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Research Article

Sexual Function in Tunisian Women with Polycystic Ovary Syndrome

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Abstract

Sexual function depends on several hormonal, social and psychological factors. These factors may be altered in women with Polycystic Ovary Syndrome (PCOS).

Objectives: Our aim was to estimate the frequency of sexual dysfunction and depression in PCOS patients.

Study design: In this case-control trial, 60 married women diagnosed with PCOS were compared with 60 healthy women. Sexual function was assessed using the Female Sexual Function Index (FSFI) questionnaire. The risk of depression was evaluated using the Beck Depression Inventory (BDI).

Results: Sexual dysfunction was present in 88,3 % of patients with PCOS (Odds ratio = 12,18; (CI = 95%: 4.7-31.32)). Sexual function was impaired in women with PCOS especially in the domains of arousal, lubrification, satisfaction, pain and desire (total score: $P < 10^{-3}$; arousal: $P < 10^{-3}$; lubrification: P = 0.029; satisfaction: $P < 10^{-3}$; pain: P = 0,027 and desire: P = 0.024). There was no significant difference in the domain of orgasm in the two groups.

The comparison of BDI scores between the two groups showed that depression was more common in PCOS group (P = 0,002).

Conclusion: PCOS women considerably suffered from sexual dysfunction and depression.

Keywords: Polycystic Ovary Syndrome; Sexual Function; FSFI; Depression; BDI

Abbreviations

PCOS: Polycystic Ovary Syndrome; FSFI: Female Sexual Function Index; BDI: Beck Depression Inventory; GALNT2: N-AcetylGalactosaminylTransferase 2 Gene; FG: Ferriman-Gallwey; BMI: Body Mass Index; SPSS: Statistical Package for the Social Sciences; DHEAS: DeHydroEpiAndrosterone Sulfate.

Introduction

- About 4 to 20 % of women of reproductive age suffer from polycystic ovary syndrome [PCOS] [1].
- The pathophysiology of the syndrome is complex and mysterious. The excessive androgen production by the ovaries is now well recognized in its genesis [2]. It is also hypothesized that insulin resistance is a key factor. GALNT2 Gene Variant rs4846914 could play a role in insulin resistance in PCOS Patients [3].
- The diagnostic criteria for this syndrome are subject to discussion. The diagnostic criteria for PCOS should include two of the following three criteria: chronic anovulation, hyperandrogenism [clinical/biologic], and polycystic ovaries [4].
- Several data suggested that women with PCOS are at an increased risk for depression and anxiety disorders [5,6].
- The metabolic, cardiovascular and reproductive function affect is now established. However, the impact on sexual function is controversial.
- In women with PCOS, sexual function can be influenced by endocrine, mental and social factors. It is known that sexual function can be impaired by androgen levels [7,8], obesity [9], metabolic syndrome [10] and subfertility [11,12].
- A systematic review and meta-analysis concluded that women with PCOS suffered from sexual dysfunction and low self-confidence [13].

Materials and Methods

This case-control trial was conducted in 2019-2020 in Tunisia (University hospital of Kairouan, Monastir and Sousse). Our project was submitted and approved by the ethical committee of faculty of medicine of Sousse. Staff was screened for PCOS according to the international evidence-based guideline for the assessment and management of polycystic ovary syndrome 2018 [4]. Women with PCOS were recruited after free, informed and signed consent. A total of 60 married women with definite diagnosis of PCOS participated in this study. Our exclusion criteria were mainly pregnancy, breastfeeding, the presence of other co-morbidities (diabetes, hypertension, known and treated depression, autoimmune diseases...).

The control group was selected during a screening campaign for chronic diseases, breast cancer and cervical cancer. The protocol and the interest of the study were explained. After free, informed and signed consent, the women were screened for diabetes, hypertension and PCOS. Therefore, women with diabetes, hypertension, cycle disorder or pathologic Ferriman-Gallwey (FG) scoring system were excluded from the study. The control group consisted of 60 married healthy women matched with the PCOS group for age, duration of marriage and level of education.

Demographic, socioeconomic, anthropometric and gynecological history were noted in both groups.

In PCOS women the degree of hirsutism was assessed using the Ferriman-Gallwey (FG) scoring system. A score of 1 to 4 is given for nine areas of the body. A total score less than 8 is considered normal, a score of 8 to 15 indicates mild hirsutism, and a score greater than 15 indicates moderate or severe hirsutism. A measurement of serum prolactin and total testosterone levels was effected in this group. Hyperprolactinemia is defined by a prolactin level greater than 20 ng/ml. A total serum testosterone level greater than 0.7 ng/ml was considered pathological.

In both groups, sexual function was assessed using the Female Sexual Function Index (FSFI). FSFI is a self-administered questionnaire, composed of 19 items and developed to estimate sexual function in the last month. It explores 5 areas of sexual function in women including sexual desire, arousal, orgasm, pain and satisfaction [14,15]. The FSFI is translated into several languages, including Arabic, and it was used in several epidemiological studies [16,17].

The cut-off value for defining sexual dysfunction using FSFI could be at 25, 26 or 26.55. The most admitted in literature was 26.55 [15]. We used the Arabic validated version of FSFI questionnaire [18] and we admitted 26.55 as cut-off in our study [15].

The depression was assessed using the Arabic validated version of Beck depression inventory (BDI). The BDI is a self-administered questionnaire made up of 21 items exploring the depressive symptoms, cognitions and physical signs linked to depression. We used the Arabic version of BDI-II validated by Ghareeb in 2000 [19]. The BDI scores vary from 0 to 63 depending on the severity of the depression: minimal for scores between 0 and 10, mild for scores between 10 and 20, moderate between 20 and 30 and severe for scores at over 30.

The main objective in our study was to compare sexual function and the risk of depression in the two groups. Additional outcomes of interest were to investigate sexual function of PCOS patients in relation to their age, BMI, degree of hirsutism, past obstetric history, the current treatment of PCOS, Testosterone and prolactin levels.

Statistical analysis

Data were processed by Statistical Package for the Social Sciences (SPSS) software version 25 (SPSS Inc. Chicago, IL, USA). Statistical comparisons were made between the group of women followed for PCOS and the control group. The statistical tests used were $\chi 2$ test for the comparison of categorical variables and Student t- test for the continuous variables (FSFI variable). The study of correlations and associations was made using the bivariate analysis of Pearson's correlations. In all statistical tests, P≤0.05 was considered significant.

Results

Both groups were matched for age, duration of marriage and level of education. Mean age of patients was 31,17 ± 6,61 years ranging from 20 to 45.

PCOS women had higher BMI ($p < 0.001$) than controls. Mean BMI was 27,73 ± 4,08 kg/m^2 ranging from 22.46 to 41.14 kg/m^2. Only 23,33% of women followed for PCOS had a normal BMI versus 63,33% in the control group ($p < 10^{-3}$).

Total testosterone level was pathological in 43,33% of PCOS women with a mean value of 0,89 ± 0,08 ng/ml. Hyperprolactinemia was found in 15% of cases. The mean prolactin value was 23,20 ± 4,8 ng/ml.

A fertility problem (defined by the absence of pregnancy after more than 12 months of regular sex without contraception) was found in 31,67% in PCOS group versus only in 5 % in the control ($p < 10^{-3}$). When it was used, the first attempt of assisted reproduction was successful in 100% of women without PCOS versus in only 52,94% of cases in the PCOS group (p = 0.001).

Depression was more common in the PCOS group (P = 0,002). Depression was minimal in 33,33% of cases, mild in 51,67%, moderate in 11,67% and severe in 3,33%. In control group, only 33,33% had mild depression and no case of moderate or severe depression was noted (Table 1).

Beck Depression Inventory	PCOS (n = 60)	Control (n = 60)	P
Mean ± SD	12 ,73 ± 6,53	7,55 ± 4,89	0,002
Minimal depression	33,33%	66,67%	
Mild depression	51,67%	33,33%	
Moderate depression	11,67%	0%	
Severe depression	3,33%	0%	

Table 1: Comparaison of Beck Depression Inventory in women with PCOS and in control subjects.

Sexual dysfunction was present in 88,3 % of patients with PCOS (Odds ratio= 12,18; (CI= 95%: 4.7-31.32)). Sexual function was impaired in women with PCOS especially in the domains of arousal, lubrification, satisfaction, pain and desire (total score: $P < 10^{-3}$; arousal: $P < 10^{-3}$; lubrification: P = 0.029; satisfaction: $P < 10^{-3}$; pain: P = 0,027 and desire: P = 0.024). There was no significant difference in the domain of orgasm in the two groups (Table 2-3).

	Sexual dysfonction		Odds ratio
	Present	Absent	
PCOS (n = 60)	88,33% (53/60)	11,67% (7/60)	12,18 [CI= 95% : 4.7-31.32]
Control (n = 60)	38,33% (23/60)	61,67% (37/60)	

Table 2: Sexual dysfunction in the two groups

	Group	N	MEAN ± SD	P
FSFI total score	PCOS	60	23,48 ± 2,92	$<10^{-3}$
	Control	60	27,09 ± 2,62	
Desire	PCOS	60	4,08 ± 0,85	0.024
	Control	60	4,41 ± 0,77	
Arousal	PCOS	60	3,58 ± 0,64	$< 10^{-3}$
	Control	60	4,57 ± 0,57	
Lubrification	PCOS	60	3,82 ± 0,79	0.029
	Control	60	4,26 ± 0,62	
Orgasm	PCOS	60	4,02 ± 0,79	0.11
	Control	60	4,23 ± 0,66	
Pain	PCOS	60	4,10 ± 0,83	0.027
	Control	60	4,64 ± 0,70	
Satisfaction	PCOS	60	3,89 ± 0,83	$<10^{-3}$
	Control	60	4,98 ± 0,78	

Table 3: Comparaison of FSFI in women with PCOS and in control subjects.

The next step was to study the correlations between sexual function in PCOS group with their ages, BMI, past obstetric history, degree of hirsutism, testosterone and prolactin levels. Theses correlations were carried out after controlling for depression score.

Age was in negative correlation with total FSFI and the domain of orgasm. Waist circumference was associated with impairment of all domains of sexuality. The Ferriman Gallwey scoring was in negative correlation with FSFI total score and most of its domains except for orgasm and desire. Fertility problem was negatively correlated with the domains of lubrification, satisfaction and pain (Table 4).

FSFI total score and the domains of lubrification, satisfaction and pain were related to the total testosterone level. Total FSFI score, the domains of desire, arousal, and pain were also related to prolactin level (Table 5).

FSFI domains	Age	BMI	Waist circumference	Ferriman Gallwey scoring	Fertility problem
Desire	NS	r = -0,33 $p < 10^{-3}$	r = -0,185 p = 0,045	NS	NS
Arousal	NS	r = -0,365 $p < 10^{-3}$	r = -0,358 p = 0,016	r = -0,476 $p < 10^{-3}$	NS
Lubrification	NS	NS	r = -0,306 p = 0,001	r = -0,327 $p < 10^{-3}$	r = -0,186 p = 0,044
Orgasm	r = -0,193 p = 0,036	NS	r = -0,169 p = 0,035	NS	NS
Satisfaction	NS	NS	r = -0,179 p = 0,027	r = -0,242 p = 0,004	r = -0,182 p = 0,025
Pain	NS	NS	r = -0,312 p =0,001	r = -0,274 p = 0,003	r = -0,204 p = 0,027
Total FSFI	r = -0,203 p = 0,027	r = -0,282 p = 0,002	r = -0,324 $p < 10^{-3}$	r = -0,324 $p < 10^{-3}$	NS

Table 4: Correlation between sexual function and clinical data in PCOS group.

26 women with PCOS were treated with metformin versus 21 women treated with oral combined contraceptive. A comparison between the two treatments showed that the total FSFI score as well as the areas of lubrification, satisfaction, pain and orgasm were significantly better in the metformin-treated group (total score: $P < 10^{-3}$; lubrification: P = 0.016; satisfaction: P = 0.032; pain: $P < 10^{-3}$; orgasm: P = 0.033).

Discussion

In our trial, sexual dysfunction was more prevalent in women with PCOS compared with control group. The domains of sexuality including desire, arousal, lubrification, satisfaction and pain were significantly compromised. Data on sexual function in women with PCOS are limited. A systematic review on PCOS and sexual function concluded that sexual function in PCOS was altered compared with control group particularly in the domains of arousal, satisfaction, orgasm and lubrification [13].

	Total Testosterone (ng/ml)	Prolactin level (mU/L)
Desire	NS	r = -0,226 p = 0,014
Arousal	NS	r = -0,328 $p < 10^{-3}$
Lubrification	r = -0,272 $p < 10^{-3}$	NS
Orgasm	NS	NS
Satisfaction	r = -0,274 p = 0,003	NS
Pain	r = -0,210 p = 0,022	r = -0,213 p = 0,020
Total FSFI	r = -0,365 p = 0,032	r = -0,267 p = 0,027

Table 5: Correlation between sexual function and biological data in PCOS group.

Role of androgen

This impairment of sexual function observed in PCOS could be explained in part by the state of hyperandrogenism. In fact, FSFI total score and the domains of lubrification, satisfaction and pain were related in our study to Ferriman-Gallwey (FG) scoring and total testosterone level. In literature, unconscious aspect of sexuality could be correlated with free testosterone ($\rho = 0.24$, $P = 0.03$) and DHEAS ($\rho = 0.31$, $P = 0.004$) in the PCOS group [5].

But according to other studies, the role of androgens may not be determinative of sexual function. Hormonal treatment could normalize the level of testosterone despite deterioration in sexual function [20-23]. It may be that it is not the absolute value of testosterone that counts the most but rather a whole hormonal balance combining estradiol, testosterone, progesterone [24].

Role of prolactin

Our study suggest a role of prolactin in sexual dysfunction in women with PCOS especially in the domains of desire, arousal, and pain. Prolactin seems to be involed in the central control of sexual behavior and activity, by modulating mainly the effects of dopaminergic and serotoninergic systems on sexual function [25]. In our study, Hyperprolactinemia was found in 15% of women with PCOS. A possibly common hypothalamic-pituitary abnormality could explain the link between hyperprolactinemia and PCOS. Some studies suggested a synchronisation between prolactin and LH pulsatility [26-29].

It is currently knowon that Short-term or long-term PRL increase can modulate the sexual response of genitalia in women [25].

Role of obesity

Sexual functions, as well as its all domains, were related to waist circumference. Indeed, several studies have suggested the role of obesity in sexual dysfunction [30,31].

The role of obesity in sexual dysfunction could be multifactorial: organic (frequency of prolapse, urinary incontinence…) psychiatric (altered self-image) and probably biological (neuropeptide Y?).

The treatment of obesity could have a beneficial effect on sexual function [32]. A role of bariatric surgery on the sexuality of women with morbid obesity was demonstrated in patients who were able to achieve a BMI decrease of more than 13 kg/m^2.

Impact of fertility problem

In our study, PCOS women with difficulties conceiving had more sexual dysfunction than PCOS women without fertility problem. This impairment concerns especially the domains of lubrification, satisfaction and pain. It may be related to the loss of spontaneity associated with the strategies the couple put in place to maximize the chance of conception. The link between infertility and sexual dysfunction was the subject of several studies. Infertility and its treatment approaches could alter sexual function [6,33-35]. However, in a cross sectional study, no relation was demonstrated between sexual function and fertility problem [36].

Effect of treatment interventions

Total FSFI score as well as the domains of lubrification, satisfaction, pain and orgasm were significantly better in the metformin-treated PCOS women compared with oral combined contraceptive treated patients. In fact, metformin improves biochemical, clinical and reproductive parameters in PCOS women. Therfore, it seems not surprising to observe a beneficial role of metformin on sexual function.

An observational study had analysed the effects of metformin treatment on health-related quality-of-life, emotional well-being and sexuality in PCOS. According to this study, PCOS women were significantly more satisfied with their sex life and reported higher frequencies of sexual intercourse following treatment [37].

Another study included 3 age- and weight-matched groups of premenopausal women: individuals with type 2 diabetes, women with prediabetes and healthy controls had studied the effect of metformin on sexual function. The conclusion was that Metformin treatment not only normalized sexual desire and sexual satisfaction in both studied groups, but also normalized or improved the remaining domains of FSFI in patients with diabetes [38].

Therefore, it seems that this improvement of sexual function by metformin involves enhancement of insulin sensitivity.

The risk of depression

PCOS patients in our study were more depressed than control women. In addition, depression in PCOS group was more severe. The link between depression and PCOS could be explained by several factors: altered self-concept by hyperandrogenism and obesity, fertility problem and failure of assisted reproductive technology.

Several recent studies suggest a link between PCOS and depression [5,6]. PCOS could be associated with impaired quality of life [40-43]. Therefore, the endocrine society clinical practice guideline for the diagnosis and treatment of polycystic ovary syndrome recommend screening for depression in PCOS women.

Conclusion

PCOS women suffer from sexual dysfunction and depression. Their Screening must become systematic. A personalized care including endocrinologist, sexologist, psychiatrist and gynecologist is required.

Disclosure

The authors report no conflict of interest.

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None to disclose for all authors

Compliance with Ethical Standards

Ethical Approval of the study was obtained from the ethical committee of faculty of medicine of Sousse.

Strengths of Our Study

Strengths include a case control trial with validated questionnaires, physical examination and biological findings.

Research Implications

Sexual dysfunction and depression might be considered as comorbidities in PCOS patients.

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