS
sex-appeal-consciousness	8.8±3.2(3-15)	9.1±2.5 (4-13)	NS	8.9±3.1 (4-14)	9.6±3.3 (4-15)	NS
<b>Multidimensional Sexuality Questionnaire (mean, SD, range)</b>						
internal-sexual-control	17.7±3.3 (10-25)	18.6±3.6 (10-25)	NS	16.8±3.8 (9-22)	18.3±3.5 (12-25)	NS
sexual-motivation	17.4±3.9 (10-25)	18.4±3.3 (13-25)	NS	16.4±4.7 (9-24)	17.2±4.9 (6-25)	NS
sexual-assertiveness	10.9±4.1(5-22)	9.6±4.4 (5-19)	NS	10.9±4.3 (5-20)	10.1±3.8 (5-18)	NS
external-sexual-control	11.2±3.9 (5-23)	9.3±3.6 (5-16)	NS	11.6±4.7 (5-20)	10.0±3.9 (5-19)	NS
fear-of-sex	13.2±2.4 (8-18)	12.7±2.0 (10-16)	NS	13.6±2.5 (8-18)	13.8±3.3 (5-21)	NS
sexual-satisfaction	17.0±4.5 (7-15)	18.3±4.1 (11-23)	NS	16.7±4.9 (8-24)	17.8±4.8 (5-24)	NS
<b>Multidimensional Sexual Self-Concept Questionnaire (mean, SD, range)</b>						
sexual self-efficacy	16.8±4.0 (7-25)	18.3±4.1 (11-25)	NS	17.1±4.6 (9-25)	18.3±3.8 (9-25)	NS
motivation to avoid risky sex	19.9±3.3 (13-25)	21.4±4.2 (1- 25)	NS	19.5±5.1 (8-25)	20.9±4.2 (9-25)	NS
sexual-optimism	19.2±3.1 (12-26)	19.6±3.2 (14-23)	NS	19.3±3.7 (11-24)	19.3±2.9 (14-25)	NS
sexual problem self-blame	13.7±3.3 (8-21)	14.5±3.0 (9 -19)	NS	13.0±3.6 (7-19)	13.7±3.1 (7-18)	NS
sexual problem management	15.2±2.9 (8-22)	15.9±3.3 (10-22)	NS	15.5±3.8 (7-22)	16.3±4.2 (5-24)	NS
power-other sexual control	10.8±3.1 (5-21)	9.4±4.1 (5-20)	NS	9.9±4.3 (5-22)	9.3±4.3 (5-23)	NS
sexual self-schemata	16.8±4.0 (7-25)	18.3±4.5 (11-25)	NS	17.2±5.2 (8-25)	17.1±3.7 (11-25)	NS
sexual problem prevention	16.4±3.2(9-22)	17.1±2.6 (13-21)	NS	16.5±4.0 (9-21)	18.2±3.1 (11-24)	NS

\*  $\chi^2$  test/Fisher's exact test for the qualitative variables; Mann-Whitney U test for the quantitative variables; SFK/K – the Mell-Krat Scale; SD – standard deviation

Mean scores for SAQ subscales were similar between women with PCOS and controls, irrespective of age (Table II). However, the percentage of women <30 years of age who scored >50 points on the sexual-consciousness subscale of the SAQ was statistically higher in the PCOS group than in age-matched controls, whereas a similar dependency was observed in the sexual-assertiveness subscale among women >30.

Mean scores for the subscales of the MSQ were similar between women with PCOS and controls, irrespective of age (Table II). However, 68% of PCOS women aged >30 scored >85 points on the sexual motivation subscale as compared to 38% of controls.

Mean scores for the subscales of the MSSCQ were similar in women with PCOS and controls, irrespective of age (Table II). However, in the age group <30, the percentage of women who had lower than average scores for 'motivation to avoid risky sex' subscale of the MSSCQ and higher than average scores in 'power-other sexual control' subscale was higher in PCOS patients than age-matched controls.

## Discussion

The impact of PCOS on mental health and sexuality is a subject of much debate. Available studies have shown conflicting results, showing 'moderate effect' to 'no effect' of PCOS on sexual function [13]. Owing to the fact that sexuality is a complex phenomenon, a thorough analysis of different aspects of female sexuality is necessary to reach reliable conclusions. Our study may provide a small but important contribution to the current state of knowledge on the relationship between PCOS and sexuality.

Mean age at first sexual intercourse was 18.9±1.8 years and 19.4±1.4 years for PCOS patients aged <30 and >30, which is consistent with the findings of earlier studies [26]. A similar age range was reported by Izdebski in his study on sexual initiation in Poland (19.1 years for women) and Lew-Starowicz in the Vamea report, in which 50% of the women reported age at first intercourse between 17 and 19 years [27, 28].

Statistically significant differences in the type of sexual activities performed were found between women with PCOS and controls in the age group <30. However, there were no differences in the percentage of women engaging in penile-vaginal

intercourse (PVI). Since it is the PVI frequency, rather than other sexual activities, that is associated with sexual satisfaction, as described by Brody et al. [29, 30], this result suggests that PCOS *per se* has little impact on sexual function.

The results of our study showed that the role of sexual activity is very important and is similar between women with PCOS and their healthy counterparts. In addition, there were no significant differences between the two groups with regard to the number of sexual partners or sexual activity. Elsenbruch et al., and Hahn et al., reported similar observations [9, 10]. However, mean scores on the sexual preoccupation subscales of the SS were statistically significantly higher for women with PCOS aged >30 than controls. Snell et al., reported that high scores in sexual preoccupation indicate that a person is preoccupied with sex due to lack of sexual activity [19, 20].

Therefore, our results suggest that women with PCOS are highly motivated toward sexual activity and are able to manifest their needs. These results are correlated with high scores on the sexual-assertiveness subscale of the SAQ: women with PCOS and >30 years of age scored >50 points more frequently than controls, indicating that they could talk about their expectations toward their partners and desire sexual satisfaction. Furthermore, 68% of PCOS women aged >30 scored >85 points on the sexual motivation subscale of the MSQ, which confirms previous observations. In the absence of earlier studies on this topic, we can only hypothesize that women with PCOS and >30 years of age are motivated by an increased sexual need and seek sexual fulfillment to compensate for their low self-perception as sexual partners. In the age group <30, the percentage of women who had lower than average scores on the 'motivation to avoid risky sex' subscale of the MSSCQ and higher scores on the 'power-other sexual control' subscale was higher among PCOS patients as compared to age-matched controls. Additionally, mean scores on the sexual depression scale were higher in the PCOS group, indicating a greater degree of sexual depression, lack of self-confidence, and anxiety [19, 20]. Research conducted by Bobrowski et al. [31], showed that risky sexual behaviors are associated with psychological stress, high levels of anxiety, and depression, which are frequently present in patients with PCOS [9, 12, 32-36]. Therefore, young women with PCOS are willing to engage in risky sexual behaviors because they feel less sexually attractive, have fewer opportunities for sexual activity, and experience higher stress caused by PCOS-related body composition.

The assessment of sexuality by the SFK/K scale did not reveal statistically significant differences between women with PCOS and healthy controls with respect to the level of desire, sexual reactions, and the frequency of sexual activity. Similar results have been reported in previous studies. In one of the first studies on PCOS, Raboch et al., compared 50 women with PCOS and 50 healthy controls and found no differences in sexual function [6]. Elsenbruch et al., observed that frequency of sexual intercourse or sexual thoughts and fantasies during the month before the study was similar between women with PCOS and healthy controls [10]. Similarly, Hahn et al., assessed sexual function in 120 women with PCOS and found no differences in the frequency of sexual intercourse [9].

The prevalence of sexual dysfunction among women with PCOS varies between 15% and 39% [8]. In our study, although the prevalence of sexual dysfunction was not determined, no statistically significant differences were detected between PCOS women and healthy controls, irrespective of the age group, with respect to the mean scores on the SFK/K scale.

The percentage of women engaging in same-sex sexual activities was higher in women with PCOS than controls but the difference was not statistically significant. In their paper assessing sexual orientation in women with PCOS, Agraval et al., concluded that PCOS occurs more frequently among lesbian than heterosexual women [37]. However, their findings have not been replicated and were not confirmed by our study.

The influence of testosterone level on sexual function in women with PCOS is unclear. Although large cross-sectional and longitudinal studies and reports of Hahn et al., did not detect a correlation between testosterone and sexual function [11, 38], other authors reported different findings. The results of a recent study by Stoval et al., who assessed sexual function in 92 women with PCOS using the Changes in Sexual Functioning Questionnaire (CSFQ), are contradictory. These authors correlated testosterone levels with CSFQ subscale scores and reported that women with PCOS and the lowest total serum testosterone levels tend to have the lowest sexual function scores, whereas those with high levels had greater desire. Furthermore, a pathologic condition known as hyperandrogenemia was positively associated with better sexual functioning, as seen in the total score and the scores for many of the subscales of the CSFQ. However, elevated serum testosterone levels in women with PCOS are associated with increased cholesterol levels and a higher incidence of cardiovascular diseases, which may result in deterioration of the general health, thus negatively influencing sexual function. A slightly different conclusion was drawn in case of PCOS women with a normal serum testosterone range, as this group was found to be at risk of sexual dysfunction [13]. In a study by Congalen and Condalen, sexual desire levels in hirsute women who had PCOS and underwent anti-androgen therapy decreased progressively, while their self-esteem increased [7]. Similarly, Graziottin et al., and Redmonda suggested a correlation between administration of exogenous testosterone and decreased desire [39, 40]. However, it should be noted that exogenous testosterone might work differently from endogenous hyperandrogenemia. In the latter, high levels of testosterone or other androgens might not influence sexuality directly but may act by affecting the physical appearance and cause hirsutism and acne. This might be aggravated by concomitant obesity in women with PCOS.

Although our study did not assess the level of serum testosterone, clinical symptoms of hyperandrogenism were carefully evaluated. The results showed that women with PCOS had higher scores on the Ferriman-Gallwey scale than controls, whereas no differences were noted in BMI. The correlation between changes in the physical appearance, particularly obesity and excessive body hair (but not acne), and psychological problems in PCOS has been previously described by Hahn et al. [11]. Dorszol et al., examined 100 women with PCOS and concluded that hirsutism is associated with decreased quality of life and marital sexual satisfaction as measured by the Index of Sexual Satisfaction [8]. Elsenbruch et al., reported that PCOS women felt that their partners were significantly less satisfied with their sex life and found them significantly less sexually attractive. Also, study participants believed that excessive body hair negatively affected their sexuality and ability to form social contacts [10]. Similarly, Stovall et al., observed a high percentage of obese women who had PCOS and scored below the cutoff for sexual dysfunction on the orgasm subscale of the CSFQ [13].

Although the sexuality of women with PCOS in our study was similar to that of healthy controls, certain age-specific differences were noted. The impact of PCOS on sexual esteem and

satisfaction was found to result in the deterioration of the intimate relationship with a partner in the age group >30 and an increased tendency to engage in risky sexual behaviors in the age group <30. Our results suggest that the approach used for all women with PCOS should be holistic and should include a hormonal profile and hirsutism assessment. Appropriate treatment options should be combined with referral to a sexual medicine specialist to improve the overall quality of life and sexual well-being.

## Conclusions

Sexual function, sexual response, attitude toward sexuality and relationships with sexual partners are similar in women with PCOS and their healthy counterparts. However, PCOS-related changes in the physical appearance can result in deterioration of the sexual function. Women with PCOS and aged <30 years have lower sexual self-esteem, lower motivation to avoid risky sexual behaviors, and have a strong feeling that the sexual aspects of their lives are controlled by others, who are more powerful and influential, as compared to their healthy peers.

Women with PCOS and aged >30 years have a higher level of sexual assertiveness, higher level of sexual depression, and a greater tendency to think about sex to an excessive degree as compared to healthy women.

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## References

1. Graziottin A, Dennerstein L, Alexander JL, [et al.]. Classification, etiology and key issues in female sexual disorders. In: Standard practice in sexual medicine. Ed. Porst H, Buvat J. Blackwell Publishing. 2006, 305-314.
2. Basson R, Leiblum S, Brotto L, [et al.]. Revised definitions of women's sexual dysfunction. *J Sex Med.* 2004, 1 (1), 40-48.
3. DeLamater J, Karraker A. Sexual functioning in older adults. *Curr Psychiatry Rep.* 2009, 11 (1), 6-11.
4. Kocelak P, Chudek J, Naworska B, [et al.]. Psychological disturbances and quality of life in obese and infertile women and men. *Int J Endocrinol.* 2012, 2012, 236217.
5. Drosdzol A, Sidlo-Stawowy A, Sajdak D, Skrzypulec-Plinta V. Diagnosing polycystic ovary syndrome in adolescent girls. *Ginekol Pol.* 2014, 85 (2), 145-148.
6. Raboch J, Kobilkova J, Raboch J, Starka L. Sexual live women with Stein-Leventhal Syndrome. *Arch Sex Behav.* 1985, 14 (3), 263-270.
7. Conaglen HM, Conaglen JV. Sexual desire in women presenting for anti-androgen therapy. *J Sex Marital Ther.* 2003, 29 (4), 255-267.
8. Drosdzol A, Skrzypulec V, Mazur B, Pawlińska-Chmara R. Quality of life and marital sexual satisfaction in women with polycystic ovary syndrome. *Folia Histochem Cytobiol.* 2007, 45 (1), 93-97.
9. Hahn S, Janssen OE, Tan S, [et al.]. Clinical and psychological correlates of quality-of-life in polycystic ovary syndrome. *Eur J Endocrinol.* 2005, 153 (6), 853-860.
10. Elsenbruch S, Hahn S, Kowalsky D, [et al.]. Quality of life, psychosocial well-being, and sexual satisfaction in women with polycystic ovary syndrome. *J Clin Endocrinol Metab.* 2003, 88 (12), 5801-5807.
11. Hahn S, Elsenbruch S, Balamitsa E, [et al.]. Impact of clinical and biochemical parameters on quality of life and sexuality in PCOS. *Exp Clin Endocrinol Diabetes.* 2005, 113.
12. Janssen OE, Hahn S, Tan S, [et al.]. Mood and Sexual Function in Polycystic Ovary Syndrome. *Semin Reprod Med.* 200, 26, 45-52.
13. Stovall DW, Scriver JL, Clayton AH, [et al.]. Sexual function in women with polycystic ovary syndrome. *J Sex Med.* 2012, 9 (1), 224-230.
14. Consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group Revised 2003. *Fertil Steril.* 2004, 81, 19-25.
15. Ferriman DM, Gallwey JD. Clinical assessment of body hair growth in women. *J Clin Endocrinol.* 1961, 2, 1440-1447.
16. Banaszewska B, Pawelczyk L. Polycystic ovary syndrome. In: Infertility and assisted reproduction. Ed. Radwan J. Poznań: *Termedia.* 2005, 63-71.
17. Lew-Starowicz Z. Metodologia pracy biegłego sądowego W: Seksuologia sądowa. Red. Lew-Starowicz Z. Warszawa: *Wydawnictwo Lekarskie PZWL.* 2000, 380-385.
18. Skrzypulec V, Drosdzol A. Evaluation of the quality of life and sexual functioning of women using a 30-microg ethinylestradiol and 3-mg drospirenone combined oral contraceptive. *Eur J Contracept Reprod Health Care.* 2008, 13 (1), 49-57.
19. Snell WE Jr, Fisher TD, Schuh T. Reliability and validity of the Sexuality Scale: A measure of sexual-esteem, sexual-depression, and sexual-preoccupation. *J Sex Res.* 1992, 29, 261-275.
20. Snell WE Jr, Papini D. The Sexuality Scale (SS): An instrument to measure sexual-esteem, sexual-depression, and sexual-preoccupation. *J Sex Res.* 1989, 26, 256-263.
21. Janda L. Twój miłosny autoportret. W: 24 testy psychologiczne dotyczące miłości, seksu i związków. Warszawa: Jacek Santorski & Co Agencja Wydawnicza. 2002, 101-126.
22. Snell WE Jr, Fisher TD, Miller RS. Development of the Sexual Awareness Questionnaire: Components, reliability, and validity. *Ann Sex Res.* 1991, 4, 65-92.
23. Snell WE Jr, Fisher TD, Walters AS. The Multidimensional Sexuality Questionnaire: An objective self-report measure of psychological tendencies associated with human sexuality. *Ann Sex Res.* 1993, 6, 27-55.
24. Snell WE Jr. The Multidimensional Sexual Self-Concept Questionnaire. In *Sexuality-related measures: A compendium* (2nd ed.). Eds. Davis C M, Yarber W, Baureman LR, [et al.]. Thousand Oaks, CA, 1998, Sage.
25. Bamard L, Ferriday D, Guenther N, [et al.]. Quality of life and psychological well being in polycystic ovary syndrome. *Hum Reprod.* 2007, 22 (8), 2279-2286.
26. Nowosielski K, Sipiski A, Kuczerawy I, [et al.]. Tattoos, piercing, and sexual behaviors in young adults. *J Sex Med.*
27. Izdebski Z. Inicjacja seksualna po polsku – Raport z badań. Warszawa TNS OBOP 2002. <http://www.tns-global.pl/abin/r/1334/IP37-02.doc>.
28. Lew-Starowicz Z. Raport Vamea – Seksualność kobiet. Warszawa: RMC&KRC. 2005.
29. Brody S, Costa RM. Satisfaction (sexual, life, relationship, and mental health) is associated directly with penile-vaginal intercourse, but inversely with other sexual behavior frequencies. *J Sex Med.* 2009, 6, 1947-1954.
30. Brody S. The relative health benefits of different sexual activities. *J Sex Med.* 2010, 7, 1336-1361.
31. Bobrowski KJ, Czabala JC, Brykczyńska C. Zachowania ryzykowne jako wymiar oceny stanu zdrowia psychicznego młodzieży *Postępy Psych Neurol.* 2005, 14 (4), 285-292.
32. Ching HL, Burke V, Stuckey BG. Quality of life and psychological morbidity in women with polycystic ovary syndrome: body mass index, age and the provision of patient information are significant modifiers. *Clin Endocrinol (Oxf).* 2007, 66 (3), 373-379.
33. Yazici K, Baz K, Yazici AE, [et al.]. Disease-specific quality of life is associated with anxiety and depression in patients with acne. *J Eur Acad Dermatol Venereol.* 2004, 18, 435-439.
34. Weiner CL, Primeau M, Ehrmann DA. Androgens and mood dysfunction in women: comparison of women with polycystic ovarian syndrome to healthy controls. *Psychosom Med.* 2004, 66, 356-362.
35. Benson S, Arck PC, Rifaie N, [et al.]. Obesity and altered stress responsiveness in women with polycystic ovary syndrome: Implications for the long-term cardiovascular and diabetes risks associated with the diagnosis? *Brain Behavior Immun.* 2006, 20 (3), 3-4.
36. Himelein MJ, Thatcher SS. Polycystic ovary syndrome and mental health: a review. *Obstet Gynecol Surv.* 2006, 61 (11), 723-732.
37. Agrawal R, Sharma S, Bekir J, [et al.]. Prevalence of polycystic ovaries and polycystic ovary syndrome in lesbian women compared with heterosexual women. *Fertil Steril.* 2004, 82 (5), 1352-1357.
38. Stuckey BGA. Female sexual function and dysfunction in the reproductive years: The influence of endogenous and exogenous sex hormones. *J Sex Med.* 2008, 5, 2282-2290.
39. Graziottin A, Giraldi A. Anatomy and physiology of women's sexual function. In: *Standard practice in sexual medicine.* Ed. Porst H, Buvat J. Oxford: Blackwell Publishing. 2006, 289-304.
40. Redmond G. Hormones and sexual function. *Int J Fertil Womens Med.* 1999, 44 (4), 193-197.